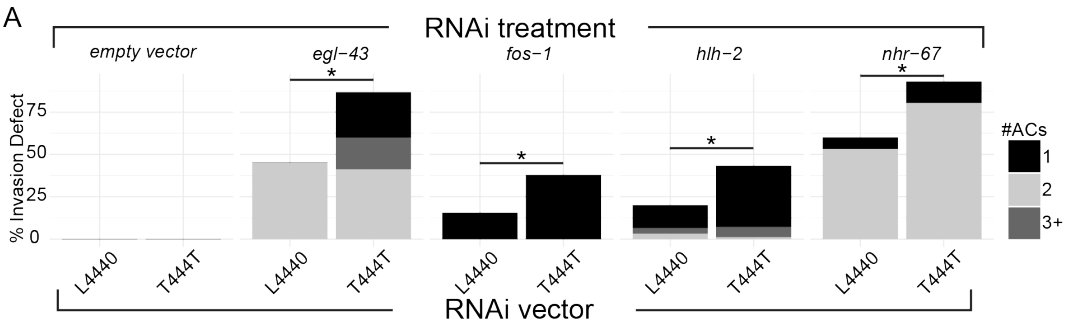
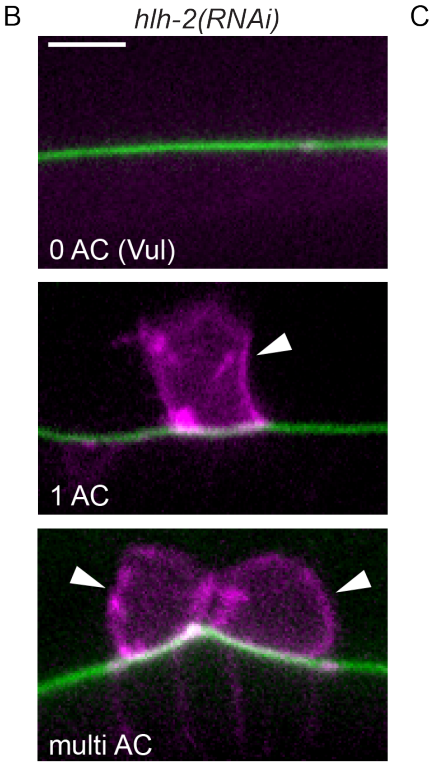
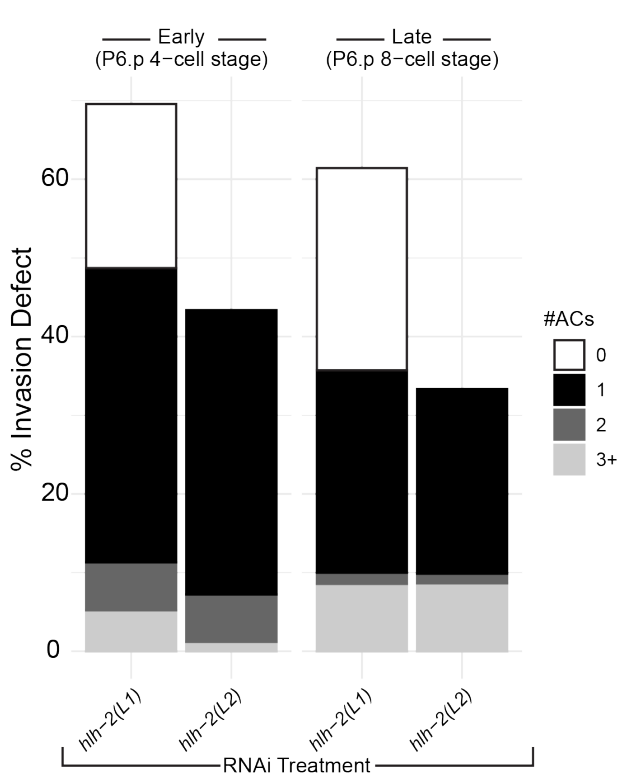

A
RNAi treatment
empty vector
egl-43
fos-1
hlh-2
nhr-67
% Invasion Defect
0
25
50
75
#ACs
1
2
3+
L4440
T444T
RNAi vector


B
hlh-2(RNAi)
0 AC (Vul)
1 AC
multi AC


C
Early
(P6.p 4-cell stage)
Late
(P6.p 8-cell stage)
% Invasion Defect
0
20
40
60
#ACs
0
1
2
3+
hlh-2(L1)
hlh-2(L2)
RNAi Treatment

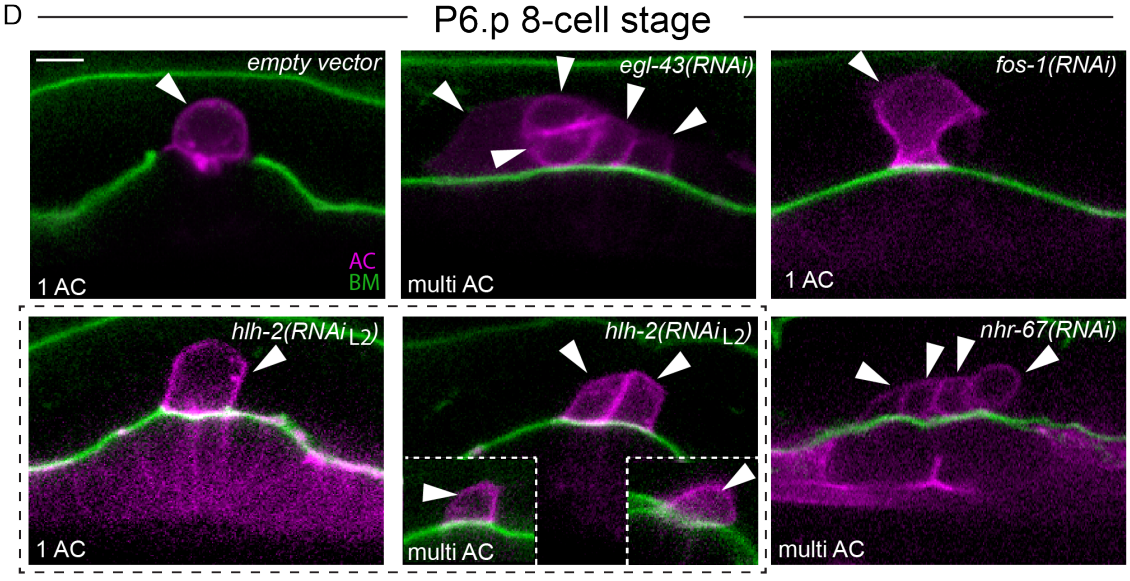

D
P6.p 8-cell stage
empty vector
AC
BM
1 AC
egl-43(RNAi)
multi AC
fos-1(RNAi)
1 AC
hlh-2(RNAi L2)
1 AC
hlh-2(RNAi L2)
multi AC
nhr-67(RNAi)
multi AC

Fig. S1. Improved RNAi increases penetrance of TF depletion phenotypes. (A) Stacked bar graph depicting penetrance of AC invasion defect comparing L4440-based versus T444T-based RNAi depletions. Asterisk (*) denotes statistical significance between treatments and represents a p-value < 0.03 by Fisher's exact test ($n \geq 30$ animals per treatment). (B) Single plane of confocal z-stack depicting L1 plating depletion of *hlh-2*. The AC-specific membrane marker (magenta, *cdh-3*$^{1.5}$>mCherry::PLCδ^{PH}) and BM marker (green, *lam-1*>LAM-1::GFP) are overlaid in each micrograph. (C) Stacked bar graphs depicting range of phenotypes following L1 and L2 platings of *hlh-2(RNAi)*. (D) Single plane of confocal z-stacks during the L4 stage depicting representative TF-RNAi phenotypes.

