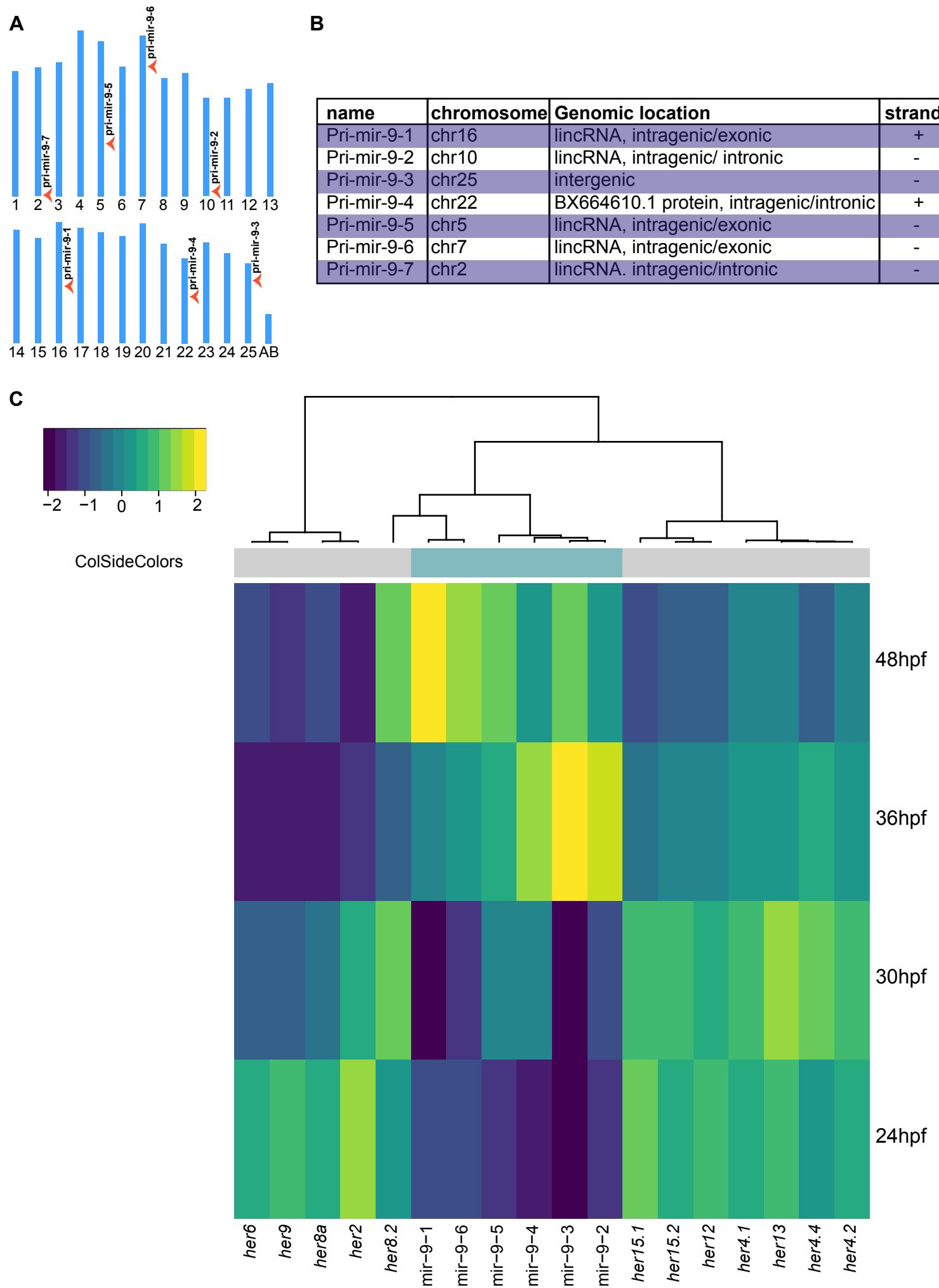
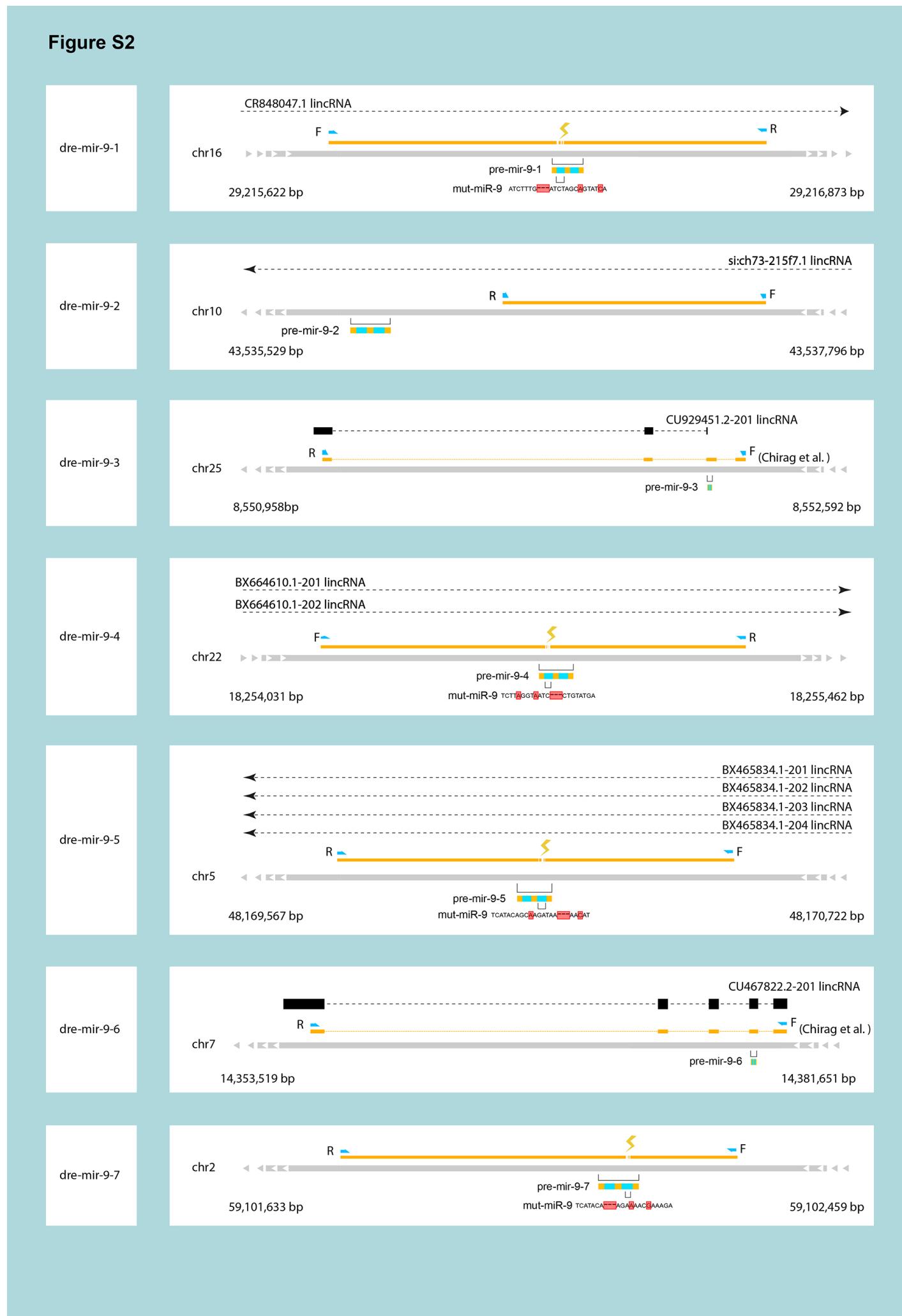


