

Table 1: Tumor genes identified as significantly depleted after genome 2CT screens

Screen 1			Screen 2		
gene_id	riger	sigLabelSwitchFD R	gene_id	riger	sigLabelSwitchFD R
hsa-mir-1299	101.5	0.00000	AHSG	197	0.00000
ALG11	319.75	0.00001	CHCHD10	237	0.00000
BIRC2	327.75	0.00001	CBLL1	260.25	0.00000
FAM32A	342	0.00001	KRTAP19-7	362.75	0.00001
KIF3C	404.5	0.00001	PRSS16	424.25	0.00001
LAPTM4A	442.75	0.00002	GOLGA7B	455	0.00001
KRTAP3-2	490.5	0.00002	FAM32A	480.25	0.00001
ARSK	498.25	0.00002	ARSD	489.75	0.00001
HHLA3	532.25	0.00002	hsa-mir-1299	490.5	0.00001
LOC730183	543.5	0.00002	PGM3	493.5	0.00001
LRR1	617.5	0.00002	APOBEC1	509.5	0.00001
MED26	635.25	0.00002	SFR1	563.75	0.00002
hsa-mir-197	654.5	0.00002	ENO4	662	0.00004
TRAF2	703.25	0.00002	SLC6A18	664.75	0.00004
EIF3I	720.5	0.00002	CXADR	685	0.00004
RBM14	730.25	0.00003	ZFYVE28	689.25	0.00004
hsa-mir-181b-2	782	0.00004	DNAJC16	694.25	0.00004
VPS13D	800.5	0.00004	SPDYA	701.25	0.00004
SCRT1	825.5	0.00004	hsa-mir-4435-1	764.75	0.00004
HES4	830.25	0.00004	ARL2BP	765.75	0.00004
DPEP2	864.75	0.00005	HLC5	769.25	0.00004
MUC7	883.5	0.00005	CCDC62	780.5	0.00004
ASPH	894	0.00006	RAD21	799.5	0.00004
EMC2	907.5	0.00006	hsa-mir-30d	834.5	0.00005
OSTM1	939.75	0.00006	CASKIN2	835.5	0.00005
ZNF124	942.25	0.00006	EMID1	893.25	0.00006
DCUN1D1	960.75	0.00007	TWIST2	905	0.00006
TCEAL7	987	0.00007	SMC5	905.5	0.00006
RRM1	989.75	0.00007	ECM1	944.25	0.00006
SLC26A9	994.5	0.00007	APPL1	958.75	0.00007
TCEB3CL	997.75	0.00007	COL11A1	966	0.00007
ZNF136	1038	0.00008	MRPS24	992.75	0.00007
TMOD4	1038.5	0.00008	THEMIS2	998.75	0.00007
PACRG	1049.75	0.00008	FOSL2	1006.75	0.00008
RALGAPA2	1078.75	0.00008	PUS10	1012.5	0.00008
CLDND1	1095.25	0.00008	GPR12	1037.5	0.00008

PROL1	1099.25	0.00008	SCAF11	1046.25	0.00009
TDO2	1133	0.00010	ISCU	1049.5	0.00009
MT1B	1171.25	0.00010	EIF3I	1052.25	0.00009
COG3	1177.5	0.00011	POLR2B	1069	0.00009
CHMP7	1200	0.00012	ACSL1	1071.75	0.00009
TMX4	1202	0.00012	ZNF232	1080.5	0.00009
GIMD1	1202.75	0.00012	KAT5	1105	0.00009
METTL14	1241.75	0.00012	ZGPAT	1114.25	0.00009
ORC1	1257	0.00013	ZBBX	1123.5	0.00009
CWC27	1264.25	0.00013	RLN3	1123.75	0.00009
DPAGT1	1275	0.00013	PPCS	1129.5	0.00010
GPS2	1276.75	0.00013	TMIGD1	1132	0.00010
SCEL	1278.25	0.00013	RPL6	1153.75	0.00010
ARMC3	1279.5	0.00013	ST8SIA6	1161	0.00010
RBM10	1294.5	0.00013	UBE2N	1177.25	0.00011
hsa-mir-6775	1354.75	0.00016	hsa-mir-597	1196.25	0.00011
RNF31	1355.75	0.00016	MUT	1200	0.00012
SCD5	1356	0.00016	MPG	1200.75	0.00012
MPL	1376.75	0.00016	AHSA1	1249.25	0.00012
NHSL1	1383	0.00016	TOR1AIP1	1279.5	0.00013
CNGB1	1424.5	0.00017	hsa-mir-3652	1289	0.00013
C22orf26	1425	0.00017	SNAP25	1295.5	0.00014
CLEC16A	1448.25	0.00018	ITSN2	1356.25	0.00016
hsa-mir-1207	1453	0.00018	CCR8	1391.5	0.00016
NLRC5	1456.25	0.00018	PIF1	1441	0.00017
DDX21	1460.5	0.00018	TAS2R14	1451.5	0.00017
FBXW7	1475	0.00018	OR2D3	1466.5	0.00018
MOBP	1507.25	0.00019	STK11IP	1472.25	0.00018
SART3	1513	0.00019	DHX35	1473	0.00018
NKX1-2	1536.75	0.00019	SHOC2	1545	0.00020
RPL23	1540.25	0.00019	FIGLA	1589	0.00022
YTHDF2	1591.5	0.00021	CRCP	1605	0.00022
hsa-mir-615	1592.25	0.00021	CY5R3	1613.75	0.00023
PRAMEF20	1604.25	0.00022	CAT	1633.75	0.00023
IL3	1604.75	0.00022	ATG13	1650.25	0.00024
GABRR2	1620.75	0.00022	PHAX	1673	0.00024
OR5H14	1623	0.00022	GUF1	1685.25	0.00024
CHST10	1632.25	0.00023	NDUFS8	1714.75	0.00025
RPL13	1638.75	0.00023	NAPSA	1737.5	0.00026

HIST2H2BE	1643.75	0.00023		MX2	1744.75	0.00026
THOP1	1649.25	0.00023		PRTG	1750.25	0.00026
DGAT2L6	1669.5	0.00024		OARD1	1754	0.00026
KRTAP19-6	1697	0.00024		BTG3	1767.25	0.00026
SUPT5H	1704	0.00024		CHST3	1799.5	0.00028
NLRP8	1706.25	0.00024		PPIA	1847.75	0.00029
OR4C11	1707	0.00024		SH2B3	1853	0.00029
SLC25A24	1716.75	0.00024		HIF3A	1860.25	0.00029
VPS29	1720.5	0.00024		ATL2	1862	0.00029
TMEM47	1734	0.00025		IL9	1871.25	0.00029
LRRC4	1752.75	0.00025		DESI2	1886.5	0.00030
ZNF227	1783.25	0.00026		CDC20	1886.75	0.00030
FBXO36	1809.75	0.00028		ATG16L2	1887.5	0.00030
GIC2	1815.5	0.00028		BTBD2	1890.25	0.00030
GPD1L	1816	0.00028		KIF21A	1900.75	0.00031
ZPLD1	1823	0.00028		NEURL2	1911.5	0.00031
P4HA2	1825.25	0.00028		SLC44A1	1925	0.00031
hsa-mir-4442	1852.5	0.00030		MRPL34	1993.5	0.00033
ROS1	1873.25	0.00031		TMED2	2018	0.00034
TTC30A	1881.5	0.00031		PDK3	2062.25	0.00036
POLRMT	1887.75	0.00031		FMNL3	2076	0.00037
RBL2	1891.25	0.00031		OXCT1	2084	0.00037
SEH1L	1909.25	0.00032		C8orf42	2101.25	0.00038
DDX59	1914.75	0.00032		PCCB	2124.25	0.00039
SERTAD2	1929.75	0.00032		SPATA31A6	2126.25	0.00039
ABI3BP	1930.75	0.00032		NRCAM	2135.5	0.00039
DPT	1978	0.00034		hsa-mir-519c	2152.5	0.00040
GRHPR	2012	0.00035		GAR1	2155.75	0.00040
KRTAP4-9	2017	0.00035		TMEM91	2179.25	0.00041
LCN2	2017.75	0.00035		RBL2	2188	0.00042
MEX3B	2029.25	0.00035		HPS6	2228.75	0.00043
RLTPR	2030	0.00035		EGR2	2232.25	0.00044
POLR3H	2037.5	0.00035		CCNB1IP1	2233	0.00044
RAD17	2048.5	0.00036		SAA2	2237	0.00044
CCDC125	2081.75	0.00037		hsa-mir-3687	2256	0.00044
UQCR11	2095.75	0.00037		ITGA7	2289	0.00046
LCE2C	2111.5	0.00038		DSTN	2294.75	0.00046
hsa-mir-3180-3	2158.75	0.00041		ENY2	2308	0.00046
FAM3B	2161.25	0.00041		PIP5KL1	2314.25	0.00046

DNMT3B	2187.75	0.00042	VAMP8	2330.5	0.00047
RPS25	2218	0.00043	KIF3A	2340	0.00047
TRIM43B	2234.5	0.00044	ISX	2344.5	0.00047
IFIT1	2236.5	0.00044	GNL3L	2344.5	0.00047
PPP1R3F	2250.5	0.00045	RASSF8	2367.5	0.00048
SNRPD3	2270.75	0.00045	FMO4	2399.75	0.00050
hsa-mir-6726	2315	0.00046	SYCE1	2414.25	0.00050
hsa-mir-147a	2321	0.00046	IL17D	2421	0.00050
TCEAL6	2325.25	0.00046	CINP	2423.5	0.00050
STRAP	2334.75	0.00046	PRPF3	2483.5	0.00053
DIDO1	2397	0.00049	FBXL13	2484	0.00053
EIF4G1	2413.5	0.00050	EIF2A	2484.5	0.00053
C2orf49	2413.75	0.00050	ATP8B4	2501	0.00053
SPRR1B	2420.25	0.00050	ALG11	2518.5	0.00054
TRAF3IP3	2462.25	0.00053	DDIT4L	2525.5	0.00055
C22orf23	2466	0.00053	GATA2	2529.75	0.00055
TMEM184A	2493	0.00053	IGSF9	2535	0.00056
CDC123	2508.75	0.00053	hsa-mir-146b	2553.5	0.00056
B3GNT8	2523.25	0.00054	DPY19L4	2613.5	0.00059
SLC6A6	2547.75	0.00055	C15orf61	2640.25	0.00059
ADM5	2548	0.00055	CDCA8	2681.75	0.00061
TRA2B	2565.25	0.00056	DDX46	2689.25	0.00062
ATF4	2577.75	0.00057	ZNF469	2705	0.00063
SLC7A9	2590.75	0.00058	OR52E2	2712	0.00063
hsa-mir-1289-1	2594.5	0.00058	NPAS2	2718.5	0.00064
CYBR3	2601.5	0.00058	P2RX4	2724.75	0.00064
hsa-mir-4539	2623.5	0.00059	NFKBIL1	2780	0.00067
SLC5A7	2652.75	0.00061	TLCD2	2836.75	0.00072
RIOK1	2687.75	0.00064	LILRA4	2848	0.00072
CCDC58	2705.75	0.00065	SRSF2	2902.5	0.00075
hsa-mir-4456	2714.75	0.00066	MYH4	2909.75	0.00076
FKBP6	2740.75	0.00068	KAL1	2955.75	0.00078
COLEC11	2742	0.00068	ABHD3	2970	0.00079
C9orf85	2752.75	0.00069	PGD	2970.25	0.00079
SUMO1	2791	0.00070	RELB	3007.5	0.00081
RAB17	2811.5	0.00071	PCNA	3011.75	0.00081
SNRPF	2815.25	0.00071	RALB	3021.25	0.00082
PLK2	2840.5	0.00073	COL5A1	3035.5	0.00082
EML3	2841.75	0.00073	HAL	3037.25	0.00083

LPPR5	2845.25	0.00073	hsa-mir-4538	3042.25	0.00083
RPAP2	2847.5	0.00073	OR1L8	3050.5	0.00083
SLC9C2	2862.5	0.00074	NonTargetingControlGuideForHuman_056 1	3078.25	0.00086
CDC45	2877.5	0.00074	HDDC2	3099.5	0.00087
hsa-mir-6868	2935	0.00076	hsa-mir-8060	3129.25	0.00088
SFPQ	2936.5	0.00076	IL6	3130	0.00089
SLC5A9	2939.75	0.00076	PNMA3	3161.25	0.00090
CHST13	2940.5	0.00076	LOC100507462	3239.25	0.00095
VAV1	2996.25	0.00078	BIRC2	3240.25	0.00095
hsa-mir-208a	3002.25	0.00078	hsa-mir-1825	3241.25	0.00095
ENY2	3013.75	0.00079	LRRFIP2	3243.75	0.00095
GALR3	3025	0.00079	SBNO1	3288	0.00098
MTA1	3028.25	0.00080	KCNG2	3312	0.00100
DDX1	3049.75	0.00081	MYO1E	3312.5	0.00100
hsa-mir-4651	3050.25	0.00081	RQCD1	3319.25	0.00101
TYW5	3051.25	0.00081	MADD	3359.75	0.00104
BAP1	3068.25	0.00082	KRTAP5-11	3373.25	0.00104
ATP6V1C1	3100.75	0.00082	CAV1	3386.75	0.00106
ALDH2	3119.75	0.00083	CCNA2	3397.75	0.00107
hsa-mir-3129	3124.5	0.00083	REG1B	3415.75	0.00108
RRH	3137.25	0.00085	IL1R1	3469.5	0.00111
CHRM3	3142.25	0.00085	PDCL2	3473.5	0.00111
SF1	3183.25	0.00087	OR1L6	3501.5	0.00113
OCEL1	3211.75	0.00089	RPS26	3502.5	0.00113
FFAR3	3216.5	0.00089	hsa-mir-4697	3526.75	0.00114
ACTC1	3216.5	0.00089	WIBG	3561	0.00117
PPFIBP1	3246.25	0.00090	PSTK	3562.75	0.00117
hsa-mir-6794	3262.25	0.00091	TMED10	3564	0.00117
MTMR14	3265.5	0.00091	CEBPG	3593.25	0.00119
INSL4	3293.5	0.00093	DEGS2	3611.25	0.00119
CHRNA3	3298.75	0.00094	C12orf56	3620.5	0.00120
hsa-mir-663b	3299.25	0.00094	DLD	3685	0.00124
WARS2	3313.25	0.00094	TDGF1	3693.25	0.00124
ATAD5	3325.75	0.00095	PIH1D3	3701	0.00124
hsa-mir-5787	3331.5	0.00095	BUD31	3721.5	0.00126
PSMC5	3336	0.00096	TRPV6	3721.5	0.00126
LOC100507462	3336.25	0.00096	SPC25	3724.25	0.00126
PRPF40A	3356.5	0.00096	DNAJB8	3769	0.00128
SLC2A8	3361.25	0.00097	NonTargetingControlGuideForHuman_085 2	3828.25	0.00132