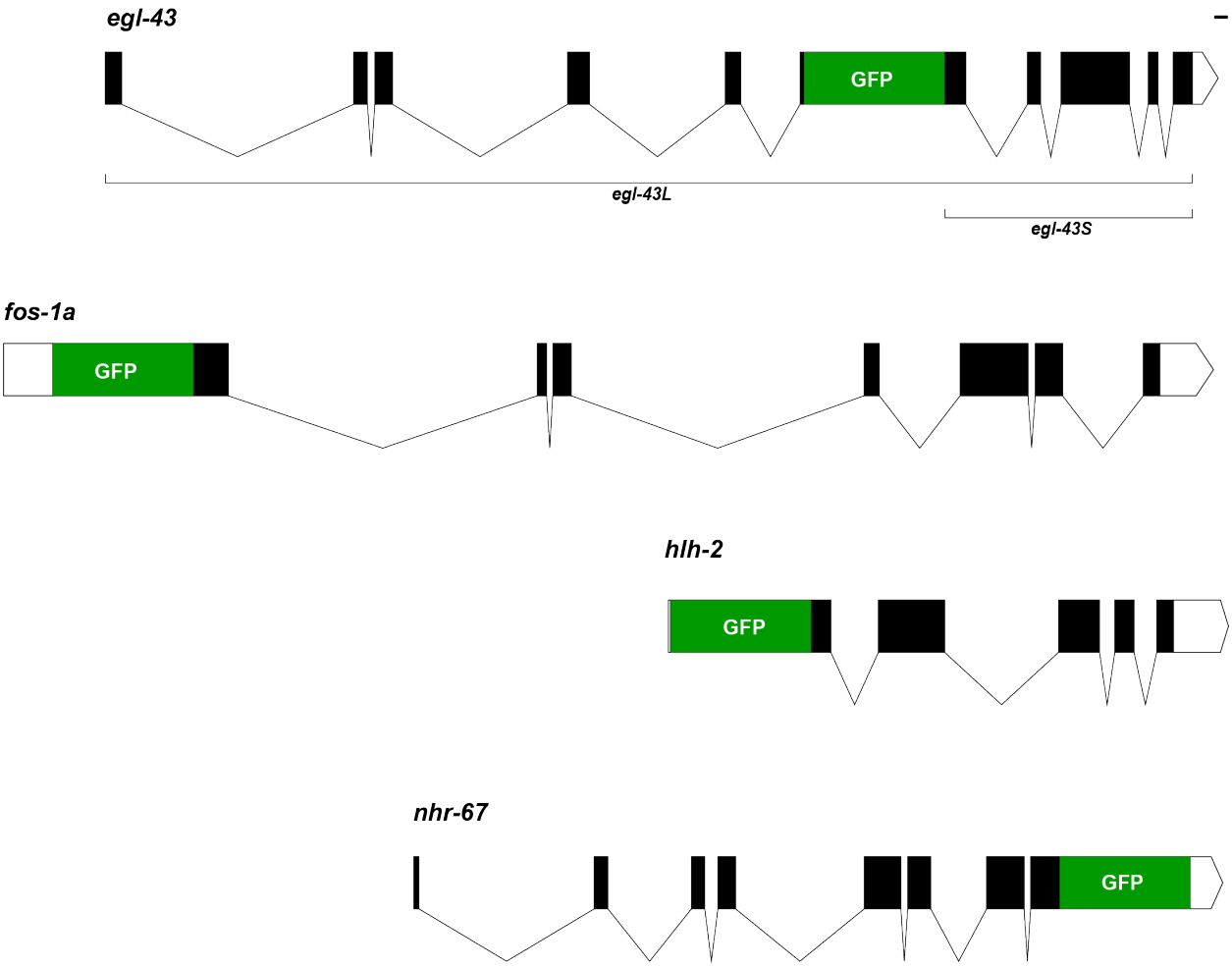


Fig. S2. Schematic of endogenous GFP-tagged loci of pro-invasive TFs. Codon-optimized GFP was integrated at the N-terminus of *fos-1A* and *hlh-2,* at the C-terminus of *nhr-67*, and internally in the *egl-43* locus (tagging both isoforms). Figure made using http://wormweb.org/exonintron. Scale bar, 100 bp.