## Figure S1

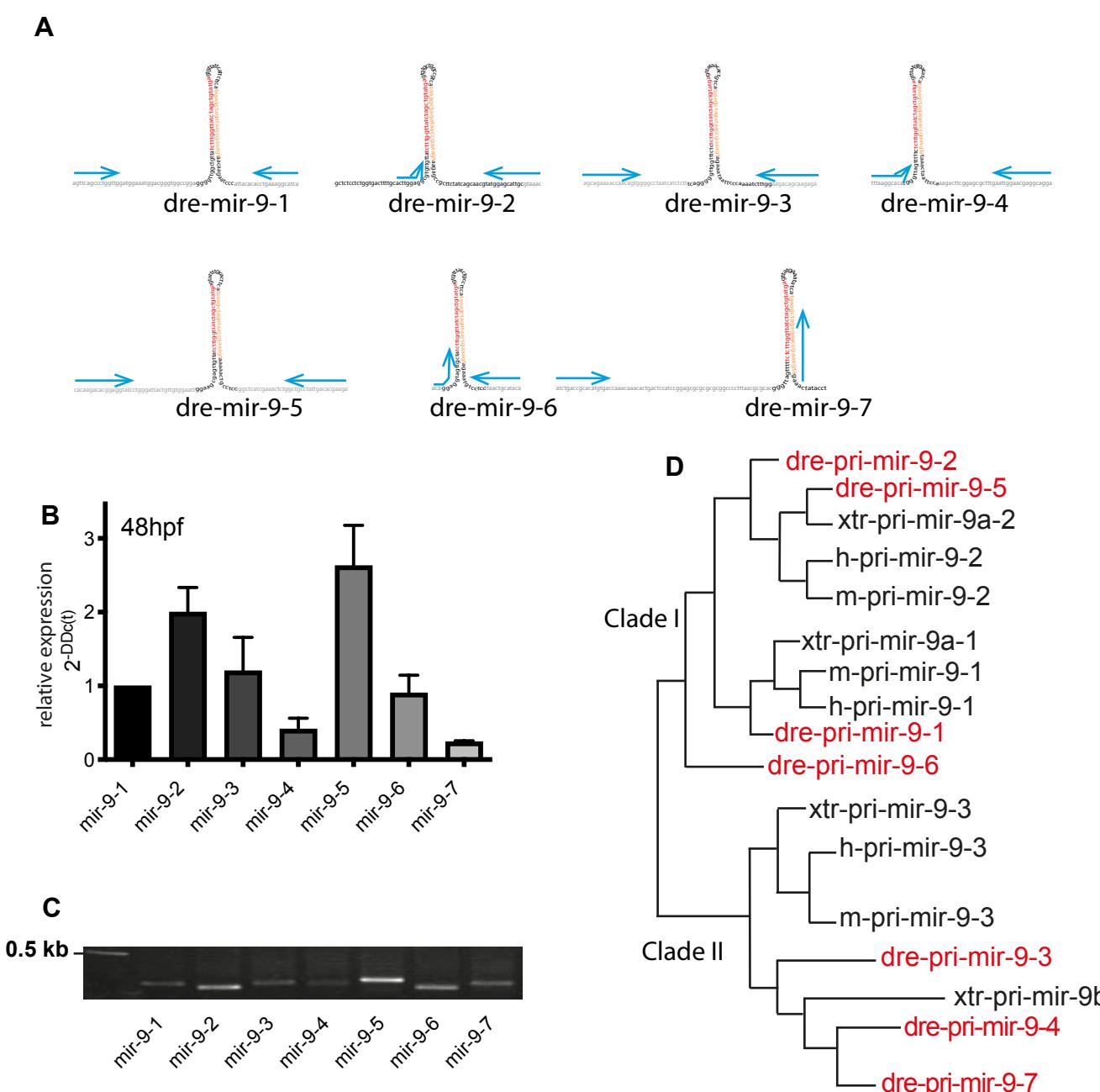


**Fig. S1. miR-9 host gene expression negatively correlates with Hes/Her gene expression over developmental time.** **(A)** Map of miR-9 paralogues in *Danio rerio* produced with information from Vega genome browser, data was collated from ensembl genome browser GRCz10, showing chromosomal loci. Red arrowhead indicates location of respective pri-mir-9. **(B)** Table showing the genomic loci of the seven *Danio rerio* miR-9 paralogues, their host gene, exonic or intronic location within the host gene and strand orientation. **(C)** Heatmap showing z-scored expression data over developmental time for the miR-9 host / pri-mirs and Hes/Her genes over developmental time in the zebrafish embryo. Data is from White *et al.*, 2017.



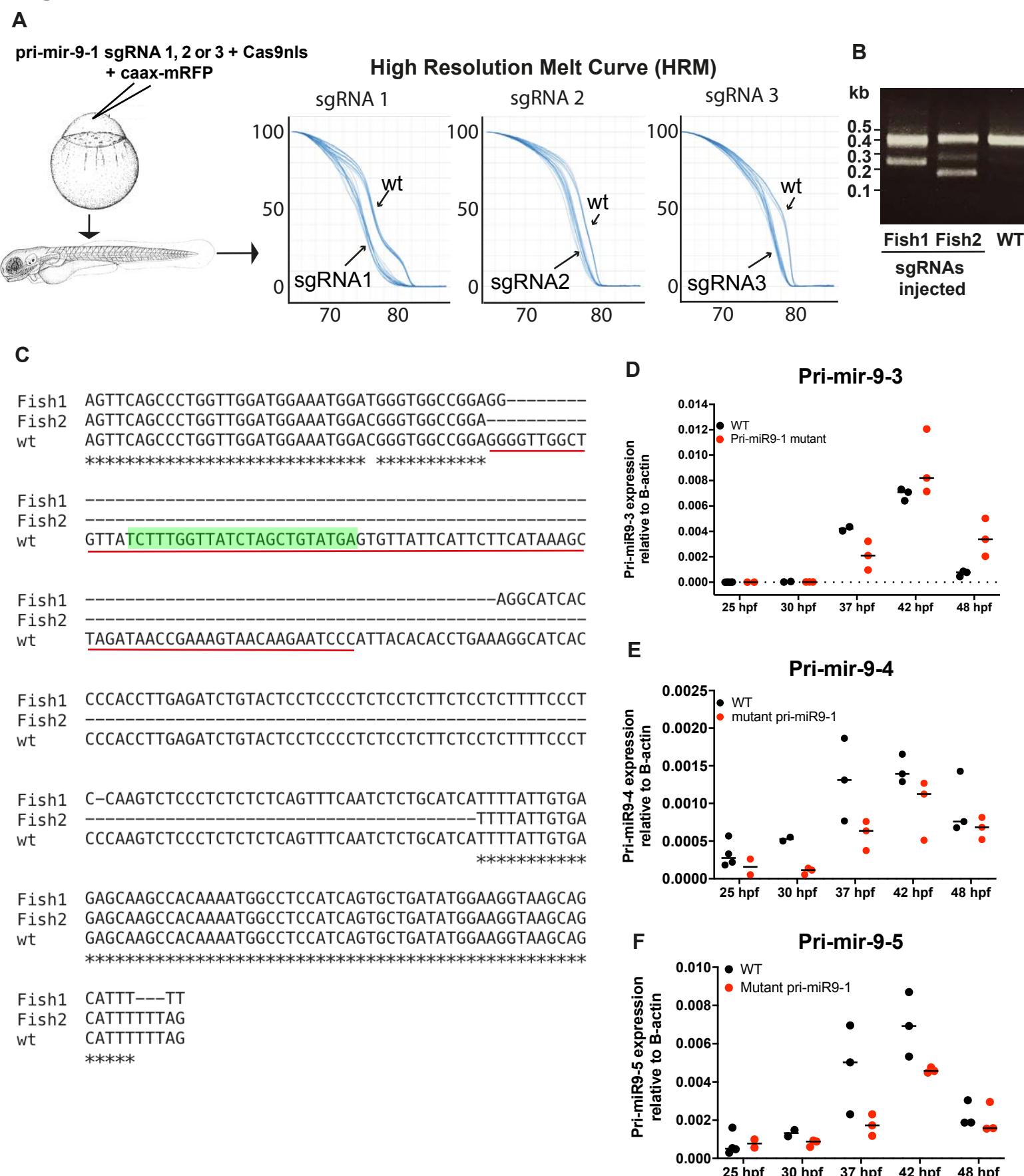
**Fig. S2. Probe design for *in situ* hybridisations of pri-mir-9s.** The probes are indicated by the orange blocks. Where probes are on exons, introns are indicated by dashed lines. Forward (F) and reverse (R) are visualised by blue arrows. Overlapping transcripts are indicated by the black boxes and dashed lines. The microRNA hairpin is indicated by a small orange box broken by two blue boxes indicating the mature sequences. Probes for pri-mir-9-3 and pri-mir-9-6 were based on those from Nepal et al. (2016). Mutations in the mature sequence are indicated by lightning bolts and also annotated underneath.

### Figure S3



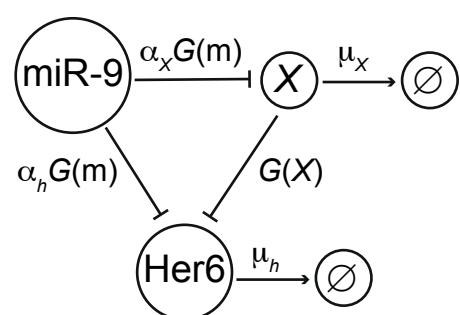
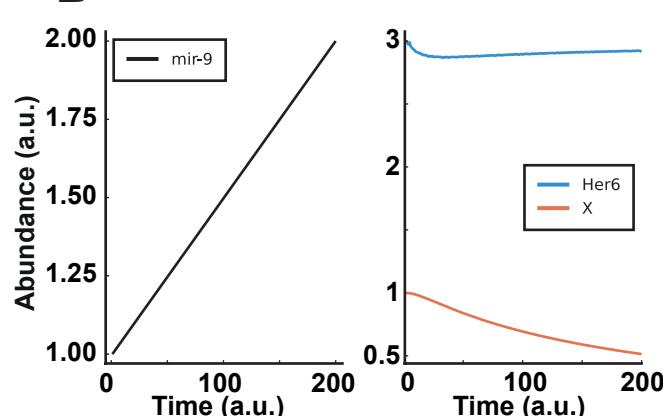
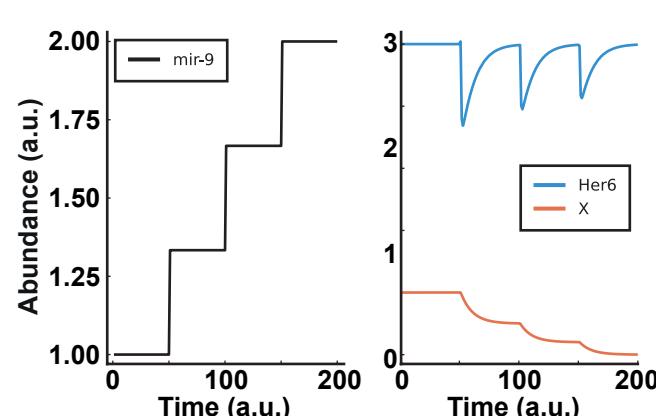
**Fig. S3. All seven miR-9 paralogues are expressed at 48hpf.** (A) Schematic of the seven miR-9 paralogues hairpin loops with the respective primers used for qRT-PCR annotated as blue arrows (**Methods. mRNA extraction and Quantitative realtime PCR; Table S3**). Red sequence: miR-9-5'arm, orange sequence: miR-9-3' arm, black sequence: pre-miR-9, grey sequence: partial sequence of pri-miR-9. (B) Bar plot showing relative expression of the seven miR-9 paralogues at 48hpf, N=3. Error bar represent mean and SEM. (C) Amplicons of the seven miR-9 paralogues generated by qRT-PCR using the respective primers (**Table S3**). (D) Evolutionary relationship of pri-mir-9 family modified from Alwin Prem Anand et al., 2018 phylogenetic analysis. Highlighted in red letter are the seven miR-9 paralogues. The zebrafish miR-9 paralogues cluster into two Clades: Clade I that is divided into 2 subgroups: Subgroup I corresponding to the group in which human (h) and mouse (m) pri-mir-9-2 precursor cluster with *Danio rerio* (dre) pri-mir-9-2 and pri-mir-9-5 precursors and subgroup II corresponding to the group where h/m-pri-mir-9-1 precursor clusters with dre-pri-mir-9-1. Interestingly, dre-pri-mir-9-6 is closely related to clade I but doesn't group with any subgroup. Clade II correspond to the branch where m/h-pri-mir-9-3 group with dre-pri-mir-9-3, dre-pri-mir-9-4 and dre-pri-mir-9-7.

