#### Helicobacter small RNA regulates host adaptation and carcinogenesis

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#### Abstract

Type-1 carcinogenic *Helicobacter pylori* that is known to evolve during longterm infection, enters the stomach orally and causes gastric cancer using the carcinogenic protein CagA<sup>1</sup>. However, little is known about the adaptation mechanisms of *H. pylori* when the environment changes from the outside to the inside of the living body. Here we show that small non-coding RNA HPnc4160 is a crucial novel RNA molecule of *H. pylori* that negatively regulates bacterial-host adaptation and gastric cancer. H. pylori isolated from gerbil's stomachs eight weeks post-infection acquired mutations in the increased number of T-repeats within the upstream region of the HPnc4160 coding region, which leads to reduced HPnc4160 expression levels that also seen in cancer patients-derived H. pylori. By comparing RNA-seq and iTRAQ analysis between wild-type and hpnc4160 deficient mutant strains, we identified eight targets of HPnc4160 including cagA and unknown factors. Mice infection experiment revealed that the *hpnc4160* deficient mutant had a higher number of colonized bacteria in the mice stomach than the wild-type strain, indicating that reduced expression levels of HPnc4160 was important for bacterial host adaptation. The expression level of HPnc4160 was lower in the clinical isolates derived from gastric cancer patients compared with noncancer-derived strains, while the mRNA expression levels of target factors were higher. Our findings highlight the first discovery that HPnc4160 is an important small RNA for bacteria to adapt to the host environment leading to gastric carcinogenesis.

#### Main

*Helicobacter pylori* infection has a very high prevalence that about half of the world population is infected. Patients infected with CagA-positive *H. pylori* closely related to disease malignancy have been reported to have an increased risk of peptic ulcer, chronic gastritis, intestinal metaplasia, and gastric cancer.<sup>2,3</sup> The highly pathogenic *H. pylori* possess a *cag* pathogenicity island that encodes components of a Type IV secretion system (TFSS), which is an injection needle, and a carcinogenic factor CagA effector protein. The *H. pylori* that has reached the gastric epithelium injects CagA protein, peptidoglycan, and heptose-1,7-bisphosphate into the attached cells via TFSS, and stimulates signal transduction pathways such as NF-κB to promote production of chemokines such as interleukin-8 (IL-8)<sup>4–11</sup>.

It is considered that the genetic diversity at the genomic level that is characteristic of *H. pylori* is very important to establish a persistent infection in an infected host with different backgrounds, adapting to a gastric niche with severe environmental changes<sup>12</sup>. The *H. pylori* gene mutations are characterized by the presence of simple repetitive sequences such as mononucleotide repeats (such as poly-T) and dinucleotide repeats (such as CT-repeats). From the analysis of clinical isolates of *H. pylori* so far, it is considered that phase variations are induced by ON / OFF control of gene expression of such as outer membrane proteins (OMPs) due to expansion and contraction of these simple repetitive sequences<sup>12–14</sup>. In the course of chronic infection, in order to escape from the host immunity, it is assumed that strong diversity in *H. pylori* OMPs that can serve as highly antigenic cell surface antigens will cause a strong directivity of selection<sup>15</sup>. Therefore, to understand the mechanism of persistent infection by *H. pylori*, we analyzed bacterial gene mutations acquired by *H. pylori* in the course of persistent infection using an

experimental animal infection system with the same host genetic background. With growing evidence that bacterial small RNA (sRNA)-mediated target gene expression in response to changes in the environment, we focused sRNAs as well<sup>16</sup>.

#### **Identification of HPnc4160**

To analyze the bacterial gene mutation acquired by *H. pylori* during the persistent infection, Mongolian gerbils (n=10) were inoculated with *H. pylori* ATCC 43504 wild-type strain for 8 wks. *H. pylori* in the infected stomachs were isolated (n=40; Fig. 1a), and analyzed comparative whole genome sequences (Fig. 1b, Supplementary Information 1, 2). We totaled genomic positions, where these mutations were introduced, for each coding and intergenic region, and identified 13 regions (Regions R1, R3-R5, R7-R8, R10-R16) where mutations were introduced in 50% or more of the strains (Fig. 1b, Extended Data Table 1).

To investigate whether the mutated region affects RNA expression in isolates recovered from the gerbils, the expression levels of mRNA or noncoding RNA around the mutated regions were quantified by quantitative PCR. Among the corresponding 15 CDSs and non-coding RNA (HP0947, *babA*, *tpiA*, jhp1163, HP0811, HPnc4160, HPnc4170, jhp0540, *araS*, *pldA*, *sabA*, HP1354, *hopZ*, *tlpB*, HPB8\_818), we found that the expression level of HPnc4160, a non-coding small RNA (sRNA) of unknown function, fluctuated the most compared to the wild-type (Fig. 1c, Extended Data Fig. 1a). Similar results were also obtained with the strains (n=10) isolated from C57BL/6 mice (n=5) (Fig. 1b, Extended Data Fig. 1a, b; Supplementary Information 3, 4).

Region R14 is the upstream region of HPnc4160 and HP0811, and is located in the CDS of HPnc4170 (*aapB* small ORF homologue) encoded by the complementary sequence of HPnc4160 (Fig. 1d) <sup>17</sup>. HPnc4160 and its

upstream T repeat were conserved in various H. pylori genome analysis strains, and T repeat length was different depending on the strain (Extended Data Fig. 2a). A repeat of 2 to 4 bases of thymidine was inserted into the repeat of isolates from rodents, and the repeat length increased depending on the infection period (Fig. 1e, Extended Data Fig. 2b-e). Importantly, sequence analysis of clinical isolates showed that T repeat lengths were longer in cancer patient-derived strains than in non-cancer patient-derived strains (Fig. 1f, Supplementary Information 5). However, expansion of the repeat was not observed in long-term *in vitro* culture (Extended Data Fig. 3). Next, we analyzed the change in HPnc4160 sRNA expression levels by T repeat length. In strains recovered from H. pylori-infected rodent stomachs, HPnc4160 expression level tended to decrease with expansion of T repeat length (Fig. 1g). To exclude the effects of mutations other than the T repeats, we further analyzed RNA expression levels of HP0811, HPnc4170 and HPnc4160 in various mutants in which the T repeat sequence was inserted into the HPnc4160 upstream region of wild-type strain (T15mut, T16mut, T17mut, T18mut, and T19mut). In strains in which the number of T repeats was greater than T14 of wild-type, the expression levels of HPnc4160, but not HP0811 and HPnc4170, were significantly reduced compared with wild-type (Fig. 1h, Extended Data Fig. 4a-c,). Although HPnc4160 and HPnc4170 were initially reported as the small ORF-encoding mRNA/antisense RNA family aapB/IsoB, in which the Iso transcript acts as asRNA antitoxin to modify the aap expression<sup>18</sup>, our data indicated that HPnc4160 expression levels had no effect on HPnc4170 levels. These results indicated that expression levels of HPnc4160 sRNA decreased when the number of Region R14 T repeats increased due to persistent intragastric infection.

#### Identification of HPnc4160 target genes

Many sRNAs regulate the expression of a target mRNA by specifically binding to a complementary sequence in the target protein coding mRNA. To elucidate the target mRNA of HPnc4160, we made a  $\Delta hpnc4160/hpnc4170$  strain, in which both the HPnc4160 and the HPnc4170 on the complementary strand were deleted, and analyzed comparative mRNA and protein expression. We identified eight factors (*cagA*, *hofC*, HELPY\_1262, *hpaA*, *horB*, *omp14*, *hopE*, and HP1227) with P-values lower than 0.001 (RNA-seq analysis) and 0.01 [isobaric tag for relative and absolute quantitation (iTRAQ) labeling and LC-MS/MS analysis] (Fig. 2a-c, Extended Data Table 2a-b). Of these, *cagA* was prominent in expression levels of mRNA and protein.

We analyzed whether the mRNA expression levels of the identified eight factors depend on the presence of HPnc4160. Although the expression level of HPnc4160 showed a decreasing trend with T16mut as the lowest value, the mRNA of the eight candidates showed increasing trends with T16mut as the highest value. The Spearman correlation coefficients r between the expression levels of these target mRNAs and HPnc4160 showed a very strong inverse correlation from -0.7714 to -1.0 (Extended Data Fig. 4d).

Next, we examined the mRNA expression correlation between HPnc4160 and each factor. The HPnc4160 overexpression strain (WT / pHel2hpnc4160) significantly increased the expression level of HPnc4160 compared to the wild-type strain, but significantly decreased the expression level of each factor mRNA. On the other hand, in  $\Delta hpnc4160/hpnc4170$  strain, mRNA expression of each target increased compared to the wild-type. Since  $\Delta hpnc4160/hpnc4170$  strain also lacks the HPnc4170 sequence present in the complementary strand of HPnc4160, we constructed a  $\Delta hpnc4160/hpnc4170$ /pHel2-hpnc4160 strain complementing only HPnc4160 to confirm the effect of the HPnc4170 sequence on HPnc4160 target mRNA expression. Compared to the  $\Delta hpnc4160/hpnc4170$  strain, the mRNA expression levels of the candidates were decreased in the HPnc4160 complemented △hpnc4160/hpnc4170 /pHel2-hpnc4160 (Fig. 2d, Extended Data Fig. 5a). These data indicated that the expression levels of the HPnc4160 target 8 candidates were suppressed depending on the expression level of HPnc4160.

When sRNA binds within a few bases around the 5 'UTR or start codon of target RNA, it often competes with ribosomes and inhibits translation initiation. If the sRNA binds within the CDS far downstream of the initiation codon, it causes mRNA degradation by RNase E or RNase III to suppress translational activation<sup>19</sup>. We confirmed by electrophoretic mobility shift assays (EMSA) that HPnc4160 binds to the 5 'UTR of seven genes other than cagA (Fig. 3a). In seven factors other than *cagA*, we confirmed a sequence complementary to the HPnc4160 sequence in the 5 'UTR of each gene (Extended Data Fig. 5b-c). In the *cagA* gene, we found HPnc4160-binding sequences Type 1 at one position (2344 nt), and Type 2 at four positions (2838, 2940, 3042, and 3144 nt) within the CM/CRPIA motifs in CagA Cterminal region, which is known to bind with host signal proteins<sup>7,20</sup> (Fig. 3b, Extended Data Fig. 5d-f). We confirmed direct binding of cagA partial CDS (positions 2778 to 3236 nt from start codon of *caqA*) to HPnc4160 (Fig. 3c). The binding between the two was abolished in the NB-cagA RNA in which the HPnc4160 binding sequence was mutated at four positions (Type 2) while the amino acid sequence of CagA was preserved (Fig. 3c, Extended Data Fig. 5g). In addition, we found that in the presence of H. pylori RNase III recombinant protein, the binding between HPnc4160 and biotin-labeled partial cagA mRNA, but not NB-cagA RNA, disappeared (Fig. 3d, Extended Data Fig. 5i). These data clearly demonstrated that HPnc4160 controls cagA at the posttranscription level by binding to multiple binding sequences present in its CDS region, and promotes degradation by RNase III.

#### Effects of HPnc4160 on H. pylori pathogenicity

Among the factors that HPnc4160 regulated the expression levels, we further analyzed CagA, which has been deeply involved in pathogenesis. First, we confirmed whether the binding of HPnc4160-cagA mRNA actually controls the expression levels of *cagA* mRNA and protein in *H. pylori*. The quantitative PCR showed that, in the H. pylori expressing NB-cagA in which all five HPnc4160binding DNA sequences were mutated but the amino acid sequence was preserved (Extended Data Fig. 5g-h), the expression level of HPnc4160 was similar to that of the wild-type, but the expression level of cagA mRNA was significantly increased to the same extent as that of the  $\Delta hpnc4160/hpnc4170$ strain (Extended Data Fig. 6a, Fig. 4a). Using the urease UreA protein as a loading control for *H. pylori*, we confirmed that NB-cagA strain expressed CagA protein at a higher level than wild-type and  $\Delta hpnc4160/hpnc4170$  / pHel2-hpnc4160 strains, similar to ∆hpnc4160/hpnc4170 strain (Fig. 4b). Next, we analyzed Western blot of the gastric epithelial cell line AGS infected with H. *pylori*. Using  $\beta$ -actin as a loading control for cells, we confirmed that the amount of UreA protein, which exhibited the bacterial amounts, was the same in the lysates of cells infected with any of the strains, indicating that all of the strains showed same binding ability to AGS cells (Extended Data Fig. 6b). Some of the CagA proteins injected from *H. pylori* to host epithelium via TFSS were tyrosine phosphorylated by host Src/Abl kinase and detected by pY-CagA-specific antibody. Using the antibody, we confirmed that the amount of intracellular CagA was increased in the NB-cagA-infected cells, accompanied with the increase in the amount of CagA (Extended Data Fig. 6b). Injected CagA induces AGS cell motility (scattering/hummingbird). In the AGS cells infected with the  $\Delta hpnc4160/hpnc4170$  or the NB-cagA strains, more remarkably elongated cells were observed than in the wild-type or △hpnc4160/hpnc4170 / pHel2-hpnc4160 strain-infected cells (Fig. 4c-d). When

we analyzed amount of IL-8 protein secreted from *H. pylori*-infected cells, which is induced mainly by intracellular CagA, we found that the *cagA*-NB strain infected cells had higher IL-8 producing ability than the wild-type infected cells (Extended Data Fig. 6c). These results suggested that binding of HPnc4160 to *cagA* mRNA is important for controlling the amount of functional CagA protein injected by *H. pylori*.

To understand the significance of the HPnc4160 control mechanism in the bacterial adaptation to the host to establish infection, mice were orally inoculated with each strain, and the number of bacteria colonized in the stomach was analyzed three days post infection. The number of colonized bacteria in the stomach was significantly increased in the  $\Delta hpnc4160/hpnc4170$  strain compared to the wild-type, but the △hpnc4160/hpnc4170 / pHel2-hpnc4160 and the NB-cagA strains were equivalent to wild-type (Fig. 4e). Since  $\Delta hpnc4160/hpnc4170$  infection significantly increased Cxcl2 mRNA compared to wild-type infection, but NBcagA strain was equivalent to wild-type, it is suggested that factors other than CagA controlled by HPnc4160 may be important for the bacterial adaptation as well as development of gastritis (Fig. 4f). To confirm the significance of HPnc4160 in the pathogenesis of *H. pylori*, we examined the expression levels of the HPnc4160 target genes in clinical isolates. As shown in Fig. 4g, isolates from cancer patients had lower levels of *hpnc4160*, but increased expression of six factors controlled by HPnc4160 (cagA, horB, hopE, omp14, hofC, and hpaA), compared to isolates from non-stomach cancer patients (Fig. 4g, Extended data Fig. 7). These data strongly suggested that target mRNA expression was suppressed by HPnc4160 at the onset of *H. pylori* infection, and with the course of infection, thymidine repeats were inserted into the upstream region of HPnc4160, HPnc4160 expression decreased, and target mRNA expression increased; those episodes contributed to bacterial

adaptation to the host environment, leading to gastritis and gastric cancer formation (Extended Data Fig. 8).

#### Discussion

Among the bacterial factors, CagA had extremely high mRNA and protein levels in the bacterial cells (Fig. 2a and b). Our data indicated that T-stretch length in the upstream region of hpnc4160 did not elongate under in vitro condition (Extended Data Fig. 3). However, the T-stretch length was increased and the expression levels of CagA and OMPs increased in vivo in gastric infection (Fig. 1e, 2a and 2b). Adaptation to the in vitro culture environment does not require CagA or OMPs. Therefore, under in vitro conditions, it may be that the expression level of hpnc4160 is increased and the expression of target is suppressed in order to allocate energy for the growth of bacterial cells, rather than expressing genes having high expression levels such as CagA. CagA suppresses apoptosis of the gastric mucosal epithelium and contributes to persistent infection of *H. pylori*<sup>6</sup>. When *H. pylor* enter the stomach, the bacteria may have acquired a mechanism to decrease the expression of HPnc4160 to increase the expression of OMP and CagA simultaneously, in order to adapt to environmental changes to colonize the gastric mucosa for a scaffold for growth.

Gene expression control mechanism by variation of the number of repeat sequences is known as one of various gene expression control mechanisms by phase variation in *H. pylori*<sup>21</sup>. This study suggests that the repeat sequence of *H. pylori* genome is important not only as an ON / OFF mechanism of protein expression such as cell adhesion factors SabA and BabA, but also in sRNA expression. It has been reported that *H. pylori* DNA polymerase I does not have gene repairing activities like other bacteria, thus insertions or deletions of bases called slipped strand mispairing (SSM) occur in simple repetitive sequences<sup>22</sup>. In fact, since there were variations in poly-T length within the upward region of *hpnc4160* in *H. pylori in vivo* (Extended Data Fig. 2a), it is conceivable that *H. pylori* become genetically heterogeneous bacterial population using SSM during the course of infection, so that a population suitable for mutation in the host is selected and propagated. In this study we mainly used strain ATCC 43504, which is a clinical isolate originally from the human antrum. The poly-T length, which did not fluctuate in the *in vitro* subculture, increased in rodent isolates ranged from 14 to 19 copies (Extended Data Fig. 2, 3), indicating that the introduction of SSM may be caused by some host stress condition.

The HPnc4160-binding sequence in the ATCC 43504 *cagA* CDS was duplicated at five sites (Fig. 3b). In the regulation of mRNA expression by general sRNA, mRNA instability can be induced by binding at one site. This is the first report of a sRNA gene regulatory mechanism having multiple binding sequences in one gene of a pathogen. The four out of five HPnc4160-binding sequences in the *cagA* CDS was located in the CM/CRPIA motif of the *cagA* gene, which is involved in maintaining host epithelial cell structure<sup>20</sup>. Since the number of the CM/CRPIA motif differs depending on the strain, HPnc4160 may regulate differences in pathogenicity between Western and East Asian type of *H. pylori*.

The onset of the diseases due to *H. pylori* infection is thought to be the result of persistent infection for decades after the initial infection during childhood, when a very small number of bacteria-containing aerosol were taken into the body orally<sup>23</sup>. However, since it is difficult to analyze *H. pylori* infection experiments using laboratory animals for decades, a relatively short time infection analysis must be performed by inoculating a large number of bacteria. Therefore, the mutation analysis in this study may correspond to mutations acquired in the acute phase (Supplementary information 1 and 3)<sup>15,24</sup>. Infection by a small number of bacteria that mimic natural infection allows for more detailed analysis of the establishment of infection.

In this study, we investigated the mutations of *H. pylori*, originated from the same strain, infected in experimental animals with the same genetic background and environment. Unlike studies in individuals with widely differing genetic backgrounds, stomach environments, and infection history, our study has advantage for understanding the adaptation process of *H. pylori* to the host. We discovered a novel non-coding sRNA that is important for post-transcriptional translation control of pathogenic factors of *H. pylori*, such as CagA, which was previously considered to be the most important pathogenic factor for gastric cancer development, and putative OMPs involved in bacterial adhesion. This study is not limited to elucidating the complicated mechanism of persistent *H. pylori* infection, but its application to *H. pylori*-specific therapies that do not rely on antibiotics can also be expected.

#### **Figure legends**

**Fig. 1**: *H. pylori* acquire poly-T extension in upstream of HPnc4160 small RNA to decrease its expression during infection *in vivo*.

a, Experimental strategies schematic. b, Circular genomic map of ATCC 43504 strain recovered from stomachs of gerbils and mice. c, Mutation rates and expression levels of candidate RNAs (mRNA or non-coding RNA). RNA expression levels of the ORFs or nearby genes of genome regions [total 15 genes (Extended Data Fig. 1a), which mutated in more than 50% of the recovered strains from the gerbils, were assessed and plotted against the mutation rates. d, Schematic structures of genes around HPnc4160. e, Schematic diagram of genome DNA sequence around the HPnc4160 and poly-T sequence of recovered strains harboring mutations. Green indicates HPnc4160 transcribed sequence, red frame indicates poly-T mutated stretches in the upstream region of HPnc4160 of ATCC 43504 wild-type (WT) strain, and red-colored "T" indicated inserted nucleotides of each recovered strain compared with WT. f, The T-repeat length in the upstream region of HPnc4160 of clinical isolates. Isolated strains from cancer patients (Cancer) have a higher number of T-repeat in the upstream region of Hpnc4160 compared with the isolates from non-cancer patients (Non-Cancer). Data are presented as means with 95% confidence interval. P values represent the results of the two-tailed Mann-Whitney test. g, Expression levels of HPnc4160 in the recovered H. pylori strains from Mongolian gerbils (n=40). Relative expression levels of HPnc4160 were measured by real-time PCR and plotted against T-repeat length in the upstream region of HPnc4160. Data are presented as means with s.d. *P* values represent the results of two-tailed Dunn's multiple comparison test. **h**, The relative expression levels of HPnc4160 in the *H. pylori* strains genetically modified with the T-repeat length. Data are presented as means

with s.d. (n=3). *P* values are from Dunnett's multiple comparison test (at twosided).

**Fig. 2**: HPnc4160 downregulates expression levels of bacterial pathogenic factors.

**a**, The MA plot of ratios [ $\Delta$ hpnc4160/hpnc4170 / wild-type (WT) *H. pylori*] versus their normalized average mRNA expression determined by RNAsequencing (RNA-Seq). The red dots showed genes of *P*<0.001. **b**, Volcano plots of the proteins quantified by isobaric tags for relative and absolute quantification (iTRAQ) analysis comparing WT and  $\Delta$ hpnc4160/4170. Each point represents the difference in expression (fold change) between the two groups plotted against the level of statistical significance. The red dots showed proteins of *P*<0.01. **c**, The Venn diagram represents the number of factors whose expression exhibited significant differences between  $\Delta$ hpnc4160/hpnc4170 and WT. **d**, The relative RNA expression levels of target candidates of HPnc4160 showed an inverse correlation with HPnc4160. The results represent the average of three separate experiments (each n=3). Data are presented as means ± s.d. (error bars). *P* values are from Tukey's multiple comparison test (at two-sided). ns: not significant.

Fig. 3: HPnc4160 binds to target mRNA.

**a**, Electrophoretic mobility shift assay (EMSA) analysis of HPnc4160 binding to the 5' UTR region of each candidate mRNA. **b**, Schematic of CagA motifs, and HPnc4160 binding sequences. **c**, EMSA analysis of HPnc4160 binding to RNA of partial *cagA* WT or HPnc4160-non-binding *cagA* (NB-*cagA*). **d**, RNase protection assay with HPnc4160, *cagA* mRNA, and recombinant RNase III.

Fig. 4: HPnc4160 controls bacterial host adaptation and pathogenesis.

a, HPnc4160, and cagA mRNA expression levels. The results represent the average of three separate experiments (each n=3). Data are presented as means ± s.d. (error bars). P values are from non-parametric Dunnett's multiple comparison test (at two-sided). ns: not significant. Experiments were repeated three times with similar results. **b**, Protein expression levels of CagA in each mutant strain. UreA protein levels serve as bacterial loading controls. c and d, Scattering phenotypes of *H. pylori*-infected AGS gastric epithelial cells. c, DNA (blue), F-actin (red), and anti-phosphorylated CagA antibody (pY-CagA, green) were stained. Scale bar, 50 µm. d, Quantification of scattering activity of AGS cells induced by *H. pylori* infection. **e** and **f**, HPnc4160 deletion mutants efficiently colonized the stomach and contributed to increasing mRNA levels of inflammatory chemokine Cxc/2 in mice stomach. C57BL/6 mice were inoculated with *H. pylori*. At three days after infection, animals were sacrificed, and a quantitative culture assay (e) and a quantitative RT-PCR (f) were performed on gastric specimens. Data are median with interguartile range. P values are from non-parametric Dunn's multiple comparison test (at two-sided). ns: not significant. g, Clinical isolates from malignant patients downregulate HPnc4160 and upregulate expression levels of its target genes. Expression levels of indicated mRNAs in clinical isolates of non-cancer (Non-Cancer, n=39) and cancer (Cancer, n=17) patients were guantified and normalized with the levels of 23S rRNA. Data are presented as medians with interquartile range. P values are from the non-parametric Mann-Whitney test (at two-sided).

# Methods

# **Data reporting**

No statistical methods were used to predetermine sample size, and the experiments were not randomized and the investigators were not blinded to allocation during experiments and outcome assessment.

# Strains and culture conditions

The *Helicobacter pylori* strain ATCC 43504, its isogenic mutants  $\triangle cagA$  and  $\triangle virB7$ , strains SS1 and PMSS1 have been described previously<sup>6,25</sup>. *H. pylori* was cultured on Trypticase soy agar with 5% (v/v) sheep blood (Thermo Fisher Scientific, Waltham, MA, USA) for 2 days at 37°C in microaerobic conditions. Bacterial colonies were suspended in Brucella broth (Thermo Fisher Scientific) supplemented with 5% (v/v) inactivated FBS (Thermo Fisher Scientific), adjusted to Optical density 600 nm of 0.05, and incubated 15 hours at 37°C with gentle agitation under microaerobic conditions.

The AGS human gastric epithelial cell line (ATCC CRL-1739) was maintained in DMEM/F-12 (Thermo Fisher Scientific) containing 10% (v/v) FBS. AGS cells were seeded in six-well plates and grown to ~80% confluence to be used for western blot analysis. For immunofluorescence microscopy, cells were seeded in six-well plates with cover glass, and grown to ~80% confluence.

# Antibodies and immunohistochemical reagents

The anti-Tyr(P)-CagA, and anti-UreA polyclonal antibodies have been described previously (Mimuro MC 2002). Anti-CagA polyclonal antibody was purchased from AUSTRAL Biologicals (CA, USA), anti-actin monoclonal antibody was from MERCK (Darmstadt, Germany), Horse radish peroxidase (HRP)-labeled anti-rabbit IgG and HRP-labeled anti-mouse IgG, and FITC- labeled anti-rabbit IgG was from Jackson ImmunoResearch Laboratories Inc. (PA, USA). DAPI was from SIGMA-ALDRICH (MD, USA), and Rhodamine Phalloidin was from Thermo Fisher SCIENTIFIC (MA, USA).

# **Animal infection**

*H. pylori* infection of rodents were performed as described previously<sup>26</sup>. Briefly, 6-week-old male MON/Jms/GbsSlc Mongolian gerbils were orally administered with 200 µL of Vancomycin (500 mg/L) at 24 and 48 hours before *H. pylori* inoculation. On the days of *H. pylori* inoculation, 300 µL of 5% (w/v) sodium bicarbonate were orally administrated 10 minutes before bacterial inoculation. The gerbils were then intragastrically inoculated with an *H. pylori* culture containing  $10^9$  CFU for 2 consecutive days. As for C57BL/6 mice (SLC Japan Inc., Tokyo, Japan) were intragastrically inoculated once with *H. pylori* culture of  $10^9$  CFU. After indicated date, the stomach of each infected animal was opened along the greater curvature. To quantitatively isolate *H. pylori*, the stomach was excised, weighed, and homogenized. Serial dilutions were plated on *H. pylori*-selective agar plates (Eiken Chemical Co.) and incubated under microaerophilic conditions at 37°C for 4 days, after which the cfu were counted. Colonization data points of 1 ×  $10^3$  cfu were the minimal detection limit of the assay.

For isolation of strains recovered from *H. pylori*-infected rodents, each colony on the *H. pylori*-selective agar plates were picked up and spread on Trypticase soy agar with 5% (v/v) sheep blood, and incubated under microaerophilic conditions at 37°C for two days. Then, the colonies were suspended in Brucella broth supplemented with 5% (v/v) inactivated FBS, adjusted to Optical density 600 nm of 0.05, and incubated 15 hours at 37°C with gentle agitation under microaerobic conditions. The cultures were preserved with 50% (v/v) glycerol in -80°C until use. For RNA isolation, the tissue was immediately frozen in liquid nitrogen. Animal experiments were conducted in accordance with the University of Tokyo or Osaka University guidelines for the care and use of laboratory animals and were approved by the ethics committee for animal experiments at the University of Tokyo or Osaka University.

#### **Genomic DNA purification and sequencing**

For PCR templates, genomic DNA was purified using InstaGene Matrix (Bio-Rad Laboratories, Inc., CA, USA).

For whole genome sequencing, genomic DNA was purified from mid-log phase culture of strain ATCC43504 using QIAGEN DNeasy (QIAGEN). A genomic DNA library for sequencing was prepared using the Nextera XT DNA Sample Preparation kit (Illumina, San Diego, CA, USA) and sequenced using the Illumina MiSeq (for isolates from gerbils) or HiSeq X (for isolates from mice) platform to generate 300-bp paired-end reads. Genome assembly, scaffolding, and gap-closing were performed using the Platanus assembler (Kajitani et al. 2014). Gene identification and annotation were conducted by the Microbial Genome Annotation Pipeline (MiGAP [http://www.migap.org]). The raw read sequences and assembled scaffold sequences have been submitted to the DDBJ/EMBL/Genbank under the Bioproject accession number;

SAMD00178897- SAMD00178935, SAMD00179460, SAMD00178937 and SAMD00204457- SAMD00204466.

The DNA sequences mutated in more than 50% of the 40 strains recovered from Mongolian gerbils, or, in all of the 10 strains recovered from C57BL/6 mice were listed in Extended Data Table 1. We selected the genes to further analyze for their mRNA expression levels as follows. For the gene in which the mutation was in the CDS region, the mRNA expression level of the CDS was measured. While, when the mutation insertion region was an intergenic region,

we measured the mRNA expression level of an adjacent gene in which the intergenic region could be a 5'UTR region. As for HP1243 and HPG27\_298, which started from 3' end of HP1243 with 33 nucleotides spaces, were regarded as a continuous gene; since both genes are annotated as *babA* gene and ribosomal binding site (RBS) is assigned only at the upstream region of HP1243.

#### In vitro passage experiment

H. pylori ATCC 43504 was recovered from frozen stock and cultured on 5% (v/v) sheep blood agar for 2 days at 37°C in microaerobic conditions. Bacterial colonies were suspended in 3 tubes of Brucella broth supplemented with 5% (v/v) inactivated FBS. Each bacterial suspension was adjusted to Optical density 600 nm of 0.05, and incubated 12 hours at 37°C with gentle agitation under microaerobic conditions. Following this incubation, each fraction of the suspension was preserved by freezing in 50% (v/v) glycerol as "Original" strains. Meanwhile, each bacterial suspension was sub-cultured by resuspending in Brucella broth supplemented with 5% (v/v) inactivated FBS to adjust Optical density 600 nm of 0.05, and incubated additional 12 hours at 37°C with gentle agitation under microaerobic conditions. The sub-cultivation was repeated for 60 passages (30 days), and each cell suspension was preserved by freezing in 50% (v/v) glycerol as "60-passaged" strains. The "Original" and "60-passaged" strains were recovered from frozen stock on 5% (v/v) sheep blood agar by 2 days incubation under microaerobic conditions, and then the colonies were suspended in Brucella broth supplemented with 5% (v/v) inactivated FBS and incubated 12 hours at 37°C with gentle agitation under microaerobic conditions. The bacterial cells were collected and subjected to the genomic DNA purification.

# **RT-PCR**

For preparation of total RNA from *H. pylori*, the liquid cultures of *H. pylori* were agitated under microaerobic conditions at 37°C overnight until the OD value at 600 nm reached 0.9.

Total RNA was extracted using ISOGEN (Nippon Gene, Tokyo, Japan), according to the manufacturer's instructions. The concentration of the purified total RNA was analyzed using the NanoDrop Spectrophotometer (ThermoFisher Scientific, Wilmington, DE, USA). The total RNA was reverse transcribed into cDNA with miScript II RT Kit (QIAGEN) according to the manufacturer's instructions. The levels of mRNA expression were quantified and normalized to 23SrRNA (for *H. pylori*) or *Gapdh* (for mice) expression with a THUNDERBIRD SYBR qPCR (TOYOBO) using the primer pairs described in Supplementary Information 6. The results are expressed as the means ± SEM from triplicate strain experiments.

#### **Genetic manipulation**

Construction of plasmids for producing gene-deficient mutants Isogenic gene null mutants derived from ATCC 43504 were constructed by

insertional mutagenesis as follows. Using the extracted *H. pylori* ATCC 43504 genome as a template, DNA fragments containing the upstream region 500 bp and the downstream region 500 bp of the target gene were amplified by PCR using primer (CagA KO up XhoI, CagA KO up EcoRI, CagA KO down BamHICagA KO down NotI, HPnc4160/4170 KO up KpnI, HPnc4160/4170 KO up ClaI, HPnc4160/4170 KO down BamHI, HPnc4160/4170 KO down SacI; listed in Supplementary Information 6). The DNA fragments were introduced at the both sides of the *aphA3* (which confers kanamycin resistant) in pBluescript II SK (+) plasmid. The fragments from the resulted plasmid were introduced into *H. pylori* by electroporation.

#### Construction of non-marker H. pylori mutants

For constructing non-marker H. pylori mutants, ATCC 43504 flaA and cag1 promoter and terminator were cloned into pBluescript SK(+) Smal aphA3 Smal, and sacB gene was cloned into EcoRI site (pKSB plasmid). Mid-log-phase (OD600 = 0.5-0.7) of *H. pylori* in 20 ml culture liquid were washed twice with ice-cold 10% glycerol and resuspended by 200 µl of icecold 10% glycerol. 1µg of pKSB vector containing aimed mutation and the bacterial liquid were mixed at 4°C and electroporated by Micropulser (Bio-Rad) with Ec2 (2.5kV) setting. After 4 hours incubation at 37°C in microaerophilic condition, cells were plated on 5% sheep blood agar plate TSAII containing 4 µg/ml Kanamycin and incubated 2-3 days at 37°C under the microaerophilic condition. 4 single colonies were seeded on new 5% sheep blood agar plate TSAII supplemented with 4 µg/ml Kanamycin and incubated for additional 2 days. Each colony was picked up and were cultured in Brucella broth containing 5% FBS at 37°C under the microaerophilic condition until *H. pylori* were grown to mid-log phase. 100µl of the medium were plated on 5% sheep blood agar plate supplemented with 2.5% sucrose and cultured for 2 days. Each colony was seeded on a new 5% sheep blood agar plate without antibiotics and incubated for 2 days. At the same time, the colony was seeded on a different agar plate with 4 µg/ml Kanamycin to confirm the Kanamycin resistant was disappeared. Grown *H. pylori* were transferred to liquid culture and the genome sequence was confirmed by Sanger sequencing.

#### Construction of point mutated H. pylori

The *H. pylori* recombination plasmids to establish various mutant strains (T15mut, T16mut, T17mut, T18mut, T19mut) in the upstream region of *hpnc4160* were constructed by PCR using *H. pylori* genome DNA from the

strains isolated from gerbil after 8 weeks as a template, and primers (pKSB-HPnc4160 Point mut *Apa*I and pKSB-HPnc4160 Point mut *Xho*I; listed in Supplementary Information 6), then, the resulted DNA fragments were cloned into suicide pKSB plasmid.

*H. pylori* T15mut, T16mut, T17mut, T18mut and T19mut mutants were established by introducing each pKSB-based plasmid into *H. pylori* ATCC 43504 strain.

# Construction of NB-cagA-expressing H. pylori

Based on the full length cagA cDNA sequence of ATCC 43504, we designed HPnc4160-unbound *cagA* gene sequence (NB-*cagA*, Extended Data Fig. 5g and h). The NB-*cagA* cDNA were artificially synthesized as pEX-K4J2-cagA mutant of 908 bps (eurofins, 99900008281-1). The cDNA fragments containing mutated *cagA* sequence were amplified using primers (pKSB-CagA-NB-ApaI, pKSB-CagA-NB-XhoI, listed in Supplemented Information 6), and cloned into a suicide vector pKSB. The resulted plasmids were introduced to *H. pylori* ATCC 43504 to obtain NB-cagA-expressing *H. pylori*.

#### Construction of hpnc4160 over-expressing H. pylori

The plasmid for the hpnc4160 overexpressing strain in *H. pylori* was constructed by combination of DNA fragments of hpnc4160 regions were amplified by PCR using primers (pHel2-4160-de-4170-hed-f XhoI, pHel2-4160-de-4170-hed-r BamHI, Supplemented Information 6) and genome DNA of the ATCC 43504 strain as a template. The resulted DNA fragments included the upstream region of *hpnc4160* without including the 5' region of the hpnc4170 region. The DNA was cloned into pHel2 shuttle vector, and introduced into *H. pylori* by electroporation.

#### **RNA-seq**

H. pylori were agitation under aerobic conditions and cultured at 37°C overnight until the OD value at 600 nm reached 0.9. Total RNA from the H. pylori were extracted using RNeasy (QIAGEN), according to the manufacturer's instructions. The concentration of total RNA extracted was examined using the NanoDrop Spectrophotometer (ThermoFisher Scientific, Wilmington, DE, USA), according to the manufacturer's instructions. Ten micrograms from each total RNA sample were treated with the MICROBExpress Bacterial mRNA Enrichment kit (Ambion, Grand Island, NY, USA) and RiboMinus<sup>™</sup> Transcriptome Isolation Kit (Bacteria) (Invitrogen, Grand Island, NY, USA) following the manufacturer's instructions. Samples were resuspended in 15 µL of RNase-free water. Bacterial mRNAs were chemically fragmented to the size range of 200-250 bp using 1 × fragmentation solution (Ambion, Grand Island, NY, USA) for 2.5 min at 94°C. cDNA was generated according to instructions given in SuperScript Double-Stranded cDNA Synthesis Kit (Invitrogen, Grand Island, NY, USA). Briefly, each mRNA sample was mixed with 100 pmol of random hexamers, incubated at 65°C for 5 min, chilled on ice, mixed with 4 µL of First-Strand Reaction Buffer (Invitrogen, Grand Island, NY, USA), 2 µL of 0.1 M DTT, 1 µL of 10 mM RNase-freed NTPmix, 1 µL of SuperScript III reverse transcriptase (Invitrogen), and incubated at 50°C for 1 h. To generate the second strand, the following Invitrogen reagents were added: 51.5 µL of RNase-free water, 20 µL of second-strand reaction buffer, 2.5 µL of 10 mM RNase-free dNTP mix, 50 U E. coli DNA Polymerase, 5 U E. coli RNase H, and incubated at 16°C for 2.5 h. The Illumina Paired End Sample Prep kit was used for RNA-Seq library creation according to the manufacturer's instructions as follows: Fragmented cDNA was end-repaired, ligated to Illumina adaptors, and amplified by 18

cycles of PCR. Paired-end 150-bp reads were generated by high-throughput sequencing with the Illumina Hiseq 2500 Genome Analyzer instrument. After removing the low-quality reads and adaptors, RNA-Seq reads were aligned to the corresponding ATCC 43504 genome using Tophat 2.1.0 (Trapnell et al 2009), allowing for a maximum of two mismatch. If reads mapped to more than one location, only the one showing the highest score was kept. Reads mapping to rRNA and tRNA regions were removed from further analysis. After getting the reads number from every sample, edgeR with TMM normalization method was used to determine the DEGs. Significantly differentially expressed genes (FDR value < 0.05 and at least two-fold changes) were selected for further analysis.

# iTRAQ

*H. pylori* ATCC 43504 strains of wild-type,  $\Delta hpnc4160/hpnc4170$ , and  $\Delta hpnc4160/hpnc4170$  / pHel2-*hpnc4160* were cultured in Brucella Broth containing 5% FCS to OD600 = 0.9. 1.5 mL of each bacterial solution was centrifuged at 5,000 xg for 10 minutes at 4°C. The pellet was resuspended in Wash buffer (1 M KCl, 15 mM Tris-HCl, pH 7.4), centrifuged again, and the supernatant was removed. The pellet was resuspended in a Wash buffer containing 1 mM AEBSF (4- (2-Aminoethyl) benzenesulfonyl fluoride hydrochloride) and frozen at -80°C. iTRAQ analysis was commissioned to Filgen Corporation.

# EMSA (electrophoretic mobility shift assay)

cDNA fragments of small RNA HPnc4160 whole region, the fragments of 150 bp total of each 5'UTR region [from 100 bases upstream from the ribosome binding region (RBS), to 50 bases downstream of the RBS] (hp0410 gene, hp0486 gene, *horB* gene, hp0671 gene, *hopE* gene, *cagA* gene, hp1227 gene

and helpy 1262 gene), and cDNA of 459 bp total containing the hpnc4160binding 4 region near the 3' tail of the *cagA* gene, were amplified by PCR using primers (Small RNA HPnc4160 Xhol, Small RNA HPnc4160 EcoRI; HP0410 150bp Xhol, HP0410 150bp EcoRI; HELPY 0660 150bp Xhol, HELPY 0660 150bp EcoRI; HP0671 150bp Xhol, HP0671 150bp EcoRI; HP0486 150bp Xhol, HP0486 150bp EcoRI; HPSH 00635 150bp Xhol, HPSH 00635 150bp EcoRI; HPP12 0555 150bp Xhol, HPP12 0555 150bp EcoRI; HP1227 150bp Xhol, HP1227 150bp EcoRI; HELPY\_1262 150bp Xhol, HELPY\_1262 150bp EcoRI; CagA-B codding XhoI, CagA-B codding EcoRI; listed in Supplementary Information 6) and the ATCC43504 genome as a template. The PCR products were cloned into the position of the downstream of the T7 promoter region of the pBluescript SK (+) plasmid. The NB-cagA mutant RNA used in the gel shift assay was amplified with a T7 promoter by PCR using (T7 promoter CagA-NB EMSA PCR s, T7 promoter CagA-NB EMSA PCR as) as primers and synthesized pEX-K4J2-CagA mutant (eurofins, 99900008281-1) cagA as a template. The cagA mutant RNA were prepared in the same manner except for mutations in the HPnc4160-binding 4 region. RNA was transcribed from a DNA fragment using an in vitro Transcription T7 kit (TAKARA).

Gel shift assays were performed using 0.04 pmol of 3'-biotin-tagged mRNA with increasing amounts of purified small RNA HPnc4160 in 20  $\mu$ L reactions. Briefly, RNA was denatured (10 min, 80°C) and cooled for 5 min on ice. Yeast tRNA 1 $\mu$ g (ThermoFisher SCIENTIFIC) was added to the labelled RNA and the reaction was filled up to 10  $\mu$ L with Binding Buffer (10 mM HEPES pH 7.3, 1 mM MgCl<sub>2</sub>, 20 mM KCl, 5% glycerol). 10  $\mu$ L of either labelled mRNA was added to the HPnc4160. The mixtures were incubated at room temperature for 20 min. Then the samples were mixed with 5  $\mu$ L native loading buffer before loading on a pre-cooled native 6% poly-acryl amide (PAA), 0.5x TBE gel. Gels were run in 0.5x TBE buffer at 30 mA per gel for 2 hours<sup>27</sup>.

#### Cleavage assays

The cDNA of 720 bps of *H. pylori rnase* III was amplified by PCR using primers (pGEX-6P-1 RNaseIII XhoI-f, pGEX-6P-1 RNaseIII NotI-r, listed in Supplemented Information 6) and template (genome DNA from ATCC 43504 strain). The cDNA was cloned into pGEX6P-1 vector (GE). *E. coli* BL21 transformed with the plasmids were subjected to shaking culture in LB broth containing 100 µg/ml ampicillin at 37°C with constant shaking at 200 rpm. Protein expression was induced with IPTG to a final concentration of 0.1 mM, at 4°C, for 4 hours. The bacteria were collected by centrifugation and the pellets were subjected to GST-fusion protein purification using Glutathione Sepharose 4B (GE) according to the manufacture's instruction. The RNase III protein was excised by PreScission Protease according to the manufacturer's instructions. The purified protein derived from 6.7 mL of the bacterial culture was developed by SDS-PAGE, and the gel was stained with CBB to confirm that no contaminants were observed in the final product. The protein concentration was determined by absorbance at 280nm.

Nuclease assays using RNase III was performed using purified *H. pylori* recombinant RNase III. The gel shift assay protocol described above was followed, except that RNase III-specific buffer (25mM Tris pH 7.5, 50 mM NaCl, 50 mM KCl, 10 mM MgCl<sub>2</sub>, 1 mM DTT) was used instead of Binding Buffer. 3'-biotin-tagged partial *cagA* mRNA was incubated on ice with either 5  $\mu$ M of small RNA HPnc4160 for 20 min. RNase III was then added at a final concentration of 300 nM and the reactions were incubated for 1 min at 37°C. The samples were mixed with 5  $\mu$ L of native loading buffer before loading on a pre-cooled native 6% PAA, 0.5x TBE gel<sup>28</sup>.

#### ELISA

AGS cells were co-incubated with *H. pylori* at an MOI of 100 for 12, 24, 36 hours at 37°C in a 5% CO<sub>2</sub> environment in 24 well plates. The supernatants were collected and stored at -30°C. Enzyme-linked immunosorbent assays (ELISAs) for human IL-8 were performed using the Human IL-8 ELISA Kit (ThermoFisher SCIENTIFIC) according to the manufacturer's instructions. The results are expressed as the means  $\pm$  SEM from triplicate experiments.

#### Immunofluorescence microscopy

AGS cells were infected with *H. pylori* at an MOI of 100 for 6 hours at 37°C in a 5% CO<sub>2</sub> environment. The cells were fixed with 4% (w/v) paraformaldehyde-PBS at room temperature for 10 min. The cells were then washed with TBS for 3 times, and blocked with Saponin buffer [10% (v/v) Blocking One (Nakalai, Japan) containing 0.2% (w/v) saponin] at 4°C for 60 min. Antibodies used for staining were DAPI, Rhodamine Phalloidin (Thermo Fisher SCIENTIFIC, MA, USA), pyCagA. Confocal laser scanning microscopy (CLSM) image acquisition was performed using a Zeiss LSM 800 confocal laser scanning microscope with ZEN 2.3 software (Carl Zeiss, Jena, Germany).

#### **Extended Data Figures and Tables Legends**

**Extended Data Figure 1 | The expression levels of candidate RNAs of strains recovered from** *H. pylori* **ATCC43504-infected rodent stomachs. a,** The list of mutation rates and expression levels of the candidate RNAs (mRNA or non-coding RNA) of strains recovered from stomachs of gerbils or mice 8 wks post-infection. The Locus tags highlighted in red indicated the candidates common in both of the strains originated from gerbils and mice. N/A, not applicable. b, The expression levels of candidate RNAs (mRNA or non-coding RNA) of isolates recovered from *H. pylori* ATCC43504-infected C57BL/6 mice stomachs. RNA expression levels of the genes or nearby genes of genome regions (Fig. 1b and Supplementary Information 2), which mutated in 100% of the recovered strains were assessed.

Extended Data Figure 2 | The length of the poly-T stretches upstream of the HPnc4160 coding region. a, Schematic diagram of genome DNA sequence around the HPnc4160 and poly-T sequence of genome analyzed strains. Red-colored "T" indicated stretches of poly-T sequence. b, Schematic diagram of genome DNA sequence around the HPnc4160 and poly-T sequence of mice-recovered strains 8 wks after infection (n=10, Hp1 to Hp10). Green indicated HPnc4160 transcribed sequence, red frame indicated poly-T mutated stretches in the upstream region of HPnc4160, and red-colored "T" indicated inserted nucleotides of each recovered strain compared with wild-type. c-e, Time-dependent change in the length of the poly-T stretches upstream of the HPnc4160 coding region in gerbils or mice-recovered strains. c, Strains from Mongolian gerbils infected with ATCC 43504. d, Strains from C57BL/6 mice infected with ATCC 43504. e, Strains from C57BL/6 mice infected with PMSS1. Data are median with interquartile range. *P* values are

from non-parametric Dunn's multiple comparison test (at two-sided). ns: not significant. **f**, Expression levels of HPnc4160 in the recovered *H. pylori* strains from mice (n=10) and *H. pylori* wild-type (T-repeat 14). Relative expression levels of HPnc4160 were measured by real-time PCR and plotted against T-repeat length in the upstream region of HPnc4160. Data are presented as means with s.d. *P* values represent the results of two-tailed Dunn's multiple comparison test.

**Extended Data Figure 3 | Effect of** *in vitro* **cultivation on the length of the poly-T stretches upstream of the HPnc4160 coding region. a**, Experimental strategies schematic. **b**, The raw data of the DNA sequence analysis of *H. pylori* genomes prepared from original culture (Original #1 - #3) and from passaged *in vitro* for 60 times (60-passaged #1 - #3).

Extended Data Figure 4 | The length of the poly-T stretches upstream of the HPnc4160 coding region and RNA expression levels. a, Growth curves of *H. pylori* ATCC43504 mutants mutated in the number of T repeat in HPnc4160 upstream region. **b-c**, The relative expression levels of *hpnc4170* (b) and HP0811 (c) in the *H. pylori* strains genetically modified with the Trepeat length. Data are presented as means with s.d. (n=3). *P* values are from Dunnett's multiple comparison test (at two-sided). ns: not significant. d, The relative RNA expression levels of target candidates of HPnc4160 showed an inverse correlation with HPnc4160. The total RNA from the indicated *H. pylori* ATCC 43504 strains were extracted, reverse transcribed, and provided for qPCR to assess the indicated genes. The results represent the average of three separate experiments (each n=3). Data are presented as means  $\pm$  s.d. (error bars). Spearman correlation coefficients (r) were used to evaluate the relationships among relative RNA expression of HPnc4160 (Fig. 1h) and each target.

Extended Data Figure 5 | Predicted HPnc4160 binding sites. a, Growth curves of *H. pylori* ATCC43504 mutants. **b.** Predicted the secondary structure of HPnc4160 RNA by CentroidFold. The bases in the predicted structure are colored according to base-pairing probabilities. Circles in pink and light green color indicated loop structures having probabilities of binding to target RNA sequences. c, Schematic diagram of predicted HPnc4160 binding sites in the corresponding 5'UTR sequence of target genes. Upper sequences indicate target mRNA sequences with base numbers, whereas lower sequences indicate HPnc4160 sequence. Colored sequences are corresponding to the loop structures indicated in (b). d, Binding prediction of HPnc4160 and 5' UTR of cagA mRNA. d, Schematic diagram of predicted HPnc4160 binding sites in the cagA CM/CRPIA motif of cagA CDS. e-f, Schematic diagram of predicted HPnc4160 binding sites in the corresponding CDS sequence of cagA TYPE 1 (e), TYPE 2 (f), and *cagA* nonbinding form (NB-*cagA*) of TYPE 2 (g) and TYPE 1 (h). Upper sequences indicate target cagA mRNA sequences, whereas lower sequences indicate HPnc4160 sequence with base numbers. Colored sequences are corresponding to the loop structures indicated in (b). Mutated nucleotides in cagA mRNA sequence are shown in red. i, Purified RNase III was separated by SDS-PAGE and stained with CBB.

#### Extended Data Figure 6 | Effect of cagA-NB on host-cell-translocated

**CagA activity. a,** Growth curves of *H. pylori* ATCC43504 *cagA*-NB mutant compared with wild-type. **b**, Phosphorylated CagA protein levels in cell lysates of AGS cells infected with *H. pylori* ATCC43504. The whole-cell lysates of AGS cells infected with *H. pylori* strains for 6 hours were subjected to western blot against anti-CagA, anti-pY CagA, anti-UreA, and anti-Actin antibodies. The

band intensities were measured and calculated by ImageJ software. **c**, IL-8 production from AGS cells infected with *H. pylori* ATCC43504. The supernatants from AGS cells infected with *H. pylori* strains shown in the figure for the indicated time were subjected to ELISA system for IL-8 production. The results represent the average of three separate experiments (each n=3). Data are presented as means  $\pm$  s.d. (error bars).

Extended Data Figure 7 | Characterization of clinical isolates. a, Clinical isolates of non-cancer (Non-Cancer, n=39) and cancer (Cancer, n=17) patients, which used in Fig. 4g, showed equal growth rate. The strains cultured on TSAII containing 5% sheep blood plates for 2 days were inoculated in Brucella broth containing 5% FCS, adjusted OD<sub>600nm</sub> at 0.1, then cultured in microaerobic condition with agitation for 16 hours. The turbidity of the cultures was assessed at OD<sub>600nm</sub>. The Data are presented as medians with interguartile range. P values represent the results of the two-tailed Mann-Whitney test. ns: not significant. **b**, The relative RNA expression levels of target candidates of HPnc4160. Spearman correlation coefficients (r) were used to evaluate the relationships among relative RNA expression of HPnc4160 and each target. c, Comparison of expression levels of mRNA (HELPY 1262 and HP1227) in clinical isolates of non-cancer (NC, n=39) and cancer (C, n=17) patients. The expression levels of mRNA were normalized with the levels of 23S rRNA. Data are presented as medians with interguartile range. P values represent the results of the two-tailed Mann-Whitney test. ns: not significant.

Extended Data Figure 8 | Infection-induced silencing of HPnc4160 upregulates target genes expression and promote bacterial host adaptation and canceration during chronic *H. pylori* infection. *H. pylori*  infection *in vivo* leads elongation of T-stretch in the upstream region of HPnc4160 sRNA coding region, which results in decreased expression levels of sRNA HPnc4160. Gene silencing of HPnc4160 results in increased levels of target genes coding OMPs and CagA, and as a result, the levels of bacterial colonization and CagA translocation into the attached host cells were increased.

# Extended Data Table 1 | The list of mutated genome regions in the strains recovered from *H. pylori*-infected rodents' stomachs.

The list showed the genome regions that mutated in the strains isolated from the stomachs of rodents 8 weeks post infection. The DNA sequences in the regions listed in the table were mutated in more than 50% of the 40 strains recovered from Mongolian gerbils, or, in all of the 10 strains recovered from C57BL/6 mice. N/A, not applicable.

# Extended Data Table 2 | Comparative analysis of expression levels between *H. pylori* ATCC43504 Δ*hpnc4160/hpnc4170* mutant and wild-type strains.

a, Comparative analysis of RNA expression levels between *H. pylori* ATCC
 43504 Δ*hpnc4160/hpnc4170* mutant and wild-type strains by RNA-seq.
 Footnote |

Normalized expression level and fold change of the strains were listed. Genes with *P*-values by Empirical Analysis of Digital Gene Expression in R (edgeR) test showed less than 0.001 were listed (17 factors). Eight genes selected by RNA-seq and iTRAQ analysis (Fig. 2c) were highlighted in red.

**b**, Comparative analysis of protein expression levels between *H. pylori* ATCC43504 Δ*hpnc4160/hpnc4170* mutant and wild-type strains by iTRAQ. Footnote | Proteins showing relative protein abundance with *P*-value of less than 0.01 were listed (21 factors). Eight proteins selected by RNA-seq and iTRAQ analysis (Fig. 2c) were highlighted in red.

# **Supplementary Information Legends**

**Supplementary information 1** | Summary of mutations in the isolates recovered from *H. pylori*-infected Mongolian gerbils.

The number of mutations in the isolates of 40 strains recovered from *H. pylori*infected Mongolian gerbils' stomachs 8 weeks after post-infection were listed.

**Supplementary information 2** | The mutated sequence list of 40 strains recovered from *H. pylori*-infected Mongolian gerbils' stomach.

**Supplementary information 3** | Summary of mutations in the isolates recovered from *H. pylori*-infected C57BL/6 mice. The number of mutations in the isolates of 10 strains recovered from H. pylori-infected mice stomachs 8 weeks after post-infection were listed.

**Supplementary information 4 |** The mutated sequence list of 10 strains recovered from *H. pylori*-infected C57BL/6 mice stomach.

**Supplementary information 5** | Information of *H. pylori* clinical isolates used in Fig. 1f, and Fig 4g.

Supplementary information 6 | Primers used in this study.

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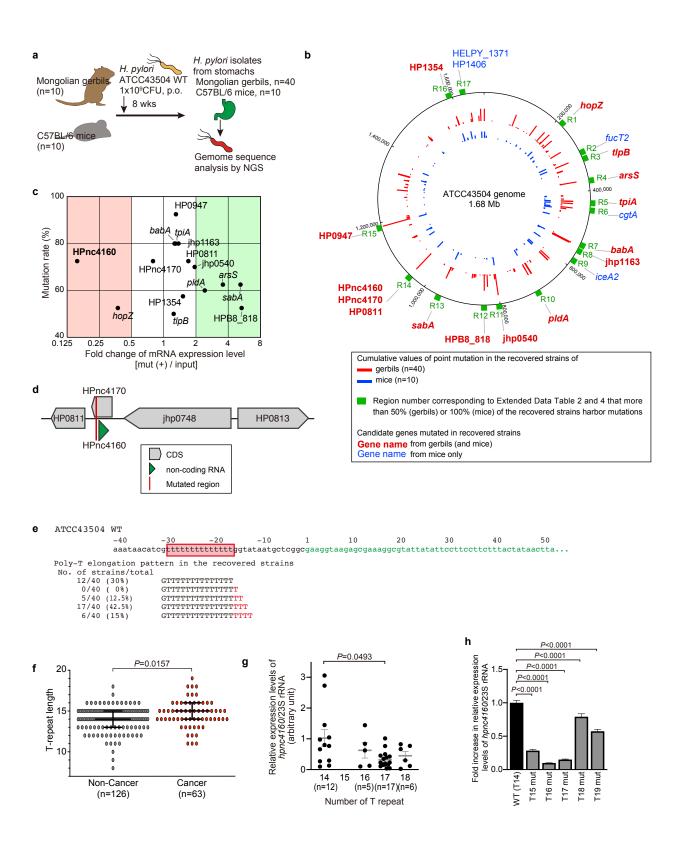


Fig. 1 Kinoshita et al.

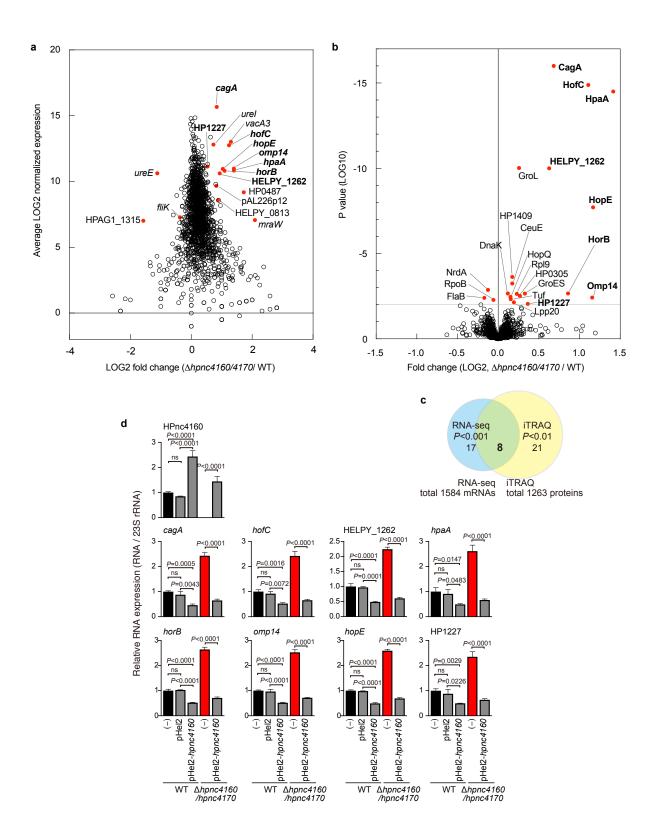


Fig. 2 Kinoshita et al.

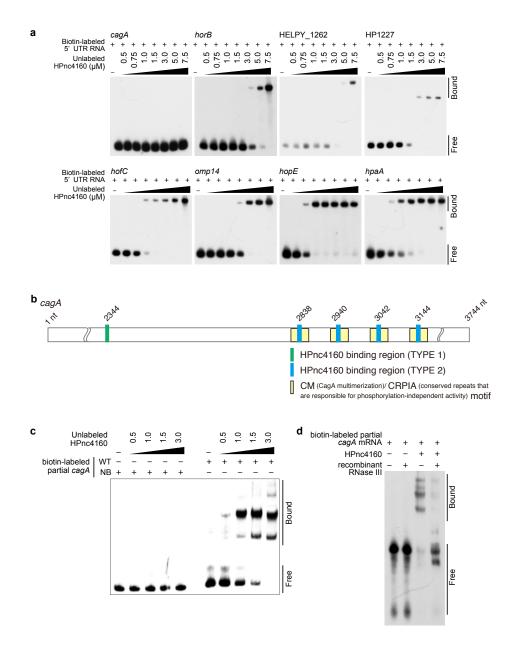


Fig. 3 Kinoshita et al.

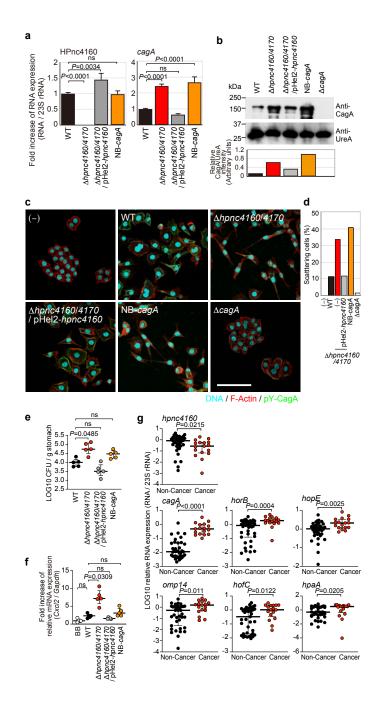
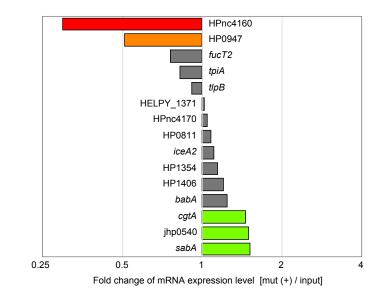


Fig. 4 Kinoshita et al.

а

b

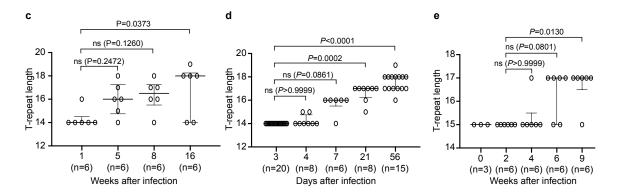
Region No.	Gene symbol	Gene description		an gerbils st infection)		_/6 mice st infection)
			Fold change of mRNA expression level [mut(+)/input]	Mutation rate (%, /40 strains)	Fold change of mRNA expression level [mut(+)/input]	Mutation rate (%, /10 strains)
R1	hopZ	outer membrane protein	0.373	52.5	N/A	N/A
R2	fucT2	alpha-1,2-fucosyltransferase	N/A	N/A	0.758	100.0
R3	tlpB	methyl-accepting chemotaxis protein	1.239	50.0	0.913	100.0
R4	arsS	histidine kinase sensor protein	3.572	62.5	N/A	N/A
R5	tpiA	triosephosphate isomerase	1.286	80.0	0.825	100.0
R6	cgtA	beta-1,4-N-acetylgalactosamyltransferase	N/A	N/A	1.453	100.0
R7	babA	outer membrane protein babA	1.263	80.0	1.243	100.0
R8	jhp1163	hypothetical protein	1.374	80.0	N/A	N/A
R9	iceA2	Ulcer-associated gene restriction endonuclease	N/A	N/A	1.104	100.0
R10	pldA	phospholipase A1	2.420	60.0	N/A	N/A
R11	jhp0540	hypothetical protein	1.946	70.0	1.497	100.0
R12	HPB8_818	family 25 glycosyl transferase	5.346	52.5	N/A	N/A
R13	sabA	outer membrane protein sabA	5.215	62.5	1.512	100.0
R14	HPnc4160	mRNA/antisense RNA family IsoB	0.155	72.5	0.297	100.0
R14	HPnc4170	mRNA/antisense RNA family aapB	0.794	72.5	1.043	100.0
R14	HP0811	hypothetical protein	1.698	72.5	1.075	100.0
R15	HP0947	hypothetical protein	1.300	92.5	0.511	100.0
R16	HP1354	adenine-specific DNA methyltransferase	1.512	57.5	1.138	100.0
R17	HELPY_1371	Type III restriction enzyme R protein	N/A	N/A	1.018	100.0
R17	HP1406	biotin synthase	N/A	N/A	1.200	100.0

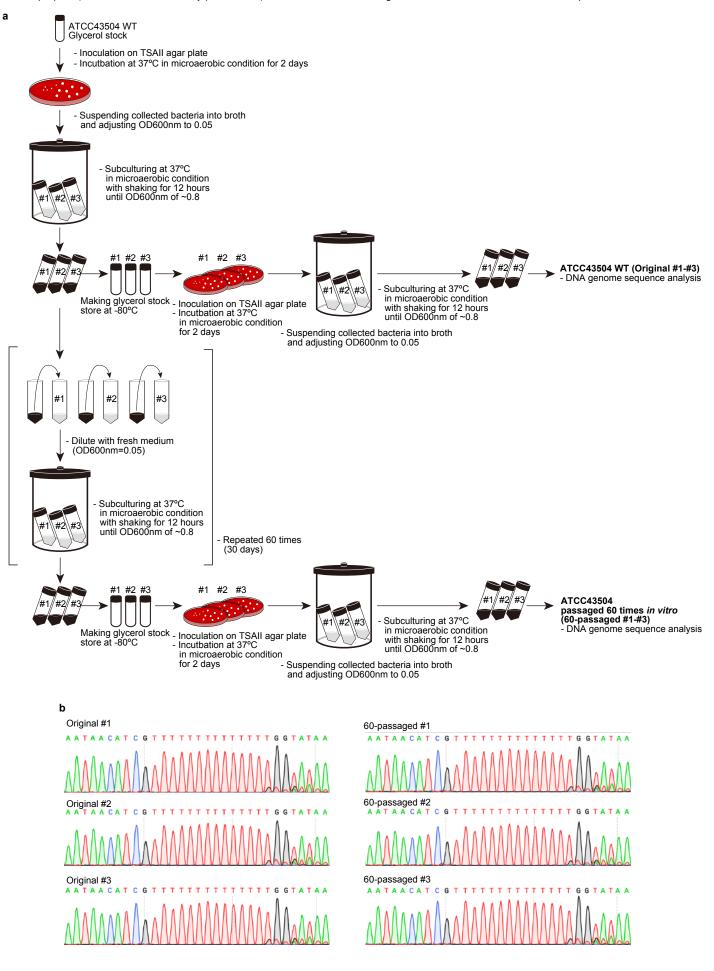


#### Extended Data Figure 1 Kinoshita et al.

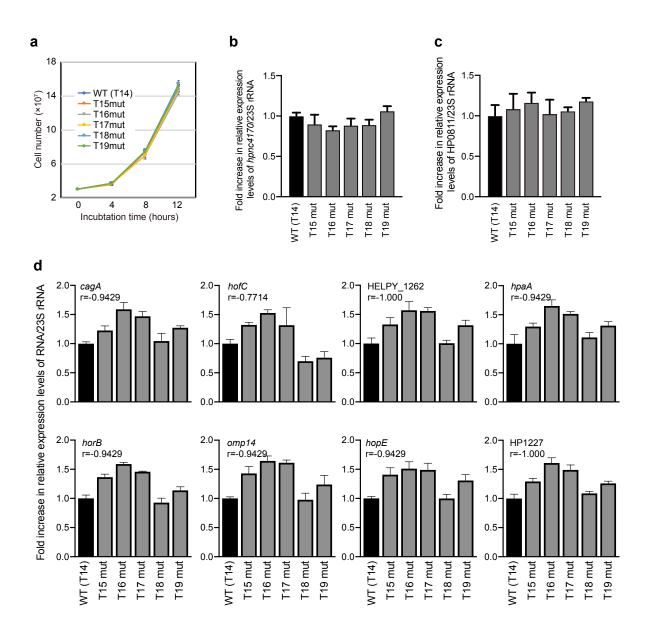
а	-40	-30	-20	-10	1	10	20	30	40
H. pylori ATCC43504	aaataacato	cgttttttt	tttttt	-ggtataatgctc	ggcgaaggt	aagagcgaaa	ggcgtattata-	ttccttcct	tctt
H. pylori PMSS1	aaataacato	-ttttttt	tttt	-ggtataatgc-c	gcctaaggt	aagagcgaaa	ggcgtattata-	ttccttccti	tctt
H. pylori SS1	aaataacato	-ttttttt	ttttt	-ggtataatgc-c	gcctaaggt	aagagcgaaa	ggcgtattata-	ttccttccti	tctt
H. pylori 26695	aaataacato	cgttttttt	tttttt	-ggtataatgctc	ggcgaaggt	aagagcgaaa	ggcgtattata-	ttccttctt	tctt
H. pylori J99	aaataacato	cgttttttt	tttttt	-ggtataatgctc	ggcgaaggt	aagagcgaaa	ggcgtattata-	ttccttccti	tctt
H. pylori HPAG1	aaataacato	cgttttttt	tttttttt-	-ggtataatgctc	ggcgaaggt	aagagcgaaa	ggcgtattata-	ttccttccti	tctt
H. pylori G27	aaataacato	-ttttttt	ttttttt	-ggtataatgc-c	gcttaaggt	aagagcgaaa	ggcgtattata-	ttccttccti	tctt
H. pylori Shi470	aaataacato	cgttttttt	tttttt	-ggtataatgctc	ggtgaaggt	aagagcaaaa	ggcgtattatat	teetteetteet	tctt
H. acinonychis Sheeba	aaataaca-	ttttttt	. <mark>ttt</mark> agtataa	tagtataatgt-t	gttgggt	aagggcaaag	ggcg-aaaata-	ttccttccti	tctt
	41	50	60	70	80	90	100		
H. pylori ATCC43504									
		-		ttttca	-				
H. pylori PMSS1		-		ttttca	-				
H. pylori SS1		-		ttttca	-				
H. pylori 26695	tactataac-	ttagca-tt	ttaatcaact	ttttca	ttaaaatgto	cctgacgctc	ttacctt-aa		
H. pylori J99	tactataac-	ttagca-tt	ttaatcaact	ttttca	ttaaaatgto	cctgacgctc	ttaccttaaa		
H. pylori HPAG1	tactataac-	ttagca-tt	ttaatcaact	ttttca	ttaaaatgto	cctgacgctc	ttacctt-aa		
H. pylori G27	tactataac-	ttagca-tt	ttaatcaact	ttttca	ttaaaatgto	cctgacgctc	ttacctt		
H. pylori Shi470	tactataac-	ttagca-tt	ttaataaact	ttttca	ttaaaatgto	cctgacgctc	ttaccttcaa		
H. acinonychis Sheeba	tactataaca	ittagcattt	ttagtaaact	ttttctttttaca	ttaaaatgto	ectaatgete	ttacctta		

Poly-T elongation pattern in the recovered strains from mice No. of strains/total 1/10 (10%) GTTTTTTTTTTTT 5/10 (50%) GTTTTTTTTTTTTTTT 4/40 (40%) GTTTTTTTTTTTTTTTTTTTT

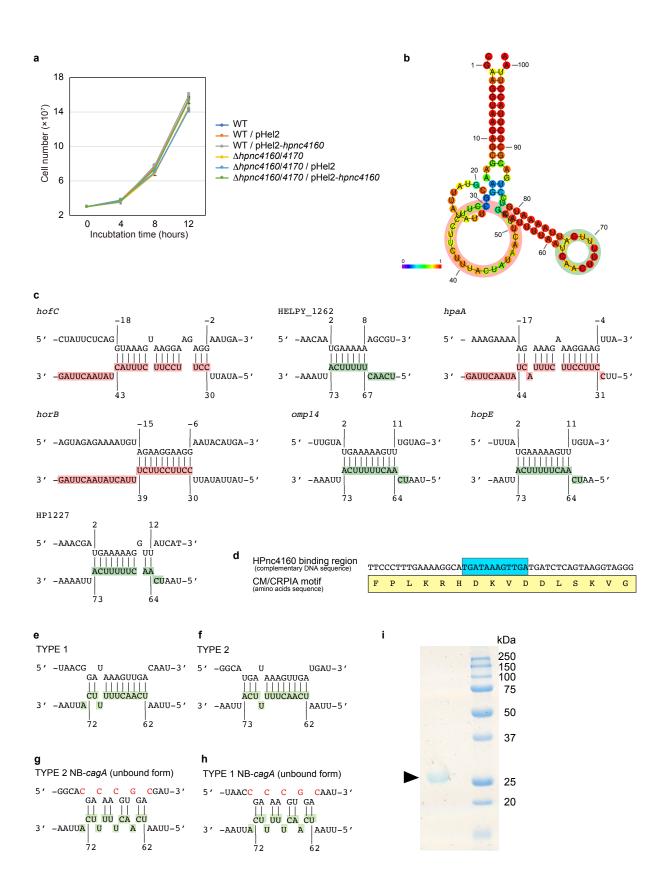




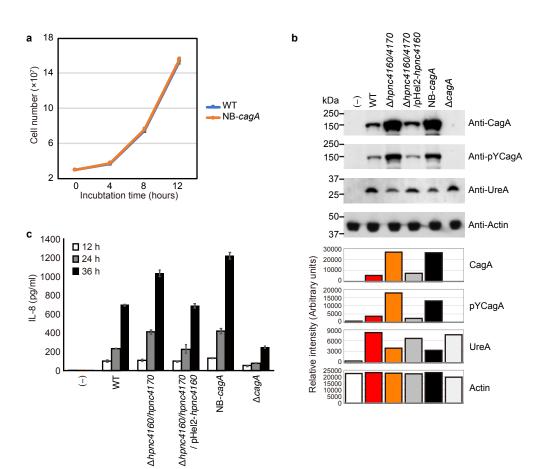
#### Extended Data Figure 3 Kinoshita et al.

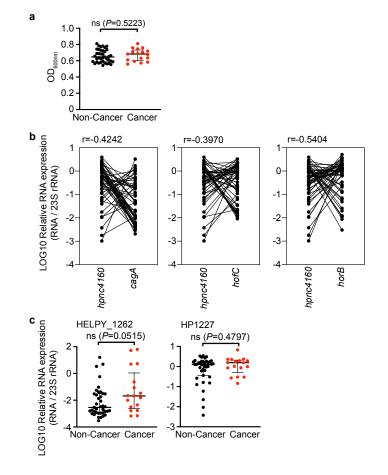


Extended Data Figure 4 Kinoshita et al.

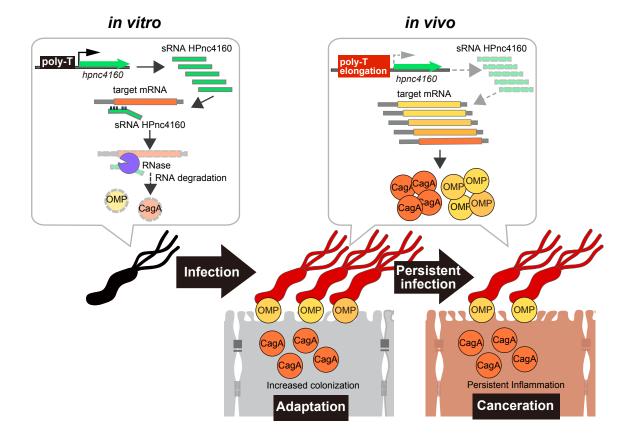


Extended Data Figure 5 Kinoshita et al.





Extended Data Figure 7 Kinoshita et al.



Extended Data Figure 8 Kinoshita et al.

Region	No. of mutated	l strains (%)		Annotatio	on	Gene	nearby the interg	genic region (#1)	Gene ne	earby the interger	nic region (#2)
No.	Mongolian gerbil (n=40)	C57BL/6 (n=10)	Gene name	Locus tag	Gene description	Gene name	Locus tag	Gene description	Gene name	Locus tag	Gene description
R1	52.5	N/A	N/A	N/A	intergenic: no annotation	hopZ	HPG27_8	outer membrane protein			
R2	N/A	100	futT2	HPP12_0096	alpha-1,2- fucosyltransferase						
R3	50	100	N/A	N/A	intergenic: no annotation	tlpB	HP0103	methyl-accepting chemotaxis protein			
R4	62.5	N/A	araS	jhp0151	signal-transducing protein, histidine						
R5	80	100	tpiA	HP0194	triosephosphate isomerase						
R6	N/A	100	HP0217	HP0217	hypothetical protein						
R7	72.5	100	N/A	N/A	intergenic: no annotation	babA	HP1243/ HPG27_298	outer membrane protein			
R8	80	N/A	N/A	N/A	intergenic: no annotation	jhp1163	jhp1163	hypothetical protein	babA	HP1243/ HPG27 298*	outer membrane protein
R9	N/A	100	N/A	N/A	intergenic: no annotation	IceA2	HPATCC43 504_00587	induced by contact with epithelium gene			P
R10	60	N/A	pldA	HP0499	phospholipase A1						
R11	70	100	N/A	N/A	intergenic: no annotation	jhp0540	jhp0540	HAD superfamily			
R12	52.5	N/A	HPB8_818	HPB8_818	family 25 glycosyl transferase						
R13	62.5	100	N/A	N/A	intergenic: no annotation	sabA	HPG27_680	outer membrane protein			
R14	72.5	100	aapB	HPnc4170	small peptide	HP0811	HP0811	hypothetical protein	IsoB	HPnc4160	small RNA
R15	92.5	100	N/A	N/A	intergenic: no annotation	HP0947	HP0947	hypothetical protein			
R16	57.5	100	HP1354	HP1354	adenine-specific DNA						
R17	N/A	100	N/A	N/A	intergenic: no annotation	bioB	HP1406	biotin synthase	HELPY_1371	HELPY_1371	type III restriction enzyme R protein

а		1	
	Gene name	Average LOG2 normalized expression	LOG2 fold change (Δ <i>hpnc4160/4170</i> / WT)
	cagA	15.6679564	0.8345757
	vacA3	13.0181033	1.3000122
	urel	12.8122441	0.7256751
	hofC	12.7562529	1.2385235
	HP1227	11.1439545	0.5356426
	hpaA	10.9856930	1.3994257
	horB	10.9589406	1.0351050
	omp14	10.8268799	1.3977712
	hopE	10.8143652	1.0951572
	ureE	10.6269817	-1.1164069
	HELPY_1262	10.6234286	0.9346910
	pAL226p12	9.6669233	0.8237894
	HP0487	9.1803234	1.7213025
	HELPY_0813	8.5854796	0.8765494
	fliK	7.2801813	-0.3748484
	mraW	7.0680550	2.0913744
	HPAG1_1315	7.0164749	-1.5753123

b

Gene name	Fold change (LOG2, ∆hp <i>nc4160/hpnc4170 /</i> WT)	Pval (LOG10)
CagA	0.6831125	-16.0000000
HofC	1.1079556	-14.8875441
НраА	1.4153801	-14.5034266
GroL	0.2561653	-10.0187654
HELPY_1262	0.6268596	-9.9953361
HopE	1.1672937	-7.7135456
HP1409	0.1735112	-3.6271647
CeuE	0.1737671	-3.2477470
NrdA	-0.1246917	-2.8700087
HorB	0.8583789	-2.6608050
DnaK	0.1192898	-2.6579389
GroES	0.3291810	-2.6528395
Rpl9	0.2299570	-2.6372507
HP0305	0.2674759	-2.5150013
HopQ	0.1519887	-2.4589011
Omp14	1.1557492	-2.4194920
FlaB	-0.1694201	-2.4003455
Tuf	0.1548424	-2.3314305
RpoB	-0.0584429	-2.2822269
Lpp20	0.1944653	-2.1385174
HP1227	0.3642362	-2.0521036

#### Extended Data Table 2 Kinoshita et al.

**Supplementary Information 1** Summary of mutations in the isolates recovered from *H. pylori*-infected Mongolian gerbils. Number of mutations in the isolates of 40 strains recovered from *H. pylori*-infected Mongolian gerbils' stomachs 8 weeks after post infection were listed.

Animal	Strain	Total No.	SNPs (s	ingle nucleo	tide polymo	rphysms)	indel (	insertion/c	leletion)	SNPs rate	indel rate
No.	Name	of mutations	total	nonsynon ymous	synonymo us	intergenic	Total	genic	intergenic	per base per year	per base per year
	S41	50	37	15	18	4	13	5	8	1.43E-04	5.04E-05
	S42	48	40	15	20	5	8	2	6	1.55E-04	3.10E-0
#1	S43	44	38	12	21	5	6	4	2	1.47E-04	2.33E-05
•	S44	46	41	16	21	4	5	1	4	1.59E-04	1.94E-0
	S45	48	39	15	17	7	9	2	7	1.51E-04	3.49E-0
	S46	47	38	22	14	2	9	1	8	1.47E-04	3.49E-0
#2	S47	46	36	15	15	6	10	2	8	1.40E-04	3.88E-0
•	S48	48	41	20	16	5	7	2	5	1.59E-04	2.71E-0
	S49	17	12	7	3	2	5	4	1	4.65E-05	1.94E-0
	S50	26	18	8	8	2	7	3	4	6.98E-05	2.71E-0
#3	S51	17	11	7	2	2	6	3	3	4.27E-05	2.33E-0
-	S52	20	13	7	2	4	7	4	3	5.04E-05	2.71E-0
	S53	27	16	7	6	3	11	5	6	6.20E-05	4.27E-0
•	S54	15	10	4	5	1	5	1	4	3.88E-05	1.94E-0
#4	S55	24	14	5	5	4	10	3	7	5.43E-05	3.88E-0
	S56	25	13	5	6	2	12	4	8	5.04E-05	4.65E-0
	S57	25	15	5	7	3	10	4	6	5.82E-05	3.88E-0
•	S58	29	15	5	5	5	14	5	9	5.82E-05	5.43E-0
#5	S59	23	13	5	6	2	10	2	8	5.04E-05	3.88E-0
	S60	27	16	5	7	4	10	3	8	6.20E-05	4.27E-0
	S61	29	20	8	8	4	9	2	7	7.76E-05	3.49E-0
	S62	35	25	10	12	3	10	2	8	9.69E-05	3.88E-0
#6	S63	25	16	6	5	5	9	3	6	6.20E-05	3.49E-0
•	S64	36	28	14	10	4	8	2	6	1.09E-04	3.10E-0
	S65	50	39	14	21	4	11	5	6	1.51E-04	4.27E-0
•	S66	47	39	13	22	4	8	5	3	1.51E-04	3.10E-0
#7	S67	55	44	15	22	7	11	4	7	1.71E-04	4.27E-0
•	S68	54	44	13	22	7	10	4	6	1.71E-04	3.88E-0
	S69	52	44	21	17	3	10	3	8	1.71E-04 1.59E-04	4.27E-0
•	S70	61	52	17	30	5	9	2	7	2.02E-04	4.27E-0
#8	S70	41	33	17	14	4	9 7	1	6	1.28E-04	2.71E-0
						3	5	0	5		
	S72 S73	39 43	34 37	15 17	16 15	4	5 6	2	5 4	1.32E-04 1.43E-04	1.94E-0 2.33E-0
•	\$73 \$74	43 79	70	32	31	7	9	2	7	2.71E-04	2.33E-0 3.49E-0
#9		79	63	29	26	8	8	4	4		
	S75 S76	43	34	29 15	17	2	8	3	6	2.44E-04	3.10E-0
										1.32E-04	3.49E-0
•	S77	45	36	8	6	21	9	3	6	1.40E-04	3.49E-0
#10 ·	S78	41	34	9	5	20	7	2	5	1.32E-04	2.71E-0
•	S79	41	32	5	6	21	9	3	6	1.24E-04	3.49E-0
	S80	41	32	7	5	20	9	3	6	1.24E-04	3.49E-0
									Average	1.19E-04	3.38E-0

**SD** 5.60E-05 8.51E-06

	Position in ATCC43504	Seque ATCC43504	nce in Reisolate		Type of difference	Annotation	Gene nearby the intergenic region (#1)	Gene nearby the intergenic region (#2)
\$41	89186		с	SNP	intergenic		HP0995	
S41	99327		Т	SNP	synonymous	jhp0935		
\$41	168379		T	SNP	synonymous	HP1547		
S41	199597	C CGTTCCGCTTTCAGTCTCGCTTCTTGTTCCGCTTTCA	T	SNP	intergenic		HP1582	jhp1488
S41	204483	GTCTCGCTTTCAGTCTCGCTTTCAGTCTCGCTTCTT GTTCCGCTTTCA	CGTTCCGCTTTCA	indel	frameshift deletion	HPATCC43504_00192		
S41	232964		Α	SNP	intergenic		HPPC_00115	
S41	276989		Α	SNP	nonsynonymous	HPP12_0070		
S41	315327	ACCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC	ACCCCCCCCCC	indel	intergenic	16-0454	HP0103	
\$41 \$41	374756 430922		CGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG	indel SNP	frameshift insertion nonsynonymous	jhp0151 HP0194		
\$41	455599	TGGGGGGGGGG	TGGGGGGGGG	indel	frameshift deletion	HP0217		
S41	546511	СААААААААААА	САААААААААААА	indel	intergenic		HP1243/HPG27_298	
S41	672079	C	A	SNP	nonsynonymous	HP1134		
S41	691071	G	A	SNP	synonymous	HP0489		
S41	691074		c	SNP	synonymous	HP0489		
\$41	691077		A	SNP	nonsynonymous	HP0489		
\$41 \$41	691089 691091		G A	SNP	synonymous	HP0489 HP0489		
\$41	691101		C	SNP	nonsynonymous synonymous	HP0489		
\$41	691113		T	SNP	nonsynonymous	HP0489		
\$41	691157		A	SNP	nonsynonymous	HP0489		
S41	691173	C	A	SNP	synonymous	HP0489		
S41	691175		G	SNP	nonsynonymous	HP0489		
S41	691179		G	SNP	synonymous	HP0489		
S41	691185		G	SNP	nonsynonymous	HP0489		
\$41 \$41	691189 691190		G C	SNP SNP	nonsynonymous	HP0489 HP0489		
\$41 \$41	691190 801836		GAAAAAAAAAAAAAA	indel	intergenic	1170403	jhp0540	
\$41 \$41	830053		Т	SNP	nonsynonymous	HPP12_0617	,	
\$41	839999		c	SNP	nonsynonymous	HPB8_818		
S41	873661	C	Т	SNP	synonymous	HP0651		
S41	873681		A	SNP	synonymous	HP0651		
S41	873702		Т	SNP	synonymous	HP0651		
\$41 \$41	873717 879985		т т	SNP	synonymous	HP0651 HP0656		
S41 S41	952086		ттстстстстстстс	indel	nonsynonymous intergenic	HP0050	HPG27 677	
\$41 \$41	958574	CGAGAGAGAGAGAGAG	CGAGAGAGAGAGAGAGAG	indel	intergenic		HPG27_680	
S41	958719		A	SNP	intergenic		 HPG27_680	
S41	1043704	GTTTTTTTTTTTT	GTTTTTTTTTTTT	indel	frameshift insertion/intergenic	HPnc4170	HP0811	HPnc4160
S41	1187376		ATTTTTTT	indel	intergenic		HP0947	
\$41 \$41	1332690 1332954		A G	SNP SNP	synonymous	HPATCC43504_01275 HPATCC43504_01275		
\$41 \$41	1332954		с	SNP	synonymous	HPATCC43504_01275		
S41	1332996	т	G	SNP	synonymous			
S41	1332997	G	c	SNP	nonsynonymous	HPATCC43504_01275		
S41	1332999		c	SNP	synonymous	HPATCC43504_01275		
\$41 \$41	1582085 1592784		ATG	indel	intergenic frameshift deletion	HP1354	HELPY_1317	HP0228
\$41 \$41	1592801	T	G	SNP	synonymous	HP1354		
S41	1593602	TGGGGGGGGGGG	TGGGGGGGGGGGG	indel	frameshift insertion	HP1354		
S42	99327	C	Т	SNP	synonymous	jhp0935		
S42	168379	C	Т	SNP	synonymous	HP1547		
S42	199597		Т	SNP	intergenic		HP1582	jhp1488
\$42	276989		A C	SNP	nonsynonymous	HPP12_0070	HP0162	
S42 S42	372979 374769		G	SNP	intergenic nonsynonymous	jhp0151	HFU1UZ	
\$42 \$42	430922		A	SNP	nonsynonymous	HP0194		
S42	548957		T	SNP	intergenic		jhp1163	HPG27_298
S42	548965	C	Т	SNP	intergenic		jhp1163	 HPG27_298
S42	548978		т	SNP	intergenic		jhp1163	HPG27_298
S42	672079		A	SNP	nonsynonymous	HP1134		
S42	691071		A C	SNP	synonymous	HP0489		
\$42 \$42	691074 691077		C	SNP	synonymous	HP0489 HP0489		
S42 S42	691077		G	SNP	synonymous	HP0489 HP0489		
\$42	691091			SNP	nonsynonymous	HP0489		
S42	691101	Т	c	SNP	synonymous	HP0489		
S42	691113		Т	SNP	nonsynonymous	HP0489		
S42	691157		A	SNP	nonsynonymous	HP0489		
\$42 \$42	691173		A	SNP	synonymous	HP0489		
\$42 \$42	691175 691179		G G	SNP	nonsynonymous synonymous	HP0489 HP0489		
S42	691179		G	SNP	nonsynonymous	HP0489		
\$42	691189		G	SNP	nonsynonymous	HP0489		
S42	691190		c	SNP	nonsynonymous	HP0489		
S42	801836		GAAAAAAAAAAAAAA	indel	intergenic		jhp0540	
S42	830053		Т	SNP	nonsynonymous	HPP12_0617		
S42	873661		T	SNP	synonymous	HP0651		
\$42 \$42	873681		A	SNP	synonymous	HP0651		
\$42 \$42	873702 873717		т т	SNP	synonymous	HP0651 HP0651		
S42	873807		G	SNP	synonymous	HP0651		
S42	874024	AGGGGGGGGG	AGGGGGGGGGG	indel	intergenic		HP0651	
S42	879985	C	т	SNP	nonsynonymous	HP0656		

| S42   | 958574   | CGAGAGAGAGAGAG  
                   | CGAGAGAGAGAGAGAG  
   
   
   
   
   | indel  | intergenic   |  | HPG27_680                       |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   
   |   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   
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S42	1043704	GTTTTTTTTTTT												
                   | GTTTTTTTTTTTT   
   
   
   
   
   | indel  | frameshift insertion/intergenic  | HPnc4170   | HP0811                          | HPnc4160             |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   
   |   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   
   |  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| \$42<br>\$42  | 1124346  | CGAGAGAGAGAGAGAGAGAG  
                   | CGAGAGAGAGAGAGAGAGAGAG  
   
   
   
   
   | indel  | intergenic   |  | HPG27_1187<br>HP0947            |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   
   |   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   
   |  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| \$42<br>\$42  | 1187376<br>1332690   | С   
                   | ATTTTTTT<br>A   
   
   
   
   
   | indel<br>SNP   | intergenic   | HPATCC43504_01275  | HP0947                          |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   
   |   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   
   |  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S42   | 1332900  |   
                   | T   
   
   
   
   
   | SNP  | synonymous<br>synonymous   | HPATCC43504_01275  |                                 |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   
   |   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   
   |  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S42   | 1332906  |   
                   | T   
   
   
   
   
   | SNP  | synonymous   | HPATCC43504_01275  |                                 |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   
   |   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   
   |  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| \$42  | 1332954  | Ţ   
                   | G   
   
   
   
   
   | SNP  | synonymous   | HPATCC43504 01275  |                                 |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   
   |   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   
   |  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| \$42  | 1332987  | T   
                   | C   
   
   
   
   
   | SNP  | synonymous   | HPATCC43504_01275  |                                 |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   
   |   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   
   |  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S42   | 1332996  | Т   
                   | G   
   
   
   
   
   | SNP  | synonymous   | HPATCC43504_01275  |                                 |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   
   |   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   
   |  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S42   | 1332997  | G   
                   | C   
   
   
   
   
   | SNP  | nonsynonymous  | HPATCC43504_01275  |                                 |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   
   |   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   
   |  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S42   | 1332999  | Т   
                   | C   
   
   
   
   
   | SNP  | synonymous   | HPATCC43504 01275  |                                 |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   
   |   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   
   |  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S42   | 1592786  | GT  
                   | G   
   
   
   
   
   | indel  | frameshift deletion  | HP1354   |                                 |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   
   |   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   
   |  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S42   | 1663529  | GTTTTT  
                   | GTTTT   
   
   
   
   
   | indel  | 1 bp deletion  |  |                                 |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   
   |   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   
   |  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S43   | 99327  | с   
                   | Т   
   
   
   
   
   | SNP  | synonymous   | jhp0935  |                                 |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   
   |   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   
   |  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S43   | 168379   | с   
                   | Т   
   
   
   
   
   | SNP  | synonymous   | HP1547   |                                 |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   
   |   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   
   |  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S43   | 199597   | с   
                   | Т   
   
   
   
   
   | SNP  | intergenic   |  | HP1582                          | jhp1488              |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   
   |   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   
   |  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S43   | 276989   | G   
                   | A   
   
   
   
   
   | SNP  | nonsynonymous  | HPP12_0070   |                                 |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   
   |   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   
   |  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S43   | 374756   | CGGGGGGGGGGGG   
                   | CGGGGGGGGGGGGGG   
   
   
   
   
   | indel  | frameshift insertion   | jhp0151  |                                 |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   
   |   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   
   |  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S43   | 430922   | G   
                   | A   
   
   
   
   
   | SNP  | nonsynonymous  | HP0194   |                                 |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   
   |   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   
   |  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S43   | 466419   | TGAGAGAGAGAGAGAGAG  
                   | TGAGAGAGAGAGAGAG  
   
   
   
   
   | indel  | intergenic   |  | HP0227                          |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   
   |   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   
   |  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S43   | 540566   | GGAGATTAAACAAGAGATTAAACAAGAGATTAA   
                   | GGAGATTAAACAAGAGATTAAACAAGAGATTAA   
   
   
   
   
   | indel  | frameshift insertion   |  |                                 |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   
   |   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   
   |  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
|   |  | ACAAGAG   
                   | ACAAGAGATTAAACAAGAG   
   
   
   
   
   |  |  |  |                                 |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   
   |   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   
   |  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S43   | 548965   | c   
                   | T   
   
   
   
   
   | SNP  | intergenic   |  | jhp1163                         | HPG27_298            |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   
   |   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   
   |  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S43   | 548978   |   
                   | T   
   
   
   
   
   | SNP  | intergenic   |  | jhp1163                         | HPG27_298            |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   
   |   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   
   |  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S43   | 548994   | A   
                   | T   
   
   
   
   
   | SNP  | intergenic   |  | jhp1163                         | HPG27_298            |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   
   |   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   
   |  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S43   | 672079   | c   
                   | A   
   
   
   
   
   | SNP  | nonsynonymous  | HP1134   |                                 |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   
   |   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   
   |  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S43   | 691071   |   
                   | A   
   
   
   
   
   | SNP  | synonymous   | HP0489   |                                 |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   
   |   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   
   |  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S43   | 691074   | A   
                   | c   
   
   
   
   
   | SNP  | synonymous   | HP0489   |                                 |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   
   |   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   
   |  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S43   | 691077   |   
                   | A   
   
   
   
   
   | SNP  | nonsynonymous  | HP0489   |                                 |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   
   |   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   
   |  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S43   | 691089   | A   
                   | G   
   
   
   
   
   | SNP  | synonymous   | HP0489   |                                 |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   
   |   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   
   |  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S43   | 691091   | c   
                   | A   
   
   
   
   
   | SNP  | nonsynonymous  | HP0489   |                                 |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   
   |   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   
   |  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S43   | 691101   | T   
                   | c   
   
   
   
   
   | SNP  | synonymous   | HP0489   |                                 |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   
   |   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   
   |  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| \$43<br>\$43  | 691113<br>691173   | G   
                   | T A   
   
   
   
   
   | SNP<br>SNP   | nonsynonymous  | HP0489<br>HP0489   |                                 |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   
   |   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   
   |  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
|   |  |   
                   |   
   
   
   
   
   |  | synonymous   |  |                                 |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   
   |   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   
   |  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S43   | 691175   | A   
                   | G   
   
   
   
   
   | SNP  | nonsynonymous  | HP0489   |                                 |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   
   |   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   
   |  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S43   | 691179   | c   
                   | G   
   
   
   
   
   | SNP  | synonymous   | HP0489   |                                 |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   
   |   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   
   |  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S43   | 691185   | A   
                   | G   
   
   
   
   
   | SNP  | nonsynonymous  | HP0489   |                                 |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   
   |   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   
   |  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| \$43<br>\$43  | 691189<br>691190   | C A   
                   | G<br>C  
   
   
   
   
   | SNP<br>SNP   | nonsynonymous  | HP0489<br>HP0489   |                                 |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   
   |   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   
   |  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| \$43<br>\$43  | 830053   | C   
                   | Т   
   