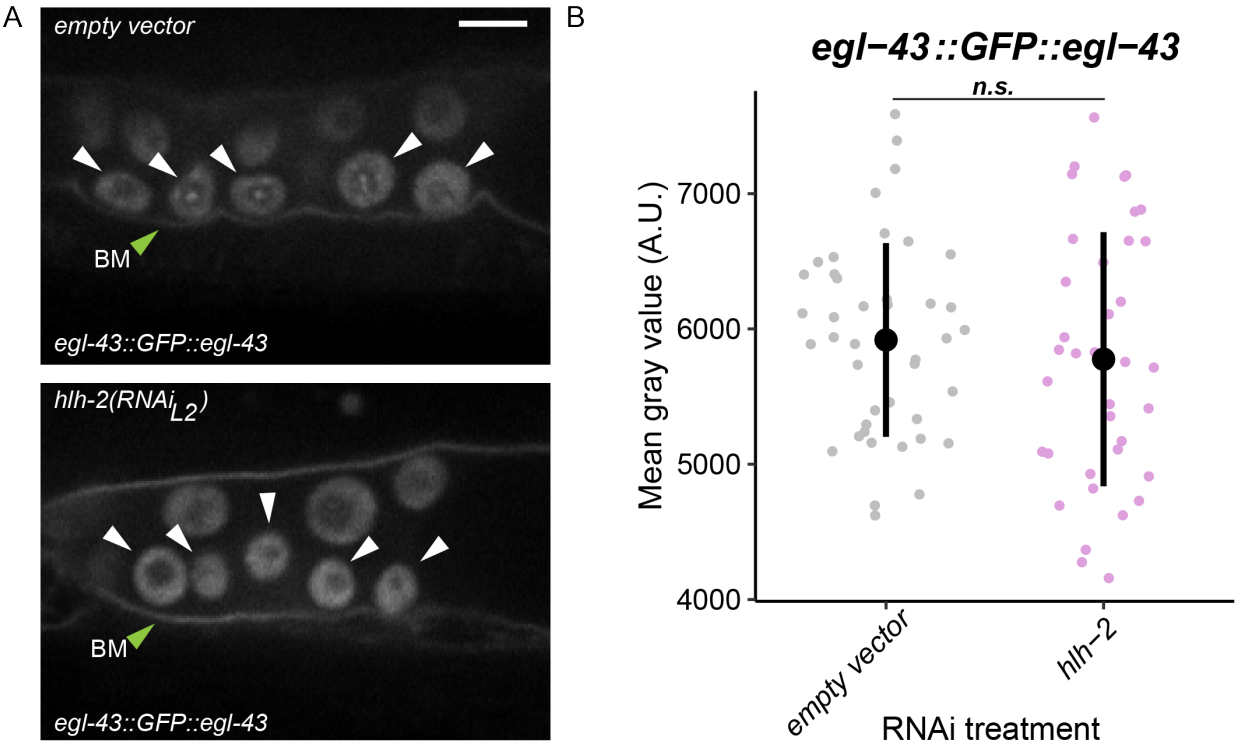


Fig S3. HLH-2 does not regulate EGL-43 expression in the ventral uterus. (A) Single plane of confocal z-stack depicting levels of *egl-43::GFP::egl-43* in the ventral uterine (VU) cells (white arrowheads) in empty vector controls (top) as compared to *hlh-2(RNAi)* depletion. BM indicated by green arrowheads. (B) Sina plots of *egl-43::GFP::egl-43* levels, defined as the mean gray value of individual VU nuclei, following *hlh-2* RNAi perturbation (n ≥ 10 animals, n ≥ 37 VU cells quantified per treatment). *n.s.,* not significant, p-value = 0.45 Student's t-test).

Table S1: Scoring tables

Genotype	RNAi Treatment	P6.p stage	% Invaded (#ACs)				% Not invaded (#ACs)				n
			0	1	2	3+	0	1	2	3+	
rrf-3(pk1426) II; unc-119(ed3) III; rde-1(ne219) V; fos-1a>RDE-1, myo-2>YFP; cdh-3>PH::mCherry; lam-1>LAM-1::GFP + unc-119(+)	*empty vector T444T*	4-cell	0	100	0	0	0	0	0	0	50
	egl-43(RNAi) T444T	4-cell	0	12	1	0	0	27	19	41	75
	egl-43L(RNAi) T444T	4-cell	0	41	1	0	0	19	15	24	80
	fos-1(RNAi) T444T	4-cell	0	62	0	0	0	38	0	0	66
	hlh-2_L1(RNAi) T444T	4-cell	0	30	0	0	21	37	6	5	115
	hlh-2_L2(RNAi) T444T	4-cell	0	57	0	0	0	36	6	1	83
	nhr-67(RNAi) T444T	4-cell	0	7	0	0	0	13	0	81	72
	empty vector T444T	8-cell	0	100	0	0	0	0	0	0	50
	egl-43(RNAi) T444T	8-cell	0	40	5	5	0	0	4	45	55
	egl-43L(RNAi) T444T	8-cell	0	78	9	5	0	7	0	2	58
	fos-1(RNAi) T444T	8-cell	0	90	0	0	0	10	0	0	50
	hlh-2_L1(RNAi) T444T	8-cell	0	41	3	0	24	24	1	8	76
	hlh-2_L2(RNAi) T444T	8-cell	0	64	1	1	0	23	1	9	81
	nhr-67(RNAi) T444T	8-cell	0	32	0	0	0	0	0	68	57
	empty vector L4440	4-cell	0	100	0	0	0	0	0	0	30
	egl-43(RNAi) L4440	4-cell	0	55	0	0	0	0	0	45	31
	fos-1(RNAi) L4440	4-cell	0	84	0	0	0	16	0	0	32
	hlh-2_L1(RNAi) L4440	4-cell	0	69	0	0	9	16	0	6	32
	hlh-2_L2(RNAi) L4440	4-cell	0	80	0	0	0	13	3	3	30
	nhr-67(RNAi) L4440	4-cell	0	40	0	0	0	7	0	53	30
cdh-3(5kb)>CKI-1::GFP; zmp-1>mCherry	*empty vector T444T*	4-cell	0	100	0	0	0	0	0	0	51
	egl-43(RNAi) T444T	4-cell	0	10	0	0	0	90	0	0	31
	fos-1(RNAi) T444T	4-cell	0	20	0	0	0	80	0	0	35
	hlh-2_L2(RNAi) T444T	4-cell	0	92	0	0	0	8	0	0	77
	nhr-67(RNAi) T444T	4-cell	0	100	0	0	0	0	0	0	42
laminin::GFP; zmp-1>mCherry	*empty vector T444T*	4-cell	0	100	0	0	0	0	0	0	27
	egl-43(RNAi) T444T	4-cell	0	19	3	0	0	30	22	27	37
	fos-1(RNAi) T444T	4-cell	0	49	0	0	0	51	0	0	53
	hlh-2_L2(RNAi) T444T	4-cell	0	56	0	0	0	31	3	10	59
	nhr-67(RNAi) T444T	4-cell	0	47	0	0	0	0	35	18	62
egl-43L>SEC::GFP::EGL-43; cdh-3>mCherry::moeABD; laminin::GFP	*N/A*	4-cell	0	67	3	0	0	8	17	6	51
egl-43L>SEC::GFP::EGL-43/mT1; cdh-3>mCherry::moeABD; laminin::GFP	*N/A*	4-cell	0	100	0	0	0	0	0	0	25

egl-43>LoxP::GFP::EGL-43; cdh-3>mCherry::moeABD; laminin::GFP	*egl-43(RNAi) T444T*	4-cell	0	0	0	0	0	13	22	123	158
fos-1>LoxP::GFP::FOS-1; cdh-3>mCherry::moeABD; laminin::GFP	*hlh-2_L2(RNAi) T444T*	4-cell	0	12	0	0	0	38	0	0	50
hlh-2>LoxP::GFP::HLH-2; cdh-3>mCherry::moeABD; laminin::GFP	*fos-1(RNAi) T444T*	4-cell	0	22	0	0	0	11	6	81	120
nhr-67>NHR-67::GFP; cdh-3>mCherry::moeABD; laminin::GFP	*nhr-67(RNAi) T444T*	4-cell	0	19	2	0	0	0	14	95	130