## Figure S4



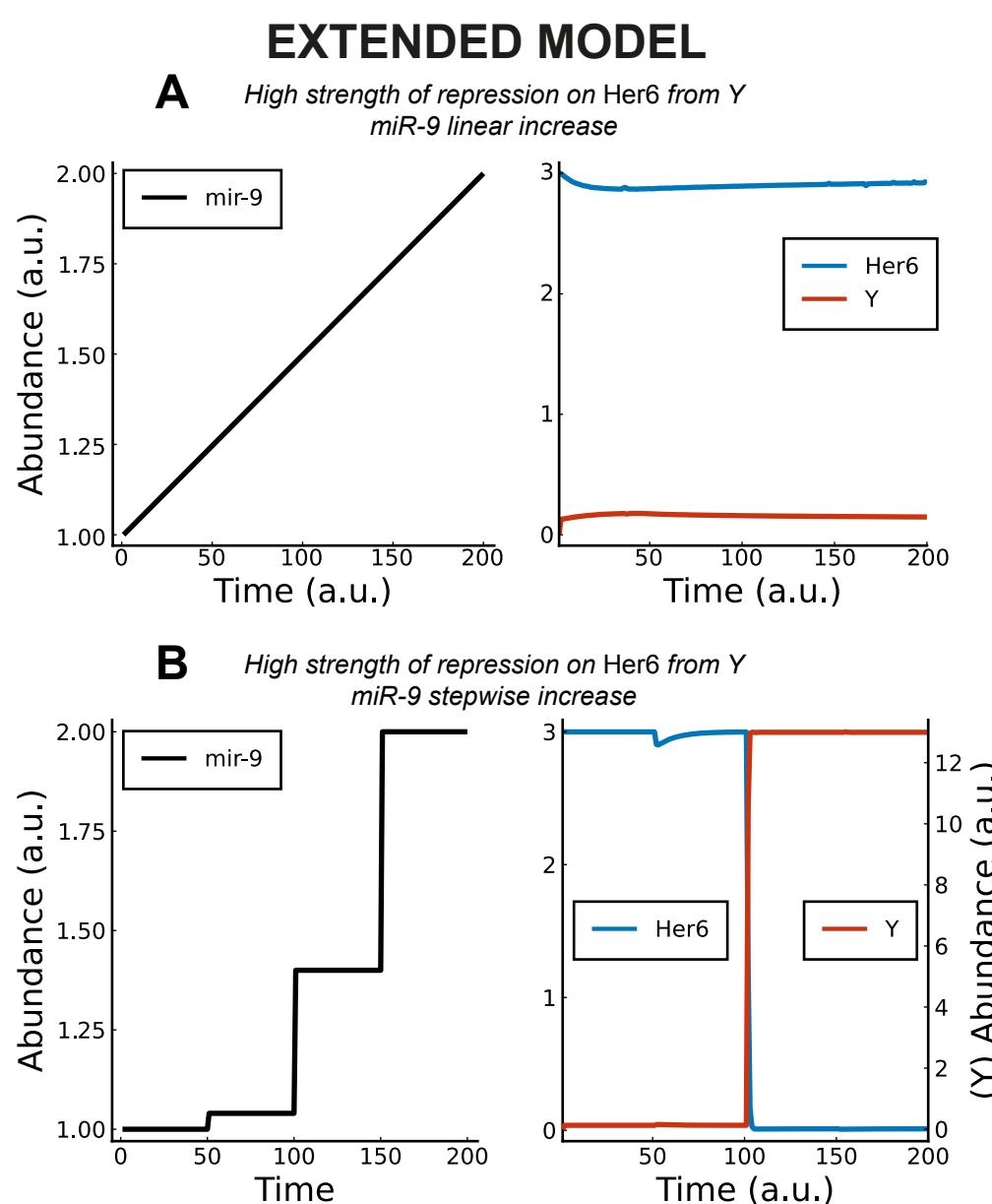
**Fig. S4. Deletion of pre-mir-9-1**

**(A). (A-left)** Schematic representation of experimental procedure used to delete premir-9-1, **(A-right)** high resolution melt graphs obtained from: wt (wildtype) versus sgRNA 1, 2 or 3 injected fish, respectively. **(B)** Agarose gel showing the size of the amplicon in wt fish (395bp) and in injected with three sgRNA fish, ~250bp and 395bp in fish1 and ~190bp and 395bp in fish2. **(C)** Representative examples of sequences obtained from F0 embryos showing deletion of pre-mir-9-1. Red underline indicates pre-mir-9-1 sequence. Green highlighted indicates mature miR-9 sequence. **(D-F)** SYBR green relative quantification of pri-mir-9-3 **(D)**, pri-mir-9-4 **(E)** and pri-mir-9-5 **(F)** from dissected hindbrain at different stages of development, in wild-type conditions (black dots) and deletion of pre-mir-9-1 (red dots), quantification was normalised using  $\beta$ -actin. N=3.

**Figure S5****PERFECT ADAPTATION MODEL****A****B***miR-9 linear increase***C***miR-9 stepwise increase*

**Fig. S5. Her6 is not down-regulated by miR-9 in the perfect adaptation model**

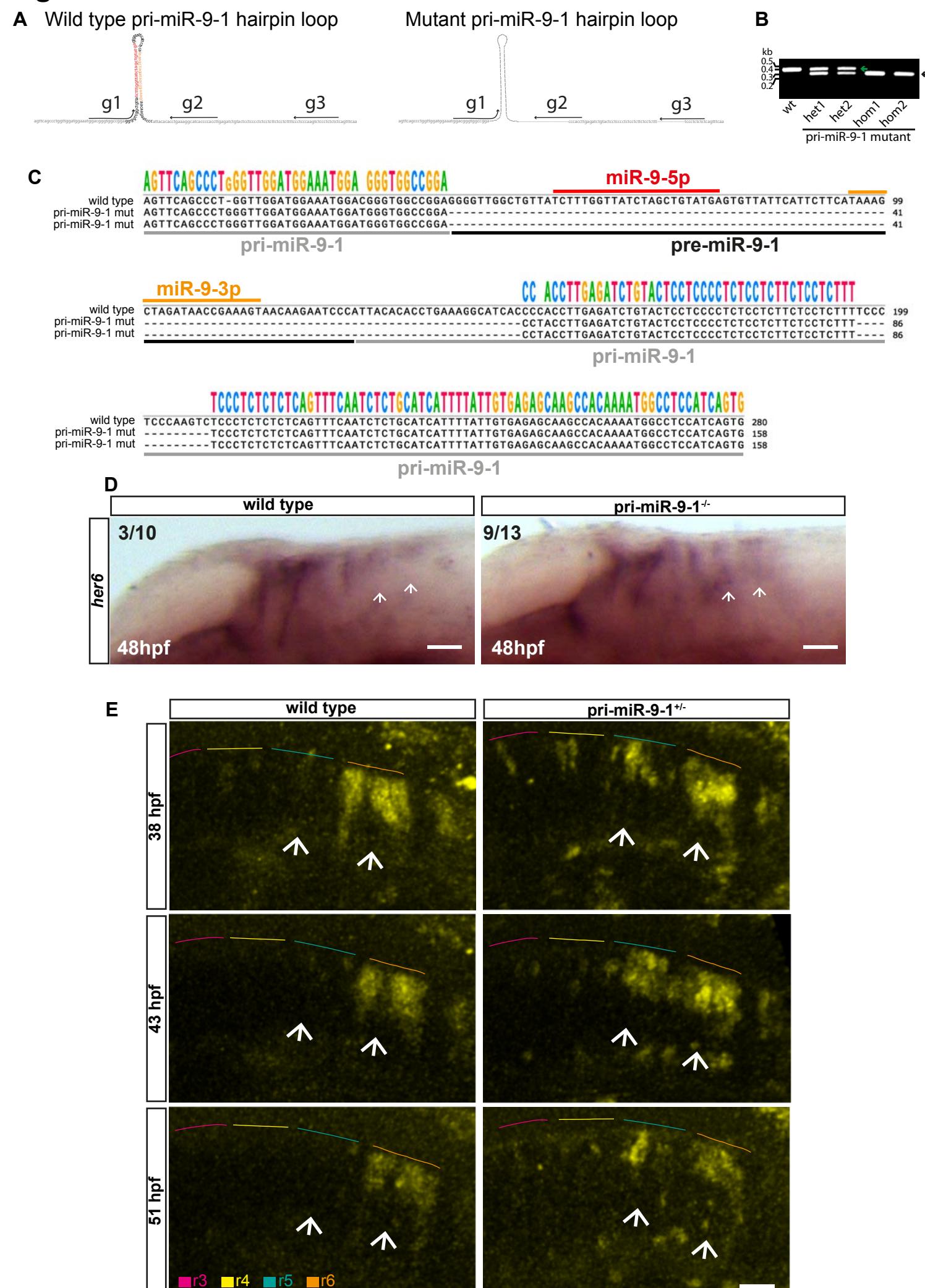
**(A-C) Perfect adaptation model.** (A) A schematic of the perfect adaptation model based on an incoherent feed forward loop. The parameters  $\mu_h$ ,  $\alpha_h$  and  $\alpha_X$  are positive real constants.  $\mu_h$  represents the degradation rates of Her6 and  $\alpha_h$  and  $\alpha_X$  represent the basal production rate of Her6 and  $X$  respectively. See **Methods**, Mathematical modelling (a), parameter values are given in Table S14. (B) A linear miR-9 expression profile leads to a small initial response in Her6 expression levels, which returns to steady state levels due to the perfect adaptation. (C) Large instantaneous changes in miR-9 cause a large drop in Her6 levels, which then returns to steady state. The model detects fold changes in miR-9 and repetitive steps result in a diminished response from Her6.