MRPL44	3365.25	0.00097	NonTargetingControlGuideForHuman_076 6	3832	0.00132
RPF1	3366.25	0.00097	KLHL31	3832.25	0.00132
TTF2	3392.5	0.00099	hsa-mir-1289-1	3835	0.00133
GLYAT	3408.75	0.00099	PSD4	3837.5	0.00133
ZNF69	3437	0.00102	CUL4A	3874.25	0.00135
BYSL	3442.5	0.00103	LCK	3878	0.00136
KAL1	3448.25	0.00103	RLN1	3901.25	0.00138
hsa-mir-3143	3456.75	0.00103	CSPG5	3931.5	0.00139
PGS1	3471.5	0.00105	KRTAP5-10	3932.5	0.00140
WBP2	3486.75	0.00106	hsa-mir-1251	3994	0.00144
ZNF480	3494	0.00106	ARHGEF11	4001.25	0.00144
PHYH	3549.5	0.00109	ZMYND15	4046.5	0.00148
COX5B	3552	0.00109	AZI1	4049	0.00148
PTMS	3554.5	0.00109	PTPRCAP	4089	0.00152
EEF1B2	3558	0.00110	CCDC172	4108.25	0.00153
MXD4	3580.5	0.00110	ZNF778	4117.75	0.00154
HOXB8	3593.5	0.00111	LAMTOR3	4157	0.00158
TMEM144	3609.75	0.00112	2-Mar	4158.5	0.00158
SOX18	3612	0.00112	ISCA2	4167.5	0.00160
RBM14-RBM4	3649.75	0.00114	POGLUT1	4169	0.00160
hsa-mir-485	3674.75	0.00117	WBP11	4171	0.00160
BRICD5	3702.25	0.00119	SYDE2	4239.75	0.00166
PPP1R27	3747.75	0.00122	PDP1	4293.75	0.00170
hsa-mir-6880	3803.25	0.00125	PGR	4309.75	0.00171
KRTAP4-6	3812.5	0.00126	LOC440563	4314.5	0.00172
hsa-mir-4425	3813	0.00126	CHGA	4316.25	0.00172
AKIRIN1	3841.75	0.00127	ANKRD42	4331.25	0.00173
FAM114A2	3845.5	0.00127	SHARPIN	4346.75	0.00174
IL36RN	3861	0.00128	SRGAP2	4355.5	0.00174
PRPF3	3902.25	0.00132	TMEM37	4364.75	0.00175
hsa-mir-548w	3941.75	0.00135	RPL12	4374	0.00176
THAP5	3951.5	0.00136	ELTD1	4390.25	0.00176
DPM2	3955.5	0.00136	MT3	4394.25	0.00176
CDR2L	3964.25	0.00136	GART	4396.5	0.00177
WDR45B	4002.5	0.00137	TRIM37	4405.5	0.00177
LYRM1	4044.5	0.00140	KRTAP5-1	4411.5	0.00178
PTPLAD1	4053.5	0.00140	SNX1	4428.5	0.00180
NLRC4	4055.75	0.00140	USP8	4429.75	0.00181
OTOR	4095.25	0.00143	KITLG	4443.25	0.00181

DYDC1	4109.75	0.00145	FAM216A	4447.75	0.00182
BARHL2	4139.25	0.00147	CDH7	4468.25	0.00183
hsa-mir-3197	4151.5	0.00148	EPB41	4487.25	0.00185
PARP10	4173	0.00149	TOM1L1	4487.75	0.00185
TNFRSF10B	4226.5	0.00156	PIP5K1A	4506.25	0.00187
WFDC6	4236	0.00156	FOLR1	4523.75	0.00188
FAM126A	4238.5	0.00157	MRPL45	4524.75	0.00189
TAF4	4252.75	0.00158	UQCRF51	4551.25	0.00192
TMIGD1	4256	0.00158	RPLP0	4567.25	0.00193
hsa-mir-19a	4283.25	0.00159	ADAMTS4	4570.75	0.00193
LIN7A	4283.5	0.00159	PDCD11	4659.5	0.00200
POLR3F	4311.5	0.00163	COPE	4700.5	0.00202
RNPS1	4325.75	0.00164	FAM50A	4719.5	0.00203
STUB1	4333.25	0.00165	DDX51	4785	0.00210
CST4	4351.5	0.00167	FOXD4L5	4811.75	0.00214
BCL2	4373	0.00168	NAALAD2	4818.25	0.00215
POLD2	4428.5	0.00172	RPAP2	4818.75	0.00215
PUS7	4470.75	0.00176	TAC1	4843.25	0.00217
OR2B11	4497	0.00177	DAOA	4852.75	0.00218
COL7A1	4497.25	0.00177	hsa-mir-2276	4871.5	0.00219
CCDC151	4498.75	0.00177	C14orf119	4877.25	0.00220
HMGB4	4565.75	0.00182	NME8	4883.5	0.00221
TOP1	4568.5	0.00182	TBCD	4890.75	0.00221
UBE2I	4579.5	0.00183	DLGAP4	4962	0.00229
ABCG8	4616.25	0.00185	hsa-mir-3185	4990.75	0.00231
SLA2	4661.5	0.00189	ZNF350	5005.75	0.00232
TREML1	4665.5	0.00190	PRRG1	5008.25	0.00232
CHMP4B	4666.5	0.00190	MAGEA3	5032	0.00233
MAT2A	4670	0.00190	MAL	5051.75	0.00235
ZBTB41	4678.75	0.00190	KISS1R	5101.75	0.00239
CASP6	4683.5	0.00191	MGA	5164.5	0.00244
METTL2B	4721.75	0.00195	CELSR2	5180.25	0.00246
RHO	4734.5	0.00196	ERO1L	5184.75	0.00246
HOXC8	4744.25	0.00196	BCL2	5231.25	0.00250
hsa-mir-320c-1	4750	0.00197	RPH3AL	5243	0.00250
RPS16	4755	0.00197	TXNDC16	5261	0.00252
WSB2	4760.5	0.00198	SMIM8	5297	0.00256
CINP	4770.75	0.00198	hsa-mir-101-1	5315.5	0.00258
SLC16A3	4771.5	0.00198	BRPF1	5317	0.00258

MS4A14	4801.25	0.00200	ICA1L	5325.75	0.00259
C1orf194	4818.5	0.00201	PRKRIP1	5331.5	0.00260
CCDC93	4898.5	0.00207	hsa-mir-4690	5346	0.00262
OR5H6	4912.5	0.00208	ROBO4	5349.25	0.00262
STXBP4	4940	0.00210	FOCAD	5426	0.00267
CWF19L2	4942	0.00210	DSG3	5446	0.00269
PHF8	4944	0.00210	CC2D1A	5450.5	0.00270
DDHD2	4951.25	0.00211	ZNF134	5455.25	0.00271
ZNF665	4955.5	0.00212	ATP11B	5460.75	0.00272
MYRIP	4958.25	0.00212	TMEM238	5515	0.00277
ATP6VOC	4971.25	0.00213	MARCKSL1	5533.25	0.00277
MNS1	4990.5	0.00214	WNT7A	5538.25	0.00278
GATAD2A	4994.75	0.00214	ZNF98	5589.5	0.00283
C1orf111	5005.75	0.00216	HAX1	5599.25	0.00285
hsa-mir-6777	5024.75	0.00217	PRKX	5607.25	0.00285
PNMAL1	5095	0.00223	SNX14	5691.75	0.00295
OR1N2	5100	0.00224	ZNF607	5719.75	0.00298
IL12A	5131	0.00226	FAHD1	5781.5	0.00306
KRT24	5163.5	0.00228	ZNF575	5787.5	0.00306
CSF1	5193.75	0.00231	CFP	5852.75	0.00312
SMIM15	5199.25	0.00231	ARHGAP40	5876.25	0.00314
RNF135	5200.5	0.00231	TSPYL6	5884.5	0.00314
hsa-mir-142	5234.5	0.00234	INSIG2	5924	0.00317
C19orf67	5252.75	0.00235	EFNB1	5935.5	0.00318
NDNL2	5254.5	0.00235	CCSAP	5977	0.00323
PAK1IP1	5258.5	0.00235	PKP4	5998.5	0.00325
RPL7	5262.25	0.00236	CNGA1	6005.75	0.00326
GAGE10	5285.5	0.00237	RAG2	6087.75	0.00334
IDE	5287.75	0.00237	KCNJ9	6121.5	0.00337
CCDC101	5310.25	0.00240	C9orf153	6127	0.00338
TUBA3D	5315.5	0.00240	FAF2	6142	0.00339
DOK6	5356.25	0.00244	AUH	6165.5	0.00343
SPAST	5369.25	0.00245	SLFN5	6166.25	0.00343
ZNF175	5375.25	0.00245	RNF130	6192.5	0.00346
OR5M1	5415.25	0.00249	FIZ1	6204	0.00348
MYOCD	5450.5	0.00254	HSCB	6212.75	0.00349
CETN2	5521	0.00260	SLC34A3	6227.5	0.00350
NME6	5521.5	0.00260	EOGT	6228.5	0.00351
BUB1	5540.75	0.00261	LDHA	6251	0.00352

hsa-mir-3923	5555	0.00263	ZC3H12C	6257	0.00353
FASN	5593.25	0.00265	AKIRIN1	6262	0.00354
PITHD1	5595	0.00265	IWS1	6288	0.00357
RPS19	5622.25	0.00266	TRAF5	6356	0.00366
SYNGR3	5687.25	0.00272	TMEM17	6371.5	0.00367
hsa-mir-4421	5749.75	0.00278	ARFIP2	6400.5	0.00370
PPAPDC1A	5762.75	0.00280	TOMM7	6401.5	0.00370
LRMP	5770.25	0.00281	hsa-mir-3689d-2	6415.25	0.00372
ECI1	5785.75	0.00282	PLEKHF1	6504.5	0.00382
TCFL5	5790.25	0.00282	SENP5	6525	0.00384
ECHDC3	5811.75	0.00285	MANSC1	6545	0.00386
HCRTR1	5812.75	0.00285	SERTAD2	6550.75	0.00387
IST1	5838	0.00289	MEX3D	6564	0.00388
hsa-mir-6820	5860.5	0.00291	CCDC42B	6579.75	0.00389
hsa-mir-4448	5884	0.00294	FAM104A	6580	0.00389
TAF10	5896.5	0.00295	POMP	6623.75	0.00395
ATP5H	5975.75	0.00303	LPGAT1	6642	0.00397
SLC27A5	5982.25	0.00304	SLC12A1	6649.5	0.00397
TCP11X2	6038.75	0.00309	hsa-mir-6749	6670.75	0.00399
SOX10	6047.75	0.00310	TBPL2	6676.75	0.00401
SAC3D1	6055.75	0.00310	SC5D	6690.5	0.00402
TWF1	6063	0.00310	NGEF	6695.5	0.00403
DNAJC1	6099	0.00313	MED22	6701.5	0.00404
CAPN13	6116.5	0.00315	MIDN	6701.5	0.00404
AKAP1	6151.75	0.00320	MPZL1	6706.25	0.00404
CTGF	6206.5	0.00326	WDR60	6738	0.00408
SAP30BP	6221.5	0.00328	FBXL15	6757.75	0.00409
LBX1	6244.5	0.00329	VRK3	6780	0.00413
SYBU	6272.75	0.00332	ITGA10	6786.5	0.00413
LALBA	6309	0.00337	MIER1	6806	0.00416
NCAPH2	6311.75	0.00338	DBI	6812.75	0.00417
PBX1	6315.75	0.00339	COG8	6826	0.00419
HMGB1	6361	0.00344	OR13H1	6840	0.00419
hsa-mir-1249	6398	0.00350	hsa-mir-5687	6869.5	0.00424
hsa-mir-3173	6438.75	0.00353	RPL22L1	6886.5	0.00426
GIPC2	6450	0.00354	KCNIP1	6887.75	0.00426
TRIML1	6466.25	0.00357	COPA	6897.75	0.00428
YIPF6	6476.5	0.00358	ZNF549	6916.75	0.00430
C9orf3	6513	0.00361	NKX2-2	7036	0.00448

hsa-mir-215	6532.75	0.00364	WDR45B	7064.25	0.00450
ATPAF1	6537.5	0.00365	CYP4F2	7078.25	0.00453
hsa-mir-5591	6585.25	0.00371	hsa-mir-6165	7106.75	0.00456
hsa-mir-4443	6595.25	0.00372	BSC12	7107.25	0.00456
ACADSB	6607.5	0.00373	SLC25A25	7179.75	0.00464
C11orf48	6650.75	0.00379	LARP6	7231.75	0.00471
C11orf71	6699.25	0.00383	CTNND2	7241.25	0.00473
hsa-mir-583	6735.75	0.00386	CAV2	7244.5	0.00473
BAG3	6743	0.00387	PIGM	7273.75	0.00475
hsa-mir-661	6754.5	0.00388	ESD	7284.25	0.00477
TPM4	6768.75	0.00389	JAM2	7310.5	0.00479
TMPRSS11D	6801	0.00394	MECOM	7321.25	0.00481
C1orf185	6806.25	0.00394	GRIA2	7335.75	0.00482
hsa-mir-6743	6824	0.00396	FAM63B	7339.75	0.00482
C16orf70	6841	0.00400	WDR18	7346.75	0.00483
ZNF24	6843.25	0.00400	SRSF10	7362.75	0.00485
ARHGAP24	6850.25	0.00400	BIK	7364.75	0.00486
HECW1	6869.75	0.00402	CAPN12	7384.75	0.00489
SLC39A12	6894.75	0.00405	WDR44	7405.5	0.00492
OSBPL3	6949	0.00411	C11orf54	7444.5	0.00496
hsa-mir-3163	6961.75	0.00413	FARSB	7446	0.00496
PIGX	6969.25	0.00414	hsa-mir-4419a	7473	0.00501
ERCC4	6982.75	0.00416	SEMA7A	7488.75	0.00502
PITPNM1	7029.25	0.00421	ZNF416	7600.5	0.00520
MILR1	7114	0.00433	WNT6	7607.75	0.00520
AAK1	7194	0.00442	NonTargetingControlGuideForHuman_081 1	7615.75	0.00522
PRSS55	7202	0.00444	ELOVL4	7634.75	0.00525
MBP	7217	0.00446	MEIG1	7648.75	0.00527
TEX37	7221.75	0.00446	OLA1	7678.75	0.00529
LARS2	7242.75	0.00447	HSBP1L1	7695	0.00531
LYSMD4	7270.5	0.00449	ZMAT3	7709.25	0.00532
NonTargetingControlGuideForHuman_062 5	7285.25	0.00451	ATRNL1	7734.5	0.00536
BIRC6	7287.5	0.00451	FAM3B	7768.5	0.00540
hsa-mir-378d-1	7300.75	0.00453	CLEC2B	7777.75	0.00541
F10	7317.25	0.00455	CCL4L2	7781.75	0.00542
SPATA31A6	7334	0.00457	SFTA3	7789.5	0.00544
FXD2	7335	0.00457	ANXA1	7845	0.00550
hsa-mir-744	7353.25	0.00460	PLK5	7871	0.00553
EGR2	7373.25	0.00462	ARPP19	7877.75	0.00554