   
   
   
   | SNP  | nonsynonymous  | HP0489<br>HPP12_0617   |                                 |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   
   |   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   
   |  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| \$43<br>\$43  | 873661   |   
                   | T   
   
   
   
   
   | SNP  | nonsynonymous  | HP0651   |                                 |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   
   |   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   
   |  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| \$43<br>\$43  | 873681   |   
                   | A   
   
   
   
   
   | SNP  | synonymous<br>synonymous   | HP0651   |                                 |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   
   |   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   
   |  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S43   | 873702   | G   
                   |   
   
   
   
   
   |  |  |  |                                 |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   
   |   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   
   |  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
|   |  |   
                   |   
   
   
   
   
   | SND  | synonymous   |  |                                 |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   
   |   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   
   |  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| \$43  |  |   
                   | T   
   
   
   
   
   | SNP  | synonymous   | HP0651   |                                 |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   
   |   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   
   |  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| \$43<br>\$43  | 873717   | C   
                   | T   
   
   
   
   
   | SNP  | synonymous   | HP0651   |                                 |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   
   |   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   
   |  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S43   | 873717<br>948328   | C<br>C  
                   | T<br>A  
   
   
   
   
   | SNP<br>SNP   | synonymous<br>synonymous   |  | HP0947                          |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   
   |   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   
   |  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| \$43<br>\$43  | 873717<br>948328<br>1187376  | C<br>C<br>ATTTTTT   
                   | т<br>А<br>АПТТТТТТ  
   
   
   
   
   | SNP<br>SNP<br>indel  | synonymous<br>synonymous<br>intergenic   | HP0651<br>HPP12_0726   | HP0947                          |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   
   |   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   
   |  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| \$43<br>\$43<br>\$43  | 873717<br>948328<br>1187376<br>1318527   | C<br>C<br>ATTTTTT   
                   | т<br>А<br>АПППППТ<br>А  
   
   
   
   
   | SNP<br>SNP<br>indel<br>SNP   | synonymous<br>synonymous<br>intergenic<br>intergenic   | HP0651<br>HPP12_0726<br>jhp1031  | HP0947                          |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   
   |   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   
   |  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| \$43<br>\$43  | 873717<br>948328<br>1187376  | С<br>С<br>АППППТ<br>С<br>С  
                   | т<br>А<br>АПТТТТТТ  
   
   
   
   
   | SNP<br>SNP<br>indel  | synonymous<br>synonymous<br>intergenic   | HP0651<br>HPP12_0726   | HP0947                          |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   
   |   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   
   |  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| \$43<br>\$43<br>\$43<br>\$43<br>\$43  | 873717<br>948328<br>1187376<br>1318527<br>1332690  | С<br>С<br>АППППТ<br>С<br>С  
                   | т<br>А<br>АПППППТ<br>А<br>А   
   
   
   
   
   | SNP<br>SNP<br>indel<br>SNP<br>SNP  | synonymous<br>synonymous<br>intergenic<br>intergenic<br>synonymous   | HP0651<br>HPP12_0726<br>jhp1031<br>HPATCC43504_01275   | HP0947                          |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   
   |   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   
   |  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S43           S43           S43           S43           S43           S43           S43   | 873717<br>948328<br>1187376<br>1318527<br>1332690<br>1332900   | C C C C C C C C C C C C C C C C C C C   
                   | T<br>A<br>ATTTTTTT<br>A<br>A<br>T   
   
   
   
   
   | SNP<br>SNP<br>indel<br>SNP<br>SNP<br>SNP   | synonymous<br>synonymous<br>intergenic<br>intergenic<br>synonymous<br>synonymous   | HP0651<br>HPP12_0726<br>jhp1031<br>HPATCC43504_01275<br>HPATCC43504_01275  | HP0947                          |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   
   |   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   
   |  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S43           S43           S43           S43           S43           S43           S43           S43           S43   | 873717<br>948328<br>1187376<br>1318527<br>1332690<br>1332900<br>1332906  | C C C C C C C C C C C C C C C C C C C   
                   | T<br>A<br>ATTTTTTT<br>A<br>A<br>T<br>T<br>T   
   
   
   
   
   | SNP<br>SNP<br>indel<br>SNP<br>SNP<br>SNP<br>SNP  | synonymous<br>synonymous<br>intergenic<br>intergenic<br>synonymous<br>synonymous<br>synonymous<br>synonymous   | HP0651<br>HPP12_0726<br>jhp1031<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275   | HP0947                          |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   
   |   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   
   |  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S43   | 873717<br>948328<br>1187376<br>1318527<br>1332690<br>1332900<br>1332906<br>1332954   | C C C C C C C C C C C C C C C C C C C   | T<br>A<br>ATTTTTTT<br>A<br>A<br>T<br>T<br>T<br>G  
   
   
   
   
   
   | SNP<br>SNP<br>indel<br>SNP<br>SNP<br>SNP<br>SNP  | synonymous<br>synonymous<br>intergenic<br>intergenic<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous   | HP0651<br>HPP12_0726<br>jhp1031<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275   | HP0947                          |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   
   |   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   
   |  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S43   | 873717<br>948328<br>1187376<br>1318527<br>1332690<br>1332900<br>1332906<br>1332954<br>1332987  | C C C ATTTTTT C C G C C T T T   | T<br>A<br>ATTTTTTT<br>A<br>A<br>A<br>T<br>T<br>T<br>G<br>G<br>C   
   
   
   
   
   
   | SNP<br>SNP<br>indel<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP   | synonymous<br>synonymous<br>intergenic<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous   | HP0651<br>HPP12_0726<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275   | HP0947                          |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   
   |   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   
                               |  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S43   | 873717<br>948328<br>1187376<br>1318527<br>1332690<br>1332900<br>1332906<br>1332954<br>1332987<br>1332996   | C C C C C C C C C C C C C C C C C C C   | T<br>A<br>ATTTTTTT<br>A<br>A<br>T<br>T<br>T<br>G<br>C<br>G<br>G   
   
   
   
   
   
   | SNP<br>indel<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP  | synonymous           synonymous           intergenic           intergenic           synonymous   | HP0651<br>HPP12_0726<br>jhp1031<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275  | HP0947                          |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   |   
   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   |   
  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S43   | 873717<br>948328<br>1187376<br>1318527<br>1332690<br>1332906<br>1332954<br>1332954<br>1332987<br>1332997   | C<br>C<br>ATTTTTTT<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>T<br>T<br>T<br>T<br>C<br>C<br>C<br>C   | T<br>A<br>ATTTTTTT<br>A<br>A<br>A<br>A<br>T<br>T<br>T<br>G<br>G<br>C<br>G<br>G<br>C   
   
   
   
   
   
   | SNP<br>sNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP   | synonymous<br>synonymous<br>intergenic<br>intergenic<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>nonsynonymous  | HP0651<br>HPP12_0726<br>jhp1031<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275   | HP0947                          |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   
                                     |   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   
   |  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S43   | 873717<br>948328<br>1187376<br>1318527<br>1332690<br>1332900<br>1332906<br>133295<br>1332995<br>1332997<br>1332999   | C C ATTTTTT C C C G G C T T T G G T T   | T A A T T T A A T T T G G C G G C C C ATG G   
   
   
   
   
   
         | SNP<br>SNP<br>indel<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP  | synonymous           synonymous           intergenic           intergenic           synonymous           onsynonymous           synonymous           synonymous           synonymous   | HP0651<br>HPP12_0726<br>Jhp1031<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275  | HP0947                          |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   |   
   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   |   
  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S43   | 873717<br>948328<br>1187376<br>1318527<br>1332690<br>1332906<br>1332954<br>1332957<br>1332997<br>1332997<br>1332999<br>1592784<br>1592801  | C C C ATTTTTT C C C C G C T T T G G T ATGG T T GGGGGGGGGG   | T A A TTTTTTT A A T T T G C G C C C ATG G G G G G G G G G G G G G G G G G G   
   
   
   
   
   
         | SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP   | synonymous<br>synonymous<br>intergenic<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>frameshift deletion  | HP0651<br>HPP12_0726<br>Jhp1031<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATS4  | HP0947                          |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   |   
   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   |   
  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S43           S44   | 873717<br>948328<br>1187376<br>1318527<br>1332690<br>1332906<br>1332926<br>1332954<br>1332987<br>1332997<br>1332999<br>1592784<br>1592801<br>1593602<br>99327  | C C C ATTTTTT C C C C C C T T T G G ATGTG T T TGGGGGGGGGG   | T         A         ATTTTTTT         A         A         T         G         C         G         C         G         C         G         C         G         G         G         G         G         G         G         G         G         G         G         G         G         G         G         G         T  
   
   
   
   
   |
SNP<br>indel<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>indel<br>SNP<br>indel<br>SNP  | synonymous<br>synonymous<br>intergenic<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>frameshift deletion<br>synonymous<br>frameshift deletion<br>synonymous   | HP0651<br>HPP12_0726<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HP1354<br>HP1354<br>HP1354  | HP0947                          |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   |  
  |                      |  |   |   |   |   |  |  |   |                      |  | | | | | | | | |
  |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |  
  |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |  
   |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   |  
   |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S43           S44           S44   | 873717<br>948328<br>1187376<br>1318527<br>1332690<br>1332906<br>133294<br>1332987<br>1332997<br>1332997<br>1332997<br>1332997<br>1332997<br>1332997<br>1332997<br>1592784<br>1592784<br>1593602<br>99327<br>168379   | C C C ATTTTTT C C C G G C C T T T G G T ATGTG T T GGGGGGGGGG  | T A A TTTTTTT A A T T G G C G G C C C ATG G G G G T T T   
   
   
   
   
   
         | SNP<br>SNP<br>indel<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>indel<br>SNP<br>SNP<br>SNP<br>SNP                                      | synonymous<br>synonymous<br>intergenic<br>intergenic<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>norsynonymous<br>norsynonymous<br>frameshift deletion<br>synonymous<br>frameshift deletion<br>synonymous<br>synonymous<br>synonymous   | HP0651<br>HPP12_0726<br>Jhp1031<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATS4  |                                 |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   |   
   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   |   
  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S43           S44           S44           S44   | 873717<br>948328<br>1187376<br>1318527<br>1332690<br>1332906<br>1332954<br>1332954<br>1332957<br>1332997<br>1332997<br>1592781<br>1593802<br>1593802<br>1593802<br>1593802<br>1593802<br>1593802   | C C C ATTTTTT C C C C C C C C T T T C G C T T T G G T T T GGGGGGGG  | T         A         ATTTTTTT         A         T         T         G         C         G         C         C         G         G         G         G         G         T         T         T         T         T         T         T         T         T  
   
   
   
   
   |
SNP<br>SNP<br>indel<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>indel<br>SNP<br>indel<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP                             | synonymous<br>synonymous<br>intergenic<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>nonsynonymous<br>frameshift deletion<br>synonymous<br>frameshift deletion<br>synonymous<br>intergenic  | HP0651<br>HPP12_0726<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HP1354<br>HP1354<br>HP1354  | HP1582                          | jhp1488              |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   |  
  |                      |  |   |   |   |   |  |  |   |                      |  | | | | | | | | |
  |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |  
  |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |  
   |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   |  
   |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S43           S44           S44           S44           S44           S44   | 873717<br>948328<br>1187376<br>1318277<br>1332900<br>1332906<br>133294<br>133298<br>1332996<br>1332991<br>1332999<br>1592784<br>1592801<br>1593602<br>99327<br>168379<br>168379<br>168379  | C C C ATTTTTT C C C C C C C T T T C G T T C G G T T T G G T T G G C C C C   | T         A         ATTTTTTT         A         A         T         T         G         C         G         C         C         ATG         G         T         T         T         T         A  
   
   
   
   
   
   | SNP<br>SNP<br>indel<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>indel<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP                               | synonymous<br>synonymous<br>intergenic<br>intergenic<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>nonsynonymous<br>frameshift deletion<br>synonymous<br>frameshift deletion<br>synonymous<br>intergenic<br>intergenic  | HP0651<br>HPP12_0726<br>Jhp1031<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HP1354<br>HP1354<br>HP1354<br>HP1547   |                                 | jhp1488              |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   |   
   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   |   
  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S43           S44           S44           S44           S44           S44           S44           S44           S44           S44   | 873717<br>948328<br>1187376<br>1318527<br>1332290<br>1332906<br>1332954<br>1332996<br>1332996<br>1332997<br>1332999<br>1592784<br>1592801<br>1593602<br>99327<br>168379<br>199597<br>232964<br>276989  | C C C C ATTTTTT C C C C C C T T T C C C C   | T         A         ATTITITIT         A         A         T         G         C         G         C         C         C         C         ATG         G         T         T         T         A         A         A   
   
   
   
   
   
         | SNP<br>SNP<br>indel<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>indel<br>SNP<br>indel<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP | synonymous<br>synonymous<br>intergenic<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>frameshift deletion<br>synonymous<br>frameshift deletion<br>synonymous<br>frameshift deletion<br>synonymous<br>frameshift deletion<br>intergenic<br>intergenic<br>nonsynonymous  | HP0651<br>HP012_0726<br>Jhp1031<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP12_0070  | HP1582                          | jhp1488              |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   |   
   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   |   
  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S43           S44   | 873717<br>948328<br>1187376<br>1318527<br>1332600<br>1332906<br>1332954<br>1332954<br>1332995<br>1332995<br>1332995<br>1332997<br>1332997<br>1352784<br>1592784<br>1592784<br>1593602<br>99327<br>168379<br>199597<br>232964<br>232964<br>232964   | C C C C ATTTTTT C C C C C C C C C C C C   | T         A         ATTTTTTT         A         A         T         G         C         G         C         C         C         C         ATG         G         T         T         T         A         A         A         A         A  
   
   
   
   
   | SNP<br>SNP<br>indel<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>indel<br>SNP<br>indel<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP
synonymous synonymous intergenic synonymous synonymous synonymous synonymous synonymous synonymous synonymous frameshift deletion synonymous frameshift deletion synonymous frameshift deletion synonymous intergenic intergenic norsynonymous nonsynonymous norsynonymous	HP0651 HPP12_0726 Jhp1031 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HP1354 HP1354 HP1354 HP1547	HP1582 HPPC_00115																
   |                      |  |   |   |   |   |  |  |   |                      |  |   
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   |   
  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S43           S44   | 873717<br>948328<br>1187376<br>1318577<br>1332900<br>1332900<br>1332954<br>1332954<br>1332997<br>1332997<br>1332999<br>1592784<br>1592784<br>1593602<br>99327<br>168379<br>199597<br>232964<br>276989<br>23694<br>276989<br>2549326  | C C C ATTTTTT C C C G G C T T T G G C T T G G T T G G C C C C   | T         A         ATTTTTTT         A         T         T         G         C         G         C         G         C         G         G         G         G         G         G         G         G         G         G         G         T         T         T         A         A         A         A         T         T         T         T         T         T         T         T         A         A         T  
   
   
   
   
   | SNP<br>indel<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>indel<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP                               |
synonymous<br>synonymous<br>intergenic<br>intergenic<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>norsynonymous<br>norsynonymous<br>frameshift deletion<br>synonymous<br>frameshift deletion<br>synonymous<br>intergenic<br>intergenic<br>norsynonymous<br>norsynonymous<br>intergenic<br>norsynonymous<br>intergenic  | HP0651<br>HPP12_0726<br>Jhp1031<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1547<br>HP1547   | HP1582                          | jhp1488<br>HPG27_298 |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   |   
   |                      |  |   |   |   |   |  |  |   |                      |  | | | | | | | | |
   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   |   
  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| \$43           \$44           \$44           \$44           \$44           \$44           \$44           \$44           \$44           \$44           \$44           \$44           \$44           \$44           \$44           \$44           \$44           \$44           \$44   | 873717<br>948328<br>1187376<br>1318277<br>1332900<br>1332906<br>1332954<br>1332997<br>1332997<br>1332997<br>1332999<br>1592784<br>1592784<br>1593602<br>99327<br>168379<br>199597<br>232964<br>276989<br>430922<br>6549326<br>672079   | C C C ATTTTTT C C C C C C C C C T T T G G C T ATGGGGGGGGGG  
                   | T         A         ATTTTTTT         A         T         T         G         C         G         C         C         G         C         G         G         G         G         G         G         T         T         A         A         A         A         A         A         A         A         A         A          A   
   
   
   
   
   | SNP<br>indel<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>indel<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP                 | synonymous<br>synonymous<br>intergenic<br>intergenic<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>rameshift deletion<br>synonymous<br>frameshift deletion<br>synonymous<br>frameshift deletion<br>synonymous<br>intergenic<br>intergenic<br>intergenic<br>intergenic<br>intergenic<br>intergenic<br>intergenic<br>intergenic<br>intergenic<br>intergenic<br>intergenic   | HP0651<br>HPP12_0726<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1547<br>HP1134  | HP1582<br>HPPC_00115            |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   
   |   |                      |  |   |   |   |   |  |  |   |                      |  |   
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   |  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S43           S44   | 873717<br>948328<br>1187376<br>1318277<br>1332900<br>1332900<br>1332954<br>1332987<br>1332997<br>1332997<br>1332997<br>1332997<br>1332999<br>1592784<br>1592801<br>1593602<br>99327<br>168379<br>168379<br>168379<br>199597<br>232964<br>276899<br>430922<br>549326<br>672079<br>691071  | C C C C ATTTTTTT C C C C C C C C T T T C G C T T T G G C T T T G G G C C C C  | T         A         ATTTTTTT         A         T         G         C         G         C         C         C         C         ATTG         G         G         T         T         T         A                                 
   
   
   
   
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   |                      |  |   |   |   |   |  |  |   |                      |  | | | | | | | | |
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  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   |   
  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S43           S44           S44      S44      S   | 873717<br>948328<br>1187376<br>1318277<br>1332090<br>1332906<br>133294<br>1332997<br>1332997<br>1332999<br>1592784<br>1592801<br>1593602<br>99327<br>168379<br>232964<br>276989<br>430922<br>549326<br>549326<br>549326<br>549326<br>549326  | C C C C ATTTTTT C C C C C C T T T C C C C   | T         A         ATTITITIT         A         A         T         G         C         G         C         C         C         ATG         G         T         T         T         A         C   
   
   
   
   
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synonymous<br>synonymous<br>intergenic<br>intergenic<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>nonsynonymous<br>frameshift deletion<br>synonymous<br>frameshift deletion<br>synonymous<br>intergenic<br>intergenic<br>intergenic<br>nonsynonymous<br>intergenic<br>nonsynonymous<br>intergenic<br>nonsynonymous<br>intergenic<br>nonsynonymous<br>intergenic<br>nonsynonymous<br>synonymous<br>synonymous<br>synonymous   | HP0651<br>HP012_0726<br>ihp1031<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354   | HP1582<br>HPPC_00115            |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   |   
   |                      |  |   |   |   |   |  |  |   |                      |  | | | | | | | | |
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  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S43           S44           S44      S44      S44   | 873717<br>948328<br>1187376<br>1318527<br>1332290<br>1332906<br>1332954<br>1332996<br>1332995<br>1332997<br>1332999<br>1592784<br>1592801<br>1593602<br>99327<br>168379<br>199597<br>232964<br>276989<br>430922<br>549326<br>672079<br>691077  | C C C C ATTTTTT C C ATTTTTT C C C C C C   | T         A         ATTITITIT         A         A         T         G         C         G         C         C         ATG         G         G         T         T         T         A         C         A   
   
   
   
   
   | SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP   |
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   |   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
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  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   |   
  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S43           S44   | 873717<br>948328<br>1187376<br>1318577<br>1332690<br>1332906<br>1332954<br>1332954<br>1332997<br>1332997<br>1332999<br>1592784<br>1592784<br>1593602<br>99327<br>168379<br>199597<br>232964<br>276989<br>99322<br>549326<br>672079<br>691071<br>691077   | C C C C ATTTTTT C C C C G G C T T T C C C C C C C   | T         A         ATTTTTTT         A         T         T         G         C         G         C         C         C         ATG         G         G         G         G         G         G         G         G         G         G         G         G         G         G         T         T         A         A         A         A         A         A         A         C         A         G         G  
   
   
   
   
   | SNP<br>indel<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>indel<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP  
              | synonymous<br>synonymous<br>intergenic<br>intergenic<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>norsynonymous<br>norsynonymous<br>frameshift deletion<br>synonymous<br>frameshift deletion<br>synonymous<br>intergenic<br>intergenic<br>intergenic<br>norsynonymous<br>intergenic<br>norsynonymous<br>intergenic<br>norsynonymous<br>synonymous<br>intergenic<br>norsynonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>norsynonymous<br>synonymous<br>norsynonymous<br>synonymous   | HP0651<br>HP072_0726<br>HP72_0726<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HPATCC43504_01275<br>HP4TC543504_01275<br>HP4TCC43504_01275<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354<br>HP1354 | HP1582<br>HPPC_00115            |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   |   
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  |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| \$43           \$44           \$44      \$44      \$   | 873717<br>948328<br>1187376<br>1318527<br>1332900<br>1332906<br>1332954<br>1332997<br>1332997<br>1332997<br>1332999<br>1592784<br>1593602<br>99327<br>168379<br>199597<br>232964<br>276989<br>430922<br>549326<br>672079<br>691071<br>691074<br>691074   | C C C C ATTTTTT C C C C C C C C C T T T G G T T G G C C C C   
                   | T         A         ATTTTTTT         A         T         T         G         C         G         C         C         ATTG         G         G         T         T         T         A         A         A         A         A         A         A         A         A         A         A         C         A         G         G         A   
   
   
   
   
   | SNP<br>SNP<br>indel<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP  | synonymous<br>synonymous<br>intergenic<br>intergenic<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>frameshift deletion<br>synonymous<br>frameshift deletion<br>synonymous<br>frameshift deletion<br>synonymous<br>intergenic<br>intergenic<br>intergenic<br>intergenic<br>nonsynonymous<br>intergenic<br>nonsynonymous<br>intergenic<br>nonsynonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>nonsynonymous<br>synonymous<br>nonsynonymous<br>synonymous<br>nonsynonymous  | HP0651           HPP12_0726           jhp1031           HPATCC43504_01275           HPATC243504_01275           HP1354           HP1354           HP1547           HP1134           HP0489   | HP1582<br>HPPC_00115            |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   |   
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                                    |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S43         S43           S44         S44           S44         S44      S44         S44      S44         S44      S44         S44      S44         S44      S44         S44  | 873717<br>948328<br>1187376<br>1318527<br>1332900<br>1332900<br>1332954<br>1332987<br>1332997<br>1332997<br>1332997<br>1332997<br>1332999<br>1592784<br>1592801<br>1593802<br>99327<br>232964<br>276989<br>430922<br>549326<br>672079<br>691071<br>691074<br>691071  | C C C C ATTTTTTT C C C C C C C T T T C G G C T T T GG6GGGGGGGGG C C C C C C C C C C C C C   | T         A         ATTTTTTT         A         T         T         G         C         G         C         C         ATG         G         G         G         G         G         G         G         G         T         T         A         A         A         A         C         A         G         A         C         A         C         A         C         A         C         C         C         C         C         C  
   
   
   
   
   | SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP        
  | synonymous<br>synonymous<br>intergenic<br>intergenic<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>frameshift deletion<br>synonymous<br>frameshift deletion<br>synonymous<br>intergenic<br>intergenic<br>intergenic<br>intergenic<br>nonsynonymous<br>intergenic<br>nonsynonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>nonsynonymous<br>synonymous<br>nonsynonymous<br>synonymous<br>synonymous<br>nonsynonymous<br>synonymous<br>synonymous  | HP0651           HPP12_0726           jhp1031           HPATCC43504_01275           HPATCC43504_01275           HPATCC43504_01275           HPATCC43504_01275           HPATCC43504_01275           HPATCC43504_01275           HPATCC43504_01275           HPATCC43504_01275           HPATCC43504_01275           HPATC243504_01275           HPATC3504_01275           HPATC3504_01275           HPATC43504_01275           HP1354           HP1354           HP1547           HP1134           HP0489   | HP1582<br>HPPC_00115            |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   |  
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   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S43         S43           S44         S44           S44         S44      S44         S44      S44         S44      S44         S44      S44         S44      S44         S44      S44         S44      S44         S44      S44         S44   | 873717<br>948328<br>1187376<br>1318270<br>1332900<br>1332906<br>133294<br>1332987<br>133299<br>133299<br>133299<br>133299<br>133299<br>133299<br>133299<br>133299<br>1592784<br>1592801<br>159370<br>232964<br>276989<br>43092<br>549326<br>549326<br>549326<br>549327<br>691071<br>691074<br>691075<br>691091   | C C C C ATTTTTT C C ATTTTTT C C C C C C   | T         A         ATTITITIT         A         A         T         G         C         G         C         C         ATG         G         G         T         T         T         T         A         A         A         A         A         A         A         A         A         G         A         C         A         G         A         C         A         C         T         T         T         A         C         T         T         T         A         C         T         T         T       
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SNP<br>indel<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>indel<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP                 | synonymous<br>synonymous<br>intergenic<br>intergenic<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>rameshift deletion<br>synonymous<br>frameshift deletion<br>synonymous<br>intergenic<br>intergenic<br>intergenic<br>intergenic<br>norsynonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous   | HP0651           HPP12_0726           jhp1031           HPATCC43504_01275           HP1354           HP1354           HP1547           HP114           HP0489  | HP1582<br>HPPC_00115            |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   |  
                        |                      |  |   |   |   |   |  |  |   |                      |  |   | | | | | | | |
  |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |  
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   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S43         S43           S44         S44           S44         S44      S44         S44      S44         S44      S44         S44      S44         S44      S44         S44      S44         S44      S44         S44      S44         S44   | 873717<br>948328<br>1187376<br>1318277<br>1332900<br>1332906<br>1332954<br>1332987<br>1332997<br>1332997<br>1332997<br>1332997<br>1592784<br>1592801<br>1593602<br>99327<br>168379<br>232964<br>276989<br>430922<br>549326<br>6572079<br>691071<br>691074<br>691074<br>691073<br>691091<br>691133<br>691133  | C C C C ATTTTTT C C ATTTTTT C C C C C C   | T         A         ATTITITIT         A         A         T         G         C         G         C         C         ATG         G         G         T         T         T         T         A         A         A         A         A         A         A         A         A         A         G         G         G         G         A         A         A         A         A         A         A         C         A         G         A         C         T         T         A         A         A       
 A         A         C         C         T         A         C <tr <="" th=""><th>SNP<br/>indel<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>indel<br/>SNP<br/>indel<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP</th><th>synonymous<br/>synonymous<br/>intergenic<br/>intergenic<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>frameshift deletion<br/>synonymous<br/>frameshift deletion<br/>synonymous<br/>frameshift deletion<br/>synonymous<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>nonsynonymous<br/>intergenic<br/>nonsynonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>nonsynonymous<br/>synonymous<br/>nonsynonymous<br/>synonymous<br/>nonsynonymous<br/>synonymous<br/>nonsynonymous<br/>synonymous<br/>nonsynonymous<br/>synonymous<br/>nonsynonymous<br/>synonymous<br/>nonsynonymous<br/>nonsynonymous<br/>nonsynonymous</th><th>HP0651           HPP12_0726           jhp1031           HPATCC43504_01275           HP1354           HP1354           HP1354           HP1354           HP1354           HP1354           HP147           HP148           HP0194           HP134           HP0489           HP0489     <!--</th--><th>HP1582<br/>HPPC_00115</th><th></th></th></tr> <tr><th>S43         S43           S43         S44           S44         S44      S44         S44      S44         S44      S44         S44      S44         S44      S44         S44      S44         S44      S44         S44      S44         S44      S44         S44</th><th>873717<br/>948328<br/>1187376<br/>1318577<br/>1332690<br/>1332906<br/>1332954<br/>1332954<br/>1332997<br/>1332997<br/>1332999<br/>1592784<br/>1592784<br/>1593602<br/>99327<br/>168379<br/>199597<br/>232964<br/>276989<br/>691071<br/>691071<br/>691071<br/>691071<br/>691013<br/>691173</th><th>C C C C ATTTTTT C C C C G G C T T T C C C C C C C</th><th>T         A         ATTTTTTT         A         T         T         G         C         G         C         G         C         G         C         ATG         G         G         G         G         G         G         G         G         G         G         A         A         A         A         G         G         A         G         A         G         A         G         G         G         G</th><th>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP</th><th>synonymous<br/>synonymous<br/>intergenic<br/>intergenic<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>norsynonymous<br/>rameshift deletion<br/>synonymous<br/>frameshift deletion<br/>synonymous<br/>intergenic<br/>intergenic<br/>intergenic<br/>norsynonymous<br/>intergenic<br/>norsynonymous<br/>intergenic<br/>norsynonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>norsynonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>norsynonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>norsynonymous<br/>synonymous<br/>norsynonymous<br/>synonymous<br/>norsynonymous<br/>synonymous<br/>norsynonymous<br/>synonymous<br/>norsynonymous<br/>synonymous<br/>norsynonymous<br/>synonymous<br/>norsynonymous<br/>synonymous<br/>norsynonymous<br/>synonymous<br/>norsynonymous</th><th>HP0651           HPP12_0726           HPP12_0726           HPATCC43504_01275           HP1354           HP1354           HP354           HP1547           HP1144           HP0489           HP0</th><th>HP1582<br/>HPPC_00115</th><th></th></tr> <tr><th>\$43           \$44           \$44      \$44      \$</th><th>873717<br/>948328<br/>1187376<br/>1318277<br/>1332900<br/>1332906<br/>1332954<br/>1332997<br/>1332997<br/>1332997<br/>1332999<br/>1592784<br/>1592784<br/>1593602<br/>99327<br/>168379<br/>199597<br/>232964<br/>276989<br/>691071<br/>691074<br/>691074<br/>691074<br/>691074<br/>691075<br/>691175<br/>691175</th><th>C  C  ATTTTTT  C  ATTTTTTT  C  C  G  G  C  T  T  T  G  G  C  C  C  C  C  C  C  C  C  C  C</th><th>T         A         ATTTTTTT         A         T         T         G         C         G         C         G         C         G         C         ATG         G         G         T         T         T         A         A         A         A         A         C         A         G</th><th>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP</th><th>synonymous<br/>synonymous<br/>intergenic<br/>intergenic<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>frameshift deletion<br/>synonymous<br/>frameshift deletion<br/>synonymous<br/>intergenic<br/>intergenic<br/>nonsynonymous<br/>intergenic<br/>nonsynonymous<br/>intergenic<br/>nonsynonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous</th><th>HP0651           HPP12_0726           Jhp1031           HPATCC43504_01275           HP1354           HP1354           HP1354           HP1354           HP1547           HP1134           HP0489           HP048</th><th>HP1582<br/>HPPC_00115</th><th></th></tr> <tr><th>S43           S43           S44           S44      S44      S44</th><th>873717<br/>948328<br/>1187376<br/>1318527<br/>1332900<br/>1332906<br/>1332954<br/>1332997<br/>1332997<br/>1332997<br/>1332999<br/>1592784<br/>1592784<br/>1593602<br/>99327<br/>168379<br/>199597<br/>232964<br/>276989<br/>430922<br/>691071<br/>691071<br/>691074<br/>691074<br/>691071<br/>691073<br/>691013<br/>691173<br/>691173<br/>691179</th><th>C         ATTTTTTT         C         G         G         C         T         T         G         T         G         T         G         T         G66666666666         C         C         C         C         G         G         C         C         G         G         G         G         G         G         G         G         C         T         G         C         T         G         C         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A</th><th>T         A         ATTITITIT         A         T         T         G         C         G         C         C         G         C         ATTG         G         G         G         G         G         G         T         T         A         A         A         A         A         G         G         A         G      <tr< th=""><th>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP</th><th>synonymous<br/>synonymous<br/>intergenic<br/>intergenic<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>frameshift deletion<br/>synonymous<br/>frameshift deletion<br/>synonymous<br/>frameshift 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     S44         S44           S44         S44      S44         S44      S44         S44      S44         S44      S44         S44      S44         S44      S44         S44      S44         S44      S44         S44      S44         S44      S44         S44      S44         S44      S44         S44     
S44<!--</th--><th>873717<br/>948328<br/>1187376<br/>1318277<br/>1332900<br/>1332900<br/>1332937<br/>1332997<br/>1332997<br/>1332997<br/>1332997<br/>1332997<br/>1332997<br/>1332997<br/>1332997<br/>1592784<br/>1592801<br/>1593602<br/>99327<br/>138279<br/>199597<br/>232964<br/>276989<br/>430927<br/>549326<br/>430927<br/>549326<br/>430927<br/>691071<br/>691074<br/>691077<br/>691089<br/>691073<br/>691173<br/>691173<br/>691175<br/>691175<br/>691185</th><th>C C C C ATTTTTTT C C ATTTTTTT C C C C C</th><th>T         A         ATTITITIT         A         A         T         G         C         G         C         C         C         ATG         G         G         G         G         G         G         G         G         A         A         A         A         A         A         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&lt;</th><th>873717<br/>948328<br/>1187376<br/>1318277<br/>1332900<br/>1332906<br/>1332954<br/>1332987<br/>1332996<br/>1332991<br/>1332991<br/>1332991<br/>1592784<br/>1592784<br/>1592801<br/>1593784<br/>1593802<br/>99327<br/>1593784<br/>276989<br/>430922<br/>549326<br/>430922<br/>549326<br/>430922<br/>549326<br/>430927<br/>691071<br/>691074<br/>691074<br/>691074<br/>691075<br/>691173<br/>691175<br/>691175<br/>691179<br/>691189</th><th>C         ATTTITITT         C         G         C         T         T         G         T         GGGGGGGGGGGG         C         T         TGGGGGGGGGGGG         C         C         C         G         T         TGGGGGGGGGGGGG         C         C         G         G         G         G         G         G         G         G         G         G         G         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A       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HP0489</th><th>HP1582<br/>HPPC_00115<br/>jhp1163</th><th></th></tr> <tr><th>S43           S43           S44           S44      S44      S44</th><th>873717<br/>948328<br/>1187376<br/>1318577<br/>1332690<br/>1332906<br/>1332954<br/>1332954<br/>1332997<br/>1332997<br/>1332999<br/>1592784<br/>1592784<br/>1593602<br/>99327<br/>168379<br/>99327<br/>168379<br/>99327<br/>168379<br/>199597<br/>232964<br/>276989<br/>430922<br/>549326<br/>672079<br/>691071<br/>691071<br/>691071<br/>691071<br/>691089<br/>691071<br/>691073<br/>691173<br/>691173<br/>691175<br/>691179<br/>691175<br/>691179</th><th>C         ATTTITITT         C         G         G         T         T         G         T         T         T         T         T         T         T         T         T         T         T         TGGGGGGGGGGGG         C         C         G         G         G         G         G         G         G         G         G         C         G         G         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A     <th>T         A         ATTITITIT         A         A         T         G         C         G         C         C         C         ATG         G         G         G         G         G         G         G         G         A         A         A         A         A         A         G</th><th>SNP<br/>SNP<br/>indel<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP</th><th>synonymous<br/>synonymous<br/>intergenic<br/>intergenic<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>nonsynonymous<br/>synonymous<br/>frameshift deletion<br/>synonymous<br/>frameshift 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HP1354           HP1354           HP1354           HP1354           HP147           HP147           HP148           HP0489           HP048</th><th>HP1582<br/>HPPC_00115</th><th></th></th></tr> <tr><th>S43           S43           S44           S44      S44      S44</th><th>873717<br/>948328<br/>1187376<br/>1318577<br/>1332900<br/>1332906<br/>1332954<br/>1332997<br/>1332997<br/>1332997<br/>1332999<br/>1592784<br/>1592784<br/>1593602<br/>99327<br/>168379<br/>199597<br/>232964<br/>276989<br/>99327<br/>168379<br/>199597<br/>232964<br/>276989<br/>691071<br/>691074<br/>691074<br/>691074<br/>691074<br/>691074<br/>691071<br/>691089<br/>691091<br/>691133<br/>691175<br/>691185<br/>691185<br/>691185</th><th>C         ATTTTTTT         C         ATTTTTTT         C         G         G         T         T         G         T         G         T         GGGGGGGGGGGG         C         C         C         C         C         C         C         G         G         G         G         G         G         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S44</th><th>873717<br/>948328<br/>1187376<br/>1318277<br/>1332900<br/>1332906<br/>1332954<br/>1332997<br/>1332997<br/>1332997<br/>1332997<br/>1332999<br/>1592784<br/>1593602<br/>99327<br/>168379<br/>199597<br/>232964<br/>276989<br/>430922<br/>691071<br/>691071<br/>691071<br/>691074<br/>691071<br/>691074<br/>691071<br/>691073<br/>691071<br/>691073<br/>691071<br/>691073<br/>691073<br/>691073<br/>691173<br/>691173<br/>691173<br/>691173<br/>691179<br/>691189<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>69100<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190<br/>691190</th><th>C 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G</th><th>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP</th><th>synonymous<br/>synonymous<br/>intergenic<br/>intergenic<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>frameshift deletion<br/>synonymous<br/>frameshift deletion<br/>synonymous<br/>frameshift 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Jhp1031           HPATCC43504_01275           HP1354           HP1354           HP1354           HP1354           HP1547           HP1134           HP0489           HP048</th><th>HP1582<br/>HPPC_00115<br/>jhp1163</th><th></th></tr> <tr><th>S43           S43           S44           S44      S44      S44</th><th>873717<br/>948328<br/>1187376<br/>1318277<br/>1332900<br/>1332900<br/>1332954<br/>1332997<br/>1332997<br/>1332997<br/>1332997<br/>1332997<br/>1332997<br/>1332997<br/>1332997<br/>1592784<br/>1592801<br/>1593702<br/>199327<br/>232964<br/>276989<br/>430922<br/>549326<br/>672079<br/>691071<br/>691074<br/>691071<br/>691074<br/>691071<br/>691074<br/>691071<br/>691071<br/>691075<br/>691091<br/>691175<br/>691185<br/>691190<br/>691185<br/>691190<br/>691185<br/>691190<br/>691185<br/>691190<br/>691193</th><th>С<br/>С<br/>АТТТТТТТ<br/>С<br/>С<br/>С<br/>С<br/>С<br/>С<br/>С<br/>С<br/>С<br/>С<br/>С<br/>С<br/>С</th><th>T         A         ATTITITIT         A         A         T         G         C         G         C         C         C         ATG         G         G         G         G         G         G         G         G         T         T         A         A         A         A         A         G</th><th>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP</th><th>synonymous<br/>synonymous<br/>intergenic<br/>intergenic<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>frameshift deletion<br/>synonymous<br/>frameshift deletion<br/>synonymous<br/>frameshift deletion<br/>synonymous<br/>intergenic<br/>intergenic<br/>intergenic<br/>nonsynonymous<br/>intergenic<br/>nonsynonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>nonsynonymous<br/>synonymous<br/>nonsynonymous<br/>synonymous<br/>nonsynonymous<br/>synonymous<br/>nonsynonymous<br/>synonymous<br/>nonsynonymous<br/>synonymous<br/>nonsynonymous<br/>synonymous<br/>nonsynonymous<br/>nonsynonymous<br/>nonsynonymous<br/>nonsynonymous<br/>nonsynonymous<br/>nonsynonymous<br/>nonsynonymous<br/>nonsynonymous<br/>nonsynonymous<br/>nonsynonymous<br/>nonsynonymous<br/>nonsynonymous<br/>nonsynonymous<br/>nonsynonymous<br/>nonsynonymous<br/>nonsynonymous<br/>nonsynonymous<br/>nonsynonymous<br/>nonsynonymous<br/>nonsynonymous<br/>nonsynonymous<br/>nonsynonymous<br/>nonsynonymous<br/>nonsynonymous</th><th>HP0651           HPP12_0726           jhp1031           HPATCC43504_01275           HP1354           HP1354           HP1354           HP0154           HP0154           HP0154           HP0489           HP0489</th><th>HP1582<br/>HPPC_00115<br/>jhp1163</th><th></th></tr> <tr><th>S43           S43           S44           S44      S44      S44</th><th>873717<br/>948328<br/>1187376<br/>131827<br/>1332900<br/>1332900<br/>1332954<br/>1332997<br/>133299<br/>133299<br/>133299<br/>133299<br/>133299<br/>1332997<br/>1332997<br/>1332997<br/>1332997<br/>1332997<br/>1332997<br/>1332997<br/>1332997<br/>133299<br/>1592784<br/>1592801<br/>1593784<br/>1593264<br/>276989<br/>430922<br/>549326<br/>430927<br/>691071<br/>691074<br/>691074<br/>691074<br/>691074<br/>691075<br/>691071<br/>691173<br/>691173<br/>691173<br/>691175<br/>691175<br/>691179<br/>691189<br/>691189<br/>691189<br/>691189<br/>691189<br/>691189<br/>691189<br/>691189<br/>691189<br/>691189<br/>691189</th><th>C         C         ATTITITT         C         G         C         T         T         G         T         GGGGGGGGGGG         C         C         G         T         GGGGGGGGGGGG         C         C         G         G         G         C         G         G         G         G         G         G         G         G         G         G         C         A         G         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C</th><th>T         A         ATTITITIT         A         A         T         G         C         G         C         ATG         G         C         ATG         G         G         T         T         T         T         T         T         A         A         A         A         A         G      <t< th=""><th>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP</th><th>synonymous<br/>synonymous<br/>intergenic<br/>intergenic<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>rameshift deletion<br/>synonymous<br/>frameshift deletion<br/>synonymous<br/>frameshift deletion<br/>synonymous<br/>intergenic<br/>intergenic<br/>norsynonymous<br/>synonymous<br/>intergenic<br/>norsynonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>norsynonymous<br/>synonymous<br/>norsynonymous<br/>synonymous<br/>norsynonymous<br/>synonymous<br/>norsynonymous<br/>norsynonymous<br/>synonymous<br/>norsynonymous<br/>synonymous<br/>norsynonymous<br/>norsynonymous<br/>norsynonymous<br/>norsynonymous<br/>norsynonymous<br/>norsynonymous<br/>synonymous<br/>norsynonymous<br/>synonymous<br/>norsynonymous<br/>norsynonymous<br/>norsynonymous<br/>norsynonymous<br/>norsynonymous<br/>norsynonymous<br/>norsynonymous<br/>norsynonymous<br/>norsynonymous<br/>norsynonymous<br/>norsynonymous<br/>synonymous<br/>synonymous</th><th>HP0651           HPP12_0726           ijhp1031           HPATCC43504_01275           HP1354           HP1354           HP1354           HP1354           HP0489           HP0489</th><th>HP1582<br/>HPPC_00115<br/>jhp1163</th><th></th></t<></th></tr> | SNP<br>indel<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>indel<br>SNP<br>indel<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP        | synonymous<br>synonymous<br>intergenic<br>intergenic<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>frameshift deletion<br>synonymous<br>frameshift deletion<br>synonymous<br>frameshift deletion<br>synonymous<br>intergenic<br>intergenic<br>intergenic<br>intergenic<br>intergenic<br>intergenic<br>intergenic<br>intergenic<br>nonsynonymous<br>intergenic<br>nonsynonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>nonsynonymous<br>synonymous<br>nonsynonymous<br>synonymous<br>nonsynonymous<br>synonymous<br>nonsynonymous<br>synonymous<br>nonsynonymous<br>synonymous<br>nonsynonymous<br>synonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous   | HP0651           HPP12_0726           jhp1031           HPATCC43504_01275           HP1354           HP1354           HP1354           HP1354           HP1354           HP1354           HP147           HP148           HP0194           HP134           HP0489           HP0489 </th <th>HP1582<br/>HPPC_00115</th> <th></th>  | HP1582<br>HPPC_00115            |                      | S43         S43           S43         S44           S44         S44      S44         S44      S44         S44      S44         S44      S44         S44      S44         S44      S44         S44      S44         S44      S44         S44      S44         S44 |
873717<br>948328<br>1187376<br>1318577<br>1332690<br>1332906<br>1332954<br>1332954<br>1332997<br>1332997<br>1332999<br>1592784<br>1592784<br>1593602<br>99327<br>168379<br>199597<br>232964<br>276989<br>691071<br>691071<br>691071<br>691071<br>691013<br>691173 | C C C C ATTTTTT C C C C G G C T T T C C C C C C C | T         A         ATTTTTTT         A         T         T         G         C         G         C         G         C         G         C         ATG         G         G         G         G         G         G         G         G         G         G         A         A         A         A         G         G         A         G         A         G         A         G         G         G         G | SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP | synonymous<br>synonymous<br>intergenic<br>intergenic<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>norsynonymous<br>rameshift deletion<br>synonymous<br>frameshift deletion<br>synonymous<br>intergenic<br>intergenic<br>intergenic<br>norsynonymous<br>intergenic<br>norsynonymous<br>intergenic<br>norsynonymous<br>synonymous<br>synonymous<br>synonymous<br>norsynonymous<br>synonymous<br>synonymous<br>synonymous<br>norsynonymous<br>synonymous<br>synonymous<br>synonymous<br>norsynonymous<br>synonymous<br>norsynonymous<br>synonymous<br>norsynonymous<br>synonymous<br>norsynonymous<br>synonymous<br>norsynonymous<br>synonymous<br>norsynonymous<br>synonymous<br>norsynonymous<br>synonymous<br>norsynonymous<br>synonymous<br>norsynonymous | HP0651           HPP12_0726           HPP12_0726           HPATCC43504_01275           HP1354           HP1354           HP354           HP1547           HP1144           HP0489           HP0 | HP1582<br>HPPC_00115 |  | \$43           \$44           \$44      \$44      \$ | 873717<br>948328<br>1187376<br>1318277<br>1332900<br>1332906<br>1332954<br>1332997<br>1332997<br>1332997<br>1332999<br>1592784<br>1592784<br>1593602<br>99327<br>168379<br>199597<br>232964<br>276989<br>691071<br>691074<br>691074<br>691074<br>691074<br>691075<br>691175<br>691175 | C  C  ATTTTTT  C  ATTTTTTT  C  C  G  G  C  T  T  T  G  G  C  C  C  C  C  C  C  C  C  C  C | T         A         ATTTTTTT         A         T         T         G         C         G         C         G         C         G         C         ATG         G         G         T         T         T         A         A         A         A         A         C         A         G | SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP | synonymous<br>synonymous<br>intergenic<br>intergenic<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>frameshift deletion<br>synonymous<br>frameshift deletion<br>synonymous<br>intergenic<br>intergenic<br>nonsynonymous<br>intergenic<br>nonsynonymous<br>intergenic<br>nonsynonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous | HP0651           HPP12_0726           Jhp1031           HPATCC43504_01275           HP1354           HP1354           HP1354           HP1354           HP1547           HP1134           HP0489           HP048 | HP1582<br>HPPC_00115 |  | S43           S44           S44      S44      S44 | 873717<br>948328<br>1187376<br>1318527<br>1332900<br>1332906<br>1332954<br>1332997<br>1332997<br>1332997<br>1332999<br>1592784<br>1592784<br>1593602<br>99327<br>168379<br>199597<br>232964<br>276989<br>430922<br>691071<br>691071<br>691074<br>691074<br>691071<br>691073<br>691013<br>691173<br>691173<br>691179 | C         ATTTTTTT         C         G         G         C         T         T         G         T         G         T         G         T         G66666666666         C         C         C         C         G         G         C         C         G         G         G         G         G         G         G         G         C         T         G         C         T         G         C         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A | T         A         ATTITITIT         A         T         T         G         C         G         C         C         G         C         ATTG         G         G         G         G         G         G         T         T         A         A         A         A         A         G         G         A         G <tr< th=""><th>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP</th><th>synonymous<br/>synonymous<br/>intergenic<br/>intergenic<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>frameshift deletion<br/>synonymous<br/>frameshift deletion<br/>synonymous<br/>frameshift deletion<br/>synonymous<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>nonsynonymous<br/>intergenic<br/>nonsynonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>nonsynonymous<br/>nonsynonymous<br/>nonsynonymous<br/>nonsynonymous<br/>nonsynonymous<br/>synonymous<br/>nonsynonymous<br/>synonymous<br/>nonsynonymous<br/>synonymous<br/>nonsynonymous<br/>synonymous<br/>nonsynonymous<br/>synonymous<br/>nonsynonymous<br/>synonymous<br/>nonsynonymous<br/>synonymous<br/>nonsynonymous<br/>synonymous<br/>nonsynonymous</th><th>HP0651           HPP12_0726           jhp1031           HPATCC43504_01275           HPATC50430_01275           HPATCC43504_01275           HPATCC43504_01275           HPATC50430_01275           HPATC743504_01275           HP1354           HP1354           HP1354           HP1354           HP0489           HP0489</th><th>HP1582<br/>HPPC_00115</th><th></th></tr<> | SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP | synonymous<br>synonymous<br>intergenic<br>intergenic<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>frameshift deletion<br>synonymous<br>frameshift deletion<br>synonymous<br>frameshift deletion<br>synonymous<br>intergenic<br>intergenic<br>intergenic<br>intergenic<br>intergenic<br>nonsynonymous<br>intergenic<br>nonsynonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>synonymous<br>nonsynonymous<br>synonymous<br>nonsynonymous<br>synonymous<br>nonsynonymous<br>synonymous<br>nonsynonymous<br>synonymous<br>nonsynonymous<br>synonymous<br>nonsynonymous<br>synonymous<br>nonsynonymous<br>synonymous<br>nonsynonymous | HP0651           HPP12_0726           jhp1031           HPATCC43504_01275           HPATC50430_01275           HPATCC43504_01275           HPATCC43504_01275           HPATC50430_01275           HPATC743504_01275           HP1354           HP1354           HP1354           HP1354           HP0489           HP0489 | HP1582<br>HPPC_00115 |  | S43         S43           S44         S44           S44         S44      S44         S44      S44         S44      S44         S44      S44         S44      S44         S44      S44         S44      S44         S44      S44         S44      S44         S44      S44         S44      S44         S44      S44         S44      S44 </th <th>873717<br/>948328<br/>1187376<br/>1318277<br/>1332900<br/>1332900<br/>1332937<br/>1332997<br/>1332997<br/>1332997<br/>1332997<br/>1332997<br/>1332997<br/>1332997<br/>1332997<br/>1592784<br/>1592801<br/>1593602<br/>99327<br/>138279<br/>199597<br/>232964<br/>276989<br/>430927<br/>549326<br/>430927<br/>549326<br/>430927<br/>691071<br/>691074<br/>691077<br/>691089<br/>691073<br/>691173<br/>691173<br/>691175<br/>691175<br/>691185</th> <th>C C C C ATTTTTTT C C ATTTTTTT C C C C C</th> <th>T         A         ATTITITIT         A         A         T         G         C         G         C         C         C         ATG         G         G         G         G         G         G         G         G         A         A         A         A         A         A         G</th> <th>SNP<br/>SNP<br/>indel<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP</th>
<th>synonymous<br/>synonymous<br/>intergenic<br/>intergenic<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>frameshift deletion<br/>synonymous<br/>frameshift deletion<br/>synonymous<br/>frameshift deletion<br/>synonymous<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>nonsynonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>nonsynonymous<br/>synonymous<br/>nonsynonymous<br/>synonymous<br/>nonsynonymous<br/>nonsynonymous<br/>nonsynonymous</th> <th>HP0651           HPP12_0726           jhp1031           HPATCC43504_01275           HP1354           HP1354           HP1354           HP154           HP0489           HP0489</th> <th>HP1582<br/>HPPC_00115</th> <th></th> | 873717<br>948328<br>1187376<br>1318277<br>1332900<br>1332900<br>1332937<br>1332997<br>1332997<br>1332997<br>1332997<br>1332997<br>1332997<br>1332997<br>1332997<br>1592784<br>1592801<br>1593602<br>99327<br>138279<br>199597<br>232964<br>276989<br>430927<br>549326<br>430927<br>549326<br>430927<br>691071<br>691074<br>691077<br>691089<br>691073<br>691173<br>691173<br>691175<br>691175<br>691185 | C C C C ATTTTTTT C C ATTTTTTT C C C C C | T         A         ATTITITIT         A         A         T         G         C         G         C         C         C         ATG         G         G         G         G         G         G         G         G         A         A         A         A         A         A         G | SNP<br>SNP<br>indel<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP | synonymous<br>synonymous<br>intergenic<br>intergenic<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>frameshift deletion<br>synonymous<br>frameshift deletion<br>synonymous<br>frameshift deletion<br>synonymous<br>intergenic<br>intergenic<br>intergenic<br>intergenic<br>intergenic<br>nonsynonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>nonsynonymous<br>synonymous<br>nonsynonymous<br>synonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous | HP0651           HPP12_0726           jhp1031           HPATCC43504_01275           HP1354           HP1354           HP1354           HP154           HP0489           HP0489 | HP1582<br>HPPC_00115 |  | S43           S44           S44      S44      S44      S44     < | 873717<br>948328<br>1187376<br>1318277<br>1332900<br>1332906<br>1332954<br>1332987<br>1332996<br>1332991<br>1332991<br>1332991<br>1592784<br>1592784<br>1592801<br>1593784<br>1593802<br>99327<br>1593784<br>276989<br>430922<br>549326<br>430922<br>549326<br>430922<br>549326<br>430927<br>691071<br>691074<br>691074<br>691074<br>691075<br>691173<br>691175<br>691175<br>691179<br>691189 | C         ATTTITITT         C         G         C         T         T         G         T         GGGGGGGGGGGG         C         T         TGGGGGGGGGGGG         C         C         C         G         T         TGGGGGGGGGGGGG         C         C         G         G         G         G         G         G         G         G         G         G         G         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C | T         A         ATTITITIT         A         A         T         G         C         G         C         C         ATG         G         G         C         A         G         G         G         G         G         T         T         A         A         A         A         G | SNP<br>SNP<br>indel<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>indel<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP | synonymous<br>synonymous<br>intergenic<br>intergenic<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>frameshift deletion<br>synonymous<br>frameshift deletion<br>synonymous<br>frameshift deletion<br>synonymous<br>intergenic<br>intergenic<br>intergenic<br>nonsynonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>nonsynonymous<br>synonymous<br>nonsynonymous<br>synonymous<br>synonymous<br>synonymous<br>nonsynonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>nonsynonymous<br>synonymous<br>synonymous<br>nonsynonymous<br>synonymous<br>nonsynonymous<br>synonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous | HP0651           HPP12_0726           jhp1031           HPATCC43504_01275           HPATC50430_01275           HPATCC43504_01275           HPATCC43504_01275           HPATC50430_01275           HPATC743504_01275           HP1354           HP1354           HP1354           HP1354           HP0489           HP0489 | HP1582<br>HPPC_00115<br>jhp1163 |  | S43           S44           S44      S44      S44 | 873717<br>948328<br>1187376<br>1318577<br>1332690<br>1332906<br>1332954<br>1332954<br>1332997<br>1332997<br>1332999<br>1592784<br>1592784<br>1593602<br>99327<br>168379<br>99327<br>168379<br>99327<br>168379<br>199597<br>232964<br>276989<br>430922<br>549326<br>672079<br>691071<br>691071<br>691071<br>691071<br>691089<br>691071<br>691073<br>691173<br>691173<br>691175<br>691179<br>691175<br>691179 | C         ATTTITITT         C         G         G         T         T         G         T         T         T         T         T         T         T         T         T         T         T         TGGGGGGGGGGGG         C         C         G         G         G         G         G         G         G         G         G         C         G         G         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A <th>T         A         ATTITITIT         A         A         T         G         C         G         C         C         C         ATG         G         G         G         G         G         G         G         G         A         A         A         A         A         A         G</th> <th>SNP<br/>SNP<br/>indel<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP</th> <th>synonymous<br/>synonymous<br/>intergenic<br/>intergenic<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>nonsynonymous<br/>synonymous<br/>frameshift deletion<br/>synonymous<br/>frameshift 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HP1354           HP1354           HP1354           HP1354           HP147           HP147           HP148           HP0489           HP048</th> <th>HP1582<br/>HPPC_00115</th> <th></th> | T         A         ATTITITIT         A         A         T         G         C         G         C         C         C         ATG         G         G         G         G         G         G         G         G         A         A         A         A         A         A         G | SNP<br>SNP<br>indel<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP |
synonymous<br>synonymous<br>intergenic<br>intergenic<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>nonsynonymous<br>synonymous<br>frameshift deletion<br>synonymous<br>frameshift 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         HP147           HP147           HP148           HP0489           HP048 | HP1582<br>HPPC_00115 |  | S43           S44           S44      S44      S44 | 873717<br>948328<br>1187376<br>1318577<br>1332900<br>1332906<br>1332954<br>1332997<br>1332997<br>1332997<br>1332999<br>1592784<br>1592784<br>1593602<br>99327<br>168379<br>199597<br>232964<br>276989<br>99327<br>168379<br>199597<br>232964<br>276989<br>691071<br>691074<br>691074<br>691074<br>691074<br>691074<br>691071<br>691089<br>691091<br>691133<br>691175<br>691185<br>691185<br>691185 | C         ATTTTTTT         C         ATTTTTTT         C         G         G         T         T         G         T         G         T         GGGGGGGGGGGG         C         C         C         C         C         C         C         G         G         G         G         G         G         G         G         G         G         G         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A | T         A         ATTITITIT         A         T         G         C         G         C         G         C         G         C         G         C         G         G         G         G         G         G         T         T         A         A         A         A         G | SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP | synonymous<br>synonymous<br>intergenic<br>intergenic<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>frameshift deletion<br>synonymous<br>frameshift 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873717<br>948328<br>1187376<br>1318277<br>1332900<br>1332906<br>1332954<br>1332997<br>1332997<br>1332997<br>1332997<br>1332999<br>1592784<br>1593602<br>99327<br>168379<br>199597<br>232964<br>276989<br>430922<br>691071<br>691071<br>691071<br>691074<br>691071<br>691074<br>691071<br>691073<br>691071<br>691073<br>691071<br>691073<br>691073<br>691073<br>691173<br>691173<br>691173<br>691173<br>691179<br>691189<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>69100<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190 | C         C         ATTITITT         C         G         C         T         T         T         G         T         G         T         GGGGGGGGGGGG         C         C         C         C         C         C         G         G         G         C         G         G         G         G         G         G         G         C         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         G         C         A         G         C         A | T         A         ATTITITIT         A         T         T         G         C         G         C         G         C         ATTG         G         C         ATG         G         G         T         T         T         A         A         A         A         C         A         G      < | SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP | 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HP1582<br>HPPC_00115<br>jhp1163 |  | S43           S44           S44      S44      S44 |
873717<br>948328<br>1187376<br>1318577<br>1332900<br>1332906<br>1332954<br>1332997<br>1332997<br>1332997<br>1332999<br>1592784<br>1592784<br>1593602<br>99327<br>168379<br>199597<br>232964<br>276989<br>99327<br>168379<br>199597<br>232964<br>276989<br>691071<br>691074<br>691074<br>691074<br>691074<br>691074<br>691071<br>691089<br>691091<br>691133<br>691175<br>691185<br>691185<br>691185 | С<br>С<br>АТТТТТТТ<br>С<br>С<br>С<br>С<br>С<br>С<br>С<br>С<br>С<br>С<br>С<br>С<br>С | T         A         ATTITITIT         A         T         G         C         G         C         G         C         G         C         G         C         G         G         G         G         G         G         T         T         A         A         A         A         G | SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP | synonymous<br>synonymous<br>intergenic<br>intergenic<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>frameshift 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HP1547           HP1134           HP0489           HP048 | HP1582<br>HPPC_00115<br>jhp1163 |  | S43           S44           S44      S44      S44 | 873717<br>948328<br>1187376<br>1318277<br>1332900<br>1332900<br>1332954<br>1332997<br>1332997<br>1332997<br>1332997<br>1332997<br>1332997<br>1332997<br>1332997<br>1592784<br>1592801<br>1593702<br>199327<br>232964<br>276989<br>430922<br>549326<br>672079<br>691071<br>691074<br>691071<br>691074<br>691071<br>691074<br>691071<br>691071<br>691075<br>691091<br>691175<br>691185<br>691190<br>691185<br>691190<br>691185<br>691190<br>691185<br>691190<br>691193 | С<br>С<br>АТТТТТТТ<br>С<br>С<br>С<br>С<br>С<br>С<br>С<br>С<br>С<br>С<br>С<br>С<br>С | T         A         ATTITITIT         A         A         T         G         C         G         C         C         C         ATG         G         G         G         G         G         G         G         G         T         T         A         A         A         A         A         G | 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HP1582<br>HPPC_00115<br>jhp1163 |  | S43           S44           S44      S44      S44 | 873717<br>948328<br>1187376<br>131827<br>1332900<br>1332900<br>1332954<br>1332997<br>133299<br>133299<br>133299<br>133299<br>133299<br>1332997<br>1332997<br>1332997<br>1332997<br>1332997<br>1332997<br>1332997<br>1332997<br>133299<br>1592784<br>1592801<br>1593784<br>1593264<br>276989<br>430922<br>549326<br>430927<br>691071<br>691074<br>691074<br>691074<br>691074<br>691075<br>691071<br>691173<br>691173<br>691173<br>691175<br>691175<br>691179<br>691189<br>691189<br>691189<br>691189<br>691189<br>691189<br>691189<br>691189<br>691189<br>691189<br>691189 | C         C         ATTITITT         C         G         C         T         T         G         T         GGGGGGGGGGG         C         C         G         T         GGGGGGGGGGGG         C         C         G         G         G         C         G         G         G         G         G         G         G         G         G         G         C         A         G         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C | T         A         ATTITITIT         A         A         T         G         C         G         C         ATG         G         C         ATG         G         G         T         T         T         T         T         T         A         A         A         A         A         G <t< th=""><th>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP</th><th>synonymous<br/>synonymous<br/>intergenic<br/>intergenic<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>rameshift deletion<br/>synonymous<br/>frameshift deletion<br/>synonymous<br/>frameshift 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HP0489           HP0489</th><th>HP1582<br/>HPPC_00115<br/>jhp1163</th><th></th></t<> | SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP | synonymous<br>synonymous<br>intergenic<br>intergenic<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>rameshift deletion<br>synonymous<br>frameshift deletion<br>synonymous<br>frameshift deletion<br>synonymous<br>intergenic<br>intergenic<br>norsynonymous<br>synonymous<br>intergenic<br>norsynonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>norsynonymous<br>synonymous<br>norsynonymous<br>synonymous<br>norsynonymous<br>synonymous<br>norsynonymous<br>norsynonymous<br>synonymous<br>norsynonymous<br>synonymous<br>norsynonymous<br>norsynonymous<br>norsynonymous<br>norsynonymous<br>norsynonymous<br>norsynonymous<br>synonymous<br>norsynonymous<br>synonymous<br>norsynonymous<br>norsynonymous<br>norsynonymous<br>norsynonymous<br>norsynonymous<br>norsynonymous<br>norsynonymous<br>norsynonymous<br>norsynonymous<br>norsynonymous<br>norsynonymous<br>synonymous<br>synonymous | HP0651           HPP12_0726           ijhp1031           HPATCC43504_01275           HP1354           HP1354           HP1354           HP1354           HP0489           HP0489 | HP1582<br>HPPC_00115<br>jhp1163 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| SNP<br>indel<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>indel<br>SNP<br>indel<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP   | synonymous<br>synonymous<br>intergenic<br>intergenic<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>frameshift deletion<br>synonymous<br>frameshift deletion<br>synonymous<br>frameshift deletion<br>synonymous<br>intergenic<br>intergenic<br>intergenic<br>intergenic<br>intergenic<br>intergenic<br>intergenic<br>intergenic<br>nonsynonymous<br>intergenic<br>nonsynonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>nonsynonymous<br>synonymous<br>nonsynonymous<br>synonymous<br>nonsynonymous<br>synonymous<br>nonsynonymous<br>synonymous<br>nonsynonymous<br>synonymous<br>nonsynonymous<br>synonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous   | HP0651           HPP12_0726           jhp1031           HPATCC43504_01275           HP1354           HP1354           HP1354           HP1354           HP1354           HP1354           HP147           HP148           HP0194           HP134           HP0489           HP0489 </th <th>HP1582<br/>HPPC_00115</th> <th></th>   | HP1582<br>HPPC_00115   
   
   
   
   
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   |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S43         S43           S43         S44           S44         S44      S44         S44      S44         S44      S44         S44      S44         S44      S44         S44      S44         S44      S44         S44      S44         S44      S44         S44  | 873717<br>948328<br>1187376<br>1318577<br>1332690<br>1332906<br>1332954<br>1332954<br>1332997<br>1332997<br>1332999<br>1592784<br>1592784<br>1593602<br>99327<br>168379<br>199597<br>232964<br>276989<br>691071<br>691071<br>691071<br>691071<br>691013<br>691173  | C C C C ATTTTTT C C C C G G C T T T C C C C C C C   | T         A         ATTTTTTT         A         T         T         G         C         G         C         G         C         G         C         ATG         G         G         G         G         G         G         G         G         G         G         A         A         A         A         G         G         A         G         A         G         A         G         G         G         G  
   
   
   
   
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|  |   |   |   |   |  |  |   |                      |  |   |   
   |   |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   |  |   |  
  |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| \$43           \$44           \$44      \$44      \$   | 873717<br>948328<br>1187376<br>1318277<br>1332900<br>1332906<br>1332954<br>1332997<br>1332997<br>1332997<br>1332999<br>1592784<br>1592784<br>1593602<br>99327<br>168379<br>199597<br>232964<br>276989<br>691071<br>691074<br>691074<br>691074<br>691074<br>691075<br>691175<br>691175  | C  C  ATTTTTT  C  ATTTTTTT  C  C  G  G  C  T  T  T  G  G  C  C  C  C  C  C  C  C  C  C  C   
                   | T         A         ATTTTTTT         A         T         T         G         C         G         C         G         C         G         C         ATG         G         G         T         T         T         A         A         A         A         A         C         A         G  
   
   
   
   
   | SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP   | synonymous<br>synonymous<br>intergenic<br>intergenic<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>frameshift deletion<br>synonymous<br>frameshift deletion<br>synonymous<br>intergenic<br>intergenic<br>nonsynonymous<br>intergenic<br>nonsynonymous<br>intergenic<br>nonsynonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous  | HP0651           HPP12_0726           Jhp1031           HPATCC43504_01275           HP1354           HP1354           HP1354           HP1354           HP1547           HP1134           HP0489           HP048  | HP1582<br>HPPC_00115            |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   |  
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   |   |   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S43           S44           S44      S44      S44   | 873717<br>948328<br>1187376<br>1318527<br>1332900<br>1332906<br>1332954<br>1332997<br>1332997<br>1332997<br>1332999<br>1592784<br>1592784<br>1593602<br>99327<br>168379<br>199597<br>232964<br>276989<br>430922<br>691071<br>691071<br>691074<br>691074<br>691071<br>691073<br>691013<br>691173<br>691173<br>691179  | C         ATTTTTTT         C         G         G         C         T         T         G         T         G         T         G         T         G66666666666         C         C         C         C         G         G         C         C         G         G         G         G         G         G         G         G         C         T         G         C         T         G         C         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A   | T         A         ATTITITIT         A         T         T         G         C         G         C         C         G         C         ATTG         G         G         G         G         G         G         T         T         A         A         A         A         A         G         G         A         G <tr<
th=""><th>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP</th><th>synonymous<br/>synonymous<br/>intergenic<br/>intergenic<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>frameshift deletion<br/>synonymous<br/>frameshift deletion<br/>synonymous<br/>frameshift deletion<br/>synonymous<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>nonsynonymous<br/>intergenic<br/>nonsynonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>nonsynonymous<br/>nonsynonymous<br/>nonsynonymous<br/>nonsynonymous<br/>nonsynonymous<br/>synonymous<br/>nonsynonymous<br/>synonymous<br/>nonsynonymous<br/>synonymous<br/>nonsynonymous<br/>synonymous<br/>nonsynonymous<br/>synonymous<br/>nonsynonymous<br/>synonymous<br/>nonsynonymous<br/>synonymous<br/>nonsynonymous<br/>synonymous<br/>nonsynonymous</th><th>HP0651           HPP12_0726           jhp1031           HPATCC43504_01275           HPATC50430_01275           HPATCC43504_01275           HPATCC43504_01275           HPATC50430_01275           HPATC743504_01275           HP1354           HP1354           HP1354           HP1354           HP0489           HP0489</th><th>HP1582<br/>HPPC_00115</th><th></th></tr<>  
   
   
   
  | SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP   | synonymous<br>synonymous<br>intergenic<br>intergenic<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>frameshift deletion<br>synonymous<br>frameshift deletion<br>synonymous<br>frameshift
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   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S43         S43           S44         S44           S44         S44      S44         S44      S44         S44      S44         S44      S44         S44      S44         S44      S44         S44      S44         S44      S44         S44      S44         S44      S44         S44      S44         S44      S44         S44      S44 </th <th>873717<br/>948328<br/>1187376<br/>1318277<br/>1332900<br/>1332900<br/>1332937<br/>1332997<br/>1332997<br/>1332997<br/>1332997<br/>1332997<br/>1332997<br/>1332997<br/>1332997<br/>1592784<br/>1592801<br/>1593602<br/>99327<br/>138279<br/>199597<br/>232964<br/>276989<br/>430927<br/>549326<br/>430927<br/>549326<br/>430927<br/>691071<br/>691074<br/>691077<br/>691089<br/>691073<br/>691173<br/>691173<br/>691175<br/>691175<br/>691185</th> <th>C C C C ATTTTTTT C C ATTTTTTT C C C C C</th> <th>T         A         ATTITITIT         A         A         T         G         C         G         C         C         C         ATG         G         G         G         G         G         G         G         G         A         A         A         A         A         A         G</th> <th>SNP<br/>SNP<br/>indel<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP</th> <th>synonymous<br/>synonymous<br/>intergenic<br/>intergenic<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>frameshift deletion<br/>synonymous<br/>frameshift deletion<br/>synonymous<br/>frameshift deletion<br/>synonymous<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>nonsynonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>nonsynonymous<br/>synonymous<br/>nonsynonymous<br/>synonymous<br/>nonsynonymous<br/>nonsynonymous<br/>nonsynonymous</th> <th>HP0651           HPP12_0726           jhp1031           HPATCC43504_01275           HP1354           HP1354           HP1354           HP154           HP0489           HP0489</th> <th>HP1582<br/>HPPC_00115</th> <th></th> | 873717<br>948328<br>1187376<br>1318277<br>1332900<br>1332900<br>1332937<br>1332997<br>1332997<br>1332997<br>1332997<br>1332997<br>1332997<br>1332997<br>1332997<br>1592784<br>1592801<br>1593602<br>99327<br>138279<br>199597<br>232964<br>276989<br>430927<br>549326<br>430927<br>549326<br>430927<br>691071<br>691074<br>691077<br>691089<br>691073<br>691173<br>691173<br>691175<br>691175<br>691185  | C C C C ATTTTTTT C C ATTTTTTT C C C C C   | T         A         ATTITITIT         A         A         T         G         C         G         C         C         C         ATG         G         G         G         G         G         G         G         G         A         A         A         A         A         A         G  
   
   
   
   
  | SNP<br>SNP<br>indel<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP  | synonymous<br>synonymous<br>intergenic<br>intergenic<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>frameshift deletion<br>synonymous<br>frameshift deletion<br>synonymous<br>frameshift
deletion<br>synonymous<br>intergenic<br>intergenic<br>intergenic<br>intergenic<br>intergenic<br>nonsynonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>nonsynonymous<br>synonymous<br>nonsynonymous<br>synonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous  | HP0651           HPP12_0726           jhp1031           HPATCC43504_01275           HP1354           HP1354           HP1354           HP154           HP0489  | HP1582<br>HPPC_00115            |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   |   |                      |  |  
  |   |   |   |  |  |   |                      |  |   |   |   | | | | | | | | | | |
  |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |  
  |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |  
   |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   |  |   |   |  |  
  |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S43           S44           S44      S44      S44      S44     <  | 873717<br>948328<br>1187376<br>1318277<br>1332900<br>1332906<br>1332954<br>1332987<br>1332996<br>1332991<br>1332991<br>1332991<br>1592784<br>1592784<br>1592801<br>1593784<br>1593802<br>99327<br>1593784<br>276989<br>430922<br>549326<br>430922<br>549326<br>430922<br>549326<br>430927<br>691071<br>691074<br>691074<br>691074<br>691075<br>691173<br>691175<br>691175<br>691179<br>691189  | C         ATTTITITT         C         G         C         T         T         G         T         GGGGGGGGGGGG         C         T         TGGGGGGGGGGGG         C         C         C         G         T         TGGGGGGGGGGGGG         C         C         G         G         G         G         G         G         G         G         G         G         G         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C   | T         A         ATTITITIT         A         A         T         G         C         G         C         C         ATG         G         G         C         A         G         G         G         G         G         T         T         A         A         A         A         G   
   
   
   
   
   | SNP<br>SNP<br>indel<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>indel<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP                 |
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   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S43           S44           S44      S44      S44   | 873717<br>948328<br>1187376<br>1318577<br>1332690<br>1332906<br>1332954<br>1332954<br>1332997<br>1332997<br>1332999<br>1592784<br>1592784<br>1593602<br>99327<br>168379<br>99327<br>168379<br>99327<br>168379<br>199597<br>232964<br>276989<br>430922<br>549326<br>672079<br>691071<br>691071<br>691071<br>691071<br>691089<br>691071<br>691073<br>691173<br>691173<br>691175<br>691179<br>691175<br>691179  | C         ATTTITITT         C         G         G         T         T         G         T         T         T         T         T         T         T         T         T         T         T         TGGGGGGGGGGGG         C         C         G         G         G         G         G         G         G         G         G         C         G         G         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A <th>T         A         ATTITITIT         A         A         T         G         C         G         C         C         C         ATG         G         G         G         G         G         G         G         G         A         A         A         A         A         A         G</th> <th>SNP<br/>SNP<br/>indel<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP</th> <th>synonymous<br/>synonymous<br/>intergenic<br/>intergenic<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>nonsynonymous<br/>synonymous<br/>frameshift deletion<br/>synonymous<br/>frameshift deletion<br/>synonymous<br/>intergenic<br/>intergenic<br/>nonsynonymous<br/>intergenic<br/>nonsynonymous<br/>intergenic<br/>nonsynonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>nonsynonymous<br/>synonymous<br/>nonsynonymous<br/>synonymous<br/>synonymous<br/>nonsynonymous<br/>synonymous<br/>nonsynonymous<br/>synonymous<br/>nonsynonymous<br/>synonymous<br/>nonsynonymous<br/>synonymous<br/>nonsynonymous<br/>synonymous<br/>nonsynonymous<br/>synonymous<br/>nonsynonymous<br/>synonymous<br/>nonsynonymous<br/>nonsynonymous<br/>nonsynonymous<br/>nonsynonymous<br/>nonsynonymous<br/>nonsynonymous<br/>nonsynonymous<br/>nonsynonymous<br/>nonsynonymous<br/>nonsynonymous<br/>nonsynonymous<br/>nonsynonymous<br/>nonsynonymous<br/>nonsynonymous<br/>nonsynonymous<br/>nonsynonymous<br/>nonsynonymous<br/>nonsynonymous</th> <th>HP0651           HPP12_0726           HPP12_0726           HPATCC43504_01275           HP1354           HP1354           HP1354           HP1354           HP1354           HP1354           HP1354           HP1354           HP147           HP147           HP148           HP0489           HP048</th> <th>HP1582<br/>HPPC_00115</th> <th></th> | T         A         ATTITITIT         A         A         T         G         C         G         C         C         C         ATG         G         G         G         G         G         G         G         G         A         A         A         A         A         A         G   
   
   
   
   
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deletion<br>synonymous<br>intergenic<br>intergenic<br>nonsynonymous<br>intergenic<br>nonsynonymous<br>intergenic<br>nonsynonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>nonsynonymous<br>synonymous<br>nonsynonymous<br>synonymous<br>synonymous<br>nonsynonymous<br>synonymous<br>nonsynonymous<br>synonymous<br>nonsynonymous<br>synonymous<br>nonsynonymous<br>synonymous<br>nonsynonymous<br>synonymous<br>nonsynonymous<br>synonymous<br>nonsynonymous<br>synonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous                      | HP0651           HPP12_0726           HPP12_0726           HPATCC43504_01275           HP1354           HP1354           HP1354           HP1354           HP1354           HP1354           HP1354           HP1354           HP147           HP147           HP148           HP0489           HP048  | HP1582<br>HPPC_00115            |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   |   |                      |  |  
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                                  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S43           S44           S44      S44      S44   | 873717<br>948328<br>1187376<br>1318577<br>1332900<br>1332906<br>1332954<br>1332997<br>1332997<br>1332997<br>1332999<br>1592784<br>1592784<br>1593602<br>99327<br>168379<br>199597<br>232964<br>276989<br>99327<br>168379<br>199597<br>232964<br>276989<br>691071<br>691074<br>691074<br>691074<br>691074<br>691074<br>691071<br>691089<br>691091<br>691133<br>691175<br>691185<br>691185<br>691185   | C         ATTTTTTT         C         ATTTTTTT         C         G         G         T         T         G         T         G         T         GGGGGGGGGGGG         C         C         C         C         C         C         C         G         G         G         G         G         G         G         G         G         G         G         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A  | T         A         ATTITITIT         A         T         G         C         G         C         G         C         G         C         G         C         G         G         G         G         G         G         T         T         A         A         A         A         G   
   
   
   
   
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synonymous<br>synonymous<br>intergenic<br>intergenic<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>frameshift deletion<br>synonymous<br>frameshift deletion<br>synonymous<br>intergenic<br>nonsynonymous<br>intergenic<br>nonsynonymous<br>intergenic<br>nonsynonymous<br>intergenic<br>nonsynonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>nonsynonymous<br>synonymous<br>nonsynonymous<br>synonymous<br>nonsynonymous<br>nonsynonymous<br>synonymous<br>nonsynonymous<br>synonymous<br>nonsynonymous<br>synonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous                              | HP0651           HPP12_0726           Jhp1031           HPATCC43504_01275           HP1354           HP1354           HP1354           HP1354           HP1547           HP1134           HP0489           HP048  | HP1582<br>HPPC_00115<br>jhp1163 |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   |   |                      |  |  
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| S43           S44           S44      S44      S44   | 873717<br>948328<br>1187376<br>1318277<br>1332900<br>1332906<br>1332954<br>1332997<br>1332997<br>1332997<br>1332997<br>1332999<br>1592784<br>1593602<br>99327<br>168379<br>199597<br>232964<br>276989<br>430922<br>691071<br>691071<br>691071<br>691074<br>691071<br>691074<br>691071<br>691073<br>691071<br>691073<br>691071<br>691073<br>691073<br>691073<br>691173<br>691173<br>691173<br>691173<br>691179<br>691189<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>69100<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190<br>691190 | C         C         ATTITITT         C         G         C         T         T         T         G         T         G         T         GGGGGGGGGGGG         C         C         C         C         C         C         G         G         G         C         G         G         G         G         G         G         G         C         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         G         C         A         G         C         A   | T         A         ATTITITIT         A         T         T         G         C         G         C         G         C         ATTG         G         C         ATG         G         G         T         T         T         A         A         A         A         C         A         G      <   
   
   
   
   
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| S43           S44           S44      S44      S44   | 873717<br>948328<br>1187376<br>1318577<br>1332900<br>1332906<br>1332954<br>1332997<br>1332997<br>1332997<br>1332999<br>1592784<br>1592784<br>1593602<br>99327<br>168379<br>199597<br>232964<br>276989<br>99327<br>168379<br>199597<br>232964<br>276989<br>691071<br>691074<br>691074<br>691074<br>691074<br>691074<br>691071<br>691089<br>691091<br>691133<br>691175<br>691185<br>691185<br>691185   | С<br>С<br>АТТТТТТТ<br>С<br>С<br>С<br>С<br>С<br>С<br>С<br>С<br>С<br>С<br>С<br>С<br>С   | T         A         ATTITITIT         A         T         G         C         G         C         G         C         G         C         G         C         G         G         G         G         G         G         T         T         A         A         A         A         G   
   
   
   
   
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   |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   |  |   |   
   |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S43           S44           S44      S44      S44   | 873717<br>948328<br>1187376<br>1318277<br>1332900<br>1332900<br>1332954<br>1332997<br>1332997<br>1332997<br>1332997<br>1332997<br>1332997<br>1332997<br>1332997<br>1592784<br>1592801<br>1593702<br>199327<br>232964<br>276989<br>430922<br>549326<br>672079<br>691071<br>691074<br>691071<br>691074<br>691071<br>691074<br>691071<br>691071<br>691075<br>691091<br>691175<br>691185<br>691190<br>691185<br>691190<br>691185<br>691190<br>691185<br>691190<br>691193   | С<br>С<br>АТТТТТТТ<br>С<br>С<br>С<br>С<br>С<br>С<br>С<br>С<br>С<br>С<br>С<br>С<br>С   | T         A         ATTITITIT         A         A         T         G         C         G         C         C         C         ATG         G         G         G         G         G         G         G         G         T         T         A         A         A         A         A         G   
   
   
   
   
   | SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP   |
synonymous<br>synonymous<br>intergenic<br>intergenic<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>frameshift deletion<br>synonymous<br>frameshift deletion<br>synonymous<br>frameshift deletion<br>synonymous<br>intergenic<br>intergenic<br>intergenic<br>nonsynonymous<br>intergenic<br>nonsynonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>nonsynonymous<br>synonymous<br>nonsynonymous<br>synonymous<br>nonsynonymous<br>synonymous<br>nonsynonymous<br>synonymous<br>nonsynonymous<br>synonymous<br>nonsynonymous<br>synonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous          | HP0651           HPP12_0726           jhp1031           HPATCC43504_01275           HP1354           HP1354           HP1354           HP0154           HP0154           HP0154           HP0489   | HP1582<br>HPPC_00115<br>jhp1163 |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   |   |                      |  |   
   |   |   |   |  |  |   |                      |  |   |   | | | | | | | | | |
           |   |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |   
   |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |   
  |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   |  |   |  
  |  |   |  |                                 |  |   |   |   |   |  |  |  |                                 |  |
| S43           S44           S44      S44      S44   | 873717<br>948328<br>1187376<br>131827<br>1332900<br>1332900<br>1332954<br>1332997<br>133299<br>133299<br>133299<br>133299<br>133299<br>1332997<br>1332997<br>1332997<br>1332997<br>1332997<br>1332997<br>1332997<br>1332997<br>133299<br>1592784<br>1592801<br>1593784<br>1593264<br>276989<br>430922<br>549326<br>430927<br>691071<br>691074<br>691074<br>691074<br>691074<br>691075<br>691071<br>691173<br>691173<br>691173<br>691175<br>691175<br>691179<br>691189<br>691189<br>691189<br>691189<br>691189<br>691189<br>691189<br>691189<br>691189<br>691189<br>691189  | C         C         ATTITITT         C         G         C         T         T         G         T         GGGGGGGGGGG         C         C         G         T         GGGGGGGGGGGG         C         C         G         G         G         C         G         G         G         G         G         G         G         G         G         G         C         A         G         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C   | T         A         ATTITITIT         A         A         T         G         C         G         C         ATG         G         C         ATG         G         G         T         T         T         T         T         T         A         A         A         A         A         G <t<
th=""><th>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP</th><th>synonymous<br/>synonymous<br/>intergenic<br/>intergenic<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>rameshift deletion<br/>synonymous<br/>frameshift deletion<br/>synonymous<br/>frameshift deletion<br/>synonymous<br/>intergenic<br/>intergenic<br/>norsynonymous<br/>synonymous<br/>intergenic<br/>norsynonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>synonymous<br/>norsynonymous<br/>synonymous<br/>norsynonymous<br/>synonymous<br/>norsynonymous<br/>synonymous<br/>norsynonymous<br/>norsynonymous<br/>synonymous<br/>norsynonymous<br/>synonymous<br/>norsynonymous<br/>norsynonymous<br/>norsynonymous<br/>norsynonymous<br/>norsynonymous<br/>norsynonymous<br/>synonymous<br/>norsynonymous<br/>synonymous<br/>norsynonymous<br/>norsynonymous<br/>norsynonymous<br/>norsynonymous<br/>norsynonymous<br/>norsynonymous<br/>norsynonymous<br/>norsynonymous<br/>norsynonymous<br/>norsynonymous<br/>norsynonymous<br/>synonymous<br/>synonymous</th><th>HP0651           HPP12_0726           ijhp1031           HPATCC43504_01275           HP1354           HP1354           HP1354           HP1354           HP0489           HP0489</th><th>HP1582<br/>HPPC_00115<br/>jhp1163</th><th></th></t<>  
   
   
   
  | SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP   | synonymous<br>synonymous<br>intergenic<br>intergenic<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>rameshift deletion<br>synonymous<br>frameshift deletion<br>synonymous<br>frameshift
deletion<br>synonymous<br>intergenic<br>intergenic<br>norsynonymous<br>synonymous<br>intergenic<br>norsynonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>synonymous<br>norsynonymous<br>synonymous<br>norsynonymous<br>synonymous<br>norsynonymous<br>synonymous<br>norsynonymous<br>norsynonymous<br>synonymous<br>norsynonymous<br>synonymous<br>norsynonymous<br>norsynonymous<br>norsynonymous<br>norsynonymous<br>norsynonymous<br>norsynonymous<br>synonymous<br>norsynonymous<br>synonymous<br>norsynonymous<br>norsynonymous<br>norsynonymous<br>norsynonymous<br>norsynonymous<br>norsynonymous<br>norsynonymous<br>norsynonymous<br>norsynonymous<br>norsynonymous<br>norsynonymous<br>synonymous<br>synonymous | HP0651           HPP12_0726           ijhp1031           HPATCC43504_01275           HP1354           HP1354           HP1354           HP1354           HP0489   | HP1582<br>HPPC_00115<br>jhp1163 |                      |  |   |   |  |  |  |   |                      |  |   |   |   |  |  |   |   |                      |  |  
  |   |   |   |  |  |   |                      |  |   |   |   | | | | | | | | | | |
  |   |   |   |                      |  |  |   |   |   |  |  |   |                                 |  |   |   |  
  |   |   |   |   |                      |  |   |  |  |   |  |   |   |                                 |  |   |  
   |   |   |  |   |   |                                 |  |   |  |   |   |  |   |   |                                 |  |   |  |   |   |  |  
  |  |                                 |  |   |   |   |   |  |  |  |                                 |  |

