

Fig. S1 Starvation induces transgenerational fertility and heat stress phenotypes that revert in the F3 generation

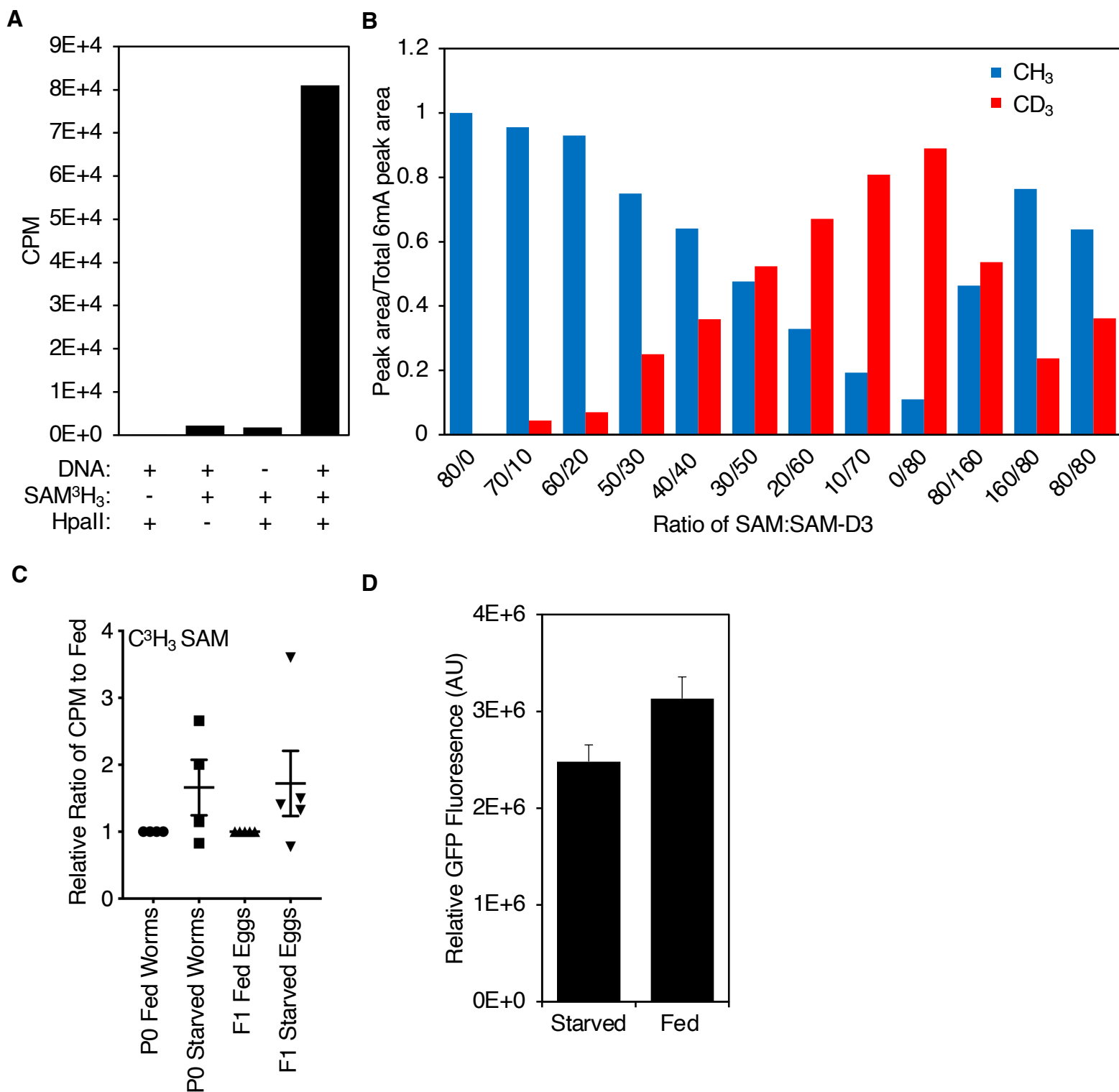


Fig. S2 Deuterated SAM can be utilized by enzymes with ~ equal activity and worms starved as L1s do not consume more food than fed worms at L3 stage

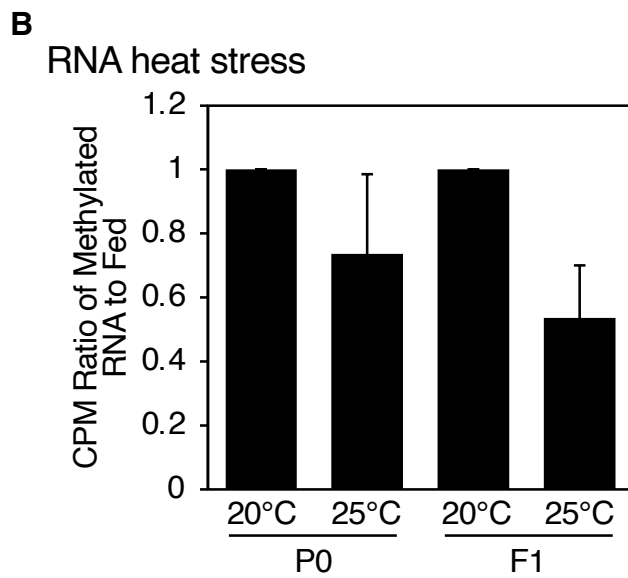
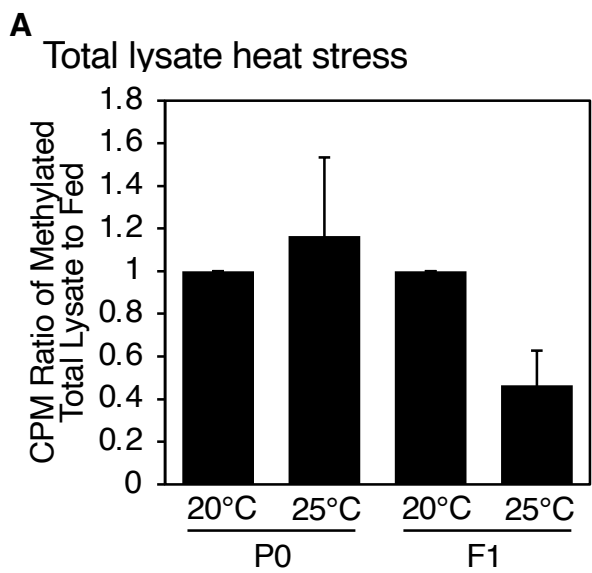