FRS2	7430.25	0.00470	ZNF556	7888.25	0.00555
ZNF556	7474	0.00476	CHMP2B	7932.5	0.00561
CLMN	7507	0.00481	ARHGAP20	7952.5	0.00564
KLHL36	7512	0.00482	KBTBD13	8036	0.00577
OR2F2	7551.25	0.00489	CREB3L2	8058.5	0.00581
NAA25	7614	0.00498	ZNF654	8067	0.00582
GRK7	7624.5	0.00500	SPACA1	8085	0.00584
DOCK1	7626.5	0.00500	CXXC1	8101.75	0.00587
USP37	7635.75	0.00500	ZNF322	8121.5	0.00590
ZNF329	7637.5	0.00501	SKA3	8184.5	0.00599
LDHB	7638.25	0.00501	FSD1	8239.75	0.00605
ARL4A	7680.75	0.00506	TSG101	8264.5	0.00608
DVL2	7756.75	0.00516	hsa-mir-346	8269.25	0.00608
HMX1	7762.75	0.00517	SLC44A5	8294	0.00613
RNF186	7781.25	0.00520	SERHL2	8295	0.00613
hsa-mir-6845	7802.75	0.00523	DUS3L	8301.75	0.00613
NPPB	7803.75	0.00524	HOXA11	8362.5	0.00621
NonTargetingControlGuideForHuman_0582	7827.25	0.00526	PCMT1	8368.75	0.00622
ADAM33	7846.25	0.00528	PTER	8397.5	0.00626
SETD9	7857.25	0.00529	XRCC2	8462.25	0.00639
YPEL1	7864.25	0.00531	MOSPD2	8493.25	0.00642
COPS8	7924.75	0.00538	SI	8494.75	0.00642
DYDC2	7957	0.00540	WIZ	8511.5	0.00644
RNF13	8064.5	0.00556	CISD3	8549.75	0.00649
SLC25A25	8076.25	0.00558	DEFB125	8567.5	0.00651
OTUD6A	8087	0.00560	TMEM185B	8571.5	0.00651
ITGAV	8093	0.00560	SLC23A3	8603.25	0.00655
CNTFR	8126	0.00564	TDG	8653	0.00661
SNRPD2	8135	0.00566	TSGA13	8655	0.00661
NPS	8148.5	0.00568	NDUFA3	8679.25	0.00664
LAMTOR1	8189.5	0.00575	PRCP	8751.25	0.00675
CD200R1L	8203.5	0.00576	ZDHHC16	8774	0.00679
XPO4	8223.5	0.00578	AKTIP	8792.75	0.00681
AXIN1	8229.75	0.00580	SLC30A3	8840.25	0.00690
PLA2G7	8273.75	0.00586	FSIP2	8859	0.00692
RPP40	8311.5	0.00592	SP6	8909.5	0.00700
KRTAP5-7	8392.25	0.00604	SRSF3	8910.25	0.00700
CD160	8425.5	0.00608	CDC37	8921.75	0.00701
SRPX2	8480	0.00616	HGD	8922	0.00701

ZNF586	8492	0.00617	SLC7A6OS	8946	0.00706
HTATIP2	8501	0.00620	WFDC12	9044.75	0.00721
SLC25A38	8548.25	0.00627	GPRC5B	9050.75	0.00722
CCDC66	8565.25	0.00630	ECM2	9091.75	0.00729
TSR2	8594.25	0.00633	IL1R2	9118.75	0.00733
ASGR1	8604.25	0.00634	FEN1	9131.25	0.00733
MDN1	8667.25	0.00644	BAG5	9217	0.00745
POLR3C	8685	0.00644	MSANTD1	9222.5	0.00745
GPHB5	8697.25	0.00646	GTF2H1	9223.25	0.00745
TSPYL2	8714	0.00647	hsa-mir-4292	9233.75	0.00747
PPA2	8740	0.00651	RWDD2B	9247.5	0.00750
NonTargetingControlGuideForHuman_0258	8741.5	0.00651	SLC25A28	9271.75	0.00754
RNF5	8759.75	0.00654	MAPK13	9278.25	0.00755
OR10J5	8809.5	0.00663	hsa-mir-2861	9335.75	0.00764
hsa-mir-4697	8810.25	0.00663	APAF1	9339.75	0.00765
TRAPPC2L	8843.5	0.00670	OR2A14	9339.75	0.00765
SPATS2	8851.5	0.00670	BOD1	9341	0.00765
EPRS	8874.75	0.00672	GLI1	9401	0.00774
CTSK	8886.5	0.00674	KRTAP5-3	9401.5	0.00774
ISCU	8926.25	0.00680	FKBPL	9403.5	0.00775
SLC30A6	8941.25	0.00681	TMEM57	9428.25	0.00778
SEMA3E	8986.5	0.00688	NPAT	9437.5	0.00780
GUCY1A3	9024.75	0.00695	NEK8	9494.25	0.00789
NonTargetingControlGuideForHuman_0042	9069.5	0.00703	TROAP	9505.75	0.00791
hsa-mir-4755	9184.25	0.00722	RPS16	9529.5	0.00794
OR52H1	9206	0.00727	NUDT8	9556	0.00799
FAM206A	9206.5	0.00727	CD300LD	9559	0.00799
APCDD1	9233.25	0.00732	C10orf99	9561.5	0.00800
hsa-mir-3915	9233.5	0.00732	TXLNB	9576	0.00803
DNAJB5	9313.75	0.00744	TUBB4B	9588.25	0.00805
HENMT1	9345.75	0.00749	CRYBA4	9646.75	0.00816
NUDC	9406.5	0.00759	GIMAP2	9703	0.00824
CHMP6	9427.25	0.00762	OR10J3	9765.5	0.00834
MTMR6	9429	0.00763	CLDN2	9773.25	0.00835
TACC1	9499.75	0.00772	SEBOX	9781	0.00837
KARS	9516	0.00774	MTRNR2L2	9809.25	0.00843
FTSJD1	9522.25	0.00775	C1orf86	9861.5	0.00853
MEGF10	9523	0.00775	RNF180	9883.25	0.00856
IGLON5	9556.5	0.00781	KIAA1429	9886.25	0.00856

ATP6V0A1	9624.25	0.00790	NUP85	9913.5	0.00860
hsa-mir-5586	9640.75	0.00794	hsa-mir-1285-2	9915.75	0.00860
MTRR	9743.5	0.00810	USP25	9940.5	0.00865
PLEKHM3	9757.75	0.00811	CCDC88A	9941.5	0.00865
TAS2R40	9764.25	0.00813	TBCA	9942.25	0.00865
CDK12	9773.25	0.00815	DNAJB6	10016	0.00881
PPME1	9839	0.00828	CUL3	10043.7 5	0.00886
GATAD2B	9852.75	0.00830	ACTR10	10070.2 5	0.00889
OTUD7B	9864.25	0.00832	NonTargetingControlGuideForHuman_049 1	10094	0.00893
PPARD	9867.25	0.00832	MTIF3	10096.7 5	0.00893
EFCAB6	9869	0.00832	HDHD2	10115.7 5	0.00895
TMEM127	9875.25	0.00834	LMAN1	10121	0.00896
ANAPC16	9888.25	0.00836	CHUK	10188	0.00908
KRTAP9-9	9935.5	0.00847	DDO	10205	0.00912
PSMG1	9940.5	0.00848	ZNF726	10229	0.00917
ARRDC1	9993.75	0.00858	SERPINB13	10256	0.00922
hsa-mir-381	10037.7 5	0.00866	MYH14	10355.5	0.00941
hsa-mir-501	10044.2 5	0.00867	ZHX2	10360.7 5	0.00942
KDM2A	10099.2 5	0.00875	MROH9	10371.5	0.00943
RPL37	10103.5	0.00876	ZNF639	10392.2 5	0.00949
STOX1	10109.7 5	0.00877	NR5A2	10413.7 5	0.00952
PLAU	10121.5	0.00879	FEZF1	10422.5	0.00954
GADD45G	10137.5	0.00883	BTG4	10429	0.00956
SYF2	10152.7 5	0.00886	FN1	10461.2 5	0.00961
TAS2R4	10236.2 5	0.00899	CKMT2	10488	0.00966
XPO6	10241.2 5	0.00899	PARN	10541.7 5	0.00977
HOXB4	10264.7 5	0.00904	VDAC3	10548.2 5	0.00978
CCNT1	10327	0.00916	ZNF595	10582	0.00984
ITGA3	10410.2 5	0.00930	hsa-mir-150	10594.2 5	0.00985
ZNF689	10438	0.00934	WDR37	10596.2 5	0.00986
COL4A3BP	10498.5	0.00945	RBP5	10711.7 5	0.01004
ARGLU1	10498.7 5	0.00945	CKLF	10734.5	0.01010
NPM3	10539	0.00952	DHFR	10814.2 5	0.01025
PAH	10543.7 5	0.00952	HERC2	10886.7 5	0.01037
hsa-mir-4436b-2	10566	0.00956	TMEM216	10903	0.01040
QSOX1	10572.7 5	0.00958	CHERP	10936.7 5	0.01046
CCDC127	10607.2 5	0.00965	DPM1	10940	0.01047

SPATA3	10630.7 5	0.00969	PKDREJ	10948	0.01049
F11R	10657.5	0.00974	EN2	10958.5	0.01050
MUC15	10696.2 5	0.00981	ZNF776	10960	0.01051
hsa-mir-6884	10701.2 5	0.00982	SPRY1	10971	0.01053
DDRKG1	10718.2 5	0.00985	KCTD14	11012.5	0.01061
ST8SIA3	10731	0.00988	BCL3	11056	0.01068
AR	10738	0.00988	TNFSF12-TNFSF13	11104.7 5	0.01077
VPS37A	10811	0.01003	YIPF4	11110.2 5	0.01078
CFH	10813.2 5	0.01003	ZNF431	11112.7 5	0.01078
ZRANB2	10842.2 5	0.01008	NIP7	11210.5	0.01093
VSTM1	10858.2 5	0.01011	C3orf36	11239.7 5	0.01098
PSG3	10873.5	0.01013	KRT13	11240.2 5	0.01098
BEST3	10896.2 5	0.01017	NUDT13	11241.2 5	0.01098
BANK1	10912.7 5	0.01020	KIAA1211L	11259.5	0.01102
TAL1	10915.7 5	0.01021	KCNT2	11269.2 5	0.01103
PET117	10943.5	0.01026	FEV	11296.5	0.01109
COMMD7	10988	0.01034	TIMP1	11324.7 5	0.01115
PVR	11021	0.01039	DGKE	11376.7 5	0.01123
LOC284385	11040.2 5	0.01042	CHRNA3	11430.5	0.01134
hsa-mir-6127	11047.2 5	0.01044	ACSM4	11439.5	0.01136
ATP6AP1	11097.7 5	0.01053	POLR1A	11486.7 5	0.01145
RPL30	11114.7 5	0.01058	C1orf172	11486.7 5	0.01145
GRIA2	11127.2 5	0.01060	CLCC1	11501.7 5	0.01149
SGCB	11152.2 5	0.01065	IQCF3	11507.7 5	0.01150
TMTC1	11199.5	0.01075	MBOAT4	11512.7 5	0.01151
SKA2	11218.2 5	0.01078	ATF5	11518.7 5	0.01152
RPLP2	11239.7 5	0.01083	FSTL4	11552.2 5	0.01158
BCAS1	11293.2 5	0.01094	TMX4	11624.5	0.01173
ACSM2A	11302.5	0.01096	ANKS4B	11731.2 5	0.01194
CENPF	11306.5	0.01097	TRIM52	11736.5	0.01194
ESD	11331.7 5	0.01103	GABRQ	11738.7 5	0.01194
THRAP3	11344	0.01105	HRH4	11755.5	0.01197
GARNL3	11375	0.01111	LOC100506422	11784	0.01203
EAF2	11511.7 5	0.01136	LMOD3	11801.5	0.01208
NDUFA8	11542.2 5	0.01141	COG3	11887.2 5	0.01225
CD180	11546.7 5	0.01141	PPP2R5D	11930	0.01233
KBTBD3	11560.5	0.01145	SAE1	11937.5	0.01234