S44 S44 S44								
	879985		Т	SNP	nonsynonymous	HP0656		
S44	958574	CGAGAGAGAGAGAG	CGAGAGAGAGAGAGAG	indel	intergenic		HPG27_680	
	1043704	GTTTTTTTTTTT	GTTTTTTTTTTTTTTTT	indel	frameshift insertion/intergenic	HPnc4170	HP0811	HPnc4160
S44	1066590		A	SNP	intergenic		jhp0775	
S44		ATTTTTT	ATTTTTTT	indel	intergenic		HP0947	
S44		Т	G	SNP	nonsynonymous	HPP12_0950		
S44	1252178		Т	SNP	nonsynonymous	HP0407		
S44		Т	C	SNP	synonymous	HPG27_1018		
S44	1332690		A	SNP	synonymous	HPATCC43504_01275		
S44	1332900	G	Т	SNP	synonymous	HPATCC43504_01275		
S44	1332906	C	Т	SNP	synonymous	HPATCC43504_01275		
S44	1332954	Т	G	SNP	synonymous	HPATCC43504_01275		
S44	1332987	Т	C	SNP	synonymous	HPATCC43504_01275		
S44	1332996	Т	G	SNP	synonymous	HPATCC43504_01275		
S44	1332997	G	C	SNP	nonsynonymous	HPATCC43504_01275		
S44	1332999	Т	C	SNP	synonymous	HPATCC43504_01275		
S44	1592784	ATGTG	ATG	indel	frameshift deletion	HP1354		
S44	1592801	Т	G	SNP	synonymous	HP1354		
S45	99327	c	Т	SNP	synonymous	jhp0935		
S45	168379	c	Т	SNP	synonymous	HP1547		
S45	199597	c	Т	SNP	intergenic		HP1582	jhp1488
S45	251374	G	A	SNP	nonsynonymous	HP0045		
S45	276989	G	A	SNP	nonsynonymous	HPP12_0070		
S45	374756	CGGGGGGGGGGGG	CGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG	indel	frameshift insertion	jhp0151		
S45	424517	CGGGG	CGGGGG	indel	intergenic		HP0189	HP0188
S45	430922	G	A	SNP	nonsynonymous	HP0194		
S45	546511	СААААААААААА	САААААААААААА	indel	intergenic		HP1243/HPG27_298	
S45	548957	C	Т	SNP	intergenic		jhp1163	HPG27_298
S45	548965	C	Т	SNP	intergenic		jhp1163	HPG27_298
S45	548994	A	Т	SNP	intergenic		jhp1163	HPG27_298
S45	691071	G	A	SNP	synonymous	HP0489		
S45	691074	A	C	SNP	synonymous	HP0489		
S45	691077	G	A	SNP	nonsynonymous	HP0489		
S45	691089	A	G	SNP	synonymous	HP0489		
S45	691091	C	A	SNP	nonsynonymous	HP0489		
S45	691101	Т	С	SNP	synonymous	HP0489		
S45	691113	G	Т	SNP	nonsynonymous	HP0489		
S45	691157	С	A	SNP	nonsynonymous	HP0489		
S45	691173	С	A	SNP	synonymous	HP0489		
S45	691175	A	G	SNP	nonsynonymous	HP0489		
S45	691179	С	G	SNP	synonymous	HP0489		
C 4F	691185	A	G	CNID	nonsynonymous	HP0489		
S45				SNP				
S45 S45	691189	с	G	SNP		HP0489		
	691189 691190				nonsynonymous			
S45 S45	691190	A	G C	SNP SNP	nonsynonymous	HP0489	HP0514	
S45		A T	G	SNP	nonsynonymous nonsynonymous intergenic	HP0489	HP0514 HPG27_556	
\$45 \$45 \$45 \$45	691190 748650 805851	A T A	G C A	SNP SNP SNP SNP	nonsynonymous nonsynonymous intergenic intergenic	HP0489 HP0489		
\$45 \$45 \$45 \$45 \$45 \$45	691190 748650 805851 830053	A T A	GCAT	SNP SNP SNP SNP SNP	nonsynonymous nonsynonymous intergenic intergenic nonsynonymous	HP0489	HPG27_556	
\$45 \$45 \$45 \$45	691190 748650 805851	А Т А С Салалалалалалал	G C A T T	SNP SNP SNP SNP	nonsynonymous nonsynonymous intergenic intergenic	HP0489 HP0489		HPnc4160
S45           S45           S45           S45           S45           S45           S45           S45           S45	691190 748650 805851 830053 958702	А Т А С Салалалалалалала GTTTTTTTTTT	G C A T T Салалалалалалалала	SNP SNP SNP SNP SNP indel	nonsynonymous nonsynonymous intergenic intergenic nonsynonymous intergenic	HP0489 HP0489 HPP12_0617	HPG27_556 HPG27_680	HPnc4160
S45	691190 748650 805851 830053 958702 1043704	А Т А С Салалалалалалала С Салалалалалалала Аптититити Аттитити	G C A T T САЛАЛАЛАЛАЛАЛАЛАЛАЛ GTTTTTTTTTTTTTTTT	SNP SNP SNP SNP SNP indel indel	nonsynonymous nonsynonymous intergenic intergenic nonsynonymous intergenic frameshift insertion/intergenic	HP0489 HP0489 HPP12_0617	HPG27_556 HPG27_680 HP0811	HPnc4160
S45	691190 748650 805851 830053 958702 1043704 1187376 1262251	А Т А С С С С С С С С С С С С С	G C A T T САЛАЛАЛАЛАЛАЛАЛАЛАЛ GTTTTTTTTTTTTTTTTTTTT	SNP SNP SNP SNP indel indel SNP	nonsynonymous nonsynonymous intergenic intergenic nonsynonymous intergenic frameshift insertion/intergenic intergenic nonsynonymous	HP0489 HP0489 HPP12_0617 HPnc4170	HPG27_556 HPG27_680 HP0811 HP0947	HPnc4160
S45	691190 748650 805851 830053 958702 1043704 1187376 1262251	А Т А С Салалалалалалала С Салалалалалалала Аптититити Аттитити	G C A T T Салалалалалалалала б11111111111111 А ТПТПТПТТ A	SNP SNP SNP SNP indel indel SNP	nonsynonymous nonsynonymous intergenic nonsynonymous intergenic frameshift insertion/intergenic intergenic	HP0489 HP0489 HPP12_0617 HPnc4170	HPG27_556 HPG27_680 HP0811	HPnc4160
S45	691190 748650 805851 830053 958702 1043704 1187376 1262251 1295885	A           T           A           C           CAAAAAAAAAAAAAAA           GTITITITITITIT           ATITITIT           C           GATATATATATATATATATATATATATATATATATATAT	G C A T T CAAAAAAAAAAAAAAAAAA GTITITITITITI A TITITITIT A GATATATATATATATATATATATATATATATATATA	SNP SNP SNP SNP indel indel SNP	nonsynonymous nonsynonymous intergenic intergenic nonsynonymous intergenic frameshift insertion/intergenic intergenic nonsynonymous	HP0489 HP0489 HPP12_0617 HPnc4170	HPG27_556 HPG27_680 HP0811 HP0947	HPnc4160
S45	691190 748650 805851 830053 958702 1043704 1187376 1262251 1295885	А	G C A T T CAAAAAAAAAAAAAAAAAAAAA GTITTITTITTITTI ATTITTITTI A GATATATATATATATATATATATATATATATATATAT	SNP SNP SNP SNP indel indel SNP indel	nonsynonymous nonsynonymous intergenic nonsynonymous intergenic frameshift insertion/intergenic intergenic nonsynonymous intergenic	HP0489 HP0489 HPP12_0617 HPnc4170 jhp0981	HPG27_556 HPG27_680 HP0811 HP0947	HPnc4160
S45	691190 748650 805851 830053 958702 1043704 1187376 1262251 1295885 1318527 1332690 1332888	A T T A C CAAAAAAAAAAAAAAAA G T T T C G T T C C C C T T T T T T T T	G C A T T CAAAAAAAAAAAAAAAAAAA GTITITITITITITI A GATATATATATATATATATATATATATATATATATATAT	SNP SNP SNP indel indel indel SNP indel	nonsynonymous nonsynonymous intergenic intergenic nonsynonymous intergenic frameshift insertion/intergenic intergenic nonsynonymous intergenic intergenic intergenic	HP0489 HP0489 HPP12_0617 HPnc4170 jhp0981 jhp1031	HPG27_556 HPG27_680 HP0811 HP0947	HPnc4160
S45	691190 748650 805851 830053 958702 1043704 1187376 1262251 1318527 1338527 1332690 1332888 1332893	A T T A C CAAAAAAAAAAAAAAAA GTTTTTTTTTTT	G         G           C         A           T         T           CAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	SNP SNP SNP indel indel SNP indel SNP SNP	nonsynonymous nonsynonymous intergenic nonsynonymous intergenic frameshift insertion/intergenic intergenic nonsynonymous intergenic intergenic synonymous	HP0489 HP0489 HP0489 HPP12_0617 HPnc4170 jhp0981 jhp1031 HPATCC43504_01275 HPATCC43504_01275	HPG27_556 HPG27_680 HP0811 HP0947	HPnc4160
S45	691190 748650 805851 830053 958702 1043704 1187376 1262251 1318527 1332690 1332888 1332893 1332897	A         T         A         C         CAAAAAAAAAAAAAAA         GTTTTTTTTTTTT         ATTTTTT         C         GATATATATATATATATATAT         C         G         GATATATATATATATATATAT         C         T         A	G         C           A         T           T         C           CAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	SNP SNP SNP indel indel SNP indel SNP SNP SNP SNP SNP	nonsynonymous nonsynonymous intergenic nonsynonymous intergenic frameshift insertion/intergenic intergenic intergenic intergenic intergenic synonymous synonymous	HP0489 HP0489 HP0489 HPP12_0617 HPnc4170 jhp0981 HPATC43504_01275 HPATCC43504_01275 HPATCC43504_01275	HPG27_556 HPG27_680 HP0811 HP0947	HPnc4160
S45	691190 748650 805851 830053 958702 1043704 1187376 1262251 137585 1318527 1332690 1332888 1332893 1332897 1332900	A T A T A C C CAAAAAAAAAAAAAAAA G G G T T T A T T C G G T T C G G G G G G G G G G G G	G         C           A         T           T         C           CAAAAAAAAAAAAAAAAAAA         G           GTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	SNP SNP SNP indel indel indel SNP indel SNP SNP SNP SNP	nonsynonymous nonsynonymous intergenic intergenic nonsynonymous intergenic frameshift insertion/intergenic intergenic intergenic intergenic intergenic synonymous synonymous nonsynonymous	HP0489 HP0489 HP0489 HPP12_0617 HPnc4170 jhp0981 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275	HPG27_556 HPG27_680 HP0811 HP0947	HPnc4160
S45	691190 748650 805851 830053 958702 1043704 1187376 1262251 1318527 1332690 1332888 1332893 1332897	A         T         A         C         CAAAAAAAAAAAAAAA         GITTITITITITITI         ATTITITT         C         GATATATATATATATATATATAT         C         T         A         G         C         C         C         C         C         G         C         C         C         C         C         C         C         G         C         C         C         C         C         C         C         G         C         C         C         C         C         C         C         C         C         C         C         C         C          C          C          C          C          C <th>G         G           C         A           T         T           CAAAAAAAAAAAAAAAA         G           GTTTTTTTTTTTTTTTT         A           GATATATATATATATATATATATATATATATATATATAT</th> <th>SNP SNP SNP indel indel SNP indel SNP SNP SNP SNP SNP</th> <th>nonsynonymous nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic intergenic intergenic synonymous synonymous nonsynonymous synonymous synonymous</th> <th>HP0489 HP0489 HP0489 HPP12_0617 HPnc4170 jhp0981 HPATC43504_01275 HPATCC43504_01275 HPATCC43504_01275</th> <th>HPG27_556 HPG27_680 HP0811 HP0947</th> <th>HPnc4160</th>	G         G           C         A           T         T           CAAAAAAAAAAAAAAAA         G           GTTTTTTTTTTTTTTTT         A           GATATATATATATATATATATATATATATATATATATAT	SNP SNP SNP indel indel SNP indel SNP SNP SNP SNP SNP	nonsynonymous nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic intergenic intergenic synonymous synonymous nonsynonymous synonymous synonymous	HP0489 HP0489 HP0489 HPP12_0617 HPnc4170 jhp0981 HPATC43504_01275 HPATCC43504_01275 HPATCC43504_01275	HPG27_556 HPG27_680 HP0811 HP0947	HPnc4160
S45	691190 748650 805851 830053 958702 1043704 1187376 1262251 13262551 1318527 1332690 1332888 1332897 1332900 1332906	A         T         A         C         CAAAAAAAAAAAAAAA         GITTITITITITITITI         ATITITIT         C         GATATATATATATATATATAT         C         C         C         T         A         G         C         T         A         G         C         T </th <th>G         G           C         A           T         T           CAAAAAAAAAAAAAAAAA         G           GTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT</th> <th>SNP SNP SNP indel indel SNP indel SNP SNP SNP SNP SNP SNP SNP</th> <th>nonsynonymous nonsynonymous intergenic intergenic nonsynonymous intergenic frameshift insertion/intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous synonymous</th> <th>HP0489 HP0489 HP0489 HPP12_0617 HPnc4170 Jhp0981 Jhp1031 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275</th> <th>HPG27_556 HPG27_680 HP0811 HP0947</th> <th>HPnc4160</th>	G         G           C         A           T         T           CAAAAAAAAAAAAAAAAA         G           GTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	SNP SNP SNP indel indel SNP indel SNP SNP SNP SNP SNP SNP SNP	nonsynonymous nonsynonymous intergenic intergenic nonsynonymous intergenic frameshift insertion/intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous synonymous	HP0489 HP0489 HP0489 HPP12_0617 HPnc4170 Jhp0981 Jhp1031 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275	HPG27_556 HPG27_680 HP0811 HP0947	HPnc4160
S45	691190 748650 805851 830053 958702 1043704 1187376 1262251 1318527 1332690 1332888 1332893 1332897 1332906 1332954 1332954	A         T         A         C         CAAAAAAAAAAAAAAA         GITTITTITTITTITT         ATTITTT         C         GATATATATATATATATAT         C         C         C         C         C         C         C         C         C         C         C         C         C         C         T         A         G         C         T         T         T         T	G         C           A         T           T         CAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	SNP SNP SNP SNP SNP indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous nonsynonymous intergenic nonsynonymous intergenic frameshift insertion/intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous	HP0489 HP0489 HP0489 HPP12_0617 HPnc4170 jhp0981 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275	HPG27_556 HPG27_680 HP0811 HP0947	HPnc4160
S45	691190 748650 805851 830053 958702 1043704 1187376 1262251 1318527 132690 1332888 1332893 1332897 1332900 1332906 1332987 1332996	A         T         A         C         CAAAAAAAAAAAAAAA         GITTITTITTITT         ATTITTT         C         GATATAATATATATATATAT         C         G         C         T         A         G         C         T         A         G         C         T         T         T         T         T         T         T         T         T         T         T         T	G         C           A         T           T         CAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	SNP SNP SNP SNP SNP indel indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous nonsynonymous intergenic nonsynonymous intergenic frameshift insertion/intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous	HP0489 HP0489 HP0489 HPP12_0617 HPnc4170 jhp0981 HPATC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275	HPG27_556 HPG27_680 HP0811 HP0947	HPnc4160
S45	691190 748650 805851 830053 958702 1043704 1187376 1262251 1325885 1318527 1332690 1332883 1332897 1332906 1332954 1332997	A         T         A         C         CAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	G         C           A         T           T         C           CAAAAAAAAAAAAAAAAAA         G           GTITTITTITTITTITTITTITTIT         A           GTITTITTITTIT         A           GTATATATATATATATATATATATATATATATATATATA	SNP SNP SNP SNP SNP indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous nonsynonymous intergenic nonsynonymous intergenic frameshift insertion/intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous	HP0489 HP0489 HP0489 HPP12_0617 HPnc4170 jhp0981 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275	HPG27_556 HPG27_680 HP0811 HP0947	HPnc4160
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S45           S45      S45      S	691190 748650 805851 830053 958702 1043704 1187376 1262251 13295885 1318527 1332893 1332893 1332893 1332995 1332995 1332999 1332997	A         T         A         C         CAAAAAAAAAAAAAAAA         GITTITITITITITIT         ATTITITT         C         GATATATATATATATATATAT         C         C         G         C         T         A         G         C         T         G         T         G         T         G         T         AIT	G         C         A         T         CAAAAAAAAAAAAAAAA         GTTTTTTTTTTTTTT         A         GATATATATATATATATATATATATATATATATATATAT	SNP SNP SNP SNP SNP indel indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous nonsynonymous intergenic intergenic nonsynonymous intergenic frameshift insertion/intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous nonsynonymous nonsynonymous	HP0489 HP0489 HP0489 HP0489 HPP12_0617 HPnc4170 ihp0981 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275	HPG27_556 HPG27_680 HP0811 HP0947	HPnc4160
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S45           S45      S45      S	691190           748650           805851           8305851           1043704           1187376           1262251           1318527           1332690           1332883           1332897           1332906           1332954           1332954           1332995           1332995           1332996           1332997           1332995           1332996           1332997           1332996           1332997           1332996           1332997           1332996           1332997           1332996           1332997           1332997           133298           1332997           1332996           1332997           133298           1358072           1592786           99327	A T A T A A C C CAAAAAAAAAAAAAAA G G C C C C C	G         C         A         T         CAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	SNP SNP SNP SNP SNP SNP indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous nonsynonymous intergenic intergenic nonsynonymous intergenic rameshift insertion/intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous intergenic intergenic synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous	HP0489 HP0489 HP0489 HP0489 HPP12_0617 HPnc4170 Jhp0981 HPATC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275	HPG27_556 HPG27_680 HP0811 HP0947 HPATCC43504_01238	
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S45           S46           S46           S46           S46           S46           S46           S46      S46	691190           748650           805851           8305851           1043704           1187376           1262251           1318527           1332690           1332893           1332936           1332937           1332997           1332997           1332997           1332997           1332997           1332997           1332997           1332997           1332997           1592786           99372           168379           168379           199597           251374	A T A T A T A A C C AAAAAAAAAAAAAAAAA G G T T T C G G T T T G G T T G G T T G G C C C C	G         C         A         T         CAAAAAAAAAAAAAAAAA         GTITTITTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	SNP SNP SNP SNP SNP indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous nonsynonymous intergenic intergenic nonsynonymous intergenic frameshift insertion/intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous intergenic frameshift deletion synonymous intergenic frameshift deletion synonymous intergenic frameshift deletion	HP0489 HP0489 HP0489 HP0489 HP02_0617 HP12_0617 HP12_0617 HP12_0617 HP12_0617 HP12_0617 HP12_0617 HP12_0617 HP12_0617 HP12_061275HP12_061275 HP12_061275 HP12_061275HP12_061275 HP12_061275HP12_061275 HP12_061275HP12_061275 HP12_061275HP12_061275 HP12_061275HP12_061275 HP12_061275HP12_061275 HP12_061275HP12_061275 HP12_061275HP12_061275 HP12_061275HP12_061275 HP12_061275HP12_061275 HP12_061275HP12_061275 HP12_061275HP12_061275 HP12_061275HP12_061275HP12_061275 HP12_061275HP12_061275 HP12_061275HP12_061275 HP12_061275HP12_061275 HP12_061275HP12_061275 HP12_061275HP12_061275 HP12_061275HP12_061275 HP12_061275HP12_061275 HP12_061275HP12_061275HP12_061275 HP12_061275HP12_061	HPG27_556 HPG27_680 HP0811 HP0947 HPATCC43504_01238 HPATCC43504_01238	HP0228
S45           S46           S46           S46           S46           S46           S46      S46	691190           748650           805851           83053           958702           1043704           1187376           1262251           137852           1318527           133288           1332893           1332906           133296           1332996           1332997           1332996           1332997           1332996           1332997           1332996           1332997           1332996           1332997           1332987           1332997           1332997           1332997           1332997           1332997           1332997           1332987           1332997           1332997           1332997           1332987           1332987           1332987           1332987           1332987           1332987           1332987           1332987           1332987           1332987           1332987           1332987<	A T A T A T A A C C AAAAAAAAAAAAAAAAA G G T T T C G G C T T T G G C T T G G C C C C	G         C         A         T         CAAAAAAAAAAAAAAAA         GTTTTTTTTTTTTT         A         GATATATATATATATATATATATATATATATATATATAT	SNP SNP SNP SNP indel indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic frameshift insertion/intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous intergenic frameshift deletion synonymous synonymous intergenic nonsynonymous intergenic frameshift deletion synonymous	HP0489 HP0489 HP0489 HP0489 HP02_0617 HP12_0617 HP12_0617 HP12_0617 HP12_0617 HP12_0617 HP12_0617 HP12_0617 HP12_0617 HP12_061275HP12_061275 HP12_061275 HP12_061275HP12_061275 HP12_061275HP12_061275 HP12_061275HP12_061275 HP12_061275HP12_061275 HP12_061275HP12_061275 HP12_061275HP12_061275 HP12_061275HP12_061275 HP12_061275HP12_061275 HP12_061275HP12_061275 HP12_061275HP12_061275 HP12_061275HP12_061275 HP12_061275HP12_061275 HP12_061275HP12_061275HP12_061275 HP12_061275HP12_061275 HP12_061275HP12_061275 HP12_061275HP12_061275 HP12_061275HP12_061275 HP12_061275HP12_061275 HP12_061275HP12_061275 HP12_061275HP12_061275 HP12_061275HP12_061275HP12_061275 HP12_061275HP12_061	HPG27_556 HPG27_680 HP0811 HP0947 HPATCC43504_01238 HPATCC43504_01238 HPATCC43504_01238 HPATCC43504_01238	HP0228
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S45           S46           S46           S46           S46           S46           S46      S46	691190           748650           805851           830053           958702           1043704           1187376           1262251           1318527           1332893           1332893           1332906           1332906           1332954           1332997           158277           1592786           99327           168379           199597           251374           276989           315327           315327	A T A T A C C CAAAAAAAAAAAAAAAA C G G G T T T C G G T T T A G G G C T T G G G G G G G G G G G G G G	G         C         A         T         CAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	SNP SNP SNP SNP SNP indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous nonsynonymous intergenic intergenic nonsynonymous intergenic frameshift insertion/intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous intergenic frameshift deletion synonymous intergenic intergenic frameshift deletion intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic frameshift insertion intergenic	HP0489 HP0489 HP0489 HP0489 HP0489 HP0489 HP045 HP12_0617 HP074170 HP074170 HP074170 HP07443504_01275 HP07443504_01275 HP07443504_01275 HP07443504_01275 HP07443504_01275 HP07443504_01275 HP07443504_01275 HP07443504_01275 HP07443504_01275 HP07443504_01275 HP07443504_01275 HP0745 HP1547 HP1547 HP0045 HP1547	HPG27_556 HPG27_680 HP0811 HP0947 HPATCC43504_01238 HPATCC43504 HP	HP0228
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S45           S46           S46           S46           S46           S46           S46           S46           S46      S46      S46	691190           748650           805851           8305851           1043704           1187376           1262251           137826           1318527           133288           1332893           1332906           133297           1332987           1332996           133297           1332987           1332997           1332997           1332997           1332997           1582072           1592786           99377           168379           199597           251374           276989           315227           374756           424517           430922	A T A T A T A C A C CAAAAAAAAAAAAAAAAA G G G C C T T C C C C C C C C C C C C C	G         C         A         T         CAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	SNP SNP SNP SNP SNP indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous nonsynonymous intergenic intergenic nonsynonymous intergenic frameshift insertion/intergenic intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous intergenic frameshift deletion synonymous intergenic nonsynonymous intergenic frameshift neetion intergenic frameshift neetion intergenic frameshift neetion intergenic frameshift neetion intergenic frameshift neetion intergenic frameshift neetion intergenic nonsynonymous intergenic frameshift neetion	HP0489 HP0489 HP0489 HP0489 HP012_0617 HPnc4170 HPnc4170 Jhp0981 HPATCC43504_01275 HPATC43504_01275 HPATC43504_01275 HPATC43504_01275 HPATC43504_01275 HPATC43504_01275 HPATC43504_01275 HPATC43504_01275 HPATC43504_01275 HPATC43504_01275 HPATC43504_01275 HPATC43504_01275 HPATC43504_01275 HPATC43504_01275 HPATC43504_01275 HPATC43504_01275 HPATC43504_01275 HPATC43504_01275 HPATC43504_01275 HPATC4350 HPATC4350 HPATC4350 HPATC4350 HPATC4350	HPG27_556 HPO27_680 HPO811 HPO947 HPATCC43504_01238 HPATCC43504 HPATCC4550 H	HP0228
S45           S46           S46           S46           S46           S46           S46           S46           S46      S46      S46	691190           748650           805851           8305851           1043704           1187376           1262251           1378527           133288           1332893           133293           133294           1332954           133296           1332996           1332997           1332996           1332997           1332996           1332997           1332996           1332997           1332996           133297           1332987           1332987           1332996           133297           1332987           1332987           1332987           1332987           1332987           1332987           1332987           1332987           1332987           1332987           1332987           1332987           1332987           13432987           13527           374756           424517           430922           548955	A T A C C C C C C C C C C C C C C C C C	G         C         A         T         CAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	SNP SNP SNP SNP SNP indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous nonsynonymous intergenic intergenic nonsynonymous intergenic frameshift insertion/intergenic intergenic nonsynonymous intergenic intergenic synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous intergenic frameshift deletion synonymous intergenic frameshift deletion synonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic frameshift insertion intergenic frameshift insertion intergenic intergenic frameshift insertion intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic	HP0489 HP0489 HP0489 HP0489 HP0489 HP0489 HP072_0617 HP074170 HP074170 HP074170 HP47C243504_01275 HP47CC43504_01275 HP47C43504_01275 HP47C43504_01275 HP47C43504_01275 HP47C43504_01275 HP47C43504_01275 HP47C43504_01275 HP47C43504_01275 HP47C43504_01275 HP47C43504_01275 HP47C43504_01275 HP47C43504_01275 HP47C43504_01275 HP47C43504_01275 HP47C43504_01275 HP47C43504_01275 HP47C43504_01275 HP47C43504_01275 HP47C43504_01275 HP47C4350 HP	HPG27_556 HPO27_680 HPO811 HPO947 HPATCC43504_01238 HPATCC43504 HPATCC4550 H	HP0228
S45           S46           S46           S46           S46           S46           S46           S46           S46      S46      S46	691190           748650           805851           830053           958702           1043704           1187376           1262251           1338527           133285           133285           133289           1332906           1332997           1332997           1332997           1332997           1582072           1592786           99327           168379           199597           251374           276889           315327           315327           34527           34527           34527           34527           34527           34527           1582071           168379           199597           315327           34527           34527           34527           34527           34527           34527           34527           34092           548965           691071           691074	A T A T A A C C CAAAAAAAAAAAAAAAA G G T T T C G T T T A A G G C C T T T G G C C C C C C C C C C C	G         C         A         T         CAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	SNP SNP SNP SNP SNP indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous nonsynonymous intergenic intergenic nonsynonymous intergenic frameshift insertion/intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic nonsynonymous synonymous intergenic nonsynonymous intergenic nonsynonymous intergenic ronsynonymous intergenic ronsynonymous intergenic ronsynonymous intergenic nonsynonymous intergenic rameshift insertion intergenic ronsynonymous intergenic ronsynonymous intergenic ronsynonymous intergenic synonymous intergenic synonymous	HP0489           HP04120617           HP0489           HP15004           HPATC43504_01275           HP0045           HP0194           HP0489           HP0489	HPG27_556 HPO27_680 HPO811 HPO947 HPATCC43504_01238 HPATCC43504 HPATCC4550 H	HP0228
S45           S46           S46      S46      S46	691190           748650           805851           830053           958702           1043704           1187376           1262251           1338527           1332893           1332893           1332897           1332906           1332954           1332995           1332997           1582072           1592786           99327           168379           195597           251374           276989           315327           315327           345257           345257           34527           34527           34527           34527           34527           34527           34527           34527           34527           34527           34527           34527           34527           34527           34527           34527           34965           691071           691074           691071	A         T         A         C         CAMAAAAAAAAAAAAA         GITHITITITITI         ATITATATATATATATATATAT         C         GATATATATATATATATATATATAT         C         T         T         A         G         C         T         A         G         C         T         T         G         C         G         C         G         C         C         C         C         C         C         C         C         G         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C <td< th=""><th>G G G G A A T T G G G G G G G G G G G G</th><th>SNP SNP SNP SNP SNP indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP</th><th>nonsynonymous nonsynonymous intergenic intergenic nonsynonymous intergenic frameshift insertion/intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous intergenic frameshift deletion synonymous intergenic intergenic frameshift deletion intergenic frameshift insertion intergenic frameshift insertion intergenic frameshift insertion intergenic frameshift insertion intergenic frameshift insertion intergenic frameshift insertion intergenic synonymous intergenic frameshift insertion intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous synonymous</th><th>HP0489 HP0489 HP0489 HP0489 HP0489 HP0489 HP12_0617 HP12_0617 HP17C4170 HP17C4170 HP47C43504_01275 HP47C4350 HP47C435 HP47C435 HP47C435 HP47C435 HP47C435 HP47C435 HP47C435 HP47C435 HP47C435 HP47C435 HP47C435 HP47C435 HP47C45</th><th>HPG27_556 HPO27_680 HPO811 HPO947 HPATCC43504_01238 HPATCC43504 HPATCC4550 H</th><th>HP0228</th></td<>	G G G G A A T T G G G G G G G G G G G G	SNP SNP SNP SNP SNP indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous nonsynonymous intergenic intergenic nonsynonymous intergenic frameshift insertion/intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous intergenic frameshift deletion synonymous intergenic intergenic frameshift deletion intergenic frameshift insertion intergenic frameshift insertion intergenic frameshift insertion intergenic frameshift insertion intergenic frameshift insertion intergenic frameshift insertion intergenic synonymous intergenic frameshift insertion intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous synonymous	HP0489 HP0489 HP0489 HP0489 HP0489 HP0489 HP12_0617 HP12_0617 HP17C4170 HP17C4170 HP47C43504_01275 HP47C4350 HP47C435 HP47C435 HP47C435 HP47C435 HP47C435 HP47C435 HP47C435 HP47C435 HP47C435 HP47C435 HP47C435 HP47C435 HP47C45	HPG27_556 HPO27_680 HPO811 HPO947 HPATCC43504_01238 HPATCC43504 HPATCC4550 H	HP0228
S45           S46           S46           S46           S46           S46           S46           S46           S46      S46      S46	691190           748650           805851           8305851           958702           1187376           1262251           1318527           1332885           1332890           1332893           1332936           1332937           1332936           1332937           1332936           1332937           135327           315327           315327           315327           315327           54305 <th>A         T         A         C         CAMAAAAAAAAAAAAA         GITTITITITITIT         ATTTATATATATATATATAT         C         GATATATATATATATATATATAT         C         GATATATATATATATATATATAT         C         T         A         G         C         T         A         G         T         T         G         T         G         T         G         T         G         C         C         G         T         G         C         C         C         C         C         C         C         G         A         GG         G         A         G         A         G         A         G         A         G         A         G     <th>G         C         A         T         CAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA</th><th>SNP SNP SNP SNP SNP indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP</th><th>nonsynonymous nonsynonymous intergenic intergenic intergenic intergenic intergenic frameshift insertion/intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous intergenic frameshift deletion synonymous intergenic frameshift deletion synonymous intergenic nonsynonymous intergenic frameshift insertion intergenic frameshift insertion intergenic frameshift insertion intergenic synonymous intergenic synonymous intergenic frameshift insertion intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous</th><th>HP0489 HP0489 HP0489 HP0489 HP0489 HP0489 HP0487 HP7C4170 HPAC4170 HPATC43504_01275 HPATCC43504_01275 HP0459 HP0489 HP0489 HP0489 HP0489</th><th>HPG27_556 HPO27_680 HPO811 HPO947 HPATCC43504_01238 HPATCC43504 HPATCC4550 H</th><th>HP0228</th></th>	A         T         A         C         CAMAAAAAAAAAAAAA         GITTITITITITIT         ATTTATATATATATATATAT         C         GATATATATATATATATATATAT         C         GATATATATATATATATATATAT         C         T         A         G         C         T         A         G         T         T         G         T         G         T         G         T         G         C         C         G         T         G         C         C         C         C         C         C         C         G         A         GG         G         A         G         A         G         A         G         A         G         A         G <th>G         C         A         T         CAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA</th> <th>SNP SNP SNP SNP SNP indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP</th> <th>nonsynonymous nonsynonymous intergenic intergenic intergenic intergenic intergenic frameshift insertion/intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous intergenic frameshift deletion synonymous intergenic frameshift deletion synonymous intergenic nonsynonymous intergenic frameshift insertion intergenic frameshift insertion intergenic frameshift insertion intergenic synonymous intergenic synonymous intergenic frameshift insertion intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous</th> <th>HP0489 HP0489 HP0489 HP0489 HP0489 HP0489 HP0487 HP7C4170 HPAC4170 HPATC43504_01275 HPATCC43504_01275 HP0459 HP0489 HP0489 HP0489 HP0489</th> <th>HPG27_556 HPO27_680 HPO811 HPO947 HPATCC43504_01238 HPATCC43504 HPATCC4550 H</th> <th>HP0228</th>	G         C         A         T         CAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	SNP SNP SNP SNP SNP indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous nonsynonymous intergenic intergenic intergenic intergenic intergenic frameshift insertion/intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous intergenic frameshift deletion synonymous intergenic frameshift deletion synonymous intergenic nonsynonymous intergenic frameshift insertion intergenic frameshift insertion intergenic frameshift insertion intergenic synonymous intergenic synonymous intergenic frameshift insertion intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous	HP0489 HP0489 HP0489 HP0489 HP0489 HP0489 HP0487 HP7C4170 HPAC4170 HPATC43504_01275 HPATCC43504_01275 HP0459 HP0489 HP0489 HP0489 HP0489	HPG27_556 HPO27_680 HPO811 HPO947 HPATCC43504_01238 HPATCC43504 HPATCC4550 H	HP0228
S45           S46           S46           S46           S46           S46           S46           S46           S46      S46      S46	691190           748650           805851           8305851           1043704           1187376           1262251           1378267           133289           133289           133290           133290           133293           133294           133295           133297           133298           133299           1582072           1592786           9937           158297           158297           158278           9937           251374           276889           31527           374756           991071           691071           691071           691071           691071           691071           691071           691071           691071	A         T         A         C         CAMAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	G G G G C A A T T G G C C C C C G G G G G G G G G G G	SNP SNP SNP SNP SNP indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous nonsynonymous intergenic intergenic nonsynonymous intergenic frameshift insertion/intergenic intergenic intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous intergenic frameshift deletion synonymous intergenic frameshift deletion intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic synonymous intergenic synonymous intergenic nonsynonymous intergenic nonsynonymous intergenic synonymous intergenic nonsynonymous intergenic synonymous intergenic synonymous intergenic nonsynonymous synonymous synonymous	HP0489 HP0489 HP0489 HP0489 HP0489 HP0489 HP0487 HP12_0617 HP12_0617 HP12_0617 HP12_0617 HP12_0617 HP12_0617 HP12_03504_01275 HP47CC43504_01275 HP47C4350 HP47C4350 HP47C4350 HP47C4350 HP47C4350 HP47C4350 HP47C4350 HP47C4350 HP47C4350 HP47C4350 HP47C4350 HP47C4350 HP47C4350 HP47C4350 HP47C4350 HP47C4350 HP47C4350 HP47C4350 HP47C4350 HP47C45	HPG27_556 HPO27_680 HPO811 HPO947 HPATCC43504_01238 HPATCC43504 HPATCC4550 H	HP0228
S45           S46           S46           S46           S46           S46           S46           S46           S46      S46      S46	691190           748650           805851           8305851           1043704           1187376           1262251           137826           1318527           133288           1332893           133294           133295           133296           133297           133299           13299           13299           132997           133297           133297           133297           133297           133297           133297           133297           133297           133297           133297           13297           133297           133297           133297           133297           133297           133293           133293           133293           133293           133293           133293           133293           133293           133293           133293           133293           133293 <td< th=""><th>A         T         A         C         CAMAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA</th><th>G         C         A         T         CAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA</th><th>SNP SNP SNP SNP SNP indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP</th><th>nonsynonymous nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic intergenic intergenic synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous intergenic frameshift deletion synonymous intergenic frameshift deletion synonymous intergenic nonsynonymous intergenic nonsynonymous intergenic intergenic frameshift insertion intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intorsynonymous intorsynonymous inonsynonymous nonsynonymous nonsynonymous</th><th>HP0489           HP0489           HP0489           HP0489           HP0489           HP0489           HP0480           HP0480           HP0480           HP0480           HP0480           HP0480           HP12_0617           HP0081           HP0031           HPATC43504_01275           HP1354           jhp0935           HP12_0070           HP12_0070           HP045           HP0489           HP0489</th><th>HPG27_556 HPO27_680 HPO811 HPO947 HPATCC43504_01238 HPATCC43504 HPATCC4550 H</th><th>HP0228</th></td<>	A         T         A         C         CAMAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	G         C         A         T         CAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	SNP SNP SNP SNP SNP indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic intergenic intergenic synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous intergenic frameshift deletion synonymous intergenic frameshift deletion synonymous intergenic nonsynonymous intergenic nonsynonymous intergenic intergenic frameshift insertion intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intorsynonymous intorsynonymous inonsynonymous nonsynonymous nonsynonymous	HP0489           HP0489           HP0489           HP0489           HP0489           HP0489           HP0480           HP0480           HP0480           HP0480           HP0480           HP0480           HP12_0617           HP0081           HP0031           HPATC43504_01275           HP1354           jhp0935           HP12_0070           HP12_0070           HP045           HP0489	HPG27_556 HPO27_680 HPO811 HPO947 HPATCC43504_01238 HPATCC43504 HPATCC4550 H	HP0228
S45           S46           S46           S46           S46           S46           S46           S46           S46      S46      S46	691190           748650           805851           830053           958702           1043704           1187376           1262251           1338527           133285           1332893           1332906           1332907           1332997           1332997           1332997           1332997           1582072           1592786           1592786           99327           168379           199597           251374           276389           315327           315327           340952           5489651           691071           691074           691071           691074           691071           691071           691071           691071           691071           691071           691071           691071           691071           691071           691071	A         T         A         C         CAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	G         C         A         T         CAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	SNP SNP SNP SNP SNP indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous nonsynonymous intergenic intergenic nonsynonymous intergenic rameshift insertion/intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous intergenic frameshift deletion frameshift deletion intergenic frameshift deletion intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic frameshift deletion intergenic frameshift nertion intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic synonymous intergenic nonsynonymous intergenic synonymous synonymous synonymous synonymous synonymous synonymous synonymous nonsynonymous nonsynonymous nonsynonymous	HP0489           HP0489           HP0489           HP0489           HP0489           HP0489           HP0480           HP0481           HP0481           Jhp0981           HPATC43504_01275           HPO45           HP0151           HP0489           HP0489           HP0489           HP0489           HP0489           HP0489 <th>HPG27_556 HPO27_680 HPO811 HPO947 HPATCC43504_01238 HPATCC43504 HPATCC4550 H</th> <th>HP0228</th>	HPG27_556 HPO27_680 HPO811 HPO947 HPATCC43504_01238 HPATCC43504 HPATCC4550 H	HP0228

S46	691179	C	G	SNP	synonymous	HP0489		
S46	691185	A	G	SNP	nonsynonymous	HP0489		
S46	691189	c	G	SNP	nonsynonymous	HP0489		
S46	691190	A	с	SNP	nonsynonymous	HP0489		
S46	801836	GAAAAAAAAAAA	GAAAAAAAAAAAAA	indel	intergenic		jhp0540	
S46	830053		Т	SNP	nonsynonymous	HPP12_0617		
S46	839999	Т	c	SNP	nonsynonymous	HPB8_818		
S46	958702		СААААААААААААААА	indel	intergenic		HPG27_680	
S46	1043704	GTTTTTTTTTTT	GTTTTTTTTTTTTT	indel	frameshift insertion/intergenic	HPnc4170	HP0811	HPnc4160
S46	1187376		ATTTTTTT	indel	intergenic		HP0947	
S46	1262251		A	SNP	nonsynonymous	jhp0981		
S46	1295885		GATATATATATATATATATAT	indel	intergenic		HPATCC43504_01238	
S46	1319852		AAG	indel	intergenic		HELPY_1075	jhp1032
S46	1332690		A	SNP	synonymous	HPATCC43504_01275		
S46	1332954		G	SNP	synonymous	HPATCC43504_01275		
S46	1332987		c	SNP	synonymous	HPATCC43504_01275		
S46	1332996		G	SNP	synonymous	HPATCC43504_01275		
S46	1332997		c	SNP	nonsynonymous	HPATCC43504_01275		
S46	1332999		c	SNP	synonymous	HPATCC43504_01275		
S46	1482848		T	SNP	nonsynonymous	HPG27_298		
S46 S46	1482850 1482859		G C	SNP SNP	nonsynonymous	HPG27_298 HPG27_298		
					synonymous	HPG27_298		
S46 S46	1482860 1482861		A A	SNP SNP	nonsynonymous	HPG27_298 HPG27_298		
S46	1482861		A	SNP	nonsynonymous	HPG27_298 HPG27_298		
S46	1483092		A	SNP	nonsynonymous	HPG27_298 HPG27_298		
S46	1483269		G	SNP	nonsynonymous	HPG27_298 HPG27_298		
S40	99327		T	SNP	synonymous	jhp0935		
S47	168379		т Т	SNP	synonymous	HP1547		
S47	199597		T	SNP	intergenic		HP1582	jhp1488
S47	214663		CGAGAGAGAGAGAG	indel	intergenic		HPG27_8	
S47	232964		A	SNP	intergenic		HPPC_00115	
S47	251374		A	SNP	nonsynonymous	HP0045	- 1	
S47	276989		A	SNP	nonsynonymous	HPP12_0070		
S47	303813		T	SNP	nonsynonymous	HPP12_0096		
S47	374756	CGGGGGGGGGGGG	CGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG	indel	frameshift insertion	 jhp0151		
S47	424517		CGGGGG	indel	intergenic		HP0189	HP0188
S47	430922	G	A	SNP	nonsynonymous	HP0194		
S47	546511	СААААААААААА	САААААААААААА	indel	intergenic		HP1243/HPG27_298	
S47	548941	с	т	SNP	intergenic		jhp1163	HPG27_298
S47	548965	с	т	SNP	intergenic		jhp1163	HPG27_298
S47	548978	G	т	SNP	intergenic		jhp1163	HPG27_298
S47	548994	A	Т	SNP	intergenic		jhp1163	HPG27_298
S47	691071	G	A	SNP	synonymous	HP0489		
S47	691074	A	c	SNP	synonymous	HP0489		
S47	691077	G	A	SNP	nonsynonymous	HP0489		
S47	691089	A	G	SNP	synonymous	HP0489		
S47	691091	c	A	SNP	nonsynonymous	HP0489		
S47	691101	т	с	SNP	synonymous	HP0489		
S47	691113	G	Т	SNP	nonsynonymous	HP0489		
S47	691173		A	SNP	synonymous	HP0489		
S47	691175		G	SNP	nonsynonymous	HP0489		
S47	691179		G	SNP	synonymous	HP0489		
S47	691185		G	SNP	nonsynonymous	HP0489		
S47	691189		G	SNP	nonsynonymous	HP0489		
S47	691190		c	SNP	nonsynonymous	HP0489		
S47	801836	GAAAAAAAAAAA	GAAAAAAAAAAAA	indel	intergenic		11	
S47	830053	C.	T	CALC		UDD12 0017	jhp0540	
S47 S47	10/2704		T	SNP	nonsynonymous	HPP12_0617		HDpc/160
S47 S47	1043704	GTTTTTTTTTTTT	GTTTTTTTTTTTT,GTTTTTTTTTTTTTTTT	indel	nonsynonymous frameshift insertion/intergenic	HPP12_0617 HPnc4170	HP0811	HPnc4160
	1187376	GTTTTTTTTTTTT	GTTTTTTTTTTTTTTT,GTTTTTTTTTTTTTTTTT ATTTTTTT	indel indel	nonsynonymous frameshift insertion/intergenic intergenic	HPnc4170		HPnc4160
	1187376 1262251	GTTTTTTTTTT ATTTTTTT C	GTTTTTTTTTTTTTT,GTTTTTTTTTTTTT ATTTTTTT A	indel indel SNP	nonsynonymous frameshift insertion/intergenic intergenic nonsynonymous	-	HP0811 HP0947	HPnc4160
S47 S47	1187376	GTTTTTTTTTTT ATTTTTTT C GATATATATATATATATATATAT	GTTTTTTTTTTTTTTT,GTTTTTTTTTTTTTTTTT ATTTTTTT	indel indel	nonsynonymous frameshift insertion/intergenic intergenic nonsynonymous intergenic	HPnc4170	HP0811	HPnc4160
S47 S47	1187376 1262251 1295885 1332690	GTTTTTTTTTTT ATTTTTTT C GATATATATATATATATATATAT C	GTTTTTTTTTTTTT,GTTTTTTTTTTT ATTTTTTT A GATATATATATATATA	indel indel SNP indel SNP	nonsynonymous frameshift insertion/intergenic intergenic nonsynonymous intergenic synonymous	HPnc4170 jhp0981 HPATCC43504_01275	HP0811 HP0947	HPnc4160
S47	1187376 1262251 1295885	GTTTTTTTTTTT ATTTTTT C GATATATATATATATATATAT C T	GTTTTTTTTTTTTT,GTTTTTTTTTTTT ATTTTTTT A GATATATATATATAT	indel indel SNP indel	nonsynonymous frameshift insertion/intergenic intergenic nonsynonymous intergenic synonymous synonymous	HPnc4170	HP0811 HP0947	HPnc4160
S47 S47 S47	1187376 1262251 1295885 1332690 1332888	GTITITITITITI ATTITITT C GATATATATATATATATAT C T T T	GTTTTTTTTTTTTT,GTTTTTTTTTTT ATTTTTTT A GATATATATATATATA	indel SNP indel SNP SNP	nonsynonymous frameshift insertion/intergenic intergenic nonsynonymous intergenic synonymous	HPnc4170 jhp0981 HPATCC43504_01275 HPATCC43504_01275	HP0811 HP0947	HPnc4160
S47 S47 S47 S47	1187376 1262251 1295885 1332690 1332888 1332893	GTTTTTTTTTTT ATTTTTTT C GATATATATATATATATATAT C C T T T G	GTTTTTTTTTTT ATTTTTTTT A GATATATATATATAT	indel SNP indel SNP SNP SNP	nonsynonymous frameshift insertion/intergenic intergenic nonsynonymous intergenic synonymous synonymous nonsynonymous frameshift deletion	HPnc4170 jhp0981 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275	HP0811 HP0947	HPnc4160
S47 S47 S47 S47 S47 S47	1187376 1262251 1295885 1332690 1332888 1332893 1332900	GTTTTTTTTTTTT ATTTTTTT C GATATATATATATATATATAT C T T G G C	GTTTTTTTTTTTT,GTTTTTTTTTTT ATTTTTTTT A GATATATATATATAT	indel indel SNP indel SNP SNP indel	nonsynonymous frameshift insertion/intergenic intergenic nonsynonymous intergenic synonymous synonymous nonsynonymous	HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275	HP0811 HP0947	HPnc4160
\$47 \$47 \$47 \$47 \$47 \$47 \$47	1187376 1262251 1295885 1332690 1332888 1332893 1332900 1332906	GTTTTTTTTTTTT ATTTTTTT C GATATATATATATATATATATAT T G C C T T C C T	GTTTTTTTTTTTTT,GTTTTTTTTTTT ATTTTTTTT A GATATATATATATAT	indel SNP indel SNP SNP SNP indel SNP	nonsynonymous frameshift insertion/intergenic intergenic onsynonymous intergenic synonymous synonymous nonsynonymous frameshift deletion synonymous	HPnc4170 jhp0981 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275	HP0811 HP0947	HPnc4160
\$47 \$47 \$47 \$47 \$47 \$47 \$47 \$47	1187376 1262251 1295885 1332690 1332888 1332893 1332900 1332906 1332954	GTTTTTTTTTTTT ATTTTTTT C GATATATATATATATATATATAT C T T G G C T T T T T T	GTTTTTTTTTTTTT,GTTTTTTTTTTTT ATTTTTTTT A GATATATATATATA	indel indel SNP indel SNP SNP indel SNP SNP	nonsynonymous frameshift insertion/intergenic intergenic onsynonymous intergenic synonymous synonymous nonsynonymous frameshift deletion synonymous synonymous	HPnc4170 jhp0981 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275	HP0811 HP0947	HPnc4160
\$47 \$47 \$47 \$47 \$47 \$47 \$47 \$47 \$47 \$47	1187376 1262251 1295885 1332690 1332888 1332893 1332900 1332906 1332954 1332987	GTITITITITIT ATTITITT C GATATATATATATATATAT C T T G G C C T T T T	GTTTTTTTTTTTTT,GTTTTTTTTTTT ATTTTTTT A GATATATATATATATA	indel indel SNP SNP SNP indel SNP SNP SNP	nonsynonymous frameshift insertion/intergenic intergenic nonsynonymous intergenic synonymous synonymous frameshift deletion synonymous synonymous synonymous synonymous	HPnc4170 jhp0981 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275	HP0811 HP0947	HPnc4160
\$47 \$47 \$47 \$47 \$47 \$47 \$47 \$47 \$47 \$47	1187376 1262251 1295885 1332690 1332888 1332930 1332906 1332954 1332985	GTITITITITIT ATTITITT C GATATATATATATATATAT C T T G G C T T T T G G G	GTTTTTTTTTTT ATTTTTTTT A GATATATATATATAT	indel indel SNP SNP SNP indel SNP SNP SNP SNP	nonsynonymous frameshift insertion/intergenic intergenic onsynonymous synonymous synonymous nonsynonymous frameshift deletion synonymous synonymous synonymous synonymous synonymous	HPnc4170 jhp0981 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275	HP0811 HP0947	HPnc4160
\$47 \$47 \$47 \$47 \$47 \$47 \$47 \$47 \$47 \$47	1187376 1262251 1395885 1332690 1332883 1332903 1332906 133295 1332996 1332997	GTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	GTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	indel indel SNP SNP SNP indel SNP SNP SNP SNP SNP	nonsynonymous frameshift insertion/intergenic intergenic nonsynonymous intergenic synonymous synonymous frameshift deletion synonymous synonymous synonymous synonymous synonymous nonsynonymous nonsynonymous	HPnc4170           jhp0981           HPATCC43504_01275	HP0811 HP0947	HPnc4160
\$47 \$47 \$47 \$47 \$47 \$47 \$47 \$47 \$47 \$47	1187376 1262251 1295885 1332690 133288 133288 133290 133290 133295 133295 133299 133299	GTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	GTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	indel indel SNP SNP SNP indel SNP SNP SNP SNP SNP SNP	nonsynonymous frameshift insertion/intergenic intergenic nonsynonymous intergenic synonymous synonymous frameshift deletion synonymous synonymous synonymous synonymous synonymous nonsynonymous nonsynonymous synonymous	HPnc4170           jhp0981           HPATCC43504_01275	HP0811 HP0947 HPATCC43504_01238	
\$47 \$47 \$47 \$47 \$47 \$47 \$47 \$47 \$47 \$47	1187376 1262251 1325885 1332690 1332888 1332900 1332906 1332954 1332987 1332995 1332999 1582071	GTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	GTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	indel indel SNP SNP SNP indel SNP SNP SNP SNP SNP SNP indel	nonsynonymous frameshift insertion/intergenic intergenic nonsynonymous intergenic synonymous synonymous frameshift deletion synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous intergenic	HPnc4170 jhp0981 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275	HP0811 HP0947 HPATCC43504_01238	
S47           S48	1187376 1262251 1325885 1332690 1332888 1332930 1332906 1332954 1332997 1332999 1582071 99327	GTITITITITIT ATTITITT C GATATATATATATATATAT C T T T G C C T T T T G G T T AATT C C	GTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	indel indel SNP SNP SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous frameshift insertion/intergenic intergenic nonsynonymous intergenic synonymous synonymous frameshift deletion synonymous synonymous synonymous synonymous synonymous intergenic synonymous intergenic	HPnc4170 jhp0981 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275	HP0811 HP0947 HPATCC43504_01238	
S47           S48           S48	1187376 1262251 1295885 1332690 1332888 1332900 1332906 1332954 1332997 1332997 1332997 1332997 1332997 1332997 1332997 1332997 1582071 99327 168379	GTITITITITIT ATTITITT C GATATATATATATATATAT C T T G G C C T T T G G T T G G T AATT C C C C C C C C C C C C C C C C	GTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	indel indel SNP SNP SNP indel SNP SNP SNP SNP SNP SNP SNP indel SNP SNP SNP	nonsynonymous frameshift insertion/intergenic intergenic nonsynonymous synonymous synonymous frameshift deletion synonymous synonymous synonymous synonymous synonymous nonsynonymous nonsynonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous	HPnc4170 jhp0981 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275	HP0811 HP0947 HPATCC43504_01238 HPATCC43504_01238	HP0228
S47           S48           S48           S48	1187376 1262251 1295885 1332690 1332888 1332900 1332906 1332954 1332957 1332997 1332997 1332997 1332997 1332997 1332997 1582071 99327 168379 199597	GTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	GTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	indel indel SNP SNP SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous frameshift insertion/intergenic intergenic onsynonymous synonymous synonymous nonsynonymous frameshift deletion synonymous synonymous synonymous synonymous nonsynonymous nonsynonymous intergenic synonymous synonymous intergenic	HPnc4170           jhp0981           HPATCC43504_01275           Jhp0935           HP1547	HP0811 HP0947 HPATCC43504_01238 HPATCC43504_01238	HP0228
S47           S48           S48           S48           S48	1187376 1262251 1295885 1332690 1332888 1332906 1332906 1332954 1332996 1332997 1332999 1582071 99327 168379 168379 19597	GTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	GTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous frameshift insertion/intergenic intergenic onorsynonymous intergenic synonymous synonymous frameshift deletion synonymous synonymous synonymous synonymous synonymous nonsynonymous nonsynonymous intergenic synonymous intergenic nonsynonymous intergenic nonsynonymous	HPnc4170           ihp0981           HPATCC43504_01275           HPATC43504_01275           HPATC43504_01275           HPATC43504_01275           HPATC43504_01275           HPATC43504_01275           HPATC43504_01275           HPATC43504_01275           HPATC43504_01275           HPATC43504_01275	HP0811 HP0947 HPATCC43504_01238 HPATCC43504_01238	HP0228
S47           S48           S48           S48           S48           S48           S48           S48           S48	1187376 1262251 1295885 1332690 1332888 1332930 1332900 1332954 1332954 1332997 1332997 1332997 1332999 1582071 99327 168379 168379 199597 251374 276989	GTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	GTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous frameshift insertion/intergenic intergenic onorsynonymous intergenic synonymous synonymous frameshift deletion synonymous synonymous synonymous synonymous synonymous intergenic synonymous intergenic norsynonymous intergenic norsynonymous intergenic norsynonymous intergenic norsynonymous norsynonymous norsynonymous	HPnc4170           ihp0981           HPATCC43504_01275           HPATC43504_01275           HPATC43504_01275           HPATC43504_01275           HPATC43504_01275           HPATC43504_01275           HPATC43504_01275           HPATC43504_01275           HPATC43504_01275           HPATC43504_01275	HP0811 HP0947 HPATCC43504_01238 HPATCC43504_01238 HPATCC43504_01238 HPATCC43504_01238	HP0228
S47           S48	1187376 1262251 1295885 1332690 133288 1332900 1332900 1332954 133297 133299 1332997 1332997 1332997 1332997 1582071 99327 168379 199577 251374 251374	GTITITITITIT ATTITITT C GATATATATATATATATAT C C T T C C C C T T T C C C C	GTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous frameshift insertion/intergenic intergenic nonsynonymous intergenic synonymous synonymous frameshift deletion synonymous synonymous synonymous synonymous intergenic synonymous intergenic nonsynonymous intergenic nonsynonymous intergenic	HPnc4170           jhp0981           HPATCC43504_01275           HPATC504_01275           HPATCC43504_01275           HPATC43504_01275           HPATC504_01275           HPATC43504_01275           HPATC504_01275           HPO045           HP12_0070	HP0811 HP0947 HPATCC43504_01238 HPATCC43504_01238 HPATCC43504_01238 HPATCC43504_01238	HP0228
S47           S48	1187376 1262251 132690 133288 1332900 1332900 1332906 1332905 1332997 1332999 1582071 99327 199597 251374 251374 276889 276882 276882	GTITITITITIT ATTITITT C GATATATATATATATATATAT C T T T G C C C T T T T G G C C C C C	GTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous frameshift insertion/intergenic intergenic nonsynonymous intergenic synonymous synonymous frameshift deletion synonymous synonymous synonymous synonymous synonymous synonymous nonsynonymous intergenic synonymous intergenic nonsynonymous intergenic nonsynonymous	HPnc4170           jhp0981           HPATCC43504_01275           HPATC504_01275           HPATCC43504_01275           HPATC43504_01275           HPATC504_01275           HPATC43504_01275           HPATC504_01275           HPO045           HP12_0070	HP0811 HP0947 HPATCC43504_01238 HPATCC43504_01238 HP0189 HP0189	HP0228
S47           S48	1187376 1262251 1295885 1332690 1332906 1332906 1332954 1332954 1332997 1332997 1332997 1582701 99327 158379 195597 251374 276989 424517 430922 546511	GTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	GTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous frameshift insertion/intergenic intergenic nonsynonymous synonymous synonymous synonymous frameshift deletion synonymous synonymous synonymous synonymous synonymous nonsynonymous intergenic synonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic	HPnc4170           jhp0981           HPATCC43504_01275           HPATC504_01275           HPATCC43504_01275           HPATC43504_01275           HPATC504_01275           HPATC43504_01275           HPATC504_01275           HPO045           HP12_0070	HP0811 HP0947 HPATCC43504_01238 HPATCC43504_01238 HP1582 HP0189 HP1243/HPG27_298	HP0228 jhp1488 HP0188
S47           S48	1187376 1262251 1295885 1332893 1332893 1332906 133294 1332954 1332954 1332954 133296 1332957 1332997 158270 199327 168379 199597 251374 276989 424517 430922 546511 548965	GTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	GTTTTTTTTTTTTTTATTTTTTTTTTTTTTTTTTTTTT	indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous frameshift insertion/intergenic intergenic onsynonymous intergenic synonymous synonymous synonymous frameshift deletion synonymous synonymous synonymous synonymous nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic intergenic intergenic	HPnc4170           jhp0981           HPATCC43504_01275           HPATC504_01275           HPATCC43504_01275           HPATC43504_01275           HPATC504_01275           HPATC43504_01275           HPATC504_01275           HPO045           HP12_0070	HP0811 HP0947 HPATCC43504_01238 HPATCC43504_01238 HP1243/HPG27_298 HP1243/HPG27_298 jhp1163	HP0228 jhp1488 HP0188 HPG27_298
S47           S48	1187376 1262251 1295885 133280 133290 133290 133294 133294 133294 133294 133295 133295 133299 1582071 9337 168379 199597 251374 276989 424517 430922 546511 54895	GTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	GTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous frameshift insertion/intergenic intergenic onorsynonymous intergenic synonymous synonymous frameshift deletion synonymous synonymous synonymous synonymous synonymous intergenic synonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic	HPnc4170           jhp0981           HPATCC43504_01275           HP0935           HP1547           HP0045           HP0194	HP0811 HP0947 HPATCC43504_01238 HPATCC43504_01238 HP1243/HPG27_298 HP1243/HPG27_298 jhp1163	HP0228 jhp1488 HP0188 HPG27_298
S47           S48           S48      S48      S	1187376 1262251 1295885 1332690 133288 1332900 1332906 1332954 133297 1332997 1332997 1332997 1332997 1332997 1332997 1332997 1332997 1332997 1332997 1332997 1332997 133297 13527 13577 13577 13577 13577 13577 13577 13577 13577 13577 13577 13577 13577 13577 13577 13577 13577 13577 13577 1357777 1357777 1357777 1357777 13577777 135777777 135777777777777777777777777777777777777	GTITITITITIT ATTITITT C GATATATATATATATATATAT C GATATATATATATATATAT C T T G C C T T T T C C C C C C C C C	GTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous frameshift insertion/intergenic intergenic nonsynonymous intergenic synonymous synonymous frameshift deletion synonymous synonymous synonymous synonymous intergenic synonymous intergenic nonsynonymous intergenic nonsynonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic	HPnc4170           jhp0981           HPATCC43504_01275           HP01935           HP12_0070           HP0194           HP0489	HP0811 HP0947 HPATCC43504_01238 HPATCC43504_01238 HP1243/HPG27_298 HP1243/HPG27_298 jhp1163	HP0228 jhp1488 HP0188 HPG27_298

S48	691091	с	Α	SNP	nonsynonymous	HP0489		
S48	691101	Т	с	SNP	synonymous	HP0489		
S48	691113	G	Т	SNP	nonsynonymous	HP0489		
S48	691149	G	С	SNP	synonymous	HP0489		
S48	691173	С	A	SNP	synonymous	HP0489		
S48	691175	Α	G	SNP	nonsynonymous	HP0489		
S48	691179	С	G	SNP	synonymous	HP0489		
S48	691185	Α	G	SNP	nonsynonymous	HP0489		
S48	691189	с	G	SNP	nonsynonymous	HP0489		
S48	691190	A	с	SNP	nonsynonymous	HP0489		
S48	830053	с	т	SNP	nonsynonymous	HPP12_0617		
S48	958702	САААААААААААААА	САААААААААААААААА	indel	intergenic	-	HPG27 680	
S48	1102177	Α	T	SNP	intergenic		HP0876	HP0875
S48	1187376	ATTTTTTT	ATTTTTTTT	indel	intergenic		HP0947	
S48	1262251	c	A	SNP	nonsynonymous	jhp0981		
			GATATATATATATATATATATATAT,GATATATATATA			j		
S48	1295885	GATATATATATATATAT	TATATATAT	indel	intergenic		HPATCC43504_01238	
S48	1318527	с	Α	SNP	intergenic	jhp1031		
S48	1332690	с	Α	SNP	synonymous	HPATCC43504_01275		
S48	1332906	с	т	SNP	synonymous	HPATCC43504_01275		
S48	1332954	т	G	SNP	synonymous	HPATCC43504_01275		
S48	1332987	т	с	SNP	synonymous	HPATCC43504_01275		
S48	1332996	т	G	SNP	synonymous	HPATCC43504 01275		
S48	1332997	G	с	SNP	nonsynonymous	HPATCC43504 01275		
S48	1332999	<u>-</u> Т	c	SNP	synonymous	HPATCC43504_01275		
S48	1482848	G	T	SNP	nonsynonymous	HPG27_298		
S48	1482850	T	G	SNP	nonsynonymous	HPG27_298		
548 548	1482859	T	c	SNP	synonymous	HPG27_298		
548 548	1482859	c	A	SNP		HPG27_298		
548 548	1482860	G	A	SNP	nonsynonymous	HPG27_298 HPG27_298		
	1482861 1483092				nonsynonymous	-		
S48		G	A	SNP	nonsynonymous	HPG27_298		
S48	1483202	G	A	SNP	nonsynonymous	HPG27_298		
S48	1483269	A	G	SNP	nonsynonymous	HPG27_298		
S48	1592784	ATGTG	ATG	indel	frameshift deletion	HP1354		
S48	1593602	TGGGGGGGGGGG	TGGGGGGGGGGGG	indel	frameshift insertion	HP1354		
S49	212868	c	A	SNP	nonsynonymous	HPG27_8		
S49	214663	CGAGAGAGAGAGAGAG	CGAGAGAGAGAGAGAGAG	indel	intergenic		HPG27_8	
S49	232964	с	A	SNP	intergenic		HPPC_00115	
S49	332580	Т	A	SNP	synonymous	HP0119		
S49	332598	C	Т	SNP	synonymous	HP0119		
S49	332632	G	A	SNP	nonsynonymous	HP0119		
S49	332653	С	Т	SNP	nonsynonymous	HP0119		
S49	332689	G	Α	SNP	nonsynonymous	HP0119		
S49	374756	CGGGGGGGGGGGG	CGGGGGGGGGGGGGG	indel	frameshift insertion	jhp0151		
S49	548978	G	Т	SNP	intergenic		jhp1163	HPG27_298
	548978 701037	G TGGGGGGGGG	T TGGGGGGG	SNP indel	intergenic frameshift deletion	HP0499	jhp1163	HPG27_298
S49						HP0499 HP0646	jhp1163	HPG27_298
S49 S49	701037	TGGGGGGGG	TGGGGGGG	indel	frameshift deletion		jhp1163	HPG27_298
S49 S49 S49	701037 868876	TGGGGGGGG T	TGGGGGGG C	indel SNP	frameshift deletion nonsynonymous	HP0646	jhp1163	HPG27_298
\$49 \$49 \$49 \$49 \$49	701037 868876 956664	TGGGGGGGG T A	TGGGGGGG C G	indel SNP SNP	frameshift deletion nonsynonymous synonymous	HP0646 HPG27_680	jhp1163	HPG27_298
\$49 \$49 \$49 \$49 \$49 \$49	701037 868876 956664 1166858	TGGGGGGGG T A G	TGGGGGGG C G T	indel SNP SNP SNP	frameshift deletion nonsynonymous synonymous nonsynonymous	HP0646 HPG27_680 HP0929	jhp1163	HPG27_298
\$49 \$49 \$49 \$49 \$49 \$49 \$49	701037 868876 956664 1166858 1185804	TGGGGGGGG T A G A	TGGGGGGG C G T G	indel SNP SNP SNP SNP	frameshift deletion nonsynonymous synonymous nonsynonymous nonsynonymous	HP0646 HPG27_680 HP0929 HP0946	jhp1163	HPG27_298
\$49 \$49 \$49 \$49 \$49 \$49 \$49 \$49 \$49	701037 868876 956664 1166858 1185804 1284699	TGGGGGGGG T A G A AGGGGGGGGGGG	TGGGGGGG C G T G AGGGGGGGGGG	indel SNP SNP SNP SNP indel	frameshift deletion nonsynonymous synonymous nonsynonymous nonsynonymous frameshift deletion frameshift insertion	HP0646 HPG27_680 HP0929 HP0946 HPG27_1018 HPATCC43504_01561	jhp1163	HPG27_298
S49           S50	701037 868876 956664 1166858 1185804 1284699 1636693 212868	TGGGGGGGG T A G A AGGGGGGGGGG TGGGG C	TGGGGGGG C G T G AGGGGGGGGG A A	indel SNP SNP SNP indel SNP	frameshift deletion nonsynonymous synonymous nonsynonymous nonsynonymous frameshift deletion frameshift insertion nonsynonymous	HP0646 HPG27_680 HP0929 HP0946 HPG27_1018 HPATCC43504_01561 HPG27_8	jhp1163	HPG27_298
S49           S50           S50	701037 868876 956664 1166858 1185804 1284699 1636693 212868 332580	TGGGGGGGG T A G A AGGGGGGGGGGG TGGGG C T	TGGGGGGG C G T G AGGGGGGGGGG TGGGGG A A	indel SNP SNP SNP indel indel SNP SNP	frameshift deletion nonsynonymous synonymous nonsynonymous nonsynonymous frameshift deletion frameshift insertion nonsynonymous synonymous	HP0646 HPG27_680 HP0929 HP0946 HPG27_1018 HPATCC43504_01561 HPG27_8 HP0119	jhp1163	HPG27_298
S49           S50           S50	701037 868876 956664 1166858 1185804 1284699 1636693 212868 332580 332580	TGGGGGGGG T A G A GGGGGGGGGGGG T GGGG C T G G	TGGGGGGG C G T G AGGGGGGGGG A A	indel SNP SNP SNP indel indel SNP SNP	frameshift deletion nonsynonymous synonymous nonsynonymous nonsynonymous frameshift deletion frameshift insertion nonsynonymous synonymous nonsynonymous	HP0646 HPG27_680 HP0929 HP0946 HPG27_1018 HPATCC43504_01561 HP627_8 HP0119 HP0119	jhp1163	HPG27_298
S49           S50           S50           S50           S50	701037 868876 956664 1166858 1185804 1284699 1636693 212868 332580 332632 332653	TGGGGGGGG T A G A AGGGGGGGGGGG T GGGG C T G G C	TGGGGGGG C G T G AGGGGGGGGG A A A A A A A T	indel SNP SNP SNP indel indel SNP SNP SNP	frameshift deletion norsynonymous synonymous norsynonymous norsynonymous frameshift deletion frameshift insertion nonsynonymous synonymous norsynonymous norsynonymous	HP0646 HPG27_680 HP0929 HP0946 HPG27_1018 HPATC43504_01561 HP627_8 HP0119 HP0119 HP0119	jhp1163	HPG27_298
S49           S49           S49           S49           S49           S49           S49           S49           S50           S50           S50           S50           S50           S50           S50           S50	701037 868876 956664 1166858 1185804 1284699 1636693 212868 332580 332632 332632 332632	TGGGGGGGG T A G A AGGGGGGGGGG TGGGG C T G G C G G	TGGGGGGG C G T G AGGGGGGGGG TGGGGG A A A A A T T A	indel SNP SNP SNP indel indel SNP SNP SNP SNP	frameshift deletion nonsynonymous synonymous nonsynonymous nonsynonymous frameshift deletion frameshift deletion frameshift insertion nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous	HP0646 HPG27_680 HP0929 HP0946 HPG27_1018 HPATCC43504_01561 HP627_8 HP0119 HP0119		HPG27_298
S49           S49           S49           S49           S49           S49           S49           S49           S50	701037 868876 956664 1166858 1185804 1284699 1636693 312868 332580 332632 332653 332689 464294	TGGGGGGGGG         T         A         G         A         AGGGGGGGGGG         TGGGG         C         G         C         G         G         A         AGGGGGGGGGG         TGGGG         C         G         C         G         A	TGGGGGGG         C         G         AGGGGGGGGG         TGGGGG         A         A         A         T         A         G         A         G         A         G         A         G         G         G         G	indel SNP SNP indel indel SNP SNP SNP SNP SNP	frameshift deletion nonsynonymous synonymous nonsynonymous nonsynonymous frameshift deletion frameshift deletion frameshift insertion nonsynonymous synonymous nonsynonymous nonsynonymous nonsynonymous intergenic	HP0646 HPG27_680 HP0929 HP0946 HPG27_1018 HPATC43504_01561 HP627_8 HP0119 HP0119 HP0119	HP0226	HPG27_298
S49           S49           S49           S49           S49           S49           S49           S49           S49           S50	701037 868876 956664 1166858 1185804 1284699 1636693 312868 332580 332632 332653 332689 464294 546511	TGGGGGGGG           T           A           G           A           AGGGGGGGGGG           TGGGG           C           T           G           C           T           G           C           T           G           C           G           A           CAMAAAAAAAAAA	TGGGGGGG           C           G           AGGGGGGGGG           TGGGGG           A           A           A           T           A           G           A           G           G           CAAAAAAAAAAAAAAAA	indel SNP SNP SNP indel indel SNP SNP SNP SNP SNP SNP indel	frameshift deletion nonsynonymous synonymous nonsynonymous nonsynonymous frameshift deletion frameshift deletion frameshift insertion nonsynonymous synonymous nonsynonymous nonsynonymous intergenic	HP0646 HPG27_680 HP0929 HP0946 HPG27_1018 HPATC43504_01561 HP627_8 HP0119 HP0119 HP0119	HP0226 HP1243/HP627_298	
S49           S49           S49           S49           S49           S49           S49           S49           S49           S50	701037 868876 956664 1166858 1185804 1284699 1636693 212868 332580 332682 332653 332689 464294 546511 548978	TGGGGGGGG           T           A           G           A           AGGGGGGGGGG           TGGG           C           T           G           C           T           G           C           G           C           G           A           CAAAAAAAAAAAAAAA           G	TGGGGGGG           C           G           AGGGGGGGGG           TGGGG           A           A           T           A           T           A           G           CAAAAAAAAAAAAAAA           T	indel SNP SNP SNP indel indel SNP SNP SNP SNP SNP indel SNP	frameshift deletion nonsynonymous synonymous nonsynonymous nonsynonymous frameshift deletion frameshift deletion frameshift insertion nonsynonymous nonsynonymous nonsynonymous nonsynonymous intergenic intergenic	HP0646 HPG27_680 HP0929 HP0946 HPG27_1018 HPATC243504_01561 HPG27_8 HP0119 HP0119 HP0119 HP0119	HP0226	HPG27_298
S49           S49           S49           S49           S49           S49           S49           S49           S49           S50	701037 868876 956664 1166858 1185804 1284699 212868 332683 332633 332632 332632 332653 332689 464294 546511 548978 701037	TGGGGGGGGG         T         A         G         A         AGGGGGGGGGGG         TGGGG         C         T         G         C         T         G         C         T         G         C         G         G         A         CAAAAAAAAAAAAA         G         TGGGGGGGGG         TGGGGGGGGG	TGGGGGGG         C         G         T         G         AGGGGGGGGG         TGGGGG         A         A         G         CAAAAAAAAAAAAAA         T         TGGGGGGG         TGGGGGGG         GGGGGGGGG         CAAAAAAAAAAAAAA         T         TGGGGGGGG	indel SNP SNP indel indel SNP SNP SNP SNP SNP indel SNP indel	frameshift deletion nonsynonymous synonymous nonsynonymous nonsynonymous frameshift deletion frameshift insertion nonsynonymous nonsynonymous nonsynonymous nonsynonymous intergenic intergenic frameshift deletion	HP0646 HPG27_680 HP0929 HP0946 HPG27_1018 HPATC43504_01561 HP627_8 HP0119 HP0119 HP0119	HP0226 HP1243/HP627_298 jhp1163	
S49           S49           S49           S49           S49           S49           S49           S49           S49           S50	701037 868876 956664 1166858 1185804 1284699 1636693 212868 332683 332633 332633 332653 332689 464294 546511 548978 701037 801836	TGGGGGGGG T A G A AGGGGGGGGGG TGGGG C T G C C C C C C C C C C C C C	TGGGGGGG C G T G AGGGGGGGG A AGGGGGGG A A A A T T CAAAAAAAAAA	indel SNP SNP SNP indel indel SNP SNP SNP SNP SNP SNP indel indel	frameshift deletion nonsynonymous synonymous nonsynonymous nonsynonymous frameshift deletion frameshift deletion frameshift insertion nonsynonymous nonsynonymous nonsynonymous nonsynonymous intergenic intergenic intergenic frameshift deletion intergenic	HP0646 HPG27_680 HP0929 HP0946 HPG27_1018 HPATCC43504_01561 HP027_8 HP0119 HP0119 HP0119 HP0119 HP019 HP019	HP0226 HP1243/HP627_298	
S49           S49           S49           S49           S49           S49           S49           S49           S49           S50	701037 868876 956664 1166858 1185804 1284699 1636693 212868 332580 332682 332683 332683 332689 464294 546511 548978 801836 801836	TGGGGGGGG           T           A           G           A           AGGGGGGGGGG           TGGGG           C           G           G           C           G           G           C           G           C           G           C           G           G           TGGGGGGGG           GGGGGGGG           GGGGGGGG           GAAAAAAAAAAAAA           G           T	TGGGGGGG C G T G G AGGGGGGGG A A A A A A A A A A C C AAAAAAAA	indel SNP SNP SNP indel SNP SNP SNP SNP SNP indel SNP indel SNP	frameshift deletion nonsynonymous synonymous nonsynonymous nonsynonymous frameshift deletion frameshift deletion frameshift deletion nonsynonymous nonsynonymous nonsynonymous nonsynonymous intergenic intergenic intergenic frameshift deletion intergenic notsrgenic nonsynonymous	HP0646 HPG27_680 HP0929 HP0946 HP627_1018 HPATCC43504_01561 HPG27_8 HP0119 HP0119 HP0119 HP0119 HP0119 HP0149 HP0149	HP0226 HP1243/HP627_298 jhp1163	
S49           S49           S49           S49           S49           S49           S49           S49           S50	701037 868876 956664 1166858 1185804 1284699 1636693 212868 332580 332683 332683 332683 332689 464294 546511 548978 701037 801836 801836 868876 873717	TGGGGGGGG           T           A           G           A           AGGGGGGGGGG           TGGGG           C           T           G           C           T           G           C           G           C           G           TGGGGGGGG           TGGGGGGGG           G           TGGGGGGGG           GAAAAAAAAAAAA           G           T           C	TGGGGGGG           C           G           AGGGGGGGGG           T           G           AGGGGGGGGG           A           A           G           CAAAAAAAAAAAAAA           T           TGGGGGG           C           T           TGGGGGGG           G           C           T	indel SNP SNP SNP indel SNP SNP SNP SNP SNP indel SNP indel SNP SNP SNP SNP	frameshift deletion nonsynonymous synonymous nonsynonymous nonsynonymous frameshift deletion frameshift deletion frameshift deletion nonsynonymous nonsynonymous nonsynonymous nonsynonymous intergenic intergenic frameshift deletion intergenic notergenic	HP0646 HP027_680 HP0929 HP0946 HP037_1018 HPATCC43504_01561 HP627_8 HP0119 HP0119 HP0119 HP0119 HP019 HP019 HP0646 HP0646 HP0651	HP0226 HP1243/HP627_298 jhp1163	
S49           S49           S49           S49           S49           S49           S49           S49           S50	701037 868876 956664 1166858 1185804 1284699 1636693 312868 332580 332633 332683 464294 546511 548978 701037 801836 868876 873717 873807	TGGGGGGGG           T           A           G           A           AGGGGGGGGGG           TGGGG           C           T           G           C           T           G           C           G           A           GGGGGGG           T           GGGGGGGG           G           A           C           GGGGGGGG           GAAAAAAAAAAAA           T           C           C           C           C           C           C	TGGGGGGG           C           G           AGGGGGGGGG           TGGGGG           A           A           T           A           T           A           C           T           A           G           CAAAAAAAAAAAAAA           T           TGGGGGGG           GAAAAAAAAAAAAAAA           C           T           G           C           T           G	indel SNP SNP SNP indel indel SNP SNP SNP SNP indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP	frameshift deletion nonsynonymous synonymous nonsynonymous nonsynonymous frameshift deletion frameshift deletion frameshift deletion nonsynonymous nonsynonymous nonsynonymous nonsynonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous	HP0646 HPG27_680 HP0929 HP0946 HPG27_1018 HPATCC43504_01561 HPG27_8 HP0119 HP0119 HP0119 HP0119 HP0119 HP0119 HP0499 HP0651 HP0651 HP0651	HP0226 HP1243/HP627_298 jhp1163	
\$49           \$49           \$49           \$49           \$49           \$49           \$49           \$50	701037 868876 956664 1165858 1185804 1284699 1284699 122868 332632 332632 332632 332632 332639 464294 546511 548978 701037 801836 868876 868876 873317 873808	TGGGGGGGG           T           A           G           A           AGGGGGGGGGG           TGGGG           C           T           G           C           T           G           C           G           C           G           G           CAAAAAAAAAAA           G           TGGGGGGGG           GAAAAAAAAAAAA           T           C           C           C           C           C           G           G	TGGGGGGG           C           G           AGGGGGGGGG           T           G           AGGGGGGGG           A           A           T           A           G           CAAAAAAAAAAAAAA           T           TGGGGGG           GAAAAAAAAAAAAA           C           T           G           GAAAAAAAAAAAAA           C           T           G           A           T           GGGGGG           GAAAAAAAAAAAAA           C           T           G           A	indel SNP SNP SNP indel indel SNP SNP SNP SNP indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	frameshift deletion nonsynonymous synonymous nonsynonymous nonsynonymous frameshift deletion frameshift deletion frameshift deletion nonsynonymous nonsynonymous nonsynonymous nonsynonymous intergenic intergenic intergenic frameshift deletion intergenic nonsynonymous synonymous synonymous synonymous	HP0646 HPG27_680 HP0929 HP0946 HPG27_1018 HPG27_8 HP0119 HP0119 HP0119 HP0119 HP0119 HP0119 HP0119 HP0119 HP0119 HP051 HP0651 HP0651 HP0651	HP0226 HP1243/HP627_298 jhp1163	
\$49           \$49           \$49           \$49           \$49           \$49           \$49           \$49           \$50	701037 868876 956664 1166858 11385804 1284699 1636693 212868 332580 332632 332632 332632 332632 332632 332689 464294 546511 548978 801836 868876 873807	TGGGGGGGGG         T         A         G         A         AGGGGGGGGGG         TGGGG         C         G         A         C         G         A         G         G         C         G         TGGGGGGGG         GAAAAAAAAAAA         G         TGGGGGGGG         GAAAAAAAAAAA         T         C         C         G         G         G         G         A	TGGGGGGG           C           G           T           G           AGGGGGGGGG           TGGGGGG           A           A           A           A           C           CAAAAAAAAAAAAAAA           T           TGGGGGGG           GAAAAAAAAAAAAAA           T           TGGGGGGG           GAAAAAAAAAAAAAAA           C           A           C	indel SNP SNP SNP indel indel SNP SNP SNP SNP SNP indel indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP	frameshift deletion nonsynonymous synonymous nonsynonymous nonsynonymous frameshift deletion frameshift deletion frameshift deletion monsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nintergenic intergenic frameshift deletion intergenic nonsynonymous synonymous synonymous synonymous synonymous	HP0646 HPG27_680 HP0929 HP0946 HPG27_1018 HPG27_8 HP0119 HP0119 HP0119 HP0119 HP0119 HP0119 HP0119 HP0119 HP051 HP0651 HP0651 HP0651	HP0226 HP1243/HP627_298 jhp1163	
S49           S49           S49           S49           S49           S49           S49           S50           S50      >>>	701037 868876 956664 1166858 1185804 1284699 1636693 212868 332632 33263	TGGGGGGGGG         T         A         G         A         GGGGGGGGG         TGGGG         C         G         C         G         A         C         G         C         G         TGGGGGGGG         GAAAAAAAAAAAA         G         TGGGGGGGG         GAAAAAAAAAAAA         T         C         C         G         C         G         G         A         G         G         G         G         G         G         G         G         G         G	TGGGGGGG         C         G         AGGGGGGGGG         TGGGGGG         A         A         G         CAAAAAAAAAAAAAA         T         TGGGGGGG         GAAAAAAAAAAAAAA         T         TGGGGGGG         GAAAAAAAAAAAAA         C         A         G         GAAAAAAAAAAAAAA         C         A         G         A         C         A         C         A         C         A         C         A         C         A	indel SNP SNP SNP indel indel SNP SNP SNP SNP SNP indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	frameshift deletion nonsynonymous synonymous nonsynonymous nonsynonymous frameshift deletion frameshift deletion frameshift deletion frameshift deletion nonsynonymous nonsynonymous nonsynonymous nonsynonymous intergenic intergenic intergenic frameshift deletion intergenic nonsynonymous synonymous synonymous synonymous synonymous	HP0646 HP027_680 HP0929 HP0946 HP027_018 HPATCC43504_01561 HP027_8 HP0119 HP019	HP0226 HP1243/HP627_298 jhp1163	
S49           S49           S49           S49           S49           S49           S49           S49           S50	701037 868876 956664 1166858 1185804 1284699 128689 332683 332632 332632 332632 332653 332653 332689 464294 546511 548978 701037 801836 868876 873807 873807 873808 873808 873803 873813 903745	TGGGGGGGG           T           A           G           A           AGGGGGGGGGG           TGGGG           C           G           C           G           A           AGGGGGGGGGG           TGGGG           G           C           G           GGGGGGGG           GAAAAAAAAAAAA           G           C           C           G           A           G           A           G           A           G           A           G           TAA	TGGGGGGG         C         G         AGGGGGGGGG         TGGGGG         A         A         G         A         A         G         CAAAAAAAAAAAAA         T         TGGGGGGG         GGGGGGGG         GGGGGGG         GAAAAAAAAAAAAA         C         T         G         A         C         T         G         A         C         T         G         A         C         T         G         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         T	indel SNP SNP SNP indel indel SNP SNP SNP SNP indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP	frameshift deletion nonsynonymous synonymous nonsynonymous nonsynonymous nonsynonymous frameshift deletion frameshift deletion frameshift deletion nonsynonymous nonsynonymous nonsynonymous intergenic frameshift deletion intergenic nonsynonymous synonymous synonymous synonymous synonymous synonymous frameshift deletion	HP0646 HPG27_680 HP0929 HP0946 HPG27_1018 HPG27_8 HP0119 HP0119 HP0119 HP0119 HP0119 HP0119 HP0119 HP0119 HP051 HP0651 HP0651 HP0651	HP0226 HP1243/HPG27_298 jhp1163 jhp0540	
S49           S49           S49           S49           S49           S49           S49           S49           S50           S50      S50      S	701037 868876 956664 1166858 1185804 1284699 1636693 212868 332632 33263	TGGGGGGGGG         T         A         G         A         GGGGGGGGG         TGGGG         C         G         C         G         A         C         G         C         G         TGGGGGGGG         GAAAAAAAAAAAA         G         TGGGGGGGG         GAAAAAAAAAAAA         T         C         C         G         C         G         G         A         G         G         G         G         G         G         G         G         G         G	TGGGGGGG         C         G         AGGGGGGGGG         TGGGGGG         A         A         G         CAAAAAAAAAAAAAA         T         TGGGGGGG         GAAAAAAAAAAAAAA         T         TGGGGGGG         GAAAAAAAAAAAAA         C         A         G         GAAAAAAAAAAAAAA         C         A         G         A         C         A         C         A         C         A         C         A         C         A	indel SNP SNP SNP indel indel SNP SNP SNP SNP SNP indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	frameshift deletion nonsynonymous synonymous nonsynonymous nonsynonymous frameshift deletion frameshift deletion frameshift deletion frameshift deletion nonsynonymous nonsynonymous nonsynonymous nonsynonymous intergenic intergenic intergenic frameshift deletion intergenic nonsynonymous synonymous synonymous synonymous synonymous	HP0646 HP027_680 HP0929 HP0946 HP027_018 HPATCC43504_01561 HP027_8 HP0119 HP019	HP0226 HP1243/HP627_298 jhp1163	
S49           S49           S49           S49           S49           S49           S49           S49           S50	701037 868876 956664 1166858 1185804 1284699 128689 332683 332632 332632 332632 332653 332653 332689 464294 546511 548978 701037 801836 868876 873807 873807 873808 873808 873803 873813 903745	TGGGGGGGG           T           A           G           A           AGGGGGGGGGG           TGGGG           C           G           C           G           A           AGGGGGGGGGG           TGGGG           G           C           G           GGGGGGGG           GAAAAAAAAAAAA           G           C           C           G           A           G           A           G           A           G           A           G           TAA	TGGGGGGG         C         G         AGGGGGGGGG         TGGGGG         A         A         G         A         A         G         CAAAAAAAAAAAAA         T         TGGGGGGG         GGGGGGGG         GGGGGGG         GAAAAAAAAAAAAA         C         T         G         A         C         T         G         A         C         T         G         A         C         T         G         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         T	indel SNP SNP SNP indel indel SNP SNP SNP SNP indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP	frameshift deletion nonsynonymous synonymous nonsynonymous nonsynonymous nonsynonymous frameshift deletion frameshift deletion frameshift deletion nonsynonymous nonsynonymous nonsynonymous intergenic frameshift deletion intergenic nonsynonymous synonymous synonymous synonymous synonymous synonymous frameshift deletion	HP0646 HP027_680 HP0929 HP0946 HP027_018 HPATCC43504_01561 HP027_8 HP0119 HP019	HP0226 HP1243/HPG27_298 jhp1163 jhp0540	
S49           S49           S49           S49           S49           S49           S49           S49           S50           S50      S50      S	701037 868876 956664 1166858 1185804 1284699 1636693 332683 332683 332683 464294 546511 548978 701037 801836 868876 873807 873807 873808 873809 873809 873813 903745 958702 1166858	TGGGGGGGG           T           A           G           A           AGGGGGGGGGG           TGGGG           C           T           G           C           T           G           C           G           A           GGGGGGGG           T           GGGGGGGG           GAAAAAAAAAAAA           G           T           C           C           G           A           G           T           C           G           A           G           TAA	TGGGGGGG           C           G           AGGGGGGGGG           TGGGGG           A           A           T           A           G           CAAAAAAAAAAAAAAA           T           TGGGGGG           G           CAAAAAAAAAAAAAA           T           TGGGGGGG           G           CAAAAAAAAAAAAAAA           C           T           G           A           C           T           G           A           C           T           G           A           C           T           G           A           C           T           G           A           C           A           C           A           C           A           C           A           C           A           C           A           C	indel SNP SNP SNP indel indel SNP SNP SNP SNP indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP	frameshift deletion nonsynonymous synonymous nonsynonymous nonsynonymous frameshift deletion frameshift deletion frameshift deletion nonsynonymous nonsynonymous nonsynonymous nonsynonymous intergenic intergenic intergenic frameshift deletion intergenic nonsynonymous synonymous synonymous synonymous synonymous frameshift deletion intergenic	HP0646 HPG27_680 HP0929 HP0946 HPG27_1018 HPATCC43504_01561 HPG27_8 HP0119 HP0119 HP0119 HP0119 HP0119 HP0199 HP0646 HP0651 HP0651 HP0651 HP0651 HP0651 HP0651 HP0651 HP0651 HP0651 HP0651 HP0651 HP0651 HP0651	HP0226 HP1243/HPG27_298 jhp1163 jhp0540	
\$49           \$49           \$49           \$49           \$49           \$49           \$49           \$50	701037 868876 956664 1166858 1185804 1284699 1636693 332683 332683 332683 464294 546511 548978 701037 801836 868876 873807 873807 873808 873809 873809 873813 903745 958702 1166858	TGGGGGGGG           T           A           G           A           AGGGGGGGGGG           TGGGG           C           T           G           C           T           G           C           G           A           GGGGGGGG           G           C           G           TGGGGGGGG           GAAAAAAAAAAAA           G           C           C           G           A           G           TAA           CAAAAAAAAAAAAAAAAAAAAAAAAAAAAA           G           TAA           CAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	TGGGGGGG           C           G           AGGGGGGGGG           T           G           AGGGGGGGGG           A           A           A           G           CAAAAAAAAAAAAAAA           T           TGGGGGG           G           CAAAAAAAAAAAAAA           C           T           G           C           T           G           A           C           T           G           A           C           T           G           A           C           T           C           A           C           A           C           TA           CAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	indel SNP SNP SNP SNP indel SNP SNP SNP SNP SNP SNP indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	frameshift deletion nonsynonymous synonymous nonsynonymous nonsynonymous frameshift deletion frameshift deletion frameshift deletion nonsynonymous nonsynonymous nonsynonymous nonsynonymous intergenic intergenic intergenic frameshift deletion intergenic nonsynonymous synonymous synonymous synonymous synonymous synonymous frameshift deletion intergenic nonsynonymous synonymous synonymous synonymous synonymous nonsynonymous	HP0646 HPG27_680 HP0929 HP0946 HPG27_1018 HPATCC43504_01561 HPG27_8 HP0119 HP0119 HP0119 HP0119 HP0119 HP0499 HP0646 HP0651 HP0651 HP0651 HP0651 HP0651 HP0651 HP0651 HP0651 HP0651 HP0651 HP0651 HP0651 HP0651	HP0226 HP1243/HPG27_298 jhp1163 jhp0540 HPG27_680	
S49           S49           S49           S49           S49           S49           S49           S49           S50	701037 868876 956664 1166858 11385804 1284699 1636693 212868 332580 332632 332653 332653 332689 464294 546378 701037 801836 868876 873807 873808 873808 873808 873809 873813 903745 958702 1166858 1187376	TGGGGGGGG           T           A           G           A           GGGGGGGGGG           TGGGG           C           G           G           T           GGGGGGGGGG           C           G           G           C           G           TGGGGGGGG           GAAAAAAAAAAAA           G           TGGGGGGGG           GAAAAAAAAAAAA           T           C           G           A           G           TAA           CAAAAAAAAAAAAAAA           G           TAA           CAAAAAAAAAAAAAAAAAAAAAAAAAAA           G           TAA           CAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	TGGGGGGG C G T G AGGGGGGGGG A AGGGGGGGG A A A A A	indel SNP SNP SNP indel indel SNP SNP SNP indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	frameshift deletion nonsynonymous synonymous nonsynonymous nonsynonymous frameshift deletion frameshift deletion frameshift deletion frameshift deletion nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous intergenic intergenic frameshift deletion intergenic synonymous synonymous synonymous synonymous synonymous synonymous synonymous intergenic intergenic intergenic intergenic intergenic intergenic frameshift deletion intergenic intergenic intergenic nonsynonymous synonymous synonymous synonymous intergenic intergenic	HP0646 HPG27_680 HP0929 HP0946 HPG27_1018 HPG27_8 HP0119 HP0119 HP0119 HP0119 HP0119 HP0119 HP0119 HP0519 HP0646 HP0651 H	HP0226 HP1243/HPG27_298 jhp1163 jhp0540 HPG27_680	
S49           S49           S49           S49           S49           S49           S49           S49           S50           S50      >>>	701037 868876 956664 1166858 1185804 1284699 1636693 212868 332580 332632 332632 332632 332632 332632 332632 332632 332632 464294 546511 548978 873807 873808 873808 873807 873808 873808 873808 873808 873808 873808 873808 873808 873808 873808 873808 873808 873808 873808 873808 873808 873808 873808 873808 873807 875807 87597 875807 87597 875977 87597757 875977575757575757575757575757575	TGGGGGGGG           T           A           G           A           GGGGGGGGGG           TGGGG           C           G           G           C           G           G           C           G           G           T           GGGGGGGG           GAAAAAAAAAAAA           G           TGGGGGGGG           GAAAAAAAAAAAAA           T           C           G           A           G           TAA           CAAAAAAAAAAAAAAAAAAAAA           G           TAA           CAAAAAAAAAAAAAAAAAAAAAAA           G           TAA           CAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA           G           TAA           CAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	TGGGGGGG           C           G           A           A           A           A           G           CAAAAAAAAAAAAAAA           T           TGGGGGG           CAAAAAAAAAAAAAA           T           TGGGGGGG           GAAAAAAAAAAAAA           C           A           G           CAAAAAAAAAAAAA           C           A           C           A           C           A           C           A           C           A           C           A           T           CAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	indel SNP SNP SNP indel indel SNP SNP SNP SNP indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	frameshift deletion nonsynonymous synonymous nonsynonymous nonsynonymous frameshift deletion frameshift deletion frameshift deletion nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous intergenic intergenic intergenic frameshift deletion intergenic synonymous synonymous synonymous synonymous synonymous frameshift deletion intergenic intergenic nonsynonymous synonymous synonymous synonymous intergenic intergenic nonsynonymous synonymous synonymous intergenic intergenic nonsynonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic	HP0646 HP027_680 HP0929 HP0946 HP027_018 HPATCC43504_01561 HP027_8 HP0119 HP0119 HP0119 HP0119 HP0119 HP0199 HP0646 HP0651 HP065	HP0226 HP1243/HPG27_298 jhp1163 jhp0540 HPG27_680	
S49           S49           S49           S49           S49           S49           S49           S50	701037 868876 956664 1166858 1185804 1284699 1284699 128580 332280 332632 33	TGGGGGGGG           T           A           G           A           GGGGGGGGGG           TGGGG           C           T           G           C           G           A           GGGGGGGGG           G           C           G           AAAAAAAAAAAAA           G           GGGGGGGG           GAAAAAAAAAAAAA           T           C           C           G           A           G           A           G           A           G           TAA           AAAAAAAAAAAAAAAAAAAAAAAAAAAA           G           TTITITT           C           C           C           C           C           C           C           C           C           C           C           C	TGGGGGGG         C         G         AGGGGGGGGG         T         G         AGGGGGGGGG         T         A         A         G         CAAAAAAAAAAAAAAA         T         GGGGGGG         GAAAAAAAAAAAAAAA         C         T         GGGGGGG         GAAAAAAAAAAAAAAAA         C         A         C         A         C         A         C         A         T         CAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA         C         T         G         A         T	indel SNP SNP SNP indel indel SNP SNP SNP SNP SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	frameshift deletion nonsynonymous synonymous nonsynonymous nonsynonymous frameshift deletion frameshift deletion frameshift deletion nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous intergenic intergenic intergenic frameshift deletion intergenic synonymous synonymous synonymous synonymous frameshift deletion intergenic intergenic nonsynonymous synonymous synonymous synonymous intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous nonsynonymous intergenic synonymous nonsynonymous	HP0646 HP027_680 HP0929 HP0946 HP027_018 HPATCC43504_01561 HP027_8 HP0119 HP0119 HP0119 HP0119 HP0119 HP0499 HP0646 HP0651 HP065	HP0226 HP1243/HPG27_298 jhp1163 jhp0540 HPG27_680	
S49           S49           S49           S49           S49           S49           S49           S49           S50           S50      >S50	701037 868876 956664 1168580 1284699 1284693 312868 332683 332683 332683 464294 546511 548978 701037 801836 868876 873813 873803 873813 903745 958702 1166858 1187376 1284512 1284514	TGGGGGGGG           T           A           G           A           AGGGGGGGGGG           TGGGG           C           T           G           C           G           C           G           AAAAAAAAAAAA           G           G           C           G           AAAAAAAAAAAAA           G           GGGGGGGG           GAAAAAAAAAAAAA           T           C           C           G           AA           G           TAA           C	TGGGGGGG           C           G           AGGGGGGGGG           TGGGGG           A           A           G           A           A           G           CAAAAAAAAAAAAA           T           GGGGGGG           GAAAAAAAAAAAAAA           T           GGGGGGG           GAAAAAAAAAAAAAAA           C           T           G           A           C           T           G           A           C           T           G           A           TA           CAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA           T           G           A           T           G           G	indel SNP SNP SNP SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	frameshift deletion nonsynonymous synonymous nonsynonymous nonsynonymous nonsynonymous frameshift deletion frameshift deletion frameshift deletion nonsynonymous nonsynonymous nonsynonymous nonsynonymous intergenic intergenic frameshift deletion intergenic nonsynonymous synonymous synonymous synonymous frameshift deletion intergenic nonsynonymous synonymous synonymous intergenic intergenic nonsynonymous synonymous synonymous intergenic intergenic nonsynonymous synonymous synonymous intergenic nonsynonymous synonymous intergenic nonsynonymous intergenic synonymous intergenic synonymous intergenic intergenic synonymous	HP0646 HP027_680 HP0929 HP0946 HP027_018 HP0727_8 HP0119 HP0119 HP0119 HP0119 HP0119 HP0199 HP0646 HP0651 H	HP0226 HP1243/HPG27_298 jhp1163 jhp0540 HPG27_680	
S49           S49           S49           S49           S49           S49           S49           S49           S50	701037 868876 956664 1166858 1185804 1284699 1636693 332683 332683 332683 332683 332683 464294 464294 464294 464294 464294 464294 546511 548978 873807 875807 875807 875807 875807 875807 875807 875807 87580	TGGGGGGGG T A G A AGGGGGGGGGG TGGGG C T G C C C C C C C C C C C C C	TGGGGGGG         C         G         AGGGGGGGGG         TGGGGG         A         A         A         T         G         A         T         A         G         CAAAAAAAAAAAAA         T         GGGGGGG         GAAAAAAAAAAAAA         C         T         GGGGGGG         A         C         T         G         A         C         T         G         A         TA         CAAAAAAAAAAAAAAAAAAAAAAAAAA         T         G         A         T         G         A         T         G         A         T         G         A         T         G         A         G         A         T         G         A         T         G	indel SNP SNP SNP indel SNP SNP SNP SNP SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	frameshift deletion nonsynonymous synonymous nonsynonymous nonsynonymous frameshift deletion frameshift deletion frameshift deletion nonsynonymous nonsynonymous nonsynonymous nonsynonymous intergenic intergenic intergenic intergenic frameshift deletion intergenic synonymous synonymous synonymous synonymous synonymous synonymous intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous intergenic intergenic intergenic intergenic nonsynonymous synonymous synonymous intergenic nonsynonymous intergenic synonymous nonsynonymous synonymous nonsynonymous	HP0646 HPG27_680 HP0929 HP0946 HPG27_1018 HPG27_1018 HP0119 HP0119 HP0119 HP0119 HP0119 HP0119 HP0499 HP0499 HP0499 HP0651 HP061	HP0226 HP1243/HPG27_298 jhp1163 jhp0540 HPG27_680	
S49           S49           S49           S49           S49           S49           S49           S49           S50           S50      S50      S50	701037 868876 956664 1166858 11385804 1284699 1636693 212868 332580 332632 332632 332632 332632 464294 546511 548978 701037 801836 873807 873807 873807 873808 873807 873807 873807 873807 873807 873807 873807 873807 873807 873807 873807 11668588 11668588 11668583 1284512 1284512 1284513 1284555 12845555 12845555 12845555 12845555 12845555 12845555 12845555 12845555 12845555 12845555 12845555 128455555 1284555555 128455555 128455555 12845555555555555	TGGGGGGGGG         T         A         G         A         GGGGGGGGGGG         TGGGGG         T         G         C         G         A         GGGGGGGGGG         TGGGGGGGGG         G         C         G         TGGGGGGGGG         GAAAAAAAAAAAA         G         TGGGGGGGGG         GAAAAAAAAAAAAA         G         C         C         G         TAA         CAAAAAAAAAAAAAAA         G         TAA         CAAAAAAAAAAAAAAAAAA         G         A         G         TAA         CAAAAAAAAAAAAAAAAAAAAAAAAAAAAA         G         A         G         TAA         C         C         C         C         C         C         C         AGGGGGGGGGG         T         C         AGGGGGGGGGGG         T </td <td>TGGGGGGG C G G A G G G G G G G G G A A C C AAAAAAAA</td> <td>indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP</td> <td>frameshift deletion nonsynonymous synonymous nonsynonymous nonsynonymous frameshift deletion frameshift deletion frameshift deletion nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous intergenic intergenic intergenic frameshift deletion intergenic synonymous synonymous synonymous synonymous synonymous intergenic intergenic nonsynonymous synonymous synonymous intergenic intergenic synonymous synonymous synonymous intergenic intergenic synonymous synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous frameshift deletion frameshift deletion</td> <td>HP0646 HP027_680 HP0929 HP0946 HP027_018 HPATCC43504_01561 HP027_8 HP0119 HP0119 HP0119 HP0119 HP0119 HP0119 HP0119 HP051 HP0651</td> <td>HP0226 HP1243/HPG27_298 jhp1163 jhp0540 HPG27_680</td> <td></td>	TGGGGGGG C G G A G G G G G G G G G A A C C AAAAAAAA	indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	frameshift deletion nonsynonymous synonymous nonsynonymous nonsynonymous frameshift deletion frameshift deletion frameshift deletion nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous intergenic intergenic intergenic frameshift deletion intergenic synonymous synonymous synonymous synonymous synonymous intergenic intergenic nonsynonymous synonymous synonymous intergenic intergenic synonymous synonymous synonymous intergenic intergenic synonymous synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous frameshift deletion frameshift deletion	HP0646 HP027_680 HP0929 HP0946 HP027_018 HPATCC43504_01561 HP027_8 HP0119 HP0119 HP0119 HP0119 HP0119 HP0119 HP0119 HP051 HP0651	HP0226 HP1243/HPG27_298 jhp1163 jhp0540 HPG27_680	
S49           S49           S49           S49           S49           S49           S49           S49           S50           S50      S50      S50	701037 868876 956664 1166858 1185804 1284699 1636693 212868 332580 332632 33	TGGGGGGGGG         T         A         G         A         GGGGGGGGGGG         TGGGG         C         T         G         C         G         C         G         G         C         G         GGGGGGGG         GGGGGGGG         GAAAAAAAAAAAA         G         T         CGGGGGGG         GAAAAAAAAAAAAA         T         CGGGGGGG         GAAAAAAAAAAAAAAAAAA         G         T         C         C         G         AAA         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         AGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG	TGGGGGGG         C         G         AGGGGGGGGG         T         G         AGGGGGGGGG         T         A         A         G         CAAAAAAAAAAAAA         T         TGGGGGGG         GAAAAAAAAAAAAA         C         T         TGGGGGGG         GAAAAAAAAAAAAAA         C         A         C         A         G         A         C         A         T         G         A         T         T         G         A         T         T         G         A         G         A         G         A         G         A         G         A         G         A         AGGGGGGGGGGG         AGGGGGGGGGGG         AGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG	indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	frameshift deletion nonsynonymous synonymous nonsynonymous nonsynonymous nonsynonymous frameshift deletion frameshift deletion frameshift deletion nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous intergenic intergenic intergenic frameshift deletion intergenic synonymous synonymous synonymous synonymous frameshift deletion intergenic nonsynonymous synonymous synonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous	HP0646 HP027_680 HP0929 HP0946 HP027_018 HP027_018 HP0119 HP0119 HP0119 HP0119 HP0119 HP019 HP0646 HP0651 HP0652 HP0651 HP0651 HP0652 HP0651 HP0652 HP0651 HP0651 HP0652 H	HP0226 HP1243/HPG27_298 jhp1163 jhp0540 HPG27_680	
S49           S49           S49           S49           S49           S49           S49           S50           S50      S50      S50	701037 868876 956664 1166858 1185804 1284693 212868 332632 32632 327802 3278	TGGGGGGGG           T           A           G           A           AGGGGGGGGGG           TGGGG           C           T           G           C           G           C           G           A           GGGGGGGG           G           C           G           AAAAAAAAAAAA           G           GGGGGGGG           GAAAAAAAAAAAAA           T           C           C           G           TAA           C      <	TGGGGGGG         C         G         AGGGGGGGGGG         TGGGGG         A         A         A         G         CAAAAAAAAAAAAA         T         GGGGGGGG         GAAAAAAAAAAAAA         T         GGGGGGG         GAAAAAAAAAAAAAA         C         T         GGGGGGG         A         C         A         C         A         T         G         A         C         T         G         A         T         G         A         T         T         T         G         A         GGGGGGGGG         A         GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG	indel SNP SNP SNP SNP indel SNP SNP SNP SNP SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	frameshift deletion nonsynonymous synonymous nonsynonymous nonsynonymous nonsynonymous frameshift deletion frameshift deletion frameshift deletion nonsynonymous nonsynonymous nonsynonymous nonsynonymous intergenic intergenic intergenic frameshift deletion intergenic nonsynonymous synonymous synonymous synonymous synonymous frameshift deletion intergenic intergenic nonsynonymous synonymous synonymous synonymous nonsynonymous intergenic nonsynonymous synonymous nonsynonymous intergenic nonsynonymous frameshift deletion frameshift deletion	HP0646 HP027_680 HP0929 HP0946 HP027_018 HP027_018 HP0119 HP0119 HP0119 HP0119 HP019 HP019 HP0646 HP0651 HP0652 HP0651 HP0652 HP	HP0226 HP1243/HPG27_298 jhp1163 jhp0540 HPG27_680	
S49           S49           S49           S49           S49           S49           S49           S50           S50      S51	701037           868876           955664           1168580           1185804           1284699           132633           332633           332633           332634           332635           332637           332638           464294           548578           701037           801836           801836           801836           873813           903745           958702           1166858           118776           1284517           1284513           1284513           1284513           1284523           1284523           128453           128453           1284523           1284523           1284523           1284523           1284523           1284523           1284523           1284523           1284523           1284523           1284523           1284523           1284523           1284524           12845253 <td>TGGGGGGGGG         T         A         G         A         AGGGGGGGGGG         TGGGG         C         T         G         C         G         A         AGGGGGGGGGG         TGGGG         C         G         A         CAAAAAAAAAAAA         G         TGGGGGGGG         GAAAAAAAAAAAA         T         C         C         G         AA         G         TAA         CAAAAAAAAAAAAAAAA         G         TAA         CAAAAAAAAAAAAAAAAAAA         G         TAA         C         C         C         C         C         C         C         C         C         C         C         C         T         C         C         T         C         C</td> <td>TGGGGGGG         C         G         AGGGGGGGGGG         TGGGGG         A         A         G         X         A         G         CAAAAAAAAAAAAA         T         GGGGGGG         GAAAAAAAAAAAAAA         C         GAAAAAAAAAAAAAAA         C         T         GGGGGGG         A         C         T         G         A         C         T         GGGGGGG         A         TA         CAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA         T         G         A         TA         CAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA         T         G         A         T         G         A         G         A         GGGGGGGGGG         T         G         A         GGGGGGGGGG         T         GGGGGGGGG         A</td> <td>indel SNP SNP SNP SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP</td> <td>frameshift deletion nonsynonymous synonymous nonsynonymous nonsynonymous nonsynonymous frameshift deletion frameshift deletion frameshift deletion nonsynonymous nonsynonymous nonsynonymous nonsynonymous intergenic intergenic intergenic nonsynonymous synonymous synonymous synonymous frameshift deletion intergenic nonsynonymous synonymous synonymous frameshift deletion intergenic nonsynonymous synonymous frameshift deletion intergenic nonsynonymous frameshift deletion intergenic synonymous nonsynonymous synonymous nonsynonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous 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    T         C         C         T         C         C	TGGGGGGG         C         G         AGGGGGGGGGG         TGGGGG         A         A         G         X         A         G         CAAAAAAAAAAAAA         T         GGGGGGG         GAAAAAAAAAAAAAA         C         GAAAAAAAAAAAAAAA         C         T         GGGGGGG         A         C         T         G         A         C         T         GGGGGGG         A         TA         CAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA         T         G         A         TA         CAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA         T         G         A         T         G         A         G         A         GGGGGGGGGG         T         G         A         GGGGGGGGGG         T         GGGGGGGGG         A	indel SNP SNP SNP SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	frameshift deletion nonsynonymous synonymous nonsynonymous nonsynonymous nonsynonymous frameshift deletion frameshift deletion frameshift deletion nonsynonymous nonsynonymous nonsynonymous 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S49           S49           S49           S49           S49           S49           S49           S50           S51           S51           S51           S51           S51           S51 <td>701037 868876 95664 1166858 11385804 1284699 133268 332632 332632 332632 332632 332632 464294 546511 548978 873807 873803 873803 873803 873803 873803 873813 903745 903745 1284512 1284512 1284512 1284512 1284512 1284523 128452 1284523 1284525 1284525 12845525 12845555 128455555 12845555 12845555 1284555555555555555555555555</td> <td>TGGGGGGGGG         T         A         G         A         AGGGGGGGGGG         TGGGG         C         T         G         C         G         A         GGGGGGGGG         G         C         GAAAAAAAAAAA         G         TGGGGGGGG         GAAAAAAAAAAAA         T         C         C         G         TAA         CAAAAAAAAAAAAAAA         G         TAA         CAAAAAAAAAAAAAAAAA         G         AAAAAAAAAAAAAAAAAAAA         G         ATAH         C         C         C         C         C         C         T         C         AGGGGGGGGGG         TGGGGG         C         GGGGG         T         C         GGGGG         T         C         AGGGGGGGGGGGGGG         T      &lt;</td> <td>TGGGGGGG         C         G         T         G         AGGGGGGGGG         TGGGGGG         A         A         A         A         G         CAAAAAAAAAAAAA         T         TGGGGGGG         GAAAAAAAAAAAAAA         T         TGGGGGGG         GAAAAAAAAAAAAAA         C         A         C         A         C         A         C         A         C         A         T         G         A         T         G         A         T         G         A         T         G         A         T         T         G         A         C         A         GGGGGGGGGGGGG         GGGGGGGGGGG         GGGGGGGGGGGGGGG         GGGGGG         T         G</td> <td>indel SNP SNP SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP</td> <td>frameshift deletion nonsynonymous synonymous nonsynonymous 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HP627_108 HP627_108 HP627_108 HP6</td> <td>HP0226 HP1243/HPG27_298 jhp1163 jhp0540 HPG27_680</td> <td></td>	701037 868876 95664 1166858 11385804 1284699 133268 332632 332632 332632 332632 332632 464294 546511 548978 873807 873803 873803 873803 873803 873803 873813 903745 903745 1284512 1284512 1284512 1284512 1284512 1284523 128452 1284523 1284525 1284525 12845525 12845555 128455555 12845555 12845555 1284555555555555555555555555	TGGGGGGGGG         T         A         G         A         AGGGGGGGGGG         TGGGG         C         T         G         C         G         A         GGGGGGGGG         G         C         GAAAAAAAAAAA         G         TGGGGGGGG         GAAAAAAAAAAAA         T         C         C         G         TAA         CAAAAAAAAAAAAAAA         G         TAA         CAAAAAAAAAAAAAAAAA         G         AAAAAAAAAAAAAAAAAAAA         G         ATAH         C         C         C         C         C         C         T         C         AGGGGGGGGGG         TGGGGG         C         GGGGG         T         C         GGGGG         T         C         AGGGGGGGGGGGGGG         T      <	TGGGGGGG         C         G         T         G         AGGGGGGGGG         TGGGGGG         A         A         A         A         G         CAAAAAAAAAAAAA         T         TGGGGGGG         GAAAAAAAAAAAAAA         T         TGGGGGGG         GAAAAAAAAAAAAAA         C         A         C         A         C         A         C         A         C         A         T         G         A         T         G         A         T         G         A         T         G         A         T         T         G         A         C         A         GGGGGGGGGGGGG         GGGGGGGGGGG         GGGGGGGGGGGGGGG         GGGGGG         T         G	indel SNP SNP SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	frameshift deletion nonsynonymous synonymous nonsynonymous frameshift deletion frameshift deletion frameshift deletion frameshift deletion nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous nonsynonymous intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous intergenic intergenic intergenic synonymous synonymous intergenic synonymous intergenic synonymous intergenic synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous frameshift deletion frameshift insertion nonsynonymous synonymous synonymous synonymous	HP0646 HPG27_680 HP0929 HP0946 HPG27_1018 HPATCC43504_01561 HPG27_8 HP0119 HP0119 HP0119 HP0119 HP0119 HP0499 HP0651 HP0651 HP0651 HP0651 HP0651 HP0651 HP0651 HP0651 HP0651 HP0651 HP0651 HP0651 HP0651 HP0651 HP0627_1018 HP621 HP627_1018HP627_1018 HP627_108 HP627_108 HP627_108 HP627_108 HP627_108 HP627_108 HP627_108 HP627_108 HP627_108 HP6	HP0226 HP1243/HPG27_298 jhp1163 jhp0540 HPG27_680	
S49           S49           S49           S49           S49           S49           S49           S49           S50           S50      S51	701037           868876           956664           1166858           1135804           1284699           1636693           212868           332632           332632           332632           332632           332632           332632           332632           332632           342632           546511           548978           801836           873803           873803           873803           873803           958702           1264512           1284512           1284513           1284514           1284513           1284513           1284523           1284533           1284534           1284533           32598           332592           332632           332632           332632	TGGGGGGGGG         T         A         G         A         GGGGGGGGGG         TGGGGG         C         G         A         GGGGGGGGGG         T         G         C         G         T         TGGGGGGGG         GAAAAAAAAAAA         G         TGGGGGGGG         GAAAAAAAAAAAA         T         C         C         G         TA         C         C         G         A         C         C         G         ATTTTTT         C         C         C         C         C         C         AGGGGGGGGGG         T         C         AGGGGGGGGGG         T         C         AGGGGGGGGGGG         T         C         G         T         C         GGGGG	TGGGGGGG         C         G         AGGGGGGGGG         T         G         AGGGGGGGGG         A         A         G         CAAAAAAAAAAAAAA         T         TGGGGGGG         GAAAAAAAAAAAAAA         T         TGGGGGGG         GAAAAAAAAAAAAAA         C         T         G         A         C         T         G         A         C         T         G         A         C         T         G         A         T         G         A         C         T         G         A         GGGGGGGG         GGGGGGGG         GGGGGG         A         GGGGGGG         A         A         GGGGGGGG         A         GGGGGGG         A         GGGGGGG         A	indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	frameshift deletion nonsynonymous synonymous nonsynonymous frameshift deletion frameshift deletion frameshift insertion nonsynonymous synonymous nonsynonymous nonsynonymous nonsynonymous intergenic intergenic intergenic frameshift deletion intergenic nonsynonymous synonymous synonymous synonymous synonymous intergenic intergenic nonsynonymous synonymous synonymous intergenic intergenic synonymous synonymous intergenic intergenic synonymous synonymous intergenic intergenic intergenic intergenic intergenic synonymous synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic synonymous synonymous frameshift deletion frameshift deletion frameshift insertion nonsynonymous synonymous nonsynonymous synonymous nonsynonymous	HP0646 HP027_680 HP0929 HP0946 HP027_018 HPATCC43504_01561 HP027_8 HP0119 HP0119 HP0119 HP0119 HP0119 HP0119 HP0651 HP0652 HP0651 HP065	HP0226 HP1243/HPG27_298 jhp1163 jhp0540 HPG27_680	
S49           S49           S49           S49           S49           S49           S49           S49           S50           S50      S51	701037           868876           956664           11168584           1135804           1284699           132682           332632           332632           332632           332632           332632           332632           332632           332632           332632           332632           342632           464294           548978           701037           801836           873807           873808           873809           873809           873803           903745           958702           1166858           1187376           1284512           1284512           1284523           128453           128453           32580           332582           332632           332653           332653           332653	TGGGGGGGGG         T         A         G         A         GGGGGGGGGGG         TGGGG         C         G         C         G         C         G         C         G         T         GGGGGGGG         GAAAAAAAAAAA         G         TGGGGGGGG         GAAAAAAAAAAAA         G         TGGGGGGGG         GAAAAAAAAAAAAA         G         TGGGGGGGG         GAAAAAAAAAAAAAAA         G         TGGGGGGGG         G         A         G         TAAA         CAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	TGGGGGGG         C         G         AGGGGGGGGGG         T         G         AGGGGGGGGG         T         A         A         G         CAAAAAAAAAAAAA         T         TGGGGGGG         GAAAAAAAAAAAAA         T         TGGGGGGG         GAAAAAAAAAAAAA         C         A         G         CAAAAAAAAAAAAAA         C         AAAAAAAAAAAAAAAA         C         AAAAAAAAAAAAAAAAA         C         AAAAAAAAAAAAAAAAAAAAAAAAAAAA         C         AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	frameshift deletion nonsynonymous synonymous nonsynonymous nonsynonymous nonsynonymous frameshift deletion frameshift deletion frameshift deletion nonsynonymous nonsynonymous nonsynonymous nonsynonymous intergenic intergenic intergenic frameshift deletion intergenic synonymous synonymous synonymous synonymous frameshift deletion intergenic nonsynonymous synonymous synonymous synonymous nonsynonymous intergenic nonsynonymous synonymous synonymous synonymous synonymous nonsynonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous nonsynonymous synonymous synonymous nonsynonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous	HP0646 HP027_680 HP0929 HP0946 HP027_018 HPATCC43504_01561 HP627_019 HP0119 HP0119 HP0119 HP0119 HP0646 HP0651 HP0	HP0226 HP1243/HPG27_298 jhp1163 jhp0540 HPG27_680	
S49           S49           S49           S49           S49           S49           S49           S49           S50           S51           S51           S51           S51           S51           S51           S51	701037 868876 956664 1166858 1185804 1284699 1636693 212868 332580 332632 332632 332632 332632 332632 464294 546511 548978 701037 463294 873803 875803 875805 875805 875805 875805 875805 875805 875805 875805 875805 875805 87	TGGGGGGGG         T         A         G         A         GGGGGGGGGGG         TGGGG         C         T         G         C         G         C         G         AAAAAAAAAAAAA         G         GGGGGGGG         GAAAAAAAAAAAA         G         GGGGGGGG         GAAAAAAAAAAAAAAA         T         C         G         AA         G         T         C         G         TAA         AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA         G         ATTITITT         C         C         C         C         C         C         C         C         C         C         C         C         C         GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG	TGGGGGGG         C         G         AGGGGGGGGGG         TGGGGG         A         A         A         G         CAAAAAAAAAAAAAA         T         GGGGGGG         GAAAAAAAAAAAAAA         C         A         GGGGGGG         GAAAAAAAAAAAAAAA         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         GGGGGGGG         A         C         A         GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG	indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	frameshift deletion nonsynonymous synonymous nonsynonymous nonsynonymous frameshift deletion frameshift deletion frameshift deletion nonsynonymous synonymous nonsynonymous nonsynonymous intergenic intergenic intergenic intergenic intergenic nonsynonymous synonymous synonymous synonymous synonymous frameshift deletion intergenic nonsynonymous synonymous synonymous frameshift deletion intergenic nonsynonymous synonymous frameshift deletion intergenic synonymous frameshift deletion intergenic synonymous synonymous synonymous synonymous nonsynonymous frameshift deletion frameshift deletion nonsynonymous synonymous synonymous synonymous nonsynonymous synonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous frameshift insertion	HP0646 HP027_680 HP0929 HP0946 HP027_018 HPATCC43504_01561 HP027_8 HP0119 HP0119 HP0119 HP0119 HP0119 HP0119 HP0651 HP0652 HP0651 HP065	HP0226 HP1243/HPG27_298 jhp1163 jhp0540 HPG27_680 HP0947	
S49           S49           S49           S49           S49           S49           S49           S50           S51           S51           S51           S51           S51           S51           S51	701037           868876           956664           11168580           1185804           1284693           3128580           332632           332632           332632           332632           332632           332632           332632           332632           464294           54878           701037           801836           868876           873803           873803           873803           903745           958702           1166583           1187376           1284512           1284513           128452           128453           128452           128452           128452           128452           332588           332582           332582           332632           332632           332632           332632           332632           332632           332632           332632           332658	TGGGGGGGGG         T         A         G         A         GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG	TGGGGGGG         C         G         AGGGGGGGGGG         TGGGGG         AGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG	indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	frameshift deletion nonsynonymous synonymous nonsynonymous nonsynonymous nonsynonymous frameshift deletion frameshift deletion frameshift deletion nonsynonymous nonsynonymous nonsynonymous intergenic intergenic intergenic frameshift deletion intergenic nonsynonymous synonymous synonymous synonymous frameshift deletion intergenic nonsynonymous synonymous frameshift deletion intergenic nonsynonymous synonymous frameshift deletion intergenic nonsynonymous frameshift deletion frameshift insertion nonsynonymous synonymous nonsynonymous nonsynonymous frameshift insertion intergenic	HP0646 HP027_680 HP0929 HP0946 HP027_018 HPATCC43504_01561 HP627_019 HP0119 HP0119 HP0119 HP0119 HP0646 HP0651 HP0	HP0226 HP1243/HPG27_298 jhp1163 jhp0540 HP0947 HP0947 HP0947 HP1243/HPG27_298	HPG27_298
S49           S49           S49           S49           S49           S49           S49           S49           S50           S51           S51           S51           S51           S51           S51           S51	701037 868876 956664 1166858 1185804 1284699 1636693 212868 332580 332632 332632 332632 332632 332632 464294 546511 548978 701037 463294 873803 875803 875805 875805 875805 875805 875805 875805 875805 875805 875805 875805 87	TGGGGGGGG         T         A         G         A         GGGGGGGGGGG         TGGGG         C         T         G         C         G         C         G         AAAAAAAAAAAAA         G         GGGGGGGG         GAAAAAAAAAAAA         G         GGGGGGGG         GAAAAAAAAAAAAAAA         T         C         G         AA         G         T         C         G         TAA         AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA         G         ATTITITT         C         C         C         C         C         C         C         C         C         C         C         C         C         GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG	TGGGGGGG         C         G         AGGGGGGGGGG         TGGGGG         A         A         A         G         CAAAAAAAAAAAAAA         T         GGGGGGG         GAAAAAAAAAAAAAA         C         A         GGGGGGG         GAAAAAAAAAAAAAAA         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         GGGGGGGG         A         C         A         GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG	indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	frameshift deletion nonsynonymous synonymous nonsynonymous nonsynonymous frameshift deletion frameshift deletion frameshift deletion nonsynonymous synonymous nonsynonymous nonsynonymous intergenic intergenic intergenic intergenic intergenic nonsynonymous synonymous synonymous synonymous synonymous frameshift deletion intergenic nonsynonymous synonymous synonymous frameshift deletion intergenic nonsynonymous synonymous frameshift deletion intergenic synonymous frameshift deletion intergenic synonymous synonymous synonymous synonymous nonsynonymous frameshift deletion frameshift deletion nonsynonymous synonymous synonymous synonymous nonsynonymous synonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous frameshift insertion	HP0646 HP027_680 HP0929 HP0946 HP027_018 HPATCC43504_01561 HP627_019 HP0119 HP0119 HP0119 HP0119 HP0646 HP0651 HP0	HP0226 HP1243/HPG27_298 jhp1163 jhp0540 HPG27_680 HP0947	