Table S2: Strains

Strain	Genotype	Description	Figure(s)	Source
NK1316	*rrf-3(pk1426) II; unc-119(ed3) III; rde-1(ne219) V; qyIs102[fos-1a>RDE-1, myo-2>YFP]; qyIs24[cdh-3>PH::mCherry]; qyIs10[lam-1>LAM-1::GFP with unc-119(with)]*	uterine-specific RNAi strain with AC and BM markers	1-2, 8,S1	Matus et al., 2015
DQM497	*fos-1(bmd138[fos-1>LoxP::GFP::FOS-1]) V.*	endogenous *fos-1* GFP reporter	3	This study
DQM337	*egl-43(bmd88[egl-43>LoxP::GFP::EGL-43]) II; qyIs225[cdh-3>mCherry::moeABD] V.*	endogenous *egl-43* GFP reporter with AC marker	3,8	This study
DQM352	*hlh-2(bmd90[hlh-2>LoxP::GFP::HLH-2]) I; qyIs225[cdh-3>mCherry::moeABD] V.*	endogenous *hlh-2* GFP reporter with AC marker	3,8	This study
DQM291	*nhr-67(syb509[nhr-67>NHR-67::GFP]) IV; qyIs227[cdh-3>mCherry::moeABD] I.*	endogenous *nhr-67* GFP reporter with AC marker	3,8	This study
DQM335	*egl-43(bmd88[egl-43>LoxP::GFP::EGL-43]) II; qyIs225[cdh-3>mCherry::moeABD] V; qyIs7[laminin::GFP] X.*	endogenous *egl-43* GFP reporter with AC and BM markers	4-5, S3	This study
DQM515	*fos-1(bmd138[fos-1>LoxP::GFP::FOS-1]) V; qyIs227[cdh-3>mCherry::moeABD] I; qyIs7[laminin::GFP] X.*	endogenous *fos-1* GFP reporter with AC and BM markers	4-5	This study
DQM350	*hlh-2(bmd90[hlh-2>LoxP::GFP::HLH-2]) I; qyIs225[cdh-3>mCherry::moeABD] V; qyIs7[laminin::GFP] X.*	endogenous *hlh-2* GFP reporter with AC and BM markers	4-5	This study
DQM368	*nhr-67(syb509[nhr-67>NHR-67::GFP]) IV; qyIs225[cdh-3>mCherry::moeABD] V; qyIs7[laminin::GFP] X.*	endogenous *nhr-67* GFP reporter with AC and BM markers	4-5	This study
DQM7	*qyIs330 [laminin::mCherry]; qyIs232 [CDT-1::GFP]*	G1 cell cycle phase reporter with BM marker	6	Matus et al., 2015
DQM39	*qyIs17 [zmp-1>mCherry] II; qyIs266[cdh-3(5kb)>CKI-1::GFP] V*	*zmp-1* mCherry reporter with AC-specific CKI-1 over-expression	6	Matus et al., 2015
NK272	*qyIs7[laminin::GFP]; qyIs17[zmp-1>mCherry]*	*zmp-1* mCherry reporter with BM marker	6	Matus et al., 2015
DQM500	*bmd135[egl-43L>SEC::GFP::EGL-43] II/mT1; qyIs227[cdh-3>mCherry::moeABD] I; qyIs7[laminin::GFP] X.*	endogenous *egl-43L* transcriptional reporter (with SEC) balanced with mT1 balancer with AC and BM markers	7	This study
DQM494	*egl-43(bmd136[egl-43L>LoxP::GFP::EGL-43]) II.*	endogenous *egl-43L* GFP reporter	7	This study
DQM503	*egl-43(bmd87[egl-43>SEC::GFP::EGL-43] II/mT1; qyIs227[cdh-3>mCherry::moeABD] I; qyIs7[laminin::GFP] X.*	endogenous *egl-43* transcriptional reporter (with SEC) balanced over mT1 with AC and BM markers	7	This study
DQM300	egl-43(bmd88[egl-43>LoxP::GFP::EGL-43]) II.	endogenous egl-43 GFP reporter	Will be made available through the CGC (cgc.umn.edu)	
DQM497	fos-1(bmd138[fos-1>LoxP::GFP::FOS-1]) V.	endogenous fos-1 GFP reporter		
DQM311	hlh-2(bmd90[hlh-2>LoxP::GFP::HLH-2]) I.	endogenous hlh-2 GFP reporter		
PHX509	nhr-67(syb509[nhr-67>NHR-67::GFP]) IV.	endogenous nhr-67 GFP reporter		

Table S3: Primers

Primer	Primer sequence (5'→3')	Primer type	Amplicon	Template
DQM657	tcactatagggagaccggcaATG	Forward	*hlh-2* and *nhr-67* synthesized DNAs for T444T	Twist Biosciences gene fragments for *hlh-2, nhr-67*
DQM658	attgggtaccgggcccc	Reverse		
DQM688	gagctcAGATCTatgagcatcgacacagacttc	Forward	BglII-*egl-43L*-XhoI for T444T	Twist Biosciences gene fragment for *egl-43L*
DQM689	acgtacCTCGAGctgactttgacacgttgggc	Reverse		
DQM720	TCACTATAGGGAGACCGGCAATG	Forward	BglII-*egl-43*-SalI for T444T	*egl-43* IDT gBlock
DQM722	GCCCCCCCTCGAGGTCGAACTTTTG GCACCGGAAC	Reverse		
DQM708	ggtttcgccacctctgacttg	Forward	colony PCR screening of T444T constructs	T444T-based constructs
DM191	gtaatacgactcactatagggcgaattgg	Reverse		
DQM433	ACGTTGTAAAACGACGGCCAG	Forward	amplify left homology arm (universal)	Twist Biosciences gene fragments
DQM434	CTCCAGTGAACAATTCTTCTCCTTTAC TC	Reverse	amplify left homology arm (universal)	
DQM435	GCGTGATTACAAGGATGACGATGAC	Forward	amplify right homology arm (universal)	
DQM436	GAAACAGCTATGACCATGTTATCGAT TTCC	Reverse	amplify right homology arm (universal)	
DQM751	tcctattgcgagatgtcttGTCCACTCTCTTATA TAGCAGGTTTTAGAGCTAGAAATAGC	Forward	*fos-1a* sgRNA	pDD122
DQM747	tcctattgcgagatgtcttGgatgctcatcctgaaaactt GTTTTAGAGCTAGAAATAGC	Forward	*egl-43L* sgRNA	pDD122
DQM438	tcctattgcgagatgtcttGaagtcagATGCCATC ACAAGGTTTTAGAGCTAGAAATAGC	Forward	*egl-43* sgRNA	pDD122
DQM440	tcctattgcgagatgtcttGAGTTTTCAGAACC TCAATGGGTTTTAGAGCTAGAAATAG C	Forward	*hlh-2* sgRNA	pDD122
DQM412	AGATTGTACTGAGAGTGCACCATATG CGGTGTGAAATACCGCAC	Reverse	amplify sgRNA (universal)	pDD122

Table S4: Plasmids

Plasmid	Base vector	Description
pTNM011	pDD122	*egl-43* internal sgRNA
pTNM012	pDD282	*egl-43::GFP::egl-43* repair template
pTNM013	pDD122	*fos-1* N-terminal sgRNA
pTNM014	pDD282	*GFP::fos-1* repair template
pTNM015	pDD122	*hlh-2* N-terminal sgRNA
pTNM016	pDD282	*GFP::hlh-2* repair template
pTNM046	pDD122	*egl-43L* N-terminal sgRNA
pTNM047	pDD282	*GFP::egl-43L* repair template
pWZ172	T444T	*egl-43* RNAi
pWZ173	T444T	*egl-43L* RNAi
pWZ174	T444T	*fos-1* RNAi
pWZ175	T444T	*hlh-2* RNAi
pWZ176	T444T	*nhr-67* RNAi