CLCN7	11566.5	0.01146	CLDN10	11939.5	0.01235
PAX8	11585.7 5	0.01150	SF3B4	11948.7 5	0.01238
SLC16A9	11590	0.01152	CFHR5	11960.2 5	0.01241
hsa-mir-6863	11603.7 5	0.01155	NGB	12013.5	0.01251
UBE2V1	11612.2 5	0.01156	TK2	12047.2 5	0.01258
CRYBB3	11619.2 5	0.01157	TMEM69	12099.2 5	0.01271
DZIP1	11676.2 5	0.01168	PDE1B	12113.5	0.01273
NXPE3	11694.5	0.01171	STRN4	12242.7 5	0.01302
MINA	11719	0.01177	ADARB2	12270.2 5	0.01309
GDF10	11774.2 5	0.01191	KRTAP9-4	12343.7 5	0.01326
SPATA31A4	11804	0.01195	HDGF	12365.7 5	0.01332
DDX24	11812.5	0.01197	RAB11FIP1	12380.5	0.01335
TMEM251	11831	0.01201	NR2F6	12403	0.01341
hsa-mir-653	11900.7 5	0.01219	SCGB1D1	12410	0.01342
HKDC1	11949.2 5	0.01229	LOC158434	12432	0.01345
PPP2CA	11952.2 5	0.01229	CHST1	12441	0.01346
ATP1B4	11966.5	0.01233	GDF11	12442.7 5	0.01346
NEXN	11981.5	0.01237	HHLA3	12467.2 5	0.01351
CA7	12013.7 5	0.01242	SRP54	12468.2 5	0.01352
AAMP	12038.5	0.01248	CWC25	12570.7 5	0.01370
C12orf71	12204.7 5	0.01281	COX6C	12604.5	0.01377
CDC23	12222.2 5	0.01285	ARHGAP19	12607.2 5	0.01379
CTSO	12283.5	0.01300	HSD11B2	12617.7 5	0.01381
HGD	12288.2 5	0.01301	AFMID	12631.7 5	0.01383
hsa-mir-6516	12308.5	0.01306	ACTR1A	12672.2 5	0.01390
FITM1	12312.2 5	0.01307	IQCH	12701.2 5	0.01396
CRISP1	12326	0.01309	CSNK1G1	12743.7 5	0.01403
GCSAML	12333.2 5	0.01311	SLC12A2	12843.5	0.01429
PDDC1	12344.7 5	0.01312	DUT	12849.2 5	0.01431
VSIG8	12354.5	0.01314	hsa-mir-4780	12850.2 5	0.01431
GLTSCR1	12370.7 5	0.01317	hsa-mir-3907	12905.5	0.01446
DLG1	12372.2 5	0.01317	KPNA3	12907.7 5	0.01446
CCL24	12380.5	0.01319	TBX20	12916.7 5	0.01449
REN	12400.5	0.01322	CFH	12922.2 5	0.01450
hsa-mir-548a-1	12470.7 5	0.01337	CDK3	12949.7 5	0.01456
hsa-mir-4297	12478	0.01339	COL10A1	12974.2 5	0.01463

ADCY2	12520.25	0.01350	TMEM27	12997.25	0.01470
HRASLS2	12522.75	0.01350	OCIAD1	13001.25	0.01471
hsa-mir-3908	12532.5	0.01353	SERTAD1	13012.75	0.01473
MANSC1	12550.25	0.01355	INTS7	13023	0.01476
PDF	12551.5	0.01356	TOP3A	13109.75	0.01496
POM121C	12560.75	0.01359	KRT28	13123	0.01499
BTBD17	12584.5	0.01363	TMEM72	13151.25	0.01506
NUDT11	12616.25	0.01373	ANXA6	13218.75	0.01522
IL13RA1	12640.75	0.01377	UNC45B	13242	0.01527
CCDC74A	12680.5	0.01385	HLA-DRB1	13259.25	0.01531
GPATCH1	12723.5	0.01395	MSL1	13319.5	0.01547
PSMD6	12753.25	0.01405	ACTA2	13322.25	0.01548
MYOC	12758.75	0.01406	ANO7	13326.25	0.01549
MOB1A	12793.75	0.01413	CXCL10	13376.25	0.01560
PCDHGB3	12818.75	0.01419	TNFRSF9	13417.75	0.01571
ATP8A1	12842	0.01426	FIBIN	13423.5	0.01573
hsa-mir-600	12843.75	0.01426	CHIA	13435	0.01576
SCAF11	12852.25	0.01428	CRADD	13440.5	0.01578
ZFP90	12874.5	0.01433	KRT33A	13442.75	0.01578
MRPL35	12881.75	0.01435	DKC1	13462.5	0.01581
hsa-mir-4499	12931.5	0.01446	NonTargetingControlGuideForHuman_0147	13495.5	0.01588
ABCA8	12939.5	0.01449	CDHR5	13510.5	0.01592
SOX14	12949.25	0.01451	KCNAB2	13528.75	0.01598
FBXL15	12965.75	0.01456	HSF2	13539.25	0.01600
IFI27L2	13067	0.01480	CBX4	13586.5	0.01612
SRFBP1	13082.75	0.01484	hsa-mir-378c	13593.75	0.01614
FAM76B	13099.75	0.01487	KRTAP9-9	13602.75	0.01616
TMIE	13137	0.01496	DMRTB1	13615.75	0.01620
FKBP4	13192.75	0.01509	GK5	13643	0.01626
CSRP2BP	13199.5	0.01511	ODF2L	13668.75	0.01630
TNRC6C	13202	0.01512	EIF3B	13674.75	0.01631
RPL24	13319	0.01539	hsa-mir-23a	13677	0.01631
VASP	13340.75	0.01542	SNPH	13679.25	0.01632
RAI2	13345.25	0.01543	hsa-mir-8076	13692.75	0.01634
ARSD	13357.75	0.01546	HARS2	13694.25	0.01634
RPS8	13362.5	0.01547	POLI	13742.5	0.01645
hsa-mir-548s	13389.5	0.01553	C7orf73	13753	0.01646

PINLYP	13390.7 5	0.01553	YLPM1	13862.2 5	0.01673
FTMT	13394.2 5	0.01554	FGF23	13876.7 5	0.01676
KIAA1211L	13443.2 5	0.01564	TAS2R46	13877	0.01676
ATG4A	13488	0.01573	MFN2	13923.7 5	0.01689
SDAD1	13511.2 5	0.01579	TOX2	13955	0.01697
FAM131A	13607.7 5	0.01599	PJA2	13958.7 5	0.01698
COPS6	13624	0.01601	SART3	13976.2 5	0.01701
hsa-mir-1277	13646.5	0.01607	SOX21	13981.2 5	0.01703
LOC100996485	13674.5	0.01611	TCEB1	13992.7 5	0.01704
PPP2R5D	13705	0.01619	hsa-mir-4686	14031.7 5	0.01714
PSMB3	13829.2 5	0.01648	CCDC92	14062.2 5	0.01721
SNX1	13864.2 5	0.01655	TRIM27	14086.7 5	0.01727
TXNL4A	13873	0.01657	FTSJ1	14107.7 5	0.01732
ROPN1	13901.7 5	0.01665	OSBPL8	14135.7 5	0.01741
C14orf119	13958.2 5	0.01679	OR52I1	14144	0.01743
C15orf61	13996.7 5	0.01689	NUDC	14149.5	0.01745
ADAMT5	14040.2 5	0.01699	DKK1	14185	0.01754
HIBADH	14051.5	0.01701	BLNK	14220.7 5	0.01763
SLITRK2	14061.5	0.01704	CCDC71L	14252.2 5	0.01771
CLDN5	14076.5	0.01707	FAM46C	14256.7 5	0.01772
C17orf97	14161.7 5	0.01726	TMC05A	14263.2 5	0.01774
DNAJB3	14172.7 5	0.01728	RPS6KA2	14264.5	0.01774
AMER3	14246.2 5	0.01745	SLC26A1	14321.5	0.01789
PRPF4B	14255.5	0.01748	MYBL2	14353.5	0.01795
AK5	14265.5	0.01750	C7orf61	14423.5	0.01812
IDS	14287.5	0.01756	RPS2	14424	0.01812
MAOB	14307.2 5	0.01761	HPS3	14496.5	0.01832
ALKBH5	14326.5	0.01764	CYP17A1	14505.7 5	0.01834
STAT1	14345.7 5	0.01769	XAGE2	14605.2 5	0.01856
hsa-mir-6727	14362.2 5	0.01773	hsa-mir-198	14621	0.01859
IPMK	14366.5	0.01775	OR2T5	14634.2 5	0.01864
YBX3	14375.7 5	0.01777	RBM20	14647.5	0.01869
PLCL1	14419	0.01790	GULP1	14681.2 5	0.01876
hsa-mir-4280	14443	0.01796	SETX	14708.2 5	0.01881
CSNK2B	14446.5	0.01797	hsa-mir-18b	14708.7 5	0.01881
DHDH	14462	0.01799	CLGN	14768	0.01896
ATP10B	14467.7 5	0.01800	TBK1	14789.5	0.01901

MTX1	14483.2 5	0.01804	CACTIN	14830.2 5	0.01910
BPIFA2	14518.5	0.01812	ZNF280C	14876.2 5	0.01922
hsa-mir-8086	14546	0.01820	PRDX1	14937.5	0.01941
TEAD2	14561.2 5	0.01824	ARHGEF5	14966.7 5	0.01949
NKX2-1	14584.5	0.01831	TMC1	15052.5	0.01974
GPR110	14605.5	0.01837	POLM	15073.2 5	0.01979
GCGR	14606	0.01837	SH3BP1	15080.5	0.01981
hsa-mir-580	14618.5	0.01841	PHF20	15129	0.01994
CSTF2	14660.5	0.01850	DPM2	15139.7 5	0.01997
ADD3	14682.7 5	0.01857	SCGB1D2	15154	0.02000
OTUD4	14688.5	0.01858	FXN	15175.7 5	0.02007
ZNF365	14719	0.01869	WDR92	15196	0.02013
LPGAT1	14738	0.01872	KIAA0825	15242.5	0.02026
FOLR3	14776.5	0.01883	CD300A	15347.5	0.02050
CNKSR3	14785.5	0.01885	GBX1	15399	0.02063
AKT1S1	14846	0.01901	hsa-mir-621	15408.2 5	0.02065
GUCA2A	14859.2 5	0.01904	NCF2	15464.2 5	0.02078
CD5L	14946	0.01927	CDH11	15609	0.02118
DOCK5	14948.7 5	0.01928	TMEM52	15644.5	0.02130
NTF3	14982.2 5	0.01939	DPH2	15651.5	0.02131
NUDCD2	14989.5	0.01940	DIRAS2	15651.5	0.02131
ZNF202	15075	0.01965	THAP1	15660.2 5	0.02133
C9orf153	15078.2 5	0.01966	POLR2E	15702.7 5	0.02144
MCSR	15136.5	0.01980	C16orf97	15702.7 5	0.02144
OR10A3	15232	0.02006	SMCHD1	15704.7 5	0.02144
MRPL1	15247.7 5	0.02009	SLC4A8	15764.2 5	0.02160
CLEC4E	15261	0.02012	STX17	15817.7 5	0.02176
ATF3	15262	0.02013	HEATR5B	15858.7 5	0.02188
hsa-mir-5096	15378.2 5	0.02047	RPS23	15859	0.02188
MAB21L1	15415.7 5	0.02058	PTN	15879.7 5	0.02194
EPS8	15417.2 5	0.02058	NDUF6F6	15907	0.02201
CHSY1	15429.2 5	0.02061	MYLK4	15914.5	0.02203
CATSPERG	15454.5	0.02068	CDC42EP3	15944.2 5	0.02211
PYROXD2	15457	0.02069	TFCP2L1	15975.7 5	0.02220
MYADML2	15459	0.02069	NDUFC1	16023	0.02234
hsa-mir-6129	15514.5	0.02084	MEMO1	16064.5	0.02249
USP7	15520.7 5	0.02086	RBM48	16072	0.02250

OTC	15526.5	0.02088	BCCIP	16093.5	0.02255
NOC2L	15607.5	0.02111	EXOSC8	16110.7 5	0.02260
C17orf80	15619	0.02114	NonTargetingControlGuideForHuman_071 7	16135	0.02266
TIMM21	15672.2 5	0.02130	OR8U1	16144.7 5	0.02268
IFNA8	15761.7 5	0.02158	EAF1	16212.7 5	0.02292
ALDH3B1	15820	0.02174	MOBP	16275.2 5	0.02307
OR7A10	15863.5	0.02187	GABRE	16283.2 5	0.02310
NT5E	15869.7 5	0.02188	TPM2	16300	0.02315
CNOT3	15913.7 5	0.02198	THRAP3	16373	0.02336
SIX5	15920.2 5	0.02200	TMF1	16388	0.02338
CALCR	15927	0.02201	MDH1	16480.2 5	0.02367
NAALAD2	15936	0.02204	FLYWCH1	16509.2 5	0.02374
ZNF430	16020.5	0.02226	KCNJ4	16571.5	0.02389
hsa-mir-626	16027.7 5	0.02229	TMPRSS11D	16625	0.02402
ZNF225	16055	0.02235	CCL18	16635.5	0.02407
CELA3A	16067.7 5	0.02239	DEDD2	16747	0.02436
C11orf35	16087.2 5	0.02243	PDK1	16774.2 5	0.02444
PRKAR1A	16119.5	0.02251	ZNF704	16806	0.02454
POLR2K	16126	0.02253	PIK3R6	16860.7 5	0.02470
ULK4	16134.2 5	0.02255	hsa-mir-633	16869	0.02472
C5orf47	16135.7 5	0.02255	ENDOD1	16873.2 5	0.02473
ZFP36	16140.7 5	0.02257	hsa-mir-4766	16890	0.02478
PROKR1	16151.7 5	0.02259	PXK	16920	0.02488
EMCN	16162	0.02261	FAM178A	16954.5	0.02500
MTRNR2L5	16171.7 5	0.02266	ABCC4	16970	0.02506
NFX1	16191.5	0.02272	NADK	16982	0.02509
OR10J1	16223.5	0.02280	CPEB3	16983	0.02509
CAPNS2	16326.5	0.02313	MAGEH1	16986.2 5	0.02510
EPHA6	16337	0.02316	ALG10B	16987.2 5	0.02510
OAF	16383.2 5	0.02330	ANAPC4	16996.2 5	0.02512
GSTM1	16389	0.02332	CTDSPL	17011.5	0.02516
ENDOD1	16411.2 5	0.02339	TNFSF12	17054.2 5	0.02528
hsa-mir-125a	16411.5	0.02339	NFIC	17123.7 5	0.02552
MTF1	16411.5	0.02339	OR6K2	17138.2 5	0.02556
SIAH2	16489.5	0.02362	GP6	17169.5	0.02565
MEST	16584	0.02392	FAM9A	17236.7 5	0.02583
KIAA0319L	16588	0.02394	hsa-mir-330	17253.2 5	0.02586

