**Table S1.** Autosomal genes with increased H3K27me3 in *oef-1* germ cell nuclei tend to be somatic or spermatogenesis genes.

|  |  |  |
| --- | --- | --- |
| **Category** | **Number of genes** | **Proportion of total** |
| Gender-neutral | 34 | 6.77% |
| Oogenesis | 51 | 10.2% |
| Spermatogenesis | 258 | 51.4% |
| N/A (Soma) | 159 | 31.7% |

Genes with increased H3K27me3 in *oef-1* relative to wild-type germ nuclei were sorted for those on autosomes and for sex-specific expression (Ortiz et al., 2014). Genes classified as N/A were not detected in RNA-seq from dissected gonads (Ortiz et al., 2014), and thus were considered somatic.

**Table S2.** *oef-1* enhances *mes-4* embryonic lethality.

|  |  |  |
| --- | --- | --- |
| **Genotype** | **% Emb** | **Total Live Progeny** |
| Wild-type | 0.58 | 2,244 |
| *oef-1(vr25)* | 0.61 | 3,078 |
| *mes-4(bn67)* | 13.1 | 2,038 |
| *oef-1; mes-4* | 45.6\*\*\*\* | 771 |

n = 10-12 parental animals per genotype. \*\*\*\* = p < 0.0001, Fisher’s exact test. Emb, embryonic lethality. *mes-4* and *oef-1; mes-4* parental animals are the first-generation progeny of *mes-4/nT1* or *oef-1/nT1; mes-4/nT1* heterozygotes, respectively.

**Table S3.** *oef-1* also enhances *mes-4(ok2326)* embryonic lethality.

|  |  |  |
| --- | --- | --- |
| **Genotype** | **% Emb** | **Total Live Progeny** |
| Wild-type | 0.31 | 4,143 |
| *oef-1(vr25)* | 0.51 | 4,864 |
| *mes-4(ok2326)* | 23.91 | 1,890 |
| *oef-1; mes-4* | 41.78\*\*\*\* | 2,198 |

n = 20-21 parental animals per genotype. \*\*\*\* = p < 0.0001, Fisher’s exact test. Emb, embryonic lethality. *mes-4* and *oef-1; mes-4* parental animals are the first-generation progeny of *mes-4/nT1* or *oef-1/nT1; mes-4/nT1* heterozygotes, respectively.

**Table S4.** *oef-1; mes-4* second-generation mutants are 100% sterile.

|  |  |  |
| --- | --- | --- |
| **Genotype** | **% Sterile** | **% Fertile** |
| Wild-type | 0 | 100 |
| *oef-1(vr25)* | 0 | 100 |
| *mes-4(bn67)* | 100 | 0 |
| *oef-1; mes-4* | 100 | 0 |

n ≥ 62 animals per genotype. *mes-4* and *oef-1; mes-4* animals are the second-generation progeny of *mes-4/nT1* or *oef-1/nT1; mes-4/nT1* heterozygotes, respectively. Animals were scored for the presence or absence of a germ line by DAPI staining.

**Table S5.** *oef-1* enhances *mes-2* embryonic lethality and incidence of males.

|  |  |  |  |
| --- | --- | --- | --- |
| **Genotype** | **% Emb** | **% Males** | **Total Live Progeny** |
| Wild-type | 0.67 | 0.1 | 2,970 |
| *oef-1(vr25)* | 0.61 | 0.082 | 3,643 |
| *mes-2(bn11)* | 1.44\*\* | 0.042 | 2,395 |
| *mes-2; oef-1* | 5.55\*\*\*\* | 1.61\*\*\*\* | 2,367 |

n = 13-15 parental animals per genotype. \*\* = p = 0.006, \*\*\*\* = p < 0.0001, Fisher’s exact test. Emb, embryonic lethality. *mes-2* and *mes-2; oef-1* parental animals are the first-generation progeny of *mes-2/mnC1* or *mes-2/mnC1; oef-1* heterozygotes, respectively.

**Table S6.** *oef-1* enhances *mrg-1* first-generation sterility.

|  |  |  |  |
| --- | --- | --- | --- |
| **Genotype** | **Generation** | **% Sterile** | **% Fertile** |
| *mrg-1(qa6200)* | F1 | 16.67 | 83.33 |
| *mrg-1(qa6200)* | F2 | 100 | 0 |
| *mrg-1(qa6200); oef-1(vr25)* | F1 | 100 | 0 |

n ≥ 25 parental animals per genotype. *mrg-1* (F1) and *mrg-1; oef-1* (F1)parental animals are the first-generation progeny of *mrg-1/qC1* or *mrg-1/qC1; oef-1* heterozygotes, respectively. *mrg-1* (F2) parental animals are the offspring of *mrg-1* F1s.