**Figure S6**

**Fig. S6. Her6 is down-regulated by miR-9 stepwise increase in extended adaptation mathematical model**

**(A-B)** Dynamics of Her6 in response to linear increase in miR-9 **(A)** or stepwise increase in miR-9 **(B)** with increased repression strength from Y. The stepwise increase in miR-9 under high repression strength from Y causes Her6 to switch off given a large enough increase in miR-9.

## Figure S7



**Fig. S7. Generation of pri-miR-9-1 mutant fish line. (A)** Schematic of pri-miR-9-1 hairpin loops with the customized guide RNAs used to specifically delete pre-mir-9-1, annotated as g1, g2 and g3. **Left panel**, sequence of wild type pri-miR-9-1 hairpin loop. **Right panel**, sequence of mutant pri-miR-9-1 after CRISPR deletion with dashed

line indicating the deleted region and loss of hairpin loop. **(B)** Amplicons obtained from F1 generation of wildtype (green arrow) and pri-miR-9-1 mutant (black arrow) embryos, 395bp and 273bp, respectively. wt: wildtype; het: heterozygote; hom: homozygote. **(C)** Sequence showing the region deleted in the pri-miR-9-1 mutant. **(A and C)** Red: miR-9 5' arm, orange: miR-9 3' arm, black: pre-mir-9, grey: partial sequence of pri-mir-9-1. **(D)** Representative image of Chromogenic WM-ISH performed at 48hpf showing *her6* expression in wild type embryos and in pri-miR-9-1<sup>-/-</sup> mutant embryos. Note ventral extension of *her6* expression in pri-miR-9-1<sup>-/-</sup> embryos (9/13) compared to wildtype embryos (3/10) as indicated by white arrowheads; longitudinal view, scale bar 30μm. **(E)** Representative confocal images of wild type and pri-miR-9-1<sup>+/-</sup> embryos showing Her6::Venus<sup>+/-</sup> expression in the hindbrain, rhombomeres 3 to 6 (r3-r6) over the course of development; longitudinal view, scale bar 30μm. Images are representing 2D maximum projection; N=3 independent experiments with 1 embryo, 1 embryo, 2 embryos per experimental condition, Her6::Venus<sup>+/-</sup>;pri-mir-9-1<sup>+/-</sup> or Her6::Venus<sup>+/-</sup>;pri-mir-9-1<sup>-/+or-/-</sup>. Note: The in-cross of Her6::Venus<sup>+/-</sup>;pri-mir-9-1<sup>+/-</sup> adults had low rate of Her6::Venus<sup>+/-</sup>;pri-mir-9-1<sup>-/+or-/-</sup> embryos explaining the low number of embryos analysed per independent experiment. **(D-E)** White arrowheads indicate increased Her6::Venus expression in pri-miR-9-1 mutants.

**Table S1.** Sequences of primers used to generate probes for *in situ* hybridisation. \* Primers for *Pri-mir-9-3* and *Pri-mir-9-6* were used to clone the probes that were kindly provided by the Bally-Cuif lab.

Gene	Oligonucleotides sequence 5>3
Pri-mir-9-1 f	cagattgacagagttgtgag
Pri-mir-9-1 r	cagtgcgtactactctaattg
Pri-mir-9-2 f	gttcaatcctcttcgttttg
*Pri-mir-9-2 r	cagcatcccggttacacattc
*Pri-mir-9-3 f	aatgctgagtttgccacct
Pri-mir-9-3 r	tgctgcggaaaataacacaa
Pri-mir-9-4 f	ttccacaagggtatcgata
Pri-mir-9-4 r	tattatatgagaaccacgtg
Pri-mir-9-5 f	gatgttattccgcgtgcac
Pri-mir-9-5 r	tcagctctcttatatgtcc
*Pri-mir-9-6 f	gagagacaacatcgcatcca
*Pri-mir-9-6 r	tcaaacatagcaggatagggtct
Pri-mir-9-7 f	tactaattaacctataacgctgc
Pri-mir-9-7 r	tctactttcggttctctagc

**Table S2.** Primers for site-directed mutagenesis

Number	Gene mane	Primer sequence 5>3
1	Pri-mir-9-1	agggttggctgttatcttgatcttagcgtatcgttgttattc
2	Pri-mir-9-4	tgggttagtttctcttagtaatccgtatgagttatgtgatataaa
3	Pri-mir-9-5	aaatactcatacagaagataaaacataacaactcgctccaattcc
4	Pri-mir-9-7	acgggttagtttctttcggttctgtatgagttatgaaatatcataaag

**Table S3.** Sequences of primers used for qRT-PCR

Number	name	Sequence 5'>3'	Amplicon size (bp)
1	pri-mir-9-1 f	agttcagccctgggtgg	149
2	pri-mir-9-1 r	tgatgccttcagggttg	
3	pri-mir-9-2 f	acttggaggcggttg	120
4	pri-mir-9-2 r	gtttacgcaatgctccatac	
5	pri-mir-9-3 f	agcagaaaaaccaacagtgg	150
6	pri-mir-9-3 r	tctcttgctgttccaaag	
7	pri-mir-9-4 f	ttaaggcacatgggttag	135
8	pri-mir-9-4 r	tcctgcctcggttccaaattc	
9	pri-mir-9-5 f	cacaagacacggaggtatcc	166
10	pri-mir-9-5 r	tcttcgtgtcaataggcagcc	
11	pri-mir-9-6 f	acaggaggtagttgttatc	104
12	pri-mir-9-6 r	tgtatgcagtttaaggaggac	
13	pri-mir-9-7 f	atctgaccgcacatgtgac	146
14	pri-mir-9-7 r	tctactttcggttctctagc	
15	$\beta$ -actin f	cgtgctgttccccatcca	176
16	$\beta$ -actin r	tcaccaacgttagctgtcttcgt	
17	elavl4 f	ccgtcaacaatgtcaagggtg	147
18	elavl4 r	acacttgcaagacacggtca	
19	barhl2 f	ttcggtcacgatggagcatc	120
20	barhl2 r	agcagatgaggctgagggtga	
21	dmox1a f	gcgaccccacatcatctataccat	105
22	dmox1a r	cgcgttgtgagatagagactga	
23	pax2a f	gtgacaggtcgagagatggc	198
24	pax2a r	acttaataacgcggggttgc	
25	otpb f	tgtggagcgattttcagg	107
26	otpb r	ttccctgttgcattccgtttgaa	
27	tal1/scl f	gcacgacggcggagaca	226
28	tal1/scl r	ggaggcagtggcaaggaa	
29	isl1 f	gcagcagcaacccaacgacaa	224
30	isl1 r	ttgagcctggaccaccacctcagaa	

**Table S4.** microRNA host genes

MicroRNA	Ensembl gene code	Host name
<b>dre-mir-9-1</b>	ENSDARG00000095906	CR848047.1
<b>dre-mir-9-2</b>	ENSDARG00000098512	si:ch73-215f7.1
<b>dre-mir-9-3</b>	ENSDARG00000098395	CU929451.2
<b>dre-mir-9-4</b>	ENSDARG00000095557	BX664610.1
<b>dre-mir-9-5</b>	ENSDARG00000095715	BX465834.1
<b>dre-mir-9-6</b>	ENSDARG00000101584	CU467822.2
<b>dre-mir-9-7</b>	NA	NA

