

**Supplemental Table 1.** Morpholinos used in this study.

Morpholino name	Sequence
<i>eaf1</i> -ATG-MO ( <i>eaf1</i> -MO1)	5'-GCGGCGGGTTCGAGCTGCCGTTTCAT -3'
<i>eaf2</i> -ATG-MO ( <i>eaf2</i> -MO1)	5'-ATGCTGTTCCATTATTCTAATCCA -3'
<i>eaf1</i> -splice-MO ( <i>eaf1</i> -MO3)	5'-GTCTCTTGGATGGACTCACATCTG-3'
<i>eaf2</i> -splice-MO ( <i>eaf2</i> -MO3)	5'-AAAAGATGCAACTTACATCGTACCG-3'
<i>P53</i> -MO1	5'-GCGCCATTGCTTTGCAAGAATTG -3'
<i>P53</i> -MO2	5'-GACCTCTCTCCACTAACTACGAT -3'

**Supplemental Table 2.** The primers used for qRT-PCR.

Primers name	Sequence
fgf8Fq	5'-GCTGGTACATGGCCTTCAC-3'
fgf8Rq	5'-AGAAGTCCACAAGAGGAGTTCA-3'
wnt8aFq	5'-CAGGCAATAGCGCGGACAAC-3'
wnt8aRq	5'-TGACTGTGCAGCACCAGTGA-3'
bmp2bFq	5'-CGCCCCGAGGAGCACTATG-3'
bmp2bRq	5'-TGGCCTGAACACCTCGTAAATG-3'
ventFq	5'-AAGTAGAAGCGGGGCAGAATC-3'
ventRq	5'-TGCTCCGAGGTAGCGGTGTTT-3'
voxFq	5'- AAACAGCGGTTATTTCGTCGGG -3
voxRq	5'- TCAGCGTCGTGTCCATCTTCG -3'
vedFq	5'- CAGCTCCTGGATCTGTGGC -3
vedRq	5'- TGTCGGTGAGTTTGAGTGTCT -3'
18sFq	5'-GAGAAACGGCTACCACATCC-3'
18sRq	5'-CACCAGACTTGCCCTCCAA-3'
<i>eaf1</i> -genotyping-F	5' -GCGTCTTCTCCTTTGTCT -3'
<i>eaf1</i> -genotyping-R	5'-TGCTTGTAATATGCTCAG -3'

**Supplemental Table 3.** The primers used for plasmid construction.

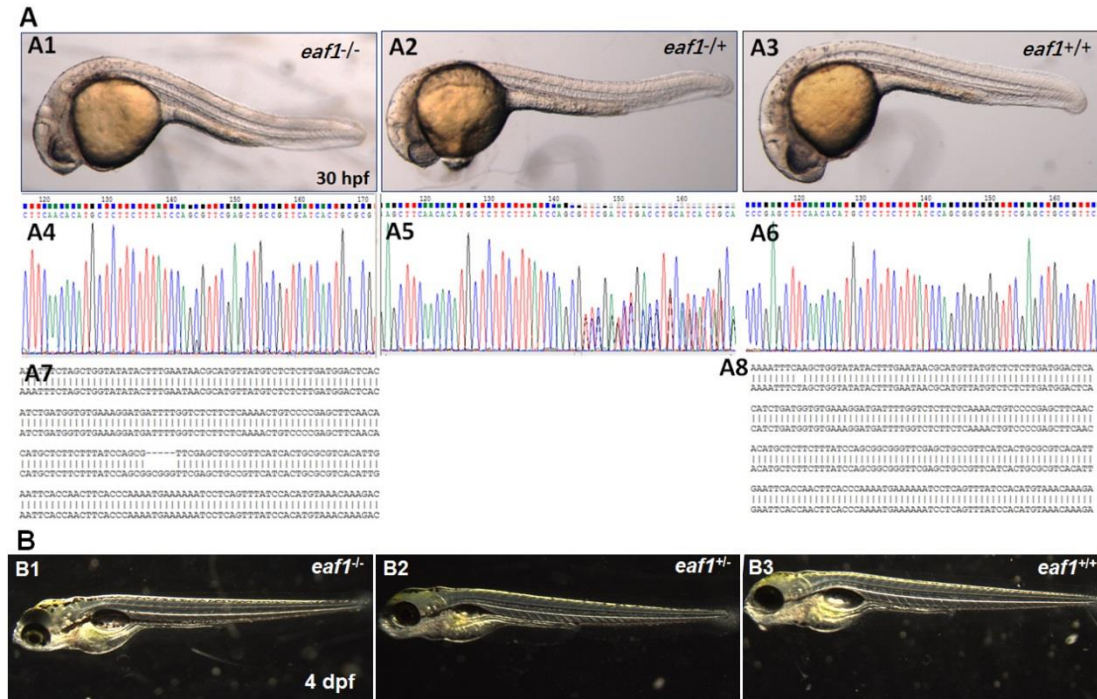
Primers name	Sequence
catenin1-myc(flag)-F	5'-ATATCGAATTCTGATGGCTACCCAGTCTGACTTGA-3'
catenin1-myc(flag)-R	5'-ATATCCGCCGGCGTTACAGATCGGTGTCAAACCAG-3'
catenin2-myc(flag)-F	5'-ATATCGAATTCTGATGGCTAGCCAGGCTGACCTGA-3'
catenin2-myc(flag)-R	5'-ATATCCGCCGGCGCTACAGGTCCGTGTCTGAACCAG-3'
tcf-HA-F	5'-ATATCTCTAGAATGATGGTGAAGGATGAG-3'
tcf-HA-R	5'-ATATCGCGCCGCTCAGTCTAACGGTGT-3'