S51	701037	TGGGGGGGG	TGGGGGGG	indel	frameshift deletion	HP0499		
S51	801836	GAAAAAAAAAAA	GAAAAAAAAAAAA	indel	intergenic		jhp0540	
\$51	839999	T	c	SNP	nonsynonymous	HPB8_818		
\$51 \$51	868876 958719	T G	C	SNP	nonsynonymous	HP0646	HPG27_680	
\$51	1043704	GTTTTTTTTTT	GTTTTTTTTTTT	indel	intergenic frameshift insertion/intergenic	HPnc4170	HP0811	HPnc4160
\$51	1166858	G	Т	SNP	nonsynonymous	HP0929	111 0011	111104100
\$51	1636693	TGGGG	TGGGGG	indel	frameshift insertion	HPATCC43504_01561		
S52	212868	с	A	SNP	nonsynonymous	HPG27_8		
S52	232963	A	C	SNP	intergenic		HPPC_00115	
S52	232964	c	A	SNP	intergenic		HPPC_00115	
S52	332580	Т	A	SNP	synonymous	HP0119		
\$52	332598		T	SNP	synonymous	HP0119		
\$52 \$52	332632 332653	G	A T	SNP	nonsynonymous	HP0119 HP0119		
\$52	332689		A	SNP	nonsynonymous	HP0119		
\$52	374756	CGGGGGGGGGGGG	CGGGGGGGGGGGGGGG	indel	frameshift insertion	jhp0151		
S52	548965	с	Т	SNP	intergenic		jhp1163	HPG27_298
S52	548978	G	Т	SNP	intergenic		jhp1163	HPG27_298
S52	701037		TGGGGGGG	indel	frameshift deletion	HP0499		
\$52	801836	GAAAAAAAAAAA	GAAAAAAAAAAA	indel	intergenic		jhp0540	
\$52 \$52	839999 868876	Т	с с	SNP	nonsynonymous	HPB8_818 HP0646		
\$52	1043704	GTTTTTTTTTT	GTTTTTTTTTTTTT	indel	nonsynonymous frameshift insertion/intergenic	HPnc4170	HP0811	HPnc4160
\$52	1166858		T	SNP	nonsynonymous	HP0929		
\$52	1187376		ATTTTTTT	indel	intergenic		HP0947	
\$52	1636693	TGGGG	TGGGGG	indel	frameshift insertion	HPATCC43504_01561		
S52	1663529	GTTTTT	GTTTT	indel	1 bp deletion			
S53	658	с	Т	SNP	synonymous	HP1529		
\$53	214663	CGAGAGAGAGAGAGAG	CGAGAGAGAGAGAGAGAG	indel	intergenic		HPG27_8	
\$53 \$53	232964 303813	C A	A T	SNP	intergenic	HPP12_0096	HPPC_00115	
\$53	303813		T	SNP	nonsynonymous	HPP12_0096		
\$53	303827	ССССССССССССССССССССССССССССССССССССССС	G	indel	frameshift deletion	HPP12_0096		
\$53	315327	ACCCCCCCCC	ACCCCCCCCCC	indel	intergenic		HP0103	
\$53	374756	CGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG	000000000000000000000000000000000000000	indel	frameshift insertion	jhp0151		
\$53	431032	с	Т	SNP	synonymous	HP0194		
\$53	437765	G	C	SNP	intergenic framashift dalation	UDDC 01040	HP0204	HELPY_0206
\$53 \$53	443932 450628	ACTCTCTCTCTCTCTCTC	ACTCTCTCTCTCTCTC	indel SNP	frameshift deletion synonymous	HPPC_01040 HP0213		
		ΑΑΤΤΤΑΑΤCTTATTTAATCTTATTTAATCTTATTTAA				111 0215		
S53	546115	TCTTATTTAATCTTATTTAATCTT	TCTTATTTAATCTTATTTAATCTTATTTAATCTT	indel	intergenic		HP1243/HPG27_298	
\$53	546511	САААААААААА	CAAAAAAAAAAAA	indel	intergenic		HP1243/HPG27_298	
\$53 \$53	548978 620169	G C	T T	SNP SNP	intergenic nonsynonymous	HPAG1_1119	jhp1163	HPG27_298
\$53	626404		т	SNP	synonymous	HP1175		
\$53	627243	G	A	SNP	nonsynonymous	HP1174		
\$53	701041	G	A	SNP	nonsynonymous	1100400		
	701011	0		JINF	nonsynonymous	HP0499		
\$53	801836	GAAAAAAAAAAAA	GAAAAAAAAAAAAAA	indel	intergenic		jhp0540	
S53	801836 839999	GAAAAAAAAAAAA T	даааааааааа С	indel SNP	intergenic nonsynonymous	HP0499 HPB8_818		
S53 S53	801836 839999 1187376	бааааааааааа Т АТТТТТТТ	GААААААААААААА С АТТТТТТТ	indel SNP indel	intergenic nonsynonymous intergenic	HPB8_818	jhp0540 HP0947	
S53	801836 839999	баллалалалал Т АПТПТПТ G	даааааааааа С	indel SNP	intergenic nonsynonymous			
\$53 \$53 \$53	801836 839999 1187376 1319683	баллалалалал Т АПТПТПТ G	баааалаааааа С АПППППП С С	indel SNP indel SNP	Intergenic nonsynonymous intergenic nonsynonymous	HPB8_818 jhp1032		
\$53 \$53 \$53 \$53	801836 839999 1187376 1319683 1592784	баллалалалал Т АТТТТТТТ G АТБТБ	баааааааааа С Аттттттт С Атб	indel SNP indel SNP indel	intergenic nonsynonymous intergenic nonsynonymous frameshift deletion	HPB8_818 jhp1032 HP1354		
S53	801836 839999 1187376 1319683 1592784 1592801 1663529 1669898	GAAAAAAAAAAA T ATTTTTTT G ATGTG T GTTTTT C	GAAAAAAAAAAAAA C ATTTTTTTT C ATG G G GTTTT T	indel SNP indel SNP indel SNP indel SNP	Intergenic nonsynonymous intergenic nonsynonymous frameshift deletion synonymous 1 bp deletion synonymous	HPB8_818 jhp1032 HP1354 HP1354 HP1450		
S53	801836 839999 1187376 1319683 1592784 1592801 1663529 1669898 658	GAAAAAAAAAAA T ATTTTTTT G ATGTG T GTTTTT C C C	GAAAAAAAAAAAAA C ATTTTTTT C ATG G G G TTT T T T	indel SNP indel SNP indel SNP SNP	Intergenic nonsynonymous Intergenic nonsynonymous frameshift deletion synonymous 1 bp deletion synonymous synonymous	HPB8_818 jhp1032 HP1354 HP1354	HP0947	
S53           S54           S54	801836 839999 1187376 1319683 1592784 1592801 1663529 1669898 658 214663	GAAAAAAAAAAA T ATTTTTTT G ATGTG T T G GTTTTT C C C C GAGAGAGAGAGAGAGAGAG	GAAAAAAAAAAAAA C ATTITITTT C ATG G G GTTTT T T CGAGAGAGAGAGAGAGAGAG G G CGAGAGAGAGAGAG	indel SNP indel SNP indel SNP SNP indel	Intergenic nonsynonymous intergenic nonsynonymous frameshift deletion synonymous 1 bp deletion synonymous synonymous intergenic	HPB8_818 jhp1032 HP1354 HP1354 HP1450 HP1529		
S53           S54           S54           S54	801836 839999 1187376 1319683 1592784 1592801 1663529 1669898 658 214663 431032	GAAAAAAAAAAA T ATTTTTTT G ATGTG T GTTTTT C C C C C CGAGAGAGAGAGAGAGAG C	GAAAAAAAAAAAAA C ATTTTTTTT C ATG G G G TTTT T T CGAGAGAGAGAGAGAGAGAG T	indel SNP indel SNP indel SNP SNP SNP indel SNP	intergenic nonsynonymous intergenic nonsynonymous frameshift deletion synonymous 1 bp deletion synonymous synonymous intergenic synonymous	HPB8_818 jhp1032 HP1354 HP1354 HP1450	HP0947	HELPY 0206
S53           S54           S54	801836 839999 1187376 1319683 1592784 1592801 1663529 1669898 658 214663	GAAAAAAAAAAA T ATTTTTTT G ATGTG T T G GTTTTT C C C C GAGAGAGAGAGAGAGAGAG	GAAAAAAAAAAAAA C ATTITITTT C ATG G G GTTTT T T CGAGAGAGAGAGAGAGAGAG G G CGAGAGAGAGAGAG	indel SNP indel SNP indel SNP SNP indel	Intergenic nonsynonymous intergenic nonsynonymous frameshift deletion synonymous 1 bp deletion synonymous synonymous intergenic	HPB8_818 jhp1032 HP1354 HP1354 HP1450 HP1529	HP0947	HELPY_0206
S53           S53           S53           S53           S53           S53           S53           S53           S53           S54           S54           S54           S54	801836 839999 1187376 1319683 1592784 1592801 1663529 1669898 658 214663 431032 431032 437765	GAAAAAAAAAAA           T           ATTTTTTT           G           ATGTG           T           G           GTTTTTT           C           CGAGAGAGAGAGAGAG           C           CGAGAGAGAGAGAGAGAG           G           G           G           AATTTAATCTTATTTTAATCTTATTTAATCTTATTTAATCTTATTTAATCTTATTTAATCTTATTTAATCTTATTTAATCTTATTTTAATCTTATTTAATCTTATTTAATCTTATTTAATCTTATTTTAATCTTATTTTAATCTTATTTAATCTTATTTAATCTTATTTAATCTTTAATCTTATTTTAATCTTATTTTAATCT	GAAAAAAAAAAAAA C ATTTTTTTT C ATG G G G G G G G G G G G G G G G G G G	indel SNP indel SNP indel SNP SNP indel SNP SNP SNP SNP	Intergenic nonsynonymous intergenic nonsynonymous frameshift deletion synonymous 1 bp deletion synonymous synonymous intergenic synonymous intergenic synonymous	HPB8_818 jhp1032 HP1354 HP1354 HP1450 HP1450 HP1529 HP0194	HP0947 HPG27_8 HP0204	HELPY_0206
S53           S54           S54           S54           S54           S54           S54           S54           S54	801836 839999 1187376 1319683 1592784 1592801 1663529 1669898 658 214663 431032 437765 450628 546115	GAAAAAAAAAAAAA T ATITTITT G ATGTG T G GTITITT C C C C GAGAGAGAGAGAGAGAGAG C C G G G AATITAATCTTATTTAATCTTATTTAATCTTATTTAATCTT	GAAAAAAAAAAAAA C ATTITITTT C ATG G G G G G T T C GAGAGAGAGAGAGAGAGAG T C C A A ATTITAATCITATITAATCITATITAATCITATITAATCIT	indel SNP indel SNP indel SNP SNP indel SNP SNP SNP SNP indel	intergenic nonsynonymous intergenic nonsynonymous frameshift deletion synonymous 1 bp deletion synonymous synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic	HPB8_818 jhp1032 HP1354 HP1354 HP1450 HP1450 HP1529 HP0194	HP0947 HPG27_8 HP0204 HP1243/HPG27_298	HELPY_0206
SS3           SS3           SS3           SS3           SS3           SS3           SS3           SS3           SS4	801836 839999 1187376 1319683 1592784 1592801 1663529 1669898 658 214663 431032 437765 450628 546115 546511	GAAAAAAAAAAAAA T ATTTTTTT G ATGTG T G G G G	GAAAAAAAAAAAAAA C ATTTTTTTT C ATTTTTTTT C G G G GTTTT T T CGAGAGAGAGAGAGAGAGAGAG G T C C A AATTTAATCTTATTTATTTATTCTTATTTATTCTTATTATTTATTTATTTATTATTTATTTATTATTTATTTATTTATTTATTTATTTATTTATTTATTTATTTATTTATTTATTTATTTT	indel SNP indel SNP indel SNP SNP SNP SNP SNP SNP indel indel indel	Intergenic nonsynonymous intergenic nonsynonymous frameshift deletion synonymous 1 bp deletion synonymous synonymous intergenic synonymous intergenic synonymous intergenic intergenic intergenic	HPB8_818 jhp1032 HP1354 HP1354 HP1450 HP1529 HP0194 HP0213	HP0947 HPG27_8 HP0204	HELPY_0206
S53           S54           S54           S54           S54           S54           S54           S54           S54	801836 839999 1187376 1319683 1592784 1592801 1663529 1669898 658 214663 431032 437765 450628 546115	GAAAAAAAAAAAAA T ATITTITT G ATGTG T G GTITTT C C C C GAGAGAGAGAGAGAGAGAG C C G G G AATITAATCTTATTTAATCTTATTTAATCTTATTTAATCTT	GAAAAAAAAAAAAA C ATTITITTT C ATG G G G G G T T C GAGAGAGAGAGAGAGAGAG T C C A A ATTITAATCITATITAATCITATITAATCITATITAATCIT	indel SNP indel SNP indel SNP SNP indel SNP SNP SNP SNP indel	intergenic nonsynonymous intergenic nonsynonymous frameshift deletion synonymous 1 bp deletion synonymous synonymous intergenic synonymous intergenic synonymous intergenic synonymous intergenic	HPB8_818 jhp1032 HP1354 HP1354 HP1450 HP1450 HP1529 HP0194	HP0947 HPG27_8 HP0204 HP1243/HPG27_298	HELPY_0206
SS3           SS3           SS3           SS3           SS3           SS3           SS3           SS3           SS3           SS4	801836 839999 1187376 1319683 1592784 1592784 1592801 1663529 1663529 1663529 1663529 431032 431032 431032 437765 450628 546115 546511 620169	GAAAAAAAAAAA           T           ATTITITIT           G           ATGTG           T           GTITIT           C           CGAGAGGAGAGAGAGAG           C           CGAGAGGAGAGAGAGAG           G           AATITAATCITATTAATCITATTATATCITATITAT	GAAAAAAAAAAAAA C ATTTTTTTT C ATG G G GTTTT T T CGAGAGAGAGAGAGAGAGAGAG T C A AATTTAATCTTATTTAATCTTATTTAATCTTATTTAATCTT ATTTAATCTTATTTAATCTTATTTAATCTT CTTATTTAATCTTATTTAATCTT CTTATTTAATCTTATTTAATCTT	indel SNP indel SNP indel SNP indel SNP SNP indel SNP indel SNP	intergenic nonsynonymous intergenic nonsynonymous frameshift deletion synonymous 1 bp deletion synonymous intergenic synonymous intergenic synonymous intergenic intergenic intergenic intergenic nonsynonymous	HPB8_818 ihp1032 HP1354 HP1354 HP1450 HP1529 HP0194 HP0213 HPAG1_1119	HP0947 HPG27_8 HP0204 HP1243/HPG27_298	HELPY_0206
\$53           \$53           \$53           \$53           \$53           \$53           \$53           \$53           \$54	801836 839999 1187376 1319683 1592784 1592784 1663529 1663829 6658 214663 431032 437055 450628 546115 546511 620169 626404	GAAAAAAAAAAA           T           ATTTTTTT           G           ATGTG           T           GTTTTT           C           CGAGAGAGAGAGAGAGAG           C           G           AATTTAATCTTATTTAATCTTATTTAATCTTATTTAATCTTATTTAATCTTATTTAATCTT           CAAAAAAAAAAAA           C           C           C           C           C           C           C           C           C           C           G           G	GAAAAAAAAAAAAA           C           ATTTTTTTT           C           ATG           G           GTTTT           T           CGAGAGAGAGAGAGAGAG           T           CGAGAGAGAGAGAGAGAG           T           C           A           ATTTTAATCTTATTTAATCTTATTTAATCTTATTTAATCTT           CAAAAAAAAAAAAAAA           T           T           T	indel SNP indel SNP indel SNP indel SNP SNP SNP SNP indel SNP SNP SNP SNP	intergenic nonsynonymous intergenic nonsynonymous frameshift deletion synonymous 1 bp deletion synonymous intergenic synonymous intergenic synonymous intergenic intergenic intergenic nonsynonymous synonymous	HPB8_818 jhp1032 HP1354 HP1354 HP1450 HP1529 HP0194 HP0213 HPAG1_1119 HP1175	HP0947 HPG27_8 HP0204 HP1243/HPG27_298	HELPY_0206
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\$53           \$53           \$53           \$53           \$53           \$53           \$53           \$53           \$53           \$53           \$53           \$53           \$53           \$53           \$54           \$54           \$54           \$54           \$54           \$54           \$54           \$54           \$54           \$54           \$54           \$54           \$54           \$54           \$54           \$54           \$55      >>         \$55 <td>801836 839999 1187376 1319683 1592784 1663529 1669898 658 214663 431032 431032 437765 450628 546115 546511 620169 626404 627243 701041 1187376 1319683 1592785 1669898 658 214663 315327 431032 437765 450628 435059 548915 548957 548955 620169</td> <td>GAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA</td> <td>GAAAAAAAAAAAAAAA C ATTTTTTTT C ATTTTTTTT C G G G G TTT T CGAGAGAGAGAGAGAGAGAGAG T C C A AATTTAATCTTATTTAATCTTATTTAATCTTATTTAA T C AAATTAAACTTATTTAATCTTATTTAATCTTATTTAA T T C AAATTAAAAAAAA</td> <td>indel SNP indel SNP indel SNP SNP SNP SNP indel SNP SNP indel SNP SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP</td> <td>intergenic nonsynonymous intergenic nonsynonymous frameshift deletion synonymous 1 bp deletion synonymous intergenic synonymous intergenic synonymous intergenic nonsynonymous nonsynonymous nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic synonymous intergenic intergenic intergenic intergenic intergenic synonymous intergenic</td> <td>HPB8_818 ihp1032 HP1354 HP1354 HP1354 HP1450 HP0194 HP0194 HP0213 HPAG1_1119 HP175 HP1174 HP175 HP174 HP0499 HP1354 HP1450 HP1529 HP</td> <td>HP0947 HP027_8 HP0204 HP1243/HPG27_298 HP1243/HPG27_298 HP1243/HPG27_298 HP0947 HP0947 HP0947 HP00947 HP00947</td> <td>HELPY_0206</td>	801836 839999 1187376 1319683 1592784 1663529 1669898 658 214663 431032 431032 437765 450628 546115 546511 620169 626404 627243 701041 1187376 1319683 1592785 1669898 658 214663 315327 431032 437765 450628 435059 548915 548957 548955 620169	GAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	GAAAAAAAAAAAAAAA C ATTTTTTTT C ATTTTTTTT C G G G G TTT T CGAGAGAGAGAGAGAGAGAGAG T C C A AATTTAATCTTATTTAATCTTATTTAATCTTATTTAA T C AAATTAAACTTATTTAATCTTATTTAATCTTATTTAA T T C AAATTAAAAAAAA	indel SNP indel SNP indel SNP SNP SNP SNP indel SNP SNP indel SNP SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	intergenic nonsynonymous intergenic nonsynonymous frameshift deletion synonymous 1 bp deletion synonymous intergenic synonymous intergenic synonymous intergenic nonsynonymous nonsynonymous nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic synonymous intergenic intergenic intergenic intergenic intergenic synonymous intergenic	HPB8_818 ihp1032 HP1354 HP1354 HP1354 HP1450 HP0194 HP0194 HP0213 HPAG1_1119 HP175 HP1174 HP175 HP174 HP0499 HP1354 HP1450 HP1529 HP	HP0947 HP027_8 HP0204 HP1243/HPG27_298 HP1243/HPG27_298 HP1243/HPG27_298 HP0947 HP0947 HP0947 HP00947 HP00947	HELPY_0206
\$53           \$53           \$53           \$53           \$53           \$53           \$53           \$53           \$53           \$53           \$53           \$53           \$53           \$53           \$54           \$54           \$54           \$54           \$54           \$54           \$54           \$54           \$54           \$54           \$54           \$54           \$54           \$54           \$54           \$55      >555      >555 <td>801836 839999 1187376 1319683 1592784 1663529 1663828 214663 431032 437765 450628 546115 546511 620169 626404 627243 159276 1319683 159278 1669898 658 214663 315327 431032 437765 450528 455599 546115 548957 548955</td> <td>GAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA</td> <td>GAAAAAAAAAAAAAA C ATTTTTTTT C ATTTTTTTT C G G G G TTTT T CGAGAGAGAGAGAGAGAGAGAG T C C A AATTTAATCTTATTTAATCTTATTTAATCTTATTTAATCTT CTTATTTAATCTTATTTAATCTTATTTAATCTT CTTATTTAT</td> <td>indel SNP indel SNP indel SNP SNP SNP SNP indel SNP SNP indel SNP SNP indel SNP SNP indel SNP SNP SNP indel SNP SNP SNP indel SNP SNP SNP SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP</td> <td>intergenic nonsynonymous intergenic nonsynonymous frameshift deletion synonymous 1 bp deletion synonymous osynonymous intergenic synonymous intergenic intergenic intergenic nonsynonymous nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic</td> <td>HPB8_818 jhp1032 HP1354 HP1354 HP1354 HP1450 HP1529 HP0194 HP0213 HPAG1_1119 HP175 HP177 HP1774 HP0499 Jhp1032 HP1354 HP1450 HP1529 HP1354 HP1529 HP1354 HP1529 HP1354 HP1529 HP1354 HP1529 H</td> <td>HP0947 HP027_8 HP0204 HP1243/HPG27_298 HP1243/HPG27_298 HP1243/HPG27_298 HP0947 HP0947 HP0947 HP00947 HP00947</td> <td>HELPY_0206</td>	801836 839999 1187376 1319683 1592784 1663529 1663828 214663 431032 437765 450628 546115 546511 620169 626404 627243 159276 1319683 159278 1669898 658 214663 315327 431032 437765 450528 455599 546115 548957 548955	GAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	GAAAAAAAAAAAAAA C ATTTTTTTT C ATTTTTTTT C G G G G TTTT T CGAGAGAGAGAGAGAGAGAGAG T C C A AATTTAATCTTATTTAATCTTATTTAATCTTATTTAATCTT CTTATTTAATCTTATTTAATCTTATTTAATCTT CTTATTTAT	indel SNP indel SNP indel SNP SNP SNP SNP indel SNP SNP indel SNP SNP indel SNP SNP indel SNP SNP SNP indel SNP SNP SNP indel SNP SNP SNP SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	intergenic nonsynonymous intergenic nonsynonymous frameshift deletion synonymous 1 bp deletion synonymous osynonymous intergenic synonymous intergenic intergenic intergenic nonsynonymous nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic	HPB8_818 jhp1032 HP1354 HP1354 HP1354 HP1450 HP1529 HP0194 HP0213 HPAG1_1119 HP175 HP177 HP1774 HP0499 Jhp1032 HP1354 HP1450 HP1529 HP1354 HP1529 HP1354 HP1529 HP1354 HP1529 HP1354 HP1529 H	HP0947 HP027_8 HP0204 HP1243/HPG27_298 HP1243/HPG27_298 HP1243/HPG27_298 HP0947 HP0947 HP0947 HP00947 HP00947	HELPY_0206
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\$53           \$53           \$53           \$53           \$53           \$53           \$53           \$53           \$53           \$53           \$53           \$53           \$53           \$53           \$54           \$54           \$54           \$54           \$54           \$54           \$54           \$54           \$54           \$54           \$54           \$54           \$54           \$54           \$55      >         \$55 <td>801836 839999 1187376 1319683 1592784 1592874 1592874 1592874 430322 431032 431032 437765 450628 546511 620169 626404 627243 109765 1319683 1592785 1669898 658 214663 315327 431032 437765 315327 431032 437765 315327 5489577 5489577 5489577 5489577 54895777 54895777777777777777777777</td> <td>GAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA</td> <td>GAAAAAAAAAAAAAA C ATTTTTTTTT C ATTTTTTTTT</td> <td>indel SNP indel SNP indel SNP SNP SNP SNP indel SNP SNP SNP SNP indel SNP SNP indel SNP SNP indel SNP indel SNP indel SNP indel SNP SNP indel SNP SNP SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP</td> <td>intergenic nonsynonymous intergenic nonsynonymous frameshift deletion synonymous 1 bp deletion synonymous intergenic synonymous intergenic synonymous intergenic nonsynonymous nonsynonymous nonsynonymous nonsynonymous frameshift deletion synonymous frameshift deletion synonymous frameshift deletion synonymous intergenic intergeni</td> <td>HPB8_818 ip1032 HP1354 HP1354 HP1354 HP1354 HP1354 HP0194 HP0194 HP0213 HPAG1_1119 HP175 HP174 HP0194 HP</td> <td>HP0947 HP027_8 HP0204 HP1243/HPG27_298 HP1243/HPG27_298 HP1243/HPG27_298 HP0947 HP0947 HP0947 HP00947 HP00947</td> <td>HELPY_0206</td>	801836 839999 1187376 1319683 1592784 1592874 1592874 1592874 430322 431032 431032 437765 450628 546511 620169 626404 627243 109765 1319683 1592785 1669898 658 214663 315327 431032 437765 315327 431032 437765 315327 5489577 5489577 5489577 5489577 54895777 54895777777777777777777777	GAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	GAAAAAAAAAAAAAA C ATTTTTTTTT C ATTTTTTTTT	indel SNP indel SNP indel SNP SNP SNP SNP indel SNP SNP SNP SNP indel SNP SNP indel SNP SNP indel SNP indel SNP indel SNP indel SNP SNP indel SNP SNP SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	intergenic nonsynonymous intergenic nonsynonymous frameshift deletion synonymous 1 bp deletion synonymous intergenic synonymous intergenic synonymous intergenic nonsynonymous nonsynonymous nonsynonymous nonsynonymous frameshift deletion synonymous frameshift deletion synonymous frameshift deletion synonymous intergenic intergeni	HPB8_818 ip1032 HP1354 HP1354 HP1354 HP1354 HP1354 HP0194 HP0194 HP0213 HPAG1_1119 HP175 HP174 HP0194 HP	HP0947 HP027_8 HP0204 HP1243/HPG27_298 HP1243/HPG27_298 HP1243/HPG27_298 HP0947 HP0947 HP0947 HP00947 HP00947	HELPY_0206

\$55	839999	Т	с	SNP	nonsynonymous	HPB8_818		
S55	958702	СААААААААААААА	САААААААААААААААА	indel	intergenic		HPG27_680	
S55	1043704	GTTTTTTTTT	GTTTTTTTTTTT	indel	frameshift insertion/intergenic	HPnc4170	HP0811	HPnc4160
\$55	1187376	АППТПТ	ATTTTTTT	indel	intergenic		HP0947	
S55	1192576	G	T	SNP	intergenic	16-4022	HP0953	
S55 S55	1319683 1592784	G ATGTG	C ATG	SNP indel	nonsynonymous frameshift deletion	jhp1032 HP1354		
\$55	1593602	TGGGGGGGGGGGG	TGGGGGGGGGGGGG	indel	frameshift insertion	HP1354		
\$55	1669898	C	T	SNP	synonymous	HP1450		
\$56	658	c	T	SNP	synonymous	HP1529		
\$56	214663	CGAGAGAGAGAGAGAG	CGAGAGAGAGAGAGAGAG	indel	intergenic		HPG27_8	
\$56	315327	ACCCCCCCCC	ACCCCCCCCCC	indel	intergenic		HP0103	
S56	374756	CGGGGGGGGGGGG	CGGGGGGGGGGGGGGG	indel	frameshift insertion	jhp0151		
S56	431032	С	т	SNP	synonymous	HP0194		
S56	437765	G	с	SNP	intergenic		HP0204	HELPY_0206
S56	443932	ACTCTCTCTCTCTCTCTC	ACTCTCTCTCTCTCTC	indel	frameshift deletion	HPPC_01040		
S56	450628	G	A	SNP	synonymous	HP0213		
S56	455599	TGGGGGGGGGG	TGGGGGGGGGGG	indel	frameshift insertion	HP0217		
S56	546115		ΑΑΤΤΤΑΑΤCTTΑΤΤΤΑΑΤCTTΑΤΤΤΑΑΤCTΤΑΤΤΤΑΑ	indel	intergenic		HP1243/HPG27_298	
S56	E46E11	тсттатттаатсттатттаатстт	тсттатттаатсттатттаатсттатттаатстт	ladal				
S56	546511 548978	САААААААААА	САААААААААААА	indel SNP	intergenic		HP1243/HPG27_298	HPG27_298
\$56	548978	G	СТТТТТТТ	indel	intergenic intergenic		jhp1163 jhp1163	HPG27_298 HPG27_298
S56	620169	c	т	SNP	nonsynonymous	HPAG1 1119	Jubiio2	TIPG27_256
\$56	626404	c	Т	SNP	synonymous	HP1175		
\$56	627243	G	A	SNP	nonsynonymous	HP1175		
\$56	701041	G	A	SNP	nonsynonymous	HP0499		
\$56	801836	GAAAAAAAAAAA	GAAAAAAAAAAAAA	indel	intergenic		jhp0540	
S56	1043704	GTTTTTTTTTTTT	GTTTTTTTTTTTTT	indel	frameshift insertion/intergenic	HPnc4170	HP0811	HPnc4160
S56	1124346	CGAGAGAGAGAGAGAGAGAG	CGAGAGAGAGAGAGAGAG	indel	intergenic		HPG27_1187	
\$56	1302389	G	A	SNP	synonymous	HP0364		
S56	1319683	G	c	SNP	nonsynonymous	jhp1032		
S56	1410493	G	A	SNP	nonsynonymous	jhp0373		
S56	1592785	TGTGG	TG	indel	frameshift deletion	HP1354		
S56	1669898	с	Т	SNP	synonymous	HP1450		
S57	658	с	Т	SNP	synonymous	HP1529		
S57	214663	CGAGAGAGAGAGAGAG	CGAGAGAGAGAGAGAGAG	indel	intergenic		HPG27_8	
\$57	374756	CGGGGGGGGGGGG	CGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG	indel	frameshift insertion	jhp0151		
S57	431032	С	T	SNP	synonymous	HP0194		
S57 S57	437765 450628	G	C A	SNP	intergenic	HP0213	HP0204	HELPY_0206
\$57	546524	c	A	SNP SNP	synonymous	HP0213	HP1243/HPG27_298	
\$57	607390	G	A	SNP	intergenic synonymous	jhp1115	TIF1243/TIF027_298	
\$57	620169	c	T	SNP	nonsynonymous	HPAG1_1119		
\$57	626404	c	т	SNP	synonymous	HP1175		
\$57	627243	G	A	SNP	nonsynonymous	HP1174		
\$57	701041	G	A	SNP	nonsynonymous	HP0499		
S57	748416	т	A	SNP	intergenic		HP0514	
S57	801836	GAAAAAAAAAAAA	GAAAAAAAAAAAA	indel	intergenic		jhp0540	
S57	958575	GAGA	GAGAAAGA	indel	intergenic		HPG27_680	
S57	1124346	CGAGAGAGAGAGAGAGAGAG	CGAGAGAGAGAGAGAGAGAGAG	indel	intergenic		HPG27_1187	
S57	1187376	ATTTTTT	ATTTTTTTT	indel	intergenic		HP0947	
S57	1272391	G	A	SNP	nonsynonymous			
S57	1284699	AGGGGGGGGGG	AGGGGGGGGG	indel	frameshift deletion	HPG27_1018		
S57	1555634	Т	С	SNP	nonsynonymous	HELPY_0259		
S57	1582072	ATT	ATTTTT	indel	intergenic		HELPY_1317	HP0228
S57	1592786	GT	G	indel	frameshift deletion	HP1354		
\$57	1592801	T	G	SNP	synonymous	HP1354		
\$57	1593602	TGGGGGGGGGGG	G	indel	frameshift insertion	HP1354		
S57 S58	1669898	c c	T	SNP	synonymous	HP1450		
S58 S58	658 961	G	T A	SNP SNP	synonymous	HP1529 HP1529		
S58 S58	214663	CGAGAGAGAGAGAGAG	A CGAGAGAGAGAGAGAGAGAG	indel	nonsynonymous intergenic		HPG27_8	
\$58	232963	A	С	SNP	intergenic		HPPC_00115	
\$58	232963	C	A	SNP	intergenic		HPPC_00115	
\$58	315327	ACCCCCCCCC	ACCCCCCCCCC	indel	intergenic		HP0103	
\$58	374756	ССССССССССССССССССССССССССССССССССССССС	066666666666666666666666666666666666666	indel	frameshift insertion	jhp0151		
S58	431032	с	Т	SNP	synonymous	HP0194		
S58	437765	G	с	SNP	intergenic		HP0204	HELPY_0206
S58	450628	G	A	SNP	synonymous	HP0213		
S58	455599	TGGGGGGGGGG	TGGGGGGGGGGG	indel	frameshift insertion	HP0217		
S58	546115	ΑΑΤΤΤΑΑΤΟΤΤΑΤΤΤΑΑΤΟΤΤΑΤΤΤΑΑΤΟΤΤΑΤΤΤΑΑ ΤΟΤΤΑΤΤΤΑΑΤΟΤΤΑΤΤΤΑΑΤΟΤΤ	ААТТТААТСТТАТТТААТСТТАТТТААТСТТАТТТАА ТСТТАТТТААТСТТАТТТААТСТТАТТТААТСТТАТТ ТААТСТТ	indel	intergenic		HP1243/HPG27_298	
S58	546511	СААААААААААА	САААААААААААА	indel	intergenic		HP1243/HPG27_298	
S58	548965	с	т	SNP	intergenic		jhp1163	HPG27_298
S58	620169	с	Т	SNP	nonsynonymous	HPAG1_1119		
		C	Т	SNP	synonymous	HP1175		
S58	626404	G	A	SNP	nonsynonymous	HP1174		
S58 S58	626404 627243	9		SNP	nonsynonymous	HP0499		
		G	Α					
S58 S58 S58	627243 701041 801836	G GAAAAAAAAAAAA	GAAAAAAAAAAAA	indel	intergenic		jhp0540	
S58 S58 S58 S58	627243 701041 801836 805851	G			intergenic intergenic		HPG27_556	
\$58 \$58 \$58 \$58 \$58	627243 701041 801836 805851 958574	G GAAAAAAAAAAAA A CGAGAGAGAGAGAGAG	GAAAAAAAAAAAAAA T CGAGAGAGAGAGAGAGAG	indel SNP indel	intergenic intergenic		HPG27_556 HPG27_680	
\$58 \$58 \$58 \$58 \$58 \$58 \$58	627243 701041 801836 805851 958574 958702	G GAAAAAAAAAAAA A CGAGAGAGAGAGAGAG CAAAAAAAA	GAAAAAAAAAAAAA T CGAGAGAGAGAGAGAGAG CAAAAAAAAAA	indel SNP indel indel	intergenic intergenic intergenic		HPG27_556 HPG27_680 HPG27_680	
S58	627243 701041 801836 805851 958574 958702 1043704	G           GAAAAAAAAAAA           A           CGAGAGAGAGAGAGAG           САААААААААААААА           GTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	GAAAAAAAAAAAAA T CGAGAGAGAGAGAGAGAGAG CAAAAAAAAAA	indel SNP indel indel indel	intergenic intergenic intergenic frameshift insertion/intergenic	HPnc4170	HPG27_556 HPG27_680 HPG27_680 HP0811	HPnc4160
S58           S58	627243 701041 801836 805851 958574 958702 1043704 1187376	G GAAAAAAAAAAAA A CGAGAGGAGAGAGAGAG CAAAAAAAA	GAAAAAAAAAAAAA T CGAGAGAGAGAGAGAGAG CAAAAAAAAAA	indel SNP indel indel indel indel	intergenic intergenic intergenic frameshift insertion/intergenic intergenic		HPG27_556 HPG27_680 HPG27_680	HPnc4160
S58	627243 701041 801836 805851 958574 958702 1043704	G           GAAAAAAAAAAA           A           CGAGAGAGAGAGAGAG           САААААААААААААА           GTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	GAAAAAAAAAAAAA T CGAGAGAGAGAGAGAGAGAG CAAAAAAAAAA	indel SNP indel indel indel	intergenic intergenic intergenic frameshift insertion/intergenic	HPnc4170 HPG27_1018 HELPY_0259	HPG27_556 HPG27_680 HPG27_680 HP0811	HPnc4160

S58	1592784	ATGTG	ATG	indel	frameshift deletion	HP1354		
S58	1593602	TGGGGGGGGGGG	TGGGGGGGGGGGG	indel	frameshift deletion	HP1354		
S58	1669898	С	Т	SNP	synonymous	HP1450		
S59	658	C	Т	SNP	synonymous	HP1529		
\$59	27485	AGGGGGG	AGGGGGGG	indel	intergenic		HP1506	jhp1400
\$59	431032	c	T	SNP	synonymous	HP0194	1100004	UEL DV 0200
\$59	437765	G	c	SNP	intergenic	1100040	HP0204	HELPY_0206
S59 S59	450628 546511	G CAAAAAAAAAAAA	А СААААААААААААА	SNP	synonymous	HP0213	101242/00027 208	
\$59	546511	G	Т	indel SNP	intergenic		HP1243/HPG27_298	HDC 27 209
S59 S59	620169	c	т Т	SNP	intergenic nonsynonymous	HPAG1 1119	jhp1163	HPG27_298
\$59	626404	c	т	SNP	synonymous	HP1175		
\$59	627243	G	A	SNP	nonsynonymous	HP1174		
\$59	701041	G	A	SNP	nonsynonymous	HP0499		
S59	757302	G	A	SNP	synonymous	HPATCC43504_00741		
S59	801836	GAAAAAAAAAAAA	GAAAAAAAAAAAAA	indel	intergenic		jhp0540	
\$59	854528	c	Т	SNP	nonsynonymous	HP0632		
S59	958574	CGAGAGAGAGAGAG	CGAGAGAGAGAGAGAG	indel	intergenic		HPG27_680	
S59	1043704	GTTTTTTTTTTT	GTTTTTTTTTTTT	indel	frameshift insertion/intergenic	HPnc4170	HP0811	HPnc4160
S59	1124346	CGAGAGAGAGAGAGAGAGAG	CGAGAGAGAGAGAGAGAG	indel	intergenic		HPG27_1187	
S59	1187376	ATTTTTT	ATTTTTTT	indel	intergenic		HP0947	
S59	1284699	AGGGGGGGGGG	AGGGGGGGGGGG	indel	frameshift deletion	HPG27_1018		
S59	1555634	Т	с	SNP	nonsynonymous	HELPY_0259		
S59	1582224	ACTCTCTCTCTCTCTC	ACTCTCTCTCTCTC	indel	intergenic		HELPY_1317	HP0228
\$59	1592800	G	GGGT	indel	frameshift insertion	HP1354		
\$59	1669898	c	T	SNP	synonymous	HP1450		
S60	658	C	T	SNP	synonymous	HP1529	100.27 0	
S60	214663	CGAGAGAGAGAGAGAG	CGAGAGAGAGAGAGAGAG	indel	intergenic		HPG27_8	
\$60	232963 232964	A C	C	SNP SNP	intergenic		HPPC_00115	
S60 S60	232964 315327	C ACCCCCCCCC	A ACCCCCCCCCC	SNP	intergenic intergenic		HPPC_00115 HP0103	
S60	315327	c	T	SNP	synonymous	HP0132		
S60	374756	CGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG	CGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG	indel	frameshift insertion	jhp0151		
S60	431032	C	T	SNP	synonymous	HP0194		
S60	437765	G	C	SNP	intergenic		HP0204	HELPY_0206
S60	450628	G	A	SNP	synonymous	HP0213		
S60	488821	С	т	SNP	nonsynonymous	jhp1233		
S60	546511	СААААААААААА	САААААААААААА	indel	intergenic		HP1243/HPG27_298	
S60	620169	С	Т	SNP	nonsynonymous	HPAG1_1119		
S60	626404	c	Т	SNP	synonymous	HP1175		
S60	627243	G	A	SNP	nonsynonymous	HP1174		
S60	701041	G	A	SNP	nonsynonymous	HP0499		
S60	801836	GAAAAAAAAAAAA	GAAAAAAAAAAAA					
			0444444444444	indel	intergenic		jhp0540	
S60	958574	CGAGAGAGAGAGAG	CGAGAGAGAGAGAGAG	indel indel	intergenic		HPG27_680	
S60 S60	958702	CGAGAGAGAGAGAG CAAAAAAAAAAAAAAAA	CGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAAAAAAA	indel indel	intergenic intergenic		HPG27_680 HPG27_680	
S60 S60 S60	958702 1043704	CGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAAAA GTTTTTTTTTT	CGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAAAAAAAA	indel indel indel	intergenic intergenic frameshift insertion/intergenic	HPnc4170	HPG27_680 HPG27_680 HP0811	HPnc4160
S60 S60 S60 S60	958702 1043704 1187376	СGAGAGAGAGAGAG САЛАЛАЛАЛАЛАЛАЛА GTTTTTTTTT ATTTTTT	CGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAAAAAAA GTTTTTTTTTT	indel indel indel indel	intergenic intergenic frameshift insertion/intergenic intergenic		HPG27_680 HPG27_680	HPnc4160
\$60 \$60 \$60 \$60 \$60	958702 1043704 1187376 1284699	СGAGAGAGAGAGAG СААААААААААААААА GTTTTTTTTT ATTTTTT AGGGGGGGGGG	CGAGAGAGAGAGAGAG           CAAAAAAAAAAAAAAAAAAA           GTTTTTTTTTTTTTTT           ATTTTTTT           AGGGGGGGGGG	indel indel indel indel indel	intergenic Intergenic frameshift insertion/intergenic intergenic frameshift deletion	HPG27_1018	HPG27_680 HPG27_680 HP0811	HPnc4160
\$60 \$60 \$60 \$60 \$60 \$60	958702 1043704 1187376 1284699 1318527	CGAGAGAGAGAGAG           CAAAAAAAAAAAAAAAAA           GTTTTTTTTTTT           ATTTTTTT           AGGGGGGGGGGGGG           C	CGAGAGAGAGAGAGAGAG           CAAAAAAAAAAAAAAAAAAA           GTTTTTTTTTTTTTTT           ATTTTTTTT           AGGGGGGGGGGG           A	indel indel indel indel SNP	intergenic intergenic frameshift insertion/intergenic intergenic frameshift deletion intergenic	HPG27_1018 jhp1031	HPG27_680 HPG27_680 HP0811	HPnc4160
\$60 \$60 \$60 \$60 \$60 \$60 \$60	958702 1043704 1187376 1284699 1318527 1555634	CGAGAGAGAGAGAG           CAAAAAAAAAAAAAAA           GTTTTTTTTTTTT           ATTTTTTT           AGGGGGGGGGGG           C           T	CGAGAGAGAGAGAGAGAG           CAAAAAAAAAAAAAAAAAAA           GTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	indel indel indel indel SNP SNP	intergenic intergenic frameshift insertion/intergenic intergenic frameshift deletion intergenic nonsynonymous	HPG27_1018 jhp1031 HELPY_0259	HPG27_680 HPG27_680 HP0811	HPnc4160
S60	958702 1043704 1187376 1284699 1318527 1555634 1592784	CGAGAGAGAGAGAG           CAAAAAAAAAAAAAA           GTTTTTTTTTTT           ATTTTTT           AGGGGGGGGGGG           C           T           ATGTG	CGAGAGAGAGAGAGAGAG           CAAAAAAAAAAAAAAAAAAA           GTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	indel indel indel indel SNP SNP indel	Intergenic intergenic frameshift insertion/intergenic intergenic frameshift deletion intergenic norsynonymous frameshift deletion	HPG27_1018 jhp1031 HELPY_0259 HP1354	HPG27_680 HPG27_680 HP0811	HPnc4160
S60	958702 1043704 1187376 1284699 1318527 1555634 1592784 1592801	CGAGAGAGAGAGAG           CAAAAAAAAAAAAAAA           GTTTTTTTTTTT           ATTTTTTTT           AGGGGGGGGGGG           C           T           ATGTG           T	CGAGAGAGAGAGAGAGAG           CAAAAAAAAAAAAAAAAAAAA           GTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	indel indel indel indel SNP SNP indel SNP	intergenic intergenic frameshift insertion/intergenic frameshift deletion intergenic nonsynonymous frameshift deletion synonymous	HPG27_1018 jhp1031 HELPY_0259 HP1354 HP1354	HPG27_680 HPG27_680 HP0811	HPnc4160
S60	958702 1043704 1187376 1284699 1318527 1555634 1592784 1592801 1669898	CGAGAGAGAGAGAG           CAAAAAAAAAAAAAAA           GTTTTTTTTTTT           ATTTTTTT           AGGGGGGGGGG           C           T           ATGTG           T           C	CGAGAGAGAGAGAGAGAG           CAAAAAAAAAAAAAAAAAAAA           GTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	indel indel indel indel SNP SNP indel SNP SNP	intergenic intergenic frameshift insertion/intergenic intergenic frameshift deletion intergenic nonsynonymous frameshift deletion synonymous synonymous	HPG27_1018 jhp1031 HELPY_0259 HP1354 HP1354 HP1354 HP1450	HPG27_680 HPG27_680 HP0811	HPnc4160
S60	958702 1043704 1187376 1284699 1318527 1555634 1592784 1592784 1592801 1669898 658	CGAGAGAGAGAGAG           CAAAAAAAAAAAAAAA           GTTTTTTTTTTT           ATTTTTTTT           AGGGGGGGGGG           C           T           ATGTG           T           C           C           C           C           C           C           C           C           C	CGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAAAAAA GTTTTTTTTTT	indel indel indel SNP SNP indel SNP SNP SNP	Intergenic Intergenic frameshift insertion/intergenic Intergenic frameshift deletion Intergenic nonsynonymous frameshift deletion synonymous synonymous synonymous	HPG27_1018 jhp1031 HELPY_0259 HP1354 HP1354	HPG27_680 HPG27_680 HP0811 HP0947	HPnc4160
S60           S61	958702 1043704 1187376 1284699 1318527 1555634 1592784 1592801 1669898 658 214663	CGAGAGAGAGAGAG           CAAAAAAAAAAAAAA           GTTITTTTTTTT           AITTITTT           AGGGGGGGGGG           C           T           ATGTG           T           C           C           C           C           C           C           C           C           C           C           C           C           C           C           C           CGAGAGAGAGAGAGAGAGAGAGAGAGAGAGAGAGAGAGA	CGAGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAAAAA GTTITITITITI ATTITITIT ATTITITIT AGGGGGGGGG A AGGGGGGGGG A C C ATG G G T T T CGAGAGAGAGAGAGAGAGAGAG	indel indel indel SNP SNP indel SNP SNP SNP indel	intergenic intergenic frameshift insertion/intergenic intergenic frameshift deletion intergenic nonsynonymous frameshift deletion synonymous synonymous intergenic	HPG27_1018 jhp1031 HELPY_0259 HP1354 HP1354 HP1450 HP1529	HPG27_680 HPG27_680 HP0811	HPnc4160
S60	958702 1043704 1187376 1284699 1318527 1555634 1592784 1592784 1592801 1669898 658	CGAGAGAGAGAGAG           CAAAAAAAAAAAAAAA           GTTTTTTTTTTT           ATTTTTTTT           AGGGGGGGGGG           C           T           ATGTG           T           C           C           C           C           C           C           C           C           C	CGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAAAAAA GTTTTTTTTTT	indel indel indel SNP SNP indel SNP SNP SNP	Intergenic Intergenic frameshift insertion/intergenic Intergenic frameshift deletion Intergenic nonsynonymous frameshift deletion synonymous synonymous synonymous	HPG27_1018 jhp1031 HELPY_0259 HP1354 HP1354 HP1354 HP1450	HPG27_680 HPG27_680 HP0811 HP0947	HPnc4160
S60           S61           S61           S61	958702 1043704 1187376 1284699 1318527 1555634 1592784 1592801 1669898 658 214663 249555	CGAGAGAGAGAGAG           CAAAAAAAAAAAAAAA           GTTITTTTTTTT           ATTITTT           AGGGGGGGGGGG           C           T           ATGTG           T           C           C           C           C           C           C           C           C           C           G           CGAGAGAGAGAGAGAGAGAG           G	CGAGAGAGAGAGAGAGAG           CAAAAAAAAAAAAAAAAAAA           GTTITTTTTTTTTTT           ATTITTTTT           ATTITTTT           AGGGGGGGGGG           A           C           ATG           G           T           T           C           CAGAGAGAGAGAGAGAGAG           A	indel indel indel SNP SNP indel SNP SNP SNP indel SNP	intergenic intergenic frameshift insertion/intergenic intergenic frameshift deletion intergenic nonsynonymous frameshift deletion synonymous synonymous intergenic nonsynonymous	HPG27_1018 jhp1031 HELPY_0259 HP1354 HP1354 HP1450 HP1529	HPG27_680 HPG27_680 HP0811 HP0947 HP0947	HPnc4160
S60           S61           S61           S61           S61	958702 1043704 1187376 1284699 1318527 1555634 1592784 1592801 1669898 658 214663 249555 315327	CGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAA GTITITITITIT ATTITITT AGGGGGGGGGG	CGAGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAAAAA GTITITITITIT ATTITITT AGGGGGGGGGG	indel indel indel SNP SNP indel SNP SNP indel SNP indel	Intergenic Intergenic frameshift insertion/intergenic frameshift deletion Intergenic norsynonymous frameshift deletion synonymous synonymous synonymous intergenic norsynonymous intergenic	HPG27_1018 jhp1031 HELPY_0259 HP1354 HP1354 HP1450 HP1529 HP0044	HPG27_680 HPG27_680 HP0811 HP0947 HP0947	HPnc4160
S60           S61           S61           S61           S61           S61           S61           S61	958702 1043704 1187376 1284699 1318527 1555634 1592784 1592801 1669898 658 214663 249555 315327 374756	CGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAA GTITITITITT ATTITITT AGGGGGGGGGG	CGAGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAAAAAA	indel indel indel SNP SNP indel SNP SNP indel SNP indel indel	Intergenic Intergenic frameshift insertion/intergenic Intergenic frameshift deletion Intergenic frameshift deletion synonymous synonymous synonymous intergenic nonsynonymous Intergenic frameshift insertion	HPG27_1018 jhp1031 HELPY_0259 HP1354 HP1354 HP1450 HP1529 HP0044 jhp0151	HPG27_680 HPG27_680 HP0811 HP0947 HP0947	HPnc4160
S60           S61	958702 1043704 1187376 1284699 1318527 1555634 1592784 159280 1669898 658 214663 249555 315327 374756 413866	CGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAAA GTITITITITIT ATTITITT AGGGGGGGGGG	CGAGAGAGAGAGAGAGAG           CAAAAAAAAAAAAAAAAAAA           GTTTTTTTTTT           ATGTGGGGGGGG           A           C           ATG           G           T           T           CGAGAGAGAGAGAGAGAG           A           ACCCCCCCCCC           CGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG	indel indel indel SNP SNP indel SNP SNP indel SNP indel indel SNP	Intergenic Intergenic frameshift insertion/intergenic Intergenic frameshift deletion Intergenic nonsynonymous frameshift deletion synonymous synonymous synonymous Intergenic nonsynonymous Intergenic frameshift insertion synonymous	HPG27_1018 jhp1031 HELPY_0259 HP1354 HP1354 HP1450 HP1529 HP0044 jhp0151 HP1535	HPG27_680 HPG27_680 HP0811 HP0947 HP0947	HPnc4160
S60           S61	958702 1043704 1187376 1284699 1318527 1555634 1592784 1592801 1669898 658 214663 214663 315327 315327 315327 413866 413887	CGAGAGAGAGAGAG CAAAAAAAAAAAAAA GTTTTTTTTTT	CGAGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAAAAAA	indel indel indel SNP SNP indel SNP indel SNP indel SNP indel SNP SNP	intergenic intergenic frameshift insertion/intergenic intergenic frameshift deletion intergenic nonsynonymous synonymous synonymous synonymous intergenic rameshift insertion frameshift insertion synonymous synonymous synonymous	HPG27_1018 jhp1031 HELPY_0259 HP1354 HP1354 HP1450 HP1529 HP0044 jhp0151 HP1535 HP1535	HPG27_680 HPG27_680 HP0811 HP0947 HP0947	HPnc4160
S60         S60           S60         S60           S60         S60           S60         S60           S60         S60           S61         S61	958702 1043704 1187376 1284699 1318527 1555634 1592784 1592801 1669898 658 214663 214663 315327 315327 315327 315327 413866 413887 413983	CGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAA GTITITITT ATTITITT AGGGGGGGGGG	CGAGAGAGAGAGAGAGAG           CAAAAAAAAAAAAAAAAAAAA           GTTTTTTTTTTT           ATTG           G           T           CGAGAGAGAGAGAGAGAG           A           CC           CGAGAGAGAGAGAGAGAG           GG           T           CGAGAGAGAGAGAGAGAGAG           A           ACCCCCCCCC           CGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG	indel indel indel indel SNP SNP SNP SNP indel SNP indel indel SNP SNP SNP SNP SNP SNP	intergenic intergenic frameshift insertion/intergenic intergenic frameshift deletion intergenic nonsynonymous frameshift deletion synonymous synonymous intergenic nonsynonymous intergenic frameshift insertion synonymous synonymous synonymous synonymous	HPG27_1018 jhp1031 HELPY_0259 HP1354 HP1354 HP1450 HP1529 HP0044 jhp0151 HP1535 HP1535 HP1535	HPG27_680 HPG27_680 HP0811 HP0947 HP0947	HPnc4160
S60           S60           S60           S60           S60           S60           S60           S60           S60           S61	958702 1043704 1187376 1284699 1318527 1555634 1592784 1592801 1669898 658 214663 214663 249555 315327 374756 413886 413887 413983 43393 437765	CGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAAA GTITITITITT ATTITITT AGGGGGGGGGG	CGAGAGAGAGAGAGAGAG           CAAAAAAAAAAAAAAAAAAAA           GTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	indel indel indel SNP SNP SNP SNP SNP SNP indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP	Intergenic Intergenic frameshift insertion/intergenic Intergenic frameshift deletion Intergenic norsynonymous frameshift deletion synonymous synonymous intergenic frameshift insertion synonymous synonymous synonymous synonymous synonymous synonymous synonymous intergenic synonymous synonymous intergenic synonymous intergenic synonymous	HPG27_1018 jhp1031 HELPY_0259 HP1354 HP1354 HP1450 HP1529 HP0044 jhp0151 HP1535 HP1535 HP1535	HPG27_680 HPG27_680 HP0811 HP0947 HP0947 HPG27_8 HP0103 HP0204	
S60           S61	958702 1043704 1187376 1284699 1318527 1555534 1592784 1592801 1669898 658 214663 249555 315327 315327 315327 315327 315327 413866 413887 413883 431032 433032 4350628 546511	CGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAA GTTTTTTTTT ATTTTTTT AGGGGGGGG	CGAGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAAAAAA	indel indel indel SNP SNP SNP SNP SNP indel SNP SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP	intergenic intergenic frameshift insertion/intergenic intergenic frameshift deletion intergenic nonsynonymous frameshift deletion synonymous synonymous synonymous intergenic frameshift insertion synonymous synonymous synonymous synonymous synonymous synonymous intergenic frameshift insertion synonymous synonymous synonymous intergenic intergenic intergenic synonymous intergenic intergenic	HPG27_1018 jhp1031 HELPY_0259 HP1354 HP1354 HP1450 HP1529 HP0044 jhp0151 HP1535 HP1535 HP1535 HP1535 HP1535	HPG27_680 HPG27_680 HP0811 HP0947 HP0947 HP027_8 HP0103 HP0204 HP1243/HPG27_298	HELPY_0206
S60           S61	958702 1043704 1187376 1284699 1318527 1555634 1552784 1592784 1592801 1669898 658 214663 249555 315327 374756 413887 413887 413887 413883 413032 437765 435765 435765	CGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAA GTITITITT ATTITITT AGGGGGGGGGG	CGAGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAAAAAA	indel indel indel SNP SNP indel SNP SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	Intergenic Intergenic frameshift insertion/intergenic Intergenic frameshift deletion Intergenic norsynonymous frameshift deletion synonymous synonymous intergenic frameshift insertion synonymous synonymous synonymous synonymous synonymous synonymous synonymous intergenic synonymous synonymous intergenic synonymous intergenic synonymous	HPG27_1018 jhp1031 HELPY_0259 HP1354 HP1354 HP1450 HP1529 HP0044 jhp0151 HP1535 HP1535 HP1535 HP1535 HP1535	HPG27_680 HPG27_680 HP0811 HP0947 HP0947 HPG27_8 HP0103 HP0204	HELPY_0206
S60           S61	958702 1043704 1187376 1284699 1318527 1555634 1552784 1592784 1592801 1669898 658 214663 249555 315327 374756 413866 413887 413883 431032 437755 450628 548978	CGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAA GTITITITT ATTITITT ATTITITT AGGGGGGGGGG	CGAGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAAAAAA	indel indel indel SNP SNP SNP SNP SNP indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	intergenic intergenic frameshift insertion/intergenic intergenic frameshift deletion intergenic nonsynonymous frameshift deletion synonymous synonymous intergenic nonsynonymous intergenic frameshift insertion synonymous synonymous synonymous synonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic	HPG27_1018 jhp1031 HELPY_0259 HP1354 HP1354 HP1450 HP1529 HP0044 jhp0151 HP1535 HP1535 HP1535 HP1535 HP1535 HP1535	HPG27_680 HPG27_680 HP0811 HP0947 HP0947 HP027_8 HP0103 HP0204 HP1243/HPG27_298	HELPY_0206
S60           S61	958702 1043704 1187376 1284699 1318527 1555634 1555634 15592801 1669898 658 214663 249555 315327 374756 413887 413883 431032 437655 450628 546511 548978 620169	CGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAA GTITITITT ATTITTT AGGGGGGGGGG	CGAGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAAAAAA	indel indel indel SNP SNP indel SNP SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	intergenic intergenic frameshift insertion/intergenic intergenic frameshift deletion intergenic nonsynonymous frameshift deletion synonymous synonymous intergenic nonsynonymous intergenic frameshift insertion synonymous synonymous synonymous synonymous synonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic	HPG27_1018 jhp1031 HELPY_0259 HP1354 HP1354 HP1450 HP1529 HP0044 jhp0151 HP1535 HP1535 HP1535 HP0194 HP0194 HP0213	HPG27_680 HPG27_680 HP0811 HP0947 HP0947 HP027_8 HP0103 HP0103 HP0204 HP1243/HPG27_298 jhp1163	HELPY_0206
S60           S61	958702 1043704 1187376 1284699 1318527 1555634 1555634 1552784 1592801 1669898 658 214663 214663 249555 315327 374756 413887 413983 413983 431032 437765 450628 546511 548956 548978 548978 548976	CGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAA GTITITITITT AGGGGGGGGGGG	CGAGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAAAAAA	indel indel indel SNP SNP SNP SNP SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	intergenic intergenic frameshift insertion/intergenic frameshift insertion/intergenic frameshift deletion intergenic frameshift deletion synonymous synonymous synonymous intergenic frameshift insertion synonymous synonymous synonymous synonymous intergenic	HPG27_1018 jhp1031 HELPY_0259 HP1354 HP1354 HP1450 HP1529 HP0044 jhp0151 HP1535 HP1535 HP1535 HP1535 HP0194 HP0213 HPAG1_1119 HP1175	HPG27_680 HPG27_680 HP0811 HP0947 HP0947 HP027_8 HP0103 HP0103 HP0204 HP1243/HPG27_298 jhp1163	HELPY_0206
S60           S61	958702 1043704 1187376 1284699 1318527 1555634 1592784 1592801 1669898 658 214663 249555 315327 374756 413866 413887 413983 43032 437765 450628 546511 548965 548978 620169 620404 627243	CGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAA GTTTTTTTTT ATTTTTTT AGGGGGGGG	CGAGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAAAAA GTTTTTTTTTT	indel indel indel SNP SNP indel SNP SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	intergenic intergenic frameshift insertion/intergenic intergenic frameshift deletion intergenic ronsynonymous frameshift deletion synonymous synonymous synonymous intergenic frameshift insertion synonymous synonymous synonymous synonymous synonymous intergenic int	HPG27_1018 jhp1031 HELPY_0259 HP1354 HP1354 HP1450 HP1529 HP0044 jhp0151 HP1535 HP1535 HP1535 HP1535 HP0194 HP0213 HPAG1_1119 HP1775 HP1174	HPG27_680 HPG27_680 HP0811 HP0947 HP0947 HP027_8 HP0103 HP0103 HP0204 HP1243/HPG27_298 jhp1163	HELPY_0206
S60           S61	958702 1043704 1187376 1284699 1318527 1555634 15592784 1592784 1592801 1669898 658 214663 249555 315327 374756 413887 413887 413887 413883 413032 433765 443845 546511 548965 548978 620169 626404 627243 701041	CGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAA GTITITITT ATTITITT AGGGGGGGGGG	CGAGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAAAAAA	indel indel indel SNP SNP indel SNP indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	intergenic intergenic frameshift insertion/intergenic intergenic frameshift deletion intergenic frameshift deletion synonymous synonymous intergenic rameshift insertion synonymous synonymous synonymous synonymous synonymous intergenic interge	HPG27_1018 jhp1031 HELPY_0259 HP1354 HP1354 HP1450 HP1529 HP0044 jhp0151 HP1535 HP1535 HP1535 HP1535 HP0194 HP0213 HPAG1_1119 HP1175	HPG27_680 HPG27_680 HP0811 HP0947 HP0947 HP0247 HP0103 HP0103 HP0204 HP1243/HPG27_298 jhp1163 jhp1163	HELPY_0206
S60           S61	958702 1043704 1187376 1284699 1318527 1555634 1552634 1592784 1592801 1669898 658 214663 249555 315327 374756 413867 413887 413887 413887 413887 413887 413887 413887 413887 546511 548965 548978 620169 626404 627243 701041 801836	CGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAA GTITITITT ATTITITT ATTITITT AGGGGGGGGGG	CGAGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAAAAAA	indel indel indel SNP SNP indel SNP indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	intergenic intergenic frameshift insertion/intergenic intergenic frameshift deletion intergenic nonsynonymous frameshift deletion synonymous synonymous intergenic nonsynonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous intergenic nonsynonymous synonymous nonsynonymous intergenic	HPG27_1018 jhp1031 HELPY_0259 HP1354 HP1354 HP1450 HP1529 HP0044 jhp0151 HP1535 HP155	HPG27_680 HPG27_680 HP0811 HP0947 HP0947 HP027_8 HP0103 HP0103 HP0204 HP1243/HPG27_298 jhp1163	HELPY_0206
S60           S61	958702 1043704 1187376 1284699 1318527 1555634 15592801 1669898 658 244653 249555 315327 374756 413887 431032 431032 437055 548978 620169 548978 620169 548978 620169 627433 701041 801836 839999	CGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAA GTITITITT ATTITITT AGGGGGGGGGG	CGAGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAAAAAA	indel indel indel SNP SNP indel SNP SNP indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	intergenic intergenic frameshift insertion/intergenic intergenic frameshift deletion intergenic nonsynonymous frameshift deletion synonymous synonymous intergenic nonsynonymous intergenic frameshift insertion synonymous synonymous synonymous synonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic nonsynonymous synonymous intergenic intergenic intergenic intergenic intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic intergenic intergenic nonsynonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic	HPG27_1018 jhp1031 HELPY_0259 HP1354 HP1354 HP1354 HP1529 HP0044 HP0044 HP1535 HP1535 HP1535 HP1535 HP1535 HP154 HP154 HP154 HP154 HP154 HP154 HP154 HP154 HP155 HP174 HP174 HP0499 HP88_818	HPG27_680 HPG27_680 HP0811 HP0947 HP0947 HP0947 HP027_8 HP0103 HP0103 HP0204 HP1243/HPG27_298 jhp1163 jhp1163 jhp1163	HELPY_0206 HPG27_298 HPG27_298
S60           S61	958702 1043704 1187376 1284699 1318527 1555634 1555634 15592801 1669898 658 214663 249555 315327 374756 413887 413887 413887 413887 431032 437765 450628 548978 5497878 548978 548978 548978 548978 548978 548978 548978 548978 548978 548978 548978 548978 548978 548978 548978 548978 548978 548978 5497878 5497878 5497878 5497878 5497878 5497878 5497878	CGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAAA GTITITITITT ATTITITT AGGGGGGGGGG	CGAGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAAAAAA	indel indel indel SNP SNP SNP indel SNP indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	intergenic intergenic frameshift insertion/intergenic intergenic frameshift deletion intergenic nonsynonymous frameshift deletion synonymous synonymous synonymous intergenic frameshift insertion synonymous synonymous synonymous synonymous intergenic	HPG27_1018 jhp1031 HELPY_0259 HP1354 HP1354 HP1450 HP1529 HP0044 jhp0151 HP1535 HP155	HPG27_680 HPG27_680 HP0811 HP0947 HP0947 HPG27_8 HP0103 HP0103 HP0204 HP1243/HPG27_298 jhp1163 jhp1163 jhp1163	HELPY_0206
S60           S61	958702 1043704 1187376 1284699 1318527 1555634 1555634 1552784 1592801 1669898 658 214663 249555 315327 374756 413886 413887 413983 431032 437765 450628 546511 548965 548978 548978 5620169 626404 627243 701041 801836 839999 1043704 112223	CGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAA GTTTTTTTTTT	CGAGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAAAAAA	indel indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	intergenic intergenic frameshift insertion/intergenic intergenic frameshift deletion intergenic frameshift deletion synonymous frameshift deletion synonymous synonymous intergenic frameshift insertion synonymous synonymous synonymous synonymous synonymous intergenic	HPG27_1018 jhp1031 HELPY_0259 HP1354 HP1354 HP1354 HP1529 HP0044 HP0044 HP1535 HP1535 HP1535 HP1535 HP1535 HP154 HP154 HP154 HP154 HP154 HP154 HP154 HP154 HP155 HP174 HP174 HP0499 HP88_818	HPG27_680 HPG27_680 HP0811 HP0947 HP0947 HP0947 HP027_8 HP0103 HP0103 HP0103 HP0204 HP1243/HPG27_298 Jhp1163 Jhp1163 Jhp1163 HP0895	HELPY_0206 HPG27_298 HPG27_298
S60           S61	958702 1043704 1187376 1284699 1318527 1555634 15592801 1669898 658 214663 249555 315327 374756 413887 413887 413887 413887 413883 413032 437765 548978 5626104 548955 548978 620169 6226404 801836 822493 701041 801836 839999 1043704 1122223 1122228	CGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAA GTITITITT AGGGGGGGGGGG C T ATGTG T C C C C CGAGAGAGAGAGAGAGAGAG G A ACCCCCCCC	CGAGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAAAAAA	indel indel indel SNP SNP indel SNP indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	intergenic intergenic frameshift insertion/intergenic intergenic frameshift deletion intergenic nonsynonymous frameshift deletion synonymous synonymous intergenic nonsynonymous intergenic frameshift insertion synonymous synonymous synonymous synonymous intergenic	HPG27_1018 jhp1031 HELPY_0259 HP1354 HP1354 HP1354 HP1529 HP0044 HP0044 HP1535 HP1535 HP1535 HP1535 HP1535 HP154 HP154 HP154 HP154 HP154 HP154 HP154 HP154 HP155 HP174 HP174 HP0499 HP88_818	HPG27_680 HPG27_680 HP0811 HP0947 HP0947 HP0947 HP0103 HP0	HELPY_0206 HPG27_298 HPG27_298
S60           S61	958702 1043704 1187376 1284699 1318527 1555634 1552801 1659284 1592801 1669898 658 214663 249555 315327 374756 413886 413887 41387 415877 415877 4158777 4158777 41587777 4	CGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAAA GTTTTTTTT ATTTTTTT AGGGGGGGG	CGAGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAAAAAA	indel indel indel SNP SNP indel SNP indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	intergenic intergenic frameshift insertion/intergenic intergenic frameshift deletion intergenic frameshift deletion synonymous frameshift deletion synonymous intergenic nonsynonymous intergenic frameshift insertion synonymous synonymous synonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic nonsynonymous synonymous intergenic intergenic nonsynonymous intergenic	HPG27_1018 jhp1031 HELPY_0259 HP1354 HP1354 HP1354 HP1450 HP1529 HP0044 Jhp0151 HP1535 HP1535 HP1535 HP1535 HP0194 HP0213 HP0213 HPAG1_1119 HP1175 HP1174 HP0499 HPB8_818 HPnc4170	HPG27_680 HPG27_680 HP0811 HP0947 HP0947 HP0947 HP027_8 HP0103 HP0103 HP0103 HP0204 HP1243/HPG27_298 Jhp1163 Jhp1163 Jhp1163 HP0895	HELPY_0206 HPG27_298 HPG27_298
S60           S61           S61      S61	958702 1043704 1187376 1284699 1318527 1555634 15592801 1669898 658 244653 244555 315327 374756 413887 413887 413887 413887 413887 413887 43032 437755 548978 626404 627243 548955 548978 626404 627243 701041 801836 839999 1043704 1122228 1187376 1483092	CGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAAA GTITITITT ATTITITT ATTITITT AGGGGGGGGGG	CGAGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAAAAAA	indel indel indel SNP SNP indel SNP indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	intergenic intergenic frameshift insertion/intergenic intergenic frameshift deletion intergenic nonsynonymous frameshift deletion synonymous synonymous intergenic nonsynonymous intergenic frameshift insertion synonymous synonymous synonymous synonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic nonsynonymous synonymous intergenic	HPG27_1018 jhp1031 HELPY_0259 HP1354 HP1354 HP1354 HP1529 HP0044 HP0044 HP1535 HP1535 HP1535 HP1535 HP0194 HP0213 HPAG1_1119 HP175 HP1174 HP0499 HPB8_818 HPnc4170 HPG27_298	HPG27_680 HPG27_680 HP0811 HP0947 HP0947 HP0947 HP0103 HP0	HELPY_0206 HPG27_298 HPG27_298
S60           S61           S61 <td>958702 1043704 1187376 1284699 1318527 1555634 1555634 15592801 1669898 658 249555 315327 374756 413883 431032 437765 443887 430828 548978 620169 62404 627243 701041 801836 839999 1043704 1122228 1187376 1483022 1483022 1483022 1483022</td> <td>CGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAA GTITITITIT ATTITITT ATTITITT AGGGGGGGGGG</td> <td>CGAGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAAAAAA</td> <td>indel indel indel SNP SNP SNP SNP indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP</td> <td>intergenic intergenic frameshift insertion/intergenic intergenic frameshift deletion intergenic nonsynonymous frameshift deletion synonymous synonymous intergenic nonsynonymous intergenic frameshift insertion synonymous synonymous synonymous synonymous intergenic intergenic intergenic intergenic intergenic intergenic nonsynonymous synonymous synonymous intergenic intergenic nonsynonymous intergenic intergenic nonsynonymous intergenic</td> <td>HPG27_1018 jhp1031 HELPY_0259 HP1354 HP1354 HP1354 HP1450 HP1529 HP0044 jhp0151 HP1535 HP1535 HP1535 HP1535 HP1535 HP0194 HP0213 HPAG1_1119 HP175 HP174 HP0499 HP88_818 HPnc4170 HPG27_298 HPG27_298</td> <td>HPG27_680 HPG27_680 HP0811 HP0947 HP0947 HP0947 HP0103 HP0</td> <td>HELPY_0206 HPG27_298 HPG27_298</td>	958702 1043704 1187376 1284699 1318527 1555634 1555634 15592801 1669898 658 249555 315327 374756 413883 431032 437765 443887 430828 548978 620169 62404 627243 701041 801836 839999 1043704 1122228 1187376 1483022 1483022 1483022 1483022	CGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAA GTITITITIT ATTITITT ATTITITT AGGGGGGGGGG	CGAGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAAAAAA	indel indel indel SNP SNP SNP SNP indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	intergenic intergenic frameshift insertion/intergenic intergenic frameshift deletion intergenic nonsynonymous frameshift deletion synonymous synonymous intergenic nonsynonymous intergenic frameshift insertion synonymous synonymous synonymous synonymous intergenic intergenic intergenic intergenic intergenic intergenic nonsynonymous synonymous synonymous intergenic intergenic nonsynonymous intergenic intergenic nonsynonymous intergenic	HPG27_1018 jhp1031 HELPY_0259 HP1354 HP1354 HP1354 HP1450 HP1529 HP0044 jhp0151 HP1535 HP1535 HP1535 HP1535 HP1535 HP0194 HP0213 HPAG1_1119 HP175 HP174 HP0499 HP88_818 HPnc4170 HPG27_298 HPG27_298	HPG27_680 HPG27_680 HP0811 HP0947 HP0947 HP0947 HP0103 HP0	HELPY_0206 HPG27_298 HPG27_298
S60           S61	958702 1043704 1187376 1284699 1318527 1555634 1555634 1555284 1552784 1552784 1552784 155278 214663 249555 315327 374756 413887 413887 413887 413887 413887 431032 437765 443887 430628 548978 548978 548978 548978 548978 548978 548978 548978 548978 548978 548978 548978 548978 548978 548978 548978 548978 548978 1122223 1122228 1187376 1483202 148255 1	CGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAA GTTTTTTTTTT	CGAGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAAAAAA	indel indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	intergenic intergenic frameshift insertion/intergenic intergenic frameshift deletion intergenic frameshift deletion synonymous frameshift deletion synonymous synonymous intergenic intergenic frameshift insertion synonymous synonymous synonymous synonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic nonsynonymous nonsynonymous frameshift insertion/intergenic int	HPG27_1018 jhp1031 HELPY_0259 HP1354 HP1354 HP1354 HP1529 HP0044 HP0044 HP1535 HP1535 HP1535 HP1535 HP0194 HP0213 HPAG1_1119 HP175 HP1174 HP0499 HPB8_818 HPnc4170 HPG27_298	HPG27_680 HPG27_680 HP0811 HP0947 HP0947 HP0947 HP0103 HP0	HELPY_0206 HPG27_298 HPG27_298
S60           S61	958702 1043704 1187376 1284099 1318527 1555634 15592801 1669898 658 214663 249555 315327 374756 413886 413887 413886 413887 413885 546511 548965 548978 620169 626404 627243 701041 801836 839999 1043704 1122228 1187376 1483202 1483269 1640915	CGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAA GTITITITT ATTITITT AGGGGGGGGGG	CGAGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAAAAAA	indel indel indel SNP SNP indel SNP indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	intergenic intergenic frameshift insertion/intergenic intergenic frameshift deletion intergenic frameshift deletion synonymous frameshift deletion synonymous synonymous intergenic frameshift insertion synonymous synonymous synonymous synonymous intergenic intergen	HPG27_1018 jhp1031 HELPY_0259 HP1354 HP1354 HP1354 HP1450 HP1529 HP0044 jhp0151 HP1535 HP1535 HP1535 HP1535 HP0194 HP0213 HPAG1_1119 HP175 HP1174 HP0499 HPB8_818 HPnc4170 HPG27_298 HPG27_298 HPG27_298	HPG27_680 HPG27_680 HP0811 HP0947 HP0947 HP0947 HP0103 HP0	HELPY_0206 HPG27_298 HPG27_298
S60           S61	958702 1043704 1187376 1284699 1318527 1555634 1555634 1555284 1552784 1552784 1552784 155278 214663 249555 315327 374756 413887 413887 413887 413887 413887 431032 437765 443887 430628 548978 548978 548978 548978 548978 548978 548978 548978 548978 548978 548978 548978 548978 548978 548978 548978 548978 548978 101717 1122223 1122228 1187376 1483202 148255 148555 148555 148555 148555 148555 148555 148555	CGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAA GTTTTTTTTTT	CGAGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAAAAAA	indel indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	intergenic intergenic frameshift insertion/intergenic intergenic frameshift deletion intergenic frameshift deletion synonymous frameshift deletion synonymous synonymous intergenic intergenic frameshift insertion synonymous synonymous synonymous synonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic nonsynonymous nonsynonymous frameshift insertion/intergenic int	HPG27_1018 jhp1031 HELPY_0259 HP1354 HP1354 HP1354 HP1450 HP1529 HP0044 jhp0151 HP1535 HP155 HP	HPG27_680 HPG27_680 HP0811 HP0947 HP0947 HP0947 HP0103 HP0	HELPY_0206 HPG27_298 HPG27_298
S60           S61           S61      S61	958702 1043704 1187376 1284699 1318527 1555634 1552801 1659898 658 244653 244555 315327 374756 413887 41387 41387 41387 41387 413887 413887 413887 413887 413887 413887 413887 413887 413887 413887 413887 413887 41482 412228 1187376 1483092 148309 1640915 1640915 1640985 1640955 1640985 1640955 1640555 1640555 1640555 16405555 16405555 16405555 16405555 16405555 16405555 164055555 1640	CGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAA GTITITITT ATTITITT ATTITITT AGGGGGGGGGG	CGAGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAAAAAA	indel indel indel SNP SNP indel SNP indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	intergenic intergenic frameshift insertion/intergenic intergenic frameshift deletion intergenic frameshift deletion synonymous frameshift deletion synonymous intergenic nonsynonymous intergenic frameshift insertion synonymous synonymous synonymous intergenic inter	HPG27_1018 jhp1031 HELPY_0259 HP1354 HP1354 HP1354 HP1355 HP1529 HP0044 Jhp0151 HP1535 HP1535 HP1535 HP1535 HP0194 HP0213 HP0213 HPAG1_1119 HP1175 HP1174 HP0499 HP188_818 HPnc4170 HPG27_298 HPG27_298 HPG27_298 HP1450	HPG27_680 HPG27_680 HP0811 HP0947 HP0947 HP0947 HP0103 HP0	HELPY_0206 HPG27_298 HPG27_298
S60           S61           S61      S61      S	958702 1043704 1187376 1284699 1318527 1555634 1552634 1552634 1552634 1552634 1659898 658 214653 224555 315327 374756 413867 413867 413887 413887 413887 413887 413887 413887 43032 437755 546511 433867 546511 548965 548978 620404 627243 701041 801836 839999 1043704 1122228 1187376 1483092 1483202 1483202 1483209 1483209 14649915 1463988 1669898 1669898	CGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAA GTTITTITTT ATTITTT ATTITTT AGGGGGGGGGG	CGAGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAAAAAA	indel indel indel SNP SNP indel SNP indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	intergenic intergenic frameshift insertion/intergenic intergenic frameshift deletion intergenic frameshift deletion synonymous frameshift deletion synonymous intergenic nonsynonymous intergenic frameshift insertion synonymous synonymous synonymous synonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic nonsynonymous synonymous nonsynonymous nonsynonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic nonsynonymous intergenic intergenic intergenic intergenic nonsynonymous nonsynonymous nonsynonymous frameshift insertion/intergenic interge	HPG27_1018 jhp1031 HELPY_0259 HP1354 HP1354 HP1354 HP1355 HP1529 HP0044 Jhp0151 HP1535 HP1535 HP1535 HP1535 HP0194 HP0213 HP0213 HPAG1_1119 HP1175 HP1174 HP0499 HP188_818 HPnc4170 HPG27_298 HPG27_298 HPG27_298 HP1450	HPG27_680 HPG27_680 HP027_680 HP0811 HP0947 HP0947 HP037 HP0103 HP0103 HP0103 HP0103 HP0204 HP1243/HPG27_298 jhp1163 jhp1163 jhp1163 Jhp1163 HP0895 HP0895 HP0895 HP0895 HP0897	HELPY_0206 HPG27_298 HPG27_298
S60           S61	958702 1043704 1187376 1284699 1318527 1555634 15592801 1669898 658 214663 249555 315327 374756 413867 413887 431032 431032 437055 546511 548978 620169 626404 627243 701041 801836 839999 1043704 1122228 1187376 1483202 148320 148320 148320 148320 148320 148320 148320 148320 148320 148320 148320 148320 148320 148320 148320 148320 1485550 1485550 1	CGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAA GTITITITT ATTITITT ATTITITT AGGGGGGGGGG	CGAGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAAAAAA	indel indel indel SNP SNP SNP SNP SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	intergenic intergenic frameshift insertion/intergenic intergenic frameshift deletion intergenic nonsynonymous frameshift deletion synonymous synonymous intergenic nonsynonymous intergenic frameshift insertion synonymous synonymous synonymous intergenic intergenic intergenic intergenic intergenic nonsynonymous synonymous intergenic intergenic nonsynonymous intergenic intergenic intergenic intergenic nonsynonymous intergenic in	HPG27_1018 jhp1031 HELPY_0259 HP1354 HP1354 HP1354 HP1355 HP1529 HP0044 Jhp0151 HP1535 HP1535 HP1535 HP1535 HP0194 HP0213 HP0213 HPAG1_1119 HP1175 HP1174 HP0499 HP188_818 HPnc4170 HPG27_298 HPG27_298 HPG27_298 HP1450	HPG27_680 HPG27_680 HP0811 HP0947 HP0947 HP0947 HP027_8 HP0103 HP0103 HP0103 HP0103 HP0204 HP1243/HPG27_298 Jhp1163 Jhp1163 Jhp1163 Jhp1163 HP0895 HP0895 HP0895 HP0947 HP0895 HP0947	HELPY_0206 HPG27_298 HPG27_298
S60           S61	958702 1043704 1187376 1284699 1318527 1555634 1555634 1555634 1555634 1555634 214663 234555 315327 374756 413887 413887 431032 431032 431032 437765 443887 430628 548978 620169 62404 627243 701041 801836 839999 1043704 112223 112228 1187376 1122228 1187376 1122228 1187376 1182369 1043704 112223 1182369 1043704 112223 1182369 1043704 112223 1182376 1183736 1183737 11837376 11837376 1183737 1183757 1183757 1183757 1183757 1183757 11857577 11857577 1185757 11857577 1185757 1185757 1185757 1185757 1185757 1185757	CGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAA GTTTTTTTTT ATTG T AGGGGGGGG	CGAGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAAAAAA	indel indel indel SNP SNP SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	intergenic intergenic frameshift insertion/intergenic intergenic frameshift deletion intergenic frameshift deletion synonymous frameshift deletion synonymous synonymous intergenic intergenic frameshift insertion synonymous synonymous synonymous synonymous intergenic	HPG27_1018 jhp1031 HELPY_0259 HP1354 HP1354 HP1354 HP1450 HP1529 HP0044 jhp0151 HP1535 HP1535 HP1535 HP1535 HP1535 HP0194 HP0213 HP0213 HPAG1_1119 HP1175 HP1174 HP0499 HP88_818 HPnc4170 HP627_298 HPG27_298 HP1450 HP1529	HPG27_680 HPG27_680 HP0811 HP0947 HP0947 HP0947 HP027_8 HP0103 HP0103 HP0103 HP0103 HP0204 HP1243/HPG27_298 Jhp1163 Jhp1163 Jhp1163 Jhp1163 HP0895 HP0895 HP0895 HP0947 HP0895 HP0947	HELPY_0206 HPG27_298 HPG27_298