TSPAN5	16612.5	0.02401	UBE2D2	17286	0.02591
LGALS8	16630.7 5	0.02408	TMEM74	17297	0.02595
OR6C3	16657.2 5	0.02416	BTF3	17416.7 5	0.02635
hsa-mir-2467	16672.5	0.02421	TUBA1B	17455.2 5	0.02647
MTSS1L	16705.5	0.02432	TYK2	17483	0.02656
LRRCS9	16755.5	0.02446	CLEC1A	17505.2 5	0.02662
FGF22	16907.5	0.02492	ZNF730	17539.7 5	0.02674
APOBEC3B	16950.2 5	0.02503	SLC5A2	17554	0.02677
EMR1	16951.2 5	0.02504	ENHO	17563.2 5	0.02680
ZSCAN25	16972.2 5	0.02509	HIST1H2BH	17598.2 5	0.02690
ZNF514	17025	0.02524	SCEL	17622.5	0.02696
MUCL1	17105	0.02549	HOXB8	17684.7 5	0.02717
RIMKLB	17145.2 5	0.02560	FGD3	17706.2 5	0.02723
FAM229B	17199.7 5	0.02576	WDR45	17709.2 5	0.02724
OR10H5	17238	0.02587	PSD3	17777.7 5	0.02745
OR4C45	17264.7 5	0.02597	BRD4	17785.5	0.02748
AK7	17264.7 5	0.02597	POU5F2	17859.5	0.02770
PLEKHG7	17268.7 5	0.02598	KRTAP4-6	17865.5	0.02771
DHCR7	17332	0.02617	SERPINB2	17961.7 5	0.02801
GNB2L1	17379	0.02631	KCTD11	18012.2 5	0.02812
ENO4	17440.5	0.02652	SGCE	18043.7 5	0.02823
hsa-mir-125b-1	17483.2 5	0.02665	ERH	18045.2 5	0.02823
IMPDH1	17502.7 5	0.02673	CAPN13	18051.2 5	0.02825
LIG4	17640.5	0.02715	KIF9	18121	0.02849
LIN54	17658.5	0.02721	PRPSAP1	18150.5	0.02858
hsa-mir-4512	17665.7 5	0.02724	POLG2	18196	0.02872
hsa-mir-1302-7	17676.2 5	0.02727	APCDD1L	18244.2 5	0.02886
hsa-mir-3196	17770.5	0.02758	HLA-DQA1	18259.5	0.02890
ASB4	17774.7 5	0.02760	NUB1	18331	0.02912
GIN52	17783	0.02763	CCDC80	18355.7 5	0.02921
GNAQ	17800.5	0.02768	NEK10	18376.2 5	0.02926
DIO3	17817	0.02774	TRA2B	18379	0.02927
SPATA7	17823.2 5	0.02777	PHC1	18394.2 5	0.02932
COX20	17886.2 5	0.02797	DOCK7	18405	0.02936
SOX5	17887	0.02797	RBBP8	18432.5	0.02945
SIGLEC7	17916.5	0.02804	LRSAM1	18492.2 5	0.02965
C5orf52	17928.7 5	0.02807	GRINA	18542.2 5	0.02983

ZCCHC14	17993.2 5	0.02831	hsa-mir-3193	18569.2 5	0.02994
KIAA0922	18008	0.02836	PACS1	18585.5	0.02999
FOXF2	18030.7 5	0.02845	SMC3	18675.7 5	0.03028
hsa-mir-6885	18124.7 5	0.02870	HIST1H2AE	18720.5	0.03040
FAM110A	18172.2 5	0.02887	WDR62	18791.2 5	0.03062
SF3A2	18176	0.02888	PLEKHM2	18857.5	0.03083
HMBOX1	18239.2 5	0.02906	TMBIM1	18952.2 5	0.03114
SIT1	18252.5	0.02908	PTBP2	19014.2 5	0.03134
OR2T8	18254.5	0.02909	GRSF1	19014.5	0.03134
CDH1	18260.5	0.02911	HDGFRP2	19122.7 5	0.03166
NonTargetingControlGuideForHuman_0820	18324.7 5	0.02934	CEP135	19151.5	0.03172
HERC1	18343	0.02940	ACVR2B	19232.2 5	0.03196
NEK8	18368.7 5	0.02951	MSANTD4	19251.2 5	0.03200
BIK	18453.7 5	0.02979	C9orf89	19442	0.03267
MIB2	18473	0.02984	HAUS7	19495	0.03282
C16orf55	18492	0.02989	SUPT20HL1	19504.7 5	0.03285
LTBP2	18513.2 5	0.02997	PDLIM1	19514.7 5	0.03289
GOLGA7	18533	0.03001	GCM1	19565	0.03306
MRPS18B	18550.5	0.03006	hsa-mir-3124	19678	0.03346
KDM5C	18559.2 5	0.03008	P2RX3	19680.7 5	0.03347
OTX1	18579	0.03015	hsa-mir-4682	19721	0.03361
SLX4	18596	0.03020	NARS2	19723.7 5	0.03362
GBP5	18634.5	0.03033	hsa-mir-4475	19727	0.03363
TM4SF1	18657.5	0.03041	OR2AE1	19768.5	0.03377
EIF4E1B	18690	0.03052	KRTAP12-3	19770.2 5	0.03377
C1orf173	18761	0.03072	PPIF	19796.5	0.03387
DYNC1LI2	18814.5	0.03088	POLR2J	19894.2 5	0.03417
CCDC61	18874.2 5	0.03109	NDUFA4	19926.7 5	0.03430
REPS1	18925.5	0.03126	HOXD11	19977.7 5	0.03449
KCTD12	18979.5	0.03142	SLC4A7	20002.7 5	0.03459
PRR25	18989.7 5	0.03144	CCL25	20147.2 5	0.03509
COX17	19076	0.03169	RNF182	20202.5	0.03525
PUSL1	19102	0.03178	SRA1	20222.7 5	0.03533
GDPD4	19158	0.03196	HDAC9	20236.2 5	0.03539
ZNF28	19232.5	0.03220	RECK	20267.7 5	0.03551
METRNL	19246.2 5	0.03224	FAM177B	20328.2 5	0.03573
EIF3J	19249.5	0.03225	GNAZ	20342.7 5	0.03576

SERTAD4	19254.2 5	0.03227	TWF1	20350.7 5	0.03579
HECTD1	19263.2 5	0.03230	FGGY	20362.5	0.03584
NAIF1	19311.7 5	0.03244	SPRED3	20380.5	0.03591
HIF1A	19339	0.03253	CCL8	20406.7 5	0.03602
TMEM209	19381.7 5	0.03270	FUT8	20443.7 5	0.03615
hsa-mir-346	19488.5	0.03305	KCNIP4	20541.7 5	0.03648
FZD5	19557	0.03327	NonTargetingControlGuideForHuman_041 8	20587.5	0.03662
ST7L	19604.2 5	0.03344	DSG4	20725.7 5	0.03711
XAB2	19630	0.03352	CDKN2C	20728.2 5	0.03712
PER2	19666	0.03367	hsa-mir-4660	20798	0.03734
PCDHGB4	19702.5	0.03378	FAM161B	20806.7 5	0.03739
RORB	19748	0.03395	hsa-mir-125b-1	20810.5	0.03739
ATRNL1	19786	0.03404	BET1	20890.5	0.03772
SLBP	19829.5	0.03420	MTRNR2L7	20933	0.03789
SATL1	19861.7 5	0.03431	C14orf28	20986.5	0.03809
MEF2D	19875	0.03434	BEND4	21000.5	0.03814
TOR1AIP1	19881.5	0.03437	UVRAG	21002	0.03815
CYB561A3	19982	0.03468	DDX4	21021	0.03823
hsa-mir-4283-2	19988.2 5	0.03470	KRT77	21208.7 5	0.03891
CCDC91	20079.2 5	0.03504	P2RY10	21225.2 5	0.03897
PKN2	20123.2 5	0.03520	MYRIP	21240.2 5	0.03905
hsa-mir-5688	20253.2 5	0.03571	MYH1	21271.5	0.03915
NOL7	20271.7 5	0.03578	C2CD4B	21283.7 5	0.03919
ZKSCAN5	20279.5	0.03582	TIMM10B	21328.5	0.03938
CCDC28A	20341	0.03601	TSPAN2	21371	0.03951
TNRC18	20415	0.03625	SMC6	21491.5	0.03999
AMOTL2	20457	0.03636	FAM129B	21511.5	0.04006
SNRNP35	20503	0.03652	SCUBE1	21604.2 5	0.04044
RAP1GDS1	20511.2 5	0.03656	RABEP1	21611.2 5	0.04046
hsa-mir-939	20548.2 5	0.03668	hsa-mir-3195	21620.7 5	0.04048
CYTH1	20569.7 5	0.03680	hsa-mir-606	21747.7 5	0.04099
AHSG	20594	0.03688	TAB3	21780.2 5	0.04113
CHCHD10	20673.5	0.03713	MATN3	21805.2 5	0.04119
CBLL1	20749.2 5	0.03738	C19orf59	21854.5	0.04137
KRTAP19-7	20780	0.03748	CAPN3	21887.5	0.04150
PRSS16	20823.2 5	0.03765	SEC61A1	21890	0.04152
GOLGA7B	20832.2 5	0.03768	MGST3	21900	0.04155

FAM32A	20853.2 5	0.03777	GCNT2	21951	0.04172
ARSD	20950.7 5	0.03813	STXBP1	22009.5	0.04193
hsa-mir-1299	20984.2 5	0.03827	CRIM1	22037	0.04204
PGM3	21001.2 5	0.03835	NonTargetingControlGuideForHuman_0820	22058.7 5	0.04213
APOBEC1	21027.7 5	0.03844	FYB	22138.2 5	0.04243
SFR1	21044.7 5	0.03853	TMEM130	22140	0.04244
ENO4	21216.2 5	0.03922	VPS28	22170.2 5	0.04258
SLC6A18	21248.2 5	0.03934	ANKFY1	22229.5	0.04281
CXADR	21280.5	0.03945	LARGE	22260.5	0.04294
ZFYVE28	21305	0.03953	EPB41L1	22260.7 5	0.04294
DNAJC16	21322.5	0.03959	UBP1	22327	0.04320
SPDYA	21374.2 5	0.03981	ZCCHC2	22348.2 5	0.04327
hsa-mir-4435-1	21389	0.03986	IER2	22350.5	0.04328
ARL2BP	21435.7 5	0.04007	SRPK2	22466	0.04369
HLC5	21550.5	0.04049	OR11A1	22511.5	0.04389
CCDC62	21574.5	0.04058	SLC39A7	22531	0.04398
RAD21	21602	0.04069	MORF4L2	22544	0.04402
hsa-mir-30d	21621.5	0.04077	FBLN5	22597.7 5	0.04425
CASKIN2	21659	0.04089	ZDHHC2	22612.7 5	0.04430
EMID1	21703.7 5	0.04106	BTF3L4	22643.2 5	0.04443
TWIST2	21747	0.04123	CSNK1A1L	22782.5	0.04491
SMC5	21985.5	0.04216	POLE2	22843.5	0.04517
ECM1	21987.7 5	0.04217	IMPACT	22942.5	0.04553
APPL1	21996.2 5	0.04220	CXorf61	23000.2 5	0.04577
COL11A1	22032.7 5	0.04234	LRRFIP1	23009.2 5	0.04581
MRPS24	22057.7 5	0.04244	AAED1	23017.2 5	0.04584
THEMIS2	22069.2 5	0.04248	XKRX	23111.2 5	0.04621
FOSL2	22149.5	0.04278	ASB16	23134.7 5	0.04630
PUS10	22188	0.04294	TMEM51	23146	0.04634
GPR12	22200	0.04298	KCNT1	23225.5	0.04668
SCAF11	22342	0.04349	INSL4	23258.5	0.04682
ISCU	22406	0.04376	ANGPTL3	23277.2 5	0.04686
EIF3I	22408	0.04377	RNF133	23305	0.04698
POLR2B	22472.7 5	0.04404	RAI2	23426.5	0.04752
ACSL1	22531.2 5	0.04429	PEX11A	23452.5	0.04760
ZNF232	22575	0.04448	RBM15	23495.5	0.04781
KAT5	22613.7 5	0.04463	FAM150B	23531.2 5	0.04796

ZGPAT	22639.7 5	0.04472	FTH1	23536.7 5	0.04799
ZBBX	22667	0.04484	FGB	23657	0.04853
RLN3	22675	0.04486	NCAPG2	23726	0.04880
PPCS	22745.7 5	0.04516	MAML2	23741.5	0.04886
TMIGD1	22894.5	0.04571	CCDC151	23765.5	0.04895
RPL6	22926.2 5	0.04584	ZNF592	23786.5	0.04904
ST8SIA6	22995.2 5	0.04613	ZNF804A	23851.5	0.04932
MRFAP1	22998.5	0.04615	GPR87	23872.7 5	0.04943
POLR3G	23053.5	0.04640	FAM117B	23911	0.04957
PRKCI	23093.5	0.04657	CARHSP1	23931.5	0.04966
BTBD2	23193.7 5	0.04696	GDNF	23938.2 5	0.04969
UCP3	23207.5	0.04702			
NPTX1	23211.5	0.04704			
LRSAM1	23371.7 5	0.04772			
hsa-mir-3684	23532.7 5	0.04836			
RHOXF2B	23593.7 5	0.04859			
E2F6	23621.5	0.04869			
TOR3A	23716.5	0.04906			
RNF113B	23819.7 5	0.04951			
CNTNAP2	23868.5	0.04971			
LHX1	23919.2 5	0.04995			

Table 2: Transcriptional dynamics of genes depleted in replicate 2CT genome-scale CRISPR screens

Gene name	Fold change mRNA 6hr coculture/0hr	pvalue (-log10)
<i>RPAP2</i>	3.83	1.386153
<i>BIRC2</i>	3.49	2.095161
<i>ESD</i>	2.78	1.655263
<i>TWF1</i>	2.15	1.127761
<i>EGR2</i>	2.13	1.422591
<i>SCAF11</i>	1.92	2.493371
<i>TOR1AIP1</i>	1.73	1.654647
<i>LPGAT1</i>	1.67	1.594682
<i>TXLNB</i>	1.65	0.736541
<i>SERTAD2</i>	1.62	1.964377
<i>COG3</i>	1.55	0.951055
<i>ALG11</i>	1.53	0.630745
<i>RBL2</i>	1.42	1.730386
<i>BCL2</i>	1.39	1.333402
<i>ENDOD1</i>	1.35	0.880535
<i>AKIRIN1</i>	1.31	0.846618
<i>EAF2</i>	1.3	0.313509
<i>C14orf119</i>	1.27	0.752152
<i>PRPF3</i>	1.22	0.822365
<i>ENY2</i>	1.21	0.719565
<i>TRA2B</i>	1.18	0.809857
<i>SNX1</i>	1.17	0.933405
<i>THRAP3</i>	1.17	1.068386
<i>ISCU</i>	1.09	0.277723
<i>WDR45B</i>	1.03	0.136798
<i>EIF3I</i>	1.02	0.092091
<i>TMX4</i>	-1.03	0.052917
<i>ARSD</i>	-1.05	0.069726
<i>HHLA3</i>	-1.05	0.042312
<i>PPP2R5D</i>	-1.06	0.239111
<i>SART3</i>	-1.06	0.201343
<i>CINP</i>	-1.13	0.501461
<i>MANSC1</i>	-1.13	0.079621
<i>NUDC</i>	-1.29	0.689154
<i>SLC25A25</i>	-1.31	1.128394
<i>RPS16</i>	-1.36	1.127576

