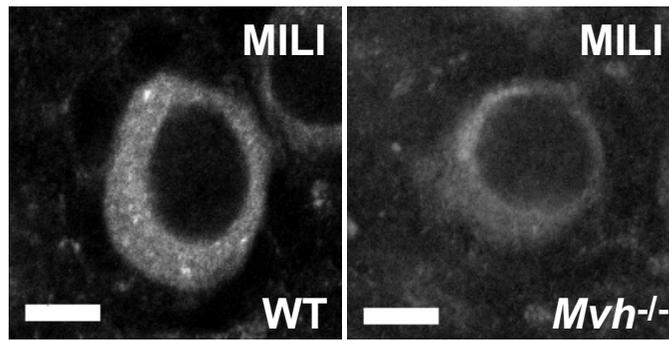
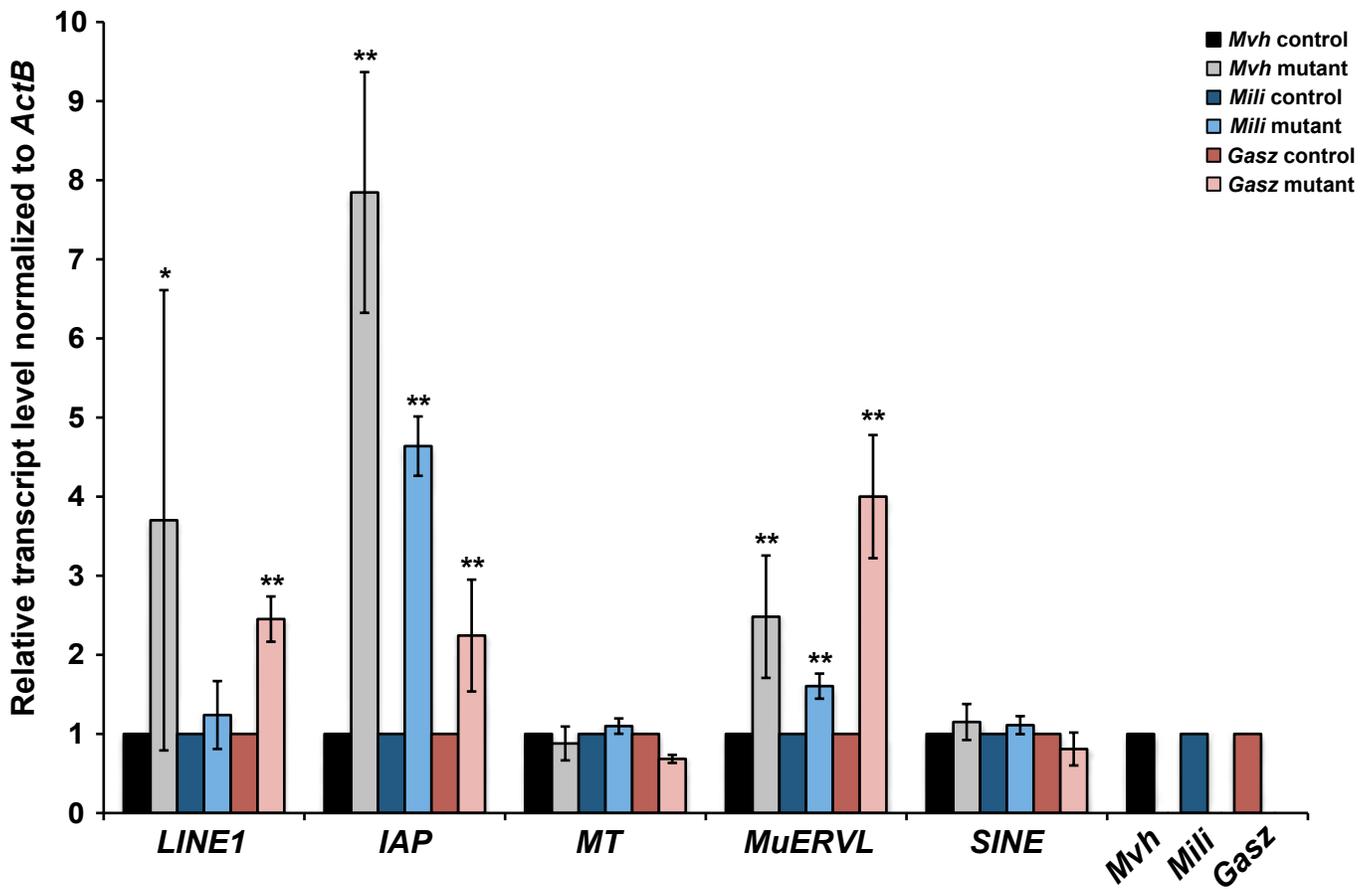