**Table S5.** smiFISH Probe sequences for pri-mir-9-1

Probe sequence name	Probe sequence (5' to 3')
pri-mir-9-1 smiFISH_1	CCTCCTAAGTTCGAGCTGGACTCAGTGcactcacttcttcaca
pri-mir-9-1 smiFISH_2	CCTCCTAAGTTCGAGCTGGACTCAGTGgaggcttctctcag
pri-mir-9-1 smiFISH_3	CCTCCTAAGTTCGAGCTGGACTCAGTGcacagcaaagtgtagaatc
pri-mir-9-1 smiFISH_4	CCTCCTAAGTTCGAGCTGGACTCAGTGgattaccctaagtgttg
pri-mir-9-1 smiFISH_5	CCTCCTAAGTTCGAGCTGGACTCAGTGctagttgccttagttccg
pri-mir-9-1 smiFISH_6	CCTCCTAAGTTCGAGCTGGACTCAGTGaataggggaaaagaccct
pri-mir-9-1 smiFISH_7	CCTCCTAAGTTCGAGCTGGACTCAGTGcgcaaaggctggatttatt
pri-mir-9-1 smiFISH_8	CCTCCTAAGTTCGAGCTGGACTCAGTGgagagatggctaaacgca
pri-mir-9-1 smiFISH_9	CCTCCTAAGTTCGAGCTGGACTCAGTGattgcaggctgatcattctc
pri-mir-9-1 smiFISH_10	CCTCCTAAGTTCGAGCTGGACTCAGTGttctgtgtctgtctta
pri-mir-9-1 smiFISH_11	CCTCCTAAGTTCGAGCTGGACTCAGTGagatgcaaagagtccattca
pri-mir-9-1 smiFISH_12	CCTCCTAAGTTCGAGCTGGACTCAGTGaaccagcctgaactgggta
pri-mir-9-1 smiFISH_13	CCTCCTAAGTTCGAGCTGGACTCAGTGctatgactcaccagtctg
pri-mir-9-1 smiFISH_14	CCTCCTAAGTTCGAGCTGGACTCAGTGctctgattggtagctaa
pri-mir-9-1 smiFISH_15	CCTCCTAAGTTCGAGCTGGACTCAGTGtgcatacgatgtgagactg
pri-mir-9-1 smiFISH_16	CCTCCTAAGTTCGAGCTGGACTCAGTGactgacgttagttatctgt
pri-mir-9-1 smiFISH_17	CCTCCTAAGTTCGAGCTGGACTCAGTGggctgaactgcaacctgaaa
pri-mir-9-1 smiFISH_18	CCTCCTAAGTTCGAGCTGGACTCAGTGcttcagggtgtataatggga
pri-mir-9-1 smiFISH_19	CCTCCTAAGTTCGAGCTGGACTCAGTGagtagatctcaagggtgg
pri-mir-9-1 smiFISH_20	CCTCCTAAGTTCGAGCTGGACTCAGTGagaggagaagaggagagggg
pri-mir-9-1 smiFISH_21	CCTCCTAAGTTCGAGCTGGACTCAGTGgagagaggagactgggag
pri-mir-9-1 smiFISH_22	CCTCCTAAGTTCGAGCTGGACTCAGTGtggctgctcacaataaaa
pri-mir-9-1 smiFISH_23	CCTCCTAAGTTCGAGCTGGACTCAGTGagcactgatggaggccattt
pri-mir-9-1 smiFISH_24	CCTCCTAAGTTCGAGCTGGACTCAGTGaaaaatgcgttaccctcca
pri-mir-9-1 smiFISH_25	CCTCCTAAGTTCGAGCTGGACTCAGTGggaggagataatcacagtt
pri-mir-9-1 smiFISH_26	CCTCCTAAGTTCGAGCTGGACTCAGTGagcaatgagagagactgggt
pri-mir-9-1 smiFISH_27	CCTCCTAAGTTCGAGCTGGACTCAGTGacgcaccttacaatagca
pri-mir-9-1 smiFISH_28	CCTCCTAAGTTCGAGCTGGACTCAGTGtagattgtgaggagggtgt
pri-mir-9-1 smiFISH_29	CCTCCTAAGTTCGAGCTGGACTCAGTGagtgcgtactactctaagt
pri-mir-9-1 smiFISH_30	CCTCCTAAGTTCGAGCTGGACTCAGTGattccgcgtattaaacgcct
pri-mir-9-1 smiFISH_31	CCTCCTAAGTTCGAGCTGGACTCAGTGccctacggagagtgaaatga
pri-mir-9-1 smiFISH_32	CCTCCTAAGTTCGAGCTGGACTCAGTGcattcagcttcgcgtatcg
pri-mir-9-1 smiFISH_33	CCTCCTAAGTTCGAGCTGGACTCAGTGcactccagaatgttgtcttg
pri-mir-9-1 smiFISH_34	CCTCCTAAGTTCGAGCTGGACTCAGTGaaaatgcgcgtgcgagctg
pri-mir-9-1 smiFISH_35	CCTCCTAAGTTCGAGCTGGACTCAGTGattcaggaccgatcgtaatg
pri-mir-9-1 smiFISH_36	CCTCCTAAGTTCGAGCTGGACTCAGTGcctatcctcgagcatcgatg

**Table S6.** smiFISH Probe sequences for pri-mir-9-4

Probe sequence name	Probe sequence (5' to 3')
pri-mir-9-4 smiFISH_1	CCTCCTAAGTTCGAGCTGGACTCAGTGctatcgataccctgtggaa
pri-mir-9-4 smiFISH_2	CCTCCTAAGTTCGAGCTGGACTCAGTGtggaaacgttgcgttggtt
pri-mir-9-4 smiFISH_3	CCTCCTAAGTTCGAGCTGGACTCAGTGacactgtcaagacactgcta
pri-mir-9-4 smiFISH_4	CCTCCTAAGTTCGAGCTGGACTCAGTGatggtagcattgttcgtg
pri-mir-9-4 smiFISH_5	CCTCCTAAGTTCGAGCTGGACTCAGTGatgcacctaaaaactgct
pri-mir-9-4 smiFISH_6	CCTCCTAAGTTCGAGCTGGACTCAGTGcagtatgttaggcgttaagg
pri-mir-9-4 smiFISH_7	CCTCCTAAGTTCGAGCTGGACTCAGTGtctttatgttggagctgg
pri-mir-9-4 smiFISH_8	CCTCCTAAGTTCGAGCTGGACTCAGTGgcacgcagggtttacaat
pri-mir-9-4 smiFISH_9	CCTCCTAAGTTCGAGCTGGACTCAGTGctctgcgttgcacttta
pri-mir-9-4 smiFISH_10	CCTCCTAAGTTCGAGCTGGACTCAGTGtagtctagggttattgcgc
pri-mir-9-4 smiFISH_11	CCTCCTAAGTTCGAGCTGGACTCAGTGtacgctcatattatgtgcgt
pri-mir-9-4 smiFISH_12	CCTCCTAAGTTCGAGCTGGACTCAGTGcacacacacatacagtggg
pri-mir-9-4 smiFISH_13	CCTCCTAAGTTCGAGCTGGACTCAGTGatacagtctcactcacttt
pri-mir-9-4 smiFISH_14	CCTCCTAAGTTCGAGCTGGACTCAGTGatggagctattgcattcact
pri-mir-9-4 smiFISH_15	CCTCCTAAGTTCGAGCTGGACTCAGTGcagatgcagctctgttg
pri-mir-9-4 smiFISH_16	CCTCCTAAGTTCGAGCTGGACTCAGTGaaaactaaccatgtgcctt
pri-mir-9-4 smiFISH_17	CCTCCTAAGTTCGAGCTGGACTCAGTGtaatctcaaggctacgggg
pri-mir-9-4 smiFISH_18	CCTCCTAAGTTCGAGCTGGACTCAGTGtcaaacgcacgcactcaca
pri-mir-9-4 smiFISH_19	CCTCCTAAGTTCGAGCTGGACTCAGTGacatccagaacatccatttc
pri-mir-9-4 smiFISH_20	CCTCCTAAGTTCGAGCTGGACTCAGTGccatccagctttacaaaa
pri-mir-9-4 smiFISH_21	CCTCCTAAGTTCGAGCTGGACTCAGTGaattcaaagcgctccgaagt
pri-mir-9-4 smiFISH_22	CCTCCTAAGTTCGAGCTGGACTCAGTGggattcgatgcatttttag
pri-mir-9-4 smiFISH_23	CCTCCTAAGTTCGAGCTGGACTCAGTGggaaacgcattaacgcagcg
pri-mir-9-4 smiFISH_24	CCTCCTAAGTTCGAGCTGGACTCAGTGacagctttggattcccgat
pri-mir-9-4 smiFISH_25	CCTCCTAAGTTCGAGCTGGACTCAGTGacgtaaaatccacgtctcc
pri-mir-9-4 smiFISH_26	CCTCCTAAGTTCGAGCTGGACTCAGTGtatgttagccggaggcagatt
pri-mir-9-4 smiFISH_27	CCTCCTAAGTTCGAGCTGGACTCAGTGcgtactgcgcgcgtactaac
pri-mir-9-4 smiFISH_28	CCTCCTAAGTTCGAGCTGGACTCAGTGgtatccgcctgaatccaag
pri-mir-9-4 smiFISH_29	CCTCCTAAGTTCGAGCTGGACTCAGTGctgagaatgatcgcaagt
pri-mir-9-4 smiFISH_30	CCTCCTAAGTTCGAGCTGGACTCAGTGgaaatgtgccgcgcacaag
pri-mir-9-4 smiFISH_31	CCTCCTAAGTTCGAGCTGGACTCAGTGacatcatcatcacgtctatg
pri-mir-9-4 smiFISH_32	CCTCCTAAGTTCGAGCTGGACTCAGTGgtatcccgaattcatacat
pri-mir-9-4 smiFISH_33	CCTCCTAAGTTCGAGCTGGACTCAGTGaaacacctcgatgaaccgatt
pri-mir-9-4 smiFISH_34	CCTCCTAAGTTCGAGCTGGACTCAGTGagagatccgaccaatcggtt
pri-mir-9-4 smiFISH_35	CCTCCTAAGTTCGAGCTGGACTCAGTGtatatgagaaccacgtgacc