<i>FAM32A</i>	-1.4	1.213536
<i>DPM2</i>	-1.62	2.076065
<i>C15orf61</i>	-1.72	1.713913
<i>CYB5R3</i>	-1.76	2.226299
<i>NEK8</i>	-1.81	2.116487
<i>FBXL15</i>	-2.15	2.270763

Table 3: Mapping top 2CT CRISPR depleted genes to protein-coding genes

Gene ID	Mapped ID	Gene name/Gene Symbol
HUMAN HGNC=13921 UniProtKB=O95870	ABHD16A	Protein ABHD16A;ABHD16A;ortholog
HUMAN HGNC=19195 UniProtKB=Q6H8Q1	ABLIM2	Actin-binding LIM protein 2;ABLIM2;ortholog
HUMAN HGNC=18075 UniProtKB=Q9NZD4	AHSP	Alpha-hemoglobin-stabilizing protein;AHSP;ortholog
HUMAN HGNC=25744 UniProtKB=Q9H9L7	AKIRIN1	Akirin-1;AKIRIN1;ortholog
HUMAN HGNC=32456 UniProtKB=Q2TA A5	ALG11	GDP-Man:Man(3)GlcNAc(2)-PP-Dol alpha-1,2-mannosyltransferase;ALG11;ortholog
HUMAN HGNC=28658 UniProtKB=Q6DCA0	AMMECR1L	AMMECR1-like protein;AMMECR1L;ortholog
HUMAN HGNC=29135 UniProtKB=Q6UB98	ANKRD12	Ankyrin repeat domain-containing protein 12;ANKRD12;ortholog
HUMAN HGNC=23725 UniProtKB=Q5T5U3	ARHGAP21	Rho GTPase-activating protein 21;ARHGAP21;ortholog
HUMAN HGNC=25361 UniProtKB=Q8N264	ARHGAP24	Rho GTPase-activating protein 24;ARHGAP24;ortholog
HUMAN HGNC=721 UniProtKB=P54793	ARSF	Arylsulfatase F;ARSF;ortholog
HUMAN HGNC=588 UniProtKB=O94817	ATG12	Ubiquitin-like protein ATG12;ATG12;ortholog
HUMAN HGNC=855 UniProtKB=P27449	ATP6V0C	V-type proton ATPase 16 kDa proteolipid subunit;ATP6V0C;ortholog
HUMAN HGNC=24137 UniProtKB=Q6L9W6	B4GALNT3	Beta-1,4-N-acetylgalactosaminyltransferase 3;B4GALNT3;ortholog
HUMAN HGNC=950 UniProtKB=Q92560	BAP1	Ubiquitin carboxyl-terminal hydrolase BAP1;BAP1;ortholog
HUMAN HGNC=990 UniProtKB=P10415	BCL2	Apoptosis regulator Bcl-2;BCL2;ortholog
HUMAN HGNC=590 UniProtKB=Q13490	BIRC2	Baculoviral IAP repeat-containing protein 2;BIRC2;ortholog
HUMAN HGNC=15519 UniProtKB=Q14137	BOP1	Ribosome biogenesis protein BOP1;BOP1;ortholog
HUMAN HGNC=27441 UniProtKB=Q3KP22	C11orf85	Membrane-anchored junction protein;C11orf85;ortholog
HUMAN HGNC=32331 UniProtKB=Q5T5A4	C1orf194	Uncharacterized protein C1orf194;C1orf194;ortholog
HUMAN HGNC=28250 UniProtKB=Q6P1W5	C1orf94	Uncharacterized protein C1orf94;C1orf94;ortholog
HUMAN HGNC=28772 UniProtKB=Q9BVC5	C2orf49	Ashwin;C2orf49;ortholog
HUMAN HGNC=26951 UniProtKB=Q86YL5	C8orf42	Testis development-related protein;TDRP;ortholog
HUMAN HGNC=18200 UniProtKB=Q8WXE0	CASKIN2	Caskin-2;CASKIN2;ortholog
HUMAN HGNC=1516 UniProtKB=P04040	CAT	Catalase;CAT;ortholog
HUMAN HGNC=29588 UniProtKB=Q5BJE1	CCDC178	Coiled-coil domain-containing protein 178;CCDC178;ortholog
HUMAN HGNC=30723 UniProtKB=Q6P9F0	CCDC62	Coiled-coil domain-containing protein 62;CCDC62;ortholog

HUMAN HGNC=1578 UniProtKB=P20248	CCNA2	Cyclin-A2;CCNA2;ortholog
HUMAN HGNC=1766 UniProtKB=Q9ULB5	CDH7	Cadherin-7;CDH7;ortholog
HUMAN HGNC=1837 UniProtKB=P53567	CEBPG	CCAAT/enhancer-binding protein gamma;CEBPG;ortholog
HUMAN HGNC=1876 UniProtKB=O15519	CFLAR	CASP8 and FADD-like apoptosis regulator;CFLAR;ortholog
HUMAN HGNC=23789 UniProtKB=Q9BW66	CINP	Cyclin-dependent kinase 2-interacting protein;CINP;ortholog
HUMAN HGNC=2080 UniProtKB=P54105	CLNS1A	Methylosome subunit pICln;CLNS1A;ortholog
HUMAN HGNC=16999 UniProtKB=Q92989	CLP1	Polyribonucleotide 5'-hydroxyl-kinase Clp1;CLP1;ortholog
HUMAN HGNC=18623 UniProtKB=Q96MW5	COG8	Conserved oligomeric Golgi complex subunit 8;COG8;ortholog
HUMAN HGNC=17888 UniProtKB=O75575	CRCP	DNA-directed RNA polymerase III subunit RPC9;CRCP;ortholog
HUMAN HGNC=2396 UniProtKB=P53673	CRYBA4	Beta-crystallin A4;CRYBA4;ortholog
HUMAN HGNC=15982 UniProtKB=Q8IWT3	CUL9	Cullin-9;CUL9;ortholog
HUMAN HGNC=10664 UniProtKB=Q6UX04	CWC27	Peptidyl-prolyl cis-trans isomerase CWC27 homolog;CWC27;ortholog
HUMAN HGNC=2873 UniProtKB=P00387	CYB5R3	NADH-cytochrome b5 reductase 3;CYB5R3;ortholog
HUMAN HGNC=21191 UniProtKB=P59103	DAOA	D-amino acid oxidase activator;DAOA;ortholog
HUMAN HGNC=17347 UniProtKB=Q9BUQ8	DDX23	Probable ATP-dependent RNA helicase DDX23;DDX23;ortholog
HUMAN HGNC=25360 UniProtKB=Q5T1V6	DDX59	Probable ATP-dependent RNA helicase DDX59;DDX59;ortholog
HUMAN HGNC=15861 UniProtKB=Q9H5Z1	DHX35	Probable ATP-dependent RNA helicase DHX35;DHX35;ortholog
HUMAN HGNC=2680 UniProtKB=Q9BTC0	DIDO1	Death-inducer obliterator 1;DIDO1;ortholog
HUMAN HGNC=2902 UniProtKB=Q92796	DLG3	Disks large homolog 3;DLG3;ortholog
HUMAN HGNC=29157 UniProtKB=Q9Y2G8	DNAJC16	DnaJ homolog subfamily C member 16;DNAJC16;ortholog
HUMAN HGNC=2981 UniProtKB=Q9ULA0	DNPEP	Aspartyl aminopeptidase;DNPEP;ortholog
HUMAN HGNC=23028 UniProtKB=Q9H4A9	DPEP2	Dipeptidase 2;DPEP2;ortholog
HUMAN HGNC=3011 UniProtKB=Q07507	DPT	Dermatopontin;DPT;ortholog
HUMAN HGNC=3208 UniProtKB=P24534	EEF1B2	Elongation factor 1-beta;EEF1B2;ortholog
HUMAN HGNC=3226 UniProtKB=P98172	EFNB1	Ephrin-B1;EFNB1;ortholog
HUMAN HGNC=3239 UniProtKB=P11161	EGR2	E3 SUMO-protein ligase EGR2;EGR2;ortholog
HUMAN HGNC=3272 UniProtKB=Q13347	EIF3I	Eukaryotic translation initiation factor 3 subunit I;EIF3I;ortholog
HUMAN HGNC=3296 UniProtKB=Q04637	EIF4G1	Eukaryotic translation initiation factor 4 gamma 1;EIF4G1;ortholog
HUMAN HGNC=3297 UniProtKB=P78344	EIF4G2	Eukaryotic translation initiation factor 4 gamma 2;EIF4G2;ortholog
HUMAN HGNC=28430 UniProtKB=Q9BV81	EMC6	ER membrane protein complex subunit 6;EMC6;ortholog
HUMAN HGNC=1316 UniProtKB=Q9HC35	EML4	Echinoderm microtubule-associated protein-like 4;EML4;ortholog
HUMAN HGNC=24449 UniProtKB=Q9NP A8	ENY2	Transcription and mRNA export factor ENY2;ENY2;ortholog
HUMAN HGNC=3415 UniProtKB=P01588	EPO	Erythropoietin;EPO;ortholog
HUMAN HGNC=3471 UniProtKB=P11474	ESRRA	Steroid hormone receptor ERR1;ESRRA;ortholog

HUMAN HGNC=3522 UniProtKB=O95677	EYA4	Eyes absent homolog 4;EYA4;ortholog
HUMAN HGNC=24563 UniProtKB=Q9Y421	FAM32A	Protein FAM32A;FAM32A;ortholog
HUMAN HGNC=1253 UniProtKB=P58499	FAM3B	Protein FAM3B;FAM3B;ortholog
HUMAN HGNC=18786 UniProtKB=Q14320	FAM50A	Protein FAM50A;FAM50A;ortholog
HUMAN HGNC=17800 UniProtKB=Q9NSD9	FARSB	Phenylalanine--tRNA ligase beta subunit;FARSB;ortholog
HUMAN HGNC=3595 UniProtKB=Q14517	FAT1	Protocadherin Fat 1;FAT1;ortholog
HUMAN HGNC=3600 UniProtKB=P23142	FBLN1	Fibulin-1;FBLN1;ortholog
HUMAN HGNC=16712 UniProtKB=Q969H0	FBXW7	F-box/WD repeat-containing protein 7;FBXW7;ortholog
HUMAN HGNC=18522 UniProtKB=Q5VV16	FOXD4L5	Forkhead box protein D4-like 5;FOXD4L5;ortholog
HUMAN HGNC=30968 UniProtKB=A6NGK3	GAGE10	G antigen 10;GAGE10;ortholog
HUMAN HGNC=14264 UniProtKB=Q9NY12	GAR1	H/ACA ribonucleoprotein complex subunit 1;GAR1;ortholog
HUMAN HGNC=11960 UniProtKB=Q6Y7W6	GIGYF2	PERQ amino acid-rich with GYF domain-containing protein 2;GIGYF2;ortholog
HUMAN HGNC=28980 UniProtKB=Q14691	GIN51	DNA replication complex GINS protein PSF1;GIN51;ortholog
HUMAN HGNC=4374 UniProtKB=O60234	GMFG	Glia maturation factor gamma;GMFG;ortholog
HUMAN HGNC=18707 UniProtKB=Q7Z6J2	GRASP	General receptor for phosphoinositides 1-associated scaffold protein;GRASP;ortholog
HUMAN HGNC=4579 UniProtKB=P39086	GRIK1	Glutamate receptor ionotropic, kainate 1;GRIK1;ortholog
HUMAN HGNC=33383 UniProtKB=A0PIZ3	GXYLT2	Glucoside xylosyltransferase 2;GXYLT2;ortholog
HUMAN HGNC=4801 UniProtKB=P40939	HADH	Trifunctional enzyme subunit alpha, mitochondrial;HADHA;ortholog
HUMAN HGNC=4803 UniProtKB=P55084	HADHB	Trifunctional enzyme subunit beta, mitochondrial;HADHB;ortholog
HUMAN HGNC=4848 UniProtKB=O43613	HCRTR1	Orexin receptor type 1;HCRTR1;ortholog
HUMAN HGNC=28982 UniProtKB=Q12766	HMGXB3	HMG domain-containing protein 3;HMGXB3;ortholog
HUMAN HGNC=25451 UniProtKB=Q1KMD3	HNRNPUL2	Heterogeneous nuclear ribonucleoprotein U-like protein 2;HNRNPUL2;ortholog
HUMAN HGNC=25155 UniProtKB=Q86XE5	HOGA1	4-hydroxy-2-oxoglutarate aldolase, mitochondrial;HOGA1;ortholog
HUMAN HGNC=5129 UniProtKB=P31273	HOXC8	Homeobox protein Hox-C8;HOXC8;ortholog
HUMAN HGNC=5961 UniProtKB=Q9Y6K9	IKBKG	NF-kappa-B essential modulator;IKBKG;ortholog
HUMAN HGNC=5993 UniProtKB=P14778	IL1R1	Interleukin-1 receptor type 1;IL1R1;ortholog
HUMAN HGNC=15561 UniProtKB=Q9UBH0	IL36RN	Interleukin-36 receptor antagonist protein;IL36RN;ortholog
HUMAN HGNC=6029 UniProtKB=P15248	IL9	Interleukin-9;IL9;ortholog
HUMAN HGNC=29882 UniProtKB=Q9H1K1	ISCU	Iron-sulfur cluster assembly enzyme ISCU, mitochondrial;ISCU;ortholog
HUMAN HGNC=28977 UniProtKB=P53990	IST1	IST1 homolog;IST1;ortholog
HUMAN HGNC=6150 UniProtKB=P06756	ITGAV	Integrin alpha-V;ITGAV;ortholog
HUMAN HGNC=6173 UniProtKB=O43736	ITM2A	Integral membrane protein 2A;ITM2A;ortholog
HUMAN HGNC=21071 UniProtKB=Q6PHW0	IYD	Iodotyrosine deiodinase 1;IYD;ortholog
HUMAN HGNC=6211 UniProtKB=P23352	KAL1	Anosmin-1;ANOS1;ortholog