S62	413866	A	G	SNP	synonymous	HP1535		
S62	413887	A	G	SNP	synonymous	HP1535		
S62	413983	C	Т	SNP	synonymous	HP1535		
S62	431032	С	т	SNP	synonymous	HP0194		
S62	437765	G	c	SNP	intergenic		HP0204	HELPY_0206
S62	450628	G	A	SNP	synonymous	HP0213		
S62	549238	AGATTTCTTTTTTAAAGGGATTTCTTTTTTAAAGG GATTTCTTTTTTAAAGGGATTTCTTTTTTAAAGGG ATTTCTTTTTT	AGATTTCTTTTTTAAAGTGATTTCTTTTTTAAAGG GATTTCTTTTTTAAAGGGATTTCTTTTTTAAAGGG ATTTCTTTTTTAAAGGGATTTCTTTTTT	indel	intergenic		jhp1163	HPG27_298
S62	620169	С	т	SNP	nonsynonymous	HPAG1_1119		
S62	626404	С	Т	SNP	synonymous	HP1175		
S62	627243	G	A	SNP	nonsynonymous	HP1174		
S62	701041	G	A	SNP	nonsynonymous	HP0499		
S62	801836	GAAAAAAAAAAA	GAAAAAAAAAAAAA	indel	intergenic		jhp0540	
S62	952187	G	c	SNP	synonymous	HPG27_677		
S62	952196	c	T	SNP	synonymous	HPG27_677		
S62	952955	A	c	SNP	nonsynonymous	HPG27_677		
S62 S62	953191 958485	A	G	SNP	nonsynonymous	HPG27_677 HPG27_680		
S62	958494	G	c	SNP	synonymous synonymous	HPG27_680		
S62	958702	СААААААААААААААА	СААААААААААААААААА	indel	intergenic		HPG27_680	
S62	1043704	GTTTTTTTTTTTT	GTTTTTTTTTTTTTTT	indel	frameshift insertion/intergenic	HPnc4170	HP0811	HPnc4160
S62	1122223	С	т	SNP	intergenic		HP0895	
S62	1122228	ТААААА	ТААААА	indel	intergenic		HP0895	
S62	1187376	ATTTTTT	ATTTTTTT	indel	intergenic		HP0947	
S62	1192843	Т	G	SNP	nonsynonymous	HPP12_0950		
S62	1483092	G	A	SNP	nonsynonymous	HPG27_298		
S62	1483202	G	A	SNP	nonsynonymous	HPG27_298		
S62	1483269	A	G	SNP	nonsynonymous	HPG27_298		
\$62 \$62	1640915 1663529	CGAGAGAGAGAGAGAG GTTTTT	CGAGAGAGAGAGAGAGAG GTTTT	indel	frameshift insertion 1 bp deletion			
S62 S62	1663529 1669898	с	т	indel SNP	1 bp deletion synonymous	HP1450		
S63	658	с	T	SNP	synonymous	HP1450 HP1529		
S63	214663	CGAGAGAGAGAGAGAGAG	CGAGAGAGAGAGAGAGAG	indel	intergenic		HPG27_8	
S63	232964	C	A	SNP	intergenic		HPPC_00115	
S63	249268	c	T	SNP	nonsynonymous	jhp0037_1	-	
S63	374756	CGGGGGGGGGGGG	CGGGGGGGGGGGGGGG	indel	frameshift insertion	jhp0151		
S63	431032	с	Т	SNP	synonymous	HP0194		
S63	437765	G	C	SNP	intergenic		HP0204	HELPY_0206
S63	450628	G	Α	SNP	synonymous	HP0213		
S63	455599	TGGGGGGGGGG	TGGGGGGGGGGG	indel	frameshift insertion	HP0217		
S63	548978	G	т	SNP	intergenic		jhp1163	HPG27_298
S63	548994	A	T	SNP	intergenic		jhp1163	HPG27_298
S63 S63	620169 626404	c c	T T	SNP SNP	nonsynonymous	HPAG1_1119 HP1175		
S63	627243	G	A	SNP	synonymous	HP1173		
S63	701041	G	A	SNP	nonsynonymous	HP0499		
S63	801836	GAAAAAAAAAAAA	GAAAAAAAAAAAAAA	indel	intergenic		jhp0540	
S63	805851	A	т	SNP	intergenic		HPG27_556	
S63							11FGZ7_330	
S63	839999	Т	c	SNP	nonsynonymous	HPB8_818	11-027_330	
S63	839999 958574	T CGAGAGAGAGAGAG	C CGAGAGAGAGAGAGAGAG		nonsynonymous intergenic	HPB8_818	HPG27_530	
202				SNP		HPB8_818		
S63 S63	958574	CGAGAGAGAGAGAG	CGAGAGAGAGAGAGAG	SNP indel	intergenic	HPB8_818 HP0751	HPG27_680	
S63 S63	958574 958702 984279 1043704	CGAGAGAGAGAGAG CAAAAAAAAAAAAAAAA C GTTTTTTTTTT	CGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAAAAAA T GTTTTTTTTTT	SNP indel indel SNP indel	intergenic intergenic nonsynonymous frameshift insertion/intergenic	-	HPG27_680 HPG27_680 HP0811	HPnc4160
S63 S63 S63	958574 958702 984279 1043704 1187376	CGAGAGAGAGAGAG           CAAAAAAAAAAAAAAA           C           GTTTTTTTTTTTTTTT           ATTTTTTT	CGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAAAAA T GTTTTTTTTTT	SNP indel indel SNP indel indel	intergenic intergenic nonsynonymous frameshift insertion/intergenic intergenic	HP0751 HPnc4170	HPG27_680 HPG27_680	HPnc4160
S63 S63 S63 S63	958574 958702 984279 1043704 1187376 1608139	CGAGAGAGAGAGAG           CAAAAAAAAAAAAAAA           C           GTTTTTTTTTTTTTTTTT           ATTTTTTT           GT	CGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAAAAA T GTTTTTTTTTT	SNP indel indel SNP indel indel	intergenic intergenic nonsynonymous frameshift insertion/intergenic intergenic frameshift deletion	HP0751 HPnc4170 HP1369m	HPG27_680 HPG27_680 HP0811	HPnc4160
\$63 \$63 \$63 \$63 \$63	958574 958702 984279 1043704 1187376 1608139 1669898	СААААбААбААбА САЛЛАЛАЛАЛАЛАЛ С GTTTTTTTTTTT ATTTTTT GT C	CGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAAAAA T GTTTTTTTTTT	SNP indel indel SNP indel indel SNP	intergenic intergenic nonsynonymous frameshift insertion/intergenic intergenic frameshift deletion synonymous	HP0751 HPnc4170 HP1369m HP1450	HPG27_680 HPG27_680 HP0811	HPnc4160
S63           S63           S63           S63           S63           S63           S63           S63           S64	958574 958702 984279 1043704 1187376 1608139 1669898 658	СGAGAGAGAGAGAG САЛАЛАЛАЛАЛАЛА С GTITITITITT ATTITITT GT C C C	CGAGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAAAAAA	SNP indel SNP indel indel indel SNP SNP	intergenic intergenic nonsynonymous franeshift insertion/intergenic intergenic frameshift deletion synonymous synonymous	HP0751 HPnc4170 HP1369m	HPG27_680 HPG27_680 HP0811 HP0947	HPnc4160
S63           S63           S63           S63           S63           S63           S64           S64	958574 958702 984279 1043704 1187376 1608139 1669898 658 214663	СААААбААбААбА САЛЛАЛАЛАЛАЛАЛ С GTTTTTTTTTTT ATTTTTT GT C	CGAGAGAGAGAGAGAG           CAAAAAAAAAAAAAAAAAAAA           T           GTTTTTTTTTTTTTTTT           G           T           G           T           CAGAGAGAGAGAGAGAGAGAGAGAGAGAGAGAGAGAGAG	SNP indel SNP indel indel SNP SNP indel	intergenic intergenic nonsynonymous frameshift insertion/intergenic intergenic frameshift deletion synonymous synonymous intergenic	HP0751 HPnc4170 HP1369m HP1450 HP1529	HPG27_680 HPG27_680 HP0811	HPnc4160
S63           S63           S63           S63           S63           S63           S63           S63           S64	958574 958702 984279 1043704 1187376 1608139 1669898 658	CGAGAGAGAGAGAG           CAAAAAAAAAAAAAA           C           GTTTTTTTTTT           ATTTTTTT           GT           C           C           C           C           C           C           C           C           C           C           C           CGAGAGAGAGAGAGAGAGAGAGAGAGAGAGAGAGAGAGA	CGAGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAAAAAA	SNP indel SNP indel indel indel SNP SNP	intergenic intergenic nonsynonymous franeshift insertion/intergenic intergenic frameshift deletion synonymous synonymous	HP0751 HPnc4170 HP1369m HP1450	HPG27_680 HPG27_680 HP0811 HP0947	HPnc4160
S63           S63           S63           S63           S63           S63           S64           S64           S64	958574 958702 984279 1043704 1187376 1608139 1669898 658 214663 249268	CGAGAGAGAGAGAG           CAAAAAAAAAAAAAA           C           GTTTTTTTTTT           ATTTTTT           GT           C           C           C           GT           C           C           C           GT           C           C           C           C           C           C           CGAGAGAGAGAGAGAGAG           C           C	CGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAAAAAA T GTTTTTTTTTT	SNP indel SNP indel indel indel SNP SNP indel SNP	intergenic intergenic nonsynonymous frameshift insertion/intergenic intergenic frameshift deletion synonymous intergenic nonsynonymous	HP0751 HPnc4170 HP1369m HP1450 HP1529 jhp0037_1	HPG27_680 HPG27_680 HP0811 HP0947	HPnc4160
S63           S63           S63           S63           S63           S63           S64           S64           S64           S64           S64	958574 958702 984279 1043704 1187376 1669898 658 214663 249268 374756	CGAGAGAGAGAGAG           CAAAAAAAAAAAAAA           C           GTTTTTTTTTTT           ATTTTTT           GT           C           C           C           C           GT           C           C           C           C           C           C           C           C           C           C           CGAGAGAGAGAGAGAGAGAG           C           CGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG	CGAGAGAGAGAGAGAG           CAAAAAAAAAAAAAAAAAA           T           GTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	SNP indel SNP indel indel indel SNP indel SNP indel	intergenic intergenic nonsynonymous frameshift insertion/intergenic intergenic frameshift deletion synonymous intergenic nonsynonymous frameshift insertion	HP0751 HPnc4170 HP1369m HP1450 HP1529 jhp0037_1 jhp0151	HPG27_680 HPG27_680 HP0811 HP0947	HPnc4160
S63           S63           S63           S63           S63           S64           S64           S64           S64           S64           S64           S64           S64	958574 958702 984279 1043704 1187376 1608139 1669898 658 214663 249268 374756 431032	CGAGAGAGAGAGAG           CAAAAAAAAAAAAAAA           C           GTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	CGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAAAAAAA T GTTTTTTTTTTTTTT	SNP indel SNP indel indel SNP SNP indel SNP indel SNP	intergenic intergenic nonsynonymous frameshift insertion/intergenic intergenic frameshift deletion synonymous synonymous intergenic nonsynonymous frameshift insertion synonymous	HP0751 HPnc4170 HP1369m HP1450 HP1529 jhp0037_1 jhp0151	HPG27_680 HPG27_680 HP0811 HP0947 HPG27_8	
S63           S63           S63           S63           S63           S63           S64	958574 958702 984279 1043704 1187376 1608139 1669898 658 214663 249268 374756 431032 437765	CGAGAGAGAGAGAG           CAAAAAAAAAAAAAA           C           GTTTTTTTTTTTTTT           ATTTTTTT           GT           C           C           C           C           C           C           C           C           C           C           CGAGAGAGAGAGAGAGAG           C           CGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG	CGAGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAAAAAA	SNP indel SNP indel indel SNP SNP indel SNP indel SNP SNP	intergenic intergenic nonsynonymous frameshift insertion/intergenic intergenic synonymous synonymous intergenic nonsynonymous frameshift insertion synonymous intergenic	HP0751 HPnc4170 HP1369m HP1450 HP1529 jhp0037_1 jhp0151 HP0194	HPG27_680 HPG27_680 HP0811 HP0947 HPG27_8	
S63           S63           S63           S63           S63           S63           S64	958574 958702 984279 1043704 1187376 1608139 1669898 658 214663 249268 374756 431032 437765 450628	CGAGAGAGAGAGAG           CAAAAAAAAAAAAAA           C           GTITITITITITT           ATTITITT           GT           C           C           C           C           CGAGAGAGAGAGAGAGAGAGAGAGAGAGAGAGAGAGAGA	CGAGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAAAAA T GTITITITITITT ATTITITITT ATTITITITT G G T T CGAGAGAGAGAGAGAGAGAG T CGGGGGGGGGG	SNP indel SNP indel indel SNP SNP indel SNP indel SNP SNP SNP	intergenic intergenic nonsynonymous frameshift insertion/intergenic intergenic frameshift deletion synonymous intergenic nonsynonymous frameshift insertion synonymous intergenic synonymous intergenic synonymous	HP0751 HPnc4170 HP1369m HP1450 HP1529 jhp0037_1 jhp0151 HP0194	HPG27_680 HPG27_680 HP0811 HP0947 HPG27_8 HP0204	
S63           S63           S63           S63           S63           S64	958574 958702 984279 1043704 118736 1608139 1669898 658 214663 249268 374756 431032 437765 430728 546511 548978 620169	CGAGAGAGAGAGAG CAAAAAAAAAAAAAAA C GTITITITITIT GT GT C C CGAGAGAGAGAGAGAGAG C CGGGGGGGGGG	CGAGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAAAAAA	SNP indel SNP indel indel SNP SNP indel SNP SNP SNP SNP indel SNP SNP SNP	intergenic intergenic nonsynonymous frameshift insertion/intergenic intergenic frameshift deletion synonymous synonymous intergenic nonsynonymous intergenic intergenic intergenic norsynonymous	HP0751 HPnc4170 HP1369m HP1450 HP1529 jhp0037_1 jhp0151 HP0194 HP0213 HPAG1_1119	HPG27_680 HPG27_680 HP0811 HP0947 HPG27_8 HP0204 HP1243/HPG27_298	HELPY_0206
S63           S63           S63           S63           S64	958574 958702 984279 1043704 1187376 1608139 1669898 658 214663 249268 374756 431032 43765 430028 546511 546517 548978 620169 626404	CGAGAGAGAGAGAG           CAAAAAAAAAAAAAA           C           GTITITITITITI           ATTITIT           GT           C           C           C           C           C           C           C           C           CGAGAGAGAGAGAGAGAG           C           CGGGGGGGGGGGGGG           C           CGGGGGGGGGGGGGG           C           CAAAAAAAAAAAAA           G           C           C           C           C           C           C           C           C           C           C           C           C           C           C           C           C	CGAGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAAAAAA	SNP indel SNP indel indel SNP SNP indel SNP SNP SNP indel SNP SNP SNP SNP SNP	intergenic intergenic nonsynonymous frameshift insertion/intergenic intergenic nonsynonymous intergenic nonsynonymous intergenic synonymous intergenic synonymous intergenic intergenic intergenic nonsynonymous intergenic nonsynonymous synonymous	HP0751 HPnc4170 HP1450 HP1450 HP1529 jhp0037_1 jhp0151 HP0194 HP0213 HPAG1_1119 HP1175	HPG27_680 HPG27_680 HP0811 HP0947 HPG27_8 HP0204 HP1243/HPG27_298	HELPY_0206
S63           S63           S63           S63           S63           S64	958574 958702 984279 1043704 1187376 1608139 1669898 658 249268 374756 431032 431032 431032 437765 450628 546511 548978 620169 62040 627243	CGAGAGAGAGAGAG CAAAAAAAAAAAAAA C GTITITITITT ATTITITT GT C C CGAGAGAGAGAGAGAGAGAG C C CGGGGGGGGG	CGAGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAAAAAA	SNP indel indel SNP indel SNP indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP	intergenic intergenic nonsynonymous frameshift insertion/intergenic intergenic frameshift deletion synonymous intergenic nonsynonymous intergenic synonymous intergenic intergenic intergenic intergenic intergenic intergenic nonsynonymous synonymous nonsynonymous	HP0751 HPnc4170 HP1369m HP1450 HP1529 jhp0037_1 jhp0151 HP0194 HP0194 HP0213 HPAG1_1119 HP1175 HP1174	HPG27_680 HPG27_680 HP0811 HP0947 HPG27_8 HP0204 HP1243/HPG27_298	HELPY_0206
S63           S63           S63           S63           S63           S64	958574 958702 984279 1043704 1187376 1669898 658 214663 249268 374756 450628 431032 431032 437765 450628 546511 548978 620169 626404 627243 701041	CGAGAGAGAGAGAG CAAAAAAAAAAAAAAA C GTTTTTTTTTT	CGAGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAAAAAA	SNP indel indel SNP indel SNP indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP	intergenic intergenic nonsynonymous frameshift insertion/intergenic intergenic frameshift deletion synonymous intergenic nonsynonymous intergenic synonymous intergenic intergenic intergenic intergenic synonymous intergenic nonsynonymous nonsynonymous nonsynonymous nonsynonymous	HP0751 HPnc4170 HP1450 HP1450 HP1529 jhp0037_1 jhp0151 HP0194 HP0213 HPAG1_1119 HP1175	HPG27_680 HPG27_680 HP0811 HP0947 HPG27_8 HP0204 HP1243/HPG27_298 jhp1163	HELPY_0206
S63           S63           S63           S63           S63           S64	958574 958702 984279 1043704 1187376 16698398 658 214663 249268 374756 431032 431032 431032 431032 4350628 546511 548978 620169 626404 622433 701041 801836	CGAGAGAGAGAGAG CAAAAAAAAAAAAAAA C GTTTTTTTTTT	CGAGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAAAAAA	SNP indel indel indel indel SNP indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP indel SNP	intergenic intergenic norsynonymous frameshift insertion/intergenic intergenic frameshift deletion synonymous intergenic norsynonymous frameshift insertion synonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic norsynonymous synonymous norsynonymous norsynonymous norsynonymous intergenic	HP0751 HPnc4170 HP1369m HP1450 HP1529 jhp0037_1 jhp0151 HP0194 HP0213 HPAG1_1119 HP1175 HP1174 HP0499	HPG27_680 HPG27_680 HP0811 HP0947 HPG27_8 HP0204 HP1243/HPG27_298	HELPY_0206
S63           S63           S63           S63           S63           S64	958574 958702 984279 1043704 1187376 1669898 658 214663 249268 374756 450628 431032 431032 437765 450628 546511 548978 620169 626404 627243 701041	CGAGAGAGAGAGAG CAAAAAAAAAAAAAAA C GTTTTTTTTTT	CGAGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAAAAAA	SNP indel indel indel indel SNP SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	intergenic intergenic nonsynonymous frameshift insertion/intergenic intergenic frameshift deletion synonymous intergenic nonsynonymous intergenic synonymous intergenic intergenic intergenic intergenic synonymous intergenic nonsynonymous nonsynonymous nonsynonymous nonsynonymous	HP0751 HPnc4170 HP1369m HP1450 HP1529 jhp0037_1 jhp0151 HP0194 HP0194 HP0213 HPAG1_1119 HP1175 HP1174	HPG27_680 HPG27_680 HP0811 HP0947 HPG27_8 HP0204 HP1243/HPG27_298 jhp1163	HELPY_0206
S63           S63           S63           S63           S63           S64	958574 958702 984279 1043704 1187376 16698398 658 214663 249268 374756 431032 431032 431032 431032 4350628 546511 548978 620169 626404 622433 701041 801836	CGAGAGAGAGAGAG CAAAAAAAAAAAAAA C GTTTTTTTTT ATTTTTTT GT C C CGAGAGAGAGAGAGAGAGAG C C CGAGAGAGAG	CGAGAGAGAGAGAGAG           CAAAAAAAAAAAAAAAAAAAA           T           GTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	SNP indel indel indel indel SNP SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	intergenic intergenic norsynonymous frameshift insertion/intergenic intergenic frameshift deletion synonymous intergenic norsynonymous frameshift insertion synonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic norsynonymous synonymous norsynonymous norsynonymous norsynonymous intergenic	HP0751 HPnc4170 HP1369m HP1450 HP1529 jhp0037_1 jhp0151 HP0194 HP0213 HPAG1_1119 HP1175 HP1174 HP0499	HPG27_680 HPG27_680 HP0811 HP0947 HPG27_8 HP0204 HP1243/HPG27_298 jhp1163	HELPY_0206
S63         S63           S63         S63           S63         S63           S64         S64	958574 958702 984279 1043704 1187376 1668139 1669898 658 214663 249268 374756 431032 437055 430028 546511 546511 548978 620169 626404 627243 701041 801836 839999 840205	CGAGAGAGAGAGAG           CAAAAAAAAAAAAAAA           C           GTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	CGAGAGAGAGAGAGAG           CAAAAAAAAAAAAAAAAAAAA           T           GTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	SNP indel indel SNP indel indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	intergenic intergenic nonsynonymous frameshift insertion/intergenic intergenic romsynonymous intergenic nonsynonymous intergenic synonymous intergenic synonymous intergenic intergenic intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous nonsynonymous nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic intergenic nonsynonymous intergenic	HP0751 HPnc4170 HP1450 HP1450 HP1529 j)p0037_1 j)p0151 HP0194 HP0213 HPAG1_1119 HP1175 HP1174 HP175 HP1174 HP0499 HPB8_818 j)p0563	HPG27_680 HPG27_680 HP0811 HP0947 HPG27_8 HP0204 HP1243/HPG27_298 jhp1163	HELPY_0206
S63         S63           S63         S63           S63         S63           S64         S64	958574 958702 984279 1043704 1187376 1668139 1669898 658 249268 374756 431032 431032 437765 450628 546511 548978 620169 626404 627243 701041 801836 839999 840205	CGAGAGAGAGAGAG           CAAAAAAAAAAAAAA           C           GTITITITITIT           ATTITIT           GT           C           C           C           C           GT           C           C           C           C           CGAGAGAGAGAGAGAGAG           C           CGGGGGGGGGGGG           C           CGGGGGGGGGGGG           C           G           G           C           G           G           G           G           G           G           G           G           G           G           G           G           GAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	CGAGAGAGAGAGAGAG           CAAAAAAAAAAAAAAAAAAA           T           GTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	SNP indel SNP indel SNP SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	intergenic intergenic nonsynonymous frameshift insertion/intergenic intergenic synonymous synonymous intergenic nonsynonymous intergenic synonymous intergenic synonymous intergenic intergenic intergenic nonsynonymous nonsynonymous nonsynonymous nonsynonymous intergenic nonsynonymous nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous	HP0751 HPnc4170 HP1369m HP1450 HP1529 jhp0037_1 jhp0151 HP0194 HP0213 HPAG1_1119 HP175 HP1174 HP0499 HP88_818	HPG27_680 HPG27_680 HP0811 HP0947 HPG27_8 HP0204 HP1243/HPG27_298 jhp1163 jhp0540	HELPY_0206
S63         S63           S63         S63           S63         S63           S64         S64	958574 958702 984279 1043704 1187376 1668139 1669898 658 214663 249268 374756 431032 437055 430028 546511 546511 548978 620169 626404 627243 701041 801836 839999 840205	CGAGAGAGAGAGAG           CAAAAAAAAAAAAAAA           C           GTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	CGAGAGAGAGAGAGAG           CAAAAAAAAAAAAAAAAAAAA           T           GTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	SNP indel indel SNP indel indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	intergenic intergenic nonsynonymous frameshift insertion/intergenic intergenic frameshift deletion synonymous intergenic nonsynonymous intergenic synonymous intergenic synonymous intergenic intergenic intergenic nonsynonymous nonsynonymous nonsynonymous nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic	HP0751 HPnc4170 HP1450 HP1450 HP1529 j)p0037_1 j)p0151 HP0194 HP0213 HPAG1_1119 HP1175 HP1174 HP175 HP1174 HP0499 HPB8_818 j)p0563	HPG27_680 HPG27_680 HP0811 HP0947 HPG27_8 HP0204 HP1243/HPG27_298 jhp1163	HELPY_0206
S63         S63           S63         S63           S63         S63           S64         S64	958574 958702 984279 1043704 1187376 1608139 1669898 658 214663 249268 374756 431032 437765 431032 437765 431032 437765 430028 546511 548978 620169 626404 627243 701041 801836 839999 840205 843969 958574 1122223	CGAGAGAGAGAGAG           CAAAAAAAAAAAAAAA           C           GTITITITITT           ATTITITT           GT           C           C           C           C           C           C           C           C           C           C           C           CGAGAGAGAGAGAGAGAG           C           CGGGGGGGGGGGGG           C           GGGGGGGGGGGGG           C           G           G           G           G           G           G           G           G           G           G           G           GAAAAAAAAAAAAAAAA           T           GCAAAATACGATGATCTCACCACAAAATACGATGATCTCACCACAAAATACGATGATCTCA           C           C           C           C           CGAGAGAGAGAGAGAGAGAGAGAGAGAGAGAGAGAGAGA	CGAGAGAGAGAGAGAG           CAAAAAAAAAAAAAAAAAAAAA           T           GTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	SNP indel indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	intergenic intergenic nonsynonymous frameshift insertion/intergenic intergenic synonymous synonymous intergenic nonsynonymous intergenic synonymous intergenic synonymous intergenic intergenic intergenic nonsynonymous nonsynonymous nonsynonymous nonsynonymous intergenic nonsynonymous nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous	HP0751 HPnc4170 HP1450 HP1450 HP1529 j)p0037_1 j)p0151 HP0194 HP0213 HPAG1_1119 HP1175 HP1174 HP175 HP1174 HP0499 HPB8_818 j)p0563	HPG27_680 HPG27_680 HP0811 HP0947 HPG27_8 HP0204 HP1243/HPG27_298 jhp1163 Jhp0540 HPG27_680	HELPY_0206
S63         S63           S63         S63           S63         S63           S64         S64	958574 958702 984279 1043704 1187376 1668139 1669898 658 214663 249268 374756 431032 437765 431032 437765 431032 437765 430028 546511 548978 620169 626404 627243 701041 801836 839999 840205 843969 958574 1122223	CGAGAGAGAGAGAG           CAAAAAAAAAAAAAAA           C           GTITITITITIT           ATTITITT           GT           C           C           C           GT           C           C           C           C           C           C           C           CGAGAGAGAGAGAGAGAG           C           CGGGGGGGGGGGG           C           G           G           G           G           G           G           G           G           G           G           G           G           GAAAAAAAAAAAAA           T           GCAAAAAAAAAAAAAA           T           GAAAAAAAAAAAAAAA           T           GCAAAAAAAAAAAAAAAA           T           GAAAAAAAAAAAAAAAAAA           T           GAAAAAAAAAAAAAAAAAAA           T           GAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	CGAGAGAGAGAGAGAG           CAAAAAAAAAAAAAAAAAAAAA           T           GTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	SNP indel indel SNP indel SNP SNP indel SNP SNP SNP SNP SNP SNP SNP indel SNP indel SNP indel SNP indel SNP	intergenic intergenic nonsynonymous frameshift insertion/intergenic intergenic frameshift deletion synonymous intergenic nonsynonymous intergenic synonymous intergenic synonymous intergenic intergenic nonsynonymous nonsynonymous nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic intergenic	HP0751 HPnc4170 HP1450 HP1450 HP1529 j)p0037_1 j)p0151 HP0194 HP0213 HPAG1_1119 HP1175 HP1174 HP175 HP1174 HP0499 HPB8_818 j)p0563	HPG27_680 HPG27_680 HP0811 HP0947 HP027_8 HP0204 HP1243/HPG27_298 jhp1163 jhp0540 HP02540 HP02540 HP0257_680 HP0895	HELPY_0206
S63         S63           S63         S63           S63         S63           S64         S64	958574 958702 984279 1043704 1187376 1608139 1669898 658 214663 249268 249268 249268 249268 249268 249268 249268 249268 249268 249268 249268 2546511 548978 620169 626404 627243 701041 801836 839999 840205 843969 958574 1122228	CGAGAGAGAGAGAG           CAAAAAAAAAAAAAAAA           C           GTTITTITTITTT           ATTITTTT           GT           C           C           C           GT           C           C           C           C           C           C           CGAGAGAGAGAGAGAG           C           CGAGAGAGAGAGAGAGAG           C           CGGGGGGGGGGGG           C           GGGGGGGGGGGGG           G           G           G           G           G           GAAAAAAAAAAAAA           T           GCAAAAAAAAAAAAAAAAA           T           GCAAAAATACGATGATCTCACCACAAAATACGATGATCTCAC           C           CGAGAGAGAGAGAGAGAGAG           C           CGAGAGAGAGAGAGAGAGAGAG           C           CGAGAGAGAGAGAGAGAGAGAG           C           CAAAAAAAAA	CGAGAGAGAGAGAGAG           CAAAAAAAAAAAAAAAAAAAAAA           T           GTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	SNP indel indel indel indel SNP SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	intergenic intergenic nonsynonymous frameshift insertion/intergenic intergenic frameshift deletion synonymous intergenic nonsynonymous intergenic intergenic nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous frameshift deletion nonsynonymous intergenic nonsynonymous nonsynonymous nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic intergenic intergenic intergenic intergenic	HP0751 HPnc4170 HP1450 HP1450 HP1529 j)p0037_1 j)p0151 HP0194 HP0213 HPAG1_1119 HP1175 HP1174 HP175 HP1174 HP0499 HPB8_818 j)p0563	HPG27_680 HPG27_680 HP0811 HP0947 HPG27_8 HP0204 HP1243/HPG27_298 Jhp1163 Jhp0540 HPG27_680 HP0895 HP0895 HP0895	HELPY_0206
S63         S63           S63         S63           S63         S63           S63         S63           S64         S64	958574 958702 984279 1043704 1187376 1608139 1669898 658 214663 249268 374756 431032 437055 430028 430028 546511 548978 620169 626404 627243 701041 801836 843969 958574 1122228 1187376	CGAGAGAGAGAGAG CAAAAAAAAAAAAAAA C GTTTTTTTTTT	CGAGAGAGAGAGAGAG           CAAAAAAAAAAAAAAAAAAAA           T           GTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	SNP indel indel indel indel SNP SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	intergenic intergenic nonsynonymous frameshift insertion/intergenic intergenic frameshift deletion synonymous intergenic nonsynonymous intergenic synonymous intergenic synonymous intergenic nonsynonymous intergenic nonsynonymous nonsynonymous nonsynonymous nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic	HP0751 HPnc4170 HP1450 HP1450 HP1529 j)p0037_1 j)p0151 HP0194 HP0213 HPAG1_1119 HP1175 HP1174 HP175 HP1174 HP0499 HPB8_818 j)p0563	HPG27_680 HPG27_680 HP0811 HP0947 HPG27_8 HP0204 HP1243/HPG27_298 Jhp1163 Jhp0540 HPG27_680 HP0895 HP0895 HP0895 HP0947	HELPY_0206
S63         S63           S63         S63           S63         S64           S64         S64	958574 958702 984279 1043704 1187376 1668139 1669898 658 214663 249268 374756 431032 437075 430628 546511 548978 620169 626404 627243 701041 801836 839999 840205 843969 958574 1122223 1122223 1187376 1192576	CGAGAGAGAGAGAG CAAAAAAAAAAAAAAA C GTITITITITT ATTITITT GT C C C GAGAGAGAGAGAGAGAGAGAG C C CGAGAGAGA	CGAGAGAGAGAGAGAG           CAAAAAAAAAAAAAAAAAAAAA           T           GTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	SNP indel indel SNP indel SNP SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	intergenic intergenic nonsynonymous frameshift insertion/intergenic intergenic nonsynonymous synonymous intergenic nonsynonymous intergenic synonymous intergenic synonymous intergenic intergenic nonsynonymous nonsynonymous nonsynonymous nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic	HP0751 HP1369m HP1450 HP1450 HP1529 jhp0037_1 jhp0151 HP0194 HP0194 HP0213 HPAG1_1119 HP1175 HP1174 HP0499 HPB8_818 jhp0563 HELPY_0749	HPG27_680 HPG27_680 HP0811 HP0947 HPG27_8 HP0204 HP1243/HPG27_298 Jhp1163 Jhp0540 HPG27_680 HP0895 HP0895 HP0895 HP0947	HELPY_0206
S63         S63           S63         S63           S63         S64           S64         S64	958574 958702 984279 1043704 1187376 1669898 658 214663 249268 374756 431032 431032 437765 450628 546511 548978 620169 626404 627243 701041 801836 839999 840205 843969 958574 1122228 1187376 11922576 1192576	CGAGAGAGAGAGAG CAAAAAAAAAAAAAAA C GTITITITITTT AITITITT G G C C C CGAGAGAGAGAGAGAGAGAG C C C CGAGAGAGA	CGAGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAAAAAA	SNP indel indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	intergenic intergenic nonsynonymous frameshift insertion/intergenic intergenic frameshift deletion synonymous intergenic nonsynonymous intergenic intergenic intergenic intergenic intergenic nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous intergenic	HP0751 HPnc4170 HP1369m HP1450 HP1529 Jhp0037_1 Jhp0151 HP0194 HP0194 HP0213 HP0213 HPAG1_1119 HP1175 HP1174 HP0499 HPB8_818 Jhp0563 HELPY_0749 HPG27_298	HPG27_680 HPG27_680 HP0811 HP0947 HPG27_8 HP0204 HP1243/HPG27_298 Jhp1163 Jhp0540 HPG27_680 HP0895 HP0895 HP0895 HP0947	HELPY_0206
S63         S63           S63         S63           S63         S64           S64         S64	958574 958702 984279 1043704 1187376 1608139 1669898 658 214663 249268 374756 431032 437755 43002 437755 43002 437755 450628 548578 620169 626404 627243 701041 801836 839999 840205 843969 958574 1122228 1187376 1192576 14828450 1482850 1482859	CGAGAGAGAGAGAG           CAAAAAAAAAAAAAAA           C           GTITITITITT           ATTITITT           GT           C           C           C           C           C           C           C           C           C           CGAGAGAGAGAGAGAGAG           C           CGAGAGAGAGAGAGAGAG           C           CGGGGGGGGGGGG           C           G           G           G           G           G           G           G           G           G           G           G           G           G           G           G           C           C           G           GAAAAAAAAAAAAAAAA           T           GCAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	CGAGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAAAAAA	SNP indel indel SNP SNP SNP indel SNP SNP SNP SNP SNP SNP indel SNP indel SNP indel SNP indel SNP indel SNP SNP SNP SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	intergenic intergenic nonsynonymous frameshift insertion/intergenic intergenic frameshift deletion synonymous intergenic nonsynonymous intergenic synonymous intergenic synonymous intergenic intergenic nonsynonymous nonsynonymous nonsynonymous nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous	HP0751 HPnc4170 HP1450 HP1450 HP1529 jhp0037_1 jhp0151 HP0194 HP0213 HPAG1_1119 HP1175 HP1174 HP049 HP88_818 jhp0563 HELPY_0749 HP627_298 HP627_298 HP627_298	HPG27_680 HPG27_680 HP0811 HP0947 HPG27_8 HP0204 HP1243/HPG27_298 Jhp1163 Jhp0540 HPG27_680 HP0895 HP0895 HP0895 HP0947	HELPY_0206
S63         S63           S63         S63           S63         S63           S64         S64           S64         S64	958574 958702 984279 1043704 1187376 1608139 1669898 658 249268 374756 431032 437055 430628 546511 548978 620169 626404 627243 701041 801836 839999 840205 843969 958574 1122223 1122223 1122223 1122223 1122223 1122223	CGAGAGAGAGAGAG           CAAAAAAAAAAAAAAA           C           GTITTITTITTIT           ATTITTT           GT           C           C           C           C           C           C           C           C           C           C           CGAGAGAGAGAGAGAGAG           C           CGAGAGAGAGAGAGAGAGAG           C           CGGGGGGGGGGGGGG           C           CGGGGGGGGGGGGGG           C           C           C           C           GAAAAAAAAAAAAAAA           G           G           GAAAAAAAAAAAAAAAA           G           G           GAAAAAAAAAAAAAAAAAAAAAA           T           GCAAAAAAAAAAAAAAAAAAAAAA           T           GCAAAAATACGATGATCTCACACAAAATACGATGATCTCA           C           CGAGAGAGAGAGAGAGAG           C           CAAAAAAAAAAAAA           ATTTTTT           G           G           C           CAAGAGAGAGAGA	CGAGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAAAAAA	SNP indel indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	intergenic intergenic intergenic intergenic intergenic intergenic frameshift insertion/intergenic frameshift deletion synonymous intergenic nonsynonymous intergenic intergenic intergenic nonsynonymous frameshift insertion frameshift deletion frameshift deletion frameshift deletion intergenic inte	HP0751 HP1369m HP1450 HP1450 HP1529 JJp0037_1 JJp00151 HP0194 HP0213 HPAG1_1119 HP1175 HP1174 HP0499 HPB8_818 JJp0563 HELPY_0749 HP627_298 HPG27_298 HPG27_298	HPG27_680 HPG27_680 HP0811 HP0947 HPG27_8 HP0204 HP1243/HPG27_298 Jhp1163 Jhp0540 HPG27_680 HP0895 HP0895 HP0895 HP0947	HELPY_0206
S63         S63           S63         S63           S63         S63           S64         S64	958574 958702 984279 1043704 1187376 1608139 1669898 658 214663 249268 374756 431032 437755 430628 430628 546511 548978 620169 626404 627243 701041 801836 801836 801836 801836 843969 958574 1122228 112228 11228 11228 11228 11228 11228 11228 11228 11228 11228 11228 11228 11228 11228 11228 11228 11228 1128	CGAGAGAGAGAGAG           CAAAAAAAAAAAAAAA           C           GTITTITTITTIT           ATTITTT           GT           C           C           C           C           C           C           C           C           C           C           CGAGAGAGAGAGAGAGAG           C           CGAGAGAGAGAGAGAGAGAG           C           CGGGGGGGGGGGGGG           C           CGGGGGGGGGGGGGG           C           C           C           C           GAAAAAAAAAAAAAAA           G           G           GAAAAAAAAAAAAAAAA           G           G           GAAAAAAAAAAAAAAAAAAAAAA           T           GCAAAAAAAAAAAAAAAAAAAAAA           T           GCAAAAATACGATGATCTCACACAAAATACGATGATCTCA           C           CGAGAGAGAGAGAGAGAG           C           CAAAAAAAAAAAAA           ATTTTTT           G           G           C           CAAGAGAGAGAGA	CGAGAGAGAGAGAGAGAG CAAAAAAAAAAAAAAAAAAA	SNP indel indel SNP indel SNP SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP indel SNP indel SNP indel SNP indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	intergenic intergenic nonsynonymous frameshift insertion/intergenic intergenic frameshift deletion synonymous intergenic nonsynonymous intergenic synonymous intergenic synonymous intergenic nonsynonymous nonsynonymous nonsynonymous nonsynonymous frameshift deletion nonsynonymous intergenic intergenic nonsynonymous intergenic int	HP0751 HPnc4170 HP1450 HP1450 HP1529 jhp0037_1 jhp0151 HP0194 HP0213 HPAG1_1119 HP1175 HP1174 HP049 HP88_818 jhp0563 HELPY_0749 HP627_298 HP627_298 HP627_298	HPG27_680 HPG27_680 HP0811 HP0947 HPG27_8 HP0204 HP1243/HPG27_298 Jhp1163 Jhp0540 HPG27_680 HP0895 HP0895 HP0895 HP0947	HELPY_0206

S64	1482879	Α	G	SNP	nonsynonymous	HPG27_298		
S64	1483092	G	A	SNP	nonsynonymous	HPG27_298		
S64	1483269	A	G	SNP	nonsynonymous	HPG27_298		
S64		T	c	SNP	synonymous	HPG27_298		
\$64 \$64	1484881 1484897	G C	A A	SNP SNP	synonymous	HPG27_298 HPG27_298		
S64	1484899	c	A	SNP	synonymous	HPG27_298		
S64	1669898	c	T	SNP	synonymous	HP1450		
S65	232964	С	A	SNP	intergenic		HPPC_00115	
S65	315327	ACCCCCCCCC	ACCCCCCCCC	indel	intergenic		HP0103	
S65	332580	Т	A	SNP	synonymous	HP0119		
S65	332598	C	Т	SNP	synonymous	HP0119		
S65	332632	G	Α	SNP	nonsynonymous	HP0119		
S65	332653	с	Т	SNP	nonsynonymous	HP0119		
S65	332689	G	A	SNP	nonsynonymous	HP0119		
\$65 \$65	374756 701037	CGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG	CGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG	indel indel	frameshift insertion frameshift deletion	jhp0151 HP0499		
S65	734196	G	A	SNP	synonymous	HPP12_0534		
S65	734198	A	G	SNP	nonsynonymous	HPP12_0534		
S65	734200	с	Α	SNP	nonsynonymous	HPP12_0534		
S65	734220	C	Т	SNP	synonymous	HPP12_0534		
S65	734234	A	G	SNP	nonsynonymous	HPP12_0534		
S65	734241	т	A	SNP	synonymous	HPP12_0534		
S65	734256	c	T	SNP	synonymous	HPP12_0534		
\$65 \$65	734260	G	A	SNP	nonsynonymous	HPP12_0534		
\$65 \$65	734271 734277	G C	A T	SNP SNP	synonymous	HPP12_0534 HPP12_0534		
S65 S65	734277	с	Т	SNP	synonymous synonymous	HPP12_0534 HPP12_0534		
S65	734285	Т	C	SNP	synonymous	HPP12_0534 HPP12_0534		
\$65	734309	A	c	SNP	nonsynonymous	HPP12_0534		
S65	734313	G	A	SNP	synonymous	HPP12_0534		
S65	734317	A	c	SNP	nonsynonymous	 HPP12_0534		
S65	735228	A	Т	SNP	synonymous	HPP12_0534		
S65	735324	с	G	SNP	synonymous	HPP12_0534		
S65	735333	A	G	SNP	synonymous	HPP12_0534		
S65	735336	G	A	SNP	synonymous	HPP12_0534		
S65	735343	c	T	SNP	synonymous	HPP12_0534		
\$65 \$65	735356 735363	T G	C A	SNP SNP	nonsynonymous synonymous	HPP12_0534 HPP12_0534		
S65	801836	GAAAAAAAAAAAAA	GAAAAAAAAAAAAA	indel	intergenic	11112_0334	jhp0540	
S65	805851	A	Т	SNP	intergenic		HPG27_556	
S65	839999	т	С	SNP	nonsynonymous	HPB8_818	-	
S65	958702	САААААААААААААА	САААААААААААААААА	indel	intergenic		HPG27_680	
-								
S65	1043704	GTTTTTTTTTTT	GTTTTTTTTTTTT	indel	frameshift insertion/intergenic	HPnc4170	HP0811	HPnc4160
S65	1122208	AG	A	indel SNP	frameshift insertion/intergenic intergenic	HPnc4170	HP0895	HPnc4160
S65 S65	1122208 1122232	AG A	A AG	indel SNP indel	frameshift insertion/intergenic intergenic intergenic	HPnc4170	HP0895 HP0895	HPnc4160
\$65 \$65 \$65	1122208 1122232 1187376	AG A ATTTTTTT	A AG ATTTTTTT	indel SNP indel indel	frameshift insertion/intergenic intergenic intergenic intergenic		HP0895	HPnc4160
\$65 \$65 \$65 \$65	1122208 1122232 1187376 1198606	AG A ATTTTTT A	А АG АТПТТТТТ С	indel SNP indel indel SNP	frameshift insertion/intergenic intergenic intergenic intergenic nonsynonymous	HP0961	HP0895 HP0895	HPnc4160
\$65 \$65 \$65 \$65 \$65	1122208 1122232 1187376 1198606 1284699	AG A ATTTTTT A AGGGGGGGGGGGG	A AG ATTTTTTT C AGGGGGGGGGG	indel SNP indel indel SNP indel	frameshift insertion/intergenic intergenic intergenic intergenic nonsynonymous frameshift deletion	HP0961 HPG27_1018	HP0895 HP0895	HPnc4160
\$65 \$65 \$65 \$65	1122208 1122232 1187376 1198606	AG A ATTTTTT A	А АG АТПТТТТТ С	indel SNP indel indel SNP	frameshift insertion/intergenic intergenic intergenic intergenic nonsynonymous	HP0961	HP0895 HP0895	HPnc4160
S65           S65           S65           S65           S65           S65           S65           S65           S65	1122208 1122232 1187376 1198606 1284699 1306585	AG A ATTTTTT A AGGGGGGGGGGG C	A AG ATTTTTTT C AGGGGGGGGGG T	indel SNP indel indel SNP indel SNP	frameshift insertion/intergenic intergenic intergenic intergenic nonsynonymous frameshift deletion nonsynonymous	HP0961 HPG27_1018 HP0360	HP0895 HP0895	HPnc4160
S65	1122208 1122232 1187376 1198606 1284699 1306585 1318527	AG A ATTTTTTT A AGGGGGGGGGGG C C C G	A AG ATTTTTTTT C AGGGGGGGGGG T A	indel SNP indel indel SNP indel SNP SNP	frameshift insertion/intergenic intergenic intergenic nonsynonymous frameshift deletion nonsynonymous intergenic	HP0961 HPG27_1018 HP0360 jhp1031	HP0895 HP0895	HPnc4160
S65	1122208 1122232 1187376 1198606 1284699 1306585 1318527 1483720 1484872	AG A ATTTTTTT A AGGGGGGGGGGG C C C G	A AG ATTTTTTTT C AGGGGGGGGGG T A A	indel SNP indel indel SNP indel SNP SNP	frameshift insertion/intergenic intergenic intergenic nonsynonymous frameshift deletion nonsynonymous intergenic synonymous	HP0961 HPG27_1018 HP0360 jhp1031 HPG27_298	HP0895 HP0895	HPnc4160
S65	1122208 1122232 1187376 1198606 1284699 1306585 1318527 1483720 1484872 1484881 1484897	AG A ATTTTTT A AGGGGGGGGGG C C C C G T C G C C C C C C C	A AG ATTTTTTTT C AGGGGGGGGGG T A A A C C A A A C A A	indel SNP indel SNP indel SNP SNP SNP SNP SNP SNP	frameshift insertion/intergenic intergenic intergenic intergenic nonsynonymous frameshift deletion nonsynonymous intergenic synonymous synonymous synonymous nonsynonymous	HP0961 HP627_1018 HP0360 jhp1031 HP627_298 HP627_298 HP627_298 HP627_298	HP0895 HP0895	HPnc4160
S65	1122208 1122232 1187376 1198606 1284699 1306585 1318527 1483720 1484872 1484881 1484897 1484899	AG A ATTTTTTT A AGGGGGGGGGGG C C C C C C C C C C C C	A AGGGGGGGGGG C AGGGGGGGGG T A A C C A A A A A A A A A A A A A A A	indel SNP indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP	frameshift insertion/intergenic intergenic intergenic intergenic nonsynonymous frameshift deletion nonsynonymous intergenic synonymous synonymous synonymous nonsynonymous synonymous	HP0961 HPG27_1018 HP0360 Jhp1031 HPG27_298 HPG27_298 HPG27_298	HP0895 HP0895	HPnc4160
S65	1122208 1122232 1187376 1198606 1284699 1306585 1318527 1483720 1484872 1484881 1484897 1484899 1640915	AG A ATTTTTTT A AGGGGGGGGGGG C C C C G C C C C C C C	A AG ATTTTTTTT C AGGGGGGGGG T A A A C C A A A A A A C GAGAGAGAGAGAGAG	indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP indel	frameshift insertion/intergenic intergenic intergenic nonsynonymous frameshift deletion nonsynonymous intergenic synonymous synonymous synonymous nonsynonymous synonymous frameshift insertion	HP0961 HP627_1018 HP0360 jhp1031 HP627_298 HP627_298 HP627_298 HP627_298	HP0895 HP0895	HPnc4160
S65	1122208 1122232 1187376 1198606 1284699 1306585 1318527 1483720 1484872 1484881 1484897 1484899 1640915 1663529	AG A ATTTTTTT A AGGGGGGGGGGG C C C G C C C C C C C C	A AG ATTITITIT C AGGGGGGGGG T A A C C A A C C A A C CAGAGAGAGAGAGAGAG	indel SNP indel SNP indel SNP SNP SNP SNP SNP SNP SNP indel indel	frameshift insertion/intergenic intergenic intergenic nonsynonymous frameshift deletion nonsynonymous intergenic synonymous synonymous synonymous synonymous frameshift insertion 1 bp deletion	HP0961 HP627_1018 HP0360 jhp1031 HP627_298 HP627_298 HP627_298 HP627_298	HP0895 HP0895 HP0947	HPnc4160
S65	1122208 1122232 1187376 1198606 1284699 1306585 1318527 1483720 1484872 1484881 1484897 1484899 1640915	AG A ATTTTTTT A AGGGGGGGGGGG C C C C G C C C C C C C	A AG ATTTTTTTT C AGGGGGGGGG T A A A C C A A A A A A C GAGAGAGAGAGAGAG	indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP indel	frameshift insertion/intergenic intergenic intergenic nonsynonymous frameshift deletion nonsynonymous intergenic synonymous synonymous synonymous nonsynonymous synonymous frameshift insertion	HP0961 HP627_1018 HP0360 jhp1031 HP627_298 HP627_298 HP627_298 HP627_298	HP0895 HP0895	HPnc4160
S65	1122208 1122232 1187376 1198606 1284699 1306585 1318527 1483720 1484872 1484881 1484897 1484899 1640915 1663529 143981	AG A ATTITITT A AGGGGGGGGGG C C C G G C C C C C C C C	A           AG           ATTTTTTT           C           AGGGGGGGGG           T           A           C           A           C           A           C           A           C           C           C           C           C           GTTT           T	indel SNP indel SNP indel SNP SNP SNP SNP SNP SNP indel indel indel	frameshift insertion/intergenic intergenic intergenic intergenic nonsynonymous frameshift deletion nonsynonymous intergenic synonymous synonymous synonymous frameshift insertion 1 bp deletion intergenic	HP0961 HP627_1018 HP0360 jhp1031 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298	HP0895 HP0895 HP0947	HPnc4160
S65           S66           S66           S66           S66	1122208 1122232 1187376 1198606 1284699 130585 1318527 1483720 1484872 1484881 1484899 1640915 1663529 143981 193201	AG         A         ATTTTTT         A         AGGGGGGGGGGG         C         C         G         C         C         G         C         C         G         C         CGAGAGGAGAGAGAGAGAG         GTTTT         TGA         G	A           AG           ATTITITT           C           AGGGGGGGGG           T           A           C           A           C           A           C           A           C           GGGGGGGAGAGAGAGAGAGAGAG           GGGAGAGAGAGAGAGAGAGAGAG           GTTTT           T           A	indel SNP indel SNP indel SNP SNP SNP SNP SNP indel indel indel SNP	frameshift insertion/intergenic intergenic intergenic intergenic nonsynonymous frameshift deletion nonsynonymous intergenic synonymous synonymous synonymous synonymous frameshift insertion 1 bp deletion intergenic synonymous	HP0961 HP627_1018 HP0360 jhp1031 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298	HP0895 HP0895 HP0947	HPnc4160
S65           S66           S66           S66           S66           S66           S66           S66           S66	1122208 1122232 1187376 1198606 1284699 1306585 1318527 1484872 1484872 1484897 1484899 1640915 1663529 143981 193201 332580 332598 332632	AG A ATTTTTTT A AGGGGGGGGGGG C C C C C C C C C C C C	A AG AG ATTTTTTTT C AGGGGGGGGG T A A A C A A C C A A C GAGAGAGAGAGAGAGAG	indel SNP indel SNP SNP SNP SNP SNP SNP SNP indel indel indel SNP SNP SNP	frameshift insertion/intergenic intergenic intergenic nonsynonymous frameshift deletion nonsynonymous intergenic synonymous synonymous synonymous frameshift insertion 1 bp deletion intergenic synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous	HP0961 HP027_1018 HP0350 Jhp1031 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP617_298 HP6119 HP0119 HP0119	HP0895 HP0895 HP0947	HPnc4160
S65           S66	1122208 1122232 1187376 1198606 1284699 1306585 1318527 1484872 1484872 1484897 1484897 1484899 1640915 1663529 143981 193201 332588 332580 332532	AG         A         ATTTTTTT         A         AGG6G6G6G6G         C         C         G         T         G         C         C         G         T         CAGAGACAGAGAGAGAGAG         GTTTTT         TGA         G         T         C         C         G         T         C         G         T         C         G         C         G         C         G         C         G         C         G         C         C         C         G         C         G         C         G         C         G         C         G         C         G         C         G         C         G         C	A AG AG ATTITITIT C AGGGGGGGGG T A A A A A C C A A C GAGAGAGAGAGAGAGAGA G TTTT T A A A C A C A C A C A C A C A C	indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP indel indel indel SNP SNP SNP SNP SNP SNP SNP	frameshift insertion/intergenic intergenic intergenic nonsynonymous frameshift deletion nonsynonymous intergenic synonymous synonymous synonymous synonymous frameshift insertion 1 bp deletion intergenic synonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous	HP0961 HP027_1018 HP0350 jhp1031 HPG27_298 HPG27_298 HPG27_298 HPG27_298 HPG27_298 Jhp1480 HP0119 HP0119 HP0119 HP0119	HP0895 HP0895 HP0947	HPnc4160
S65           S66	1122208 1122232 1187376 1198606 1284099 1306585 1318527 1483720 1484872 1484872 1484897 1484899 1640915 1663529 143981 193201 332580 332582 332653 332685	AG         A         ATTITIT         A         AGGGGGGGGGGG         C         C         G         T         G         C         C         G         T         GAGAGAGAGAGAGAGAG         GTTTT         TGA         G         T         G         C         G         T         GA         G         T         G         T         G         T         G	A         AG         ATTITITT         C         AGG6G6G6G6         T         A         C         A         C         A         CGAGAGAGAGAGAGAGAGAGAG         GTTTT         T         A         A         T         A         T         A         T         A         T         A         T         A         T         A         T         A         T         A         T         A         T         A         T         A         T         A         T         A	indel SNP indel SNP SNP SNP SNP SNP SNP SNP indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	frameshift insertion/intergenic intergenic intergenic intergenic nonsynonymous frameshift deletion nonsynonymous intergenic synonymous synonymous synonymous synonymous synonymous frameshift insertion 1 bp deletion intergenic synonymous synonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous	HP0961 HP627_1018 HP627_1018 HP0360 jjhp1031 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP6119 HP0119 HP0119 HP0119 HP0119	HP0895 HP0895 HP0947	HPnc4160
S65           S66	1122208 1122232 1187376 1198606 1284699 1306585 1318527 1483720 1484872 1484872 1484881 1484899 1640915 1663529 143981 163529 1332580 332588 332588 332632 332659 332669 332677	AG         A         ATTITITT         A         AGGGGGGGGGGG         C         C         G         T         G         C         CAGAGAGAGAGAGAGAG         GTITIT         TGA         G         T         G         C         C         GAGAGAGAGAGAGAGAG         GITITIT         TGA         G         C         G         C         G <td>A         AG         ATTITITIT         C         AGGGGGGGGGG         T         A         C         A         C         A         C         A         C         A         C         A         C         A         CGAGAGAGAGAGAGAGAGAGAGAG         GTTIT         T         A         A         A         A         T         A         T         A         GGGG,GGGTG</td> <td>indel SNP indel SNP indel SNP SNP SNP SNP SNP indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP</td> <td>frameshift insertion/intergenic intergenic intergenic nonsynonymous frameshift deletion nonsynonymous intergenic synonymous synonymous synonymous synonymous frameshift insertion 1 bp deletion intergenic synonymous synonymous synonymous synonymous synonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous frameshift insertion</td> <td>HP0961 HP627_1018 HP0360 jhp1031 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_198 HP019 HP0119 HP0119 HP0119 HP0119</td> <td>HP0895 HP0895 HP0947</td> <td>HPnc4160</td>	A         AG         ATTITITIT         C         AGGGGGGGGGG         T         A         C         A         C         A         C         A         C         A         C         A         C         A         CGAGAGAGAGAGAGAGAGAGAGAG         GTTIT         T         A         A         A         A         T         A         T         A         GGGG,GGGTG	indel SNP indel SNP indel SNP SNP SNP SNP SNP indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	frameshift insertion/intergenic intergenic intergenic nonsynonymous frameshift deletion nonsynonymous intergenic synonymous synonymous synonymous synonymous frameshift insertion 1 bp deletion intergenic synonymous synonymous synonymous synonymous synonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous frameshift insertion	HP0961 HP627_1018 HP0360 jhp1031 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_198 HP019 HP0119 HP0119 HP0119 HP0119	HP0895 HP0895 HP0947	HPnc4160
S65           S66	1122208 1122232 1187376 1284699 1306585 1318527 1483720 1484872 1484872 1484887 1484897 1484899 1663529 143981 163529 143981 332580 332598 332632 332632 332632 332639 332639	AG         A         ATTTTTTT         A         AGGGGGGGGGGG         C         G         T         GAGAGAGAGAGAGAG         GTTTTT         TGA         G         T         GA         GGT         C         G         G         G         G         G         G         G         C         G         T         G         G         G         G         G         G         G         G         GGGT         TGGGGGGGGGGG	A A G A A T T T C A A G G G A A C C A A C C A A C G A A C G A A C G A A C G A A C G A A C G A A C G A C A C	indel SNP indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	frameshift insertion/intergenic intergenic intergenic insorgenic nonsynonymous frameshift deletion nonsynonymous intergenic synonymous synonymous synonymous nonsynonymous frameshift insertion 1 bp deletion intergenic synonymous synonymous synonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous frameshift insertion frameshift insertion	HP0961 HP627_1018 HP627_1018 HP0360 jjhp1031 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP6119 HP0119 HP0119 HP0119 HP0119	HP0895 HP0895 HP0947 HP0947 HP1400	HPnc4160
S65           S66	1122208 1122232 1187376 1198606 1284699 1306585 1318527 1483720 1484872 1484872 1484881 1484899 1640915 1663529 143981 163529 1332580 332588 332588 332632 332659 332669 332677	AG         A         ATTITITT         A         AGGGGGGGGGGG         C         C         G         T         G         C         CAGAGAGAGAGAGAGAG         GTITIT         TGA         G         T         G         C         C         GAGAGAGAGAGAGAGAG         GITITIT         TGA         G         C         G         C         G <td>A         AG         ATTITITIT         C         AGGGGGGGGGG         T         A         C         A         C         A         C         A         C         A         C         A         C         A         CGAGAGAGAGAGAGAGAGAGAGAG         GTTIT         T         A         A         A         A         T         A         T         A         GGGG,GGGTG</td> <td>indel SNP indel SNP indel SNP SNP SNP SNP SNP indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP</td> <td>frameshift insertion/intergenic intergenic intergenic nonsynonymous frameshift deletion nonsynonymous intergenic synonymous synonymous synonymous synonymous frameshift insertion 1 bp deletion intergenic synonymous synonymous synonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous frameshift insertion frameshift insertion frameshift insertion</td> <td>HP0961 HP627_1018 HP0360 jhp1031 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_198 HP019 HP0119 HP0119 HP0119 HP0119</td> <td>HP0895 HP0895 HP0947</td> <td>HPnc4160</td>	A         AG         ATTITITIT         C         AGGGGGGGGGG         T         A         C         A         C         A         C         A         C         A         C         A         C         A         CGAGAGAGAGAGAGAGAGAGAGAG         GTTIT         T         A         A         A         A         T         A         T         A         GGGG,GGGTG	indel SNP indel SNP indel SNP SNP SNP SNP SNP indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	frameshift insertion/intergenic intergenic intergenic nonsynonymous frameshift deletion nonsynonymous intergenic synonymous synonymous synonymous synonymous frameshift insertion 1 bp deletion intergenic synonymous synonymous synonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous frameshift insertion frameshift insertion frameshift insertion	HP0961 HP627_1018 HP0360 jhp1031 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_198 HP019 HP0119 HP0119 HP0119 HP0119	HP0895 HP0895 HP0947	HPnc4160
S65           S66	1122208 1122232 1187376 1198606 1284699 1306585 1318527 1484872 1484872 1484897 1484899 1640915 1663529 143881 193201 332580 332693 332653 332653 332695 332659 546511	AG A ATTTTTTT A AGGGGGGGGGGG C C C C C C C C C C C C	A A A A A A H H H H H H H H H H H H H H	indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	frameshift insertion/intergenic intergenic intergenic insorgenic nonsynonymous frameshift deletion nonsynonymous intergenic synonymous synonymous synonymous nonsynonymous frameshift insertion 1 bp deletion intergenic synonymous synonymous synonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous frameshift insertion frameshift insertion	HP0961 HP027_1018 HP0350 jhp1031 HP027_298 HP027_298 HP027_298 HP027_298 HP027_298 HP027_298 HP027_298 HP019 HP0119 HP0119 HP0119 HP0119 HP0119 HP0119 HP0119 HP0119 HP0119	HP0895 HP0895 HP0947 HP0947 HP1400	HPnc4160
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S65           S66           S66      S66	1122208 1122232 1187376 1284699 1306585 1318527 1484872 1484872 1484872 1484897 1484897 148489 1660915 166529 143981 193201 332580 332580 332583 332632 32632 34262 34262 34262 34262 34262 34262 34262 34262 342	AG         A         ATTITITT         A         AGGGGGGGGGG         C         C         G         T         G         C         C         C         C         C         CGAGAGAGAGAGAGAGAGAG         GTITTT         TGA         G         T         C         G         G         T         C         GGT         TGGGGGGGGGG         G         G         G         G         C         C         G         G         G         G         G         G         C         C         C         G         G         G         G         G         G         G         G         G         G         G         G         G <td>A         AG         ATTITITT         C         AGGGGGGGGGG         T         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         CGGGAGAGAGAGAGAGAGAG         GTTT         T         A         GGGGC,GGGTG         TGGGGGGGGGG         A         G         A         G         A         G         A         G         A         G         A         T         A         G         A         G         A         G         A         G         A         G         A         G         A         G         A         T</td> <td>indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP</td> <td>frameshift insertion/intergenic intergenic intergenic insergenic nonsynonymous frameshift deletion nonsynonymous frameshift deletion intergenic synonymous synonymous synonymous frameshift insertion 1 bp deletion intergenic synonymous synonymous synonymous synonymous frameshift insertion frameshift insertion frameshift insertion frameshift deletion intergenic frameshift deletion synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous synonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous synonymous synonymous synonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous</td> <td>HP0961 HP627_1018 HP0350 Jhp1031 HP627_298 HP6</td> <td>HP0895 HP0895 HP0947 HP0947 HP1400</td> <td>HPnc4160</td>	A         AG         ATTITITT         C         AGGGGGGGGGG         T         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         CGGGAGAGAGAGAGAGAGAG         GTTT         T         A         GGGGC,GGGTG         TGGGGGGGGGG         A         G         A         G         A         G         A         G         A         G         A         T         A         G         A         G         A         G         A         G         A         G         A         G         A         G         A         T	indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	frameshift insertion/intergenic intergenic intergenic insergenic nonsynonymous frameshift deletion nonsynonymous frameshift deletion intergenic synonymous synonymous synonymous frameshift insertion 1 bp deletion intergenic synonymous synonymous synonymous synonymous frameshift insertion frameshift insertion frameshift insertion frameshift deletion intergenic frameshift deletion synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous synonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous synonymous synonymous synonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous	HP0961 HP627_1018 HP0350 Jhp1031 HP627_298 HP6	HP0895 HP0895 HP0947 HP0947 HP1400	HPnc4160
S65           S66           S66	1122208           1122232           1187376           1198606           1284699           1305585           1318527           1483720           1484872           1484872           1484891           1464915           1663529           1332580           332598           332653           332653           332653           332654           734259           546511           701037           734198           734200           734220           734224           734226           734226           734226           734226           734227           734284           734226           73427           734261           73427	AG A ATTTTTTT A AGGGGGGGGGGG C C C C C C C C C C C C	A         AG         ATTITITT         C         AGGGGGGGGGG         T         A         C         A         C         A         A         C         A         C         A         C         A         C         A         C         A         C         A         CGGGAGAGAGAGAGAGAGAGAG         GTTTT         T         A         GGGGG,GGGTG         TGGGGGGGGGG         A         GGGG,GGGTG         TGGGGGGGGGG         A         G         A         T         G         A         T         A         G         A         T         A         G         A         T         A         GGGG,GGGTG         T         G         A         T	indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	frameshift insertion/intergenic intergenic intergenic inonsynonymous frameshift deletion nonsynonymous synonymous synonymous synonymous nonsynonymous frameshift insertion 1 bp deletion intergenic synonymous synonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous frameshift insertion frameshift insertion frameshift insertion frameshift insertion intergenic frameshift insertion intergenic frameshift insertion intergenic frameshift insertion intergenic frameshift insertion intergenic synonymous nonsynonymous nonsynonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous	HP0961 HP627_1018 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP619 HP0119 HP0119 HP0119 HP0119 HP0119 HP0119 HP012_0534 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534	HP0895 HP0895 HP0947 HP0947 HP1400	HPnc4160
S65           S66           S66      S66	1122208 1122232 1187376 1284699 1306585 1318527 1484872 1484872 1484872 1484897 1484897 148489 1660915 166529 143981 193201 332580 332580 332583 332632 32632 34262 34262 34262 34262 34262 34262 34262 34262 342	AG         A         ATTITITT         A         AGGGGGGGGGG         C         C         G         T         G         C         C         C         C         C         CGAGAGAGAGAGAGAGAGAG         GTITTT         TGA         G         T         C         G         G         T         C         GGT         TGGGGGGGGGG         G         G         G         G         C         C         G         G         G         G         G         G         C         C         C         G         G         G         G         G         G         G         G         G         G         G         G         G <td>A         AG         ATTITITT         C         AGGGGGGGGGG         T         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         CGGGAGAGAGAGAGAGAGAG         GTTT         T         A         GGGGC,GGGTG         TGGGGGGGGGG         A         G         A         G         A         G         A         G         A         G         A         T         A         G         A         G         A         G         A         G         A         G         A         G         A         G         A         T</td> <td>indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP</td> <td>frameshift insertion/intergenic intergenic intergenic insynonymous frameshift deletion nonsynonymous frameshift deletion intergenic synonymous synonymous synonymous synonymous synonymous frameshift insertion intergenic synonymous synonymous nonsynonymous nonsynonymous nonsynonymous frameshift insertion frameshift insertion frameshift insertion frameshift insertion frameshift insertion intergenic frameshift deletion synonymous nonsynonymous nonsynonymous nonsynonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous</td> <td>HP0961 HP627_1018 HP0350 Jhp1031 HP627_298 HP6</td> <td>HP0895 HP0895 HP0947 HP0947 HP1400</td> <td>HPnc4160</td>	A         AG         ATTITITT         C         AGGGGGGGGGG         T         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         CGGGAGAGAGAGAGAGAGAG         GTTT         T         A         GGGGC,GGGTG         TGGGGGGGGGG         A         G         A         G         A         G         A         G         A         G         A         T         A         G         A         G         A         G         A         G         A         G         A         G         A         G         A         T	indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	frameshift insertion/intergenic intergenic intergenic insynonymous frameshift deletion nonsynonymous frameshift deletion intergenic synonymous synonymous synonymous synonymous synonymous frameshift insertion intergenic synonymous synonymous nonsynonymous nonsynonymous nonsynonymous frameshift insertion frameshift insertion frameshift insertion frameshift insertion frameshift insertion intergenic frameshift deletion synonymous nonsynonymous nonsynonymous nonsynonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous	HP0961 HP627_1018 HP0350 Jhp1031 HP627_298 HP6	HP0895 HP0895 HP0947 HP0947 HP1400	HPnc4160
S65           S66           S66	1122208 1122232 1187376 1284699 1284699 1305285 1318527 1484827 1484827 1484897 1484897 1484897 1484897 1484897 1484897 1484897 1484897 1484897 1484897 1484897 1484897 1484897 1484897 1484897 1332580 332580 332580 332580 332653 332653 332653 332653 332653 332654 193207 734207 734220 734220 734220 734221 734225 734227 734277 734283	AG A ATTTTTTT A AGGGGGGGGGGG C C C C C C C C C C C C	A         AG         ATTITITIT         C         AGG6G6G6G6         T         A         A         A         A         A         A         C         A         C         A         CGAGAGAGAGAGAGAGAGAG         GTTTT         T         A         A         CGAGAGAGAGAGAGAGAGAG         GTTTT         T         A         GGG6,GGGTG         TGGGGGGGGG         A         T         GGGG,GGGGG         A         G         A         T         G         A         T         G         A         T         A         T         A         A         G         A         A         T         A         T         A         A         G         A	indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	frameshift insertion/intergenic intergenic intergenic inonsynonymous frameshift deletion nonsynonymous synonymous synonymous synonymous nonsynonymous frameshift insertion 1 bp deletion intergenic synonymous synonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous frameshift insertion frameshift insertion frameshift insertion frameshift insertion intergenic frameshift insertion intergenic frameshift insertion intergenic frameshift insertion intergenic frameshift insertion intergenic synonymous nonsynonymous nonsynonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous	HP0961 HP027_1018 HP627_1018 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP617_298 HP0119 HP0119 HP0119 HP0119 HP0119 HP0119 HP0119 HP0119 HP0119 HP0119 HP0127 HP0249 HP0249 HP0247 HP0249 HP0243 HP12_0534 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534	HP0895 HP0895 HP0947 HP0947 HP1400	HPnc4160
S65           S66           S66      S66      S66	1122208 1122232 1187376 1286699 1286699 1306585 1318527 1483720 1484721 1484897 148489 148	AG A ATTTTTTT A AGGGGGGGGGGG C C C C C C C C C C C C	A         AG         ATTITITIT         C         AGGGGGGGGGG         T         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         CGAGAGAGAGAGAGAGAGAGG         GTTIT         T         A         A         A         GGGGG,GGGTG         T         GGGGGGGGG         A         GGGGGGGGG         A         T         G         A         T         G         A         T         G         A         T         G         A         T         G         A         T         GGGGGGGGG         A         T         G         A	indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP	frameshift insertion/intergenic intergenic intergenic intergenic nonsynonymous frameshift deletion nonsynonymous intergenic synonymous synonymous synonymous synonymous synonymous trameshift insertion 1 bp deletion intergenic synonymous synonymous synonymous nonsynonymous nonsynonymous frameshift insertion frameshift insertion intergenic frameshift deletion synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous synonymous synonymous nonsynonymous nonsynonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous	HP0961 HP627_1018 HP0360 jhp1031 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP621_98 HP0119 HP0119 HP0119 HP0119 HP0119 HP0119 HP0119 HP0119 HP0119 HP0127 HP0217 HP0234 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534	HP0895 HP0895 HP0947 HP0947 HP1400	HPnc4160
S65           S66           S66	1122208           1122232           1187376           1198606           1284699           1483720           1484720           1484872           1484872           1484872           1484872           1484891           1663529           143981           1332580           332588           332632           332632           332632           332638           332639           344559           546511           701037           734196           734126           734220           734234           734245           734256           734261           73427           734281           734282           734281           734281           734282           734283           734284           734285           734286           734286           734286           734286	AG A ATTTTTT A AGGGGGGGGGGG C C C C C C C C C C C AGAGAGAG	A         AG         ATTITITT         C         AGGGGGGGGG         T         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         CGAGAGAGAGAGAGAGAGAG         GTITT         T         A         A         A         GGGG,GGGTG         TGGGGGGGGG         A         T         A         GGGG,GGGTG         TGGGGGGGGG         A         T         G         A         T         G         A         T         G         A         T         A         G         A         T         G         A         T         A         A	indel indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	frameshift insertion/intergenic intergenic intergenic onosynonymous frameshift deletion nonsynonymous frameshift deletion intergenic synonymous synonymous synonymous synonymous frameshift insertion 1 bp deletion intergenic synonymous synonymous synonymous synonymous nonsynonymous frameshift insertion frameshift insertion frameshift insertion frameshift insertion intergenic frameshift deletion synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous synonymous	HP0961 HP627_1018 HP0360 jhp1031 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP621_98 HP6119 HP0119 HP0119 HP0119 HP0119 HP0119 HP0119 HP0119 HP0119 HP0119 HP0119 HP0119 HP0119 HP0127 HP0217 HP0217 HP0243 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534	HP0895 HP0895 HP0947 HP0947 HP1400	HPnc4160
S65           S66           S66      S66      S66	1122208           1122232           1187376           1198606           1284699           1305585           1318527           1483720           1484872           1484891           1484891           1640915           1663529           1332580           332583           332633           332633           332633           332639           332580           332580           332633           332633           332633           332633           332633           34263           34263           734196           734200           734201           734202           734234           734266           73427           734283           734283           734284           734283           734284           734283           734284           734285           734286           734287           734283           734284	AGAATTITITTAAGGGGGGGGGGGCCGTGCCCGAGAGAGAGAGAGAGAGGTITTTTGAGCCGGAAACCAACCCCCCCCAAACCCCCCCCCCCCCCCCCCC	AAGATTITITITCAGGGGGGGGGGTAACAACAACAACAACAACACACGAGAGAGAGAGAGAGAGAGGITTTTACATACGGGGGGGGGGGATGGGGGGGGGGACC	indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	frameshift insertion/intergenic intergenic intergenic insynonymous frameshift deletion nonsynonymous frameshift deletion intergenic synonymous synonymous synonymous synonymous frameshift insertion 1 bp deletion intergenic synonymous synonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous synonymous synonymous nonsynonymous synonymous	HP0961 HP027_1018 HP627_29	HP0895 HP0895 HP0947 HP0947 HP1400	HPnc4160
S65           S66           S66      S66      S66	1122208           1122232           1187376           1198066           1284699           1484720           1484720           1484720           1484872           1484872           1484891           1663529           163529           332580           332580           332653           332653           332653           332659           34467           701037           701037           734196           734206           734226           734226           734226           734226           734226           734226           734226           734226           734226           734283           734284           734285           734285           734286           734309           734284           735232           735324	AGAATTITITTAAGGGGGGGGGGCCGTGCCAGAGAGAGAGAGAGAGGITITTTGAGCCGCGGGCAA <t< td=""><td>A         AG         ATTITITT         C         AGGGGGGGGGG         T         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         CGAGAGAGAGAGAGAGAGAGAG         GTTTT         T         A         CGAGAGGAGAGAGAGAGAGAGAG         GTTTT         T         A         CGAGAGGGGGGGG         A         GGGGGGGGGG         A         GGGGGGGGG         A         G         A         T         G         A         T         G         A         T         G         C         C         C         C         C         C         C</td><td>indel indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP</td><td>frameshift insertion/intergenic intergenic intergenic intergenic nonsynonymous frameshift deletion nonsynonymous intergenic synonymous synonymous synonymous synonymous synonymous intergenic synonymous intergenic synonymous synonymous synonymous nonsynonymous nonsynonymous frameshift insertion intergenic frameshift insertion intergenic frameshift deletion synonymous nonsynonymous nonsynonymous nonsynonymous synonymous</td><td>HP0961 HP627_1018 HP0360 jhp1031 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP019 HP0119 HP0119 HP0119 HP0119 HP0119 HP0119 HP0119 HP0119 HP0119 HP0120 HP0217 HP0217 HP0234 HPP12_0534</td><td>HP0895 HP0895 HP0947 HP0947 HP1400</td><td>HPnc4160</td></t<>	A         AG         ATTITITT         C         AGGGGGGGGGG         T         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         CGAGAGAGAGAGAGAGAGAGAG         GTTTT         T         A         CGAGAGGAGAGAGAGAGAGAGAG         GTTTT         T         A         CGAGAGGGGGGGG         A         GGGGGGGGGG         A         GGGGGGGGG         A         G         A         T         G         A         T         G         A         T         G         C         C         C         C         C         C         C	indel indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	frameshift insertion/intergenic intergenic intergenic intergenic nonsynonymous frameshift deletion nonsynonymous intergenic synonymous synonymous synonymous synonymous synonymous intergenic synonymous intergenic synonymous synonymous synonymous nonsynonymous nonsynonymous frameshift insertion intergenic frameshift insertion intergenic frameshift deletion synonymous nonsynonymous nonsynonymous nonsynonymous synonymous	HP0961 HP627_1018 HP0360 jhp1031 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP627_298 HP019 HP0119 HP0119 HP0119 HP0119 HP0119 HP0119 HP0119 HP0119 HP0119 HP0120 HP0217 HP0217 HP0234 HPP12_0534	HP0895 HP0895 HP0947 HP0947 HP1400	HPnc4160
S65           S66           S66      S66      S66	1122208           1122232           1187376           1198606           1284699           1305585           1318527           1483720           1484872           1484891           1484891           1640915           1663529           1332580           332583           332633           332633           332633           332639           332580           332580           332633           332633           332633           332633           332633           34263           34263           734196           734200           734201           734202           734234           734266           73427           734283           734283           734284           734283           734284           734283           734284           734285           734286           734287           734283           734284	AGAATTITITTAAGGGGGGGGGGGCCGTGCCCGAGAGAGAGAGAGAGAGGTITTTTGAGCCGGAAACCAACCCCCCCCAAACCCCCCCCCCCCCCCCCCC	AAGATTITITITCAGGGGGGGGGGTAACAACAACAACAACAACACACGAGAGAGAGAGAGAGAGAGGITTTTACATACGGGGGGGGGGGATGGGGGGGGGGACC	indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	frameshift insertion/intergenic intergenic intergenic insynonymous frameshift deletion nonsynonymous frameshift deletion intergenic synonymous synonymous synonymous synonymous frameshift insertion 1 bp deletion intergenic synonymous synonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous synonymous synonymous nonsynonymous synonymous	HP0961 HP027_1018 HP627_29	HP0895 HP0895 HP0947 HP0947 HP1400	HPnc4160

S66	735343	С	Т	SNP	synonymous	HPP12_0534		
S66	735356	Т	c	SNP	nonsynonymous	HPP12_0534		
S66	735363	G	A	SNP	synonymous	HPP12_0534		
S66	805851	A	Т	SNP	intergenic		HPG27_556	
S66	1122208	AG	Α	SNP	intergenic		HP0895	
S66	1122235	G	A	SNP	intergenic		HP0895	
S66	1187376	АТПТТТТ	АТТТТТТТ	indel	intergenic	1100004	HP0947	
S66	1198606	A	C C	SNP	nonsynonymous	HP0961		
S66 S66	1284699 1306585	AGGGGGGGGGG	AGGGGGGGGG T	indel SNP	frameshift deletion	HPG27_1018 HP0360		
S66	1319853	c	A	SNP	intergenic	HP0300	HELPY_1075	jhp1032
S66	1483720	G	A	SNP	synonymous	HPG27_298	TIELF 1_1075	J11p1032
S66	1484872	T	c	SNP	synonymous	HPG27_298		
S66	1484881	G	A	SNP	synonymous	HPG27_298		
S66	1484897	C	A	SNP	nonsynonymous	HPG27_298		
S66	1484899	c	A	SNP	synonymous	HPG27_298		
S66	1592801	T	G	SNP	synonymous	HP1354		
S66	1640915	CGAGAGAGAGAGAGAG	CGAGAGAGAGAGAGAGAG	indel	frameshift insertion			
S67	92562	т	с	SNP	intergenic		HP0993	-
S67	232964	С	A	SNP	intergenic		HPPC_00115	
S67	315327	ACCCCCCCCC	ACCCCCCCCCC	indel	intergenic		HP0103	-
S67	332580	т	A	SNP	synonymous	HP0119		
S67	332598	с	Т	SNP	synonymous	HP0119		
S67	332632	G	Α	SNP	nonsynonymous	HP0119		
S67	332653	с	т	SNP	nonsynonymous	HP0119		
S67	332689	G	Α	SNP	nonsynonymous	HP0119		
S67	455599	TGGGGGGGGGG	TGGGGGGGGGGG	indel	frameshift insertion	HP0217		
S67	546511	СААААААААААА	САААААААААААА	indel	intergenic		HP1243/HPG27_298	
S67	548865	c	Т	SNP	intergenic		jhp1163	HPG27_298
S67	548868	Т	C	SNP	intergenic		jhp1163	HPG27_298
S67	548965	C	Т	SNP	intergenic		jhp1163	HPG27_298
S67	548978	G	Т	SNP	intergenic		jhp1163	HPG27_298
S67	701037	TGGGGGGGG	TGGGGGGG	indel	frameshift deletion	HP0499		
S67	734196	G	A	SNP	synonymous	HPP12_0534		
S67	734198	A	G	SNP	nonsynonymous	HPP12_0534		
S67	734200	с	Α	SNP	nonsynonymous	HPP12_0534		
S67	734220	с	Т	SNP	synonymous	HPP12_0534		
S67	734234	Α	G	SNP	nonsynonymous	HPP12_0534		
S67	734241	Т	A	SNP	synonymous	HPP12_0534		
S67	734256	с	Т	SNP	synonymous	HPP12_0534		
S67	734260	G	A	SNP	nonsynonymous	HPP12_0534		
S67	734271	G	A	SNP	synonymous	HPP12_0534		
S67	734277	С	Т	SNP	synonymous	HPP12_0534		
S67	734283	с	Т	SNP	synonymous	HPP12_0534		
S67	734286	Т	С	SNP	synonymous	HPP12_0534		
S67	734309	A	С	SNP	nonsynonymous	HPP12_0534		
S67	734317	A	С	SNP	nonsynonymous	HPP12_0534		
S67	734661	с	G	SNP	synonymous	HPP12_0534		
S67	734733	с	Т	SNP	synonymous	HPP12_0534		
S67	735228	A	Т	SNP	synonymous	HPP12_0534		
S67	735239	c	A	SNP	nonsynonymous	HPP12_0534		
S67	735324	c	G	SNP	synonymous	HPP12_0534		
S67	735333	A	G	SNP	synonymous	HPP12_0534		
S67	735336	G	A	SNP	synonymous	HPP12_0534		
S67	735343	c	T	SNP	synonymous	HPP12_0534		
S67	735356	T	c	SNP	nonsynonymous	HPP12_0534		
S67	735363	G	A	SNP	synonymous	HPP12_0534	ih=0540	
S67	801836	GAAAAAAAAAAA	GAAAAAAAAAAAA	indel	intergenic	11000 040	jhp0540	
S67	839999	T	C	SNP	nonsynonymous	HPB8_818	100.37 (77	
S67 S67	952086			indel	intergenic frameshift insertion/intergenic	HPnc4170	HPG27_677	HPpc4160
S67	1043704 1122208	AG	GTTTTTTTTTTTTT	indel SNP	frameshift insertion/intergenic	1111141/0	HP0811 HP0895	HPnc4160
S67		AG	A AG	indel	intergenic intergenic		HP0895	
S67	1122252	АТТТТТТ	ATTTTTTT	indel	intergenic		HP0895 HP0947	
S67	1198606	A	С	SNP	nonsynonymous	HP0961		
S67	1284699	AGGGGGGGGGGG	AGGGGGGGGG	indel	frameshift deletion	HPG27_1018		
S67	1306585	C	T	SNP	nonsynonymous	HP0360		
S67		G	A	SNP	synonymous	HPG27_298		
S67	1484872	T	c	SNP	synonymous	HPG27_298		
S67	1484881	G	A	SNP	synonymous	HPG27_298		
S67	1484897	c	A	SNP	nonsynonymous	HPG27_298		
S67	1484899	с	Α	SNP	synonymous	HPG27_298		
		CGAGAGAGAGAGAGAG	CGAGAGAGAGAGAGAGAG	indel	frameshift insertion	_		
S67	1640915	CORORORORORORO	A	SNP	intergenic		HPPC_00115	
S68	1640915 232964	C		indel	intergenic		-	
			ACCCCCCCCCC	muer			HP0103	
S68	232964	c		SNP	synonymous	HP0119	HP0103	
S68 S68	232964 315327	C ACCCCCCCCC	ACCCCCCCCCC		synonymous synonymous	HP0119 HP0119	HP0103	
S68 S68 S68	232964 315327 332580	C ACCCCCCCCC	ACCCCCCCCC A	SNP			HP0103	
S68 S68 S68 S68	232964 315327 332580 332598	C ACCCCCCCC T C	ACCCCCCCCC A T	SNP SNP	synonymous	HP0119	HP0103	
\$68 \$68 \$68 \$68 \$68 \$68	232964 315327 332580 332598 332632	C ACCCCCCCC T C G	ACCCCCCCCC A T A	SNP SNP SNP	synonymous nonsynonymous	HP0119 HP0119	HP0103	
S68           S68           S68           S68           S68           S68           S68           S68	232964 315327 332580 332598 332632 332653	C ACCCCCCCC T C G C C	ACCCCCCCCC A T A T	SNP SNP SNP SNP	synonymous nonsynonymous nonsynonymous	HP0119 HP0119 HP0119	HP0103	
S68	232964 315327 332580 332598 332632 332653 332689	C C C C C C C C C C C C C C C C C C C	Accccccccc A T A T T A A	SNP SNP SNP SNP SNP	synonymous nonsynonymous nonsynonymous nonsynonymous	HP0119 HP0119 HP0119 HP0119	HP0103 HP1243/HPG27_298	
S68	232964 315327 332580 332598 332632 332653 332689 374767	C C C C C C C C C C C C C C C C C C C	ACCCCCCCCC A T A T A A GGGGGT	SNP SNP SNP SNP SNP indel	synonymous nonsynonymous nonsynonymous nonsynonymous frameshift insertion	HP0119 HP0119 HP0119 HP0119		HPG27_298
S68	232964 315327 332580 332598 332632 332653 332689 374767 546511	C ACCCCCCCC T C G G G GGT CAAAAAAAAAAAAA	АССССССССС А Т А Т С А GGGCGT САААААААААААА Т Т	SNP SNP SNP SNP SNP indel indel	synonymous nonsynonymous nonsynonymous nonsynonymous frameshift insertion intergenic	HP0119 HP0119 HP0119 HP0119	HP1243/HPG27_298	HPG27_298 HPG27_298
S68	232964 315327 332580 332598 332632 332653 332689 374767 546511 548937 548965 548978	С АССССССССС Т С С С С С С С С С С С С С	АССССССССС А Т А А Т С А А САЛАЛАЛАЛАЛАЛАЛ А С АЛАЛАЛАЛАЛАЛА	SNP SNP SNP SNP indel indel SNP SNP SNP	synonymous nonsynonymous nonsynonymous nonsynonymous frameshift insertion intergenic intergenic intergenic intergenic	HP0119 HP0119 HP0119 HP0119	HP1243/HPG27_298 jhp1163 jhp1163 jhp1163	HPG27_298 HPG27_298
S68           S68	232964 315327 332580 332598 332632 332653 332689 374767 546511 548937 54894 54894	C ACCCCCCCC T C G G G G G G G G G G G G C C C AAAAAAAA	ACCCCCCCCC A T A A T A GGGCGT CAAAAAAAAAA	SNP SNP SNP SNP indel indel SNP SNP SNP	synonymous nonsynonymous nonsynonymous nonsynonymous frameshift insertion intergenic intergenic intergenic intergenic intergenic intergenic	HP0119 HP0119 HP0119 HP0119 Jhp0151	HP1243/HPG27_298 jhp1163 jhp1163	HPG27_298
S68	232964 315327 332580 332598 332632 332653 332689 374767 546511 548937 548965 548978	С АССССССССС Т С С С С С С С С С С С С С	АССССССССС А Т А А Т С А А САЛАЛАЛАЛАЛАЛАЛ А С АЛАЛАЛАЛАЛАЛА	SNP SNP SNP SNP indel indel SNP SNP SNP	synonymous nonsynonymous nonsynonymous nonsynonymous frameshift insertion intergenic intergenic intergenic intergenic	HP0119 HP0119 HP0119 HP0119	HP1243/HPG27_298 jhp1163 jhp1163 jhp1163	HPG27_298 HPG27_298