Table S5: CRISPR reagents

	Guide	Left homology arm sequence	Right homology arm sequence
egl-43 (internal)	aagtcagatgccatcacaag	CTAAGATATGAGAACCCGTTTACAGAGTCCTTTT ATAGAATTTTGGTTTTTATAATAGAGATGTATGGA AACCGGGCAAAGTTAATTAGGATTCTTACAGCCA ACAAGAAAATTTTAAGATAAGTAACGACCAAAAC TTGAGCGGAGTTGAAAGTTCAGTGCATTACAATT GAAGTTTTTATTTATTATTTATTTATCTTGGGCTA GAATAGATGGAGCATCTTCACAGGACTGGACTT ATATAATGGCTATCTGCCTGCCTGCCTACCTGC CTTTCGTTTTATTTATACTGTATTTGCGCAATATA AACTCATGCATTTCTATTTGTTAGAAGTTAAAAAA AACAATATTTAGAAAACGTTCACATGTACTTTGAT AGTTGGCTCGCATGTTGGCAGAAGGCAGGCACA GGGAACCCTGAAGGCACTTAGGCAGGTTCGCT GGACAAAATACCTGCTGATTGTGCTGATTTATTT TCACTAATATAATCAGATATGAAACATGGACAAT TGGGTACAATACTAATAGAGGGTGTACTGCTATA TAACTTCTCCGAATCAAAACTTAACAGTCATTCA CATTCACTATCACGTGTTATCAATCAATTTTTTTC AGCGGTCTCAAACAACACTCTCATATTCATTGCT CCTTAAAGCCGTTTCGGTGTCATTTGTGTCCAAA GTCCTACACACAATTCTCAAATCTGTGCAGGCAC CGGAGAGTTCATTCAGTGAGTTATTAATTTAGAG TTTCTAAGAATAAACTGAGCACTGTAATAATCTAT CGTGCAATGCTCCTGGGCTAAGAGTCCTTAAAG AGAGGATATAAAACTGAATAAACCCCATAATCTC ACAACAGGGGGGAAAACTCGAGGCGTGGTCAA GAAGGTTATTGTCCTCTGTACTAATAAAAACGGA AACGATTTCAATGATGTGCCCCCACCTGAGGTG GTCCCTTCCTTAATTGTTTACCCCGTGAGAAAAG TGCAAGGAGCCATGATGCTCCGCCCTCTTTCTT CTCAACCAATAAGACACGCGCGCCGCCCATCCC TCGTGCATCTTCCCTTTGGGGTGTGTCACAGGG CTCATTCTTGTGACGTGCGCTTCCCACCTTTACC AGTGTGTTATCAATCTCCGTCTTATTCATTAGTG AATAAATATTCCAGGACGGTTGGACGTGCCCAA CGTGTCAAAGTCAG	ATGCCATCACAAGCGGCACTAACGAAGCATCGACC AGTTTGCGAGATGACTGCACTCTACAAACCATTGAT GGCGCAACTTGCCGGATTGAGCGGAGCAGGTGGAT TAGGTTCCGTGCCATATTGGCCACATATACTTCAAA TGGCAACACAGGTTAGTTATTATTTTGAAAACTCAAC TATAGATACCGTCTCCCCTATTACTATTGCATCCCAT TATTCAACTTTGACGCTTTATATTTCAGTTTCCGTTT GTCCTACATGAAAATGATCAATTGGCCAATTTTTTAT TATTTCTTTCTCTATAGTTTTGTAGTTGATAAAATAAT CAAATCGTCATAATGAACCGAGATATAGCATTTCAAA GTGAAATAGTGGGCTGCAATAGAGGAAATAAGGTAA TTTTCCCTCACCCCCTTGACTATACAACACTCTTGAG AGTATCCATGGACAACAATCATCGTACCTTAATTAAC CTACCTTAAGCCTCCTCCCAACCTCTCCATCTCTTC CGTTCAATATGATACCTTCATTTCCCGCATCTCGGG GGCTTAATCCTCTTTCCTTCTCTTCCTCAAGCGGCT AATGAACATGCACTCATTTTCAGGCACCACATTTCC CGCTTGCTTTTCTTGCCGCCAATCCAGAAGCGTACA AACTGATGCAGCAGACGACGTGTGCATCTCCAGAT GCCGAGTGTTCCAGGTTTGTGAATGATTTATATGGT GAATCAAAAAAAAAAGTGGAGTAGTTCTCTTACTCTTA TCAATAATTGATTTATTCTATTCACTCTTTAGTACTAG TGAGAAGCTAATATATTGTATAGAAAACACAAAAAAA AATCAATTTATTCCAGTGGACATGCCAGTGAATCTTC ACCAACTACAACTGAACCAGTCGACCTAACAGCTAC ACCAAAACCTCCTTCGACGTCTGAAATGGAAACTAC ATCAAAGTCCGACGATGGAGAGGATCGTGACAGCA TCGGAGACTCTGGGAATGATGATGATGATGACTCAG AAGCTGGAGTTCTAGATGAGTCGTCCACAACAACGT CAACGAAAAAGCGTCCGACATCTCACACAATTTCCG ACATACTCGCTGCTCCACAACTCGGTGCTCAGGCTT TGAATTCGACGTTCCTTGGCATGCTTCAGCGCTCGC TTAATTATAATCCAGCAGTTCCATCGCCTCACTCATT TC