HUMAN HGNC=6217 UniProtKB=Q9BVA0	KATNB1	Katanin p80 WD40 repeat-containing subunit B1;KATNB1;ortholog
HUMAN HGNC=6246 UniProtKB=Q9H3M0	KCNF1	Potassium voltage-gated channel subfamily F member 1;KCNF1;ortholog
HUMAN HGNC=6249 UniProtKB=Q9UJ96	KCNG2	Potassium voltage-gated channel subfamily G member 2;KCNG2;ortholog
HUMAN HGNC=6304 UniProtKB=P24390	KDEL1	ER lumen protein-retaining receptor 1;KDEL1;ortholog
HUMAN HGNC=29266 UniProtKB=Q9P2G3	KLHL14	Kelch-like protein 14;KLHL14;ortholog
HUMAN HGNC=16905 UniProtKB=O60662	KLHL41	Kelch-like protein 41;KLHL41;ortholog
HUMAN HGNC=6356 UniProtKB=Q96PQ7	KLHL5	Kelch-like protein 5;KLHL5;ortholog
HUMAN HGNC=6359 UniProtKB=Q9UBX7	KLK11	Kallikrein-11;KLK11;ortholog
HUMAN HGNC=20523 UniProtKB=P60371	KRTAP10-6	Keratin-associated protein 10-6;KRTAP10-6;ortholog
HUMAN HGNC=23598 UniProtKB=Q6L8H2	KRTAP5-3	Keratin-associated protein 5-3;KRTAP5-3;ortholog
HUMAN HGNC=17095 UniProtKB=Q15031	LARS2	Probable leucine--tRNA ligase, mitochondrial;LARS2;ortholog
HUMAN HGNC=29460 UniProtKB=Q5TA81	LCE2C	Late cornified envelope protein 2C;LCE2C;ortholog
HUMAN HGNC=17787 UniProtKB=O14910	LIN7A	Protein lin-7 homolog A;LIN7A;ortholog
HUMAN Gene=LPPR5 UniProtKB=Q32ZL2	LPPR5	Phospholipid phosphatase-related protein type 5;PLPPR5;ortholog
HUMAN HGNC=6690 UniProtKB=Q12912	LRMP	Lymphoid-restricted membrane protein;LRMP;ortholog
HUMAN HGNC=19742 UniProtKB=Q96L50	LRR1	Leucine-rich repeat protein 1;LRR1;ortholog
HUMAN HGNC=19410 UniProtKB=Q86VH5	LRRTM3	Leucine-rich repeat transmembrane neuronal protein 3;LRRTM3;ortholog
HUMAN HGNC=13940 UniProtKB=Q9Y333	LSM2	U6 snRNA-associated Sm-like protein Lsm2;LSM2;ortholog
HUMAN HGNC=1968 UniProtKB=Q99698	LYST	Lysosomal-trafficking regulator;LYST;ortholog
HUMAN HGNC=25183 UniProtKB=Q8TC57	M1AP	Meiosis 1 arrest protein;M1AP;ortholog
HUMAN HGNC=6780 UniProtKB=Q9ULX9	MAFF	Transcription factor MafF;MAFF;ortholog
HUMAN HGNC=6823 UniProtKB=Q9UKM7	MAN1B1	Endoplasmic reticulum mannosyl-oligosaccharide 1,2-alpha-mannosidase;MAN1B1;ortholog
HUMAN HGNC=13961 UniProtKB=P35410	MAS1L	Mas-related G-protein coupled receptor MRG;MAS1L;ortholog
HUMAN HGNC=6904 UniProtKB=P31153	MAT2A	S-adenosylmethionine synthase isoform type-2;MAT2A;ortholog
HUMAN HGNC=19866 UniProtKB=Q05BQ5	MBTD1	MBT domain-containing protein 1;MBTD1;ortholog
HUMAN HGNC=7095 UniProtKB=O15344	MID1	E3 ubiquitin-protein ligase Midline-1;MID1;ortholog
HUMAN HGNC=21460 UniProtKB=Q8TD10	MIPOL1	Mirror-image polydactyly gene 1 protein;MIPOL1;ortholog
HUMAN HGNC=29636 UniProtKB=Q8NEH6	MNS1	Meiosis-specific nuclear structural protein 1;MNS1;ortholog
HUMAN HGNC=17617 UniProtKB=Q96LA9	MRGPRX4	Mas-related G-protein coupled receptor member X4;MRGPRX4;ortholog
HUMAN HGNC=16635 UniProtKB=P82673	MRPS35	28S ribosomal protein S35, mitochondrial;MRPS35;ortholog
HUMAN HGNC=7394 UniProtKB=P07438	MT1B	Metallothionein-1B;MT1B;ortholog
HUMAN HGNC=7411 UniProtKB=O94776	MTA2	Metastasis-associated protein MTA2;MTA2;ortholog
HUMAN HGNC=7748 UniProtKB=Q6P3R8	NEK5	Serine/threonine-protein kinase Nek5;NEK5;ortholog
HUMAN HGNC=29933 UniProtKB=Q86WI3	NLRC5	Protein NLRC5;NLRC5;ortholog

HUMAN HGNC=17877 UniProtKB=Q9HAN9	NMNAT1	Nicotinamide/nicotinic acid mononucleotide adenylyltransferase 1;NMNAT1;ortholog
HUMAN HGNC=32203 UniProtKB=Q5H8A3	NMS	Neuromedin-S;NMS;ortholog
HUMAN HGNC=16821 UniProtKB=P78316	NOP14	Nucleolar protein 14;NOP14;ortholog
HUMAN HGNC=7895 UniProtKB=Q99743	NPAS2	Neuronal PAS domain-containing protein 2;NPAS2;ortholog
HUMAN HGNC=14124 UniProtKB=Q12980	NPRL3	Nitrogen permease regulator 3-like protein;NPRL3;ortholog
HUMAN HGNC=8266 UniProtKB=Q8NH16	OR2L2	Olfactory receptor 2L2;OR2L2;ortholog
HUMAN HGNC=8268 UniProtKB=Q96R28	OR2M2	Olfactory receptor 2M2;OR2M2;ortholog
HUMAN HGNC=8510 UniProtKB=Q92882	OSTF1	Osteoclast-stimulating factor 1;OSTF1;ortholog
HUMAN HGNC=20882 UniProtKB=Q9NWT1	PAK1IP1	p21-activated protein kinase-interacting protein 1;PAK1IP1;ortholog
HUMAN HGNC=8621 UniProtKB=P23759	PAX7	Paired box protein Pax-7;PAX7;ortholog
HUMAN HGNC=9719 UniProtKB=P50542	PEX5	Peroxisomal targeting signal 1 receptor;PEX5;ortholog
HUMAN HGNC=8940 UniProtKB=O14832	PHYH	Phytanoyl-CoA dioxygenase, peroxisomal;PHYH;ortholog
HUMAN HGNC=8971 UniProtKB=O00443	PIK3C2A	Phosphatidylinositol 4-phosphate 3-kinase C2 domain-containing subunit alpha;PIK3C2A;ortholog
HUMAN HGNC=20764 UniProtKB=Q96S99	PLEKHF1	Pleckstrin homology domain-containing family F member 1;PLEKHF1;ortholog
HUMAN HGNC=9200 UniProtKB=O00411	POLRMT	DNA-directed RNA polymerase, mitochondrial;POLRMT;ortholog
HUMAN HGNC=23531 UniProtKB=Q5VZY2	PPAPDC1A	Phospholipid phosphatase 4;PLPP4;ortholog
HUMAN HGNC=9358 UniProtKB=P48147	PREP	Prolyl endopeptidase;PREP;ortholog
HUMAN HGNC=17348 UniProtKB=O43395	PRPF3	U4/U6 small nuclear ribonucleoprotein Prp3;PRPF3;ortholog
HUMAN HGNC=16463 UniProtKB=O75400	PRPF40A	Pre-mRNA-processing factor 40 homolog A;PRPF40A;ortholog
HUMAN HGNC=9480 UniProtKB=Q9NQE7	PRSS16	Thymus-specific serine protease;PRSS16;ortholog
HUMAN HGNC=19096 UniProtKB=Q8NDX1	PSD4	PH and SEC7 domain-containing protein 4;PSD4;ortholog
HUMAN HGNC=17822 UniProtKB=Q9H7Z7	PTGES2	Prostaglandin E synthase 2;PTGES2;ortholog
HUMAN HGNC=9650 UniProtKB=P17706	PTPN2	Tyrosine-protein phosphatase non-receptor type 2;PTPN2;ortholog
HUMAN HGNC=9692 UniProtKB=P26022	PTX3	Pentraxin-related protein PTX3;PTX3;ortholog
HUMAN HGNC=26505 UniProtKB=Q3MIT2	PUS10	Putative tRNA pseudouridine synthase Pus10;PUS10;ortholog
HUMAN HGNC=29982 UniProtKB=P83859	QRFP	Orexigenic neuropeptide QRFP;QRFP;ortholog
HUMAN HGNC=9795 UniProtKB=Q92696	RABGGTA	Geranylgeranyl transferase type-2 subunit alpha;RABGGTA;ortholog
HUMAN HGNC=9807 UniProtKB=O75943	RAD17	Cell cycle checkpoint protein RAD17;RAD17;ortholog
HUMAN HGNC=9832 UniProtKB=P55895	RAG2	V(D)J recombination-activating protein 2;RAG2;ortholog
HUMAN HGNC=9840 UniProtKB=P11234	RALB	Ras-related protein Ral-B;RALB;ortholog
HUMAN HGNC=15864 UniProtKB=Q9BYM8	RBCK1	RanBP-type and C3HC4-type zinc finger-containing protein 1;RBCK1;ortholog
HUMAN HGNC=9894 UniProtKB=Q08999	RBL2	Retinoblastoma-like protein 2;RBL2;ortholog
HUMAN HGNC=16502 UniProtKB=P58872	RHBDL3	Rhomboid-related protein 3;RHBDL3;ortholog
HUMAN HGNC=21158 UniProtKB=Q8IUD6	RNF135	E3 ubiquitin-protein ligase RNF135;RNF135;ortholog

HUMAN HGNC=13432 UniProtKB=Q9NV58	RNF19A	E3 ubiquitin-protein ligase RNF19A;RNF19A;ortholog
HUMAN HGNC=17985 UniProtKB=Q8WZ75	ROBO4	Roundabout homolog 4;ROBO4;ortholog
HUMAN HGNC=25791 UniProtKB=Q8IXW5	RPAP2	Putative RNA polymerase II subunit B1 CTD phosphatase RPAP2;RPAP2;ortholog
HUMAN HGNC=30350 UniProtKB=Q9H9Y2	RPF1	Ribosome production factor 1;RPF1;ortholog
HUMAN HGNC=10302 UniProtKB=P30050	RPL12	60S ribosomal protein L12;RPL12;ortholog
HUMAN HGNC=10371 UniProtKB=P05388	RPLP0	60S acidic ribosomal protein P0;RPLP0;ortholog
HUMAN HGNC=10402 UniProtKB=P39019	RPS19	40S ribosomal protein S19;RPS19;ortholog
HUMAN HGNC=6502 UniProtKB=P08865	RPSA	40S ribosomal protein SA;RPSA;ortholog
HUMAN HGNC=10450 UniProtKB=O14718	RRH	Visual pigment-like receptor peropsin;RRH;ortholog
HUMAN HGNC=13081 UniProtKB=Q9BY12	SCAPER	S phase cyclin A-associated protein in the endoplasmic reticulum;SCAPER;ortholog
HUMAN HGNC=21088 UniProtKB=Q865K9	SCD5	Stearoyl-CoA desaturase 5;SCD5;ortholog
HUMAN HGNC=15950 UniProtKB=Q9BWW7	SCRT1	Transcriptional repressor scratch 1;SCRT1;ortholog
HUMAN HGNC=8951 UniProtKB=P07093	SERPINE2	Glia-derived nexin;SERPINE2;ortholog
HUMAN HGNC=30784 UniProtKB=Q14140	SERTAD2	SERTA domain-containing protein 2;SERTAD2;ortholog
HUMAN HGNC=12950 UniProtKB=Q15637	SF1	Splicing factor 1;SF1;ortholog
HUMAN HGNC=10809 UniProtKB=Q13326	SGCG	Gamma-sarcoglycan;SGCG;ortholog
HUMAN HGNC=25321 UniProtKB=Q9H0F6	SHARPIN	Sharpin;SHARPIN;ortholog
HUMAN HGNC=11014 UniProtKB=Q99726	SLC30A3	Zinc transporter 3;SLC30A3;ortholog
HUMAN HGNC=11047 UniProtKB=Q9UN76	SLC6A14	Sodium- and chloride-dependent neutral and basic amino acid transporter B(0+);SLC6A14;ortholog
HUMAN HGNC=23092 UniProtKB=Q8TCU3	SLC7A13	Solute carrier family 7 member 13;SLC7A13;ortholog
HUMAN HGNC=14013 UniProtKB=Q9NTJ3	SMC4	Structural maintenance of chromosomes protein 4;SMC4;ortholog
HUMAN HGNC=20465 UniProtKB=Q8IY18	SMC5	Structural maintenance of chromosomes protein 5;SMC5;ortholog
HUMAN HGNC=18122 UniProtKB=Q9H6I2	SOX17	Transcription factor SOX-17;SOX17;ortholog
HUMAN HGNC=32006 UniProtKB=Q5VV P1	SPATA31A6	Spermatogenesis-associated protein 31A6;SPATA31A6;ortholog
HUMAN HGNC=24508 UniProtKB=B4DYI2	SPATA31C2	Spermatogenesis-associated protein 31C2;SPATA31C2;ortholog
HUMAN HGNC=24031 UniProtKB=Q9HBM1	SPC25	Kinetochore protein Spc25;SPC25;ortholog
HUMAN HGNC=11337 UniProtKB=Q99909	SSX3	Protein SSX3;SSX3;ortholog
HUMAN HGNC=10863 UniProtKB=Q16842	ST3GAL2	CMP-N-acetylneuraminic acid-6-sialyltransferase 2;ST3GAL2;ortholog
HUMAN HGNC=23317 UniProtKB=P61647	ST8SIA6	Alpha-2,8-sialyltransferase 8F;ST8SIA6;ortholog
HUMAN HGNC=11389 UniProtKB=Q15831	STK11	Serine/threonine-protein kinase STK11;STK11;ortholog
HUMAN HGNC=30796 UniProtKB=Q9Y3F4	STRAP	Serine-threonine kinase receptor-associated protein;STRAP;ortholog
HUMAN HGNC=11427 UniProtKB=Q9UNE7	STUB1	E3 ubiquitin-protein ligase CHIP;STUB1;ortholog
HUMAN HGNC=19694 UniProtKB=Q6Z WJ1	STXBP4	Syntaxin-binding protein 4;STXBP4;ortholog
HUMAN HGNC=27411 UniProtKB=Q6PIF2	SYCE2	Synaptonemal complex central element protein 2;SYCE2;ortholog