S68	734196	G	A	SNP	synonymous	HPP12_0534		
S68	734198	A	G	SNP	nonsynonymous	HPP12_0534		
S68	734200	С	A	SNP	nonsynonymous	HPP12_0534		
S68	734220	С	Т	SNP	synonymous	HPP12_0534		
S68	734234	A	G	SNP	nonsynonymous	HPP12_0534		
S68	734241	Т	A	SNP	synonymous	HPP12_0534		
S68	734256	С	Т	SNP	synonymous	HPP12_0534		
S68	734260	G	A	SNP	nonsynonymous	HPP12_0534		
S68	734271	G	A	SNP	synonymous	HPP12_0534		
S68	734277	С	Т	SNP	synonymous	HPP12_0534		
S68	734283	С	Т	SNP	synonymous	HPP12_0534		
S68	734286	Т	с	SNP	synonymous	HPP12_0534		
S68	734309	A	с	SNP	nonsynonymous	HPP12_0534		
S68	734313	G	A	SNP	synonymous	HPP12_0534		
S68	734317	A	с	SNP	nonsynonymous	HPP12_0534		
S68	734661	С	G	SNP	synonymous	HPP12_0534		
S68	734733	c	т	SNP	synonymous	HPP12_0534		
S68	735228	A	Т	SNP	synonymous	HPP12_0534		
S68	735324	c	G	SNP	synonymous	HPP12_0534		
S68	735333	A	G	SNP	synonymous	HPP12_0534		
S68	735336	G	A	SNP	synonymous	HPP12_0534		
S68	735343	c	Т	SNP	synonymous	HPP12_0534		
S68	735356	T	c	SNP	nonsynonymous	HPP12_0534		
S68	735363	G	A	SNP	synonymous	HPP12_0534		
S68	801836	GAAAAAAAAAAA	GAAAAAAAAAAAA	indel	intergenic	1000 0.7	jhp0540	
S68	839999	1	c	SNP	nonsynonymous	HPB8_818		
S68	958702	СААААААААААААА	СААААААААААААААА	indel	intergenic		HPG27_680	
S68	1043704	GTTTTTTTTTT	GTTTTTTTTT	indel	frameshift insertion/intergenic	HPnc4170	HP0811	HPnc4160
S68	1122211	G	A	SNP	intergenic		HP0895	
S68	1122235	G	A	SNP	intergenic		HP0895	
S68	1187376	АТПТТТТ	ΑΤΤΤΤΤΤΤΤ	indel	intergenic		HP0947	
S68	1198606	A	c	SNP	nonsynonymous	HP0961		
S68	1284699	AGGGGGGGGGG	AGGGGGGGGG	indel	frameshift deletion	HPG27_1018		
S68	1306585	c	T	SNP	nonsynonymous	HP0360		
S68	1483720	G	A	SNP	synonymous	HPG27_298		
S68	1484872	Т	c	SNP	synonymous	HPG27_298		
S68	1484881	G	A	SNP	synonymous	HPG27_298		
S68	1484897	с	A	SNP	nonsynonymous	HPG27_298		
S68	1484899	c	A	SNP	synonymous	HPG27_298		
S68	1640915	CGAGAGAGAGAGAGAG	CGAGAGAGAGAGAGAGAG	indel	frameshift insertion			
S69	99327	с	Т	SNP	synonymous	jhp0935		
S69	155189	GA	G	indel	frameshift deletion	jhp1438		
S69	168379	С	Т	SNP	synonymous	HP1547		
S69	199597	c	T	SNP	intergenic		HP1582	jhp1488
S69	207029	T	c	SNP	nonsynonymous	HPATCC43504_00197		jhp1488
S69 S69	207029 214663	T CGAGAGAGAGAGAGAGAG	C CGAGAGAGAGAGAGAGAGAG	SNP indel	nonsynonymous intergenic	_	HP1582 HPG27_8	jhp1488
S69 S69 S69	207029 214663 276989	T CGAGAGAGAGAGAGAG G	C CGAGAGAGAGAGAGAGAGAG A	SNP indel SNP	nonsynonymous intergenic nonsynonymous	HPATCC43504_00197 HPP12_0070	HPG27_8	jhp1488
\$69 \$69 \$69 \$69	207029 214663 276989 315327	T CGAGAGAGAGAGAGAG G ACCCCCCCCC	C CGAGAGAGAGAGAGAGAG A ACCCCCCCCCC	SNP indel SNP indel	nonsynonymous intergenic nonsynonymous intergenic	HPP12_0070		jhp1488
\$69 \$69 \$69 \$69 \$69	207029 214663 276989 315327 430922	T CGAGAGAGAGAGAGAG G ACCCCCCCC G	C CGAGAGAGAGAGAGAGAG A ACCCCCCCCCC A	SNP indel SNP indel SNP	nonsynonymous intergenic nonsynonymous intergenic nonsynonymous	_	HPG27_8 HP0103	jhp1488
\$69 \$69 \$69 \$69 \$69 \$69 \$69	207029 214663 276989 315327 430922 546511	T CGAGAGAGAGAGAGAG G ACCCCCCCCC G CAAAAAAAA	С СGAGAGAGAGAGAGAGAG A АСССССССССС A САААААААААА	SNP indel SNP indel SNP indel	nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic	HPP12_0070	HPG27_8 HP0103 HP1243/HPG27_298	
\$69 \$69 \$69 \$69 \$69 \$69 \$69 \$69	207029 214663 276989 315327 430922 546511 548965	Т СGAGAGAGAGAGAGAGAG G ACCCCCCCC G CAAAAAAAA	С СGAGAGAGAGAGAGAGAGAG A Асссссссссс A СААААААААААААААА T	SNP indel SNP indel SNP indel SNP	nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic intergenic	HPP12_0070	HPG27_8 HP0103 HP1243/HPG27_298 jhp1163	HPG27_298
S69	207029 214663 276989 315327 430922 546511 548965 548978	T CGAGAGAGAGAGAGAGAG G ACCCCCCCCC G CAAAAAAAA	С СGAGAGAGAGAGAGAGAGAG A ACCCCCCCCCC A СААААААААААААААА T T T	SNP indel SNP indel SNP indel SNP SNP	nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic intergenic intergenic	HPP12_0070	HPG27_8 HP0103 HP1243/HPG27_298 jhp1163 jhp1163	HPG27_298 HPG27_298
S69	207029 214663 276989 315327 430922 546511 548965 548978 548986	Т СGAGAGAGAGAGAGAGAG G ACCCCCCCCC G CAAAAAAAA	С СGAGAGAGAGAGAGAGAGAG А Асссссссссс А СААААААААААААА Т Т Т СТПТТТТТ	SNP indel SNP indel SNP indel SNP SNP indel	nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic intergenic intergenic intergenic	HPP12_0070	HPG27_8 HP0103 HP1243/HPG27_298 jhp1163 jhp1163	HPG27_298
S69	207029 214663 276989 315327 430922 546511 548965 548978 548986 680519	Т СGAGAGAGAGAGAGAGAG G ACCCCCCCCC G САЛАЛАЛАЛАЛА C G CTTTTTT AC	С СGAGAGAGAGAGAGAGAGAG A ACCCCCCCCC A CAAAAAAAA	SNP indel SNP indel SNP indel SNP indel indel	nonsynonymous intergenic nonsynonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic	HPP12_0070	HPG27_8 HP0103 HP1243/HPG27_298 jhp1163 jhp1163	HPG27_298 HPG27_298
S69	207029 214663 276989 315327 430922 546511 548965 548978 548986 680519 691071	T CGAGAGAGAGAGAGAGAG G ACCCCCCCCC G CAAAAAAAA	С СGAGAGAGAGAGAGAGAGAG A ACCCCCCCCCC A CAAAAAAAAAA	SNP indel SNP indel SNP indel SNP indel indel SNP	nonsynonymous intergenic nonsynonymous intergenic intergenic intergenic intergenic intergenic intergenic synonymous	HPP12_0070 HP0194 HP0489	HPG27_8 HP0103 HP1243/HPG27_298 jhp1163 jhp1163	HPG27_298 HPG27_298
S69         S69	207029 214663 276989 315327 430922 546511 548965 548978 548986 680519 691071 691074	Т СGAGAGAGAGAGAGAGAG G ACCCCCCCC G CAAAAAAAAAA	С СGAGAGAGAGAGAGAGAGAG A ACCCCCCCCC A САААААААААААА Т Т СПТПТТТ АСС А СС С С С С С С С С С С С С	SNP indel SNP indel SNP SNP indel indel SNP SNP SNP	nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic intergenic intergenic intergenic intergenic synonymous synonymous	HPP12_0070 HP0194 HP0489 HP0489	HPG27_8 HP0103 HP1243/HPG27_298 jhp1163 jhp1163	HPG27_298 HPG27_298
S69         S69	207029 214663 276989 315327 430922 546511 548965 548978 548986 680519 691071 691074	T CGAGAGAGAGAGAGAGAG G ACCCCCCCCC G CAAAAAAAA	С СGAGAGAGAGAGAGAGAGAG A ACCCCCCCCC A CAAAAAAAAAA	SNP indel SNP indel SNP SNP indel indel SNP SNP SNP SNP	nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic intergenic intergenic intergenic intergenic synonymous synonymous nonsynonymous	HPP12_0070 HP0194 HP0489 HP0489 HP0489 HP0489	HPG27_8 HP0103 HP1243/HPG27_298 jhp1163 jhp1163	HPG27_298 HPG27_298
S69	207029 214663 276989 315327 430922 546511 548965 548978 548986 680519 691071 691074 691077 691089	T           CGAGAGAGAGAGAGAGAGAG           G           Accccccccc           G           C           C           G           CTITITIT           AC           G           G           G           G           G           A           G           A           G           A           G           A	С СGAGAGAGAGAGAGAGAGAG A ACCCCCCCCC A CAAAAAAAAAA	SNP indel SNP indel SNP indel SNP indel indel SNP SNP SNP SNP	nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous	HPP12_0070 HP0194 HP0489 HP0489 HP0489 HP0489 HP0489	HPG27_8 HP0103 HP1243/HPG27_298 jhp1163 jhp1163	HPG27_298 HPG27_298
S69	207029 214663 276989 315327 430922 546511 548965 548978 6480519 691071 691074 691077 691089 691091	T           CGAGAGAGAGAGAGAGAG           G           ACCCCCCCCC           G           C           G           CTTTTTT           AC           G           A           G           A           C           G           A           C           C           C           C           C           C           C           G           A           C           C	С СGAGAGAGAGAGAGAGAGAG A ACCCCCCCCC A CAAAAAAAAAA	SNP indel SNP indel SNP indel SNP indel indel SNP SNP SNP SNP SNP	nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous nonsynonymous	HPP12_0070 HP0194 HP0489 HP0489 HP0489 HP0489 HP0489 HP0489	HPG27_8 HP0103 HP1243/HPG27_298 jhp1163 jhp1163	HPG27_298 HPG27_298
669         569           569         569           569         569           569         569           569         569           569         569           569         569           569         569           569         569           569         569           569         569           569         569           569         569           569         569           569         569           569         569           569         569           569         569           569         569	207029 214663 276989 315327 430922 546511 548965 548978 680519 691071 691077 691089 691091	T           CGAGAGAGAGAGAGAGAG           G           ACCCCCCCCC           G           CAAAAAAAAAAA           C           G           CTTTTTTT           AC           G           A           G           A           G           A           C           T	С СGAGAGAGAGAGAGAGAGAG A ACCCCCCCCC A CAAAAAAAAAA	SNP indel SNP indel SNP indel SNP indel indel SNP SNP SNP SNP SNP SNP	nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous nonsynonymous nonsynonymous synonymous	HPP12_0070 HP0194 HP0194 HP0489 HP0489 HP0489 HP0489 HP0489 HP0489	HPG27_8 HP0103 HP1243/HPG27_298 jhp1163 jhp1163	HPG27_298 HPG27_298
S69         S69	207029 214663 276989 315327 430922 546511 548965 548978 680519 691071 691074 691077 691089 691091 691011 691113	T CGAGAGAGAGAGAGAGAG G ACCCCCCCC G CAAAAAAAA	С СGAGAGAGAGAGAGAGAGAG A ACCCCCCCCC A CAAAAAAAAAA	SNP indel SNP indel SNP indel SNP indel indel SNP SNP SNP SNP SNP SNP SNP	nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous synonymous nonsynonymous nonsynonymous nonsynonymous	HPP12_0070 HP0194 HP0194 HP0489 HP0489 HP0489 HP0489 HP0489 HP0489 HP0489	HPG27_8 HP0103 HP1243/HPG27_298 jhp1163 jhp1163	HPG27_298 HPG27_298
S69         S69	207029 214663 276989 315327 430922 546511 548965 548978 548978 548978 691071 691074 691077 691089 691091 691011 691113 691157	T         CGAGAGAGAGAGAGAGAG         G         ACCCCCCCC         G         C         G         C         G         C         CTTTTTT         ACC         G         AC         G         A         C         T         G         C         T         G         C	C CGAGAGAGAGAGAGAGAGAGAG A ACCCCCCCCC A CAAAAAAAA	SNP indel SNP indel SNP indel indel indel SNP SNP SNP SNP SNP SNP SNP	nonsynonymous intergenic nonsynonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous nonsynonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous	HPP12_0070 HP0194 HP0489 HP0489 HP0489 HP0489 HP0489 HP0489 HP0489 HP0489 HP0489 HP0489 HP0489	HPG27_8 HP0103 HP1243/HPG27_298 jhp1163 jhp1163	HPG27_298 HPG27_298
S69         S69	207029 214663 276989 315327 430922 546511 548965 548978 548978 548978 691071 691074 691077 691091 691013 691113 691157	T         CGAGAGAGAGAGAGAGAG         G         ACCCCCCCCC         G         C         G         C         CTTITITT         AC         G         AC         G         A         C         T         G         C         T         G         C	C CGAGAGAGAGAGAGAGAGAGAG A ACCCCCCCCC A CAAAAAAAA	SNP indel SNP indel SNP SNP indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous synonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous synonymous synonymous synonymous	HPP12_0070 HP0194 HP0489	HPG27_8 HP0103 HP1243/HPG27_298 jhp1163 jhp1163	HPG27_298 HPG27_298
S69         S69	207029 214663 276989 315327 430922 546511 548965 548978 548966 680519 691071 691071 691077 691089 691091 691101 691173 691175	T         CGAGAGAGAGAGAGAGAG         G         ACCCCCCCC         G         C         G         C         G         CTITITIT         AC         G         A         C         G         A         C         T         G         C         T         G         C         C         C         C         A         C         T         G         C         C         C         C         A         C         A         C         C         C         C         C         C         C         C         C         C         A          C          C         C          C          C          C <tbr>       C</tbr>	C CGAGAGAGAGAGAGAGAGAG A ACCCCCCCCC A CAAAAAAAA	SNP indel SNP indel SNP SNP indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous	HPP12_0070 HP0194 HP0489	HPG27_8 HP0103 HP1243/HPG27_298 jhp1163 jhp1163	HPG27_298 HPG27_298
S69         S69	207029 214663 276989 315327 430922 546511 548965 548978 548986 680519 691071 691071 691077 691089 691071 691101 691133 691157 691175 691179	T         CGAGAGAGAGAGAGAGAG         G         ACCCCCCCCC         G         C         G         C         G         CTTTTTT         ACC         G         A         C         G         A         C         G         C         G         A         C         G         A         C         G         A         C         T         G         C         A         C         C         A         C         C         C         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C	C           CGAGAGAGAGAGAGAGAGAG           A           ACCCCCCCCC           A           CAAAAAAAAAAAAA           T           T           CTITTITTT           ACCC           A           CC           A           C           A           C           A           C           A           C           A           G           A           C           A           G           A           G	SNP indel SNP indel SNP SNP indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous synonymous nonsynonymous nonsynonymous synonymous	HPP12_0070 HP0194 HP0489 HP0489 HP0489 HP0489 HP0489 HP0489 HP0489 HP0489 HP0489 HP0489 HP0489 HP0489 HP0489 HP0489	HPG27_8 HP0103 HP1243/HPG27_298 jhp1163 jhp1163	HPG27_298 HPG27_298
\$69         \$69           \$69         \$69	207029 214663 276989 315327 430922 546511 548965 548978 548986 680519 691071 691074 691077 691079 691091 691113 691173 691173 691179 691185	T         CGAGAGAGAGAGAGAGAG         G         ACCCCCCCC         G         CAAAAAAAAAAA         C         G         CTITITIT         AC         G         AC         G         AC         G         A         C         T         G         C         T         G         C         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A	С СGAGAGAGAGAGAGAGAGAGA A ACCCCCCCCC A CAAAAAAAAAA	SNP indel SNP indel SNP SNP indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous nonsynonymous nonsynonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous nonsynonymous nonsynonymous	HPP12_0070 HP0194 HP0489	HPG27_8 HP0103 HP1243/HPG27_298 jhp1163 jhp1163	HPG27_298 HPG27_298
\$69         \$69           \$69         \$69	207029 214663 276389 315327 430922 546511 548965 548978 548978 680519 691071 691074 691074 691077 691079 691091 691133 691173 691175 691175 691185 691185	T         CGAGAGAGAGAGAGAGAG         G         ACCCCCCCC         G         C         G         C         TITITIT         AC         G         AC         G         A         C         T         G         C         T         G         C         T         G         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C<	C CGAGAGAGAGAGAGAGAGAGAG A ACCCCCCCCC A CAAAAAAAA	SNP indel SNP indel SNP SNP indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous synonymous nonsynonymous nonsynonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous	HPP12_0070 HP0194 HP0489	HPG27_8 HP0103 HP1243/HPG27_298 jhp1163 jhp1163	HPG27_298 HPG27_298
869         869           869         869	207029 214663 276989 315327 430922 546511 548965 548978 54896 680519 691074 691077 691089 691077 691089 691091 691113 691175 691175 691175 691179 691189 691189	T CGAGAGAGAGAGAGAGAGAG G CCCCCCC G CAAAAAAAA	C           CGAGAGAGAGAGAGAGAGAG           A           ACCCCCCCCCC           A           C           T           T           CTITITITT           ACCC           A           C           A           C           A           C           A           C           A           C           A           C           A           G	SNP indel SNP indel SNP SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous nonsynonymous	HPP12_0070 HP0194 HP0489	HPG27_8 HP0103 HP1243/HPG27_298 jhp1163 jhp1163 HPP12_1088	HPG27_298 HPG27_298
\$69         \$69           \$69         \$69	207029 214663 276989 315327 430922 546511 548965 548978 54896 69077 691071 691071 691071 691071 691091 691101 691101 691173 691175 691179 691179 691185 691190 801836	T CGAGAGAGAGAGAGAGAGAG G CCCCCCC G CAAAAAAAA	C CGAGAGAGAGAGAGAGAGAGAG A ACCCCCCCCC A CAAAAAAAA	SNP indel SNP indel SNP SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous synonymous nonsynonymous	HPP12_0070 HP0194 HP0489	HPG27_8 HP0103 HP1243/HPG27_298 jhp1163 jhp1163	HPG27_298 HPG27_298
S69         S69           S69	207029 214663 276989 315327 430922 546511 548965 548978 54896 680519 691071 691071 691071 691071 691091 691011 691113 691173 691175 691179 691185 691185 691185 691185	T CGAGAGAGAGAGAGAGAGAG G CCCCCCC G CAAAAAAAA	C CGAGAGAGAGAGAGAGAGAGAG A ACCCCCCCCC A CAAAAAAAA	SNP indel SNP indel SNP SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous	HPP12_0070 HP0194 HP0489	HPG27_8 HP0103 HP1243/HPG27_298 jhp1163 jhp1163 HPP12_1088	HPG27_298 HPG27_298
\$69         \$69           \$69         \$69	207029 214663 276989 315327 430922 546511 548965 548978 548978 691071 691074 691077 691077 691079 691071 691073 691113 691173 691175 691179 691185 691179 691185 691189 691189	T CGAGAGAGAGAGAGAGAGAG G ACCCCCCCC G CAAAAAAAA	C CGAGAGAGAGAGAGAGAGAGAG A ACCCCCCCCC A CAAAAAAAA	SNP indel SNP indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous nonsynonymous	HPP12_0070 HP0194 HP0489	HPG27_8 HP0103 HP1243/HPG27_298 jhp1163 jhp1163 HPP12_1088	HPG27_298 HPG27_298
\$69         \$69           \$69	207029 214663 276989 315327 430922 546511 548965 548978 54896 680519 691071 691074 691077 691074 691077 691073 691071 691173 691173 691175 691175 691175 691175 691175 691185 691189 691185	T CGAGAGAGAGAGAGAGAGAG G CCCCCCC G CAAAAAAAA	C CGAGAGAGAGAGAGAGAGAGAG A ACCCCCCCCC A CAAAAAAAA	SNP indel SNP indel SNP SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous nonsynonymous	HPP12_0070 HP0194 HP0489	HPG27_8 HP1243/HPG27_298 jhp1163 jhp1163 HPP12_1088 HPP12_1088 jhp0540 HPG27_680	HPG27_298 HPG27_298
\$69         \$69           \$69         \$69	207029 214663 276989 315327 430922 546511 548965 548978 548978 680519 691074 691077 691074 691077 691079 691091 691091 691113 691157 691173 691175 691173 691175 691175 691189 691189 691189 691180 830053 839099 958702 1187376	T CGAGAGAGAGAGAGAGAGAG G C CAAAAAAAAAAAA	C CGAGAGAGAGAGAGAGAGAGAG A ACCCCCCCCC A CAAAAAAAA	SNP indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous nonsynonymous synonymous nonsynonymous intergenic intergenic	HPP12_0070 HP0194 HP0489	HPG27_8 HP0103 HP1243/HPG27_298 jhp1163 jhp1163 HPP12_1088	HPG27_298 HPG27_298
669         669           669         669           569         569           569	207029 214663 276989 315327 430922 546511 548965 548978 54896 680519 691071 691077 691079 691091 691071 691103 691175 691173 691175 691179 691189 691189 691189 691189 691189 691189 691189 691189 691189 691357	T CGAGAGAGAGAGAGAGAGAGAG G CCCCCCC G CAAAAAAAA	C CGAGAGAGAGAGAGAGAGAGAG A ACCCCCCCCC A CAAAAAAAA	SNP indel SNP indel SNP SNP indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous nonsynonymous intergenic intergenic nonsynonymous	HPP12_0070 HP0194 HP0489	HPG27_8 HP1243/HPG27_298 jhp1163 jhp1163 HPP12_1088 HPP12_1088 jhp0540 HPG27_680	HPG27_298 HPG27_298
\$69         \$69           \$69	207029 214663 276989 315327 430922 546511 548965 548978 548978 69077 691071 691071 69107 69107 69109 691091 691101 691175 691175 691179 691175 691179 691185 691190 801836 830053 839999 958702 1187376	T CGAGAGAGAGAGAGAGAGAG G CCCCCCC G CAAAAAAAA	C CGAGAGAGAGAGAGAGAGAGAG A ACCCCCCCCC A CCAAAAAAAA	SNP indel SNP indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous synonymous	HPP12_0070 HP0194 HP0489	HPG27_8 HP1243/HPG27_298 jhp1163 jhp1163 HPP12_1088 HPP12_1088 jhp0540 HPG27_680	HPG27_298 HPG27_298
\$69           \$69      \$69	207029 214663 276989 315327 430922 548965 548968 680519 691071 691074 691077 691077 691079 691071 691073 691103 691113 691173 691173 691173 691189 691189 691189 691189 691189 830336 830939 958702 1187376 1192157	T CGAGAGAGAGAGAGAGAGAG G ACCCCCCCC G CAAAAAAAA	C CGAGAGAGAGAGAGAGAGAGAG A ACCCCCCCCC A CAAAAAAAA	SNP indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous intergenic nonsynonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous nonsynonymous synonymous synonymous synonymous synonymous	HPP12_0070 HP0194 HP0489 HP048	HPG27_8 HP1243/HPG27_298 jhp1163 jhp1163 HPP12_1088 HPP12_1088 jhp0540 HPG27_680	HPG27_298 HPG27_298
569         569           569	207029 214663 276989 315327 430922 548511 548965 548968 680519 691071 691074 691077 691074 691077 691073 691173 691173 691173 691175 691179 691185 691190 80185 691190 80185 691191 80185 691192 101275 101275 101277 101277 101277 101277 101277 101277 101277 101277 101277 101277 101277 101277 101277 101277	T CGAGAGAGAGAGAGAGAGAG G CCCCCCC G CAAAAAAAA	C GAGAGAGAGAGAGAGAGAGAG A ACCCCCCCCC A CAAAAAAAA	SNP indel SNP indel SNP SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous nonsynonymous intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous intergenic intergenic intergenic synonymous synonymous synonymous	HPP12_0070 HP0194 HP0489 HP048	HPG27_8 HP1243/HPG27_298 jhp1163 jhp1163 HPP12_1088 HPP12_1088 jhp0540 HPG27_680	HPG27_298 HPG27_298
\$69         \$69           \$69	207029 214663 276989 315327 430922 546511 548965 548978 548978 691071 691074 691074 691077 691079 691091 691091 691193 691173 691173 691173 691175 691173 691175 691185 691185 691189 691185 691180 830053 830909 958702 1187376 1192157 1332680 1332893 1332893	T CGAGAGAGAGAGAGAGAGAG G C CAAAAAAAAAAAA	C CGAGAGAGAAGAGAGAGAGAG A ACCCCCCCCC A CCAAAAAAAA	SNP indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous nonsynonymous synonymous nonsynonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous intergenic nonsynonymous synonymous synonymous synonymous nonsynonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous nonsynonymous synonymous nonsynonymous synonymous	HPP12_0070 HP0194 HP0489 HP048	HPG27_8 HP1243/HPG27_298 jhp1163 jhp1163 HPP12_1088 HPP12_1088 jhp0540 HPG27_680	HPG27_298 HPG27_298
869         869           869	207029 214663 276989 315327 430922 546511 548965 548978 548978 69071 691077 691077 691077 691079 691091 691103 691175 691175 691179 691179 691189 691189 691189 691189 691189 691189 691189 691189 1001 830053 839999 558702 1187376 1132280 1132280	T CGAGAGAGAAGAGAGAGAGAG G CCCCCCC G CAAAAAAAA	C CGAGAGAGAAGAGAGAGAGAGAG A ACCCCCCCCC A CAAAAAAAA	SNP indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous intergenic nonsynonymous intergenic intergenic intergenic intergenic nonsynonymous synonymous synonymous intergenic intergenic intergenic intergenic nonsynonymous synonymous	HPP12_0070 HP0194 HP0489 HP048	HPG27_8 HP1243/HPG27_298 jhp1163 jhp1163 HPP12_1088 HPP12_1088 jhp0540 HPG27_680	HPG27_298 HPG27_298
869         869           869	207029 214663 276989 315327 430922 546511 548965 680519 691071 691071 691077 691079 691071 691071 691071 691173 691175 691173 691175 691173 691175 691173 691185 691190 801836 830053 830999 958702 1187376 1182376 1182376 1332690 133288	T CGAGAGAGAAGAGAGAGAGAG G CAAAAAAAAAAAAA	C CGAGAGAGAGAGAGAGAGAGAG A ACCCCCCCCC A CCAAAAAAAA	SNP indel SNP indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous nonsynonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous synonymous synonymous synonymous intergenic nonsynonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous	HPP12_0070 HP0194 HP0489 HP048	HPG27_8 HP1243/HPG27_298 jhp1163 jhp1163 HPP12_1088 HPP12_1088 jhp0540 HPG27_680	HPG27_298 HPG27_298
569           569      569	207029 214663 276989 315327 430922 548965 548968 680519 691071 691074 691077 691077 691077 691077 691073 691173 691173 691173 691173 691173 691189 691189 691189 691189 691189 691189 131277 691773 69175 69175 79175 79	T CGAGAGAGAAGAGAGAGAGAG G ACCCCCCCC G CAAAAAAAA	C CGAGAGAGAAGAGAGAGAGAGAG A ACCCCCCCCC A CAAAAAAAA	SNP indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous nonsynonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous	HPP12_0070 HP0194 HP0489 HP048	HPG27_8 HP1243/HPG27_298 jhp1163 jhp1163 HPP12_1088 HPP12_1088 jhp0540 HPG27_680	HPG27_298 HPG27_298
569           569      569	207029 214663 276989 315327 430922 548511 548965 54896 680519 691071 691074 691074 691077 69107 69107 69107 691101 691113 691157 691173 691175 691179 691185 691189 691185 691189 691190 1331285 1187376 1192177 133288 133289 133289 133289	T CGAGAGAGAAGAGAGAGAG G CAAAAAAAAAAAAA C C CAAAAAAAA	C CGAGAGAGAAGAGAGAGAGAG A ACCCCCCCCC A CAAAAAAAA	SNP indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous intergenic intergenic intergenic intergenic synonymous	HPP12_0070 HP0194 HP0489 HP048	HPG27_8 HP1243/HPG27_298 jhp1163 jhp1163 HPP12_1088 HPP12_1088 jhp0540 HPG27_680	HPG27_298 HPG27_298
569         569           569	207029 214663 276989 315327 430922 546511 548965 548978 548978 691071 691074 691074 691074 691077 691073 691071 691193 691173 691173 691173 691173 691173 691173 691185 691190 80183 691190 80183 691190 13129 691185 691190 13129 691185 691185 691185 691185 691190 13129 691185 691185 691190 13129 691185 691190 13129 691185 691190 691185 691190 691185 691190 691185 691190 691185 691190 131290 1332890 1332906 133297 1332996	T CGAGAGAGAAGAGAGAGAG G CCAAAAAAAAAAAA C C CAAAAAAAA	C CGAGAGAGAAGAGAGAGAGAG A ACCCCCCCCC A CCAAAAAAAA	SNP indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous nonsynonymous nonsynonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous	HPP12_0070 HP0194 HP0489 HP048	HPG27_8 HP1243/HPG27_298 jhp1163 jhp1163 HPP12_1088 HPP12_1088 jhp0540 HPG27_680	HPG27_298 HPG27_298
669         669           569         569           569	207029 214663 276989 315327 430922 546511 548965 548978 54896 680519 691074 691077 691074 691077 691073 691073 691173 691173 691173 691173 691173 691173 691173 691179 691183 691183 691183 691187 691187 691189 691189 13128 691189 13128 830999 133288 133288 1332996 1332996 1332995	T         CGAGAGAGAGAGAGAGAG         G         ACCCCCCCC         G         C         G         C         G         C         G         CITTITTT         AC         G         AC         G         A         C         T         G         C         T         G         C         C         C         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         C         T         C         C         C         C         C	C CGAGAGAGAAGAGAGAGAGAGA A CCCCCCCCC A CAAAAAAAA	SNP indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous synonymous synonymous nonsynonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic nonsynonymous synonymous synonymous synonymous nonsynonymous nonsynonymous intergenic nonsynonymous synonymous	HPP12_0070 HP0194 HP0489 HP048	HPG27_8 HP1243/HPG27_298 jhp1163 jhp1163 HPP12_1088 HPP12_1088 jhp0540 HPG27_680	HPG27_298 HPG27_298
669         669           669         669           569         569           569	207029 214663 276989 315327 430922 546511 548965 64071 691074 691077 691074 691077 691079 691073 691175 691173 691175 691173 691175 691179 691175 691179 691189 691189 691189 691189 691189 13028 839999 358702 113736 1332690 133288 1332897 1332995	T         CGAGAGAGAGAGAGAGAG         G         ACCCCCCCCC         G         C         G         C         G         C         G         CTITITTT         AC         G         AC         G         A         C         T         G         C	C CGAGAGAGAAGAGAGAGAGAGA A CCCCCCCCC A CAAAAAAAA	SNP indel SNP indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous synonymous nonsynonymous synonymous	HPP12_0070 HP0194 HP0194 HP0489 HP048	HPG27_8 HP1243/HPG27_298 jhp1163 jhp1163 HPP12_1088 HPP12_1088 jhp0540 HPG27_680	HPG27_298 HPG27_298
569           569      569	207029 214663 276989 315327 430922 548965 548968 680519 691071 691074 691077 691077 691077 691077 691073 691173 691173 691173 691173 691173 691183 691189 691189 691189 691189 691189 69173 69175 6919	T CGAGAGAGAAGAGAGAGAG G ACCCCCCCC G CAAAAAAAA	C CGAGAGAGAAGAGAGAGAGAG A ACCCCCCCCC A CAAAAAAAA	SNP indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous intergenic intergenic intergenic intergenic nonsynonymous synonymous	HPP12_0070 HP0194 HP0194 HP0489 HP048	HPG27_8 HP1243/HPG27_298 jhp1163 jhp1163 HPP12_1088 HPP12_1088 jhp0540 HPG27_680	HPG27_298 HPG27_298
669         669           669         669           569         569           569	207029 214663 276989 315327 430922 546511 548965 64071 691074 691077 691074 691077 691079 691073 691175 691173 691175 691173 691175 691179 691175 691179 691189 691189 691189 691189 691189 13028 839999 358702 113736 1332690 133288 1332897 1332995	T         CGAGAGAGAGAGAGAGAG         G         ACCCCCCCCC         G         C         G         C         G         C         G         CTITITTT         AC         G         AC         G         A         C         T         G         C	C CGAGAGAGAAGAGAGAGAGAGA A CCCCCCCCC A CAAAAAAAA	SNP indel SNP indel SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous intergenic nonsynonymous intergenic nonsynonymous intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous synonymous nonsynonymous synonymous	HPP12_0070 HP0194 HP0194 HP0489 HP048	HPG27_8 HP1243/HPG27_298 jhp1163 jhp1163 HPP12_1088 HPP12_1088 jhp0540 HPG27_680	HPG27_298 HPG27_298

S69	1483092		A	SNP	nonsynonymous	HPG27_298		
S69	1483202	G	A	SNP	nonsynonymous	HPG27_298		
S69	1483269	Α	G	SNP	nonsynonymous	HPG27_298		
S69	1592786	GT	G	indel	frameshift deletion	HP1354		
S69	1663529	GTTTTT	GTTTT	indel	1 bp deletion			
\$70	99327	c	T	SNP	synonymous	jhp0935		
S70	168379	c	T	SNP	synonymous	HP1547	1104502	lb-1400
S70 S70	199597	c c	T	SNP	intergenic		HP1582 HPPC_00115	jhp1488
\$70	232964 276989	G	A A	SNP SNP	intergenic	HPP12_0070	HPPC_00115	
S70	315327	ACCCCCCCCCC	ACCCCCCCCCC	indel	intergenic	HPP12_0070	HP0103	
\$70	374756	CGGGGGGGGGGGGGG	CGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG	indel	frameshift insertion	jhp0151	11/0105	
\$70	430922	G	A	SNP	nonsynonymous	HP0194		
\$70	464722	T	G	SNP	synonymous	HP0227		
S70	464740	С	A	SNP	synonymous	HP0227		
S70	464743	А	G	SNP	synonymous	HP0227		
S70	464764	A	G	SNP	synonymous	HP0227		
S70	464765	Т	C	SNP	nonsynonymous	HP0227		
S70	464767	G	Α	SNP	synonymous	HP0227		
S70	464773	G	Α	SNP	synonymous	HP0227		
S70	464779	с	Т	SNP	synonymous	HP0227		
S70	464788	G	Α	SNP	synonymous	HP0227		
S70	464797	A	G	SNP	synonymous	HP0227		
\$70	464800	G	A	SNP	synonymous	HP0227		
\$70	464803	G CAAAAAAAAAAAAA	A	SNP	synonymous	HP0227	HD1242/UDC27_200	
S70 S70	546511 548957	СААААААААААААА	CAAAAAAAAAAAAAA T	indel SNP	intergenic		HP1243/HPG27_298	HPG27_298
S70 S70	548957	с	Т	SNP	intergenic		jhp1163	HPG27_298 HPG27_298
S70 S70	548965 548978	G	Т	SNP	intergenic intergenic		jhp1163 jhp1163	HPG27_298 HPG27_298
S70	548986	ститит	СТПТТТТТ	indel	intergenic		jhp1163	HPG27_298
S70	691071	G	A	SNP	synonymous	HP0489	j.ip1100	11 027_250
\$70	691074	A	c	SNP	synonymous	HP0489		
\$70	691077	G	A	SNP	nonsynonymous	HP0489		
S70	691089	A	G	SNP	synonymous	HP0489		
S70	691091	с	A	SNP	nonsynonymous	HP0489		
S70	691101	Т	C	SNP	synonymous	HP0489		
S70	691113	G	Т	SNP	nonsynonymous	HP0489		
S70	691157	c	Α	SNP	nonsynonymous	HP0489		
S70	691173	с	Α	SNP	synonymous	HP0489		
S70	691175	A	G	SNP	nonsynonymous	HP0489		
S70	691179	С	G	SNP	synonymous	HP0489		
S70	691185	A	G	SNP	nonsynonymous	HP0489		
S70	691189	c	G	SNP	nonsynonymous	HP0489		
S70	691190	A	С	SNP	nonsynonymous	HP0489	16-0540	
S70 S70	801836 830053	GAAAAAAAAAAAAA	GAAAAAAAAAAAAA T	indel SNP	intergenic nonsynonymous	HPP12_0617	jhp0540	
\$70	839999	т	C	SNP	nonsynonymous	HPB8 818		
\$70	879985	c	т	SNP	nonsynonymous	HP0656		
\$70	958702	СААААААААААААААА	СААААААААААААААААААА	indel	intergenic	11 0000	HPG27_680	
S70	1043704	GTTTTTTTTTTTT	GTTTTTTTTTTTTT	indel	frameshift insertion/intergenic	HPnc4170	HP0811	HPnc4160
S70	1187376	ATTTTTTT	ATTTTTTT	indel	intergenic		HP0947	
S70	1192157	т	с	SNP	nonsynonymous	HP0953		
S70	1332690	с	Α	SNP	synonymous	HPATCC43504_01275		
S70	1332870	с	Т	SNP	synonymous	HPATCC43504_01275		
S70	1332888	Т	G					
S70	1332893	-		SNP	synonymous	HPATCC43504_01275		
S70		Т	G	SNP SNP	synonymous	HPATCC43504_01275 HPATCC43504_01275		
S70	1332897		G	SNP SNP		HPATCC43504_01275 HPATCC43504_01275		
	1332900	A G	G T	SNP SNP SNP	nonsynonymous	HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275		
S70	1332900 1332906	A G C	G T T	SNP SNP SNP SNP	nonsynonymous synonymous	HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275		
S70	1332900 1332906 1332954	A G C T	G T G	SNP SNP SNP SNP SNP	nonsynonymous synonymous synonymous synonymous synonymous	HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275		
S70 S70	1332900 1332906 1332954 1332987	A G C T T	G T G C	SNP SNP SNP SNP SNP SNP	nonsynonymous synonymous synonymous synonymous synonymous synonymous	HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275		
S70 S70 S70	1332900 1332906 1332954 1332987 1332996	A G C T T T	G T T G C G	SNP SNP SNP SNP SNP SNP SNP	nonsynonymous synonymous synonymous synonymous synonymous synonymous synonymous	HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275		
\$70 \$70 \$70 \$70	1332900 1332906 1332954 1332987 1332996 1332997	A G C T T T G	G T T G C G C	SNP SNP SNP SNP SNP SNP SNP	nonsynonymous synonymous synonymous synonymous synonymous synonymous synonymous nonsynonymous	HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275		
\$70 \$70 \$70 \$70 \$70	1332900 1332906 1332954 1332987 1332996 1332997 1332999	A G C T T T G T	GTT _T	SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous synonymous synonymous synonymous synonymous synonymous nonsynonymous synonymous synonymous	HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275		
\$70 \$70 \$70 \$70 \$70 \$70	1332900 1332906 1332954 1332987 1332996 1332997 1332999 1592784	A G C T T T G T T ATGTG	G T T G C G C C C C ATG	SNP SNP SNP SNP SNP SNP SNP SNP SNP indel	nonsynonymous synonymous synonymous synonymous synonymous synonymous nonsynonymous synonymous frameshift deletion	HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275		
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S70           S70           S70           S70           S70           S70           S70           S71	1332900 1332954 1332954 1332997 1332999 1592784 1592784 1592784 159278 159278 159377 276889 315337 430922 546511 548965 54896 691071 691074 691074 691013 691113	A         G         C         T         G         T         G         T         G         T         G         T         G         T         G         C         C         G         C         G         C         G         C         G         A         G         A         G         A         C         T         G         A         C         T         G         A         C         T         G         C         T         G         C         T         G         C         T         G         C         T         G         C         T         G         C <t< td=""><td>G         T         G         C         G         C         C         ATG         G         T         T         T         CA         A         CAAAAAAAAAAAAA         T         T         CA         A         CAAAAAAAAAAAAA         T         A         CA         A         CA         A         CA         A         C         A         C         A         C         A         G         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A&lt;</td><td>SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP</td><td>nonsynonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous ronsynonymous frameshift deletion synonymous synonymous synonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous synonymous</td><td>HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HP1354 HP1354 HP1354 HP1354 HP1354 HP1354 HP149 HP0489 HP0489 HP0489 HP0489 HP0489 HP0489 HP0489 HP0489 HP0489 HP0489 HP0489 HP0489 HP0489 HP0489</td><td>HP0103 HP1243/HPG27_298 jhp1163 jhp1163</td><td>HPG27_298 HPG27_298</td></t<>	G         T         G         C         G         C         C         ATG         G         T         T         T         CA         A         CAAAAAAAAAAAAA         T         T         CA         A         CAAAAAAAAAAAAA         T         A         CA         A         CA         A         CA         A         C         A         C         A         C         A         G         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A<	SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous ronsynonymous frameshift deletion synonymous synonymous synonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous synonymous	HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HP1354 HP1354 HP1354 HP1354 HP1354 HP1354 HP149 HP0489 HP0489 HP0489 HP0489 HP0489 HP0489 HP0489 HP0489 HP0489 HP0489 HP0489 HP0489 HP0489 HP0489	HP0103 HP1243/HPG27_298 jhp1163 jhp1163	HPG27_298 HPG27_298
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S70           S70           S70           S70           S70           S70           S71           S71      S71      S71	1332900 1332954 1332954 1332997 1332999 1592784 1592784 1592784 159278 159278 159377 276889 315337 430922 546511 548965 54896 691071 691074 691074 691013 691113	A         G         C         T         G         T         G         T         G         T         G         T         G         T         G         C         C         G         C         G         C         G         C         G         A         G         A         G         A         C         T         G         A         C         T         G         A         C         T         G         C         T         G         C         T         G         C         T         G         C         T         G         C         T         G         C <t< td=""><td>G         T         G         C         G         C         C         ATG         G         T         T         T         CA         A         CAAAAAAAAAAAAA         T         T         CA         A         CAAAAAAAAAAAAA         T         A         CA         A         CA         A         CA         A         C         A         C         A         C         A         G         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A&lt;</td><td>SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP</td><td>nonsynonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous ronsynonymous frameshift deletion synonymous synonymous synonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous synonymous</td><td>HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HP1354 HP1354 HP1354 HP1354 HP1354 HP1354 HP149 HP0489 HP0489 HP0489 HP0489 HP0489 HP0489 HP0489 HP0489 HP0489 HP0489 HP0489 HP0489 HP0489 HP0489</td><td>HP0103 HP1243/HPG27_298 jhp1163 jhp1163</td><td>HPG27_298 HPG27_298</td></t<>	G         T         G         C         G         C         C         ATG         G         T         T         T         CA         A         CAAAAAAAAAAAAA         T         T         CA         A         CAAAAAAAAAAAAA         T         A         CA         A         CA         A         CA         A         C         A         C         A         C         A         G         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A<	SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous ronsynonymous frameshift deletion synonymous synonymous synonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous synonymous	HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HP1354 HP1354 HP1354 HP1354 HP1354 HP1354 HP149 HP0489 HP0489 HP0489 HP0489 HP0489 HP0489 HP0489 HP0489 HP0489 HP0489 HP0489 HP0489 HP0489 HP0489	HP0103 HP1243/HPG27_298 jhp1163 jhp1163	HPG27_298 HPG27_298

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\$71	879985		T	SNP	nonsynonymous	HP0656		
\$71	958702		САААААААААААААААА	indel	intergenic		HPG27_680	
\$71	1043704		GTTTTTTTTTTTTTTT	indel	frameshift insertion/intergenic	HPnc4170	HP0811	HPnc4160
S71	1187376	ATTTTTTT	ATTTTTTT	indel	intergenic		HP0947	
S71	1192157	т	C	SNP	nonsynonymous	HP0953		
S71	1318502	С	т	SNP	intergenic	jhp1031		
S71	1332690	с	A	SNP	synonymous	HPATCC43504_01275		
S71	1332900	G	GT	indel	frameshift deletion	HPATCC43504_01275		
S71	1332906	с	Т	SNP	synonymous	HPATCC43504_01275		
\$71	1332954	т	G	SNP	synonymous	HPATCC43504_01275		· · · · · · · · · · · · · · · · · · ·
S71	1332987	Т	C	SNP	synonymous	HPATCC43504_01275		
S71	1332996	Т	G	SNP	synonymous	HPATCC43504_01275		
S71	1332997	G	C	SNP	nonsynonymous	HPATCC43504_01275		
S71	1332999	Т	C	SNP	synonymous	HPATCC43504_01275		
S71	1592135	G	A	SNP	nonsynonymous	HP1350		
S71	1592784	ATGTG	ATG	indel	frameshift deletion	HP1354		
S72	99327	с	Т	SNP	synonymous	jhp0935		
S72	168379	с	Т	SNP	synonymous	HP1547		
S72	199597	с	Т	SNP	intergenic		HP1582	jhp1488
S72	276989	G	A	SNP	nonsynonymous	HPP12_0070		
S72	315327	ACCCCCCCCC	ACCCCCCCCCC	indel	intergenic		HP0103	
S72	430922	G	A	SNP	nonsynonymous	HP0194		
S72	466390	G	A	SNP	intergenic		HP0227	
S72	466443	G	A	SNP	intergenic		HP0227	
S72	546511	СААААААААААА	СААААААААААА	indel	intergenic		HP1243/HPG27_298	
S72	691071	G	A	SNP	synonymous	HP0489		
S72	691074	A	C	SNP	synonymous	HP0489		
S72	691077	G	A	SNP	nonsynonymous	HP0489		
S72	691089	A	G	SNP	synonymous	HP0489		
S72	691091	C	A	SNP	nonsynonymous	HP0489		
S72	691101	Т	C	SNP	synonymous	HP0489		
S72	691113	G	т	SNP	nonsynonymous	HP0489		
S72	691157	c	A	SNP	nonsynonymous	HP0489		
S72	691173	C	A	SNP	synonymous	HP0489		
S72	691175	A	G	SNP	nonsynonymous	HP0489		
S72	691179	C	G	SNP	synonymous	HP0489		
S72	691185	A	G	SNP	nonsynonymous	HP0489		
S72	691189	c	G	SNP	nonsynonymous	HP0489		
S72	691190	A	С	SNP	nonsynonymous	HP0489		
S72	801836	GAAAAAAAAAAA	GAAAAAAAAAAAA	indel	intergenic		jhp0540	
S72 S72	801836 830053		GAAAAAAAAAAAAA T	indel SNP	intergenic nonsynonymous	HPP12_0617	jhp0540	
		C				HPP12_0617 HP0617	jhp0540	
S72	830053	C C	Т	SNP	nonsynonymous	-	jhp0540	
\$72 \$72 \$72 \$72 \$72	830053 836443 839999 879985	C C T C	т т С т	SNP SNP	nonsynonymous synonymous	HP0617 HPB8_818 HP0656		
\$72 \$72 \$72 \$72 \$72 \$72 \$72	830053 836443 839999 879985 1043704	С С Т С GTTTTTTTTTT	т т С т бПППППППППП	SNP SNP SNP SNP indel	nonsynonymous synonymous nonsynonymous	HP0617 HPB8_818	HP0811	HPnc4160
\$72 \$72 \$72 \$72 \$72 \$72 \$72 \$72	830053 836443 839999 879985 1043704 1187376	С С Т С GTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	т т С т бппппппппп Аппппп	SNP SNP SNP SNP indel indel	nonsynonymous synonymous nonsynonymous nonsynonymous frameshift insertion/intergenic intergenic	HP0617 HPB8_818 HP0656 HPnc4170		HPnc4160
S72	830053 836443 839999 879985 1043704 1187376 1192157	С С Т С С С С С С С С С С С С С С С С С	T T C T G G IIIIIIIIIIIIIIIIIIIIIIIIIIIII	SNP SNP SNP indel indel SNP	nonsynonymous synonymous nonsynonymous nonsynonymous frameshift insertion/intergenic intergenic nonsynonymous	HP0617 HPB8_818 HP0656 HPnc4170 HP0953	HP0811	HPnc4160
S72	830053 836443 839999 879985 1043704 1187376 1192157 1332690	С С Т С GTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	т т С т бппппппппп Аппппп	SNP SNP SNP SNP indel indel	nonsynonymous synonymous nonsynonymous nonsynonymous frameshift insertion/intergenic intergenic	HP0617 HPB8_818 HP0656 HPnc4170 HP0953 HPATCC43504_01275	HP0811	HPnc4160
S72	830053 836443 839999 879985 1043704 1187376 1192157 1332690 1332900	C C C G T C G T T C G T T T C G G G G G	т т с бітпіпіпіпі аптіпіп с А т	SNP SNP SNP indel indel SNP SNP SNP	nonsynonymous synonymous nonsynonymous nonsynonymous frameshift insertion/intergenic intergenic nonsynonymous	HP0617 HP88_818 HP0656 HPnc4170 HP0953 HPATCC43504_01275 HPATCC43504_01275	HP0811	HPnc4160
S72	830053 836443 839999 879985 1043704 1187376 1192157 1332690 1332900 1332906	С С Т С С С С С С С С С С С	T T C T GIIIIIIIIII AIIIIIII C A T T T	SNP SNP SNP indel indel SNP SNP SNP	nonsynonymous synonymous nonsynonymous nonsynonymous frameshift insertion/intergenic intergenic nonsynonymous synonymous	HP0617 HP082_818 HP0656 HPnc4170 HP0953 HPATCC43504_01275 HPATCC43504_01275	HP0811	HPnc4160
S72	830053 836443 839999 879985 1043704 1187376 1192157 1332690 1332900 1332906 1332954	С С Т С GTTTTTTTTTT АТТТТТТ Т С С С С С Т Т	т т С т б птптпт с А т т б б	SNP SNP SNP indel indel SNP SNP SNP SNP SNP	nonsynonymous synonymous nonsynonymous nonsynonymous frameshift insertion/intergenic intergenic nonsynonymous synonymous synonymous synonymous synonymous synonymous	HP0617 HP082_818 HP0656 HPnc4170 HP0953 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275	HP0811	HPnc4160
S72	830053 836443 839999 879985 1043704 1187376 1192157 1332690 1332906 1332954 1332987	C C G G G G G G G G G G G G G G G G G G	T T T C G G C T T T C C C C C C C C C C	SNP SNP SNP indel indel SNP SNP SNP SNP SNP	nonsynonymous synonymous nonsynonymous nonsynonymous frameshift insertion/intergenic intergenic nonsynonymous synonymous synonymous synonymous synonymous synonymous	HP0617 HP082_818 HP0656 HPnc4170 HP0953 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275	HP0811	HPnc4160
S72	830053 836443 839999 879985 1043704 1187376 1192157 1332690 1332906 1332954 1332987 1332996	C C C T T C G HITHITH T C C G G C C T T T T C T T T C C T T T T	T         T         C         T         GITTITITITITI         AITTITITI         C         A         T         G         C         G         G         G         G         G         G         G         G	SNP SNP SNP indel indel SNP SNP SNP SNP SNP SNP SNP	nonsynonymous synonymous nonsynonymous frameshift insertion/intergenic intergenic nonsynonymous synonymous synonymous synonymous synonymous synonymous synonymous	HP0617 HP082_818 HP0556 HPnc4170 HP0953 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275	HP0811	HPnc4160
S72	830053 836443 839999 879985 1043704 1187376 132260 1332906 1332906 1332954 1332996 1332997	C C C C T C GITITITITIT T C C G G C C T T T G G G C G G G G G	T         T         C         T         GITTITITITI         A         T         G         C         G         C         G         C         G         C         G         C         G         C         G         C         G         C         G         C         G         C         G         C         G         C         G         C         G         C         G         C         G         C         G         C	SNP SNP SNP indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous synonymous nonsynonymous frameshift insertion/intergenic intergenic nonsynonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous nonsynonymous	HP0617 HP082_818 HP0656 HPnc4170 HP0953 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275	HP0811	HPnc4160
S72	830053 836443 839999 879985 1043704 1187376 1332690 1332906 1332954 1332954 1332996 1332997 1332999	C C C C T C G T T C C C C C C C C C C C	T         T         C         T         GITTITITITITI         C         A         T         G         C         G         C         G         C         G         C         G         C         G         C <t< td=""><td>SNP SNP SNP indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP</td><td>nonsynonymous synonymous nonsynonymous frameshift insertion/intergenic intergenic norsynonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous</td><td>HP0617           HP08_818           HP0656           HPnc4170           HP353           HPATCC43504_01275           HPATCC43504_01275           HPATCC43504_01275           HPATCC43504_01275           HPATCC43504_01275           HPATCC43504_01275           HPATCC43504_01275           HPATCC43504_01275           HPATCC43504_01275</td><td>HP0811</td><td>HPnc4160</td></t<>	SNP SNP SNP indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous synonymous nonsynonymous frameshift insertion/intergenic intergenic norsynonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous	HP0617           HP08_818           HP0656           HPnc4170           HP353           HPATCC43504_01275           HPATCC43504_01275           HPATCC43504_01275           HPATCC43504_01275           HPATCC43504_01275           HPATCC43504_01275           HPATCC43504_01275           HPATCC43504_01275           HPATCC43504_01275	HP0811	HPnc4160
S72           S73	830053 836443 839999 879985 1043704 1187376 1192157 1332900 1332906 1332957 1332997 1332999 1332997 1332997	C C C C T C G T T C C C C C C C C C C C	T         T         C         T         GTITITITITITI         C         A         T         G         C         G         C         G         C         G         C         G         C         G         C         G         C         G         C         G         C         G         C         T <t< td=""><td>SNP SNP SNP indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP</td><td>nonsynonymous synonymous nonsynonymous frameshift insertion/intergenic intergenic nonsynonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous</td><td>HP0617 HP082_818 HP0656 HPnc4170 HP0953 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275</td><td>HP0811</td><td>HPnc4160</td></t<>	SNP SNP SNP indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous synonymous nonsynonymous frameshift insertion/intergenic intergenic nonsynonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous	HP0617 HP082_818 HP0656 HPnc4170 HP0953 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275	HP0811	HPnc4160
S72           S73	830053 836443 839999 879985 1043704 1187376 1132157 1332906 1332906 1332996 1332996 1332997 1332997 1332997 1332997 1332997 1332997	C C C T T C G G G C T T C G G G G C T T G G G C T C C C C	T         T         C         T         GITTITITITITI         ATTITITI         C         A         T         G         C         G         C         G         C         G         C         G         C         G         C         T	SNP SNP SNP indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous synonymous nonsynonymous nonsynonymous frameshift insertion/intergenic intergenic nonsynonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous	HP0617           HP08_818           HP0656           HPnc4170           HP353           HPATCC43504_01275           HPATCC43504_01275           HPATCC43504_01275           HPATCC43504_01275           HPATCC43504_01275           HPATCC43504_01275           HPATCC43504_01275           HPATCC43504_01275           HPATCC43504_01275	HP0811 HP0947	
S72           S73           S73	830053 836443 839999 879985 1043704 1187376 1192157 1332690 1332906 1332954 1332996 1332996 1332997 1332997 1332997 1332997 168379 199597	C C C C T T C G G C T T C G G C T T C G G C T T C C C C	T         T         C         T         GITTITITITI         ATTTITIT         C         A         T         G         C         G         C         G         C         G         C         G         C         G         C         T         T         T         T         T         T         T         T         T         T         T         T         T         T         T	SNP SNP SNP indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous synonymous nonsynonymous nonsynonymous frameshift insertion/intergenic intergenic nonsynonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous	HP0617 HP082_818 HP0556 HPnc4170 HP0953 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275	HP0811	HPnc4160
S72           S73           S73	830053 836443 839999 879985 1043704 1182757 1332690 1332900 1332906 133294 1332995 1332995 1332997 1332999 1332997 1332997 1332997 1332997 158379	C C C C T T C G H H H H H H H H H H H H H H H H H H	T         T         C         T         GITTITITITITI         C         A         T         G         C         G         C         G         C         G         C         G         C         G         C         T         T         T         T         T         T         T         A	SNP SNP SNP indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous synonymous nonsynonymous nonsynonymous frameshift insertion/intergenic intergenic nonsynonymous synonymous synonymous synonymous synonymous synonymous nonsynonymous synonymous synonymous synonymous synonymous synonymous synonymous intergenic nonsynonymous	HP0617 HP082_818 HP0656 HPnc4170 HP0953 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HP019_1	HP0811 HP0947	
S72           S73           S73           S73	830053 836443 839999 879985 1043704 1187376 11322690 1332906 1332906 1332995 1332997 1332997 1332997 1332997 1332997 1332997 1332997 1332997 29327 168379 199597 226261 276989	C C C C G H H H H H H H H H H H H H H H	T         T         G         T         G         T         C         A         T         G         C         G         C         G         C         G         C         G         C         T         T         T         T         T         T         A         A	SNP SNP SNP indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous synonymous nonsynonymous frameshift insertion/intergenic intergenic nonsynonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous nonsynonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous	HP0617 HP082_818 HP0656 HPnc4170 HP0953 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HP019_1 HP12_0070	HP0811 HP0947	
S72           S73           S73           S73           S73           S73	830053 836443 839999 879985 1043704 1187376 1332690 1332906 1332906 1332996 1332995 1332997 1332997 1332999 9327 168379 199597 199597 226261 276989 430922	C         C         T         C         ATTITITIT         T         C         G         T         G         T         G         T         G         T         G         T         G         T         G         T         G         T         G	T         T         GITTITITITITI         GITTITITITI         C         A         T         G         C         G         C         G         C         G         C         G         C         G         C         T         T         T         A         A         A         A	SNP SNP SNP indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous synonymous nonsynonymous frameshift insertion/intergenic intergenic onosynonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous norsynonymous synonymous norsynonymous norsynonymous intergenic norsynonymous norsynonymous	HP0617 HP082_818 HP0656 HPnc4170 HP0953 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HP019_1	HP0811 HP0947 HP0947	jhp1488
S72           S73           S73           S73           S73           S73	830053 836443 839999 879985 1043704 1187376 11322690 1332906 1332954 1332954 1332954 1332997 1332997 1332997 1332997 168379 99327 168379 195597 22661 276989 276985	C C C C G G IIIIIIIIII T C G G G G G G G G G G G G G G G C	T         T         C         T         GITTITITITITI         ATTTTTT         C         A         T         G         C         G         C         G         C         G         C         G         C         G         C         T         T         T         T         A         A         A         A         A         T         T	SNP SNP SNP indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous synonymous nonsynonymous nonsynonymous frameshift insertion/intergenic intergenic nonsynonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous intergenic nonsynonymous intergenic	HP0617 HP082_818 HP0656 HPnc4170 HP0953 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HP019_1 HP12_0070	HP0811 HP0947 HP1582 jhp1163	jhp1488 HPG27_298
S72           S73           S73           S73           S73           S73           S73           S73	830053 836443 839999 879985 1043704 1187376 1132157 1332690 1332906 1332996 1332997 1332997 1332997 1332997 1332997 1332997 1332997 1332997 1332997 24325 26261 276889 430925 548958	C C C C G G G C C C C C C C C C C C C C	T         T         C         T         GITTITITITI         C         A         T         G         C         G         C         G         C         G         C         G         C         G         C         G         C         G         C         G         C         G         C         G         C         G         C         G         C         T         T         A         A         T         T         T         T         T         T         T         T         T         T         T         T         T         T         T         T         T         T	SNP SNP SNP indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous synonymous nonsynonymous nonsynonymous frameshift insertion/intergenic intergenic nonsynonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous intergenic nonsynonymous intergenic intergenic intergenic intergenic	HP0617 HP082_818 HP0656 HPnc4170 HP0953 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HP019_1 HP12_0070	HP0811 HP0947 HP1582 jhp1163 jhp1163	jhp1488 HPG27_298 HPG27_298
S72           S73	830053 836443 839999 879985 1043704 1187376 1187376 11322900 1332900 1332906 1332997 1332997 1332997 1332997 1332997 1332997 1332997 1332997 1332997 1332997 1332997 1332997 1352997 226261 276989 430922 548978 548978	С С Т С С С С С С С С С С С С С	T         T         C         T         GITTITITITITI         C         A         T         G         C         G         C         G         C         G         C         G         C         G         C         G         C         G         C         G         C         G         C         G         C         G         C         G         C         G         C         T         T         A         A         A         T         T         T         T         T         T         T         T         T         T         T         T         T         T         T <t< td=""><td>SNP SNP SNP SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP</td><td>nonsynonymous synonymous nonsynonymous nonsynonymous frameshift insertion/intergenic intergenic nonsynonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous nonsynonymous synonymous intergenic nonsynonymous intergenic intergenic intergenic intergenic</td><td>HP0617           HP08_818           HP0556           HPnc4170           HP353           HPATCC43504_01275           HP01547           HP0019_1           HPP12_0070           HP0194</td><td>HP0811 HP0947 HP1582 jhp1163</td><td>jhp1488 HPG27_298</td></t<>	SNP SNP SNP SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous synonymous nonsynonymous nonsynonymous frameshift insertion/intergenic intergenic nonsynonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous nonsynonymous synonymous intergenic nonsynonymous intergenic intergenic intergenic intergenic	HP0617           HP08_818           HP0556           HPnc4170           HP353           HPATCC43504_01275           HP01547           HP0019_1           HPP12_0070           HP0194	HP0811 HP0947 HP1582 jhp1163	jhp1488 HPG27_298
S72           S73	830053 836443 839999 879985 1043704 1187376 1187376 11322900 1332900 1332906 1332997 1332997 1332997 1332997 1332997 1332997 1332997 1332997 1332997 236261 276989 430922 548976 548976 548978 548986 691071	С С С С С С С С С С С С С С	T         T         G         A         T         G         C         A         G         C         G         C         G         C         G         C         G         C         G         C         G         C         G         C         G         C         G         C         G         C         A         A         A         A         T         T         T         T         T         T         T         CITITITIT         A	SNP SNP SNP SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous synonymous nonsynonymous nonsynonymous frameshift insertion/intergenic intergenic nonsynonymous synonymous synonymous synonymous synonymous synonymous nonsynonymous synonymous intergenic nonsynonymous intergenic intergenic intergenic intergenic intergenic	HP0617 HP0818818 HP0656 HPnc4170 HP0953 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HP012_070 HP019_1 HP0189	HP0811 HP0947 HP1582 jhp1163 jhp1163	jhp1488 HPG27_298 HPG27_298
S72           S73	830053 836443 839999 879985 1043704 1187376 1187376 1332690 1332906 1332906 1332997 1332997 1332997 1332997 1332997 1332997 1332997 1332997 1332997 226261 276989 430922 548965 548965 548986 691071 691074	C C C C C G G G C C C C C C C C C C C C	T         T         G         T         G         T         C         A         T         G         C         G         C         G         C         G         C         G         C         G         C         T         T         T         A         A         T         T         T         A         A         C         C         C         C         C         C         C         C         C	SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous synonymous nonsynonymous frameshift insertion/intergenic intergenic norsynonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous nonsynonymous synonymous intergenic intergenic intergenic intergenic intergenic intergenic synonymous synonymous	HP0617           HP0617           HP88_818           HP0656           HPnc4170           HP353           HPATCC43504_01275           HP147           HP0019_1           HPP12_0070           HP0194           HP0489           HP0489	HP0811 HP0947 HP1582 jhp1163 jhp1163	jhp1488 HPG27_298 HPG27_298
S72           S73	830053 836443 839999 879985 1043704 1187376 11322690 1332906 1332905 1332954 1332954 1332997 1332997 1332997 1332997 168379 99327 168379 195597 226261 276989 548965 548965 548978 54896 691077	C C C C T C G G G C C T C G G C C T T C G G C C T C G G G G	T         T         C         T         GITTITITITITI         ATTTTTT         C         A         T         G         C         G         C         G         C         G         C         G         C         G         C         T         T         T         T         A         A         A         A         A         C         A         A         C         A         A         A         A         A         C         A         C         A	SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous synonymous nonsynonymous nonsynonymous frameshift insertion/intergenic intergenic nonsynonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous intergenic intergenic intergenic intergenic intergenic intergenic synonymous synonymous intergenic intergenic synonymous synonymous intergenic intergenic synonymous synonymous intergenic intergenic synonymous synonymous synonymous intergenic intergenic intergenic intergenic synonymous	HP0617           HP0617           HP088_818           HP0656           HPnc4170           HP0953           HPATCC43504_01275           HPD1547           HP0019_1           HP1547           HP0019_1           HP0194           HP0489           HP0489           HP0489           HP0489           HP0489           HP0489           HP0489	HP0811 HP0947 HP1582 jhp1163 jhp1163	jhp1488 HPG27_298 HPG27_298
S72           S73	830053 836443 839999 879985 1043704 1187376 1132157 1332690 1332906 1332905 1332954 1332954 1332997 133297 13577 13577 13577 135777 135777 1357777777777	C C C C C G G G C C C C C C C C C C C C	T         T         C         T         GITTITITITI         C         A         T         C         G         C         G         C         G         C         G         C         G         C         G         C         G         C         T         T         T         T         A         A         A         T         T         T         T         T         A         A         A         C         A         G         G	SNP SNP SNP SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous synonymous nonsynonymous nonsynonymous frameshift insertion/intergenic intergenic nonsynonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous intergenic nonsynonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic synonymous synonymous intergenic intergenic intergenic intergenic synonymous synonymous intergenic intergenic intergenic intergenic intergenic synonymous synonymous intergenic intergenic intergenic intergenic intergenic intergenic synonymous synonymous nonsynonymous	HP0617           HP0617           HPB8_818           HP0556           HPnc4170           HP0553           HPATCC43504_01275           HPD412_0070           HP019_1           HP0489	HP0811 HP0947 HP1582 jhp1163 jhp1163	jhp1488 HPG27_298 HPG27_298
S72           S73	830053 836443 839999 879985 1043704 1187376 1132157 1332690 1332906 1332996 1332997 1332997 1332997 1332997 1332997 1332997 1332997 1332997 236261 276989 430922 548956 548958 548956 548978 548966 691071 691074 691074	С С Т С С С С С С С С С С С С С	T         T         C         T         GITTITITITI         C         A         T         G         C         G         C         G         C         G         C         G         C         G         C         G         C         T         T         T         A         A         A         A         C         T         T         C         A         C         A         C         A         C         A         C         A         G         G         A         G         A         G         A         G         A         G         A         G         A         G	SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous synonymous nonsynonymous nonsynonymous frameshift insertion/intergenic intergenic nonsynonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous nonsynonymous intergenic nonsynonymous intergenic intergenic intergenic intergenic intergenic synonymous synonymous nonsynonymous nonsynonymous synonymous intergenic intergenic intergenic synonymous synonymous synonymous synonymous synonymous synonymous synonymous	HP0617           HP0617           HPB8_818           HP0556           HPnc4170           HP0953           HPATCC43504_01275           HPATC243504_01275           HPATC43504_01275           HPATC43504_01275           HPATC43504_01275           HPATC43504_01275           HPATC43504_01275           HPATC43504_01275           HPATC43504_01275           HPATC43504_01275           HPO19_1           HP019_1           HP0489           HP0489           HP0489           HP0489           HP0489           HP0489           HP0489           HP0489           HP0489	HP0811 HP0947 HP1582 jhp1163 jhp1163	jhp1488 HPG27_298 HPG27_298
S72           S73	830053 836443 839999 879985 1043704 1187376 1187376 11322900 1332900 1332906 1332997 1332997 1332997 1332997 1332997 1332997 1332997 1332997 1332997 226261 276989 430922 548965 649071 691074 691074 691071	С С С Т С G H H H H H H H H H H H H H	T         T         G         A         T         G         T         G         C         A         T         G         C         G         C         G         C         G         C         G         C         T         T         T         A         A         A         C         C         C         A         A         G         G         A         G         A         G         A         G         A         G         A         G         A         G         A         G         A         G         A         G         A         G         A         G <td< td=""><td>SNP SNP SNP SNP indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP</td><td>nonsynonymous synonymous nonsynonymous nonsynonymous frameshift insertion/intergenic intergenic nonsynonymous synonymous synonymous synonymous synonymous synonymous nonsynonymous nonsynonymous intergenic nonsynonymous intergenic intergenic intergenic intergenic synonymous synonymous intergenic intergenic intergenic synonymous intergenic intergenic synonymous synonymous intergenic intergenic synonymous synonymous synonymous nonsynonymous intergenic synonymous synonymous nonsynonymous nonsynonymous</td><td>HP0617           HP0617           HPB8_818           HP0656           HPnc4170           HP0953           HPATCC43504_01275           HP019_1           HP019_1           HP019_1           HP019_1           HP0489           HP0489</td><td>HP0811 HP0947 HP1582 jhp1163 jhp1163</td><td>jhp1488 HPG27_298 HPG27_298</td></td<>	SNP SNP SNP SNP indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous synonymous nonsynonymous nonsynonymous frameshift insertion/intergenic intergenic nonsynonymous synonymous synonymous synonymous synonymous synonymous nonsynonymous nonsynonymous intergenic nonsynonymous intergenic intergenic intergenic intergenic synonymous synonymous intergenic intergenic intergenic synonymous intergenic intergenic synonymous synonymous intergenic intergenic synonymous synonymous synonymous nonsynonymous intergenic synonymous synonymous nonsynonymous nonsynonymous	HP0617           HP0617           HPB8_818           HP0656           HPnc4170           HP0953           HPATCC43504_01275           HP019_1           HP019_1           HP019_1           HP019_1           HP0489	HP0811 HP0947 HP1582 jhp1163 jhp1163	jhp1488 HPG27_298 HPG27_298
S72           S73	830053 836443 839999 879985 1043704 1187376 1187376 11322900 1332900 1332906 1332997 1332997 1332997 1332997 1332997 1332997 1332997 1332997 1332997 1332997 1332997 1332997 1332997 1332997 1332995 548978 548978 548978 548978 548978 548978 548978 548978 548978 548978 548978 548978 548978 548978 548978 548978 548978 548978 548978 548986 691071 691074 691013	C         C         T         C         ATTITITIT         T         C         G         C         G         T         C         G         T         G         T         C         G         T         G         T         C         C         C         G         G         G         G         G         G         G         G         A         C         T         G         A         C         T         G         A         C         T         G	T         T         G         A         T         G         C         A         C         G         C         G         C         G         C         G         C         G         C         G         C         G         C         T         T         T         A         A         A         A         A         A         A         A         A         A         A         A         A         A         C         C         A         G         A         G         A         G         A         G         A         G         A         G         A         G <td< td=""><td>SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP</td><td>nonsynonymous synonymous nonsynonymous frameshift insertion/intergenic intergenic nonsynonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous intergenic intergenic intergenic intergenic intergenic synonymous synonymous nonsynonymous nonsynonymous synonymous synonymous intergenic intergenic intergenic synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous</td><td>HP0617           HP0617           HP88_818           HP0656           HPnc4170           HP353           HPATCC43504_01275           HP012           HP019_1           HP12_0070           HP019           HP0489           HP0489</td><td>HP0811 HP0947 HP1582 jhp1163 jhp1163</td><td>jhp1488 HPG27_298 HPG27_298</td></td<>	SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous synonymous nonsynonymous frameshift insertion/intergenic intergenic nonsynonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous intergenic intergenic intergenic intergenic intergenic synonymous synonymous nonsynonymous nonsynonymous synonymous synonymous intergenic intergenic intergenic synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous	HP0617           HP0617           HP88_818           HP0656           HPnc4170           HP353           HPATCC43504_01275           HP012           HP019_1           HP12_0070           HP019           HP0489	HP0811 HP0947 HP1582 jhp1163 jhp1163	jhp1488 HPG27_298 HPG27_298
S72           S73	830053 836443 839999 879985 1043704 1187376 11322690 1332906 1332905 1332954 1332954 1332995 1332997 168379 99327 168379 99327 168379 99327 168379 195597 226261 276989 548965 548965 548965 548965 548978 548966 691071 691077 691089 691013	C C C C C C C C C C C C C C C C C C C	T         T         C         T         GITTITITITIT         ATTTTTT         C         A         T         G         C         G         C         G         C         G         C         G         C         G         C         T         T         T         T         A         A         A         A         A         A         C         A         G         G         A         G         A         G         A         G         A         G         A         G         A         G         A         G         A         G         A         G         A         C         T	SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous synonymous nonsynonymous nonsynonymous frameshift insertion/intergenic intergenic nonsynonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic synonymous synonymous intergenic synonymous synonymous synonymous intergenic intergenic synonymous synonymous synonymous synonymous synonymous synonymous nonsynonymous synonymous synonymous synonymous synonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous synonymous	HP0617           HP0617           HP88_818           HP0656           HPnc4170           HP353           HPATCC43504_01275           HP019_1           HP0019_1           HP019_1           HP0489           HP0	HP0811 HP0947 HP1582 jhp1163 jhp1163	jhp1488 HPG27_298 HPG27_298
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S72           S73           S73	830053 836443 839999 879985 1043704 1187376 1132157 1332690 1332906 1332996 1332997 133297 1332	C         C         T         C         ATTITIT         T         C         G         C         G         C         T         T         T         G         C         T         G         C         C         C         C         G         G         G         G         G         G         G         G         A         C         G         G         C         G         C         G         A         C         G         C         T         G         C         T         G         C         T         G         C         C         C         C         C         C	T         T         G         ATTITITT         C         A         T         C         A         T         G         C         G         C         G         C         G         C         G         C         G         C         G         C         T         T         T         T         T         A         A         A         G         G         A         G         A         G         A         G         A         G         G         G         G         G         G         G         G         G         G         G         G         G         G         G	SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous synonymous nonsynonymous nonsynonymous frameshift insertion/intergenic intergenic nonsynonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous nonsynonymous synonymous	HP0617           HP0617           HPB8_818           HP0556           HPnc4170           HP353           HPATCC43504_01275           HPATC43504_01275           HPATC43504_01275           HPATC43504_01275           HPO19_1           HP019_1           HP019_1           HP0489           HP048	HP0811 HP0947 HP1582 jhp1163 jhp1163	jhp1488 HPG27_298 HPG27_298
S72           S73           S73	830053 836443 839999 879985 1043704 1187376 11322690 1332906 1332906 1332907 1332997 133297 133297 133297 133297 135297 133297 133297 1332997 1332997 1332997 1332997 1332997 1332997 1332997 1332997 1332997 133297 134297 13	С С С С С С С С С С С С С С	T         T         C         T         GITTITITITI         C         A         T         G         C         G         C         G         C         G         C         G         C         G         C         G         C         T         T         T         T         T         A         A         C         C         A         C         A         G	SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous synonymous nonsynonymous nonsynonymous frameshift insertion/intergenic intergenic nonsynonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous nonsynonymous nonsynonymous intergenic intergenic intergenic intergenic intergenic intergenic synonymous synonymous nonsynonymous synonymous synonymous nonsynonymous synonymous synonymous nonsynonymous synonymous nonsynonymous synonymous synonymous nonsynonymous synonymous synonymous nonsynonymous synonymous nonsynonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous	HP0617           HP0617           HPB8_818           HP0656           HPnc4170           HP0556           HPATCC43504_01275           HPATC43504_01275           HP019_1           HP019_1           HP019_1           HP0489	HP0811 HP0947 HP1582 jhp1163 jhp1163	jhp1488 HPG27_298 HPG27_298
S72           S73           S73	830053 836443 839999 879985 1043704 1187376 11322900 1332900 1332906 1332997 133297 1332	C         C         T         C         ATTITIT         T         C         G         C         G         C         T         T         G         T         G         T         G         C         C         G         C         G         G         G         G         G         G         G         G         G         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A	T         T         C         GITTITTITTITTITT         A         T         G         C         A         T         G         C         G         C         G         C         G         C         G         C         G         C         T         T         T         A         A         A         A         A         A         C         T         T         T         T         T         C         T         C         C         A         G         G         G         G         G         G         G         G         G         G         G         G         G         G	SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous synonymous nonsynonymous nonsynonymous frameshift insertion/intergenic intergenic norsynonymous synonymous synonymous synonymous synonymous synonymous synonymous nonsynonymous intergenic intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous intergenic synonymous intergenic synonymous synonymous synonymous synonymous synonymous synonymous synonymous nonsynonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous	HP0617           HP0617           HP88_818           HP0656           HPnc4170           HP0556           HPATCC43504_01275           HPD4TCC43504_01275           HPD147           HP0019_1           HPD14           HP019           HP0489           HP048	HP0811 HP0947 HP1582 jhp1163 jhp1163	jhp1488 HPG27_298 HPG27_298
S72           S73           S73	830053 836443 839999 879985 1043704 1187376 11322690 1332906 1332905 1332954 1332954 1332995 1332997 1332997 1332997 168379 99327 168379 99327 168379 19557 226582 548965 548965 548965 548978 548965 548965 548978 548965 548978 548965 548978 548965 548978 548965 548978 548965 548978 548965 548978 548965 548978 548965 548978 548965 548978 548965 548978 548965 548978 548978 548978 548978 548978 549177 691073 691173 691173 691175 691179 691185	C         C         T         C         ATTITIT         T         C         G         C         T         C         G         C         T         G         C         T         G         C         C         C         C         G         G         G         G         G         G         G         G         G         G         G         G         G         G         G         C         T         G         C         T         G         C         A         C         A         C         A         C         A         C         A         C         A         C	T         T         C         T         GIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous synonymous nonsynonymous nonsynonymous inorsynonymous intergenic intergenic nonsynonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic synonymous synonymous intergenic synonymous synonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous nonsynonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous	HP0617           HP0617           HP088_818           HP0656           HPnc4170           HP0953           HPATCC43504_01275           HP019_1           HP019_1           HP019_1           HP0289           HP0489	HP0811 HP0947 HP1582 jhp1163 jhp1163	jhp1488 HPG27_298 HPG27_298
S72           S73           S73	830053 83043 839999 879985 1043704 1187376 1132157 1332690 1332906 1332904 1332954 1332954 1332954 1332997 1332997 1332997 1332997 1332997 1332997 1332997 1332997 1332997 1332997 1332997 1332997 1332997 1332997 1332997 1332997 1332997 1332987 1332997 1332987 1332987 1332987 1332987 1332987 1332997 1332997 1332987 134297 1	C         C         T         C         ATTITIT         T         C         G         C         T         C         G         T         T         G         C         T         G         C         C         C         C         G         G         G         G         G         G         G         G         G         G         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A	T         T         C         T         GIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous synonymous nonsynonymous nonsynonymous inorsynonymous frameshift insertion/intergenic intergenic nonsynonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic synonymous nonsynonymous nonsynonymous nonsynonymous synonymous synonymous nonsynonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous synonymous synonymous synonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous nonsynonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous	HP0617           HP0617           HP088_818           HP0556           HPnc4170           HP0556           HPATCC43504_01275           HPATC43504_01275           HPATC43504_01275           HPATC43504_01275           HPO19_1           HPD21_0070           HP0489           HP0489	HP0811 HP0947 HP1582 jhp1163 jhp1163	jhp1488 HPG27_298 HPG27_298
S72           S73           S73	830053 830953 839999 879985 1043704 1187376 1132157 1332690 1332906 1332996 1332997 1332987 1332987 1332997 133297 1329	C         C         T         C         ATTITITT         T         C         G         C         G         C         T         T         T         T         G         C         C         C         C         C         C         G         G         G         G         G         G         G         G         G         G         G         G         G         G         G         G         C         T         G         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C	T         T         C         T         GITTITITITI         C         A         T         G         C         G         C         G         C         G         C         G         C         G         C         G         C         T         T         T         T         T         T         T         T         T         C         A         A         G	SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous synonymous nonsynonymous nonsynonymous frameshift insertion/intergenic intergenic nonsynonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous intergenic nonsynonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic synonymous intergenic synonymous intergenic synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous	HP0617           HP0617           HP088_818           HP0656           HPnc4170           HP0953           HPATCC43504_01275           HP019_1           HP019_1           HP019_1           HP0289           HP0489	HP0811 HP0947 HP1582 jhp1163 jhp1163	jhp1488 HPG27_298 HPG27_298
S72           S73           S73	830053 836443 839999 879985 1043704 1187376 1132157 1332690 1332906 1332906 1332997 133297 1332997 1332997 133297 1332997 133297 1332997 133297 1332997 133297 1332997 133297 133297 1332997 133297 133297 1332997 133297 133297 133297 133297 133297 133297 133297 133297 133297 133297 133297 133297 133297 133297 1332997 133297 133	C         C         T         C         GITTITITIT         T         C         G         C         G         C         T         T         T         T         G         C         C         C         C         C         C         C         G         G         G         G         G         G         G         G         G         G         G         G         G         G         G         C         G         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A	T         T         C         T         GIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous synonymous nonsynonymous nonsynonymous frameshift insertion/intergenic intergenic nonsynonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous nonsynonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous	HP0617           HP0617           HP088_818           HP0656           HPnc4170           HP0953           HPATCC43504_01275           HPATC43504_01275           HPATC43504_01275           HPATC43504_01275           HP019_1           HP02019_1           HP019_1           HP0489           HP0489	HP0811 HP0947 HP1582 jhp1163 jhp1163	jhp1488 HPG27_298 HPG27_298
S72           S73           S73	830053 836443 839999 879985 1043704 1187376 1187376 11322900 1332900 1332906 1332997 133297 133297 133297 133297 133297 1332977 1332997 1332997 1332997 1332997 1332997 1332997 1332997 133297	C         C         T         C         GITTITITITIT         T         C         G         C         G         C         T         T         C         G         C         C         C         C         C         C         C         C         G         G         G         G         G         G         G         G         C         C         G         G         C         C         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C <t< td=""><td>T         T         C         GIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII</td><td>SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP</td><td>nonsynonymous synonymous nonsynonymous nonsynonymous frameshift insertion/intergenic intergenic nonsynonymous synonymous synonymous synonymous synonymous synonymous synonymous nonsynonymous nonsynonymous intergenic nonsynonymous intergenic intergenic intergenic intergenic intergenic synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous synonymous nonsynonymous</td><td>HP0617           HPB8_818           HP0656           HPnc4170           HP0556           HPATCC43504_01275           HPATC43504_01275           HPATCC43504_01275           HPATCC43504_01275           HPATC43504_01275           HPO19_1           HPD1_019_1           HP0489           HP0489</td><td>HP0811 HP0947 HP0947 HP1582 jhp1163 jhp1163 jhp1163 HP1582 HPG27_680</td><td>jhp1488</td></t<>	T         T         C         GIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous synonymous nonsynonymous nonsynonymous frameshift insertion/intergenic intergenic nonsynonymous synonymous synonymous synonymous synonymous synonymous synonymous nonsynonymous nonsynonymous intergenic nonsynonymous intergenic intergenic intergenic intergenic intergenic synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous synonymous nonsynonymous	HP0617           HPB8_818           HP0656           HPnc4170           HP0556           HPATCC43504_01275           HPATC43504_01275           HPATCC43504_01275           HPATCC43504_01275           HPATC43504_01275           HPO19_1           HPD1_019_1           HP0489           HP0489	HP0811 HP0947 HP0947 HP1582 jhp1163 jhp1163 jhp1163 HP1582 HPG27_680	jhp1488
S72           S73           S73	830053 836443 839999 879985 1043704 1187376 1322690 1332906 1332954 1332954 1332954 1332957 1332997 168379 99327 168379 99327 168379 99327 168379 232658 548965 548965 548965 548965 548965 548965 548978 548965 548978 548965 548978 548965 548978 548965 548978 548965 548978 548965 548978 548965 548978 548965 548978 548965 548978 548965 548978 548978 591073 691073 691173 691173 691173 691175 691179 691173 691175 691179 691173 691175 691179 691185 691190 830053 83999 958719	C         C         T         C         ATTITIT         T         C         G         C         T         C         G         T         T         G         C         T         G         C         G         C         C         G         G         G         G         G         G         G         G         G         G         G         G         C         T         G         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C         A         C	T         T         C         T         GIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous synonymous nonsynonymous nonsynonymous frameshift insertion/intergenic intergenic nonsynonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous nonsynonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous	HP0617           HP0617           HP088_818           HP0656           HPnc4170           HP0953           HPATCC43504_01275           HPATC43504_01275           HPATC43504_01275           HPATC43504_01275           HP019_1           HP02019_1           HP019_1           HP0489           HP0489	HP0811 HP0947 HP1582 jhp1163 jhp1163	jhp1488 HPG27_298 HPG27_298