**Fig. S1:** Embryos from in-crossed *eaf1* F1 heterozygotic mutants exhibited wild type similar phenotype in both 30 hpf and 4 dpf, and their genotypes were homozygous, heterozygotic, and wild type respectively.

**Fig.S2:** *ved* exhibited increased expression in homozygous and heterozygotic *eaf1* mutants at 30% epiboly stage.

**Fig.S3:** Embryos injected with *frzb* and *dntcf* mRNA exhibited developmental defects.

**Fig.S4:** Competitive Co-IP of Eaf,  $\beta$ -catenin2, and  $\beta$ -catenin1 proteins in cells.



**Fig.S1**

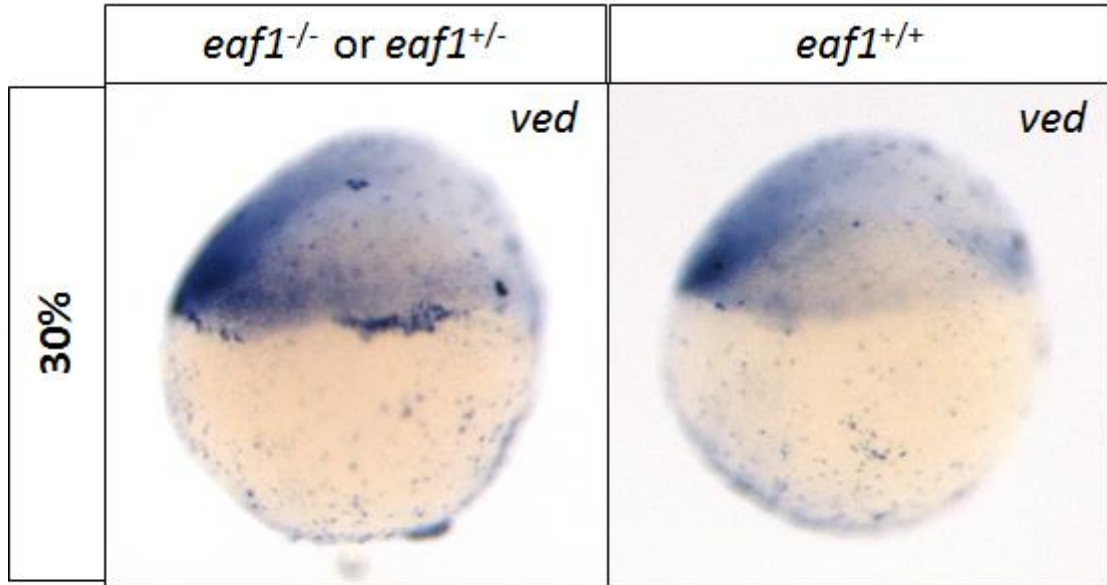


Fig.S2

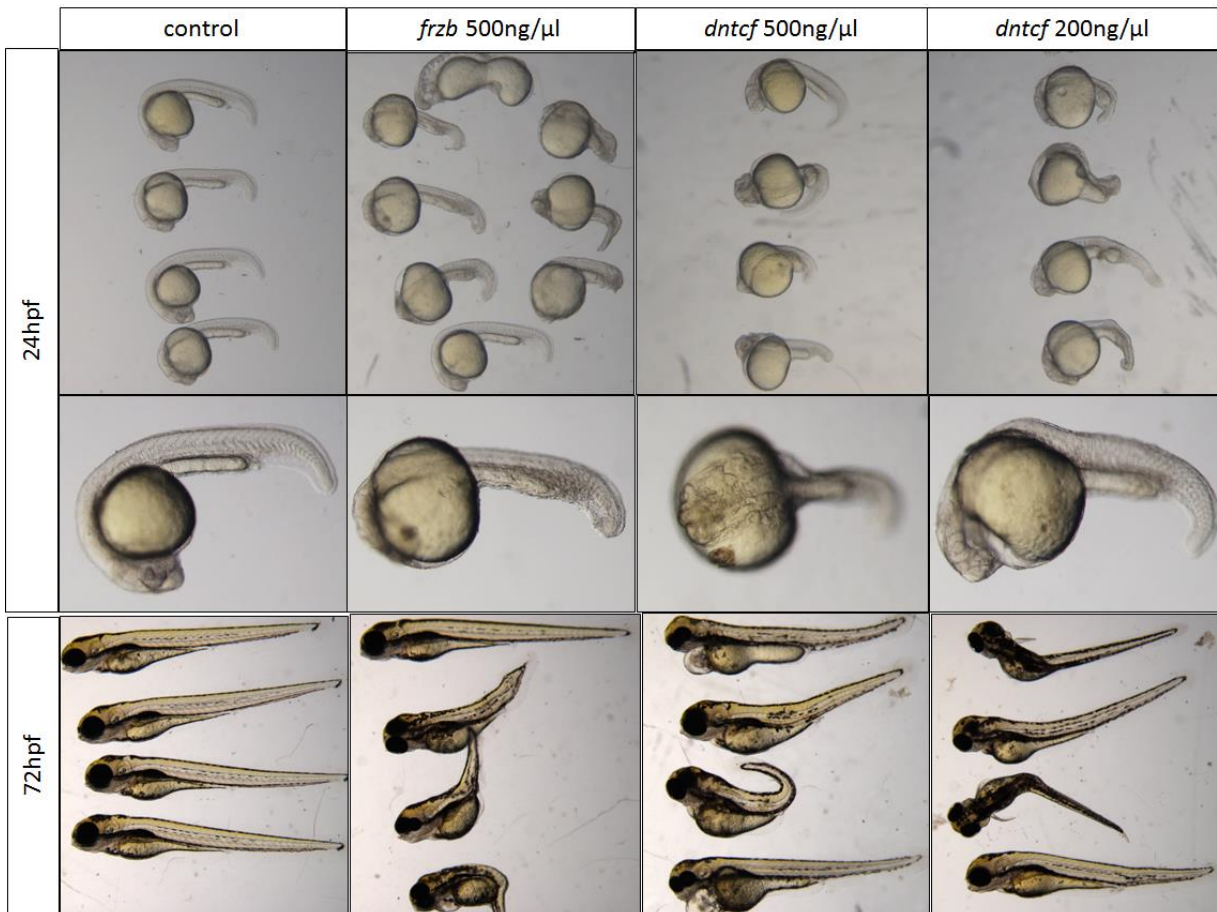
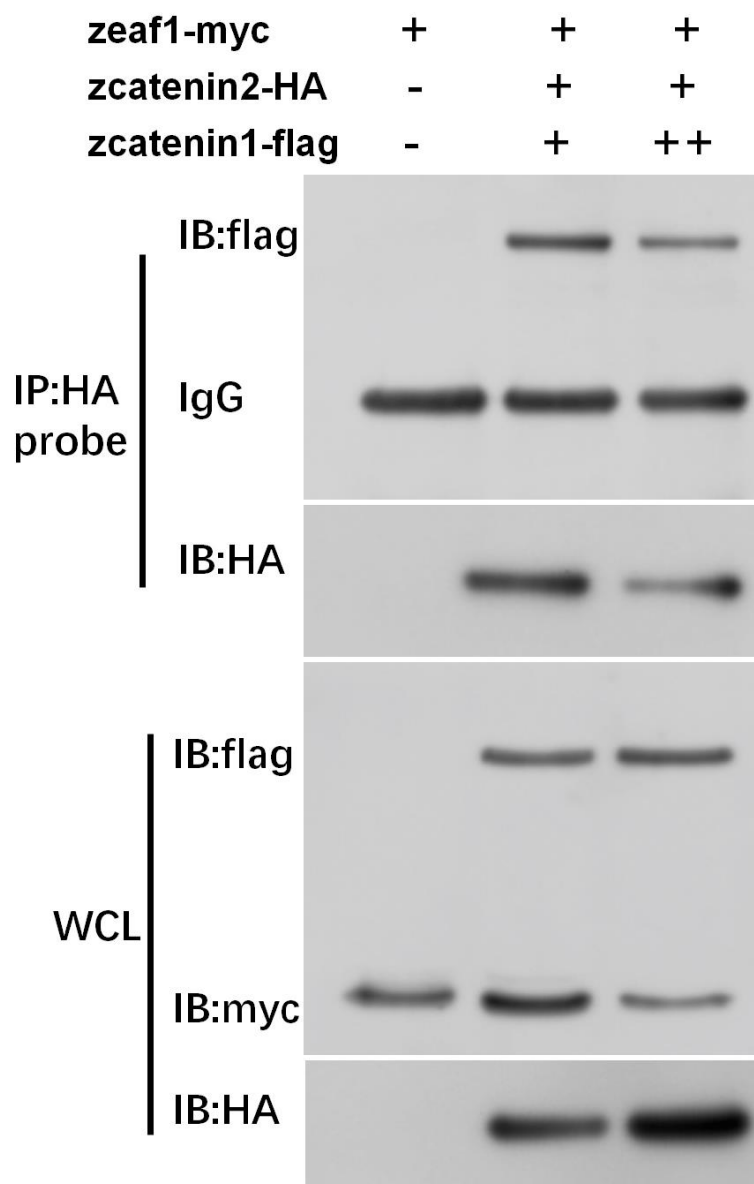


Fig.S3



**Fig.S4**