egl-43L (N-terminus)	gatgctcatcctgaaaactt	TATTTTCCGTCCAGCAATTTACTTCCAAAAATTCA AACTAAGTCAATAGTTGTTATAGTTTTTAAGTTGG TCTTTGATTATTGAGCAGTTCGGTAAACTCGCAG CCGACCTCGATGGAGTCTCGCGATAGCCTACTC CTGGAAAAAACGTTTGTCTTCTGCTTTCACCTCA TGATATCAGGAAACTTATTACAGACATTCAGCCG ACAAATAAACGGCTTGGCTTCTACTAGAAATGCT CAATAGATTCTAATTTAGTAGGTGTAGATATTTTC ACTTTTGTTTATTTTTCTAAGTATCGAAGTACATA TGTTAGAAAGTAAATAAAAATTGCTATTCTACTTT AAGAATTTTCTATATTAAAATAGTCTTTAGTAACG TGGGGTTTTCGAAACTTGCAACTTTTCAAGTGAA GATGCTCCTCACCTGAAGCATCCTGTCACTCTA CCGATTGGCTGATGGGCGTGTCGTCTTCCATCT CTTCCACCCGCCCACTTTTTGAGACAGGAGAGG CTCTCGCTCCTCTCGCATCCACAAATGGAAGGC GCCTCTTTCCATCTTCCTTTCTTTTTTTTCTGGTT AGTTGAAGTATCCTTAAAGTATCTTGACGTTTTTA CTATATATGACTTCTGGAGAGACATTCGAGTTTT TGGATCAAATATAGAATGTCAAATTTTGAAGAGC AATCTTCTCATATGTCAATTTTTCAATAAAATTGT ATCCTACATTGTGGTGGTGTAGAACCCTCAAAAA ATAATCTCTAAATTAAGAATTTCTTGATTTTAAAA CTGACTAGCAAATTTGTCATGAAAAATCTCAAAC GAATTTCCTACAGTTCATCTACCAAATGAATTGG GCTTGTAAACTTTTTCACCATCTACTAAAAAATTC AATAAAATAATAATCTCTTCCCAAACTACACCTC CCTCCAATATCTCTCAGCTTACTCCTAACTCCTA TCCCAAATTCGTACATCTACCGTACCATTCCTCC TCCCTGTTCGTTCTCAATGACAAAGCCAGCCTTG AACAGCCATATCCAACTTTTTCGTTGCATTGTTC TCGTTCACAAGATGTATTACTCATCTTTCGCCCC AAAACTGTTCTTGTAATTTGTACAGTTCTTGTTTC TTCCCACGTACAGTTTCCTAAGTTTTCAGG	ATGAGCATCGACACAGACTTCCTCACGAGTGTTGAG GTAAAGGAGGATGAGCTACATGGAAATGTGCTCATT GCAGTAACTCAAATTGCACTCGGAAGGACCATCGGT GTGATTGATAAGGTGAGCTTTTGGTGTACAATTTTTA CGCCGTAGACATTGTCTTAGAGGTGTCCGCTAGAAA AAGAAGTATAAGCTTATTCCCGGGCGTCTAAAAAAC TCCACCGGAAAAAATACAGGTCGCTTGAACTGAAAT ATCTTATAGCTTGAGTAACCTATGAAATAAGCTTTCA GATGTTACACTCATATTTTGTTAGTTAGTAGTTATAT GATAACAGTAATTTTAGGTTGTAATTGATAAAATAAT GACTTTTTTAAATTAACAAAACTTTTTTTAAAATATTT TTACAAGCATTTTAAATTGATACCTTGGTGCCTAATC TACCTAATCTACAGTACCTTCGCCAACATTTTCAAAT CCTTTCCTAATGATTCAACGTTCGAATTACAAATTCT TCCCAGAACCCAAAACCGCAATTATCGGGACCCTGA AATGTTTGGCGCCATGTGTTCCTCCCTGCTTCTTCT CCTCAAAAATTCCTTACACCTGTCTTTCCACCTTTCC CGCTCCCCCCGTCCATTACCACTTTGTTAACCTTGG GGGCACACTAGTAACCATTACATTAGGATTTA
fos-1A (N-terminus)	ccactctcttatatagcaga	CTTAGACATCCATCCAAATATTTAAATGTTGCTG TTGCTTTTGGGTCAACAAACGACACATACCTGTT AGTGTCATCCTTCGTTCCGCGTGCACGCATCGC ACTGAATCATCGGTATTCATCACCTCTTCTCTGC AATCAACGAGCCAAATGCCAATTGGGTTATTTGA GTTAGAAACTCGGGAAGCTTCACAGAAGAAATA ATTAGCTGAATTGGCAAAGAGAGCACCTGCTCC CCGGAATGTCATACTTTTGTAGAATAAAAGAAGG GAAGACGACGACGTCTCCGGTTCTTCTATCCCA AACAATACCATTTTTTGTTTCCCATCTCGTCTTCG ATGTTGCTGACTCACCATCAATATCTAAACAGAA AGCACCCAATGGTTCGCCTTTTTTTGTCTCCTTTC TCGACAGTTTCTGTTTTTTTTTGTATGTTACATAA ATACCGTACACCCACCATCTAGTCAATTGTCACA TATTCGAAATCAAAAGTTATCAAAAACTCTCGTG CACTTTAATACACAGTTCCGTCGGCCACCCCGT CACCAGCCGGCGTTTTCTTGGTGATATCATTGG CGGTGGCTCTTTGAAAATTCAAATTTGGTGTCGT CCTCCCGAAGGTGTGGGCGGAGCTTGCGCACC GTTCGCGGTGGCCGTTGCTCTCGACAGTTTTCT CTTTCCCTCGCTCCTTTCTTCTCTCAACCAAACA CCTGCCCACACACGCAACTTACTTTTGTCATCGC TGGTCCCCTGTCCAAAGATACAATCAACCCGTG TTGTGCTAATCATCACCTAGAAGAGTCATCTTCG TGAATCAGAATCCCTTTTCTTCCCCCTACTTTTTC CACTTCTATTCCCGGTTACTCACCTTCTGTGTTT GGCCCCGATCGTGTGTCAGCACGTCTGCTATAT AAGAGAGTGCA	ATGTTCGAACAACCATCGTCGACGACTAACACCACC ACGAGCTCTGGTTCTGGCTCCGATTCCAATCACTAC TTCGAATTGGGTCCCAGGAACCCGATCAACCAAGC GCACCCGACATCAGTCATTGTTCCACCGCGACAACA TCACCATCAGATCCACCAACAACAAACCGACAACTC ACCTCTAACTCCGTGTACACCATATTATCCATCAAAT GCATATGGACTCCCTTTATTCTTTGGAACTGATTTCC TGCAGGTATGATACATCACAAATATCTTCCTTAATTC AGTGTTTACTTCAAAGTCCACTATTCCCTTGCTAATA ATCACGAGTTTTGATAGAGCTTTTAAATCATTACTTT CACTCATTTTTCACTCAACCTCGAGCCTTACATTTGT CAGTTGATCTCTTCTTTCCCATATAAAAATGAGATTA TAGTAGCTTACTTTCATTTAGTTTAATATTAATTCTGA AAGTATCAAACCAAAAAGTAAAGCGTTCACTAATTCT TTTGTGCAAAAGTCATGCAGAAAAAAGTTACCTAGC TCTTGAATCTTTTCCCTCAAAAATGTTCTTACCAGCC ATCTCCCCCGGATTTTAGTTCCGGAAAAATAAAACT ATTTGGTTATGGATTAAATGTATATGGATAGGTGGT GCACGAGGAATCTTAAAAGAAGATGCCGACGTGTTT ACACACTTCTACAGTAATCTATCTATCTTTCACCTTT CCCCCAATTGTTACTTTTGTGATCTTCTTTACCTCTC ATGCACTCGCTAATCCGTTTTGGATTGTTTCCTGTTT GCACCTGTTGAAAAAAGATAAGTAATACTTATATGTT AACTTTTTTCGGTGCCAGTGAAAATATTACAGGCAC GCAAATTTTTTAAATATTCAAAAAATATCTGTCACTTC TGCTTTGAGCTTG