HUMAN HGNC=11523 UniProtKB=O95359	TACC2	Transforming acidic coiled-coil-containing protein 2;TACC2;ortholog
HUMAN HGNC=11585 UniProtKB=O60907	TBL1X	F-box-like/WD repeat-containing protein TBL1X;TBL1X;ortholog
HUMAN HGNC=20854 UniProtKB=Q9H0W7	THAP2	THAP domain-containing protein 2;THAP2;ortholog
HUMAN HGNC=11793 UniProtKB=P52888	THOP1	Thimet oligopeptidase;THOP1;ortholog
HUMAN HGNC=11803 UniProtKB=O95411	TIAF1	TGFB1-induced anti-apoptotic factor 1;TIAF1;ortholog
HUMAN HGNC=14523 UniProtKB=Q96MW7	TIGD1	Tigger transposable element-derived protein 1;TIGD1;ortholog
HUMAN HGNC=33522 UniProtKB=A6NGC4	TLCD2	TLC domain-containing protein 2;TLCD2;ortholog
HUMAN HGNC=24257 UniProtKB=Q9HC24	TMBIM4	Protein lifeguard 4;TMBIM4;ortholog
HUMAN HGNC=16996 UniProtKB=Q15363	TMED2	Transmembrane emp24 domain-containing protein 2;TMED2;ortholog
HUMAN HGNC=16823 UniProtKB=P17152	TMEM11	Transmembrane protein 11, mitochondrial;TMEM11;ortholog
HUMAN HGNC=30366 UniProtKB=Q92545	TMEM131	Transmembrane protein 131;TMEM131;ortholog
HUMAN HGNC=31723 UniProtKB=Q24JQ0	TMEM241	Transmembrane protein 241;TMEM241;ortholog
HUMAN HGNC=32393 UniProtKB=Q6ZNR0	TMEM91	Transmembrane protein 91;TMEM91;ortholog
HUMAN HGNC=32431 UniProtKB=Q6UXZ0	TMIGD1	Transmembrane and immunoglobulin domain-containing protein 1;TMIGD1;ortholog
HUMAN HGNC=11905 UniProtKB=O14763	TNFRSF10B	Tumor necrosis factor receptor superfamily member 10B;TNFRSF10B;ortholog
HUMAN HGNC=11983 UniProtKB=O75674	TOM1L1	TOM1-like protein 1;TOM1L1;ortholog
HUMAN HGNC=12032 UniProtKB=Q12933	TRAF2	TNF receptor-associated factor 2;TRAF2;ortholog
HUMAN HGNC=30832 UniProtKB=Q96Q05	TRAPPC9	Trafficking protein particle complex subunit 9;TRAPPC9;ortholog
HUMAN HGNC=31454 UniProtKB=Q6A555	TXNDC8	Thioredoxin domain-containing protein 8;TXNDC8;ortholog
HUMAN HGNC=12477 UniProtKB=P51965	UBE2E1	Ubiquitin-conjugating enzyme E2 E1;UBE2E1;ortholog
HUMAN HGNC=12492 UniProtKB=P61088	UBE2N	Ubiquitin-conjugating enzyme E2 N;UBE2N;ortholog
HUMAN HGNC=15664 UniProtKB=Q9NYU1	UGGT2	UDP-glucose:glycoprotein glucosyltransferase 2;UGGT2;ortholog
HUMAN HGNC=20332 UniProtKB=Q9H1J1	UPF3A	Regulator of nonsense transcripts 3A;UPF3A;ortholog
HUMAN HGNC=20485 UniProtKB=O75317	USP12	Ubiquitin carboxyl-terminal hydrolase 12;USP12;ortholog
HUMAN HGNC=14340 UniProtKB=Q9UBQ0	VPS29	Vacuolar protein sorting-associated protein 29;VPS29;ortholog
HUMAN HGNC=25072 UniProtKB=Q5MNZ6	WDR45B	WD repeat domain phosphoinositide-interacting protein 3;WDR45B;ortholog
HUMAN HGNC=14540 UniProtKB=Q9H4A3	WNK1	Serine/threonine-protein kinase WNK1;WNK1;ortholog
HUMAN HGNC=12786 UniProtKB=O00755	WNT7A	Protein Wnt-7a;WNT7A;ortholog
HUMAN HGNC=28304 UniProtKB=Q96EC8	YIPF6	Protein YIPF6;YIPF6;ortholog
HUMAN HGNC=31675 UniProtKB=Q9Y5A9	YTHDF2	YTH domain-containing family protein 2;YTHDF2;ortholog
HUMAN HGNC=17908 UniProtKB=O43298	ZBTB43	Zinc finger and BTB domain-containing protein 43;ZBTB43;ortholog
HUMAN HGNC=29362 UniProtKB=Q9C0D7	ZC3H12C	Probable ribonuclease ZC3H12C;ZC3H12C;ortholog
HUMAN HGNC=20368 UniProtKB=Q5T200	ZC3H13	Zinc finger CCCH domain-containing protein 13;ZC3H13;ortholog
HUMAN HGNC=14881 UniProtKB=O60315	ZEB2	Zinc finger E-box-binding homeobox 2;ZEB2;ortholog

HUMAN HGNC=12863 UniProtKB=Q9Y6Q3	ZFP37	Zinc finger protein 37 homolog;ZFP37;ortholog
HUMAN HGNC=20997 UniProtKB=Q9H091	ZMYND15	Zinc finger MYND domain-containing protein 15;ZMYND15;ortholog
HUMAN HGNC=12907 UniProtKB=Q15973	ZNF124	Zinc finger protein 124;ZNF124;ortholog
HUMAN HGNC=12920 UniProtKB=P52737	ZNF136	Zinc finger protein 136;ZNF136;ortholog
HUMAN HGNC=23708 UniProtKB=Q6ZR52	ZNF493	Zinc finger protein 493;ZNF493;ortholog
HUMAN HGNC=13168 UniProtKB=Q03936	ZNF92	Zinc finger protein 92;ZNF92;ortholog
HUMAN HGNC=25820 UniProtKB=Q9C0D3	ZYG11B	Protein zyg-11 homolog B;ZYG11B;ortholog

Table 4: Preliminary Identification of tumor targets for combination immunotherapy

Druggable Gene Category	Matching Gene Count	Matching Gene(s)
DRUGGABLE GENOME	68	ABHD16A, ARSF, BAP1, BCL2, BIRC2, CAT, CCNA2, CFLAR, CWC27, CYB5R3, DNAJC16, DNPEP, DPEP2, DPT, EFN1, EPO, ESRR, FAM3B, FAT1, FBLN1, GRIK1, HCRTR1, HNRNPUL2, IKBKG, IL1R1, IL36RN, IL9, ITGAV, ANOS1, KCNF1, KCNG2, KLHL5, KLK11, LARS2, LRRTM3, MAN1B1, MAS1L, MID1, MRGPRX4, NEK5, NMS, OR2L2, OR2M2, PIK3C2A, PREP, PRSS16, PTPN2, PTX3, QRF, RABGGTA, RBCK1, RHBDL3, RNF135, RRH, SCD5, SERPINE2, SHARPIN, SLC6A14, SLC7A13, ST3GAL2, STK11, THOP1, TNFRSF10B, TXNDC8, UBE2N, USP12, WNK1, WNT7A
KINASE	22	CCNA2, CLP1, DLG3, EPO, FBXW7, GMFG, HMGXB3, IKBKG, LRRTM3, NEK5, NLRC5, PIK3C2A, PTPN2, RALB, RBL2, STK11, TNFRSF10B, TOM1L1, TRAF2, UBE2N, WNK1, ZEB2
TUMOR SUPPRESSOR	18	BAP1, BCL2, BIRC2, BOP1, CCNA2, CUL9, EIF4G1, EIF4G2, FBXW7, GIGYF2, PRPF40A, RAD17, RBL2, SMC5, STK11, STXB4, TOM1L1, UBE2E1
PROTEASE	17	BAP1, BIRC2, CFLAR, DNPEP, DPEP2, FBLN1, ANOS1, KLK11, NEK5, PREP, PRSS16, RHBDL3, SERPINE2, THOP1, TNFRSF10B, TRAF2, USP12
TRANSPORTER	15	ATP6V0C, BCL2, DLG3, EPO, GRIK1, ITGAV, KCNF1, KCNG2, SLC30A3, SLC6A14, SLC7A13, TMEM241, UPF3A, VPS29, WNK1
SERINE THREONINE KINASE	10	CCNA2, IKBKG, NEK5, RALB, STK11, TNFRSF10B, TRAF2, UBE2N, WNK1, ZEB2
HISTONE MODIFICATION	9	BAP1, CCNA2, ENY2, EYA4, MTA2, PAX7, TBL1X, UBE2E1, UBE2N
DNA REPAIR	8	CEBPG, CINP, EYA4, NPAS2, RAD17, SMC5, STUB1, UBE2N
G PROTEIN COUPLED RECEPTOR	7	CRCP, HCRTR1, MAS1L, MRGPRX4, OR2L2, OR2M2, RRH
ION CHANNEL	7	DLG3, EPO, GRIK1, ITGAV, KCNF1, KCNG2, WNK1
TRANSCRIPTION FACTOR BINDING	7	BCL2, CEBPG, EGR2, MTA2, RNF19A, SOX17, TBL1X
CELL SURFACE	6	EPO, IL1R1, ITGAV, SERPINE2, TNFRSF10B, WNT7A
CLINICALLY ACTIONABLE	6	BAP1, BCL2, FAT1, FBXW7, SOX17, STK11
TYROSINE KINASE	5	FBXW7, GMFG, LRRTM3, PTPN2, WNK1
TRANSCRIPTION FACTOR COMPLEX	4	MTA2, NPAS2, RBL2, SOX17

B30_2 SPRY DOMAIN	3	HNRNPUL2, MID1, RNF135
DRUG RESISTANCE	3	BCL2, CAT, HADH
NEUTRAL ZINC METALLOPEPTIDASE	3	DNPEP, DPEP2, THOP1
PROTEASE INHIBITOR	3	BIRC2, ANOS1, SERPINE2
PROTEIN PHOSPHATASE	3	EYA4, PTPN2, RPAP2
EXTERNAL SIDE OF PLASMA MEMBRANE	2	ITGAV, SERPINE2
GROWTH FACTOR	2	GMFG, IL9
HORMONE ACTIVITY	2	EPO, QRFP
NUCLEAR HORMONE RECEPTOR	2	ESRRA, SF1
THIOREDOXIN	2	DNAJC16, TXNDC8
ABC TRANSPORTER	1	ATP6V0C
LIPID KINASE	1	RBL2
PHOSPHATIDYLINOSITOL 3 KINASE	1	PIK3C2A

Table 5: Inhibitors utilized in study

Inhibitor	Alternative nomenclature	Target	Source
Venetoclax	ABT-199	BCL2	Selleckchem
Navitoclax	ABT-263	BCL2	Selleckchem
LCL161		BIRC2	Selleckchem
Birinapant		BIRC2	Selleckchem
Fomepizole		CAT	Selleckchem
Tosedostat	CHR2797	DNPEP	Tocris
XCT790		ESRRA	Sigma Aldrich
Compound 29		ESRRA	Synthesized by collaborator
Topiramate		GRIK1	Selleckchem
ACET		GRIK1	Tocris
Almorexant	ACT-078573	HCRTR1	Selleckchem
SB334867		HCRTR1	R&D systems
Blocking antibody	AF269	IL1R1	R&D systems
Blocking antibody	AF209	IL9	R&D systems
Blocking antibody	ab16821	ITGAV	Abcam
Cilengitide		ITGAV	Selleckchem
Guanidine HCL		KCNF1	Sigma Aldrich
Dalfampridine	4-aminopyridine	KCNF1	Sigma Aldrich
Guanidine HCL		KCNG2	Sigma Aldrich
Dalfampridine	4-aminopyridine	KCNG2	Sigma Aldrich
Dactolisib	BEZ235	PIK3C2A	Selleckchem

Apitolisib	GDC-0980	PIK3C2A	Selleckchem
S17092		PREP	Sigma Aldrich
WNK463		WNK1	Selleckchem

Table 6: sgRNA sequences

sgRNA Name	sgRNA sequence
RPAP2 sgRNA1	GGCCCAGCGAAGTCCGCCAT
RPAP2 sgRNA2	AAATTCTCGTAACTTGGCAG
RPAP2 sgRNA3	CGCTGCTCTCGAAAAGCCGC
BIRC2 sgRNA1	TGGAGACGTATTCTTAGAGG
BIRC2 sgRNA2	ACATATTCAACTTTCCCCGC
BIRC2 sgRNA3	ATATTCAACTTTCCCCGCCG
ESD sgRNA1	CGTTGTTTTTCGATTGCAAG
ESD sgRNA2	TAGACCACAAACACTTACGA
ESD sgRNA3	CACTTACGAGGGCTGGTATC
EGR2 sgRNA1	GCAAGACGCCGGTGCACGAG
EGR2 sgRNA2	TCAAGGTGTCCGGGTCCGAG
EGR2 sgRNA3	CTCGTGCACCGGCGTCTTGC
SCAF11 sgRNA1	TGTCTTCGAGCTATCTGCGC
SCAF11 sgRNA2	TCTGGTTGGGTATCTAACCG
SCAF11 sgRNA3	CTGTACCGATCATTTCCTCG
TOR1AIP1 sgRNA1	CATAAACTACGTCGGCTGG
TOR1AIP1 sgRNA2	TCAACAACATATGGCGGGCGA
TOR1AIP1 sgRNA3	GCGCGTACTACCTTCGGTCT
LPGAT1 sgRNA1	AAGCGGTTCTGGTATATCGA
LPGAT1 sgRNA2	CTTCATGGTCGTCAACAACC
LPGAT1 sgRNA3	CTTACTGTCCAGCACTCGAA
SERTAD2 sgRNA1	CCAGGGGCGTAGTGCTTCCG
SERTAD2 sgRNA2	CGTAGTGCTTCCGAGGTCCG
SERTAD2 sgRNA3	GTAGTGCTTCCGAGGTCCG
RBL2 sgRNA1	CCGCCTCAACATGGACGAGG
RBL2 sgRNA2	CGACGGCATAGCGCACCCCT
RBL2 sgRNA3	CTATGCGTAGCTGTAGAAAC
BCL2 sgRNA1	AAGCGTCCCCGCGCGGTGAA
BCL2 sgRNA2	ACCTGACGCCCTTACCAGCG
BCL2 sgRNA3	GGGGCCGTACAGTTCCACAA