**Table S7.** smiFISH Probe sequences for pri-mir-9-5

Probe sequence name	Probe sequence (5' to 3')
pri-mir-9-5 smiFISH_1	CCTCCTAAGTTCGAGCTGGACTCAGTGacggaggagatcgtaatgc
pri-mir-9-5 smiFISH_2	CCTCCTAAGTTCGAGCTGGACTCAGTGtttagttggccgagtggtg
pri-mir-9-5 smiFISH_3	CCTCCTAAGTTCGAGCTGGACTCAGTGactgaatggagggatcgctc
pri-mir-9-5 smiFISH_4	CCTCCTAAGTTCGAGCTGGACTCAGTGataacatcgcttgcgttcg
pri-mir-9-5 smiFISH_5	CCTCCTAAGTTCGAGCTGGACTCAGTGaggaaaaaaagtgcacgcgg
pri-mir-9-5 smiFISH_6	CCTCCTAAGTTCGAGCTGGACTCAGTGgagggaaaaatccgattcc
pri-mir-9-5 smiFISH_7	CCTCCTAAGTTCGAGCTGGACTCAGTGgaaccacgcgcgagattata
pri-mir-9-5 smiFISH_8	CCTCCTAAGTTCGAGCTGGACTCAGTGtggcagcagcatacatac
pri-mir-9-5 smiFISH_9	CCTCCTAAGTTCGAGCTGGACTCAGTGgctccctggctctattaaa
pri-mir-9-5 smiFISH_10	CCTCCTAAGTTCGAGCTGGACTCAGTGttacctccaaatctcacaaa
pri-mir-9-5 smiFISH_11	CCTCCTAAGTTCGAGCTGGACTCAGTGtacaggccatattgcatt
pri-mir-9-5 smiFISH_12	CCTCCTAAGTTCGAGCTGGACTCAGTGcctgtcaataagaagcagt
pri-mir-9-5 smiFISH_13	CCTCCTAAGTTCGAGCTGGACTCAGTGtatgagagtggagtgagg
pri-mir-9-5 smiFISH_14	CCTCCTAAGTTCGAGCTGGACTCAGTGaccggagcagtaacgtaa
pri-mir-9-5 smiFISH_15	CCTCCTAAGTTCGAGCTGGACTCAGTGtggatatgcgcaccaaaa
pri-mir-9-5 smiFISH_16	CCTCCTAAGTTCGAGCTGGACTCAGTGggcaatggactcacaattg
pri-mir-9-5 smiFISH_17	CCTCCTAAGTTCGAGCTGGACTCAGTGtccaagtggagaagtgcata
pri-mir-9-5 smiFISH_18	CCTCCTAAGTTCGAGCTGGACTCAGTGtccgtgtctgtgtaaagaa
pri-mir-9-5 smiFISH_19	CCTCCTAAGTTCGAGCTGGACTCAGTGcacaacagtaatcccaggat
pri-mir-9-5 smiFISH_20	CCTCCTAAGTTCGAGCTGGACTCAGTGgataacaactcgctccaaat
pri-mir-9-5 smiFISH_21	CCTCCTAAGTTCGAGCTGGACTCAGTGtcatacagctagataacca
pri-mir-9-5 smiFISH_22	CCTCCTAAGTTCGAGCTGGACTCAGTGgaggcagtttacttcgg
pri-mir-9-5 smiFISH_23	CCTCCTAAGTTCGAGCTGGACTCAGTGcagccagagttcgatgagc
pri-mir-9-5 smiFISH_24	CCTCCTAAGTTCGAGCTGGACTCAGTGagctactgacacaggctata
pri-mir-9-5 smiFISH_25	CCTCCTAAGTTCGAGCTGGACTCAGTGtctaacatgttgttagcc
pri-mir-9-5 smiFISH_26	CCTCCTAAGTTCGAGCTGGACTCAGTGttatagcacaagtgaagcc
pri-mir-9-5 smiFISH_27	CCTCCTAAGTTCGAGCTGGACTCAGTGcccgcagctatgagaata
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pri-mir-9-5 smiFISH_32	CCTCCTAAGTTCGAGCTGGACTCAGTGaatagtgagcacgtgggttc
pri-mir-9-5 smiFISH_33	CCTCCTAAGTTCGAGCTGGACTCAGTGcaaaggcgcaccgagctgaaa
pri-mir-9-5 smiFISH_34	CCTCCTAAGTTCGAGCTGGACTCAGTGattctgttggatgccag
pri-mir-9-5 smiFISH_35	CCTCCTAAGTTCGAGCTGGACTCAGTGgctctctatatgtcctaa

**Table S8.** smiFISH Probe sequences for *her6*

Probe sequence name	Probe sequence (5' to 3')
her6 smiFISH_1	CCTCCTAAGTTCGAGCTGGACTCAGTGtccatgatatcgccaggcat
her6 smiFISH_2	CCTCCTAAGTTCGAGCTGGACTCAGTGaccggagaagaggagttt
her6 smiFISH_3	CCTCCTAAGTTCGAGCTGGACTCAGTGtggttatcaggtagtg
her6 smiFISH_4	CCTCCTAAGTTCGAGCTGGACTCAGTGagacttctgttgtccgaag
her6 smiFISH_5	CCTCCTAAGTTCGAGCTGGACTCAGTGtcttctccataatgggtt
her6 smiFISH_6	CCTCCTAAGTTCGAGCTGGACTCAGTGttcgattctcgctt
her6 smiFISH_7	CCTCCTAAGTTCGAGCTGGACTCAGTGattaacgtttcagctgacc
her6 smiFISH_8	CCTCCTAAGTTCGAGCTGGACTCAGTGatctttcagagcatcca
her6 smiFISH_9	CCTCCTAAGTTCGAGCTGGACTCAGTGggttctcaagtttagagt
her6 smiFISH_10	CCTCCTAAGTTCGAGCTGGACTCAGTGtactgtcatctccaggatg
her6 smiFISH_11	CCTCCTAAGTTCGAGCTGGACTCAGTGcgctgcatttctgagatg
her6 smiFISH_12	CCTCCTAAGTTCGAGCTGGACTCAGTGtttagggcagcggtcattt
her6 smiFISH_13	CCTCCTAAGTTCGAGCTGGACTCAGTGtccaaagaacggggatc
her6 smiFISH_14	CCTCCTAAGTTCGAGCTGGACTCAGTGattcactgaatccagctcg
her6 smiFISH_15	CCTCCTAAGTTCGAGCTGGACTCAGTGaaccggtaacctcgitt
her6 smiFISH_16	CCTCCTAAGTTCGAGCTGGACTCAGTGtgttaaccctcacatgt
her6 smiFISH_17	CCTCCTAAGTTCGAGCTGGACTCAGTGcggtatctgtcatgcag
her6 smiFISH_18	CCTCCTAAGTTCGAGCTGGACTCAGTGtgcgtgtggatagttcat
her6 smiFISH_19	CCTCCTAAGTTCGAGCTGGACTCAGTGtgaaggatggatgaggagc
her6 smiFISH_20	CCTCCTAAGTTCGAGCTGGACTCAGTGgggatctgaaccatgggt
her6 smiFISH_21	CCTCCTAAGTTCGAGCTGGACTCAGTGcgctaagaggcacaacgtt
her6 smiFISH_22	CCTCCTAAGTTCGAGCTGGACTCAGTGtcaaattggaggatgagcc
her6 smiFISH_23	CCTCCTAAGTTCGAGCTGGACTCAGTGccatatactttagtgcgt
her6 smiFISH_24	CCTCCTAAGTTCGAGCTGGACTCAGTGtggccggcacaagctggaaa
her6 smiFISH_25	CCTCCTAAGTTCGAGCTGGACTCAGTGaaaaaggcgaactgtccgt
her6 smiFISH_26	CCTCCTAAGTTCGAGCTGGACTCAGTGtggagcaaaggcagcgt
her6 smiFISH_27	CCTCCTAAGTTCGAGCTGGACTCAGTGtagactgaaataacagggcc
her6 smiFISH_28	CCTCCTAAGTTCGAGCTGGACTCAGTGgaaccgggtgttggaaatt
her6 smiFISH_29	CCTCCTAAGTTCGAGCTGGACTCAGTGaaacggagtcgtacgtacg

**Table S9.** smiFISH Probe sequences for *her9*

Probe sequence name	Probe sequence (5' to 3')
her9 smiFISH _1	CCTCCTAAGTTCGAGCTGGACTCAGTGcttccatattatcggttg
her9 smiFISH _2	CCTCCTAAGTTCGAGCTGGACTCAGTGcagaataggatgtgcgtc
her9 smiFISH _3	CCTCCTAAGTTCGAGCTGGACTCAGTGgcttgtcaggagtatgagat
her9 smiFISH _4	CCTCCTAAGTTCGAGCTGGACTCAGTGagacttctatgctcgctgg
her9 smiFISH _5	CCTCCTAAGTTCGAGCTGGACTCAGTGgctttccatgattggctt
her9 smiFISH _6	CCTCCTAAGTTCGAGCTGGACTCAGTGaaggctctcggtgattctcg
her9 smiFISH _7	CCTCCTAAGTTCGAGCTGGACTCAGTGaatgagacttcagctgc
her9 smiFISH _8	CCTCCTAAGTTCGAGCTGGACTCAGTGctatcttttaagagcat
her9 smiFISH _9	CCTCCTAAGTTCGAGCTGGACTCAGTGtctccaatttagagtgtctg
her9 smiFISH _10	CCTCCTAAGTTCGAGCTGGACTCAGTGgtcatctccagaatatcagc
her9 smiFISH _11	CCTCCTAAGTTCGAGCTGGACTCAGTGtaattgcgcagggtctga
her9 smiFISH _12	CCTCCTAAGTTCGAGCTGGACTCAGTGaaggctgcgtcatctgaac
her9 smiFISH _13	CCTCCTAAGTTCGAGCTGGACTCAGTGactgtctgaggacgttigt
her9 smiFISH _14	CCTCCTAAGTTCGAGCTGGACTCAGTGcatgcactcggtcatccctg
<u>her9</u> smiFISH _15	CCTCCTAAGTTCGAGCTGGACTCAGTGagagaaatcgagtcacctcg
her9 smiFISH _16	CCTCCTAAGTTCGAGCTGGACTCAGTGtctgacctctgtattcactc
her9 smiFISH _17	CCTCCTAAGTTCGAGCTGGACTCAGTGacagggtgtaagaagtgc
her9 smiFISH _18	CCTCCTAAGTTCGAGCTGGACTCAGTGcatcatctgtccataacaac
her9 smiFISH _19	CCTCCTAAGTTCGAGCTGGACTCAGTGcaggctgaggtagttcatg
her9 smiFISH _20	CCTCCTAAGTTCGAGCTGGACTCAGTGagccaaatgagcctgttag
her9 smiFISH _21	CCTCCTAAGTTCGAGCTGGACTCAGTGgaagctgcacgtgaagaggc
her9 smiFISH _22	CCTCCTAAGTTCGAGCTGGACTCAGTGccgtgatggtaacgttg
her9 smiFISH _23	CCTCCTAAGTTCGAGCTGGACTCAGTGtgagttggaaacccatttag
her9 smiFISH _24	CCTCCTAAGTTCGAGCTGGACTCAGTGtggtgagaccgctctgaag
her9 smiFISH _25	CCTCCTAAGTTCGAGCTGGACTCAGTGagctggaaatcccaaagac
her9 smiFISH _26	CCTCCTAAGTTCGAGCTGGACTCAGTGaaaagcaaactgtccgtcc
her9 smiFISH _27	CCTCCTAAGTTCGAGCTGGACTCAGTGcaaacgctgggtgggata
her9 smiFISH _28	CCTCCTAAGTTCGAGCTGGACTCAGTGaatgaccggagttgtggcag
her9 smiFISH _29	CCTCCTAAGTTCGAGCTGGACTCAGTGcgcttgtcggtacaag
her9 smiFISH _30	CCTCCTAAGTTCGAGCTGGACTCAGTGactggcgttgacagtca
her9 smiFISH _31	CCTCCTAAGTTCGAGCTGGACTCAGTGcattccctggacaggagatg
her9 smiFISH _32	CCTCCTAAGTTCGAGCTGGACTCAGTGtttgtgaaacccccgagaag
her9 smiFISH _33	CCTCCTAAGTTCGAGCTGGACTCAGTGctgacaccaacgggactgac