S73	1284699	AGGGGGGGGGG	AGGGGGGGGGGG	indel	frameshift deletion	HPG27_1018		
S73	1332593	A	C	SNP	nonsynonymous	HPATCC43504_01275		
\$73		T	A	SNP	nonsynonymous	HPATCC43504_01275		
\$73	1332690	c c	A T	SNP	synonymous	HPATCC43504_01275		
\$73 \$73	1332906 1332954	Т	G	SNP SNP	synonymous	HPATCC43504_01275 HPATCC43504 01275		
\$73	1332954	T	c	SNP	synonymous synonymous	HPATCC43504_01275		
\$73	1332996	Т	G	SNP	synonymous	HPATCC43504_01275		
\$73	1332997	G	c	SNP	nonsynonymous	HPATCC43504_01275		
\$73	1332999	T	c	SNP	synonymous	HPATCC43504_01275		
S73	1342802	т	с	SNP	nonsynonymous	 jhp0433		
S73	1461744	с	A	SNP	intergenic		HP0349	HP0350
S73	1592784	ATGTG	ATG	indel	frameshift deletion	HP1354		
S73	1592801	Т	G	SNP	synonymous	HP1354		
S73	1640915	CGAGAGAGAGAGAGAG	CGAGAGAGAGAGAGAGAG	indel	frameshift insertion			
S74	99327	с	Т	SNP	synonymous	jhp0935		
S74	113930	T	A	SNP	intergenic		HPATCC43504_00103	
\$74 \$74	168379 199597	c c	T T	SNP	synonymous	HP1547	101592	ib=1400
\$74	214663	CGAGAGAGAGAGAGAGAG	CGAGAGAGAGAGAGAGAGAG	SNP indel	intergenic intergenic		HP1582 HPG27_8	jhp1488
\$74	226261	G	A	SNP	nonsynonymous	HP0019_1	TIF027_8	
\$74	276989	G	A	SNP	nonsynonymous	HPP12_0070		
\$74	347947	G	A	SNP	nonsynonymous	jhp0122		
\$74	374756	CGGGGGGGGGGGGG	CGGGGGGGGGGGGGG	indel	frameshift insertion	jhp0151		
S74	430922	G	Α	SNP	nonsynonymous	HP0194		
S74	546511	СААААААААААА	A	indel	intergenic		HP1243/HPG27_298	
S74	547618	A	G	SNP	nonsynonymous	HPG27_298		
S74	548965	c	Т	SNP	intergenic		jhp1163	HPG27_298
S74	548978	G	Т	SNP	intergenic		jhp1163	HPG27_298
S74	691071	G	Α	SNP	synonymous	HP0489		
S74	691074	A	С	SNP	synonymous	HP0489		
\$74	691077	G	A	SNP	nonsynonymous	HP0489		
\$74	691089	A	G	SNP	synonymous	HP0489		
\$74	691091	C	A	SNP	nonsynonymous	HP0489		
\$74 \$74	691101 691113	T G	C T	SNP SNP	synonymous	HP0489 HP0489		
\$74	691115	c	A	SNP	nonsynonymous	HP0489 HP0489		
\$74	691173	c	A	SNP	synonymous	HP0489		
\$74	691175	A	G	SNP	nonsynonymous	HP0489		
S74	691179	C	G	SNP	synonymous	HP0489		
S74	691185	A	G	SNP	nonsynonymous	HP0489		
S74	691189	с	G	SNP	nonsynonymous	HP0489		
S74	691190	Α	С	SNP	nonsynonymous	HP0489		
c								
S74	734658	С	Т	SNP	synonymous	HPP12_0534		
S74 S74	734658 734661	c c	T G	SNP SNP	synonymous	HPP12_0534 HPP12_0534		
						_		
\$74 \$74 \$74	734661 734672 734695	C G A	G A G	SNP SNP SNP	synonymous	HPP12_0534 HPP12_0534 HPP12_0534		
\$74 \$74 \$74 \$74	734661 734672 734695 734697	C G A A	G A G G	SNP SNP SNP SNP	synonymous nonsynonymous nonsynonymous synonymous	HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534		
\$74 \$74 \$74 \$74 \$74 \$74	734661 734672 734695 734697 734703	C G A A T	G A G G C	SNP SNP SNP SNP SNP	synonymous nonsynonymous nonsynonymous synonymous synonymous	HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534		
S74           S74           S74           S74           S74           S74           S74           S74           S74	734661 734672 734695 734697 734703 734841	C G A T T	G A G G C A	SNP SNP SNP SNP SNP SNP	synonymous nonsynonymous nonsynonymous synonymous synonymous synonymous synonymous	HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534		
S74	734661 734672 734695 734697 734703 734841 734842	C G A A A A A A A A A A A A A A A A A A	G A G G G G G G G G G G G G G G G G G G	SNP SNP SNP SNP SNP SNP SNP	synonymous nonsynonymous synonymous synonymous synonymous synonymous nonsynonymous	HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534		
S74	734661 734672 734695 734697 734703 734841 734842 734852	C G A A T T C C	G A G C A A A A	SNP SNP SNP SNP SNP SNP SNP SNP	synonymous nonsynonymous synonymous synonymous synonymous nonsynonymous nonsynonymous	HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534		
S74	734661 734672 734695 734697 734703 734841 734842 734852 734852	C G A A T T C C C T	G A G C A A C	SNP SNP SNP SNP SNP SNP SNP SNP	synonymous nonsynonymous synonymous synonymous synonymous nonsynonymous nonsynonymous synonymous synonymous	HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534		
S74	734661 734672 734695 734697 734703 734841 734842 734852 734852 734853 734871	C G A A T T C C	G A G G C C A A A C C A	SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	synonymous nonsynonymous synonymous synonymous synonymous nonsynonymous nonsynonymous nonsynonymous synonymous synonymous synonymous	HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534		
S74	734661 734672 734695 734697 734703 734841 734842 734852 734852	C G A A T T C C C C C C C C C C C C C C C C	G A G C A A C	SNP SNP SNP SNP SNP SNP SNP SNP	synonymous nonsynonymous synonymous synonymous synonymous nonsynonymous nonsynonymous synonymous synonymous	HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534 HPP12_0534		
S74	734661 734672 734695 734697 734703 734841 734842 734852 734853 734871 734874	C G A A T T C C C C T G G	G A G G C A A A C C A C	SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	synonymous           nonsynonymous           nonsynonymous           synonymous           synonymous           synonymous           synonymous           nonsynonymous           synonymous	HPP12_0534		
S74	734661 734692 734695 734697 734703 734841 734842 734852 734853 734853 734874 734874 735072	C G A A T T C C C C C C C C C C C C C C C C	G A A G G C A A A C C A C C A C C C C A C C C C	SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	synonymous     nonsynonymous     nonsynonymous     synonymous     synonymous     synonymous     synonymous     nonsynonymous     synonymous     synonymous     synonymous     synonymous     synonymous     synonymous     synonymous	HPP12_0534		
S74	734661 734692 734695 734697 734703 734841 734842 734852 734853 734874 734874 735072 735126	C G A A T T C C C C C C C C C C C C C C C C	G A G G C A A A C C C C C C C C C C C C	SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	synonymous     nonsynonymous     nonsynonymous     synonymous     synonymous     synonymous     synonymous     nonsynonymous     synonymous	HPP12_0534		
\$74           \$74	734661 734672 734695 734697 734703 734841 734842 734852 734853 734874 734874 734874 735072 735126 735143 735162	C G A A T T T C C C C T G G T T A C C T	G         A         G         G         C         A         C         A         C         T         C         G         T         A         G         T         A         A         A         A         A         C         A         C         A         A         A	SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	synonymous           nonsynonymous           nonsynonymous           synonymous           synonymous           synonymous           synonymous           synonymous           nonsynonymous           synonymous           nonsynonymous           nonsynonymous           synonymous           synonymous           synonymous           synonymous           synonymous           nonsynonymous           synonymous           nonsynonymous           nonsynonymous           nonsynonymous           nonsynonymous           nonsynonymous           nonsynonymous           nonsynonymous           nonsynonymous           nonsynonymous	HPP12_0534		
S74	734661 734672 734695 734697 734703 734841 734842 734852 734853 734874 734874 735072 735126 735143 735162 735163	C G G A A T T T C C C T G G T G G T A C C T C C C C C C C C C C C C C C C	G         A         G         G         C         A         C         A         C         T         C         G         T         A         A         A         A         A         A         A         A         A         A         A         A         A	SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	synonymous           nonsynonymous           nonsynonymous           synonymous           nonsynonymous           synonymous           synonymous           nonsynonymous           nonsynonymous           synonymous           nonsynonymous           nonsynonymous	HPP12_0534		
\$74           \$74	734661 734672 734695 734697 734697 734842 734842 734842 734853 734853 734871 734874 735072 735126 735163 735163 735164	C G G A A T T T C C C G G T G G T A C C T C C C C C C C C C C C C C C C	G         A         G         G         C         A         A         C         C         T         C         G         T         G         T         A         A         G         G         G         G         G	SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	synonymous           nonsynonymous           nonsynonymous           synonymous           synonymous           synonymous           synonymous           synonymous           nonsynonymous           nonsynonymous           nonsynonymous           synonymous           synonymous           synonymous           synonymous           synonymous           nonsynonymous           nonsynonymous           nonsynonymous           synonymous           nonsynonymous           nonsynonymous           nonsynonymous           nonsynonymous           nonsynonymous           nonsynonymous           nonsynonymous           nonsynonymous           nonsynonymous	HPP12_0534		
\$74           \$74	734661 734672 734695 734697 734703 734841 734842 734853 734853 734871 734874 735072 735126 735126 735140 735163 735164 735173	C G G A A T T T C C G G T G G T A C C T C A C C C C C C C C C C C C C	G         A         G         G         C         A         A         C         A         C         T         C         G         T         A         A         G         A         A         G         A         B <td< td=""><td>SNP           SNP           SNP</td><td>synonymous           nonsynonymous           nonsynonymous           synonymous           synonymous           synonymous           synonymous           synonymous           synonymous           nonsynonymous           synonymous           nonsynonymous           synonymous           synonymous           synonymous           synonymous           synonymous           synonymous           synonymous           synonymous           nonsynonymous           synonymous           nonsynonymous           nonsynonymous           nonsynonymous           nonsynonymous           nonsynonymous           nonsynonymous           nonsynonymous           nonsynonymous           nonsynonymous           nonsynonymous</td><td>HPP12_0534           HPP12_0534           HPP12_0534</td><td></td><td></td></td<>	SNP           SNP	synonymous           nonsynonymous           nonsynonymous           synonymous           synonymous           synonymous           synonymous           synonymous           synonymous           nonsynonymous           synonymous           nonsynonymous           synonymous           synonymous           synonymous           synonymous           synonymous           synonymous           synonymous           synonymous           nonsynonymous           synonymous           nonsynonymous	HPP12_0534		
\$74           \$74	734661 734672 734695 734697 734803 734841 734842 734852 734852 734853 734874 734874 735072 735126 735163 735164 735173 735174	C G G A A T T T C C C G G T G G T A C C T C A C C T C A C C T T C A C C T T C A C C T T C A C C T T C A C C T T C C A C C T C C C C	G         A         G         G         C         A         A         C         A         C         T         C         G         T         A         A         G         G         A         C         C         C         C         G         A         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C	SNP	synonymous           nonsynonymous           nonsynonymous           synonymous           synonymous           synonymous           synonymous           synonymous           nonsynonymous           nonsynonymous           nonsynonymous           nonsynonymous           synonymous           synonymous           synonymous           synonymous           nonsynonymous           synonymous           nonsynonymous	HPP12_0534		
\$74           \$74	734661 734672 734695 734697 734703 734841 734842 734852 734852 734853 734874 734874 735126 735126 735126 735163 735163 735164 735174 735174 735192	C G G A A T T T C C C T G G T A C C T A C C C C A C C T G G G T C C C C C C C C C C C C C	G         A         G         G         C         A         A         C         A         C         T         G         T         A         G         G         G         G         A         C         A         A         A         A         A         G         A         C         A         G         A         C         A         G         A         C         A         C         A         C         A         C         A	SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	synonymous           nonsynonymous           nonsynonymous           synonymous           synonymous           synonymous           synonymous           synonymous           nonsynonymous           synonymous           nonsynonymous           nonsynonymous           synonymous           synonymous           synonymous           synonymous           nonsynonymous           synonymous           synonymous           synonymous	HPP12_0534		
\$74           \$74	734661 734672 734695 734703 734703 734841 734842 734852 734871 734874 735072 735126 735126 735163 735163 735164 735173 735173	C G G A A A T T T C C C C T G G T G C T C C C C C C	G         A         G         G         C         A         A         C         A         C         T         G         G         T         A         G         T         A         G         G         A         G         A         A         C         A         C         A         C         A         C         C         A         C         C         C         C         C         C         C         C         C	SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	synonymous     nonsynonymous     nonsynonymous     synonymous     synonymous	HPP12_0534	ihn0540	
\$74           \$74	734661 734672 734695 734697 734807 734841 734842 734852 734874 734874 734874 734874 735072 735126 735126 735163 735164 735173 735164 735174 735195 801836	C G G A A T T T C C C T G G T A C C T A C C C C A C C T G G G T C C C C C C C C C C C C C	G         A         G         G         C         A         A         C         A         C         T         G         T         A         G         G         G         G         A         C         A         A         A         A         A         G         A         C         A         G         A         C         A         G         A         C         A         C         A         C         A         C         A	SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	synonymous           nonsynonymous           nonsynonymous           synonymous           synonymous           synonymous           synonymous           synonymous           synonymous           synonymous           synonymous           nonsynonymous           synonymous           synonymous           synonymous           synonymous           nonsynonymous           synonymous	HPP12_0534	hp0540 HP627 556	
\$74           \$74	734661 734672 734695 734703 734703 734841 734842 734852 734871 734874 735072 735126 735126 735163 735163 735164 735173 735173	C G G A A A T T T C C C C T G G T A C C C T C C C T C C C T C C T C C C T C C T C C T C C T C C T C C T C C T C C C T C C C T C C C T C C C C T C	G         A         G         C         A         A         C         A         C         T         C         G         T         G         T         A         A         G         T         A         G         C         C         A         C         A         C         G         A         C         GAAAAAAAAAAAAAAAA	SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	synonymous nonsynonymous synonymous synonymous synonymous synonymous nonsynonymous synonymous synonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous synonymous synonymous synonymous synonymous synonymous intergenic	HPP12_0534	jhp0540 HPG27_556	
\$74           \$74	734661 734672 734695 734697 734807 734841 734842 734852 734853 734874 734874 734874 734874 735072 735176 735163 735164 735173 735164 735173 735174 735192 735192 735192 735193 801836	C G G A A A T T T C C C T G G T G C T C C T C C C T G G T G T	G         A         G         G         C         A         A         C         A         C         T         C         G         G         T         A         G         A         G         A         G         A         C         G         A         C         G         A         C         GAAAAAAAAAAAAAAAA         T	SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	synonymous           nonsynonymous           nonsynonymous           synonymous           synonymous           synonymous           synonymous           synonymous           synonymous           synonymous           synonymous           nonsynonymous           synonymous           synonymous           synonymous           synonymous           nonsynonymous           synonymous	HPP12_0534		
\$74           \$74	734661 734672 734695 734697 734841 734842 734852 734852 734853 734874 735072 735164 735162 735164 735164 735164 735173 735164 735173 735174 735192 735192 735195 801836 801835	C G G A A A T T T C C C G G T G G T C C T C C C T C C C C	G         A         G         G         C         A         A         C         A         C         T         G         G         G         G         A         G         A         C         G         A         C         G         A         C         GAAAAAAAAAAAAAAAA         T         T	SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	synonymous nonsynonymous synonymous synonymous synonymous synonymous nonsynonymous synonymous synonymous synonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous synonymous synonymous synonymous synonymous intergenic intergenic nonsynonymous	HPP12_0534	HPG27_556	HPnc4160
\$74           \$74	734661 734672 734695 734697 734803 734841 734842 734852 734852 734853 734874 734874 735072 735164 735163 735163 735164 735163 735164 735173 735164 735173 735164 735173 735164 735195 801836 805851 83053	С G A A T T C C C C C T G G T C C C T A C C T C C C T C C C C C C C C C C C C C	G         A         G         G         C         A         A         C         A         C         T         G         GAAAAAAAAAAAAA         T         TICПСПСПСПСПСС	SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	synonymous nonsynonymous synonymous synonymous synonymous synonymous nonsynonymous nonsynonymous synonymous synonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous synonymous nonsynonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous intergenic intergenic	HPP12_0534	HPG27_556 HPG27_677	HPnc4160
\$74           \$74	734661 734672 734695 734703 734703 734842 734852 734873 734874 734874 735072 735126 735126 735163 735163 735164 735163 735164 735173 735192 735192 735195 801836 805851 830053	С G A A A T T C C C T G T G T C C C C C C C C C C C C C	G         A         G         G         G         C         A         C         C         T         G         G         G         G         G         T         G         A         G         G         G         G         A         G         A         G         T         GAAAAAAAAAAAAAA         T         TTCCTCTCTCTCTCTC         GHTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	synonymous nonsynonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous intergenic intergenic intergenic intergenic intergenic	HPP12_0534	HPG27_556 HPG27_677 HP0811	HPnc4160
\$74           \$74	734661 734672 734695 734697 734842 734842 734852 734853 734874 734874 735072 735126 735126 735126 735140 735140 735163 735164 735173 735164 735173 735164 735173 735164 735174 735195 801836 805851 830053 952086 1043704 1122223	C         G         A         A         T         C         C         T         G         T         G         T         G         T         G         T         G         T         C         T         G         T         G         T         G         T         GAAAAAAAAAAA         A         C         T         GAAAAAAAAAAA         A         C         TITCETCETCETCETCETCETCETCETCETCETCETCETCET	G         A         G         G         C         A         A         C         A         C         T         C         G         T         G         A         A         C         G         T         C         G         A         G         A         C         G         A         C         GAAAAAAAAAAAAAAAA         T         TICCTCCTCTCTCTC         GTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	synonymous nonsynonymous synonymous synonymous synonymous synonymous synonymous nonsynonymous synonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous synonymous synonymous nonsynonymous nonsynonymous nonsynonymous synonymous synonymous intergenic intergenic frameshift insertion/intergenic intergenic	HPP12_0534	HPG27_556 HPG27_677 HP0811 HP0895	HPnc4160
\$74           \$74	734661 734672 734695 734695 734703 734703 734842 734852 734874 734874 734874 735072 735163 735163 735163 735164 735173 735164 735173 735165 801836 805851 830053 952086 1043704 1122223	С G A A A T T C C C C C C C C C C C C C	G         A         G         G         C         A         A         A         C         A         C         T         C         G         T         A         A         G         T         A         G         A         G         A         G         A         G         A         G         A         G         A         G         T         TCICICICICICICICIC         GITTITTITTITTITITITITITITITITITITITITIT	SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	synonymous nonsynonymous synonymous synonymous synonymous synonymous nonsynonymous nonsynonymous synonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous intergenic intergenic intergenic intergenic intergenic	HPP12_0534	HPG27_556 HPG27_677 HP0811 HP0895 HP0895	HPnc4160
\$74           \$74	734661 734672 734695 734697 734842 734842 734852 734852 734853 734874 735072 735176 735176 735162 735164 735173 735164 735173 735164 735173 735162 735192 735192 735192 801836 805851 830053 952086 1043704 1122228 1122228	С G A A A T T T C C C T G T G T G T C C T C C C T C C C T C C C C C C C C C C C C C	G         A         G         G         C         A         A         A         C         A         C         T         C         G         T         A         G         A         G         A         G         A         G         A         C         GAAAAAAAAAAAAAA         T         TCTCTCTCTCTCTC         GHTTTTTTTTT         T         TAAAAAA         ATTTTTTTT	SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	synonymous nonsynonymous synonymous synonymous synonymous synonymous nonsynonymous nonsynonymous synonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous synonymous nonsynonymous nonsynonymous nonsynonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic	HPP12_0534           HPP12_0617           HP012_0617	HPG27_556 HPG27_677 HP0811 HP0895 HP0895	HPnc4160
\$74           \$74	734661 734672 734695 734697 734842 734852 734852 734853 734874 734874 735072 735126 735126 735126 735163 735163 735163 735164 735173 735164 735173 735164 735173 735164 735173 735164 735173 735195 801836 805851 830053 952086 1043704 1122228 1187376 1282699	C         G         A         A         T         C         C         T         G         T         G         T         G         T         G         T         G         T         G         T         G         T         C         T         G         T         G         T         GAAAAAAAAAAA         A         C         T         GAAAAAAAAAAAA         A         C         T         GAAAAAAAAAAAA         A         C         THCHCHCHCHCHCHCHCHCHCHCHCHCHCHCHCHCHCHC	G         A         G         G         C         A         A         C         A         C         T         C         G         T         G         A         A         C         T         G         A         G         A         G         A         G         A         G         T         TICTCTCTCTCTCTC         GTITITITITIT         T         TAAAAAA         ATITITT         AGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG	SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	synonymous nonsynonymous synonymous synonymous synonymous synonymous nonsynonymous nonsynonymous synonymous synonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous synonymous nonsynonymous nonsynonymous synonymous synonymous synonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic	HPP12_0534 HPP12_0534	HPG27_556 HPG27_677 HP0811 HP0895 HP0895	HPnc4160
\$74           \$74	734661 734672 734695 734697 734807 734842 734852 734853 734874 734874 735072 735126 735126 735126 735126 735127 735162 735163 735164 735173 735162 735163 735164 735173 735195 801836 805851 830585 805851 83053 952086 10432704 1122228 1187376 1284699 1332888	C G G G A A A A T T T C C C G G T G G T G G T G G T G G T G C T G C T G G T G G T G G T G G T G G T G G T G G G T G G G T G G G G C C C C	G A G G G C A A A A A C C C C C C C C C	SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	synonymous nonsynonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous synonymous synonymous synonymous synonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic frameshift deletion	HPP12_0534           HPP12_0617           HP012_0617	HPG27_556 HPG27_677 HP0811 HP0895 HP0895	HPnc4160
\$74           \$74	734661 734672 734695 734697 734842 734852 734852 734853 734874 734874 734874 735072 735163 735163 735163 735164 735173 735163 735164 735173 735192 735192 735192 735192 801836 805851 830053 95208 1043704 1122223 1122228 1187376 1284699 1318277 1332680 1332689	C         G         A         A         T         T         C         C         T         G         T         G         T         G         T         G         T         G         T         G         T         C         T         G         T         G         T         GAAAAAAAAAAA         A         C         T         GAAAAAAAAAAAA         A         C         T         GAAAAAAAAAAAA         A         C         T         GAGGGGGGGGG         C         T         AGGGGGGGGGGG         C         T         AGGGGGGGGGGG         C         T         T         T         T         T         T         T         T <td>G A G G G C A A A A A C C T C C C C C C C C C C C</td> <td>SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP</td> <td>synonymous nonsynonymous synonymous synonymous synonymous synonymous nonsynonymous nonsynonymous synonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous intergenic synonymous synonymous synonymous synonymous synonymous</td> <td>HPP12_0534 HPP12_</td> <td>HPG27_556 HPG27_677 HP0811 HP0895 HP0895</td> <td>HPnc4160</td>	G A G G G C A A A A A C C T C C C C C C C C C C C	SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	synonymous nonsynonymous synonymous synonymous synonymous synonymous nonsynonymous nonsynonymous synonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous intergenic synonymous synonymous synonymous synonymous synonymous	HPP12_0534 HPP12_	HPG27_556 HPG27_677 HP0811 HP0895 HP0895	HPnc4160
\$74           \$74	734661 734672 734695 734897 734842 734842 734852 734852 734854 734874 735072 735163 735163 735164 735164 735164 735164 735163 735164 735173 735165 801836 801836 805851 830053 952086 1043704 1122228 1043704 1122228 1132289 1332893	C G G G A A A T T T C C C G G T G G T G G T G G T C C C C	G A G G G C A A A A A C C C C C C C C C	SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	synonymous nonsynonymous synonymous synonymous synonymous synonymous nonsynonymous nonsynonymous synonymous synonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous synonymous nonsynonymous nonsynonymous nonsynonymous synonymous synonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous synonymous intergenic intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous nonsynonymous synonymous	HPP12_0534 HPP12_	HPG27_556 HPG27_677 HP0811 HP0895 HP0895	HPnc4160
\$74           \$74	734661 734672 734695 734703 734703 73482 73482 734852 734871 734874 735072 735126 735126 735126 735163 735163 735164 735163 735164 735173 735174 735192 73518 735164 735195 801836 805851 830053 800531 830053 73510505 735105 735105 735	C G G G A A A A T T T C C C G T G G T G G T G G T G G T C C T G G T G G T G G T G G T G G T G G T G G G T G G G T G G G T G G G G T G	G         A         G         G         G         C         A         A         C         A         C         T         C         G         G         T         G         A         A         G         T         GAAAAAAAAAAAAA         T         TCCTCTCTCTCTC         GHTHTHTHTHT         T         TAAAAAA         A         G         A         G	SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	synonymous nonsynonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous synonymous synonymous synonymous synonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic synonymous	HPP12_0534           HPP12_0617           HP12_0617           HP12_0617 <td>HPG27_556 HPG27_677 HP0811 HP0895 HP0895</td> <td>HPnc4160</td>	HPG27_556 HPG27_677 HP0811 HP0895 HP0895	HPnc4160
\$74           \$74	734661 734672 734695 734697 734897 73482 73482 734852 734853 734874 735072 735126 735126 735126 735163 735163 735163 735163 735164 735173 735163 735164 735173 735195 801836 805851 830053 952086 1043704 1122223 118277 1332690 133288 1332897 1332905	C G G A A A A A T T T C C C G T G G T G G T G G T G C T C C A A C C C T G G T G G T G G T G G T C C T G G G T C C T G G G T C C T G G G C C C T T C C A A G G G C C C C T C A G G C C C C C C C C C C C C C C C C	G         A         G         G         G         C         A         A         C         A         C         T         C         G         T         G         G         T         G         A         A         G <td< td=""><td>SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP</td><td>synonymous nonsynonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous synonymous synonymous synonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous synonymous intergenic intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous</td><td>HPP12_0534           HPP12_0534           HP</td><td>HPG27_556 HPG27_677 HP0811 HP0895 HP0895</td><td>HPnc4160</td></td<>	SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	synonymous nonsynonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous synonymous synonymous synonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous synonymous intergenic intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous	HPP12_0534           HP	HPG27_556 HPG27_677 HP0811 HP0895 HP0895	HPnc4160
\$74           \$74	734661 734672 734695 734697 734842 734852 734853 734874 734874 734874 735072 735126 735126 735126 735126 735127 735162 735163 73517 735163 735163 73517 735163 73517 735163 73517 735163 73517 735163 73517 7351	C G G G A A A A T T T C C C G G T G G T G G T G G T G G T G G T G C T G G T G G T G G T G G T G G G T G G G T G G G T G G G G C C C C	G         A         G         G         C         A         A         A         C         A         C         T         C         G         T         G         G         T         A         G         A         G         A         G         A         G         A         G         A         G         A         C         GAAAAAAAAAAAAAAAA         T         TICTCICTCICTCTC         GHTTHTHTT         AAAAAA         ATTHTTT         AGGGGGGGGGGGG         A         G         G         G         G         G         G         G         G         G         G         G         G         G         G         G	SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	synonymous nonsynonymous synonymous synonymous synonymous synonymous nonsynonymous synonymous synonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous synonymous synonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous intergenic intergenic intergenic intergenic intergenic synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous synonymous	HPP12_0534           HPP12_0617           HP2057_1018           Jhp1031           HPATCC43504_01275           HPATCC43504_01275           HPATCC43504_01275           HPATCC43504_01275           HPATCC43504_01275	HPG27_556 HPG27_677 HP0811 HP0895 HP0895	HPnc4160
\$74           \$74	734661 734672 734695 734693 734703 734842 734852 734853 734874 734874 735072 735163 735163 735163 735163 735163 735163 735163 735163 735163 735163 735163 735163 735163 735163 735163 735163 735163 735163 735173 735192 73	C G G G A A A A A T T T C C C G G T G G T G G T G G T G G T G C C T C C C T G G A C C T G G A C C T G G A C C T G G A C C T G G A C C T G G C T G A C C T C C C T C C C C T C C C C T C C C C C T C C C C C T C C C C C T C	GAGGGCAACTCGTCGTAAGTAAGGTAACGAAAAAAAAAAAAATTCTCTCTCTCTCGTITITITITITITITITTTAAAAAAAGGGGGGGCGCCGC	SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	synonymous nonsynonymous synonymous synonymous synonymous synonymous nonsynonymous nonsynonymous synonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic synonymous	HPP12_0534           HPP12_0617           HP2_0534           HPP12_0534           HP2_0534           HP2_0534           HP2_0617           HP3_0534           HP2_0534           HP2_0617           HP4C43504_01275           HPATCC43504_01275           HPAT	HPG27_556 HPG27_677 HP0811 HP0895 HP0895	HPnc4160
\$74           \$74	734661 734672 734695 734897 734842 734852 734852 734853 734871 734874 735072 735164 735173 735164 735163 735164 735163 735163 735163 735163 735163 735173 735163 735163 735173 735192 73	C G G G A A A A T T T C C C G G T G G T G G T G G T G G T C C C T C G G G T G G G T G G G T G G G T G G G T G G G T G G G T G G G T G G G T G G G G T G G G G T G	GAGGGCAACCGTCGACGTAACGTAACGACGACGAAAAAAAAAAAAATTTCTCTCTCTCTCCGITTITTITTTTTTTAAAAAAATTTTTTTAAAAAAGGGCGCGCGGCGCGGCGGCGCGCGCGCGCGCGCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC	SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	synonymous nonsynonymous synonymous synonymous synonymous synonymous nonsynonymous synonymous synonymous synonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous synonymous intergenic synonymous	HPP12_0534           HP12_0534           HP12_0534           HP12_0534           HP12_0534           HP12_0534           HP12_0534           HP12_0534           HP212_0617           HP32           HP3012_011           HP4012_01205 <td>HPG27_556 HPG27_677 HP0811 HP0895 HP0895</td> <td>HPnc4160</td>	HPG27_556 HPG27_677 HP0811 HP0895 HP0895	HPnc4160
\$74           \$74	734661 734672 734695 734703 734703 73482 73482 73482 73482 734871 734874 735072 735126 735126 735126 735137 735126 735137 735127	C G G G A A A A A T T T C C C G G T G G T G G T G G T G G T G C C T C C C T G G A C C T G G A C C T G G A C C T G G A C C T G G A C C T G G C T G A C C T C C C T C C C C T C C C C T C C C C C T C C C C C T C C C C C T C	GAGGGCAACTCGTCGTAAGTAAGGTAACGAAAAAAAAAAAAATTCTCTCTCTCTCGTITITITITITITITITTTAAAAAAAGGGGGGGCGCCGC	SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	synonymous nonsynonymous synonymous synonymous synonymous synonymous nonsynonymous nonsynonymous synonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic synonymous	HPP12_0534           HPP12_0617           HP2_0534           HPP12_0534           HP2_0534           HP2_0534           HP2_0617           HP3_0534           HP2_0534           HP2_0617           HP4C43504_01275           HPATCC43504_01275           HPAT	HPG27_556 HPG27_677 HP0811 HP0895 HP0895	HPnc4160

S74	1362531	Α	Т	SNP	nonsynonymous	HPB8_1119		
S74	1456630	G	A	SNP	nonsynonymous	HP0354		
S74	1482848	G	Т	SNP	nonsynonymous	HPG27_298		
\$74	1482850	T	G	SNP	nonsynonymous	HPG27_298		
\$74	1483092	G	A	SNP	nonsynonymous	HPG27_298		
\$74 \$74	1483202 1592801	G T	A G	SNP SNP	synonymous	HPG27_298 HP1354		
\$75	99327	c	T	SNP	synonymous	jhp0935		
\$75	122766	TTTTTTAATGAAGTT	тп	indel	frameshift deletion	HP1003		
S75	168379	с	т	SNP	synonymous	HP1547		
S75	199597	С	т	SNP	intergenic		HP1582	jhp1488
S75	214663	CGAGAGAGAGAGAGAG	CGAGAGAGAGAGAGAGAG	indel	intergenic		HPG27_8	
S75	226261	G	A	SNP	nonsynonymous	HP0019_1		
S75	276989	G	Α	SNP	nonsynonymous	HPP12_0070		
S75	430922	G	A	SNP	nonsynonymous	HP0194		
S75	546511	САААААААААА	A	indel	intergenic	UDC27 200	HP1243/HPG27_298	
\$75 \$75	547618 548965	A C	G T	SNP SNP	nonsynonymous	HPG27_298	ib=1162	HPG27_298
\$75	548965	G	T	SNP	intergenic		jhp1163 jhp1163	HPG27_298
\$75	691071	G	A	SNP	synonymous	HP0489	Jupiios	11 027_250
\$75	691074	A	C	SNP	synonymous	HP0489		
S75	691077	G	A	SNP	nonsynonymous	HP0489		
S75	691089	Α	G	SNP	synonymous	HP0489		
S75	691091	C	A	SNP	nonsynonymous	HP0489		
S75	691101	Т	C	SNP	synonymous	HP0489		
S75	691113	G	Т	SNP	nonsynonymous	HP0489		
\$75	691155	c	G	SNP	synonymous	HP0489		
S75	691157	c	A	SNP	nonsynonymous	HP0489		
\$75 \$75	691173	C	A	SNP	synonymous	HP0489		
\$75 \$75	691175 691179	A C	G	SNP SNP	nonsynonymous	HP0489 HP0489		
\$75 \$75	691179 691185	A	G	SNP	synonymous	HP0489 HP0489		
\$75	691185	C	G	SNP	nonsynonymous	HP0489		
\$75	691190	A	c	SNP	nonsynonymous	HP0489		
S75	734658	С	т	SNP	synonymous	HPP12_0534		
S75	734661	С	G	SNP	synonymous	HPP12_0534		
S75	734672	G	A	SNP	nonsynonymous	HPP12_0534		
S75	734695	A	G	SNP	nonsynonymous	HPP12_0534		
S75	734697	A	G	SNP	synonymous	HPP12_0534		
S75	734703	Т	С	SNP	synonymous	HPP12_0534		
S75	734722	G	c	SNP	nonsynonymous	HPP12_0534		
\$75	735067	T	G T	SNP	nonsynonymous	HPP12_0534		
\$75 \$75	735072 735126	G T	c	SNP SNP	synonymous	HPP12_0534 HPP12_0534		
\$75	735120	A	G	SNP	nonsynonymous	HPP12_0534		
\$75	735143	C	т	SNP	nonsynonymous	HPP12 0534		
S75	735162	T	A	SNP	synonymous	HPP12 0534		
S75	735163	С	Α	SNP	nonsynonymous			
S75	735164	A	G	SNP	nonsynonymous	HPP12_0534		
S75	735173	C	A	SNP	nonsynonymous	HPP12_0534		
S75	735174	Т	c	SNP	synonymous	HPP12_0534		
S75	735192	G	A	SNP	synonymous	HPP12_0534		
\$75		T	c	SNP	synonymous	HPP12_0534		
\$75	805851	A	T	SNP	intergenic	HPP12 0617	HPG27_556	
\$75 \$75	830053 960744	т	T G	SNP SNP	nonsynonymous intergenic	HPP12_0617	HP0727	
\$75		G	A	SNP	intergenic	HPnc4170	HP0727 HP0811	HPnc4160
\$75	1122223	c	T	SNP	intergenic		HP0895	
\$75	1122228	ТААААА	ТААААА	indel	intergenic		HP0895	
S75	1124346	CGAGAGAGAGAGAGAGAGAG	CGAGAGAGAGAGAGAGAG	indel	intergenic		HPG27_1187	
S75	1187376	ATTTTTTT	ATTTTTTT	indel	intergenic		HP0947	
S75	1284699	AGGGGGGGGGG	AGGGGGGGGGGG	indel	frameshift deletion	HPG27_1018		
S75	1318527	c	A	SNP	intergenic	jhp1031		
\$75	1332593	A	c	SNP	nonsynonymous	HPATCC43504_01275		
\$75	1332595	T	A	SNP	nonsynonymous	HPATCC43504_01275		
\$75 \$75	1332690	C	A	SNP	synonymous	HPATCC43504_01275 HPATCC43504 01275		
\$75 \$75	1332900 1332906	G C	T	SNP SNP	synonymous	HPATCC43504_01275 HPATCC43504_01275		
\$75				SNP	synonymous	HPATCC43504_01275		
	1332954	т	G					
S75		T T	C	SNP	synonymous			
\$75 \$75	1332954 1332987			SNP SNP	synonymous synonymous			
	1332954 1332987	Т	c			HPATCC43504_01275		
\$75 \$75 \$75	1332954 1332987 1332996 1332997 1332999	T T G T	C G C C	SNP SNP SNP	synonymous	HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275		
\$75 \$75 \$75 \$75 \$75	1332954 1332987 1332996 1332997 1332999 1482848	T T G T G	C G C C T	SNP SNP SNP SNP	synonymous nonsynonymous synonymous nonsynonymous	HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPG27_298		
\$75 \$75 \$75 \$75 \$75 \$75	1332954 1332987 1332996 1332997 1332999 1482848 1482850	T G T G T T	C G C C T G	SNP SNP SNP SNP SNP	synonymous nonsynonymous synonymous nonsynonymous nonsynonymous	HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPG27_298 HPG27_298		
\$75 \$75 \$75 \$75 \$75 \$75 \$75 \$75	1332954 1332987 1332996 1332997 1332999 1482848 1482850 1483092	T G T G T G G	C 6 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	SNP SNP SNP SNP SNP SNP	synonymous nonsynonymous synonymous nonsynonymous nonsynonymous nonsynonymous	HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPG27_298 HPG27_298 HPG27_298		
\$75 \$75 \$75 \$75 \$75 \$75 \$75 \$75 \$75	1332954 1332987 1332996 1332997 1332999 1482848 1482850 1483092 1592784	T G G T G G T G ATGTG	C 6 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	SNP SNP SNP SNP SNP SNP indel	synonymous nonsynonymous synonymous nonsynonymous nonsynonymous nonsynonymous frameshift deletion	HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPG27_298 HPG27_298 HPG27_298 HPG27_298 HP1354		
S75	1332954 1332987 1332996 1332997 1332999 1482848 1482850 1483092 1592784 1592801	T T G T G T G ATGTG T	C	SNP SNP SNP SNP SNP SNP indel SNP	synonymous nonsynonymous synonymous nonsynonymous nonsynonymous nonsynonymous frameshift deletion synonymous	HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPG27_298 HPG27_298 HPG27_298 HP1354 HP1354		
S75	1332954 1332987 1332996 1332997 1332999 1482848 1482850 1483092 1592784 1592801 99327	T T G T G G ATGTG T C	C	SNP SNP SNP SNP SNP indel SNP SNP	synonymous nonsynonymous synonymous nonsynonymous nonsynonymous nonsynonymous frameshift deletion synonymous synonymous	HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPG27_298 HPG27_298 HPG27_298 HP1354 HP1354 HP1354		
S75	1332954 1332987 1332996 1332997 1332999 1482848 1482850 1483092 1592784 1592801	T T G T G T G ATGTG T	C	SNP SNP SNP SNP SNP SNP indel SNP	synonymous nonsynonymous synonymous nonsynonymous nonsynonymous nonsynonymous frameshift deletion synonymous synonymous nonsynonymous	HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPG27_298 HPG27_298 HPG27_298 HP1354 HP1354		
S75           S76           S76	1332954           1332987           1332996           1332997           1332999           1482848           1482848           148280           1483092           1592784           1592801           99327           119015	T T G T G G ATGTG T C A	C G C C T G A A A A G G T C	SNP SNP SNP SNP SNP indel SNP SNP SNP	synonymous nonsynonymous synonymous nonsynonymous nonsynonymous nonsynonymous frameshift deletion synonymous synonymous nonsynonymous synonymous	HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPG27_298 HPG27_298 HPG27_298 HP1354 HP1354 HP1354 HP1534	HP1582	jhp1488
S75           S76           S76           S76           S76           S76	1332954 1332987 1332996 1332997 1332999 1482848 1482850 1483092 1592784 1592801 99327 119015 168379	T G G T G T G ATGTG T C A C	C G C C T G A A T G G T C C T	SNP SNP SNP SNP SNP indel SNP SNP SNP SNP	synonymous nonsynonymous synonymous nonsynonymous nonsynonymous nonsynonymous frameshift deletion synonymous synonymous nonsynonymous	HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPG27_298 HPG27_298 HPG27_298 HP1354 HP1354 HP1354	HP1582	jhp1488
S75           S76           S76           S76           S76	1332954 1332987 1332996 1332997 1332999 1482848 1482850 1483092 1592784 1592801 99327 119015 168379 199597	T T G T G T G ATGTG T C A C C	C G G C C T G G A A ATG G T C C T T C T T T T T	SNP SNP SNP SNP SNP indel SNP SNP SNP SNP	synonymous nonsynonymous synonymous nonsynonymous nonsynonymous nonsynonymous frameshift deletion synonymous synonymous nonsynonymous synonymous intergenic	HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPG27_298 HPG27_298 HPG27_298 HP1354 HP1354 HP1354 HP1534 HP1534 HP1534	HP1582	jhp1488
S75           S75           S75           S75           S75           S75           S75           S75           S76	1332954 1332987 1332996 1332999 1482848 1482850 1592784 1592801 99327 119015 168379 199597 199597 226261 226689 315327	T T G T G T G ATGTG T C A C C G G	C G G C C T T G A A ATG G G T C C T T T A A ACCCCCCCCCC	SNP SNP SNP SNP indel SNP SNP SNP SNP SNP SNP	synonymous nonsynonymous synonymous nonsynonymous nonsynonymous frameshift deletion synonymous nonsynonymous nonsynonymous intergenic nonsynonymous	HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPG27_298 HPG27_298 HPG27_298 HP1354 HP1354 HP1354 HP1534 HP1534 HP159 HP0019_1 HP0019_1 HP12_0070	HP1582	jhp1488
S75           S76	1332954 1332987 1332996 1332999 1482848 1482850 1592784 1592784 1592801 99327 119015 168379 199597 226261 276989 315327 413866	T         G         T         G         T         G         T         G         ATGTG         T         C         C         G         G         G         A         C         G         G         A         C         G         G         Accccccccccc         A	C G G C C T G G A A TG G T C C T T C T C T A A A C C A A A C C C C	SNP SNP SNP SNP indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	synonymous nonsynonymous synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous synonymous synonymous nonsynonymous intergenic nonsynonymous intergenic synonymous intergenic synonymous	HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPG27_298 HPG27_298 HPG27_298 HP1354 HP1354 HP1354 HP1534 HP1534 HP1547 HP0019_1 HP0019_1 HP0019_1 HP1535		jhp1488
S75           S75           S75           S75           S75           S75           S75           S75           S76           S76	1332954 1332987 1332996 1332999 1482848 1482850 1592784 1592801 99327 119015 168379 199597 199597 226261 226689 315327	T         T         G         T         G         T         G         ATGTG         T         C         A         C         G         G         G         A         C         G         G         A         C         C         G         Accccccccccc	C G G C C T T G A A ATG G G T C C T T T A A ACCCCCCCCCC	SNP SNP SNP SNP indel SNP SNP SNP SNP SNP SNP SNP SNP indel	synonymous nonsynonymous synonymous nonsynonymous nonsynonymous frameshift deletion synonymous synonymous nonsynonymous intergenic nonsynonymous nonsynonymous intergenic	HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HPG27_298 HPG27_298 HPG27_298 HP1354 HP1354 HP1354 HP1534 HP1534 HP159 HP0019_1 HP0019_1 HP12_0070		jhp1488

| S76  | 430922   | G  
   
   
   
   
   
   
  | Α  
   | SNP   | nonsynonymous   | HP0194  | | | | | | | | | | | | |
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S76	455599	TGGGGGGGGGG
   
   
   
   
   
   
  | TGGGGGGGGGGG   
   | indel   | frameshift insertion  | HP0217  | | | | | | | | | | | | |
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| S76  | 546511   | САААААААААА  
   
   
   
   
   
   
  | СААААААААААА   
   | indel   | intergenic  |   | HP1243/HPG27_298  
   | 10007 200  |  |  |  |   |   |   |  |   |  |  |  |   |  |   |  
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| S76<br>S76   | 548978<br>691071   | G  
   
   
   
   
   
   
  | T  
   | SNP   | intergenic  | HP0489  | jhp1163   
   | HPG27_298  |  |  |  |   |   |   |  |   |  |  |  |   |  |   |  
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| S76  | 691071   | A  
   
   
   
   
   
   
  | A<br>C   
   | SNP<br>SNP  | synonymous  | HP0489  | | | | | | | | | | | | |
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| \$76   | 691074   | G  
   
   
   
   
   
   
  | A  
   | SNP   | synonymous<br>nonsynonymous   | HP0489<br>HP0489  | | | | | | | | | | | | |
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| \$76   | 691089   | A  
   
   
   
   
   
   
  | G  
   | SNP   | synonymous  | HP0489  | | | | | | | | | | | | |
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| S76  | 691091   | c  
   
   
   
   
   
   
  | A  
   | SNP   | nonsynonymous   | HP0489  | | | | | | | | | | | | |
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| S76  | 691101   | T  
   
   
   
   
   
   
  | c  
   | SNP   | synonymous  | HP0489  | | | | | | | | | | | | |
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| \$76   | 691113   | G  
   
   
   
   
   
   
  | T  
   | SNP   | nonsynonymous   | HP0489  | | | | | | | | | | | | |
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| S76  | 691173   | C  
   
   
   
   
   
   
  | A  
   | SNP   | synonymous  | HP0489  | | | | | | | | | | | | |
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| S76  | 691175   | A  
   
   
   
   
   
   
  | G  
   | SNP   | nonsynonymous   | HP0489  | | | | | | | | | | | | |
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| S76  | 691179   | с  
   
   
   
   
   
   
  | G  
   | SNP   | synonymous  | HP0489  | | | | | | | | | | | | |
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| S76  | 691185   | Α  
   
   
   
   
   
   
  | G  
   | SNP   | nonsynonymous   | HP0489  | | | | | | | | | | | | |
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| S76  | 691189   | С  
   
   
   
   
   
   
  | G  
   | SNP   | nonsynonymous   | HP0489  | | | | | | | | | | | | |
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| S76  | 691190   | A  
   
   
   
   
   
   
  | C  
   | SNP   | nonsynonymous   | HP0489  | | | | | | | | | | | | |
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| S76  | 830053   | C  
   
   
   
   
   
   
  | Т  
   | SNP   | nonsynonymous   | HPP12_0617  | | | | | | | | | | | | |
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| S76  | 839999   | Т  
   
   
   
   
   
   
  | С  
   | SNP   | nonsynonymous   | HPB8_818  | | | | | | | | | | | | |
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| S76  | 952086   | TTCTCTCTCTCTCTCTC  
   
   
   
   
   
   
  | TTCTCTCTCTCTCTC  
   | indel   | intergenic  |   | HPG27_677   
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| S76  | 984348   | G  
   
   
   
   
   
   
  | A  
   | SNP   | nonsynonymous   | HP0751  | | | | | | | | | | | | |
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|  | 1043704  | GTTTTTTTTTTT   
   
   
   
   
   
   
  | GTTTTTTTTTTTT  
   | indel   | frameshift insertion/intergenic   | HPnc4170  | HP0811  
   | HPnc4160   |  |  |  |   |   |   |  |   |  |  |  |   |  |   |  
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|  | 1187376  | ATTTTTTT   
   
   
   
   
   
   
  | ATTTTTTTT  
   | indel   | intergenic  |   | HP0947  
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|  | 1284699  | AGGGGGGGGGG  
   
   
   
   
   
   
  | AGGGGGGGGGGG   
   | indel   | frameshift deletion   | HPG27_1018  | | | | | | | | | | | | |
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|  | 1318525  | AAC  
   
   
   
   
   
   
  | A  
   | indel   | frameshift deletion   | jhp1031   | | | | | | | | | | | | |
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|  | 1332690  | c  
   
   
   
   
   
   
  | A  
   | SNP   | synonymous  | HPATCC43504_01275   | | | | | | | | | | | | |
   |            |  |  |  |   |   |   |  |   |  |  |  |   |  |   |  
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|  | 1332906  | C  
   
   
   
   
   
   
  | T  
   | SNP   | synonymous  | HPATCC43504_01275   | | | | | | | | | | | | |
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   |  |   |   |   |  |
|  | 1332954  | T  
   
   
   
   
   
   
  | G  
   | SNP   | synonymous  | HPATCC43504_01275   | | | | | | | | | | | | |
   |            |  |  |  |   |   |   |  |   |  |  |  |   |  |   |  
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|  | 1332987  | T  
   
   
   
   
   
   
  | c<br>c   
   | SNP   | synonymous  | HPATCC43504_01275   | | | | | | | | | | | | |
   |            |  |  |  |   |   |   |  |   |  |  |  |   |  |   |  
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|  | 1332996  | T  
   
   
   
   
   
   
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   | SNP   | synonymous  | HPATCC43504_01275   | | | | | | | | | | | | |
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|  | 1332997<br>1332999   | G<br>T   
   
   
   
   
   
   
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|  | 1332999  | T  
   
   
   
   
   
   
  | G  
   | SNP   | synonymous  | HP1354  | | | | | | | | | | | | |
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|  | 1592801  | I<br>CGAGAGAGAGAGAGAG  
   
   
   
   
   
   
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   | indel   | synonymous<br>frameshift insertion  | 1171334   | | | | | | | | | | | | |
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| \$77   | 658  | С  
   
   
   
   
   
   
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| \$77   | 248956   | c  
   
   
   
   
   
   
  | т  
   | SNP   | synonymous  | jhp0037_1   | | | | | | | | | | | | |
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| \$77   | 303827   | CGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG  
   
   
   
   
   
   
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   | indel   | frameshift insertion  | HPP12_0096  | | | | | | | | | | | | |
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| \$77   | 315327   | ACCCCCCCCC   
   
   
   
   
   
   
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   | indel   | intergenic  | 11112_0000  | HP0103  
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| \$77   | 374756   | CGGGGGGGGGGGGGG  
   
   
   
   
   
   
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   | indel   | frameshift insertion  | jhp0151   | 111 0 2 0 0   
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| \$77   | 412566   | т  
   
   
   
   
   
   
  | c  
   | SNP   | nonsynonymous   | HP1534  | | | | | | | | | | | | |
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| \$77   | 413983   | C  
   
   
   
   
   
   
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   | SNP   | synonymous  | HP1535  | | | | | | | | | | | | |
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| \$77   | 431032   | C  
   
   
   
   
   
   
  | т  
   | SNP   | synonymous  | HP0194  | | | | | | | | | | | | |
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| S77  | 437765   | G  
   
   
   
   
   
   
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   | SNP   | intergenic  |   | HP0204  
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| S77  | 450628   | G  
   
   
   
   
   
   
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   | SNP   | synonymous  | HP0213  | | | | | | | | | | | | |
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| S77  | 546511   | СААААААААААА   
   
   
   
   
   
   
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   | indel   | intergenic  |   | HP1243/HPG27_298  
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| S77  | 548957   | с  
   
   
   
   
   
   
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| S77  | 548965   | с  
   
   
   
   
   
   
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   | SNP   | intergenic  |   | jhp1163   
   | HPG27_298  |  |  |  |   |   |   |  |   |  |  |  |   |  |   |  
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| S77  | 548978   | G  
   
   
   
   
   
   
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| S77  | 620169   | C  
   
   
   
   
   
   
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   | SNP<br>SNP<br>SNP<br>SNP  | synonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous   | HP1175<br>HP1174<br>HP0499<br>HP0607  | | | | | | | | | | | | |
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   | SNP<br>SNP<br>SNP<br>SNP<br>indel<br>indel<br>indel   | synonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>intergenic<br>intergenic<br>intergenic  | HP1175<br>HP1174<br>HP0499<br>HP0607  | HPG27_680<br>HPG27_1187<br>HP0947   
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   | SNP<br>SNP<br>SNP<br>SNP<br>indel<br>indel<br>indel<br>SNP  | synonymous<br>nonsynonymous<br>nonsynonymous<br>nonsynonymous<br>intergenic<br>intergenic<br>intergenic<br>intergenic   | HP1175<br>HP1174<br>HP0499<br>HP0607  | HPG27_680<br>HPG27_1187<br>HP0947<br>HP0953   
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G G G C T CAAAAAAAAAAAAAAAA CGAGAGAGAGAGAGAGAGAG ATTTTTTT C A A G G T T C C A A G G T T C A A C G G C C C C A A C G G G G G G G</td><td>T         A         A         T         C         CAAAAAAAAAAAAAAAA         CGAGAGAGAGAGAGAGAGAG         ATTTTTTTT         A         G         G         G         G         T         C         G</td><td>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>indel<br/>indel<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP</td><td>synonymous<br/>nonsynonymous<br/>nonsynonymous<br/>nonsynonymous<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic</td><td>HP1175<br/>HP1174<br/>HP0499<br/>HP0607<br/>HPB8_818</td><td>HPG27_680<br/>HPG27_1187<br/>HPO947<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HP</td><td></td></tr> <tr><td>\$77<br/>\$77<br/>\$77<br/>\$77<br/>\$77<br/>\$77<br/>\$77<br/>\$77<br/>\$77<br/>\$77</td><td>626404<br/>627243<br/>701041<br/>820046<br/>839999<br/>958702<br/>1124346<br/>1192612<br/>1192637<br/>1192636<br/>1192763<br/>1192763<br/>1192787<br/>1192773<br/>1192773<br/>1192773<br/>1192773<br/>1192778<br/>1192787<br/>1192787<br/>1192787<br/>1192787<br/>1192782<br/>1192782<br/>1192782<br/>1192784<br/>1192782<br/>1192783</td><td>C         G         G         C         T         CAAAAAAAAAAAAAA         CGAGAGAGAGAGAGAGAGAGAGAG         AITTITITT         C         A         G         T       
 C         T         C         A         A         A         A         A         A         A         A         C         C         C         GAGAGAGAGAGAGAGAGAGAGAGAGAGAGAGAGAGAGA</td><td>T         A         T         C         CAAAAAAAAAAAAAAA         CGAGAGAGAGAGAGAGAGAG         A         CGAGAGAGAGAGAGAGAG         A         G         G         G         G         C         G</td><td>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>indel<br/>indel<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP</td><td>synonymous<br/>nonsynonymous<br/>nonsynonymous<br/>nonsynonymous<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>in</td><td>HP1175<br/>HP1174<br/>HP0499<br/>HP0607<br/>HPB8_818</td><td>HPG27_680<br/>HPG27_1187<br/>HPO947<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953</td><td></td></tr> <tr><td>\$77<br/>\$77<br/>\$77<br/>\$77<br/>\$77<br/>\$77<br/>\$77<br/>\$77</td><td>626404<br/>627243<br/>701041<br/>820046<br/>839999<br/>958702<br/>1124346<br/>1192612<br/>1192632<br/>1192634<br/>1192636<br/>1192763<br/>1192763<br/>1192773<br/>1192773<br/>1192773<br/>1192773<br/>1192778<br/>1192784<br/>1192786<br/>1192782<br/>1192784<br/>1192782<br/>1192782<br/>1192782<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192792<br/>1192</td><td>C         G         G         C         T         CAAAAAAAAAAAAAA         CGAGAGAGAGAGAGAGAGAGAG         AITTITITT         C         A         A         G         T         C         A         G         T         C         A         A         A         A         A         C         C         C         G         T         C         A         C         G         G         C         A         C         G         G         G         G         G         GGAGAGAGAGAGAGAGAGAGAG         GITTIT         C         C         C         C         C         C         C         C         C         C         C         C&lt;</td><td>T A A A T C C C CAAAAAAAAAAAAAAAAAA
CGAGAGAGAGAGA</td><td>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>indel<br/>indel<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP</td><td>synonymous<br/>nonsynonymous<br/>nonsynonymous<br/>nonsynonymous<br/>nonsynonymous<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic</td><td>HP1175<br/>HP1174<br/>HP0499<br/>HP0607<br/>HPB8_818</td><td>HPG27_680<br/>HPG27_1187<br/>HPO947<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953<br/>HPO953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G G C C C C CAAAAAAAAAAAAAAA CGAGAGAGA</td><td>T         A         T         C         CAAAAAAAAAAAAAAAA         CGAGAGAGAGAGAGAGAGAG         A         CGAGAGAGAGAGAGAGAG         A         G         G         G         G         G         G         C         G
        G         G         G         G         GITTT     <td>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP</td><td>synonymous<br/>nonsynonymous<br/>nonsynonymous<br/>nonsynonymous<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>in</td><td>HP1175<br/>HP1174<br/>HP0499<br/>HP0607<br/>HP88_818</td><td>HPG27_680<br/>HPG27_1187<br/>HP0947<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP</td><td></td></td></tr> <tr><td>\$77<br/>\$77<br/>\$77<br/>\$77<br/>\$77<br/>\$77<br/>\$77<br/>\$77</td><td>626404<br/>627243<br/>701041<br/>820046<br/>839999<br/>958702<br/>1124346<br/>1192612<br/>1192627<br/>1192636<br/>1192650<br/>1192686<br/>1192742<br/>1192742<br/>1192743<br/>1192773<br/>1192773<br/>1192786<br/>1192787<br/>1192786<br/>1192787<br/>1192782<br/>1192784<br/>1192782<br/>1192784<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192</td><td>C G G G C T CAAAAAAAAAAAAAAAA CGAGAGAGAGAGAGAGAGAG ATTTTTTT C A A G G T T C C C C C C C C C C C C C C G G C G C</td><td>T A A A T C C C CAAAAAAAAAAAAAAAAAA C
CGAGAGAGAGA</td><td>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>indel<br/>indel<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP</td><td>synonymous<br/>nonsynonymous<br/>nonsynonymous<br/>nonsynonymous<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic</td><td>HP1175<br/>HP1174<br/>HP0499<br/>HP0607<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP88_818<br/>HP</td><td>HPG27_680<br/>HPG27_1187<br/>HP0947<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/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<tr><td>\$77<br/>\$77<br/>\$77<br/>\$77<br/>\$77<br/>\$77<br/>\$77<br/>\$77</td><td>626404<br/>627243<br/>701041<br/>820046<br/>839999<br/>958702<br/>1124346<br/>1192612<br/>1192637<br/>1192636<br/>1192763<br/>1192763<br/>1192784<br/>1192773<br/>1192773<br/>1192773<br/>1192773<br/>1192773<br/>1192784<br/>1192787<br/>1192784<br/>1192785<br/>1192785<br/>1192784<br/>1192785<br/>1192784<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192785<br/>1192</td><td>C G G C C C C CAAAAAAAAAAAAAAA CGAGAGAGA</td><td>T         A         T         C         CAAAAAAAAAAAAAAAA         CGAGAGAGAGAGAGAGAGAG         A         CGAGAGAGAGAGAGAGAG         A         G         G         G         G         G         G         C         GITTT    
<td>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP<br/>SNP</td><td>synonymous<br/>nonsynonymous<br/>nonsynonymous<br/>nonsynonymous<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>intergenic<br/>synonymous<br/>intergenic<br/>synonymous</td><td>HP1175<br/>HP1174<br/>HP0499<br/>HP0607<br/>HP88_818<br/>HP8_818<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607<br/>HP9607</td><td>HPG27_680<br/>HPG27_1187<br/>HP0947<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP</td><td></td></td></tr> | T         A         A         T         C         CAAAAAAAAAAAAAAAA         CGAGAGAGAGAGAGAGAGAG         ATTITTT         A         G  
  | SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>indel<br>indel<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP   | synonymous nonsynonymous nonsynonymous nonsynonymous nonsynonymous intergenic  | HP1175<br>HP1174<br>HP0499<br>HP0607<br>HPB8_818  | HPG27_680<br>HPG27_1187<br>HPO947<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953   
   |            | \$77<br>\$77<br>\$77<br>\$77<br>\$77<br>\$77<br>\$77<br>\$77<br>\$77<br>\$77 | 626404<br>627243<br>701041<br>820046<br>839999<br>958702<br>1124346<br>1192612<br>1192637<br>1192636<br>1192763<br>1192763<br>1192787<br>1192773<br>1192773<br>1192773<br>1192773<br>1192778<br>1192787<br>1192787<br>1192787<br>1192787<br>1192782<br>1192782<br>1192782<br>1192784<br>1192782<br>1192783 | C G G G C T CAAAAAAAAAAAAAAA CGAGAGAGAGAGAGAGAGAG ATTTTTTT C A A G G T T C A A G G T T C A A C C C C C C C C C C C C C C C | T A A A T C C C CAAAAAAAAAAAAAAAAA CGAGAGAGAGAGAG | SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>indel<br>indel<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP<br>SNP | 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HPG27_680<br>HPG27_1187<br>HPO947<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953 |  | \$77<br>\$77<br>\$77<br>\$77<br>\$77<br>\$77<br>\$77<br>\$77<br>\$77<br>\$77 | 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HPG27_680<br>HPG27_1187<br>HPO947<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HP 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<td>HP1175<br/>HP1174<br/>HP0499<br/>HP0607<br/>HP88_818</td> <td>HPG27_680<br/>HPG27_1187<br/>HP0947<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP0953<br/>HP</td> 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  | HPG27_680<br>HPG27_1187<br>HPO947<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953<br>HPO953 |   |   | | | | | | | | | | | | | | |
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91     1940     NTTT     NTTT     Not     Not     Not     Not     Not       191     1925     A     A     Not     Not     Not     Not       191     1925     A     A     Not     Not     Not     Not       191     1925     A     A     Not     Not     Not     Not       191     1927     A     A     A     Not     Not     Not       191     1928     A     A     A     Not     Not     Not       191     1929     A     A     A     Not     Not     Not       191     1929     A     A     A     Not     <	S78	839999	Т	C	SNP	nonsynonymous	HPB8_818		
19.     19.00     <	S78	1043704	GTTTTTTTTTTT	GTTTTTTTTTTTT	indel	frameshift insertion/intergenic	HPnc4170	HP0811	HPnc4160
97     19207     A     0     19794     19794     19794       1918     19208     0     A     399     19895     19793       1918     19109     1     0     0     19794     19793       1918     19109     1     0     0     1999     19793     19993       1918     19174     0     0     1999     19993     19993     19993     19993     19993     19993       1918     19174     0     0     19994     19993     19993     19993     19993     19993     19993       1918     19174     0     0     19994     19993     19993     19993     19993     19993     19993       1918     19174     0     0     19993									
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919     1.2	S78	1192744	Т	с	SNP	intergenic		HP0953	
971     3.277     A.     6.     509     Magnet:     M953       172     3.2724     T     C     504     Magnet:     M953       173     3.2724     T     C     504     Magnet:     M953       173     12.272     A.     0.     504     Magnet:     M953       174     12.472     A.     0.     504     Magnet:     M953       174     12.472     A.     C     104     Magnet:     M953       174     12.483     A.     C     104     Magnet:     M953       174     12.483     G.     C.     104     Magnet:     M953       174     12.483     G.     C.     104     Magnet:     M953       174     12.483     G.     G.     104     Magnet:     M953       174     12.484     G.     G.     104     Magnet:     M953       174     12.494     G.     G.     104 </td <td>S78</td> <td>1192752</td> <td>A</td> <td>G</td> <td>SNP</td> <td>intergenic</td> <td></td> <td>HP0953</td> <td></td>	S78	1192752	A	G	SNP	intergenic		HP0953	
971     19279     19279     19279     19289     19933       158     19278     C     T     60     199     190930     19933       158     19278     C     T     60     99     190930     19931       158     19278     A     6     99     190930     19932       158     19270     A     6     99     190930     19932       158     19250     0     A     99     190930     19932       158     19261     A     10     99     19932     19931       158     19261     A     10     99     19932     19931     19931       158     19261     A     10     99     19932     19931     19931       159     19461     GAMAMAMAMAMAMAMAMAMAMAMAMAMAMAMAMAMAMAM			Α			intergenic			
19     12074     C     1907 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>									
197     1927%     C     1927%     C     19973       197     1927%     A     G     SAP     Margent     19973       197     1927%     A     G     SAP     Margent     19973       197     19287     A     A     SAP     Margent     19973       197     19281     A     A     SAP     Persportants     19917       197     19281     A     C     SAP     Persportants     19917       197     19281     G     T     SAP     Persportants     19917       197     19285     G     T     SAP     Persportants     19924       197     19285     G     T     SAP     Persportants     19924       197     19285     G     T     SAP     Persportants     19924       197     19285     G     T     SAP     Persportants     19924       197     19						-			
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979         646         C         T         979         974         975         975         975         975         977         9775         977         9776         977         9776         977         9776         977         9777							HP1369m		
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979     437785     6     C     SPP     Sprompons     HP0234       579     54085     C     T     SPP     Sprompons     HP013       579     54085     C     T     SPP     intergenic     Ip01133       579     54094     A     T     SPP     intergenic     Ip01134       579     54044     A     T     SPP     nerry product     Ip01134       579     56046     C     T     SPP     nerry product     HP0113       579     57046     C     T     SPP     nerry product     HP0113       579     57346     C     A     SPP     nerry product     HP0113       579     57356     G     A     SPP     nerry product     HP0127       579     50356     G     A     SPP     nerry product     HP027       579     50356     G     A     SPP     nerry product     HP0217       579     150377     A     G     SPP     nerry product     HP0217       579     150315     G     A     SPP     nerry product     HP0217       579     150315     G     A     SPP     nerry product     HP0217       579 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>									
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1979         54995         C         T         SHP         Integratic         Pp118           1979         54997         G         T         SHP         Integratic         Pp118           1979         564944         C         T         SHP         Integratic         Pp118           1979         564944         C         T         SHP         Integratic         Pp118           1979         564944         C         T         SHP         Integratic         HP017           1979         564944         C         A         SHP         Integratic         HP017           1979         58184         GAAAAAAAAAAA         GAAAAAAAAAAAA         Integratic         HP027         HP027           1979         58182         GAAAAAAAAAAAA         GAAAAAAAAAAAAA         Integratic         HP027         HP027           1979         192627         A         A         SHP         Integratic         HP027         HP021           1979         192627         A         A         SHP         Integratic         HP027         HP023           1979         192627         A         A         SHP         Integratic         HP023           197							HP0213		
179         54994         A         T         549         Integenic         //p0163           578         62040         C         T         549         nonsynomymous         HP1175           578         62040         C         T         549         nonsynomymous         HP1175           578         62040         C         A         549         nonsynomymous         HP1174           578         62040         C         A         549         nonsynomymous         HP1274           578         6303         GAAAAAAAAAAAA         GAAAAAAAAAAAA         GAAAAAAAAAAAAAA         Indel Integenic         HP0272759           579         59350         CAAAAAAAAAAAAAAA         CAAAAAAAAAAAAAAA         Indel Integenic         HP0272759           579         120274         A         TTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	S79	548965	с	Т	SNP			jhp1163	HPG27_298
179         620169         C         T         SMP         somportymous         H961[1119           179         622644         C         T         SMP         somportymous         H91175           179         62243         G         A         SMP         somportymous         H91174           179         701641         G         A         SMP         somportymous         H91174           179         701641         G         A         SMP         somportymous         H91174           179         701641         G         A         SMP         somportymous         H92175           179         59385         G         A         SMP         somportymous         H9217           179         1916244         G         A         SMP         somportymous         H9217           179         1916244         G         G         SMP         intergenic         H90217           179         1912524         A         G         SMP         intergenic         H90231           179         192625         G         A         SMP         intergenic         H90231           179         1926264         T         G	S79	548978	G	Т	SNP	intergenic		jhp1163	HPG27_298
179         62404         C         T         54P         symmymax         H#117           578         62743         G         A         54P         nonsymparymanus         H#1174           578         701011         G         A         54P         nonsymparymanus         H#1174           578         801356         GAAAAAAAAAAAA         GAAAAAAAAAAAAA         S4P         nonsymparymanus         H#02197           578         68036         A         ASPA         SAPAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	S79	548994	A	Т	SNP	intergenic		jhp1163	HPG27_298
572         627283         6         A         SNP         nonsynonymous         HP1174           579         701041         6         A         SNP         nonsynonymous         HP0499           579         801836         GAAAAAAAAAAA         Indel Integenic         Jp0540           579         953856         G         A         SNP         nonsynonymous         HP027_677           579         501307         CAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	S79	620169	c	Т	SNP	nonsynonymous	HPAG1_1119		
579         201041         6         A         SNP         nonsynonymous         HP0499           579         801385         GAAAAAAAAAAAA         GAAAAAAAAAAAAA         Indel         Integeric         IP0540           579         953365         G         A         SNP         nonsynonymous         HP627_677           579         953702         CAAAAAAAAAAAAAAAA         CAAAAAAAAAAAAAAAAAAAAAAAAAAAAA         Indel         Integeric         HP627_677           579         953702         CAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA						synonymous			
1779         B01385         GAAAAAAAAAAA         GAAAAAAAAAAA         indel         intergenic         jip0540           579         95702         GAAAAAAAAAAAAA         Indel         intergenic         HPG27_G77           579         95702         GAAAAAAAAAAAAAAA         Indel         intergenic         HPG27_G70           579         198704         GTTTTTTTTT         GTTTTTTTTTTTTTTT         Indel         Intergenic         HPG27_G70           579         198704         GTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT									
579         95386         G         A         SNP         norsynonymous         HPG27_677           579         95702         CAMAMAMAMAA         Cinded         Integreic         HPG27_687           579         95702         CAMAMAMAMAAAAAAAAAAAA         Indel         Integreic         HPG27_687           579         113726         ATTITITT         ATTITITT         Integreic         HPG27           579         1132612         C         A         SNP         integreic         HPG053           579         1132626         G         SNP         integreic         HP0053           579         1132636         G         SNP         integreic         HP0053           579         1132656         G         A         SNP         integreic         HP0053           579         1132656         G         A         SNP         integreic         HP0053           579         1132742         C         T         SNP         integreic         HP0053           579         1132754         G         SNP         integreic         HP0053           579         1132754         G         SNP         integreic         HP0053           579<							HP0499		
579         5570         CAAAAAAAAAAAAAA         Indel         Intergenic         HPC27_680           579         1043704         GTITTITTITT         GITTITTITTIT         Indel         Intergenic         HPC27_680           579         1182512         C         A         SNP         Intergenic         HP0933           579         1192527         A         G         SNP         Intergenic         HP0933           579         1192626         G         A         SNP         Intergenic         HP0933           579         1192636         G         A         SNP         Intergenic         HP0933           579         1192636         G         A         SNP         Intergenic         HP0953           579         1192686         T         C         SNP         Intergenic         HP0953           579         1192647         T         C         SNP         Intergenic         HP0953           579         1192744         T         C         SNP         Intergenic         HP0953           579         1192758         G         G         SNP         Intergenic         HP0953           579         1192727         G <td< td=""><td></td><td></td><td></td><td></td><td></td><td>•</td><td>UDC 27 677</td><td>JND0540</td><td></td></td<>						•	UDC 27 677	JND0540	
59         1043704         GTTTTTTTT         GTTTTTTTT         indel         frameshift insertion/intergenic         HP0811           578         1137376         ATTTTTT         ATTTTTT         indel         frameshift insertion/intergenic         HP0833           578         1132634         A         SNP         intergenic         HP0953           579         1132634         G         SNP         intergenic         HP0953           579         1132636         G         A         SNP         intergenic         HP0953           579         1132636         G         A         SNP         intergenic         HP0953           579         1132636         G         A         SNP         intergenic         HP0953           579         1132742         C         T         SNP         intergenic         HP0953           579         1132724         G         G         SNP         intergenic         HP0953           579         1132724         T         G         SNP         intergenic         HP0953           579         1132773         A         G         SNP         intergenic         HP0953           579         1132787         A	-						11-027_077	HPG27 680	
579         1187376         ATTTTTT         ATTTTTT         indel         intergenic         HP09847           579         1132512         C         A         SNP         intergenic         HP0953           579         1132527         A         G         SNP         intergenic         HP0953           579         1132636         G         A         SNP         intergenic         HP0953           579         1132636         G         A         SNP         intergenic         HP0953           579         1132636         T         C         SNP         intergenic         HP0953           579         1132742         C         T         SNP         intergenic         HP0953           579         1132742         C         T         SNP         intergenic         HP0953           579         1132778         A         G         SNP         intergenic         HP0953           579         1132778         A         G         SNP         intergenic         HP0953           579         1132787         A         G         SNP         intergenic         HP0953           579         1132786         C         T							HPnc4170		HPnc4160
579         1192627         A         G         SNP         intergenic         HP0953           579         1192634         A         G         SNP         intergenic         HP0953           579         1192636         G         A         SNP         intergenic         HP0953           579         1192636         T         C         SNP         intergenic         HP0953           579         1192782         C         T         SNP         intergenic         HP0953           579         1192742         C         T         SNP         intergenic         HP0953           579         1192752         A         G         SNP         intergenic         HP0953           579         1192763         A         G         SNP         intergenic         HP0953           579         1192784         T         C         SNP         intergenic         HP0953           579         1192787         A         G         SNP         intergenic         HP0953           579         1192784         T         C         SNP         intergenic         HP0953           579         1192786         C         T         SNP	S79	1187376	ATTTTTT	ATTTTTTT	indel			HP0947	
579         1192634         A         G         SNP         Intergenic         HP0953           579         1192636         G         A         SNP         Intergenic         HP0953           579         1192630         T         C         SNP         Intergenic         HP0953           579         1192636         T         G         SNP         Intergenic         HP0953           579         1192742         C         T         SNP         Intergenic         HP0953           579         1192744         T         C         SNP         Intergenic         HP0953           579         1192734         A         G         SNP         Intergenic         HP0953           579         1192773         A         G         SNP         Intergenic         HP0953           579         1192786         C         T         SNP	S79	1192612	c	A	SNP	intergenic		HP0953	
579       1192636       G       A       SNP       Intergenic       HP0953         579       1192650       T       C       SNP       Intergenic       HP0953         579       1192686       T       G       SNP       Intergenic       HP0953         579       1192742       C       T       SNP       Intergenic       HP0953         579       1192744       T       C       SNP       Intergenic       HP0953         579       1192752       A       G       SNP       Intergenic       HP0953         579       1192763       A       G       SNP       Intergenic       HP0953         579       1192773       A       G       SNP       Intergenic       HP0953         579       1192784       T       C       SNP       Intergenic       HP0953         579       1192787       A       G       SNP       Intergenic       HP0953         579       1192787       A       G       SNP       Intergenic       HP0953         579       1192782       A       G       SNP       Intergenic       HP0953         579       1192820       G       A	S79	1192627	A	G	SNP	intergenic		HP0953	
S79         1192650         T         C         SNP         intergenic         HP0953           S79         1192666         T         G         SNP         intergenic         HP0953           S79         1192742         C         T         SNP         intergenic         HP0953           S79         1192744         T         C         SNP         intergenic         HP0953           S79         1192752         A         G         SNP         intergenic         HP0953           S79         1192763         A         G         SNP         intergenic         HP0953           S79         1192773         A         G         SNP         intergenic         HP0953           S79         1192786         C         T         SNP         intergenic         HP0953           S79         1192786         C         T         SNP         intergenic         HP0953           S79         1192786         G         SNP         intergenic         HP0953           S79         1192792         A         G         SNP         intergenic         HP0953           S79         1192792         G         T         SNP         i		1192634	Α	G	SNP	intergenic		HP0953	
S79         1192686         T         G         SNP         intergenic         HP0953           S79         1192742         C         T         SNP         intergenic         HP0953           S79         1192742         C         T         SNP         intergenic         HP0953           S79         1192752         A         G         SNP         intergenic         HP0953           S79         1192753         A         G         SNP         intergenic         HP0953           S79         1192773         A         G         SNP         intergenic         HP0953           S79         1192779         T         G         SNP         intergenic         HP0953           S79         1192784         T         C         SNP         intergenic         HP0953           S79         1192787         A         G         SNP         intergenic         HP0953           S79         1192787         A         G         SNP         intergenic         HP0953           S79         1192782         A         G         SNP         intergenic         HP0953           S79         1192820         G         A         SNP									
S79         1192742         C         T         SNP         Intergenic         HP0953           S79         1192752         A         G         SNP         Intergenic         HP0953           S79         1192752         A         G         SNP         Intergenic         HP0953           S79         1192753         A         G         SNP         Intergenic         HP0953           S79         1192773         A         G         SNP         Intergenic         HP0953           S79         1192779         T         G         SNP         Intergenic         HP0953           S79         1192784         T         C         SNP         Intergenic         HP0953           S79         1192787         A         G         SNP         Intergenic         HP0953           S79         1192787         A         G         SNP         Intergenic         HP0953           S79         1192787         A         G         SNP         Intergenic         HP0953           S79         1192794         C         T         SNP         Intergenic         HP0953           S79         1192820         G         A         SNP									
S79         1192744         T         C         SNP         Intergenic         HP0953           S79         1192752         A         G         SNP         Intergenic         HP0953           S79         1192763         A         G         SNP         Intergenic         HP0953           S79         1192773         A         G         SNP         Intergenic         HP0953           S79         1192779         T         G         SNP         Intergenic         HP0953           S79         1192784         T         C         SNP         Intergenic         HP0953           S79         1192786         C         T         SNP         Intergenic         HP0953           S79         1192787         A         G         SNP         Intergenic         HP0953           S79         1192787         A         G         SNP         Intergenic         HP0953           S79         1192787         A         G         SNP         Intergenic         HP0953           S79         1192782         A         G         SNP         Intergenic         HP0953           S79         1192820         G         A         SNP									
S79         1192752         A         G         SNP         Intergenic         HP0953           S79         1192763         A         G         SNP         Intergenic         HP0953           S79         1192773         A         G         SNP         Intergenic         HP0953           S79         1192779         T         G         SNP         Intergenic         HP0953           S79         1192784         T         C         SNP         Intergenic         HP0953           S79         1192786         C         T         C         SNP         Intergenic         HP0953           S79         1192787         A         G         SNP         Intergenic         HP0953           S79         1192787         A         G         SNP         Intergenic         HP0953           S79         1192792         A         G         SNP         Intergenic         HP0953           S79         1192292         A         G         SNP         Intergenic         HP0953           S79         1192858         GATATATATATATATAT         GATATATATATATATATATATATATATATAT         Indel         Intergenic         HP012,0950           S79									
S79         1192763         A         G         SNP         intergenic         HP0953           S79         1192773         A         G         SNP         intergenic         HP0953           S79         1192779         T         G         SNP         intergenic         HP0953           S79         1192778         T         G         SNP         intergenic         HP0953           S79         1192786         C         T         SNP         intergenic         HP0953           S79         1192787         A         G         SNP         intergenic         HP0953           S79         1192787         A         G         SNP         intergenic         HP0953           S79         1192792         A         G         SNP         intergenic         HP0953           S79         119280         G         A         SNP         intergenic         HP0953           S79         1192820         G         A         SNP         intergenic         HP0953           S79         1192820         G         A         SNP         nonsynonymous         HP12_0950           S79         1505985         GATATATATATATATATATATATATATATATATATA									
S79         1192773         A         G         SNP         intergenic         HP0953           S79         1192779         T         G         SNP         intergenic         HP0953           S79         1192784         T         C         SNP         intergenic         HP0953           S79         1192784         T         C         SNP         intergenic         HP0953           S79         1192787         A         G         SNP         intergenic         HP0953           S79         1192787         A         G         SNP         intergenic         HP0953           S79         1192784         C         T         SNP         intergenic         HP0953           S79         1192792         A         G         SNP         intergenic         HP0953           S79         1192794         C         T         SNP         intergenic         HP0953           S79         119280         G         A         SNP         nonsynomyous         HP12_0950           S79         1192820         G         C         T         SNP         sonsynomyous         HP12_0950           S79         1562557         G									
S791192779TGSNPintergenicHP0953S791192784TCSNPintergenicHP0953S791192786CTSNPintergenicHP0953S791192787AGSNPintergenicHP0953S791192792AGSNPintergenicHP0953S791192792AGSNPintergenicHP0953S791192794CTSNPintergenicHP0953S791192820GASNPnonsynonymousHP12_0950S791192820GASNPnonsynonymousHP12_0950S791192820GCGSNPsnewsynonymousHP12_0950S791192820GCGSNPsnewsynonymousHP12_0950S791192820GCGSNPsnewsynonymousHP12_0950S791192820GCSNPsnowymousHP12_0950MP12_0950S791193602TGGGGGGGGGGGGTGGGGGGGGGGGGGindelframeshift insertionHP1354S791169392TGGGGGGGGGGGGGTSNPsynowymousHP1450S80S8CTSNPsynowymousHP1529S80232964CASNPnonsynowymousHP027S80248956CTSNPsnowymousHP02096S80248956GG									
S79         1192786         C         T         SNP         intergenic         HP0953           S79         1192787         A         G         SNP         intergenic         HP0953           S79         1192787         A         G         SNP         intergenic         HP0953           S79         1192792         A         G         SNP         intergenic         HP0953           S79         1192794         C         T         SNP         intergenic         HP0953           S79         1192820         G         A         SNP         nonsynonymous         HPP12_0950           S79         1295885         GATATATATATATAT         GATATATATATATAT         indel         intergenic         HP142_0950           S79         1362557         G         C         SNP         synonymous         HP134           S79         1593602         TGGGGGGGGGGG         TGGGGGGGGGGGG         indel         frameshift insertion         HP345           S79         1640915         CGAGAGAGAGAGA         CGAGAGAGAGAGA         indel         frameshift insertion         HP1450           S80         658         C         T         SNP         synonymous         HP1450	S79	1192779	Т	G	SNP	intergenic		HP0953	
S79         1192787         A         G         SNP         intergenic         HP0953           S79         1192792         A         G         SNP         intergenic         HP0953           S79         1192794         C         T         SNP         intergenic         HP0953           S79         1192794         C         T         SNP         intergenic         HP0953           S79         1192820         G         A         SNP         norsynonymous         HP12_0950           S79         1192820         G         A         SNP         norsynonymous         HP12_0950           S79         1295885         GATATATATATATATATATATATAT         GATATATATATATATATATATATATATATATATATATAT									
S791192792AGSNPintergenicHP0953S791192794CTSNPintergenicHP0953S791192820GASNPnonsynonymousHP12_0950S791295885GATATATATATATATGATATATATATATindelintergenicHPA1CC43504S791295805GGAGGGGGGGGGTGGGGGGGGGGGGindelframeshift insertionHP1354S791362557GCSNPsynonymousHP8_1119S791362567GGGGGGGGGGGGTGGGGGGGGGGGindelframeshift insertionHP1354S791660364AGAGAGAGAGACGAGAGAGAGAGAGAGAindelframeshift insertionHP1450S80658CTSNPsynonymousHP1529S80232964CASNPnonsynonymousHP0037_1S80248956CTSNPnonsynonymousHP0134S8030327CGGGGGGGGGGGCGGGGGGGGGGGindelframeshift insertionHP012_0096S8031527ACCCCCCCCACCCCCCCCCindelindergenicHP0103S8037475GCCSNPsynonymousHP012S80431032CTSNPsynonymousHP012S80431032CTSNPsynonymousHP0134S80431032CTSNPsynonymousHP0134<									
S79         1192794         C         T         SNP         intergenic         HP0953           S79         1192820         G         A         SNP         nonsynonymous         HPP12_0950           S79         1295885         GATATATATATAT         GATATATATATAT         indel         intergenic         HPATCC43504           S79         1362557         G         C         SNP         synonymous         HP81_119           S79         1593602         TGGGGGGGGGGG         TGGGGGGGGGGG         indel         frameshift insertion         HP154           S79         1593602         TGGGGGGGGGGG         TGGGGGGGGGGG         indel         frameshift insertion         HP154           S79         1669898         C         T         SNP         synonymous         HP1450           S80         658         C         T         SNP         synonymous         HP1529           S80         248956         C         T         SNP         nonsynonymous         jhp0037_1           S80         303827         CGGGGGGGGGG         CGGGGGGGGGGG         indel         frameshift insertion         HP013           S80         374756         CGGGGGGGGG         CGGGGGGGGGGG         indel <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>									
S791192820GASNPnonsynonymousHPP12_0950S791295885GATATATATATATATATGATATATATATATindelintergenicHPATCCA3504_S791362557GCSNPsynonymousHPB8_1119S791593602TGGGGGGGGGGGTGGGGGGGGGGGGindelframeshift insertionHP1354S791593602TGGGGGGGGGGGCGGAGAGAGAGAGGGindelframeshift insertionHP1354S791669898CTSNPsynonymousHP1450S80658CTSNPsynonymousHP1529S80232964CASNPintergenicHPPC_00115S80248956CTSNPsynonymousHP0057S8030827CGGGGGGGGGGCGGGGGGGGGGGindelframeshift insertionHP0057S80315327ACCCCCCCCACCCCCCCCCindelframeshift insertionHP0134S80374756CGGGGGGGGGGGCGGGGGGGGGGGGindelframeshift insertionjhp0151S80431032CTSNPsynonymousHP0144S80430765GCSNPsynonymousHP024S80546511CAAAAAAAAAAAACAAAAAAAAAAAAAAAAAindelindelintergenicHP0213									-
S79       1295885       GATATATATATATATAT       GATATATATATATAT       indel       intergenic       HPATCC43504         S79       1362557       G       C       SNP       synonymous       HPB8_1119         S79       1593602       TGGGGGGGGGGG       TGGGGGGGGGGG       indel       frameshift insertion       HP1354         S79       1640915       CGAGAGAGAGAGG       CGAGAGAGAGAGAG       indel       frameshift insertion       HP1354         S79       1669898       C       T       SNP       synonymous       HP1450         S80       658       C       T       SNP       synonymous       HP1299         S80       232964       C       A       SNP       norsynonymous       jhp0037_1         S80       248956       C       T       SNP       norsynonymous       HP057         S80       267811       A       G       SNP       norsynonymous       HP0057         S80       31527       ACCCCCCCC       ACCCCCCCCC       indel       frameshift insertion       HP013         S80       31527       ACCCCCCCCC       ACCCCCCCCC       indel       frameshift insertion       jhp0151         S80       317475       CGGGGGGGGGG							HPP12 0050	666041	
S79         1362557         G         C         SNP         synonymous         HP88_1119           S79         1593602         TGGGGGGGGGG         TGGGGGGGGGGG         indel         frameshift insertion         HP1354           S79         1640915         CGAGAGAGAGAGAG         CGAGAGAGAGAGAG         indel         frameshift insertion           S79         1669898         C         T         SNP         synonymous         HP1450           S80         658         C         T         SNP         synonymous         HP1529           S80         232954         C         A         SNP         intergenic         HP0057_1           S80         248956         C         T         SNP         nonsynonymous         HP0057_1           S80         267811         A         G         SNP         nonsynonymous         HP0057           S80         303827         CGGGGGGGGGGG         CGGGGGGGGGGGG         indel         frameshift insertion         HP012_0096           S80         31527         ACCCCCCCC         ACCCCCCCCC         indel         intergenic         HP0103           S80         37475         CGGGGGGGGGGG         CGGGGGGGGGGGG         SNP         synonymous         H								HPATCC43504_01238	
S79       1593602       TGGGGGGGGGGG       TGGGGGGGGGGG       indel       frameshift insertion         S79       1640915       CGAGAGAGAGAGAGAG       CGAGAGAGAGAGAGAGAG       indel       frameshift insertion         S79       16609898       C       T       SNP       synonymous       HP1450         S80       658       C       T       SNP       synonymous       HP1529         S80       232964       C       A       SNP       intergenic       HPPC_00115         S80       248956       C       T       SNP       nonsynonymous       HP0037_1         S80       267811       A       G       SNP       nonsynonymous       HP0057         S80       303827       CGGGGGGGGGGG       CGGGGGGGGGGGG       indel       frameshift insertion       HP12_0096         S80       315327       ACCCCCCCC       ACCCCCCCCC       indel       intergenic       HP0103         S80       317476       CGGGGGGGGGGG       CGGGGGGGGGGGG       indel       frameshift insertion       jhp0151         S80       431032       C       T       SNP       synonymous       HP0204         S80       431032       C       T       SNP       synonymous							HPB8_1119		
S79         1669898         C         T         SNP         synonymous         HP1450           S80         658         C         T         SNP         synonymous         HP1529           S80         232964         C         A         SNP         synonymous         HP1529           S80         248956         C         T         SNP         nonsynonymous         jhp0037_1           S80         248956         C         T         SNP         nonsynonymous         jhp0037_1           S80         263811         A         G         SNP         nonsynonymous         HP057           S80         303827         CGGGGGGGGGGG         CGGGGGGGGGGGG         indel         frameshift insertion         HP12_0096           S80         315327         ACCCCCCCCC         ACCCCCCCCCC         indel         frameshift insertion         HP103           S80         374756         CGGGGGGGGGGG         CGGGGGGGGGGG         indel         frameshift insertion         jhp0151           S80         431032         C         T         SNP         synonymous         HP0204           S80         430765         G         C         SNP         synonymous         HP0213			TGGGGGGGGGGG	TGGGGGGGGGGGG			_		
S80         658         C         T         SNP         synonymous         HP1529           S80         232964         C         A         SNP         intergenic         HPPC_00115           S80         248956         C         T         SNP         nonsynonymous         jhp0037_1           S80         267811         A         G         SNP         nonsynonymous         HP057           S80         303827         CGGGGGGGGGGG         CGGGGGGGGGGGG         indel         frameshift insertion         HP12_0096           S80         315327         ACCCCCCCC         ACCCCCCCCC         indel         intergenic         HP0103           S80         374756         CGGGGGGGGGGG         CGGGGGGGGGGGG         indel         frameshift insertion         jhp0151           S80         3374756         GGGGGGGGGGG         C         SNP         synonymous         HP0194           S80         431032         C         T         SNP         synonymous         HP0194           S80         437765         G         C         SNP         intergenic         HP0204           S80         450628         G         A         SNP         synonymous         HP0213 <t< td=""><td></td><td></td><td></td><td></td><td>indel</td><td></td><td></td><td></td><td></td></t<>					indel				
S80         232964         C         A         SNP         intergenic         HPPC_00115           S80         248956         C         T         SNP         nonsynonymous         jhp0037_1           S80         267811         A         G         SNP         nonsynonymous         HP057           S80         303827         CGGGGGGGGGGGG         CGGGGGGGGGGGGG         indel         frameshift insertion         HP012_0096           S80         315327         ACCCCCCCC         ACCCCCCCCCC         indel         intergenic         HP0103           S80         3174756         CGGGGGGGGGG         CGGGGGGGGGGGG         indel         frameshift insertion         jhp0151           S80         431032         C         T         SNP         synonymous         HP0194           S80         431765         G         C         SNP         intergenic         HP0204           S80         450628         G         A         SNP         synonymous         HP0213           S80         546511         CAAAAAAAAAAAAAAAA         indel         intergenic         HP1243/HPG22	S79	1669898	С	т	SNP	synonymous	HP1450		
S80     248956     C     T     SNP     nonsynonymous     jhp0037_1       S80     267811     A     G     SNP     nonsynonymous     HP0057       S80     303827     CGGGGGGGGGGGG     CGGGGGGGGGGGG     indel     frameshift insertion     HPP12_0096       S80     315327     ACCCCCCCC     ACCCCCCCCC     indel     intergenic     HP0103       S80     37475     CGGGGGGGGGGGG     CGGGGGGGGGGGG     indel     frameshift insertion     jhp0151       S80     431032     C     T     SNP     synonymous     HP0194       S80     437755     G     C     SNP     synonymous     HP0204       S80     450628     G     A     SNP     synonymous     HP0213       S80     546511     CAAAAAAAAAAA     CAAAAAAAAAAA     indel     intergenic     HP1243/HPG22							HP1529		
S80     267811     A     G     SNP     nonsynonymous     HP0057       S80     303827     CGGGGGGGGGGGG     CGGGGGGGGGGGG     indel     frameshift insertion     HPP12_0096       S80     315327     ACCCCCCCCC     ACCCCCCCCC     indel     intergenic     HP0103       S80     374756     CGGGGGGGGGGG     CGGGGGGGGGGGG     indel     frameshift insertion     jhp0151       S80     431032     C     T     SNP     synonymous     HP0194       S80     431032     C     C     SNP     intergenic     HP0204       S80     430628     G     A     SNP     synonymous     HP0213       S80     546511     CAAAAAAAAAAA     CAAAAAAAAAAAA     indel     intergenic     HP1243/HPG22								HPPC_00115	
S80         303827         CGGGGGGGGGGG         CGGGGGGGGGGGG         Indel         frameshift insertion         HPP12_0096           S80         315327         ACCCCCCCCC         ACCCCCCCCC         indel         intergenic         HP0103           S80         37475         CGGGGGGGGGGG         CGGGGGGGGGGG         indel         frameshift insertion         jhp0151           S80         431032         C         T         SNP         synonymous         HP0194           S80         437765         G         C         SNP         intergenic         HP0204           S80         430628         G         A         SNP         synonymous         HP0213           S80         546511         CAAAAAAAAAAAA         indel         intergenic         HP1243/HPG22									
S80     315327     ACCCCCCCCC     ACCCCCCCCC     indel     intergenic     HP0103       S80     374756     CGGGGGGGGGGG     CGGGGGGGGGGGG     indel     frameshift insertion     jhp0151       S80     431032     C     T     SNP     synonymous     HP0194       S80     437765     G     C     SNP     intergenic     HP0204       S80     450628     G     A     SNP     synonymous     HP0213       S80     546511     CAAAAAAAAAAA     CAAAAAAAAAAAA     indel     intergenic     HP1243/HPG22									
S80         374756         CGGGGGGGGGGGG         CGGGGGGGGGGGG         indel         frameshift insertion         jhp0151           S80         431032         C         T         SNP         synonymous         HP0194           S80         437765         G         C         SNP         intergenic         HP0204           S80         430628         G         A         SNP         synonymous         HP0213           S80         546511         CAAAAAAAAAAA         CAAAAAAAAAAA         indel         intergenic         HP1243/HPG22							нрь17_0096	HP0103	
S80         431032         C         T         SNP         synonymous         HP0194           S80         437765         G         C         SNP         intergenic         HP0204           S80         430628         G         A         SNP         synonymous         HP0213           S80         546511         CAAAAAAAAAAA         CAAAAAAAAAAAA         indel         intergenic         HP1243/HPG22							ibp0151	010103	
S80         437765         G         C         SNP         intergenic         HP0204           S80         450628         G         A         SNP         synonymous         HP0213           S80         546511         CAAAAAAAAAAA         CAAAAAAAAAAAA         indel         intergenic         HP1243/HPG22									
S80         450628         G         A         SNP         synonymous         HP0213           S80         546511         CAAAAAAAAAAA         CAAAAAAAAAAAA         indel         intergenic         HP1243/HPG23								HP0204	HELPY_0206
S80 546511 CAAAAAAAAAAA CAAAAAAAAAA CAAAAAAAAAA							HP0213		
S80         620169         C         T         SNP         nonsynonymous         HPAG1_1119								HP1243/HPG27_298	
	S80	620169	c	Т	SNP	nonsynonymous	HPAG1_1119		
S80         626404         C         T         SNP         synonymous         HP1175	S80	626404	c	т	SNP	synonymous	HP1175		

S80	627243	G	Α	SNP	nonsynonymous	HP1174		
S80	701041	G	Α	SNP	nonsynonymous	HP0499		
S80	801836	GAAAAAAAAAAA	GAAAAAAAAAAAA	indel	intergenic		jhp0540	
S80	820046	C	т	SNP	nonsynonymous	HP0607		
S80	958719	G	Α	SNP	intergenic		HPG27_680	
S80	1043704	GTTTTTTTTTTTT	GTTTTTTTTTTTT	indel	frameshift insertion/intergenic	HPnc4170	HP0811	HPnc4160
S80	1124346	CGAGAGAGAGAGAGAGAGAG	CGAGAGAGAGAGAGAGAG	indel	intergenic		HPG27_1187	
S80	1187376	ATTTTTTT	ATTTTTTT	indel	intergenic		HP0947	
S80	1192612	C	A	SNP	intergenic		HP0953	
S80	1192627	A	G	SNP	intergenic		HP0953	
S80	1192634	A	G	SNP	intergenic		HP0953	
S80	1192636	G	Α	SNP	intergenic		HP0953	
S80	1192650	Т	с	SNP	intergenic		HP0953	
S80	1192686	Т	G	SNP	intergenic		HP0953	
S80	1192742	С	т	SNP	intergenic		HP0953	
S80	1192744	Т	C	SNP	intergenic		HP0953	
S80	1192752	A	G	SNP	intergenic		HP0953	
S80	1192763	A	G	SNP	intergenic		HP0953	
S80	1192773	A	G	SNP	intergenic		HP0953	
S80	1192779	Т	G	SNP	intergenic		HP0953	
S80	1192784	Т	C	SNP	intergenic		HP0953	
S80	1192786	С	Т	SNP	intergenic		HP0953	
S80	1192787	Α	G	SNP	intergenic		HP0953	
S80	1192792	A	G	SNP	intergenic		HP0953	
S80	1192794	С	т	SNP	intergenic		HP0953	
S80	1192820	G	A	SNP	nonsynonymous	HPP12_0950		
S80	1640915	CGAGAGAGAGAGAGAG	CGAGAGAGAGAGAGAGAG	indel	frameshift insertion			
S80	1669898	С	Т	SNP	synonymous	HP1450		

Supplementary Information 3 | Summary of mutations in the isolates recovered from *H. pylori*-infected C57BL/6 mice. Number of mutations in the isolates of 10 strains recovered from *H. pylori*-infected mice stomachs 8 weeks after post infection were listed.