**Table S7**. Strains used in this study.

|  |  |  |
| --- | --- | --- |
| **Strain** | **Genotype** | **Source** |
| N2 | Bristol N2 | Michael Stern |
| RW10325 | *unc-119(ed3)* III; *stIs10325* [MES-4::TY1::EGFP::3xFLAG + *unc-119*(+)] | modENCODE |
| SS104 | *glp-4(bn2)* I | Susan Strome |
| SS186 | *mes-2(bn11) unc-4(e120)/mnC1 [dpy-10(e128) unc-52(e444)]* II | Susan Strome |
| YL585 | *oef-1(vr25)* IV | McManus and Reinke 2018 |
| YL679 | *glp-4(bn2)* I; *oef-1(vr25)* IV | This study |
| SS472/YL656 | *mes-4(bn67) dpy-11(e224)* V*/nT1 [unc-?(n754) let-? qIs50]* (IV;V) (modified from SS472) | This study; Susan Strome |
| VC1874 | *mes-4(ok2326)* V/*nT1 [unc-?(n754) let-? qIs50]* (IV;V) | *Caenorhabditis* Genetics Center |
| YL646 | *mes-2(bn11) unc-4(e120)/mnC1 [dpy-10(e128) unc-52(e444)]* II; *oef-1(vr25)* IV | This study |
| YL657 | *oef-1(vr25)* IV*/nT1 [unc-?(n754) let-? qIs50]* (IV;V); *mes-4(bn67) dpy-11(e224)* V*/nT1 [unc-?(n754) let-? qIs50]* (IV;V) | This study |
| YL680 | *oef-1(vr25)* IV*/nT1 [unc-?(n754) let-? qIs50]* (IV;V); *mes-4(ok2326)* V/*nT1 [unc-?(n754) let-? qIs50]* (IV;V) | This study |
| MT16973  | *met-1(n4337)* I | *Caenorhabditis* Genetics Center |
| YL666 | *met-1(n4337)* I; *oef-1(vr25)* IV | This study |
| XA6226 | *mrg-1(qa6200)/qC1 [dpy-19(e1259) glp-1(q339) qIs26[lag-2::GFP + rol-6(su1006)]] III* | *Caenorhabditis* Genetics Center |
| YL690 | *mrg-1(qa6200)/qC1 [dpy-19(e1259) glp-1(q339) qIs26[lag-2::GFP + rol-6(su1006)]] III; oef-1(vr25) IV* | This study |

**Table S8**. Omics samples used for genomic analyses.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Type** | **Mark** | **Tissue** | **Condition** | **GEO ID** | **Reference** | **Description** |
| ChIP-seq | H3K27me3 | germ line (IGN) | wild type | GSM4430030-1  | - |  |
| H3K36me3 | germ line (IGN) | wild type | GSM4430032-3 | - |  |
| H3K27me3 | germ line (IGN) | *oef-1* | GSM4430034-5 | - |  |
| H3K36me3 | germ line (IGN) | *oef-1* | GSM4430036-7 | - |  |
| input | germ line (IGN) | wild type | GSM4430038-9 | - |  |
| input | germ line (IGN) | *oef-1* | GSM4430040-1 | - |  |
| H3K27me3 | somatic (*glp-4*) | wild type | GSM4430042-3 | - |  |
| H3K36me3 | somatic (*glp-4*) | wild type | GSM4430044-5 | - |  |
| H3K27me3 | somatic (*glp-4*) | *oef-1* | GSM4430045-6 | - |  |
| H3K36me3 | somatic (*glp-4*) | *oef-1* | GSM4430046-7 | - |  |
| H3K36me3 | somatic (*glp-4*) | *oef-1* | GSM4430048-9 | - |  |
| input | somatic (*glp-4*) | wild type | GSM4430050-1 | - |  |
| input | somatic (*glp-4*) | *oef-1* | GSM4430052-3 | - |  |
| RNA-seq | - | dissected gonads | wild type | GSM4430054-6 | - | Used for *oef-1/*wt and ctrl contrasts |
| - | dissected gonads | *oef-1* | GSM4430057-9 | - | Used for *oef-1*/wt contrast |
| - | dissected gonads | wild type | GSM4411148-50 | Robert et al., 2020 | Used for ctrl contrast |