**Table S10.** smiFISH Probe sequences for *neurog1*

Probe sequence name	Probe sequence (5' to 3')
neurog1 smiFISH_1	CCTCCTAAGTTCGAGCTGGACTCAGTGtgcttaaccctcaatcag
neurog1 smiFISH_2	CCTCCTAAGTTCGAGCTGGACTCAGTGaagataatggcacgcgtctg
neurog1 smiFISH_3	CCTCCTAAGTTCGAGCTGGACTCAGTGatcctgcagatagttgtgt
neurog1 smiFISH_4	CCTCCTAAGTTCGAGCTGGACTCAGTGgagatgctgaggtttgca
neurog1 smiFISH_5	CCTCCTAAGTTCGAGCTGGACTCAGTGtgataaccatttggggc
neurog1 smiFISH_6	CCTCCTAAGTTCGAGCTGGACTCAGTGcgagatatacgatccatt
neurog1 smiFISH_7	CCTCCTAAGTTCGAGCTGGACTCAGTGtagtcacagctgaggtttc
neurog1 smiFISH_8	CCTCCTAAGTTCGAGCTGGACTCAGTGatcatccgtgcaaaaagg
neurog1 smiFISH_9	CCTCCTAAGTTCGAGCTGGACTCAGTGtggagacgcagggttttc
neurog1 smiFISH_10	CCTCCTAAGTTCGAGCTGGACTCAGTGttcttcacgacgtgcac
neurog1 smiFISH_11	CCTCCTAAGTTCGAGCTGGACTCAGTGttaagggtgtgcacccgtt
neurog1 smiFISH_12	CCTCCTAAGTTCGAGCTGGACTCAGTGgctctcaaagcatccaatg
neurog1 smiFISH_13	CCTCCTAAGTTCGAGCTGGACTCAGTGtgtcgtcaggaaacgcag
neurog1 smiFISH_14	CCTCCTAAGTTCGAGCTGGACTCAGTGgagtctaatttggcagc
neurog1 smiFISH_15	CCTCCTAAGTTCGAGCTGGACTCAGTGatgttagttgagcgaagcg
neurog1 smiFISH_16	CCTCCTAAGTTCGAGCTGGACTCAGTGatccggatggctccgaaag
neurog1 smiFISH_17	CCTCCTAAGTTCGAGCTGGACTCAGTGatgaagacgcaggatgcc
neurog1 smiFISH_18	CCTCCTAAGTTCGAGCTGGACTCAGTGggctgagttgcagtaagac
neurog1 smiFISH_19	CCTCCTAAGTTCGAGCTGGACTCAGTGtatccaaatcgtccatggc
neurog1 smiFISH_20	CCTCCTAAGTTCGAGCTGGACTCAGTGctgtacactacgtcggtttg
neurog1 smiFISH_21	CCTCCTAAGTTCGAGCTGGACTCAGTGagatgctaggcacgaagtg
neurog1 smiFISH_22	CCTCCTAAGTTCGAGCTGGACTCAGTGaccgacatgagaacgcctaa
neurog1 smiFISH_23	CCTCCTAAGTTCGAGCTGGACTCAGTGtacatacttctggagattct
neurog1 smiFISH_24	CCTCCTAAGTTCGAGCTGGACTCAGTGagtaacagtggcttacact
neurog1 smiFISH_25	CCTCCTAAGTTCGAGCTGGACTCAGTGgttgtgcctgggtctaat
neurog1 smiFISH_26	CCTCCTAAGTTCGAGCTGGACTCAGTGaggcaaacagtgaataccta
neurog1 smiFISH_27	CCTCCTAAGTTCGAGCTGGACTCAGTGtctattgcagactgtcat
neurog1 smiFISH_28	CCTCCTAAGTTCGAGCTGGACTCAGTGcacgcctcaaggaatgcaaa
neurog1 smiFISH_29	CCTCCTAAGTTCGAGCTGGACTCAGTGatttctctaacggggtct
neurog1 smiFISH_30	CCTCCTAAGTTCGAGCTGGACTCAGTGcaatctgcctgcttttaa
neurog1 smiFISH_31	CCTCCTAAGTTCGAGCTGGACTCAGTGtgcatttcacctggacag
neurog1 smiFISH_32	CCTCCTAAGTTCGAGCTGGACTCAGTGtcagttatcgctctacaa
neurog1 smiFISH_33	CCTCCTAAGTTCGAGCTGGACTCAGTGaactgatttcacgcgtcg
neurog1 smiFISH_34	CCTCCTAAGTTCGAGCTGGACTCAGTGttcagtctattgcacagcg
neurog1 smiFISH_35	CCTCCTAAGTTCGAGCTGGACTCAGTGcataaggccagatttgtc
neurog1 smiFISH_36	CCTCCTAAGTTCGAGCTGGACTCAGTGttctcggtcaaaataca
neurog1 smiFISH_37	CCTCCTAAGTTCGAGCTGGACTCAGTGggatcagttggacagatgag
neurog1 smiFISH_38	CCTCCTAAGTTCGAGCTGGACTCAGTGcatgagagctggtaactgt
neurog1 smiFISH_39	CCTCCTAAGTTCGAGCTGGACTCAGTGagaaaagtggggaaagcc
neurog1 smiFISH_40	CCTCCTAAGTTCGAGCTGGACTCAGTGcgtacaaacatgtttgcacc

**Table S11.** smiFISH Probe sequences for *atoh1a*

<b>Probe sequence name</b>	<b>Probe sequence (5' to 3')</b>
<i>atoh1a</i> smiFISH_1	CCTCCTAAGTTCGAGCTGGACTCAGTGggtaagggattttac
<i>atoh1a</i> smiFISH_2	CCTCCTAAGTTCGAGCTGGACTCAGTGagatttcttccacac
<i>atoh1a</i> smiFISH_3	CCTCCTAAGTTCGAGCTGGACTCAGTGtacaggacggatattgc
<i>atoh1a</i> smiFISH_4	CCTCCTAAGTTCGAGCTGGACTCAGTGttggaggaaagtgtggc
<i>atoh1a</i> smiFISH_5	CCTCCTAAGTTCGAGCTGGACTCAGTGatccattctgttgttg
<i>atoh1a</i> smiFISH_6	CCTCCTAAGTTCGAGCTGGACTCAGTGtcaaccacctcttgtat
<i>atoh1a</i> smiFISH_7	CCTCCTAAGTTCGAGCTGGACTCAGTGaagctgaatgtggacg
<i>atoh1a</i> smiFISH_8	CCTCCTAAGTTCGAGCTGGACTCAGTGtaagttggaggcagaggac
<i>atoh1a</i> smiFISH_9	CCTCCTAAGTTCGAGCTGGACTCAGTGcgtaacttgcacaggactt
<i>atoh1a</i> smiFISH_10	CCTCCTAAGTTCGAGCTGGACTCAGTGgttgtggattgtggatg
<i>atoh1a</i> smiFISH_11	CCTCCTAAGTTCGAGCTGGACTCAGTGtcaatccgtgcattctcg
<i>atoh1a</i> smiFISH_12	CCTCCTAAGTTCGAGCTGGACTCAGTGcaaaggctggatgacactg
<i>atoh1a</i> smiFISH_13	CCTCCTAAGTTCGAGCTGGACTCAGTGttggagagttctgtcg
<i>atoh1a</i> smiFISH_14	CCTCCTAAGTTCGAGCTGGACTCAGTGttgttagatctggccat
<i>atoh1a</i> smiFISH_15	CCTCCTAAGTTCGAGCTGGACTCAGTGctgttagtaagtgcgacagg
<i>atoh1a</i> smiFISH_16	CCTCCTAAGTTCGAGCTGGACTCAGTGttctaacaacgttgcgc
<i>atoh1a</i> smiFISH_17	CCTCCTAAGTTCGAGCTGGACTCAGTGctgtactggtaac
<i>atoh1a</i> smiFISH_18	CCTCCTAAGTTCGAGCTGGACTCAGTGgtctgtccatgaaagat
<i>atoh1a</i> smiFISH_19	CCTCCTAAGTTCGAGCTGGACTCAGTGcgaccagactgtcg
<i>atoh1a</i> smiFISH_20	CCTCCTAAGTTCGAGCTGGACTCAGTGaccgaggcgacttactg
<i>atoh1a</i> smiFISH_21	CCTCCTAAGTTCGAGCTGGACTCAGTGcgagtggcgagaacttc
<i>atoh1a</i> smiFISH_22	CCTCCTAAGTTCGAGCTGGACTCAGTGgttcgtctgagtcaactgaa
<i>atoh1a</i> smiFISH_23	CCTCCTAAGTTCGAGCTGGACTCAGTGgacagctgtttcactctg
<i>atoh1a</i> smiFISH_24	CCTCCTAAGTTCGAGCTGGACTCAGTGttctaaaaagcgcggc
<i>atoh1a</i> smiFISH_25	CCTCCTAAGTTCGAGCTGGACTCAGTGtgcacacgttggacagt
<i>atoh1a</i> smiFISH_26	CCTCCTAAGTTCGAGCTGGACTCAGTGaagcaaccattacaagcc
<i>atoh1a</i> smiFISH_27	CCTCCTAAGTTCGAGCTGGACTCAGTGtctattggcgacacaa
<i>atoh1a</i> smiFISH_28	CCTCCTAAGTTCGAGCTGGACTCAGTGgtcaatgtcacgagaaggca
<i>atoh1a</i> smiFISH_29	CCTCCTAAGTTCGAGCTGGACTCAGTGttatgtcatgacattcgagcc
<i>atoh1a</i> smiFISH_30	CCTCCTAAGTTCGAGCTGGACTCAGTGgtctaaaaacagtggcg
<i>atoh1a</i> smiFISH_31	CCTCCTAAGTTCGAGCTGGACTCAGTGaggtccatgacaatcatgt
<i>atoh1a</i> smiFISH_32	CCTCCTAAGTTCGAGCTGGACTCAGTGgtcgaaaattgtacagg
<i>atoh1a</i> smiFISH_33	CCTCCTAAGTTCGAGCTGGACTCAGTGccgttttaaagtgc
<i>atoh1a</i> smiFISH_34	CCTCCTAAGTTCGAGCTGGACTCAGTGgaatattctcaagcctacg
<i>atoh1a</i> smiFISH_35	CCTCCTAAGTTCGAGCTGGACTCAGTGcacatcattctgtccat
<i>atoh1a</i> smiFISH_36	CCTCCTAAGTTCGAGCTGGACTCAGTGattggcattacttctacata
<i>atoh1a</i> smiFISH_37	CCTCCTAAGTTCGAGCTGGACTCAGTGgcagaacacaacttcttgc
<i>atoh1a</i> smiFISH_38	CCTCCTAAGTTCGAGCTGGACTCAGTGatagctacttcagctacag
<i>atoh1a</i> smiFISH_39	CCTCCTAAGTTCGAGCTGGACTCAGTGgtcattccaatgtacac