**Fig. S1. The electron-dense intermitochondrial cement/nuage is disrupted in *Mvh* mutant ovaries.** (A,B) Electron micrographs of intermitochondrial cement/nuage in primordial follicles of P5 wild-type (A) and *Mvh* mutant (B) ovaries. (C,D) Electron micrographs of immuno-gold-labeled MVH in primordial follicles of P5 wild-type (C) and *Mvh* mutant (D) ovaries. Blue and red arrowheads indicate the intermitochondrial cement and MVH-gold labeling, respectively. Scale bars: 200 nm.



**Fig. S2. MILI forms a large aggregate in *Mvh* mutant ovaries.** IFA of MILI in P5 ovaries of wild-type and *Mvh* mutants. Scale bar: 10  $\mu$ m.



**Fig. S3. Some retrotransposons are upregulated in *Mvh*, *Mili* and *Gasz* mutant mature oocytes.** qRT-PCR of retrotransposon transcript levels in *Mvh*, *Mili* and *Gasz* mutant MII oocytes. Retrotransposons *LINE1*, *IAP* and *MuERV1*, but not *MT* and *SINE*, are differentially upregulated in the nuage mutant MII oocytes. \* $P < 0.05$ , \*\* $P < 0.01$ ,  $n = 3$ . Error bars represent s.d.

1 **Table S1. Primer sequences**

<b>Primer name</b>	<b>Sequence</b>
<i>ActB</i> Fw	aaggccaaccgtgaaaagat
<i>ActB</i> Rv	gtggtacgaccagaggcatac
<i>LINE1</i> Fw	ttattaatagtctcccagccaaaa
<i>LINE1</i> Rv	tgaaggctgatagaactctgcac
<i>IAP</i> Fw	ttggcagataaggccactaaa
<i>IAP</i> Rv	atttctgcagcctctaccg
<i>MT</i> Fw	gcattactgggactattgatgct
<i>MT</i> Rv	tcatgctggctctcttctaatac
<i>MuERVL</i> Fw	ggctgctctaccacttggac
<i>MuERVL</i> Rv	tcagccacagacacctcaag
<i>SINE</i> Fw	acgcctttaatcccagcac
<i>SINE</i> Rv	ctggcctcgaactcagaat
<i>Mvh</i> Fw	tgaaggaggtgaaagcagtg
<i>Mvh</i> Rv	ataatgtgcaaagatggagtct
<i>Mili</i> Fw	cagctggggacagcaaac
<i>Mili</i> Rv	gaactaccttcccagcattc
<i>Gasz</i> Fw	gaaagcactgaccactggaga
<i>Gasz</i> Rv	aagaggggtccatccatagc
<i>Dnajc11</i> Fw	gaacacagccagcgacatc
<i>Dnajc11</i> Rv	gattcctgcattagccgaac
<i>Glcci1</i> Fw	gggagcagaaaaacgatcac
<i>Glcci1</i> Rv	gcgtttagctgttgcctaa
<i>Spin1</i> Fw	gccagtaagaacatcctcca
<i>Spin1</i> Rv	cttgcttgggtcccactg
<i>5S rRNA</i> Fw	tctacggccataccacctga
<i>piRNA1</i> Fw	gactctagataccgggggtca
<i>piRNA2</i> Fw	tgctctgctactccgtgccta
<i>piRNA3</i> Fw	aagccagtctaatagccaca
<i>piRNA4</i> Fw	taccaatcccagcaatgcc
<i>Dnajc11 piRNA1</i> Fw	aagaggatgacgcgtgtgtacaaa
<i>Dnajc11 piRNA2</i> Fw	tctggagccaagaggatgacg

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**Table S2. Litter size in triple mutant female mice**

	<b>Average litter size (mean <math>\pm</math> s.d.)</b>
<b>Triple mutant 1 (7-month-old)</b>	9.33 $\pm$ 3.67 ( <i>n</i> =6)
<b>Triple mutant 2 (8-month-old)</b>	8.20 $\pm$ 1.64 ( <i>n</i> =5)
<b>Triple mutant 3 (7-month-old)</b>	9.00 $\pm$ 2.97 ( <i>n</i> =6)
<b>Triple mutant 4 (4-month-old)</b>	7.50 $\pm$ 2.12 ( <i>n</i> =2)

Triple mutant mice were from an outbred genetic background, prior to backcrossing (age at last litter)  
*n*, number of litters