Animal	Strain	Total No.	SNPs (s	ingle nucleo	tide polyn	norphysms)	indel (	insertion/c	leletion)	SNPs rate	indel rate
No.	Name	of mutations	total	nonsynon ymous	synonym us	intergenic	Total	genic	intergenic	per base per year	per base per year
#1	Hp1	37	13	5	7	1	24	8	16	5.04E-05	9.31E-0
#1	Hp2	36	16	5	9	2	20	7	13	6.20E-05	7.76E-0
#2	Hp3	38	16	6	8	2	22	8	14	6.20E-05	8.53E-0
#2	Hp4	38	18	6	9	3	20	7	13	6.98E-05	7.76E-0
#3	Hp5	34	15	6	7	2	19	6	13	5.82E-05	7.37E-0
#3	Hp6	33	10	4	5	1	23	7	16	3.88E-05	8.92E-0
#4	Hp7	45	25	11	12	2	20	10	10	9.69E-05	7.76E-0
#4	Hp8	42	19	7	10	2	23	8	15	7.37E-05	8.92E-0
#5	Hp9	46	30	11	17	2	16	5	11	1.16E-04	6.20E-0
#5	Hp10	36	13	5	7	1	23	8	15	5.04E-05	8.92E-0
									Average	6.79E-05	8.14E-0
									SD	2.32E-05	9.50E-0

Strain name	Position in ATCC43504	Alcobset	Sequence in Reisolate	p	Type of difference	Annotation	Gene nearby the intergenic region (#1)	Gene nearby the intergenic region (#2)
Hp1 Hp1	658 146525	С	Τ CAAAAAAAAAAAAAAA	SNP indel	synonymous intergenic	HP1529	HP1397	
Hp1	214663	CGAGAGAGAGAGAGAGA	CGAGAGAGAGAGAGAGAGA	indel	frameshift insertion	HPG27_8	111 1357	
Hp1	249268	C	Т	SNP	nonsynonymous	HPB8_1582		
Hp1	303827	CGGGGGGGGGGGG	CGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG	indel	frameshift insertion	HPP12_0096		
Hp1	315327	ACCCCCCCCC	ACCCCCCCCC	indel	intergenic		HP0103	
Hp1	431032	G	T	SNP	synonymous	HP0194	1100204	UELDV 0206
Hp1 Hp1	437765 450628	G	С А	SNP	intergenic synonymous	HP0213	HP0204	HELPY_0206
Hp1	455599	TGGGGGGGGGG	TGGGGGGGGGGG	indel	frameshift insertion	HP0217		
Hp1	483804	Т	TTAAATACA	indel	intergenic		HPATCC43504_00472	
Hp1	546124	TATTTAATCTT	Т	indel	intergenic		HP1243/HPG27_298	
Hp1	546511	СААААААААААА	СААААААААААА	indel	intergenic		HP1243/HPG27_298	
Hp1 Hp1	581837 620169	ATCAAATACTCAAATAC C	A T	indel SNP	intergenic nonsynonymous	HP1180	HPATCC43504_00587	
Hp1	626404	с	т	SNP	synonymous	HP1175		
Hp1	627243	G	А	SNP	nonsynonymous	HP1174		
Hp1	649248	TG	TGG	indel	frameshift insertion	HP1156		
Hp1	701041	G	A	SNP	nonsynonymous	HP0499		
Hp1	801836	GAAAAAAAAAAA	GAAAAAAAAAAAAA	indel	intergenic		jhp0540	
Hp1 Hp1	840225 945518	GCAAAATACGATGATCTCACCA C	G T	indel SNP	nonframeshift deletion synonymous	jhp0563		
Hp1	943518	CGAGAGAGAGAGA	I CGAGAGAGAGAGAGAGA	indel	intergenic	jhp0853	HPG27_680	
Hp1	958702	СААААААААААААААА	СААААGAAAAAAAAAAAAAAAA	indel	intergenic		HPG27_680	
Hp1	1043704	GTTTTTTTTTT	GTTTTTTTTTTTTT	indel	frameshift insertion/intergenic	HPnc4170	HP0811	HPnc4160
Hp1	1102157	GTTTTTTTTTT	GTTTTTTTTT	indel	intergenic		HP0876	HP0875
Hp1	1124346	CGAGAGAGAGAGAGAGAGAGA	CGAGAGAGAGAGAGAGAGA	indel	intergenic		HPG27_1187	
Hp1	1124501	GTTTTTTTTT	GTTTTTTTT	indel	intergenic		HPG27_1187	
Hp1 Hp1	1187376 1230599	ATTTTTTT TTCAAGCAA	АТТТТТТТТ Т	indel indel	intergenic frameshift deletion	HP0427	HP0947	
Hp1	1319839	САААААААААААА	ССАААААААААААА	indel	intergenic	11F0427	HELPY_1075	jhp1032
Hp1	1331327	G	Т	SNP	nonsynonymous	HPATCC43504_01275		J
Hp1	1331328	G	А	SNP	synonymous	HPATCC43504_01275		
Hp1	1592784	ATG	А	indel	frameshift deletion	HP1354		
Hp1	1593602	TGGGGGGGGGGG	TGGGGGGGGGGGG	indel	frameshift insertion	HP1354		
Hp1	1627016 1669898	TGGGGGGGGGGGGG C	TGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG	indel SNP	intergenic	HP1450	HP1406	HELPY_1371
Hp1 Hp2	658	c	Т	SNP	synonymous synonymous	HP1450 HP1529		
Hp2	146525	СААААААААААА	Салалалалалалал	indel	intergenic	111 2020	HP1397	
Hp2	214663	CGAGAGAGAGAGAGA	CGAGAGAGAGAGAGAGAGA	indel	frameshift insertion	HPG27_8		
Hp2	232964	САААААААААААААААААА	СААААААААААААААААААААА	indel	intergenic		HPPC_00115	
Hp2	249268	C	Т	SNP	nonsynonymous	HPB8_1582		
Hp2	303827 315327	CGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG	CGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG	indel	frameshift insertion	HPP12_0096	HP0103	
Hp2 Hp2	431032	C	I	indel SNP	intergenic synonymous	HP0194	HP0103	
Hp2	437765	G	C	SNP	intergenic	110104	HP0204	HELPY_0206
Hp2	450628	G	А	SNP	synonymous	HP0213		_
Hp2	455599	TGGGGGGGGGG	TGGGGGGGGGGG	indel	frameshift insertion	HP0217		
Hp2	464722	Т	G	SNP	synonymous	HP0227		
Hp2	464740 464743	C A	A G	SNP SNP	synonymous synonymous	HP0227 HP0227		
Hp2 Hp2	546511	СААААААААААА	Саааааааааааа	indel	intergenic	11F0227	HP1243/HPG27_298	
Hp2	548978	G	T	SNP	intergenic		jhp1163	HPG27_298
Hp2	581837	ATCAAATACTCAAATACTCAAATAC	A	indel	intergenic		HPATCC43504_00587	
Hp2	620169	С	Т	SNP	nonsynonymous	HP1180		
Hp2	626404	c c	T	SNP	synonymous	HP1175		
Hp2 Hp2	627243 649248	G TG	A TGG	SNP indel	nonsynonymous frameshift insertion	HP1174 HP1156		
Hp2	701041	G	A	SNP	nonsynonymous	HP0499		
Hp2	801836	GAAAAAAAAAAAA	GAAAAAAAAAAAAA	indel	intergenic		jhp0540	
Hp2	945518	C	Т	SNP	synonymous	jhp0853		
Hp2	958574	CGAGAGAGAGAGA	CGAGAGAGAGAGAGA	indel	intergenic		HPG27_680	
Hp2	958702	GTTTTTTTTTTTT	CAATAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	indel	intergenic frameshift insertion/intergenic	HPnc4170	HPG27_680 HP0811	HPnc4160
Hp2 Hp2	1043704 1102157	GTTTTTTTTTTT	GTTTTTTTTTT	indel indel	intergenic	1191104170	HP0811 HP0876	HPnc4160 HP0875
Hp2					intergenic		HPG27_1187	
	1124501	GTTTTTTTTTT	GTTTTTTTTT	indel			HP0947	
Hp2		GTTTTTTTTTT	ATTTTTTT	indel	intergenic		111 05 17	
Hp2	1124501 1187376 1423237	ATTTTTT G	ATTTTTTT A		nonsynonymous	HP1068	1103-17	
Hp2 Hp2	1124501 1187376 1423237 1592784	ATTITIT G ATG	АТТТТТТТ А А	indel SNP indel	nonsynonymous frameshift deletion	HP1354		
Hp2 Hp2 Hp2	1124501 1187376 1423237 1592784 1593602	ATTTTTT G ATG TGGGGGGGGGGGG	ATTTTTTT A A TGGGGGGGGGGGGGG	indel SNP indel indel	nonsynonymous frameshift deletion frameshift insertion			
Hp2 Hp2 Hp2 Hp2	1124501 1187376 1423237 1592784 1593602 1627016	ATTTTTTT G ATG TGGGGGGGGGGGGGG TGGGGGGGG	ATTTTTTT A A TGGGGGGGGGGGGGGG TGGGGGGGGG	indel SNP indel indel indel	nonsynonymous frameshift deletion frameshift insertion intergenic	HP1354 HP1354	HP1406	HELPY_1371
Hp2 Hp2 Hp2	1124501 1187376 1423237 1592784 1593602	ATTTTTT G ATG TGGGGGGGGGGGG	ATTTTTTT A A TGGGGGGGGGGGGGG	indel SNP indel indel	nonsynonymous frameshift deletion frameshift insertion	HP1354		HELPY_1371
Hp2 Hp2 Hp2 Hp2 Hp2	1124501 1187376 1423237 1592784 1593602 1627016 1640915	ATTTTTTT G ATG TGGGGGGGGGGGGGG TGGGGGGGG	ATTTTTTT A A TGGGGGGGGGGGGGGG TGGGGGGGGG	indel SNP indel indel indel indel	nonsynonymous frameshift deletion frameshift insertion intergenic frameshift insertion	HP1354 HP1354 jhp1312		HELPY_1371
Hp2 Hp2 Hp2 Hp2 Hp2 Hp2 Hp2	1124501 1187376 1423237 1592784 1593602 1627016 1640915 1669898	ATTTTTTT G ATG TGGGGGGGGGGGGG TGGGGGGGGG	ATTTTTTT A A TGGGGGGGGGGGGG TGGGGGGGGGG	indel SNP indel indel indel indel SNP	nonsynonymous frameshift deletion frameshift insertion intergenic frameshift insertion synonymous	HP1354 HP1354 jhp1312 HP1450		HELPY_1371
Hp2 Hp2 Hp2 Hp2 Hp2 Hp2 Hp3 Hp3 Hp3	1124501 1187376 1423237 1592784 1593602 1627016 1640915 1669898 658 214663 249555	ATTTTTT G ATG TGGGGGGGGGGGG GGGGGGGGGGG	ATTITITT A A TGGGGGGGGGGGGG GGGGGGGGGGGG	indel SNP indel indel indel SNP SNP indel SNP	nonsynonymous frameshift deletion frameshift insertion intergenic frameshift insertion synonymous synonymous	HP1354 HP1354 Jhp1312 HP1450 HP1529 HPG27_8 HP0044		HELPY_1371
Hp2 Hp2 Hp2 Hp2 Hp2 Hp2 Hp3 Hp3 Hp3	1124501 1187376 1423237 1592784 1593602 1627016 1669898 658 214663 249555 303827	ATTTTTTT           G           ATG           TGGGGGGGGGGGG           CGAGAGAGAGAGAGAGA           C           C           C           CGAGAGAGAGAGAGAGA           G           C           CGAGAGAGAGAGAGAGA           G           CGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG	ATTITITT A A TGGGGGGGGGGGGG TGGGGGGGGGGG	indel SNP indel indel indel SNP SNP indel SNP indel	nonsynonymous frameshift deletion frameshift insertion intergenic frameshift insertion synonymous frameshift insertion nonsynonymous frameshift insertion	HP1354 HP1354 Jhp1312 HP1450 HP1529 HPG27_8	HP1406	HELPY_1371
Hp2 Hp2 Hp2 Hp2 Hp2 Hp3 Hp3 Hp3 Hp3 Hp3	1124501 1187376 1423237 1592784 1593602 1627016 1640915 1669898 658 214663 249555 303827 315327	ATTTTTTT           G           ATG           TG6G6G6G6G6G           TG6G6G6G6G6G           CGAGAGAGAGAGAGA           C           CGAGAGAGAGAGAGAGA           G           CGGGGGGGGGGGG           CGGGGGGGGGGGGG           ATG	ATTITITT           A           A           TGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG	indel SNP indel indel indel SNP SNP indel SNP indel indel	nonsynonymous frameshift deletion frameshift insertion intergenic frameshift insertion synonymous frameshift insertion nonsynonymous frameshift insertion intergenic	HP1354 HP1354 HP1354 HP1450 HP1529 HP627_8 HP0044 HPP12_0096		HELPY_1371
Hp2 Hp2 Hp2 Hp2 Hp2 Hp3 Hp3 Hp3 Hp3 Hp3 Hp3	1124501 1187376 1423237 1592784 1593602 1627016 1640915 1669898 658 214663 214663 214653 303827 315327 413866	ATTTTTTT           G           ATG           TGGGGGGGGGGGGG           CGGAGAGAGAGAGAGA           C           CGAGAGAGAGAGAGAGA           G           CGGGGGGGGGGGG           CGGGGGGGGGGGGG           ACCCCCCCCC           A	ATTITITT           A           TGGGGGGGGGGGG           TGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG	indel SNP indel indel indel SNP SNP indel SNP indel indel SNP	nonsynonymous frameshift deletion frameshift insertion intergenic frameshift insertion synonymous frameshift insertion nonsynonymous frameshift insertion intergenic synonymous	HP1354 HP1354 HP1354 HP1450 HP1529 HP027_8 HP0044 HP12_0096 HP1535	HP1406	HELPY_1371
Hp2 Hp2 Hp2 Hp2 Hp2 Hp3 Hp3 Hp3 Hp3 Hp3 Hp3 Hp3	1124501 1187376 1423237 1592784 1593602 1627016 1640915 1669898 658 214663 249555 303827 315327	ATTTTTTT           G           ATG           TG6G6G6G6G6G           TG6G6G6G6G6G           CGAGAGAGAGAGAGA           C           CGAGAGAGAGAGAGAGA           G           CGGGGGGGGGGGG           CGGGGGGGGGGGGG           ATG	ATTITITT           A           A           TGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG	indel SNP indel indel indel SNP SNP indel SNP indel indel	nonsynonymous frameshift deletion frameshift insertion intergenic frameshift insertion synonymous synonymous frameshift insertion nonsynonymous frameshift insertion intergenic synonymous synonymous	HP1354 HP1354 HP1354 HP1450 HP1529 HP627_8 HP0044 HPP12_0096	HP1406	HELPY_1371
Hp2 Hp2 Hp2 Hp2 Hp2 Hp3 Hp3 Hp3 Hp3 Hp3 Hp3	1124501 1187376 1423237 1592784 1593602 1627016 1640915 1669898 658 214663 214663 249555 303827 315327 413866 413983	ATTTTTTT           G           ATG           TGGGGGGGGGGGGG           CGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG	ATTITITT           A           TGGGGGGGGGGGGG           TGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG	indel SNP indel indel indel SNP SNP indel SNP indel SNP SNP	nonsynonymous frameshift deletion frameshift insertion intergenic frameshift insertion synonymous frameshift insertion nonsynonymous frameshift insertion intergenic synonymous	HP1354 HP1354 Jpp1312 HP1450 HP1529 HP627_8 HP0044 HPP12_0096 HP1535 HP1535	HP1406	HELPY_1371 HELPY_0206
Нр2 Нр2 Нр2 Нр2 Нр2 Нр3 Нр3 Нр3 Нр3 Нр3 Нр3 Нр3 Нр3 Нр3	1124501 1187376 1423237 1592784 1593602 1627016 1640915 1669898 658 214663 249555 303827 315327 413866 413983 431032	ATTTTTTT           G           ATG           TGGGGGGGGGGGGG           CGAGAGAGAGAGAGAGA           C           CGAGAGAGAGAGAGAGAGAGAGA           G           CGGGGGGGGGGGGGGGA           CCCCCCCC           A           C           C           CGGGGGGGGGGGGG           C           C           CGGGGGGGGGGGGG           ACCCCCCCCC           A           C           C           C	ATTITITT A A TGGGGGGGGGGGGG TGGGGGGGGGGG	indel SNP indel indel indel SNP SNP indel SNP indel SNP SNP SNP	nonsynonymous frameshift deletion frameshift insertion intergenic frameshift insertion synonymous synonymous frameshift insertion intergenic synonymous synonymous synonymous synonymous	HP1354 HP1354 Jpp1312 HP1450 HP1529 HP627_8 HP0044 HPP12_0096 HP1535 HP1535	HP1406 HP0103	
Нр2 Hp2 Hp2 Hp2 Hp2 Hp3 Hp3 Hp3 Hp3 Hp3 Hp3 Hp3 Hp3	1124501 1187376 1423237 1592784 1593602 1627016 1669898 658 214663 249555 303827 315327 413866 413983 431032 437765	ATTTTTTT           G           ATG           TGGGGGGGGGGGG           CGAGAGAGAGAGAGAGA           C           CGAGAGAGAGAGAGAGAGAGAGAGAGAGAGAGAGAGAGA	ATTITITT           A           TGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG	indel SNP indel indel indel SNP SNP indel SNP indel SNP SNP SNP SNP SNP	nonsynonymous frameshift deletion frameshift insertion intergenic frameshift insertion synonymous frameshift insertion nonsynonymous frameshift insertion intergenic synonymous synonymous synonymous intergenic	HP1354 HP1354 HP1354 HP1450 HP1529 HP627_8 HP0044 HPP12_0096 HP1535 HP0194	HP1406 HP0103	

name	Position in ATCC43504	ATCC43504	ence in Reisolate		Type of difference	Annotation	Gene nearby the intergenic region (#1)	Gene nearby the intergenic region (#2)
Нр3	546511	САААААААААА	СААААААААААА	indel	intergenic		HP1243/HPG27_298	
Нр3	548979	ТА	TTGA	indel	intergenic		jhp1163	HPG27_298
Нр3	581837	ΑΤCAAATACTCAAATACTCAAATAC	A	indel	intergenic		HPATCC43504_00587	
Hp3	620169	c	T	SNP	nonsynonymous	HP1180		
Hp3	626404	c	T	SNP	synonymous	HP1175		
Hp3 Hp3	627243 701041	G	A A	SNP SNP	nonsynonymous	HP1174 HP0499		
нрз НрЗ	801836	GAAAAAAAAAAAA	GAAAAAAAAAAAAAA	indel	intergenic	HP0499	jhp0540	
Hp3	958702	CAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	CAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	indel	intergenic		HPG27 680	
Hp3	1043704	GTTTTTTTTTTT	GTTTTTTTTTTTTTTTT	indel	frameshift insertion/intergenic	HPnc4170	HP0811	HPnc4160
Hp3	1102157	GTTTTTTTT	GTTTTTTTT	indel	intergenic		HP0876	HP0875
Hp3	1122223	c	T	SNP	intergenic		HP0895	HPnc4510
Hp3	1122228	ТААААА	ТАААААА	indel	intergenic		HP0895	HPnc4510
Hp3	1124501	GTTTTTTTTTT	GTTTTTTTTT	indel	intergenic		HPG27_1187	
Нр3	1187376	ATTTTTTT	ATTTTTTT	indel	intergenic		HP0947	
Нр3	1331327	G	Т	SNP	nonsynonymous	HPATCC43504_01275		
Hp3	1331328	G	Α	SNP	synonymous	HPATCC43504_01275		
Нр3	1362543	ACCCCCCCCCCC	ACGCCCCCCCCCCCCC	indel	nonframeshift insertion	HPB8_1119		
Нр3	1482699	GAAAAAA	GAAAAAAA	indel	intergenic		HPG27_298	
Нр3	1483269	A	G	SNP	nonsynonymous	HPG27_298		
Hp3	1592787	TGGGGGGGGGGGGG		indel	nonframeshift substitution	HP1354		
Hp3	1593602	TGGGGGGGGGGG	TGGGGGGGGGGGG	indel	frameshift insertion	HP1354		
Hp3	1608140	TGA	TGGA	indel	frameshift substitution	HP1369m	1101400	UELDV 4274
Hp3	1627016 1640915	TGGGGGGGGGGGGGG	TGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG	indel	intergenic framoshift insortion	ibn1212	HP1406	HELPY_1371
Hp3	1640915 1669898	CGAGAGAGAGAGAGAGAGAGAGAGAGAGAGAGAGAGAGA	CGAGAGAGAGAGAGAGA T	indel SNP	frameshift insertion	jhp1312		
Hp3 Hp4	1669898	c	T	SNP	synonymous synonymous	HP1450 HP1529		
Hp4 Hp4	214663	CGAGAGAGAGAGAGAGA	I CGAGAGAGAGAGAGAGAGA	indel	frameshift insertion	HP1529 HPG27 8		
Hp4 Hp4	232964	C	A	SNP	intergenic		HPPC_00115	
Hp4	249555	G	A	SNP	nonsynonymous	HP0044		
Hp4	303827	C6666666666666666666666666666666666666	CGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG	indel	frameshift insertion	HPP12_0096		
Hp4	315327	ACCCCCCCCC	ACCCCCCCCCC	indel	intergenic	-	HP0103	
Hp4	413866	Α	G	SNP	synonymous	HP1535		
Hp4	413887	A	G	SNP	synonymous	HP1535		
Hp4	413983	C	T	SNP	synonymous	HP1535		
Hp4	431032	C	Т	SNP	synonymous	HP0194		
Hp4	437765	G	с	SNP	intergenic		HP0204	HELPY_0206
Hp4	450628	G	Α	SNP	synonymous	HP0213		
Hp4	455599	TGGGGGGGGGG	TGGGGGGGGGGG	indel	frameshift insertion	HP0217		
Hp4	483804	TTAAATACA	Т	indel	intergenic		HPATCC43504_00472	
Hp4	546511	САААААААААА	СААААААААААА	indel	intergenic		HP1243/HPG27_298	
Hp4	548979	TA ATCAAATACTCAAATACTCAAATACTCAAATACTCA	TTGA	indel	intergenic		jhp1163	HPG27_298
Hp4								
	581837	AATAC	Α	indel	intergenic		HPATCC43504_00587	
Hp4	620169		A T	indel SNP	nonsynonymous	HP1180	HPATCC43504_00587	
Hp4 Hp4		AATAC				HP1180 HP1175	HPATCC43504_00587	
	620169	AATAC C	T	SNP	nonsynonymous		HPATCC43504_00587	
Hp4	620169 626404	AATAC C C	T T T	SNP SNP	nonsynonymous synonymous	HP1175	HPATCC43504_00587	
Hp4 Hp4	620169 626404 627243	AATAC C C G	T T A	SNP SNP SNP	nonsynonymous synonymous nonsynonymous	HP1175 HP1174	HPATCC43504_00587	
Hp4 Hp4 Hp4	620169 626404 627243 701041	AATAC C C G G	T T A A	SNP SNP SNP SNP	nonsynonymous synonymous nonsynonymous nonsynonymous	HP1175 HP1174		
Hp4 Hp4 Hp4 Hp4 Hp4 Hp4	620169 626404 627243 701041 801836 958702 1043704	AATAC           C           G           G           GAAAAAAAAAAAA           CAAAAAAAAAAAAAA           GTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	Т Т А А GAAAAAAAAAAAAAAAA GAAAAAAAAAAAAA	SNP SNP SNP indel indel indel	nonsynonymous synonymous nonsynonymous norsynonymous intergenic intergenic frameshift insertion/intergenic	HP1175 HP1174	jhp0540 HPG27_680 HP0811	HPnc4160
Hp4 Hp4 Hp4 Hp4 Hp4 Hp4 Hp4 Hp4	620169 626404 627243 701041 801836 958702 1043704 1102157	AATAC           C           G           G           G           CAAAAAAAAAAAA           CAAAAAAAAAAAAAA           GTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	Т Т А А GAAAAAAAAAAAAAAAAA GAAAAAAAAAAAA	SNP SNP SNP indel indel indel indel	nonsynonymous synonymous nonsynonymous intergenic intergenic frameshift insertion/intergenic intergenic	HP1175 HP1174 HP0499	jhp0540 HPG27_680 HP0811 HP0876	HP0875
Hp4 Hp4 Hp4 Hp4 Hp4 Hp4 Hp4 Hp4	620169 626404 627243 701041 801836 958702 1043704 1102157 1122223	AATAC C C G G G G G CAAAAAAAAAAAA CAAAAAAAA	Т Т А А Салалалалалалала Салалалалалалала GTTTTTTTTTTTTTTTTTTTTTTT	SNP SNP SNP indel indel indel sNP	nonsynonymous synonymous nonsynonymous intergenic intergenic frameshift insertion/intergenic intergenic intergenic	HP1175 HP1174 HP0499	jhp0540 HPG27_680 HP0811 HP0876 HP0895	HP0875 HPnc4510
Hp4 Hp4 Hp4 Hp4 Hp4 Hp4 Hp4 Hp4 Hp4	620169 626404 627243 701041 801836 958702 1043704 1102157 1122223 1122228	AATAC           C           G           G           GAAAAAAAAAAAA           GTITITITITITI           GTITITITITIT           GTITITITITIT           GTITITITITIT           GTITITITITIT           GTITITITITITI           GTITITITITITI           GTITITITITITI           GTITITITITITI           GTITITITITITITI           GTITITITITITITI	Т Т А А Салалалалалалала Салалалалалалалала GTITITITITITI Т Т Т Т Алалалалалалалалала Салалалалалалалала Салалалалалалалала Салалалалалалалалала Салалалалалалалала Салалалалалалалала Салалалалалалалала Салалалалалалалала Салалалалалалалала Салалалалалалалалала Салалалалалалалалала Салалалалалалалалала Салалалалалалалалала Салалалалалалалалала Салалалалалалалалала Салалалалалалалалала Салалалалалалалалала Салалалалалалалалала Салалалалалалалалала Салалалалалалалалалалала Салалалалалалалала Салалалалалалалала Салалалалалалалалалалалалалала Салалалалалалалалалала Салалалалалалалалалалала Салалалалалалалалала Салалалалалалала Салалалалалалалалала Салалалалалала Салалалалалалалалалалала Салалалалана Салалалана Салалалана Салалалана Салалалалана Салалалана Салалалана Салалана Салана	SNP SNP SNP indel indel indel indel SNP indel	nonsynonymous synonymous nonsynonymous intergenic intergenic frameshift insertion/intergenic intergenic intergenic intergenic intergenic	HP1175 HP1174 HP0499	jhp0540 HPG27_680 HP0811 HP0876 HP0895 HP0895	HP0875
Hp4 Hp4 Hp4 Hp4 Hp4 Hp4 Hp4 Hp4 Hp4 Hp4	620169 626404 627243 701041 801836 958702 1043704 1102157 1122223 1122228 1124501	AATAC           C           G           G           GAAAAAAAAAAA           GAAAAAAAAAAAA           GTITTITTITTITT           GTITTITTITTIT           GT           C           TAAAAA           GTITTITTITTITT           GTITTITTITTITT           GTITTITTITTITT           GTITTITTITTITT           GTITTITTITTITT           GTITTITTITTITT           GTITTITTITTITT           GTITTITTITTITT	Т Т А А Салалалалалалала Салалалалалалала Салалалалалалала Салалалалалалала Салалалалалала Салалалалалалала Салалалалалалала Салалалалалалала Салалалалалалала Салалалалалалала Салалалалалалала Салалалалалалалала Салалалалалалалала Салалалалалалалала Салалалалалалалала Салалалалалалалала Салалалалалалалала Салалалалалалалала Салалалалалалалалала Салалалалалалалала Салалалалалалалалала Салалалалалалалалала Салалалалалалалала Салалалалалалалала Салалалалалалалала Салалалалалалалалала Салалалалалалалалала Салалалалалалалалала Салалалалалалалалалала Салалалалалалалалалалала Салалалалалалалалалалала Салалалалалалалалалалалала Салалалалалалалалалала Салалалалалалалалалалала Салалалалалалалалалала Салалалалалала Салалалалалалалалалалала Салалалалалалалалалалала Салалалана Салалалана Салалана Салаласа Сасласа Сасласа Сасла Сасласа Сасла Сасла Сасла Сасла Сасла	SNP SNP SNP indel indel indel indel SNP indel indel	nonsynonymous synonymous nonsynonymous intergenic intergenic frameshift insertion/intergenic intergenic intergenic intergenic intergenic	HP1175 HP1174 HP0499	jhp0540 HPG27_680 HP0811 HP0876 HP0895 HP0895 HP0895 HPG27_1187	HP0875 HPnc4510
Hp4 Hp4 Hp4 Hp4 Hp4 Hp4 Hp4 Hp4 Hp4 Hp4	620169 626404 627243 701041 801836 958702 1043704 1102157 1122223 1122228 11224501 1187376	AATAC           C           C           G           GAAAAAAAAAAA           CAAAAAAAAAAAA           GIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	Т Т А А Салалалалалалалала Салалалалалалалала GTITITITITITI GTITITITITITI T Т Т Т Т Т Т Т Т Т Т Т Т Т	SNP SNP SNP indel indel indel SNP indel indel indel	nonsynonymous synonymous nonsynonymous intergenic intergenic frameshift insertion/intergenic intergenic intergenic intergenic intergenic intergenic intergenic	HP1175 HP1174 HP0499 HPnc4170	jhp0540 HPG27_680 HP0811 HP0876 HP0895 HP0895	HP0875 HPnc4510
Hp4 Hp4 Hp4 Hp4 Hp4 Hp4 Hp4 Hp4 Hp4 Hp4	620169 626404 627243 701041 801836 958702 1043704 1102157 1122223 1122228 1122501 1187376 1331327	AATAC           C           C           G           GAAAAAAAAAAA           GAAAAAAAAAAAA           GTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	Т         T           Т            А            БАЛАЛАЛАЛАЛАЛА            САЛАЛАЛАЛАЛАЛАЛА            GITTITTITTITT            T            T            ТАЛАЛАЛА            GITTITTITTIT            T            T            TAЛАЛАЛА            GITTITTITT            ATTITTTT            T            T            T            T            T            T            T            T            T            T            T	SNP SNP SNP indel indel indel SNP indel indel indel SNP	nonsynonymous synonymous nonsynonymous intergenic intergenic frameshift insertion/intergenic intergenic intergenic intergenic intergenic intergenic norsynonymous	HP1175 HP1174 HP0499 HPnc4170 HPATCC43504_01275	jhp0540 HPG27_680 HP0811 HP0876 HP0895 HP0895 HP0895 HPG27_1187	HP0875 HPnc4510
Hp4 Hp4 Hp4 Hp4 Hp4 Hp4 Hp4 Hp4 Hp4 Hp4	620169 626404 627243 701041 801836 958702 1043704 1102157 1122223 1122228 1122501 1187376 1331327 1331328	AATAC           C           C           G           GAAAAAAAAAAAA           GTTTTTTTTTTTT           GTTTTTTTTTTT           C           TAAAAA           GTTTTTTTTTTT           C           AAAAA           GTTTTTTTTTTT           G           GTTTTTTTTTT           G           G           G           G           G           G	Т Т А А Салалаалалалалала Салалалалалалалала Салалалалалалалала Салалалалалалала Салалалалала Салалалала Салалалала Салалалалала Салалалалала Салалалалала Салалалалала Салалалалалала Салалалалалала Салалалалалала Салалалалалалала Салалалалалалала Салалалалалалала Салалалалалалалала Салалалалалалалалала Салалалалалалалала Салалалалалалалала Салалалалалалалала Салалалалалалалала Салалалалалалалалалала Салалалалалалалалала Салалалалалалалала Салалалалалалалала Салалалалалалалалала Салалалалалалалалалала Салалалалалалалалалалала Салалалалалалалалалалалалалала Салалалалалалалалалалалалалала Салалалалалалалалалалала Салалалалалалалалалалалалалала Салалалалалалалалалалалалалалала Салалалалалалалалалалалалалалала Салалалалалалалалалалалалалала Салалалалалалалалалалалалалала Салалалалалалалалалалалалала Салалалалалалалалалалалалалалала Салалалалалалалала Салалалалала Салалалала Салала Салала Салала Салала Салалала Са	SNP SNP SNP indel indel indel SNP indel indel SNP SNP	nonsynonymous synonymous nonsynonymous nonsynonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic norsynonymous synonymous	HP1175 HP1174 HP0499 HPnc4170 HPArcC43504_01275 HPATCC43504_01275	jhp0540 HPG27_680 HP0811 HP0876 HP0895 HP0895 HP0895 HPG27_1187	HP0875 HPnc4510
Hp4 Hp4 Hp4 Hp4 Hp4 Hp4 Hp4 Hp4 Hp4 Hp4	620169 626404 627243 701041 801836 958702 1043704 1102157 1122223 1122228 1122501 1122501 1137376 1331327 1331328 1362543	AATAC           C           C           G           G           GAAAAAAAAAAAAAA           GTITITITITITIT           G           GTITITITITIT           C           TAAAAA           GTITITITITIT           G           G           G           G           G           G           G           ACCCCCCCCCCCC	Т Т А А А Салалалалалалала Салалалалалалалала Салалалалалалалала Салалалалалалалала Салалалалалалалала Салалалалалалалалалала Салалалалалалалалалалала Салалалалалалалалалалала Салалалалалалалалалалалалалалалалалалал	SNP SNP SNP indel indel indel SNP indel indel SNP SNP SNP indel	nonsynonymous synonymous nonsynonymous nonsynonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic synonymous synonymous frameshift substitution	HP1175 HP1174 HP0499 HPnc4170 HPArC4170 HPATCC43504_01275 HPATCC43504_01275 HP88_1119	jhp0540 HPG27_680 HP0811 HP0876 HP0895 HP0895 HP0895 HPG27_1187	HP0875 HPnc4510
Hp4 Hp4 Hp4 Hp4 Hp4 Hp4 Hp4 Hp4 Hp4 Hp4	620169 626404 627243 701041 801836 958702 1043704 1102157 1122223 1122228 1124501 1187376 1331328 1331328 13362543	AATAC           C           C           G           GAAAAAAAAAAAA           GAAAAAAAAAAAAA           GTITTITTITTITT           GTITTITTITTT           C           TAAAAA           GTITTITTITTT           G           G           G           G           G           G           G           G           G           G           G           ACCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC	Т     Т       Т	SNP SNP SNP indel indel indel indel indel indel SNP SNP indel SNP	nonsynonymous synonymous nonsynonymous intergenic intergenic frameshift insertion/intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic synonymous frameshift substitution nonsynonymous	HP1175 HP1174 HP0499 HPnc4170 HPATCC43504_01275 HPATCC43504_01275 HP88_1119 HP627_298	jhp0540 HPG27_680 HP0811 HP0876 HP0895 HP0895 HP0895 HPG27_1187	HP0875 HPnc4510
Hp4	620169 626404 627243 701041 801836 958702 1043704 1102157 1122223 1122223 1122228 1124501 1187376 1331328 1331328 1362543 1362543 1362543	AATAC           C           C           G           GAAAAAAAAAAA           GAAAAAAAAAAAA           GIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	Т Т А А А Салалалалалалала Салалалалалалалала Салалалалалалалала Салалалалалалалала Салалалалалалалала Салалалалалалалалалала Салалалалалалалалалалала Салалалалалалалалалалала Салалалалалалалалалалалалалалалалалалал	SNP SNP SNP indel indel indel indel indel indel SNP SNP indel SNP indel	nonsynonymous synonymous nonsynonymous nonsynonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic synonymous synonymous frameshift substitution	HP1175 HP1174 HP0499 HPnc4170 HPATCC43504_01275 HPATCC43504_01275 HP88_1119 HPG27_298 HP1354	jhp0540 HPG27_680 HP0811 HP0876 HP0895 HP0895 HP0895 HPG27_1187	HP0875 HPnc4510
Hp4 Hp4 Hp4 Hp4 Hp4 Hp4 Hp4 Hp4 Hp4 Hp4	620169 626404 627243 701041 801836 958702 1043704 1102157 1122223 1122228 1124501 1187376 1331328 1331328 13362543	AATAC           C           C           G           GAAAAAAAAAAAA           GAAAAAAAAAAAAA           GTITTITTITTITT           GTITTITTITTT           C           TAAAAA           GTITTITTITTT           G           G           G           G           G           G           G           G           G           G           G           ACCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC	Т         Т           Т	SNP SNP SNP indel indel indel indel indel indel SNP SNP indel SNP	nonsynonymous synonymous nonsynonymous intergenic intergenic frameshift insertion/intergenic intergenic intergenic intergenic intergenic intergenic intergenic synonymous synonymous frameshift substitution	HP1175 HP1174 HP0499 HPnc4170 HPATCC43504_01275 HPATCC43504_01275 HP88_1119 HP627_298	jhp0540 HPG27_680 HP0811 HP0876 HP0895 HP0895 HP0895 HPG27_1187	HP0875 HPnc4510
Hp4	620169 626404 627243 701041 801836 958702 1043704 1102157 1122223 1122228 1124501 1187376 1331327 1331328 1362543 1483269 1593602 1593602 1593602	AATAC C C C G G G G G G G AAAAAAAAAAAA G G G G	T         T           T         A           A         A           GAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	SNP SNP SNP indel indel indel indel indel indel SNP SNP indel SNP indel SNP indel indel	nonsynonymous synonymous nonsynonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic nonsynonymous frameshift substitution frameshift substitution	HP1175 HP1174 HP0499 HPnc4170 HPATCC43504_01275 HPATCC43504_01275 HP82T_298 HP1354 HP1369m	jhp0540 HPG27_680 HP0811 HP0876 HP0895 HP0895 HPG27_1187 HP0947	HP0875 HPnc4510 HPnc4510
Hp4	620169 626404 627243 701041 801836 958702 1043704 1102157 1122223 1122501 1124501 1187376 1331327 1331328 1362543 1483269 1593602 1593602	AATAC C C C C G G G G G G G G G G G T TAAAAA G TITTITTITT C T TAAAAA G TITTITTITT C C T TAAAAA G TITTITTITT C C T TAAAAA G TITTITTTT C C T TAAAAA G TITTITTTT C C T TAAAAA G TITTITTTT C C T TAAAAA G TITTITTTT C T TAAAAA G TITTITTTT C T TAAAAA G TITTITTTT C C T TAAAAA G TITTITTTT C C T TAAAAA G TITTITTTTT C C T TAAAAA G TITTITTTTT C C T TAAAAA G TITTITTTTT C C T TAAAAA G TITTITTTTT C C T TAAAAA C C C T TAAAAAAAAAA	T           T           A           A           GAAAAAAAAAAAAA           GITITITITITITITITITITITITITITITITITITIT	SNP SNP SNP indel indel indel indel indel SNP SNP indel SNP indel indel indel	nonsynonymous synonymous nonsynonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic nonsynonymous frameshift substitution nonsynonymous frameshift insertion frameshift insertion frameshift substitution intergenic	HP1175 HP1174 HP0499 HPnc4170 HPATCC43504_01275 HPATCC43504_01275 HP88_1119 HPG27_298 HP1354	jhp0540 HPG27_680 HP0811 HP0876 HP0895 HP0895 HPG27_1187 HP0947	HP0875 HPnc4510 HPnc4510
Hp4	620169 626404 627243 701041 801836 958702 1043704 1102157 112223 112223 112223 112223 1124501 1187376 1331327 1331328 1362543 1483269 1593602 1608140 1627016 1627016	AATAC C C C C G G G AAAAAAAAAAAAAA G TITTITTITTI C TAAAAA G TITTITTITTT C C TAAAAA G TITTITTITTT C C TAAAAA G TITTITTTTT G G G G G G G G G G G G G	T           T           A           GAAAAAAAAAAAAAA           GAAAAAAAAAAAAAAA           GIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	SNP SNP SNP indel indel indel indel indel indel SNP indel SNP indel indel indel indel	nonsynonymous synonymous nonsynonymous nonsynonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic synonymous frameshift substitution nonsynonymous frameshift substitution frameshift substitution intergenic intergenic	HP1175 HP1174 HP0499 HPnc4170 HPnc4170 HPATCC43504_01275 HPATCC43504_01275 HP88_1119 HP027_298 HP1354 HP1354 HP1354 Jjhp1312	jhp0540 HPG27_680 HP0811 HP0876 HP0895 HP0895 HPG27_1187 HP0947	HP0875 HPnc4510 HPnc4510
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Hp4           Hp5           Hp5           Hp5           Hp5           Hp5	620169 626404 627243 701041 801836 958702 1043704 1102157 112223 112223 112228 1124501 118750 118750 1331327 1331328 1362543 1483269 1593602 1608400 1627016 1669898 658 60246 119015 1669898	AATAC C C C G G G GAAAAAAAAAAA GTITTITTITTIT GTITTITTITTITT GTITTITTITTITT GTITTITTITTITT C TAAAAA GTITTITTITT G G G ACCCCCCCCCCC A TGGGGGGGGGGGGGG G ACCCCCCCCCCC A TGGGGGGGGGGGGGG C C C C C C C C C C C C C	T           T           A           A           GAAAAAAAAAAAA           GAAAAAAAAAAAAA           GITITITITITITITITITITITITITITITITITITIT	SNP SNP SNP indel indel indel SNP indel SNP indel SNP indel indel SNP SNP SNP SNP SNP	nonsynonymous synonymous nonsynonymous nonsynonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic nonsynonymous synonymous frameshift substitution nonsynonymous frameshift insertion frameshift insertion intergenic intergenic synonymous synonymous synonymous synonymous synonymous synonymous	HP1175 HP1174 HP0499 HPnc4170 HPnc4170 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HP88_1119 HP027_298 HP1354 HP1354 HP1354 HP1354 HP1354 HP1529 jhp1371 HP1534 HP1534 HP1534	jhp0540 HPG27_680 HP0811 HP0876 HP0895 HP0895 HPG27_1187 HP0947	HP0875 HPnc4510 HPnc4510
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Hp4           Hp5           Hp5           Hp5           Hp5	620169 626404 627243 701041 801836 958702 1043704 1102157 1122223 1122228 1124501 1187376 1331327 1331328 1362543 1483269 1593602 1608140 1627016 1640915 1669918 658 66246 119015 214663 232964 119015 214663 303827 315327	AATAC C C C C G G G G G G G G G G G TAAAAAAAAAA	T T T A A A GAAAAAAAAAAAAAAAAAAAAAAAAAA	SNP SNP SNP SNP indel indel indel indel indel SNP SNP indel indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous synonymous nonsynonymous norsynonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic synonymous frameshift substitution nonsynonymous frameshift insertion frameshift insertion intergenic synonymous synonymous synonymous synonymous frameshift insertion intergenic	HP1175 HP1174 HP0499 HPnc4170 HPnc4170 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HP827_298 HP1354 HP1359 HP1329 HP1354 HP1529 Jjhp1371 HP1534 HP1534 HP1534 HP1528 HP1529 Jjhp1371 HP1534 HP1534 HP1534 HP1528 HP1529 Jjhp1371 HP1534 HP1534 HP1528 HP12_0096	jhp0540 HPG27_680 HP0811 HP0876 HP0895 HPG27_1187 HP0947 HP1406	HP0875 HPnc4510 HPnc4510
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Hp4           Hp5           Hp5 <td>620169 626404 627243 701041 801836 958702 1043704 1102157 112223 112223 112250 1187376 1331327 1331328 1362543 1483269 1593602 1593602 1593602 1593602 1608140 1608140 1608140 1608140 1608140 160898 658 65266 119015 214663 232964 333827 315327 431027 43107 43107 43107 43107 43107 43107 43107 43107 43107 43107 43107 43107 43107 4</td> <td>AATAC C C C C C C C G G G AAAAAAAAAAAAAA</td> <td>T T T T A A GAAAAAAAAAAAAAAAA GAAAAAAAAA</td> <td>SNP SNP SNP indel indel indel indel SNP indel SNP indel SNP indel SNP SNP indel indel SNP SNP indel indel SNP SNP indel indel SNP indel indel SNP indel indel SNP indel indel SNP</td> <td>nonsynonymous synonymous nonsynonymous nonsynonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic nonsynonymous frameshift substitution nonsynonymous frameshift substitution intergenic frameshift substitution intergenic frameshift substitution intergenic frameshift substitution intergenic frameshift nsertion frameshift nsertion frameshift nsertion intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic</td> <td>HP1175 HP1174 HP0499 HPnc4170 HPnc4170 HPnc4170 HPATCC43504_01275 HPATCC43504_01275 HP88_1119 HP627_298 HP1354 HP1354 HP1354 HP1354 HP159 Jhp1312 HP1534 HP1544 HP1</td> <td> hp0540 HP627_680 HP0811 HP0876 HP0895 HP0895 HP627_1187 HP0947 HP1406</td> <td>HP0875 HPnc4510 HPnc4510 HELPY_1371</td>	620169 626404 627243 701041 801836 958702 1043704 1102157 112223 112223 112250 1187376 1331327 1331328 1362543 1483269 1593602 1593602 1593602 1593602 1608140 1608140 1608140 1608140 1608140 160898 658 65266 119015 214663 232964 333827 315327 431027 43107 43107 43107 43107 43107 43107 43107 43107 43107 43107 43107 43107 43107 4	AATAC C C C C C C C G G G AAAAAAAAAAAAAA	T T T T A A GAAAAAAAAAAAAAAAA GAAAAAAAAA	SNP SNP SNP indel indel indel indel SNP indel SNP indel SNP indel SNP SNP indel indel SNP SNP indel indel SNP SNP indel indel SNP indel indel SNP indel indel SNP indel indel SNP	nonsynonymous synonymous nonsynonymous nonsynonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic nonsynonymous frameshift substitution nonsynonymous frameshift substitution intergenic frameshift substitution intergenic frameshift substitution intergenic frameshift substitution intergenic frameshift nsertion frameshift nsertion frameshift nsertion intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic	HP1175 HP1174 HP0499 HPnc4170 HPnc4170 HPnc4170 HPATCC43504_01275 HPATCC43504_01275 HP88_1119 HP627_298 HP1354 HP1354 HP1354 HP1354 HP159 Jhp1312 HP1534 HP1544 HP1	hp0540 HP627_680 HP0811 HP0876 HP0895 HP0895 HP627_1187 HP0947 HP1406	HP0875 HPnc4510 HPnc4510 HELPY_1371
Hp4           Hp5	620169 626404 627243 701041 801836 958702 1043704 1102157 112223 112223 112223 112223 112223 112223 112223 112223 112223 112223 112223 112223 112223 112223 11331327 1331327 1331327 1608490 169998 658 60246 169959 169040 232964 303827 315327 431032 430327 315327 431032 450628 455599 483804 545511 5581837 620169 626404	AATAC C C C C C C C C C C C C C C C C C	T T T T A A GAAAAAAAAAAAAAAAAAAAAAAAAAA	SNP SNP SNP indel indel indel indel SNP indel SNP indel indel indel indel indel indel indel indel indel indel SNP SNP SNP indel indel indel indel indel indel indel indel indel SNP SNP SNP indel indel indel indel indel indel indel indel indel indel indel indel indel indel indel indel SNP SNP indel SNP SNP SNP indel indel indel indel indel indel indel indel indel indel indel indel indel indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous synonymous nonsynonymous norsynonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic synonymous frameshift substitution norsynonymous frameshift substitution intergenic frameshift insertion intergenic synonymous synonymous frameshift insertion intergenic intergenic intergenic intergenic synonymous nonsynonymous frameshift insertion intergenic	HP1175 HP1174 HP0499 HPnc4170 HPnc4170 HPnc4170 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HP88_1119 HP027_298 HP1354 HP1354 HP1354 HP1354 HP159 Jhp1312 HP1450 HP159 Jhp1312 HP159 Jhp1312 HP159 Jhp1312 HP12_0096 HP0194 HP0194 HP0213 HP0217 HP0217 HP1180 HP1175	hp0540 HP627_680 HP0811 HP0876 HP0895 HP0895 HP627_1187 HP0947 HP1406	HP0875 HPnc4510 HPnc4510 HELPY_1371
Hp4           Hp5           Hp5      Hp5	620169 626404 627243 701041 801836 958702 1102157 112223 112228 1124501 11331327 1331327 1331328 1362543 1483269 1593602 1608140 1627016 16409193 1669918 658 60246 119015 21463 232964 119015 21463 303827 315327 431032 437765 450529 483804 545519 455599 483804 545511 58137 626404 5626404 62743	AATAC C C C C C C G G G AAAAAAAAAAAAAAAA	T T T T A A A GAAAAAAAAAAAAAAAAAAAAAAAA	SNP SNP SNP indel indel indel indel indel indel SNP SNP indel indel indel indel indel indel SNP SNP SNP SNP SNP indel indel indel indel indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous synonymous nonsynonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic frameshift substitution frameshift substitution frameshift substitution intergenic frameshift insertion frameshift insertion intergenic synonymous synonymous synonymous nonsynonymous frameshift insertion intergenic frameshift insertion intergenic frameshift insertion intergenic synonymous nonsynonymous nonsynonymous intergenic interg	HP1175 HP1174 HP0499 HPnc4170 HPnc4170 HPnc4170 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HP827_298 HP1354 HP1354 HP1354 HP1529 Jhp1371 HP1529 Jhp1371 HP1534 HP027_8 HP1534 HP0217 HP1534 HP0194	hp0540 HP627_680 HP0811 HP0876 HP0895 HP0895 HP627_1187 HP0947 HP1406	HP0875 HPnc4510 HPnc4510 HELPY_1371
Hp4           Hp5	620169 626404 627243 701041 801836 958702 1043704 1102157 112223 112223 112223 112223 112223 112223 112223 112223 112223 112223 112223 112223 112223 112223 11331327 1331327 1331327 1608490 169998 658 60246 169995 1699898 658 60246 119015 214663 232964 303827 315327 431032 430327 315327 431032 450628 455599 483804 545511 5581837 620169 626404	AATAC C C C C C C C C C C C C C C C C C	T T T T A A GAAAAAAAAAAAAAAAAAAAAAAAAAA	SNP SNP SNP indel indel indel indel SNP indel SNP indel indel indel indel indel indel indel indel indel indel SNP SNP SNP indel indel indel indel indel indel indel indel indel SNP SNP SNP indel indel indel indel indel indel indel indel indel indel indel indel indel indel indel indel SNP SNP indel SNP SNP SNP indel indel indel indel indel indel indel indel indel indel indel indel indel indel indel SNP SNP SNP SNP SNP SNP SNP SNP SNP SNP	nonsynonymous synonymous nonsynonymous norsynonymous intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic intergenic synonymous frameshift substitution norsynonymous frameshift substitution intergenic frameshift insertion intergenic synonymous synonymous frameshift insertion intergenic intergenic intergenic intergenic synonymous nonsynonymous frameshift insertion intergenic	HP1175 HP1174 HP0499 HPnc4170 HPnc4170 HPnc4170 HPATCC43504_01275 HPATCC43504_01275 HPATCC43504_01275 HP88_1119 HP027_298 HP1354 HP1354 HP1354 HP1354 HP159 Jhp1312 HP1450 HP159 Jhp1312 HP159 Jhp1312 HP159 Jhp1312 HP12_0096 HP0194 HP0194 HP0213 HP0217 HP0217 HP1180 HP1175	hp0540 HP627_680 HP0811 HP0876 HP0895 HP627_1187 HP0947 HP0947 HP1406	HP0875 HPnc4510 HPnc4510 HELPY_1371

Strain name	Position in ATCC43504	ATCC43504	uence in Reisolate		Type of difference	Annotation	Gene nearby the intergenic region (#1)	Gene nearby the intergenic region (#2)
Hp5	958702	САААААААААААААА	ССААААААААААААААА	indel	intergenic		HPG27_680	
Hp5	984279	с	Т	SNP	nonsynonymous	HP0751		
Hp5	1043704	GTTTTTTTTTTT	GTTTTTTTTTTTT	indel	frameshift insertion/intergenic	HPnc4170	HP0811	HPnc4160
Hp5	1102157	GTTTTTTTTTT	GTTTTTTTTTT	indel	intergenic		HP0876	HP0875
Hp5	1124501	GTTTTTTTTTT	GTTTTTTTTTT	indel	intergenic		HPG27_1187	
Hp5	1187376	АТПТТТТ	ATTTTTTT	indel	intergenic		HP0947	
Hp5	1192576	G	T	SNP	intergenic		HP0953	
Hp5	1284699	AGGGGGGGGGG	AGGGGGGGGGG	indel	stopgain	HPG27_1018 HPATCC43504 01275		
Hp5 Hp5	1331327 1331328	G	T A	SNP SNP	nonsynonymous	HPATCC43504_01275		
Hp5	1362543	ACCCCCCCCCCC	ACCCCCCCCCCCCCC	indel	synonymous frameshift insertion	HPB8_1119		
Hp5	1593602	TGGGGGGGGGGGG	TGGGGGGGGGGGGG	indel	frameshift insertion	HP1354		
Hp5	1627016	TGGGGGGGGGGGGGG	TGGGGGGGGGGGGGGGGGG	indel	intergenic	111 2004	HP1406	HELPY_1371
Hp5	1669898	c	Т	SNP	synonymous	HP1450	111 2100	1001_1071
Hp6	658	c	T	SNP	synonymous	HP1529		
Hp6	146525	СААААААААААА	CAAAAAAAAAAAAAAA	indel	intergenic		HP1397	
Hp6	214663	CGAGAGAGAGAGAGA	CGAGAGAGAGAGAGAGA	indel	frameshift insertion	HPG27_8		
Hp6	232959	СТТТА	СТТТСАА	indel	intergenic		HPPC_00115	
Hp6	249268	C	Т	SNP	nonsynonymous	HPB8_1582		
Hp6	303827	CGGGGGGGGGGGG	CGGGGGGGGGGGGGGG	indel	frameshift insertion			
Hp6	315327	ACCCCCCCCC	ACCCCCCCCCC	indel	intergenic	-	HP0103	
Hp6	431032	С	т	SNP	synonymous	HP0194		
Hp6	437765	G	с	SNP	intergenic		HP0204	HELPY_0206
Hp6	450628	G	A	SNP	synonymous	HP0213		-
Hp6	455599	TGGGGGGGGGG	TGGGGGGGGGGG	indel	frameshift insertion	HP0217		
Hp6	483804	т	TTAAATACA	indel	intergenic		HPATCC43504_00472	
Hp6	546511	СААААААААААА	САААААААААААА	indel	intergenic		HP1243/HPG27_298	
Hp6	581837	ΑΤCAAATACTCAAATACTCAAATACTCAAATAC	A	indel	intergenic		HPATCC43504_00587	
Hp6	620169	с	т	SNP	nonsynonymous	HP1180		
Hp6	626404	С	т	SNP	synonymous	HP1175		
Hp6	627243	G	A	SNP	nonsynonymous	HP1174		
Hp6	701041	G	A	SNP	nonsynonymous	HP0499		
Hp6	801836	GAAAAAAAAAAAA	GAAAAAAAAAAAAAA	indel	intergenic		jhp0540	
Hp6	805851	AT	AATT	indel	intergenic		HPG27_556	
Hp6	958574	CGAGAGAGAGAGA	CGAGAGAGAGAGAGA	indel	intergenic		HPG27_680	
Hp6	958702	САААААААААААААА	СААААААААААААААААА	indel	intergenic		HPG27_680	
Hp6	984287	GA	G	indel	frameshift deletion	HP0751		
Hp6	1043704	GTTTTTTTTTTTT	GTTTTTTTTTTTTT	indel	frameshift insertion/intergenic	HPnc4170	HP0811	HPnc4160
Hp6	1102157	GTTTTTTTTTTT	GTTTTTTTTTT	indel	intergenic		HP0876	HP0875
Hp6	1124346	CGAGAGAGAGAGAGAGAGA	CGAGAGAGAGAGAGAGAGA	indel	intergenic		HPG27_1187	
Hp6	1124501	GTTTTTTTTTTT	GTTTTTTTTTT	indel	intergenic		HPG27_1187	
Hp6	1187376	ATTTTTTT	ATTTTTTT	indel	intergenic		HP0947	
Hp6	1362543	ACCCCCCCCCCC	ACGCGCCCCCCCCCCC	indel	frameshift substitution	HPB8_1119		
Hp6	1593602	TGGGGGGGGGGG	TGGGGGGGGGGGG	indel	frameshift insertion	HP1354		
Hp6	1608125	TGGGGGGGGGGGGGG	TTGGGGGGGGGGGGGG	indel	nonframeshift substitution	HP1369m		
Hp6	1627016	TGGGGGGGGGGGGG	TGGGGGGGGGGGGGGGGG	indel	intergenic		HP1406	HELPY_1371
Hp6	1669898	c	т	SNP	synonymous	HP1450		
Hp7	8299	AGGGGGGGGGGG	AGGGGGGGGGGGG	indel	frameshift insertion	HPAG1_1393		
Hp7	99327	c	т	SNP	synonymous	jhp0935		
Hp7	168379	c	т	SNP	synonymous	HP1547		
Hp7	199597	C	Т	SNP	intergenic		HP1582	jhp1488
Hp7	232964	c	A	SNP	intergenic		HPPC_00115	
Hp7	251374	G	A	SNP	nonsynonymous	HP0045		
Hp7	276989	G	A	SNP	nonsynonymous	HPP12_0070		
Hp7	303827	CGGGGGGGGGGGG	CGGGGGGGGGGGGGGGG	indel	nonframeshift insertion	HPP12_0096		
Hp7	315327	ACCCCCCCCC	ACCCCCCCCC	indel	intergenic		HP0103	
Hp7	332924	TTGTCTTTTGTTTTCTTGTTC	Т	indel	nonframeshift deletion	HP0119		
Hp7	424517	CGGGG	CGGGGG	indel	intergenic		HP0189	HP0188
Hp7	430922	G	А	SNP	nonsynonymous	HP0194		
Hp7	455599	TGGGGGGGGGG	TGGGGGGGGGGG	indel	frameshift insertion	HP0217		
Hp7	483804	ТТАААТАСА	т	indel	intergenic		HPATCC43504_00472	
Hp7	546511	СААААААААААА	САААААААААААА	indel	intergenic		HP1243/HPG27_298	
Hp7	581837	ΑΤCAAATACTCAAATACTCAAATACTCAAATAC	А	indel	intergenic		HPATCC43504_00587	
Hp7	691071	G	A	SNP	synonymous	HP0489		
Hp7		Α	с	SNP	synonymous	HP0489		
Hp7	691077	G	A	SNP	synonymous	HP0489		
Hp7	691088	c	CG	indel	frameshift insertion	HP0489		
Hp7		т	с	SNP	synonymous	HP0489		
Hp7	691113	G	Т	SNP	nonsynonymous	HP0489		
Hp7	691157	c	A	SNP	nonsynonymous	HP0489		
Hp7	691173	с	A	SNP	synonymous	HP0489		
Hp7		Α	G	SNP	nonsynonymous	HP0489		
Hp7	691179	c	G	SNP	synonymous	HP0489		
Hp7		A	G	SNP	synonymous	HP0489		
Hp7	691189	c	G	SNP	nonsynonymous	HP0489		
Hp7	691190	Α	C	SNP	nonsynonymous	HP0489		
Hp7	801836	GAAAAAAAAAAA	GAAAAAAAAAAAA	indel	intergenic		jhp0540	
Hp7	830053	c	Т	SNP	nonsynonymous	HPP12_0617		
Hp7	958702	САААААААААААААА	САААААААААААААААА	indel	intergenic		HPG27_680	
Hp7	1043704	GTTTTTTTTTTTT	GTTTTTTTTTTTTT	indel	frameshift insertion/intergenic	HPnc4170	HP0811	HPnc4160
Hp7		ATTTTTT	ATTTTTTT	indel	intergenic		HP0947	
Hp7	1262251	c	A	SNP	nonsynonymous	jhp0981		
Hp7	1295885	GATATATATATATATAT	GATATATATATATATATGTATAT	indel	frameshift insertion	gene_1054		
		GATATATATATATATATAT	CCTATATATATATATATATATAT		frameshift insertion	gene_1054		
Hp7 Hp7 Hp7	1295885 1332987	T	GGTATATATATATATATATATATAT	indel SNP	synonymous	HPATCC43504_01275		

name	Position in ATCC43504	ATCC43504	ence in Reisolate		Type of difference	Annotation	Gene nearby the intergenic region (#1)	Gene nearby the intergenic region (#2)
Hp7		T	G	SNP	synonymous	HPATCC43504_01275		
Hp7	1332997	G	c	SNP	nonsynonymous	HPATCC43504_01275		
Hp7	1332999	T	c	SNP	synonymous SNV	HPATCC43504_01275		
Hp7	1362543	ACCCCCCCCCC	AACCCCCCCCCCCCCCCC	indel	frameshift substitution	HPB8_1119		
Hp7	1593602	TGGGGGGGGGGG	TGGGGGGGGGGGGG	indel	frameshift insertion	HP1354		
Hp7	1608125	TGGGGGGGGGGGGGGG	TGGGGGGGGGGGGGGGGG	indel	frameshift insertion	HP1369m	101406	UELDV 1271
Hp7	1627016	TGGGGGGGGGGGGG	TGGGGGGGGGGGGGGGG	indel	intergenic	1104530	HP1406	HELPY_1371
Hp8	658	C CGAGAGAGAGAGAGAGA	T CGAGAGAGAGAGAGAGAGA	SNP	synonymous	HP1529		
Hp8	214663			indel	frameshift insertion	HPG27_8		
Hp8	249555	G	A	SNP	nonsynonymous	HP0044		
Hp8	303827	CGGGGGGGGGGGG	CGGGGGGGGGGGGGG	indel	frameshift insertion	HPP12_0096	1150100	
Hp8	315327	ACCCCCCCCC	ACCCCCCCCC	indel	intergenic	1104505	HP0103	
Hp8	413866	A	G	SNP	synonymous	HP1535		
Hp8	413887	A	G	SNP	synonymous	HP1535		
Hp8	413983	c	T	SNP	synonymous	HP1535		
Hp8	431032	c	T	SNP	synonymous	HP0194		
Hp8	437765	G	C	SNP	intergenic		HP0204	HELPY_0206
Hp8	444106	GTTTTTTTT	GTTTTTTTTTT	indel	intergenic		HP0209	HPPC_01040
Hp8	450628	G	Α	SNP	synonymous	HP0213		
Hp8	455599	TGGGGGGGGGG	TGGGGGGGGGGG	indel	frameshift insertion	HP0217		
Hp8	483804	TTAAATACA	T	indel	intergenic		HPATCC43504_00472	
Hp8	546511	САААААААААА	САААААААААААА	indel	intergenic		HP1243/HPG27_298	
Hp8	548979	TA	TTGA	indel	intergenic		jhp1163	HPG27_298
Hp8	581837	ATCAAATAC	A	indel	intergenic		HPATCC43504_00587	
Hp8	620169	c	Т	SNP	nonsynonymous	HP1180		
Hp8	626404	С	Т	SNP	synonymous	HP1175		
Hp8	627243	G	Α	SNP	nonsynonymous	HP1174		
Hp8	701041	G	A	SNP	nonsynonymous	HP0499		
Hp8	801836	GAAAAAAAAAAA	GAAAAAAAAAAAAA	indel	intergenic		jhp0540	
Hp8	958702	САААААААААААААА	САААААААААААААААА	indel	intergenic		HPG27_680	
Hp8	1043704	GTTTTTTTTTTT	GTTTTTTTTTTTTTT	indel	frameshift insertion/intergenic	HPnc4170	HP0811	HPnc4160
Hp8	1102157	GTTTTTTTTTT	GTTTTTTTTT	indel	intergenic		HP0876	HP0875
Hp8	1122223	C	Т	SNP	intergenic		HP0895	HPnc4510
Hp8	1122228	ТААААА	ТАААААА	indel	intergenic		HP0895	HPnc4510
Hp8	1124501	GTTTTTTTTTTT	GTTTTTTTTTT	indel	intergenic		HPG27_1187	
Hp8	1187376	ATTTTTTT	ATTTTTTTT	indel	intergenic		HP0947	
Hp8	1331328	G	A	SNP	synonymous	HPATCC43504_01275		
Hp8	1362543	ACCCCCCCCCCC	ACCCCCCCCCCCCC	indel	frameshift insertion	HPB8_1119		
Hp8	1482848	G	Т	SNP	nonsynonymous	HPG27 298		
Hp8	1483202	G	A	SNP	nonsynonymous	HPG27_298		
Hp8	1483269	A	G	SNP	nonsynonymous	HPG27_298		
Hp8	1483203	G	A	SNP	synonymous	HPATCC43504_01426		
Hp8	1484991 1582075	ATTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	GATTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	indel indel	nonframeshift insertion	HPATCC43504_01426	HELPY 1317	HP0228
Hp8		TGGGGGGGGGGG	TGGGGGGGGGGGGG		intergenic	1104254	HELP1_1317	HPU228
Hp8	1593602 1608140	TGA	TGGA	indel	frameshift insertion	HP1354 HP1369m		
Hp8 Hp8	1627016	TGGGGGGGGGGGGGGG	TGGGGGGGGGGGGGGGGG	indel	frameshift substitution intergenic	HP1309III	HP1406	HELPY_1371
	1627016	CGAGAGAGAGAGAGAGA	CGAGAGAGAGAGAGAGAGA		-	ib=1212	HP1400	HELP1_13/1
Hp8 Hp8	1669898	C	T	indel SNP	frameshift insertion	jhp1312 HP1450		
· ·					synonymous			
Hp9	8299	AGGGGGGGGGGG C	AGGGGGGGGGGGG	indel	frameshift insertion	HPAG1_1393		
Hp9	99327		т	SNP	synonymous	jhp0935		
Hp9	168379	c		SNP	synonymous	HP1547	101500	
Hp9	199597	c	Ť	SNP	intergenic		HP1582	jhp1488
Hp9	232964	c	A	SNP	intergenic	10042 0070	HPPC_00115	
Hp9	276989	G	A	SNP	nonsynonymous	HPP12_0070		
Hp9	303827	CGGGGGGGGGGGGG	CGGGGGGGGGGGGGGGGG	indel	frameshift insertion	HPP12_0096		
Hp9	315327	ACCCCCCCCC	ACCCCCCCCC	indel	intergenic		HP0103	
Hp9	430922	G	A	SNP	nonsynonymous	HP0194		
Hp9	444106	GTTTTTTTTT	GTTTTTTTTTTT	indel	intergenic		HP0209	HPPC_01040
Hp9	455599	TGGGGGGGGGG	TGGGGGGGGGGG	indel	frameshift insertion	HP0217		
Hp9	464722	т	G	SNP	synonymous	HP0227		
Hp9	464740	С	A	SNP	synonymous	HP0227		
Hp9	464743	A	G	SNP	synonymous	HP0227		
Hp9	483804	TTAAATACA	Т	indel	intergenic		HPATCC43504_00472	
Hp9	546511	СААААААААААА	САААААААААААА	indel	intergenic		HP1243/HPG27_298	
Hp9	581837	ATCAAATACTCAAATAC	A	indel	intergenic		HPATCC43504_00587	
Hp9	691071	G	A	SNP	synonymous	HP0489		
Hp9	691074	Α	C	SNP	synonymous	HP0489		
Hp9	691077	G	A	SNP	synonymous	HP0489		
Hp9	691089	A	G	SNP	synonymous	HP0489		
Hp9	691091	C	A	SNP	nonsynonymous	HP0489		
Hp9	691101	т	С	SNP	synonymous	HP0489		
Hp9	691113	G	Т	SNP	nonsynonymous	HP0489		
Hp9	691173	с	Α	SNP	synonymous	HP0489		
Hp9	691175	Α	G	SNP	nonsynonymous	HP0489		
Hp9	691179	C	G	SNP	synonymous	HP0489		
Hp9	691185	A	G	SNP	synonymous	HP0489		
Hp9	691189	c	G	SNP	nonsynonymous	HP0489		
Hp9	691190	A	c	SNP	nonsynonymous	HP0489		
Hp9	801836	GAAAAAAAAAAAA	GAAAAAAAAAAAA	indel	intergenic		jhp0540	
uha	801836	С	Т	SNP		HPP12_0617	J. 100-10	
HnQ	0000000		т	SNP	nonsynonymous			
Hp9	070005				nonsynonymous	HP0656		
Hp9	879985	С					UDC 27 690	
Hp9 Hp9	958702	СААААААААААААА	СААААААААААААААА	indel	intergenic		HPG27_680	HPpc4160
Hp9						HPnc4170	HPG27_680 HP0811 HPP12_0910	HPnc4160

Strain name	Position in ATCC43504	ATCC43504	Sequence in Reisolate		Type of difference	Annotation	Gene nearby the intergenic region (#1)	Gene nearby the intergenic region (#2)
Hp9	1187376	ATTTTTT	ATTTTTTT	indel	intergenic		HP0947	
Hp9	1192157	т	С	SNP	nonsynonymous	HP0953		
Hp9	1331328	G	A	SNP	synonymous	HPATCC43504_01275		
Hp9	1332987	Т	С	SNP	synonymous	HPATCC43504_01275		
Hp9	1332996	Т	G	SNP	synonymous	HPATCC43504_01275		
Hp9	1332997	G	С	SNP	nonsynonymous	HPATCC43504_01275		
Hp9	1332999	Т	С	SNP	synonymous SNV	HPATCC43504_01275		
Hp9	1362543	ACCCCCCCCCCC	ACCCCCCCCCCCCC	indel	frameshift insertion	HPB8_1119		
Hp9	1593602	TGGGGGGGGGGG	TGGGGGGGGGGGG	indel	frameshift insertion	HP1354		
Hp9	1627016	TGGGGGGGGGGGGG	TGGGGGGGGGGGGGGGG	indel	intergenic		HP1406	HELPY_1371
Hp10	658	с	Т	SNP	synonymous	HP1529		
Hp10	8299	AGGGGGGGGGGG	AGGGGGGGGGGGG	indel	frameshift insertion	HPAG1_1393		
Hp10	214663	CGAGAGAGAGAGAGA	CGAGAGAGAGAGAGAGAGA	indel	frameshift insertion	HPG27_8		
Hp10	232959	СТТТА	CTTTCA	indel	intergenic		HPPC_00115	
Hp10	303827	CGGGGGGGGGGGG	CGGGGGGGGGGGGGG	indel	frameshift insertion	HPP12_0096		
Hp10	315327	ACCCCCCCCC	ACCCCCCCCCC	indel	intergenic		HP0103	
Hp10	431032	С	т	SNP	synonymous	HP0194		
Hp10	437765	G	С	SNP	intergenic		HP0204	HELPY_0206
Hp10	450628	G	А	SNP	synonymous	HP0213		-
Hp10	455599	TGGGGGGGGGG	TGGGGGGGGGGG	indel	frameshift insertion	HP0217		
Hp10	483804	ΤΤΑΑΑΤΑCΑΤΑΑΑΤΑCΑΤΑΑΑΤΑCΑ	т	indel	intergenic		HPATCC43504 00472	
Hp10	546114	ΤΑΤΤΤΑ	т	indel	intergenic		HP1243/HPG27_298	
Hp10	546140	A	AATCTTATTTG	indel	intergenic		HP1243/HPG27_298	
Hp10	546511	СААААААААААА	САААААААААААА	indel	intergenic		HP1243/HPG27_298	
Hp10	581837	ΑΤCAAATACTCAAATACTCAAATAC	А	indel	intergenic		HPATCC43504_00587	
Hp10	620169	С	т	SNP	nonsynonymous	HP1180		
Hp10	626404	с	т	SNP	synonymous	HP1175		
Hp10	627243	G	А	SNP	nonsynonymous	HP1174		
Hp10	701041	G	А	SNP	nonsynonymous	HP0499		
Hp10	801836	GAAAAAAAAAAAA	GAAAAAAAAAAAA	indel	intergenic		jhp0540	
Hp10	958702	САААААААААААААА		indel	intergenic		HPG27_680	
Hp10	1043704	GTTTTTTTTTTTT	GTTTTTTTTTTTTTTT	indel	frameshift insertion/intergenic	HPnc4170	HP0811	HPnc4160
Hp10	1102157	GTTTTTTTTTT	GTTTTTTTTTT	indel	intergenic		HP0876	HP0875
Hp10	1124501	GTTTTTTTTTT	GTTTTTTTTTT	indel	intergenic		HPG27_1187	
Hp10	1187376	ATTTTTT	ATTTTTTT	indel	intergenic		HP0947	
Hp10	1302389	G	А	SNP	synonymous	HP0364		
Hp10	1319683	G	С	SNP	nonsynonymous	jhp1032		
Hp10	1319839	САААААААААААА	СААААААААААА	indel	intergenic		HELPY 1075	jhp1032
Hp10	1331328	G	A	SNP	synonymous	HPATCC43504_01275	-	
Hp10	1362543	ACCCCCCCCCCCC	ACCCCCCCCCCCCCC	indel	frameshift insertion	HPB8_1119		
Hp10	1410493	G	A	SNP	nonsynonymous	jhp0373		
Hp10	1592785	TGTG	т	indel	nonframeshift deletion	HP1354		
Hp10	1593602	TGGGGGGGGGGG	TGGGGGGGGGGGG	indel	frameshift insertion	HP1354		
Hp10	1608125	TGGGGGGGGGGGGGGG	TGGGGGGGGGGGGGGGGGG	indel	nonframeshift insertion	HP1369m		
Hp10	1627016	TGGGGGGGGGGGGGG	TGGGGGGGGGGGGGGGGG	indel	intergenic		HP1406	HELPY 1371
Hp10		C	Т	SNP	synonymous	HP1450		- 1

SI4

train name	Isolation country	Host pathology	om gastric cancer patients (C Source	No. of T- repeat	Strain name	Isolation country	Host pathology	ic cancer patients (NC) Source	No.o repe
PY6271 57	Japan Japan	Cancer Cancer	GCA_000274665.1 GCA_000270065.1	11 11	IID6291 IID6268	Japan Japan	Gastritis Gastritis	LC497489 LC497473	8
E_C13 .S37	Sweden ElSalvador	Cancer Cancer	SAMN08381257 GCA 000255955.1	11 12	VN0630 462	Vietnam UK	Gastritis Normal	Registration in progress SAMN08381250	10 11
N0464	Vietnam	Cancer	Registration in progress	12	462 Hp_A-9	US	DU	SAMN003381250	11
274 C52	China Sweden	Cancer Cancer	GCA_000262655.1 SAMN08381260	12 13	IID6266 VN0607	Japan Vietnam	Gastritis Gastritis	LC497471 Registration in progress	11
A180	Peru	Cancer	GCA_000148855.1	13	3770	France	Gastritis	SAMN08381234	12
0232 0246	Vietnam Vietnam	Cancer Cancer	Registration in progress Registration in progress	13	3824 HE_NC14_2	France Sweden	Gastritis Gastritis	SAMN08381236 Registration in progress	12
0274	Vietnam	Cancer	Registration in progress	13	HE_NC5_3	Sweden	Gastritis	Registration in progress	12
0390 2	Vietnam Singapore	Cancer Cancer	Registration in progress SAMN05771043	13 14	Hp_A-20 Hp_H-16	US US	DU DU	SAMN00778862 SAMN00778876	12
2A	Singapore	Cancer	SAMN05804595	14	Hp_H-42	US	DU	SAMN00778881	12
6261	China Japan	Cancer Cancer	SAMN03013094 SAMN00777167	14 14	Hp_H-44 VN0530	US Vietnam	DU Gastritis	SAMN00778872 Registration in progress	12
6311	Japan	Cancer	SAMN00777266	14	VN0559	Vietnam	DU	Registration in progress	12
30_HL	France	Cancer	SAMN08381231	14	VN0660	Vietnam	Gastritis	Registration in progress	12
039	Singapore China	Cancer Cancer	SAMN05804593 SAMN02597427	14 14	VN1154 VN1270	Vietnam Vietnam	Gastritis DU	Registration in progress Registration in progress	12
0219	Vietnam	Cancer	Registration in progress	14	456	UK	Normal	SAMN08381249	1
0224 0227	Vietnam Vietnam	Cancer Cancer	Registration in progress Registration in progress	14 14	518 HE_NC20_5	UK Sweden	Normal Gastritis	SAMN08381251 SAMN08381282	1
0240	Vietnam	Cancer	Registration in progress	14	IID6271	Japan	GDU	LC497476	1
)352 )355	Vietnam Vietnam	Cancer Cancer	Registration in progress Registration in progress	14 14	IID6273 IID6292	Japan Japan	DU GDU	LC497477 LC497490	1
0401	Vietnam	Cancer	Registration in progress	14	VN0510	Vietnam	Gastritis	Registration in progress	1
0403 0405	Vietnam Vietnam	Cancer Cancer	Registration in progress Registration in progress	14 14	VN0511 VN0598	Vietnam Vietnam	DU Gastritis	Registration in progress Registration in progress	1
)448	Vietnam	Cancer	Registration in progress	14	VN0606	Vietnam	Gastritis	Registration in progress	1
7	Singapore	Cancer	SAMN05791070	15	VN0612	Vietnam	DU	Registration in progress	1
02 93	Colombia Colombia	Cancer Cancer	SAMN05405368 SAMN05394518	15 15	VN0638 VN0647	Vietnam Vietnam	DU DU	Registration in progress Registration in progress	1
00	Colombia	Cancer	SAMN05393257	15	VN0768	Vietnam Vietnam	Gastritis	Registration in progress	1
9_HL C30	France Sweden	Cancer Cancer	SAMN08381240 SAMN08381272	15 15	VN0899 VN1249	Vietnam Vietnam	DU Gastritis	Registration in progress Registration in progress	1
an18	Peru	Cancer	SAMN02603196	15	VN1250	Vietnam	Gastritis	Registration in progress	1
an4 1212	Peru Vietnam	Cancer Cancer	SAMN02603203 Registration in progress	15 15	VN1280 CPY1662	Vietnam Japan	DU DU	Registration in progress SAMN01178408	1
220	Vietnam	Cancer	Registration in progress	15	HE_NC19_5	Sweden	Gastritis	SAMN08381281	1
1228 1229	Vietnam Vietnam	Cancer Cancer	Registration in progress Registration in progress	15 15	HE_NC60_1 IID6267	Sweden Japan	Gastritis GU	SAMN08381303 LC497472	1
272	Vietnam	Cancer	Registration in progress	15	IID6274	Japan	Gastritis	LC497478	1
411 472	Vietnam Vietnam	Cancer Cancer	Registration in progress Registration in progress	15 15	IID6280 IID6286	Japan Japan	Gastritis DU	LC497482 LC497485	1
299	Japan	Cancer	LC497495	15	IID6289	Japan	DU	LC497488	1
50	Singapore Belgium	Cancer Cancer	SAMN05771044 SAMN08381243	16 16	IID6301 IID6302	Japan Japan	GDU DU	LC497497 LC497498	1
10	Japan	Cancer	SAMN02472069	16	IID6303	Japan	GU	LC497499	1
8A	Singapore Singapore	Cancer Cancer	SAMN05806843 SAMN05804677	16 16	J99 SSR1	US Ireland	DU GU	SAMN02602990 SAMN08381226	1
1235	Vietnam	Cancer	Registration in progress	16	VN0532	Vietnam	Gastritis	Registration in progress	1
264 271	Vietnam Vietnam	Cancer Cancer	Registration in progress	16 16	VN0563 VN0594	Vietnam Vietnam	Gastritis Gastritis	Registration in progress	1
12/1	Vietnam	Cancer	Registration in progress Registration in progress	16	VN0611	Vietnam	Gastritis	Registration in progress Registration in progress	1
361 84	Vietnam Colombia	Cancer Cancer	Registration in progress SAMN05395355	16 17	VN0637 VN0656	Vietnam Vietnam	Gastritis Gastritis	Registration in progress	1
64	Japan	Cancer	SAMD00060973	17	VN0670	Vietnam	Gastritis	Registration in progress Registration in progress	1
C58	Sweden	Cancer	SAMN08381263	17	VN0686	Vietnam	Gastritis	Registration in progress	1
C18 0484	Sweden Vietnam	Cancer Cancer	SAMN08381270 Registration in progress	18 18	VN0786 VN1180	Vietnam Vietnam	Gastritis DU	Registration in progress Registration in progress	1
0495	Vietnam	Cancer	Registration in progress	18	VN1193	Vietnam	Gastritis	Registration in progress	1
298	Japan	Cancer	LC497494	19	VN1196 VN1203	Vietnam Vietnam	Gastritis Gastritis	Registration in progress Registration in progress	1
					VN1204	Vietnam	Gastritis	Registration in progress	1
					VN1212 VN1213	Vietnam Vietnam	Gastritis Gastritis	Registration in progress Registration in progress	1
					VN1219	Vietnam	Gastritis	Registration in progress	1
					VN1225 VN1226	Vietnam Vietnam	Gastritis Gastritis	Registration in progress Registration in progress	1
					VN1246	Vietnam	DU	Registration in progress	1
					VN1266 VN1281	Vietnam Vietnam	DU DU	Registration in progress Registration in progress	1
					51	SouthKorea	DU	SAMN02603300	1
					CPY1313 F30	Japan Japan	DU DU	SAMN00777156 SAMD00060972	1
					HE_NC38_5	Japan Sweden	Gastritis	SAMN08381297	1
					IID6270 IID6275	Japan	GU DU	LC497475	1
					IID6275 IID6279	Japan Japan	DU Gastritis	LC497479 LC497481	1
					IID6285	Japan	Gastritis	LC497484	1
					IID6287 IID6293	Japan Japan	Gastritis Gastritis	LC497486 LC497491	1
					IID6294	Japan	Gastritis	LC497492	1
					IID6296 IID6300	Japan Japan	DU Gastritis	LC497493 LC497496	1
					TN2GF4	unknown	DU	SAMN08381237	1
					VN0500 VN0526	Vietnam Vietnam	Gastritis Gastritis	Registration in progress Registration in progress	1
					VN0635	Vietnam	Gastritis	Registration in progress	1
					VN0636 VN0639	Vietnam Vietnam	Gastritis Gastritis	Registration in progress Registration in progress	1
					VN0658	Vietnam	Gastritis	Registration in progress	1
					VN0759 VN0760	Vietnam Vietnam	DU Gastritis	Registration in progress Registration in progress	1
					VN0785	Vietnam	Gastritis	Registration in progress	1
					VN1156 VN1169	Vietnam Vietnam	Gastritis Gastritis	Registration in progress Registration in progress	1
					VN1192	Vietnam	Gastritis	Registration in progress	1
					VN1202 VN1205	Vietnam Vietnam	Gastritis DU	Registration in progress Registration in progress	1
					VN1221	Vietnam	Gastritis	Registration in progress	1
					VN1224 VN1227	Vietnam Vietnam	Gastritis Gastritis	Registration in progress	1
					VN1237	Vietnam Vietnam	Gastritis DU	Registration in progress Registration in progress	1
					VN1258	Vietnam	DU	Registration in progress	1
					VN1264 VN1274	Vietnam Vietnam	DU DU	Registration in progress Registration in progress	1
					VN1279	Vietnam	DU	Registration in progress	1
					3699 HE_NC23_2a	France Sweden	Gastritis Gastritis	SAMN08381239 SAMN08381284	1
					HE_NC47_5	Sweden	Gastritis	SAMN08381299	1
					HE_NC89_4 IID6269	Sweden Japan	Gastritis Gastritis	Registration in progress LC497474	1
					IID6269 IID6276	Japan Japan	Gastritis Gastritis	LC497474 LC497480	1
					IID6281	Japan	Gastritis	LC497483	1
					IID6288 VN0787	Japan Vietnam	Gastritis Gastritis	LC497487 Registration in progress	1
					VN1158	Vietnam	Gastritis	Registration in progress	1
					VN1184	Vietnam	Gastritis	Registration in progress	1
						Vietnam	Gastritic	Registration in progress	1
					VN1241 VN1261 VN0667	Vietnam Vietnam	Gastritis DU	Registration in progress Registration in progress	1

Supplementary Information 5	Information of H.	pylori clinical isolates	used in Fig. 1f and Fig 4g

#### Supplementary Information 6 | Primers used in this study.

Purpose	Description	Primer (Forward)				
r ur poste	beberrperon	rimer (rorward)		Primer (Reverse)		Reference
RT-PCR for H. pylori mRNA	HPnc4160	HPnc4160 det-s	Sequence (5'-3') AAATGTCCTGACGCTCTTACC	UNIVERSAL-as	Sequence (5'-3') GAATCGAGCACCAGTTACGC	This study, miScript II RT
quantitative analysis (Figures 1a, 2d, 4a, 4g;	HPnc4170	HPnc4170 det-s	CTTCGCCGAGCATTATACC	UNIVERSAL-as	GAATCGAGCACCAGTTACGC	Kit (QIAGEN) This study, miScript II RT
Extended Data Figures 1a, 2f, 4b, 4c, 4d, 7b, 7c)						Kit (QIAGEN)
	jhp0540 jhp1163	jhp0540 det-s jhp1163 det-s	TGCTTGTTTGTCCTAAGGCTTC AACCGCTGAGCAACAAAACG	jhp0540 det-as jhp1163 det-as	TCTGCCCTTGTTTTGCAACG ACTCTATGATCATGCTGTGGATTTC	This study This study
	tpi	HELPY_0197 det-s	CAACAAGCCATCCACGCTATC	HELPY 0197 det-as	AGACGCCCTTGTTGTATGGG	This study
	tlpB	HP0103 det-s	TTACGCCAAATCCGGACACC	HP0103 det-as	TGGTCGTTCCACTCACATGC	This study
	arsS	HP0164 (jhp0151) det-s	TGAAATAGGGGATCTGGCTAACG	HP0164 (jhp0151) det-as	TAGGGGTGCGTAGTTCATGC	This study
	HP0811	HP0811 det-s	AGCGATTGTCTCTCTCCTATGG	HP0811 det-as	CACGCTCTGTTTAGTGAAAGGC	This study
	HP0947	HP0947 det-s	GGCCATGTATGAGCCTGATTTG	HP0947 det-as	CCGCCATCACCATTCTTTCAC	This study
	HP1354 pldA	HP1354 det-s HPAG1_0475 (HP0499) det-s	AGGCGCAACAGATGAAAACG AACCACTGCGCATAAATCCC	HP1354 det-as HPAG1_0475 (HP0499) det-as	TCAGCCCTTTGGCCATACAC CGTTATGATCGCTGGCATGG	This study This study
	HPB8_818	HPB8_818 det-s	CTTGTTGCGTATCTCGTGTGG	HPB8 818 det-as	AACCAATTTGTGCGCTCTCC	This study
	hopZ	HPG27_8 det-s	TCAACTCCGCCTCTGATGTG	HPG27_8 det-as	GTGCCAGCTAAAGCAATCCC	This study
	babA	HP1243/HPG27_298 det-s	GGTGGTCCACAGATGGAACC	HP1243/HPG27_298 det-as	GATTGACCAGCTCTTGTGCG	This study
	sabA	HPG27_680 det-s	GGCTACCCCACTCAATACGC	HPG27_680 det-as	ATCCTGTGGCTTGAGCTTGC	This study
	hpaA	HP0410-hpaA det-s	GCGAGTGGGGCGTTTTATAC	HP0410-hpaA det-as	GAAATGCAACTCCACGGACTC	This study
	hopE	HELPY_0660-hopE det-s	TGGCTCTCACGCCAAAATTC	HELPY_0660-hopE det-as HP0671 det-as	GCTCAGCGGCAAACTATTGG	This study
	omp14 hofC	HP0671 det-s HP0486 det-s	GCTGTATTGACGGCGGTAAG TACCGAGCAGGAGCAAATGG	HP0671 det-as HP0486 det-as	GCCGGCATCAAGAATTCGAC ACCATCAGCGATACCACGAC	This study This study
	horB	HPSH_00635-horB det-s	TACCCAGGAGCAGGAGCAAATGG	HPSH_00635-horB det-as	ATCAAAGTGGGGCTTATGGC	This study This study
	caqA	HPP12_0555-cagA det-s	CCGACTAGGGTTCCGTTCAC	HPP12_0555-cagA det-as	AGCAAGCGTTAGCCGATCTC	This study
	HP1227	HP1227 det-s	GCGATGAAGACATCAAAGCTTTAG	UNIVERSAL-as	GAATCGAGCACCAGTTACGC	This study, miScript II R Kit (QIAGEN)
	HELPY_1262	HELPY_1262 det-s	GGGATGAGGTAAAGATTGAGCTC	UNIVERSAL-as	GAATCGAGCACCAGTTACGC	This study, miScript II R <sup>4</sup> Kit (QIAGEN)
	23srrna	HP23SrRNA det-s	GACTACTACTAATAGAGCGTTTGGC	UNIVERSAL-as	GAATCGAGCACCAGTTACGC	This study, miScript II R Kit (QIAGEN)
	iceA2	HPATCC43504_00587 det-s	GATGTGGTTACAGCCACTACAC	HPATCC43504_00587 det-as	CTGATGGGCATATTGTTGCTG	Kit (QIAGEN) This study
	tpiA	HP0194 det-s	CTAATTCCAAAGACGCGCTC	HP0194 det-as	GAAGACATTTACCTCACGCATGG	This study This study
	fucT2	HPP12_0096 det-s	GAGCCTAAATTATTAAAGCCAAGCC	HPP12_0096 det-as	GCTTGCGCTGATATTCTTCCTC	This study
	HP1406	HP1406 det-s	TCGCCATTGTCAAGCCATAAG	HP1406 det-as	GGCGTGAAGTGGTGTTTAAAG	This study
	HELPY_1371	HELPY_1371 det-s	CATGGAAGCTAAAGGCGAACA	HELPY_1371 det-as	GCGGTTGCAAATTCGTCAT	This study
	cgtA	HP0217 det-s	TGCCTATCAAATCGGCATGGTG	HP0217 det-as	TGCAATGGCACTTCCCTTTAG	This study
RT-PCR for mice mRNA quantitative analysis (Figure 4f)	mouse GAPDH	GAPDH det-s	GTGTCTTCACCACCATGGAG	GAPDH det-as	TCGTGGTTCACACCCATCAC	Sanada T., et al. Nature.2012
	mouse Cxcl2	CXCL2 det-s	CAAGGGTTGACTTCAAGAACATCC	CXCL2 det-as	CCTTGAGAGTGGCTATGACTTC	Sanada T., et al. Nature.2012
						This study
genome fragments for	cagA deletion mutant (upstream region)	CagA KO up XhoI	AAAAACCGCTCGAGGAGGGCGAATTGTTAGAA ACTTG	CagA KO up EcoRI	TTTTTCCGGAATTCGTTTCCAAAAATCTTAAA GGATTAAGGAATACC	Inis scuuy
genome fragments for establishment of deletion	(upstream region)		ACTTG		GGATTAAGGAATACC	-
genome fragments for establishment of deletion	(upstream region) cagA deletion mutant	CagA KO up XhoI CagA KO down BamHI	ACTTG		GGATTAAGGAATACC	-
genome fragments for establishment of deletion	(upstream region) cagA deletion mutant (downstream region) hpnc4160/hpnc4170 deletion	CagA KO down BamHI	асттб алаласособатссооттготтабтсаттбт тготостта алалакобтасссалоссталососттасала	CagA KO down NotI	GGATTAAGGAATACC	This study
genome fragments for establishment of deletion	(upstream region) cagA deletion mutant (downstream region) hpnc4160/hpnc4170 deletion mutant (upstream region) hpnc4160/hpnc4170 deletion	CagA KO down BamHI HPnc4160/4170 KO up KpnI HPnc4160/4170 KO down BamHI	АСТТО АММАСССВОЛГСССОРТТСОТТАЯТСАТИОТ ТГСТССТИ АЛАМАЯБГИСССАЛСССТИЛСССТИАТСССТИСАСИ ССС	CagA KO down NotI HPnc4160/4170 KO up ClaI	GGATTANGGARTACC TITTICCTITICGOGCCGCCCCACCAATCCAATCG CATGACT TITTITICAATCCTTCGCCGAGCATTATACC TITTITIGAGCTCGAGCTTTGATTATGGCGATG	This study This study
penome fragments for stablishment of deletion mutants of H. pylori	(upstream region) cagA deletion mutant (downstream region) hpnc4160/hpnc4170 deletion mutant (upstream region) loning of T repeat sequences from H. plori isolated from Mongoliam	CagA KO down BamHI HPnc4160/4170 KO up KpnI HPnc4160/4170 KO down BamHI	ACTEG	CagA KO down NotI HPnc4160/4170 KO up ClaI	GGATTAAGGAATACC TTTTCCTTTTGCGGCCGCCCAACCAATCCAAT	This study This study
penome fragments for stablishment of deletion mutants of H. pylori Construction of T repeat mutated H. pylori	(upstream region) cagA deletion mutant (downstream region) hpnc4160/hpnc4170 deletion mutant (upstream region) Cloning of T repeat sequences from H. pylori isolated from Mongoliam gerblis 8 wks post infection into pKSB plasmid	CagA KO down BamHI HPnc4160/4170 KO up KpnI HPnc4160/4170 KO down BamHI pKSB-HPnc4160 Point mut ApaI	АСТТО АЛААЛСОСОБАТССООРТТСОТТАЯТСАТТОТ ТГСТССТИ АЛААЛАЯТАССОЛАССТАЯТССТТАСАА СС АЛААЛАЯТСССТОАСТТЯТСАСОСАААСТ АСС АЛААБООССАЮСЯТРТСАССТАТОЯТОТ	CagA KO down HotI HPnc4160/4170 KO up ClaI HPnc4160/4170 KO down SacI pKSB-HFnc4160 Point mut XhoI	GGRTTANGGARTACC ТТТТССТТТТОСОБССБССТАССАЛТСАТСЯ САТСАСТ ТТТТТТАЛСБАГССТГСССБАССАТТАНТАС ТТТТТТБАСТСБАССТТГСАТСАССАТСЯ АНТТАС АНТТАС	This study This study This study This study
Cloning of H. pylori genome fragments for setablishment of deletion mutants of H. pylori Construction of T repeat mutated H. pylori Construction of NB-cagA H. pylori	(upstream region) cagA deletion mutant (downstream region) hpnc4160/hpnc4170 deletion mutant (upstream region) hpnc4160/hpnc4170 deletion mutant (downstream region) Cloning of T repeat sequences from H. pylori isolated from Mongoliam gerblis 8 wks post infection into pKSB	CagA KO down BamHI HPnc4160/4170 KO up KpnI HPnc4160/4170 KO down BamHI	ACTEG	CagA KO down HotI HPnc4160/4170 KO up ClaI HPnc4160/4170 KO down SacI pKSB-HFnc4160 Point mut XhoI	GGATTAAGGAATACC TTTTCCTTTTGCGGCCGCCCAACCAATCCAAT	This study This study This study This study
penome fragments for establishment of deletion mutants of H. pylori Construction of T repeat mutated H. pylori Construction of NB-cagA H. pylori Stablishment of hpnc4160- sxpressing H. pylori	(upstream region) cagA deletion mutant (downstream region) hpne160/hpne170 deletion mutant (upstream region) hpne160/hpne170 deletion mutant (downstream region) Cloning of T repeat sequences from H. pyloril isolated from Hongolian gerbils 8 wks poet infection into pKSB plaamid pKB-Bagenet from synthesized KH-cagA containing plasmid) pHel2 Plasmid construct for hpne160 without Hone170 R terminal region	CagA KO down BamHI HPnc4160/4170 KO up KpnI HPnc4160/4170 KO down BamHI PKSB-HPnc4160 Point mut ApaI pKSB-CagA-NB-ApaI pHs12-4160-de-4170-hed-f XhoI	ACTTG AMAMAGGACCOGGTTCGTTAGTCATTGT TTCTCCTA AMAMAGGACCCOMACCTAATCCCTTACAAA CC AMAMAGGACCCCCAACTTACAACT AACC AAMAAGGACCCAGCGATTGACCTATGATGT AAAAAAGGGCCCGGGACCTTGAAAATTCCGTTF AAAG GGGGGCCCGCGACATTAAGGTAAGAGCGTCAG G	CagA KO down HotI HPnc4160/4170 KO up ClaI HPnc4160/4170 KO down SacI PKSB-HPnc4160 Point mut XhoI PKSB-CagA-NB-XhoI PHE12-4160-de-4170-hed-r BamHI	Санталадантисс ттутестутисодосодостисемитеснос силалет тутутитеданеситодосоцисантитисс тутутитеданеситодистиратитесодос милистодидестиратителестира мамаластосидестирассилитестирантесс тир соссосодитеситескитесителитира	This study This study This study This study This study
penome fragments for stablishment of deletion mutants of H. pylori construction of T repeat mutated H. pylori construction of NB-cagA . pylori Stablishment of hpnc4160- xxpressing H. pylori construction of H. pylori	(upstream region) cagh deletion mutant (downstream region) hpne160/hpne4170 deletion mutant (downstream region) hpne150/hpne4170 deletion mutant (downstream region) Cloning of T repeat sequences from H. pylori isolated from Mongolian gerbils 8 Wks post infection into pKSB plasmid pKSB-KB-cagh fragment from synthesized B-cagh construct (NB-cagh fragment from synthesized monstruct for hpne160 without HPne4170 Herminal region pGEX6P-1-Rmase III	CagA KO down BamHI HPnc4160/4170 KO up KpnI HPnc4160/4170 KO up KpnI HPnc4160/4170 KO down BamHI PKSB-HPnc4160 Point mut ApaI pKSB-CagA-NB-ApaI pHE12-4160-de-4170-hed-f XhoI pGEX-6P-1 RNaseIII XhoI-f	ACTTG AAAAAAGCOGGATCOGGTTTCGTTAGTCATTGT TTCTCCTTA AAAAAAGGTCCCAAGCCTAATCCCTTAGAAAAC CC AAAAAAGGTCCCCACAGCTAATCACGTTAGAAAATCCCTTAGAAAATCCCTTAGAAAATCCCTTAGAAAATCCCTTAGAAAATCCCTTAGAAAATCCCTTAGAAAATCCCTTAGAAAATCCCTTAGAAAATCCCTTAGAAAATCCCTTAGAAAATCCCTTAGAAAATCCCTTAGAAAATCCCTTAGAAAATCCCTCAG C AAAAAAGGTCCGACCAATGAAAAAGGTAAGAGCACCCAG C AAAAAGGTCCGACCAATGAAAAACGAAAAGGTAAGAGCACCCAG C AAAAAGGTCCGACCAATGAAAAACGAAAAGGTAAGAGCACCCAG C AAAAAGGTCCGACCAATGAAAAACGAAAAGGTAAGAGCACCAGG C	CagA KO down NotI HPnc4160/4170 KO up ClaI HPnc4160/4170 KO down SacI PKSB-HPnc4160 Point mut XhoI PKSB-CagA-NB-XhoI pHE12-4160-de-4170-hed-r BamHI pGEX-6P-1 RNaseIII NotI-r	Салтталаралтасс ттттостттносоросоростассалтосалтор саларат ттттторалтоситосторосоросалталасс тттттторалосторосоросттралталоросалта лаларасторосоросттралталоросалта лаларасторосороссалтосттралтасс тто соссосоралтосалоссалостралалт тот аларасоросостослаторостостралалт тторасс	This study This study This study This study This study This study This study
enome fragments for stablishment of deletion watnis of <i>H. pylori</i> construction of T repeat wated <i>H. pylori</i> construction of NB-cagA <i>I. pylori</i> construction of NB-cagA <i>I. pylori</i> construction of <i>H. pylori</i> STRNase III-expressing <i>H. pylori</i> STRNase III-expressing <i>J. coli</i> 100 pBluescript	(upstream region) cagA deletion mutant (downstream region) hpne160/hpne170 deletion mutant (upstream region) hpne160/hpne170 deletion mutant (downstream region) Cloning of T repeat sequences from H. pyloril isolated from Hongolian gerbils 8 wks poet infection into pKSB plaamid pKB-Bagenet from synthesized KH-cagA containing plasmid) pHel2 Plasmid construct for hpne160 without Hone170 R terminal region	CagA KO down BamHI HPnc4160/4170 KO up KpnI HPnc4160/4170 KO down BamHI PKSB-HPnc4160 Point mut ApaI pKSB-CagA-NB-ApaI pHs12-4160-de-4170-hed-f XhoI	ACTTG AAAAACGCGGATCCGGTTTCGTTAGTCATTGT TTCTCCTTA AAAAAAGGTCCCAAGCCTAACCCTTACAAA CC AAAAAAGGGCCCAGGGATTTGACCTATGACGTAGAGT AAAAAAGGGCCCAGGGACTTGAAAATTCCGTT AAAG GGGGGCCTCGAACTTAAAGGTAAGAGCGTCAG G AAAAAAGGGACCATGAAAAACAACGCTCCAG	CagA KO down NotI HPnc4160/4170 KO up ClaI HPnc4160/4170 KO down SacI PKSB-HPnc4160 Point mut XhoI PKSB-CagA-NB-XhoI pHE12-4160-de-4170-hed-r BamHI pGEX-6P-1 RNaseIII NotI-r	GARTRAGGARTACC TTTTTCCTTTTGCGGCCGGCCACCAATCCATCG CATGACT TTTTTTGGGCCGACCTTCGCCGAGCATTATACC TTTTTTTGGACCCGAGCTTTGATTATGGCGAG ANAAAACTCGAGCCTGAGCCAATTCTTGATTCC TTG ANAAAACTCGAGCCTGAGCCAATTCTTGATTCC TTG ANAAAGCGGCCGATCCATCATGAGCTTAAAT	This study This study This study This study This study This study This study
enome fragments for stablishment of deletion watnis of <i>H. pylori</i> construction of T repeat wated <i>H. pylori</i> construction of NB-cagA <i>I. pylori</i> construction of NB-cagA <i>I. pylori</i> construction of <i>H. pylori</i> STRNase III-expressing <i>H. pylori</i> STRNase III-expressing <i>J. coli</i> 100 pBluescript	(upstream region) cagh deletion mutant (downstream region) hpne160/hpne4170 deletion mutant (downstream region) hpne150/hpne4170 deletion mutant (downstream region) Cloning of T repeat sequences from H. pylori isolated from Mongolian gerbils 8 Wks post infection into pKSB plasmid pKSB-KB-cagh fragment from synthesized B-cagh construct (NB-cagh fragment from synthesized monstruct for hpne160 without HPne4170 Herminal region pGEX6P-1-Rmase III	CagA KO down BamHI HPnc4160/4170 KO up KpnI HPnc4160/4170 KO up KpnI HPnc4160/4170 KO down BamHI PKSB-HPnc4160 Point mut ApaI pKSB-CagA-NB-ApaI pHE12-4160-de-4170-hed-f XhoI pGEX-6P-1 RNaseIII XhoI-f	ACTTG AAAAAAGCOGGATCOGGTTTCGTTAGTCATTGT TTCTCCTTA AAAAAAGGTCCCAAGCCTAATCCCTTAGAAAAC CC AAAAAAGGTCCCCACAGCTAATCACGTTAGAAAATCCCTTAGAAAATCCCTTAGAAAATCCCTTAGAAAATCCCTTAGAAAATCCCTTAGAAAATCCCTTAGAAAATCCCTTAGAAAATCCCTTAGAAAATCCCTTAGAAAATCCCTTAGAAAATCCCTTAGAAAATCCCTTAGAAAATCCCTTAGAAAATCCCTCAG C AAAAAAGGTCCGACCAATGAAAAAGGTAAGAGCACCCAG C AAAAAGGTCCGACCAATGAAAAACGAAAAGGTAAGAGCACCCAG C AAAAAGGTCCGACCAATGAAAAACGAAAAGGTAAGAGCACCCAG C AAAAAGGTCCGACCAATGAAAAACGAAAAGGTAAGAGCACCAGG C	CagA KO down NotI HPnc4160/4170 KO up ClaI HPnc4160/4170 KO up ClaI PKSB-HPnc4160 Point mut XhOI PKSB-CagA-NB-XhOI PKSB-CagA-NB-XhOI pHel2-4160-de-4170-hed-r BamHI pGEX-6P-1 RNaseIII NotI-r Small RNA HPnc4160 EcoRI	GARTAAGGAATACC TTTTCCTTTTGGGGCGGCCGACCAATCAATGG CARGACT TTTTTTTGAGCTCGAGCTTGGCGAGCATTATACC TTTTTTTGGCTCGAGCTTGGCTAAGGCCTAATACC AAAAAACTCGAGCTGAGCCGAGCCAATCCTTGGCTG AAAAAACTCGAGCTGAGCCGAGCCAATCCTTGATTCC TTG AAAAAACTCGAGCTGAGCCGACATCATGGCTTAAAT TTG AAAAAGCGGCGCCCCACATTGGCTTCCTTCAGTT TTTGAAGC	This study This study This study This study This study This study This study This study
enome fragments for stablishment of deletion watnis of <i>H. pylori</i> construction of T repeat wated <i>H. pylori</i> construction of NB-cagA <i>I. pylori</i> construction of NB-cagA <i>I. pylori</i> construction of <i>H. pylori</i> STRNase III-expressing <i>H. pylori</i> STRNase III-expressing <i>J. coli</i> 100 pBluescript	(upstream region) cagh deletion mutant (downstream region) hpne160/hpne4170 deletion mutant (downstream region) hpne1160/hpne4170 deletion mutant (downstream region) Cloning of T repeat sequences from H. pylori isolated from Hongolian gerblis 8 Wks poet infection into pKSB plaamid pKSB-NB-cagh Construct (NB-cagh fragment from synthesized NB-cagh containing plaamid pRESP-NB-cagh construct for hpne4160 S'UTR of hpaA S'UTR of hopE	CagA KO down BamHI HPnc4160/4170 KO up KpnI HPnc4160/4170 KO up KpnI HPnc4160/4170 KO down BamHI PKSB-HPnc4160 Point mut ApaI pKSB-CagA-NB-ApaI pHE12-4160-de-4170-hed-f XhoI pGE2-6P-1 RNaseIII XhoI-f Small RNA HPnc4160 XhoI HF0410 150bp XhoI HELPY_0660 150bp XhoI	АСТТО АЛАААСОСОБАТССООРТТООТТИЯТСАТТОТ ТТСТССТТА АЛАААСОССОЛАССТИАТСССТИАСКА ССС АЛАААСОССССОССТИАТСКОСТИАСКА АЛАААСОССССССССИТТОСАССААСТ АЛАААЛОСОССАССОСПСТТОАЛААТТССОТТ АЛАААЛОСОССАССОСПСТТОАЛААТТССОТТ СОССССССАССААТТИАЛСЯТАСААСССТСАС АЛАААЛСССАСССАЛСТИАЛАССААССАА	CagA KO down NotI HPnc4160/4170 KO up ClaI HPnc4160/4170 KO up ClaI BPnc4160/4170 KO down SacI PKSB-HPnc4160 Point mut XhoI PKSB-CagA-NB-XhoI PRSB-CagA-NB-XhoI PRE12-4160-de-4170-hed-r BamHI PGEX-6P-1 RNaseIII NotI-r Small RNA HPnc4160 EcoRI HP0410 150bp EcoRI	GENTTANGENETACC TTTTCCTTTTGCGOCCGCCCALCAATCCATCG CATGACT TTTTTTTTGCGACCTCGACGCTGATATACCC TTTTTTTTGCGACCTCGACGCTGGATGATATACCC AMALTCGACGCCGACGCTGGACCCAATCCTTGATACGCGATG AMALACTCGGACCTCGACCCAATCCTTGATTCC TCT AMALGGGGCCCCCACTCGACGCCAATCCTGGATACCAGGCTCA AMALMGGACTCCCAATTGGCTTCCCTCCAGTT TTTGCAAGC	This study This study This study This study This study This study This study This study This study This study
enome fragments for stablishment of deletion watnis of <i>H. pylori</i> construction of T repeat wated <i>H. pylori</i> construction of NB-cagA <i>I. pylori</i> construction of NB-cagA <i>I. pylori</i> construction of <i>H. pylori</i> STRNase III-expressing <i>H. pylori</i> STRNase III-expressing <i>J. coli</i> 100 pBluescript	(upstream region) cagA deletion mutant (downstream region) hpoc160/hpoc170 deletion mutant (downstream region) hpoc160/hpoc170 deletion mutant (downstream region) cloning of T repest sequences from H. pylori isolated from Hongolian gerbils 8 Wks post infection into pKSB plasmid pKSB-NB-cagA construct (NB-cagA fragment from synthesized MB-cagA containing plasmid) pHE12 Plasmid construct for hpoc160 without HPnc4100 S'UTR of hpaA S'UTR of hopE S'UTR of omp14	CagA KO down BamHI HPnc4160/4170 KO up KpnI HPnc4160/4170 KO up KpnI HPnc4160/4170 KO down BamHI PKSB-HPnc4160 Point mut ApaI PKSB-CagA-NB-ApaI pKSB-CagA-NB-ApaI pHE12-4160-de-4170-hed-f XhoI pGEX-6P-1 RNaseIII XhoI-f Small RNA HPnc4160 XhoI HP0410 150bp XhoI HELEY_0660 150bp XhoI HP0471 150bp XhoI	ACTTG AMAAGGOGGATCGGGTTTGGTTAGTCATTGGTTAGTCATTGGTTAGTAATGGGTTAGATGGTTAGTATAGGGTTAGATGGTTAGATGGTTAGATGGTTAGATGGTTAGATGGTTAGATGGTTAGATGGTTAGATGGTTAGATGGTTAGATGGTTAGATGGTTAGATGGTTAGATGGTTAGATGGTTAGATGGTTAGATGGTTAGATGGTTAGATGGGTTTAGATGGTTAGATGGTTAGATGGTTAGATGGGTTTTAGATGGTTAGATGGTTAGATGGTTAGATGGTTAGATGGTTAGATGGTTAGATGGTTAGATGGTTAGATGGGTTTTAGATGGTTAGATGGTTAGATGGTTAGATGGTTAGATGGTTAGATGGTTAGATGGTTAGATGGTTAGATGGTTAGATGGTTAGATGGTTAGATGGTTTAGATGGTTTAGATGGTTTTAGATGGTGTTTAGATGGGGTTTTAGATGGGGTGTTTAGATGGTGATGGATGGATGGATGGATGAT	CagA KO down NotI HPnc4160/4170 KO up ClaI HPnc4160/4170 KO up ClaI HPnc4160/4170 KO up ClaI PKSB-CagA-HD-KhOI PKSB-CagA-HD-KHOI PKSB-CagA-HD-KHOI PKSB-CagA-HD-KHOI PKSB-CAGA PKSB-CAGA	GARTEARGEATECC TTTTCCTTTEGGACCGCCGACCAACCACGACG CARGACT TTTTTTTEGGACCGCGGCGGCGACATTATACC TTTTTTTTGGGCCGGGCGACGATTGATATGGGGACG AMAMACTGGGGCCCCCGGCGACGCCGACGCCGACGCCGGCGCCCCCC	This study This study
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