**Table S12.** smiFISH Probe sequences for *asc1a*

Probe sequence name	Probe sequence (5' to 3')
<i>asc1a</i> smiFISH_1	CCTCCTAAGTTCGAGCTGGACTCAGTGtctcgaccgttgtgagttg
<i>asc1a</i> smiFISH_2	CCTCCTAAGTTCGAGCTGGACTCAGTGttcacgtgtggcttcaatg
<i>asc1a</i> smiFISH_3	CCTCCTAAGTTCGAGCTGGACTCAGTGaaagtttcttggactgcc
<i>asc1a</i> smiFISH_4	CCTCCTAAGTTCGAGCTGGACTCAGTGtccattcgcggagtcaaaa
<i>asc1a</i> smiFISH_5	CCTCCTAAGTTCGAGCTGGACTCAGTGtggttacgcttattccat
<i>asc1a</i> smiFISH_6	CCTCCTAAGTTCGAGCTGGACTCAGTGaagcaaggcagggtggcatgaa
<i>asc1a</i> smiFISH_7	CCTCCTAAGTTCGAGCTGGACTCAGTGtgagttggatgctctgagag
<i>asc1a</i> smiFISH_8	CCTCCTAAGTTCGAGCTGGACTCAGTGttgacgcggacttgtgctg
<i>asc1a</i> smiFISH_9	CCTCCTAAGTTCGAGCTGGACTCAGTGattgagtcttcttgcacc
<i>asc1a</i> smiFISH_10	CCTCCTAAGTTCGAGCTGGACTCAGTGggtaagctgttagccaaac
<i>asc1a</i> smiFISH_11	CCTCCTAAGTTCGAGCTGGACTCAGTGcaaagccgtgtcacaagc
<i>asc1a</i> smiFISH_12	CCTCCTAAGTTCGAGCTGGACTCAGTGctccattggAACgtgttcg
<i>asc1a</i> smiFISH_13	CCTCCTAAGTTCGAGCTGGACTCAGTGcttgctcatctctgttg
<i>asc1a</i> smiFISH_14	CCTCCTAAGTTCGAGCTGGACTCAGTGgttagttggagatgggg
<i>asc1a</i> smiFISH_15	CCTCCTAAGTTCGAGCTGGACTCAGTGgccatagatgtcatgtcatt
<i>asc1a</i> smiFISH_16	CCTCCTAAGTTCGAGCTGGACTCAGTGctcatccgatgatgatgagg
<i>asc1a</i> smiFISH_17	CCTCCTAAGTTCGAGCTGGACTCAGTGttgttcttgactcagag
<i>asc1a</i> smiFISH_18	CCTCCTAAGTTCGAGCTGGACTCAGTGaaaccagtggtaagtcca
<i>asc1a</i> smiFISH_19	CCTCCTAAGTTCGAGCTGGACTCAGTGagttccattacgaacgct
<i>asc1a</i> smiFISH_20	CCTCCTAAGTTCGAGCTGGACTCAGTGccaaggcgtgtgatattt
<i>asc1a</i> smiFISH_21	CCTCCTAAGTTCGAGCTGGACTCAGTGttgttcttgaggacatc
<i>asc1a</i> smiFISH_22	CCTCCTAAGTTCGAGCTGGACTCAGTGctggctttgacactcg
<i>asc1a</i> smiFISH_23	CCTCCTAAGTTCGAGCTGGACTCAGTGatagatttggcgagtg
<i>asc1a</i> smiFISH_24	CCTCCTAAGTTCGAGCTGGACTCAGTGgggtcggtggaaagtcttt
<i>asc1a</i> smiFISH_25	CCTCCTAAGTTCGAGCTGGACTCAGTGcaacgtttgtgttgtt
<i>asc1a</i> smiFISH_26	CCTCCTAAGTTCGAGCTGGACTCAGTGagggcaaaccctttgatt
<i>asc1a</i> smiFISH_27	CCTCCTAAGTTCGAGCTGGACTCAGTGagagttgagagaggggtc
<i>asc1a</i> smiFISH_28	CCTCCTAAGTTCGAGCTGGACTCAGTGaattcgccaagtggaaagca
<i>asc1a</i> smiFISH_29	CCTCCTAAGTTCGAGCTGGACTCAGTGccgcaggctataaggcaaaa
<i>asc1a</i> smiFISH_30	CCTCCTAAGTTCGAGCTGGACTCAGTGctgcgtgcatttgagacta
<i>asc1a</i> smiFISH_31	CCTCCTAAGTTCGAGCTGGACTCAGTGtccacaaccgtaaaggaa
<i>asc1a</i> smiFISH_32	CCTCCTAAGTTCGAGCTGGACTCAGTGttgagcattacactcctca
<i>asc1a</i> smiFISH_33	CCTCCTAAGTTCGAGCTGGACTCAGTGataagacacgttggctga
<i>asc1a</i> smiFISH_34	CCTCCTAAGTTCGAGCTGGACTCAGTGtcaactgtgactcacattaca
<i>asc1a</i> smiFISH_35	CCTCCTAAGTTCGAGCTGGACTCAGTGggacaatagctgcataacct
<i>asc1a</i> smiFISH_36	CCTCCTAAGTTCGAGCTGGACTCAGTGgagacacaaaacaccctcg
<i>asc1a</i> smiFISH_37	CCTCCTAAGTTCGAGCTGGACTCAGTGgcaaagtggaaacaggcagt
<i>asc1a</i> smiFISH_38	CCTCCTAAGTTCGAGCTGGACTCAGTGtgactgcaacacgtaaagca
<i>asc1a</i> smiFISH_39	CCTCCTAAGTTCGAGCTGGACTCAGTGtttagcaggatggcttatcac
<i>asc1a</i> smiFISH_40	CCTCCTAAGTTCGAGCTGGACTCAGTGttggcattcatagagcgc

**Table S13.** CRISPR/Cas9 Target sequences for pre-mir-9-1 and primers used to generate respective sgRNA. PAM region is Highlighted in red.

sgRNA Number	Target sequence 5'-3' with PAM	CRISPRscan Primer 5'-3'
1	GGACGGGTGGCCGGAGGG GT <b>TGG</b>	taatacgactcactataGGACGGGTGGCCGGAGGGGTgtttag agctagaa
2	AAGGTGGGTGATGCCTT <b>CAGG</b>	taatacgactcactataGGGTGGGTGATGCCTTCgtttaga gctagaa
3	AGAGAGAGGGAGACTTGGG <b>AGGG</b>	taatacgactcactataGGAGAGAGGGAGACTTGGGAgtttag agctagaa

**Table S14.** The parameter values used for the mathematical model. Highlighted in grey are the additional parameters used for the extended model.  $\alpha_x$ ,  $\mu_x$ ,  $\alpha_h$  and  $\mu_h$  parameters were used in both, adaptation and extended, models.

Parameter	Value
$h_1$	3.0
$h_2$	3.0
$h_3$	3.0
$P_1$ (low, high)	2.0, 10.0
$p_2$	1.0
$p_3$	1.0
$\alpha_x$	0.1
$\mu_x$	0.1
$\alpha_h$	6.0
$\mu_h$	2.0
$\alpha_y$	30.0
$\beta_y$	100.0
$\mu_y$	10.0