hlh-2 (N-terminus)	agttttcagaacctcaatgg	GACTGGTGAATGAATGGTGGGAGAAGAGATGGA GGACCCCGGGATAATAGAGGATTGTGTGCTGCA GGAGGTAGAGAGAGATGGTTGTGGGCGTGACC TCTCCCGATCATCGTCTCTGCGTCTCTTGGATGT AGACGGTCCCCGGGAGAAAGAATGTCTGCGTCT ATGTACACCAATATACTGTTTATGTCCCTTGAAT GGGCTTTTATACGCGTCCCTCCACTACCACCAC CCTCGAAGAACCATTCCTAGCCACCCGCATAGC CGCTAAGAAGGGGGGAGTGCACTCTTTTCGTCT TTTTTTGTGTCTAAATCTGTTCCGTTTACTAGCTT TTCAAGTTCATGATCTTACTGTAATAAAACATAG CACATATTTTGAATGAAATACATAATGTATCCCAT CTTCTGATTTTGAAAATTAAAATTTCTCTCCTCCC AATTTTCAATTTTGGATCTTTTACCAAATAATTTT GATCTGCATTACTTTTTCTCACTCCTACAATGTTT ACGAATCCTTACCAATTTTGAATTTAAACAAGAA CGCAAATGTATTGTAGGGCAGTTTTTTTTTCAAT TATTGAGTTTATCAAAAAATGTATATTTGCATCCG AAATGTTACTAGCTCACGTTTAAAGCTTTCATATA TATCTTATCCTACGTCTGAATTTAAACTAATTATT TAGATGGGCCTGAAACCCTTTGATCCATCACCC CTTTACTGTTATTTTATTGCTCTTTCGGGATGTCA TCCATCCGATAATCATCTACAATGACATCTACAT TTACAACTATTTCTTGATACCATCTCAACATCATT ACCTCCCTACAAATTGTTCTCCTTCAAGTAACTT GCTCCTAATAATTTATACCGGAACTTAGTAGATC TATTGTGACGTCACAATTATTATTCTTTATTGATC TACCTTGCCTCTTTTGATCTCGTTTGCCTATTTAA CCAAACGAGGAGAATCGATTATTTTCTTCTTTTT CTTATTCTCAATATTTCTTCAAATGGGGTTGTCTT GACGAAAATCTAATCAGAATATATTTACTAACCT AATTTTTTCACCTGCTGCTCCAGCCCAATTCCCT ACTTATTCCCTTTCCTCTCCCCGCTTCTCCGCTG ACTTTATTTCTTTGACATTACTACTATAATCGTCT TTCATATCATTTCGCAGAAATAAAGTTTTCAGAA CCTCA	ATGGCGGATCCAAATAGCCAACTTACGTCAGCCACA ACTGTTGCAACTGCCGCCATTGCTCAACCACAGGTT ATGCTTCCAAATGCATATGATTATCCTTATAATATTG ATCCGACAACGATTCAGATGCCTGATTATTGGAGTG GTTAGTCTTTTTTTCATTTGAAATCTATTATAATTTCA ATTATATCATTTGGTAAACCAAACCAAACATGTTTTC GTGAATTTGTTAAAAGTCGCTTGTAATCAGTTAGAAA TATTGGATAAATTGCAGAAAAAGGATATAAGTTTGGT ATTACTTATCTCGAATTGTTGAATTGTTGATTTTATAA GCTCGCAAATTTTTAAAATTTACTTTAAGTTGAAACA AAATGTATAACTCTTTTAATGTTCTAAAATTTTGTAAA AATCTGGTTTGCTCTAGTAAGTAGTTTATTAACCAAA ATGTTTATATCTCATTTCTCAAGTGCAAGTCATCTAA ATAAACATTTTCAGGATACCATCTCAACCCGTATCCT CCGATGCAAACAACGGATATTGATTATTCATCAGCC TTCCTTCCAACACATCCACCAACTGAAACCCCTGCT TCCGTAGCTGCTCCAACTTCTGCAACATCTGATATT AAGCCAATTCATGCAACATCATCCACTTCAACGACG GCTCCATCTACTGCTCCAGCTCCAACTTCAACTACT GATGTGCTTGAGTTAAAGCCAACAACAGCTCCAGCC ACGAATTCTGCAGAAACATCAGCGATTGTTGCTCCA CAGCCTCTTACTAATCTTACCGCACCAATTGACGCA ATGTCATCAATGTATACATGGCCACAAACATATCCA GGTTACCTTCCACCTTCAGAAGATAACAAAGCAAGT GAAGCTGTTAATCCATACATCTCAATCCCTCCAACAT ATACATTTGGTGCTGATCCATCAGTTGCCGACTTCT CATCGTATCAGCAGCAACTTGCTGGACAGCCGGTA CGTTTCTATTCTTCTTGGTTTTATTCGTGTTTTACTGT TTTACCACAAGTTAATCTCGACGAATGATTGCTTGG CCCTCCTCAGCCGCCAAGCATTCACGTATGCATAAT CCGCTTCCTTTTGATGTGAGCCGCCGCCTTCTGAAG ATTGAGATGCATGCAAAAGGCGGCATCTTCTTGAGA AGAACACCCTGTGCGCACTAAACGACCTCC
nhr-67 (C-terminus)	ccacgtcattcgattcgatcaat	N/A (made by SunyBiotech)	N/A (made by SunyBiotech)
	agagagtgttaatgttgaagagg		

Table S6: RNAi vectors

Gene Target	Synthetic gene block
egl-43L(RNAi)	TCACTATAGGGAGACCGGCAATGAGCATCGACACAGACTTCCTCACGAGTGTTGAGGTAAAGGAGGATGAGCTACATGGA AATGTGCTCATTGCAGTAACTCAAATTGCACTCGGAAGGACCATCGGTGTGATTGATAAGGCTACACCGAATGATTCGAAT GCTCTTCTCATCTTGAACCTGATTAAGGAAGCTGATGACGGAGAAGATGCCAATATTTGTATGAGGCAGGAGGATAGAAAG ACTTTTCTACAAACCAGTAAGATTATCAATATTGGAGAGCGTCTTCTTCTACAAAGACTGTCCGAAGAGGAGTGTGATGAGG AGGATCAGGATGATCTTGAGAATTTAATTTTGTTAAAAGATGAAGATCGGCCGGACAGTACTCAAAGCTGCACAAAGAGCA GCAGTGAAGACAGCAATCTAAACGGTTTCGAGGAGTATATTCGAGAACACGGCGAACTTGTACCTGGTCAAACGCCTCCC GACGGATCACACAAGTGTGGAGTTTGTCCAAAGAGTTTTTCAAGTGCAAGCGGTCTCAAACAACACTCTCATATTCATTGCT CCTTAAAGCCGTTTCGGTGTCATTTGTGTCCAAAGTCCTACACACAATTCTCAAATCTGTGCAGGCACCGGAGAGTTCATTC AGACGGTTGGACGTGCCCAACGTGTCAAAGTCAGGGGGGGGCCCGGTACCCAAT
egl-43(RNAi)	TCACTATAGGGAGACCGGCAATGCCATCACAAGCGGCACTAACGAAGCATCGACCAGTTTGCGAGATGACTGCACTCTAC AAACCATTGATGGCGCAACTTGCCGGATTGAGCGGAGCAGGTGGATTAGGTTCCGTGCCATATTGGCCACATATACTTCAA ATGGCAACACAGGCACCACATTTCCCGCTTGCTTTTCTTGCCGCCAATCCAGAAGCGTACAAACTGATGCAGCAGACGACG TGTGCATCTCCAGATGCCGAGTGTTCCAGTGGACATGCCAGTGAATCTTCACCAACTACAACTGAACCAGTCGACCTAACA GCTACACCAAAACCTCCTTCGACGTCTGAAATGGAAACTACATCAAAGTCCGACGATGGAGAGGATCGTGACAGCATCGGA GACTCTGGGAATGATGATGATGATGACTCAGAAGCTGGAGTTCTAGATGAGTCGTCCACAACAACGTCAACGAAAAAGCGT CCGACATCTCACACAATTTCCGACATACTCGCTGCTCCACAACTCGGTGCTCAGGCTTTGAATTCGACGTTCCTTGGCATG CTTCAGCGCTCGCTTAATTATAATCCAGCAGTTCCATCGCCTCACTCATTTCTAAGAGCAATGAGCGGAGCAAAAGCATCAT CATCACCAAGCTCGAGCAGTGGAAGTGGAAAGGATAGGTACACGTGCAAGTTCTGTCAGAAAGTGTTCCCAAGATCAGCG AATTTGACAAGACATTTAAGGACACATACAGGAGAGCAGCCTTATAAGTGTCAATATTGCGAGCGAAGCTTCTCAATCTCCT CCAATTTGCAACGCCACGTTAGAAACATTCATAATAAGCCGAACACCTCGCTGACACCCCACAATCATCATCGTCAACGAA GTCTGCACAATTCAACCTCAACCTCCACTACTACTACTACCGTCCATCATCCTCTTCTTCATCTTCCAGGAACGTCCGTTCC GGTGCCAAAAGTTACCGGGCCCCCCCTCGAGG
fos-1(RNAi)	CTCACTATAGGGAGACCGGCAGATCTATGGTACAGTATAGCACGGTGAAGAAATCGTCGGCTGGGAGAAAACCTAAAGAA GAGGATAATATGGAGGATGACGATGATGATAAGAGGCTGAAACGTCGTCAAAGGAATAAAGAAGCTGCTGCAAGATGTCG GCAAAGGAGAATTGATTTGATGAAGGAATTGCAAGATCAAGTAAATGACTTCAAAAATAGCAACGACAAAAAAATGGCGGAA TGCAACAACATCCGAAATAAGCTCAACAGTCTCAAAAACTATTTGGAAACGCATGATTGTAAACTGAGTCGCGAAGAACGAA CACATGAGATAAATCGATTGATAATCCCACCATCAACAGTTCCACCATCACAACCATATCTTCAACATTCGTTGAGAGTTCAT CCACCACGTGCTGACTCTGTACCATATTCTATTCGATCAGGACATTCATCTTCATCGTCTGAACAACACTCACCAGTTGAGG ACTATAAGCCTTCAATTGATCAATTACTTCTTCCTCCAATCTCATGTATTCAAAATATCAAAGATCGAAATATCAATTCTATGC CACCACCAGCTTTACCGGCAAGCACGAGTGCTGCTGGAATTCATGTTATCACTTCTATCCCGGTTTCGCATGCCAACTCATT ACACGGTCGTTCGGAAAACGTTTTCGCAGAACCGGAACGCAAAATTCCAAAAATCGAGTTGGACCAAACACTGACATCATT GACCATGCCAGACGACGTTGAACGTCCGTCAGCTCTTCCGACGCTTTCCAGAATCGTTGAAAATCAGCCGATCACTACTCC CAGCAGGCCTTTCCGTCTCGGGGGGGAATATCAAAATCAAACACCGCAGAGTACAGGGAATGGACTATTCGGAGGCCCAC CAGGCCCATTCGACTTGCTTTCCTCCAACACTGGTCTGACACCTTCTGGTCAGCCAACAATGAACTTCGTTTCAACTCCAAC CCCGATTCAACCACATCCGGATGCTGATCTCCGACCACTCTAGGTCGACCTCGAGGGGGGGCCCG
hlh-2(RNAi)	TCACTATAGGGAGACCGGCAATGGCGGATCCAAATAGCCAACTTACGTCAGCCACAACTGTTGCAACTGCCGCCATTGCTC AACCACAGGTTATGCTTCCAAATGCATATGATTATCCTTATAATATTGATCCGACAACGATTCAGATGCCTGATTATTGGAGT GGATACCATCTCAACCCGTATCCTCCGATGCAAACAACGGATATTGATTATTCATCAGCCTTCCTTCCAACACATCCACCAA CTGAAACCCCTGCTTCCGTAGCTGCTCCAACTTCTGCAACATCTGATATTAAGCCAATTCATGCAACATCATCCACTTCAAC GACGGCTCCATCTACTGCTCCAGCTCCAACTTCAACTACTGATGTGCTTGAGTTAAAGCCAACAACAGCTCCAGCCACGAA TTCTGCAGAAACATCAGCGATTGTTGCTCCACAGCCTCTTACTAATCTTACCGCACCAATTGACGCAATGTCATCAATGTAT ACATGGCCACAAACATATCCAGGTTACCTTCCACCTTCAGAAGATAACAAAGCAAGTGAAGCTGTTAATCCATACATCTCAA TCCCTCCAACATATACATTTGGTGCTGATCCATCAGTTGCCGACTTCTCATCGTATCAGCAGCAACTTGCTGGACAGCCGAA TGGTCTTGGTGGAGATACCAACTTGGTTGACTACAATCATCAATTCCCACCAGCCGGTATGAGCCCACACTTTGATCCAAAT GGATATCCAGGAATGACCGGAATGCCACCAGGATCAAGTGCATCATCTGTTCGAAATGATAAGTCTGCATCAAGAGCAACG AGCCGTCGTCGGGTACAAGGCCCTCCATCTTCTGGAATTCCAACTCGCCATTCATCGTCTTCAAGGCTTTCTGATAATGAAT CAATGAGTGATGACAAAGATACGGATAGGAGATCACAGAATAATGCTCGAGAAAGAGTACGAGTTCGTGACATCAGGGGG GGCCCGGTACCCAAT
nhr-67(RNAi)	TCACTATAGGGAGACCGGCAATGATGACTGCGGTTTCACAGATGTCGGTTCCAAGCAGTCGAATTCTATTGGATGTTGATT GTAGAGTCTGTGAAGATCATTCGTCGGGGAAGCATTACAGTATTTTTTCCTGCGACGGGTGTGCTGGATTCTTTAAACGTTC AATCCGTCGTCATCGTCAATACGTGTGCAAAAACAAAGGCAGTCCATCCGAAGGACAATGCAAAGTGGACAAAACACACCG CAACCAGTGCAGAGCTTGCCGACTAAGAAAGTGTCTGGAAATTGGGATGAACAAAGATGCTGTCCAACATGAGAGAGGGC CTCGTAACTCAAGTTTAAGACGACAACAGATGATGTTCGATCATGGATCCTCTCCTAATTCGCCGGAAATGGGATCAGAAA GTGATGCAATAATTCTTCCGACATCATCAATGAATCGTGACACAGTGGCCGGTACTGCTGCTCGAATCTTTTTTGCACTTGT TGGATTTTGTCAGAATCCTTTGAATGGAGTACCTAAAGAACGGCAAATGACAATGTTTCAACAAAATTGGGCAGCACTTCTT GTTCTCCATGCAACTGAAACACGTGCCATAACTTCTAAGCAAATAAGGACTGAGACGATATCCGGTAGCTCAGAGCAAAGA AATGCGGTTGCTAACGCGTTTGAAATAATTGAACGTTTACAATTGGATAATAGAGAATACATGATGTTGAAACATTTCACAAT GTGGAGAGATACACCAAGTGCAATTCAAATTGTCTTTCAGTTAGCATCTATTCAGAATTTCACACATAGAACCGAACCGACG AGATATATCCAATGTATAAATGCAATTGCCGCTATTCCAACAACTTCAATAATTGATGTTCTATTCCGCCCTTCAATTGGATC AGCTTCAATGCCAAGACTTATTCAAGACATGTTCAAGCCACCACAACAACCCACTCCTACGTCACTGTTTCCAATGGGGGG GGGCCCGGTACCCAAT