Fig. S3 Heat stress causes no consistent heritable change in methylation

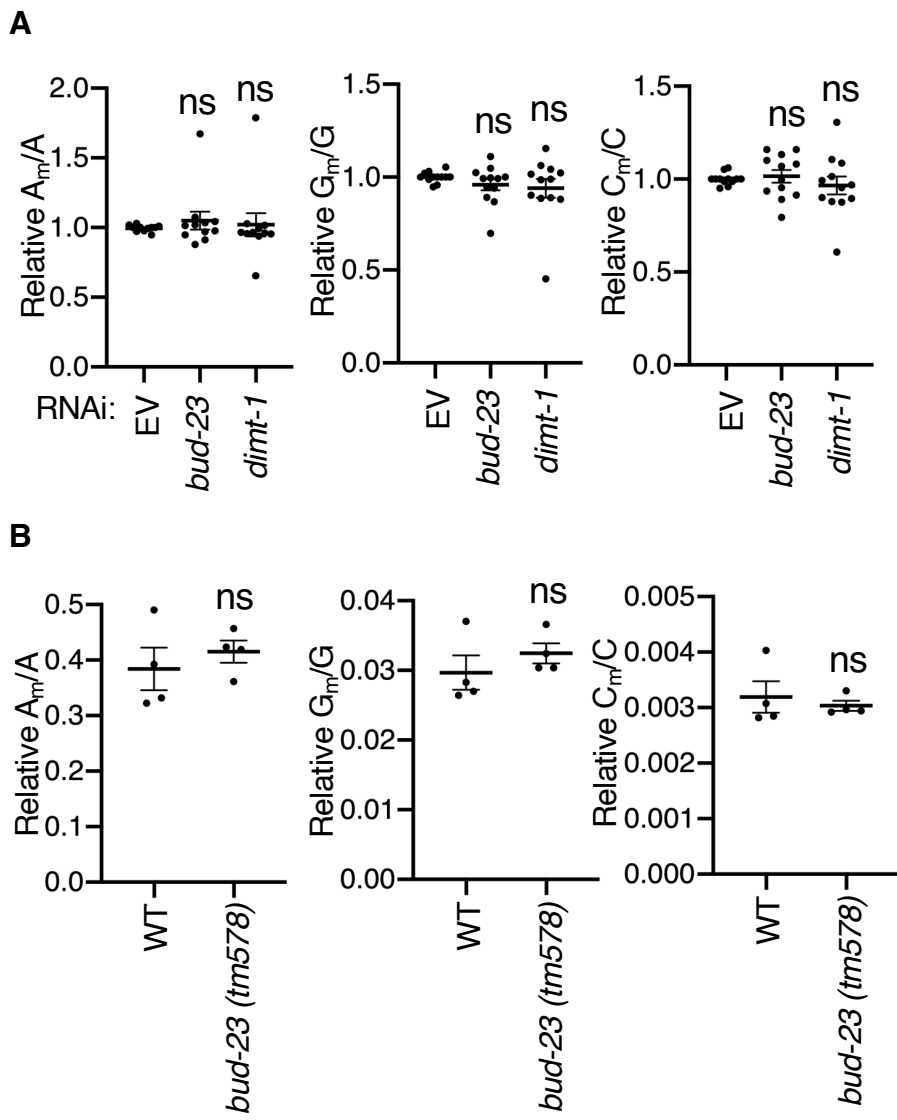
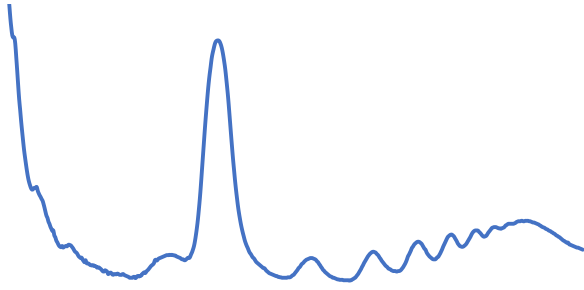


Fig. S4 *dimt-1* and *bud-23* deletion do not affect 2'O methylation modifications on the 18S rRNA

A

F1 Fed eggs



B

F1 starved eggs

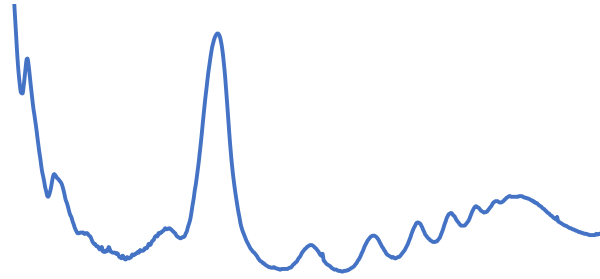
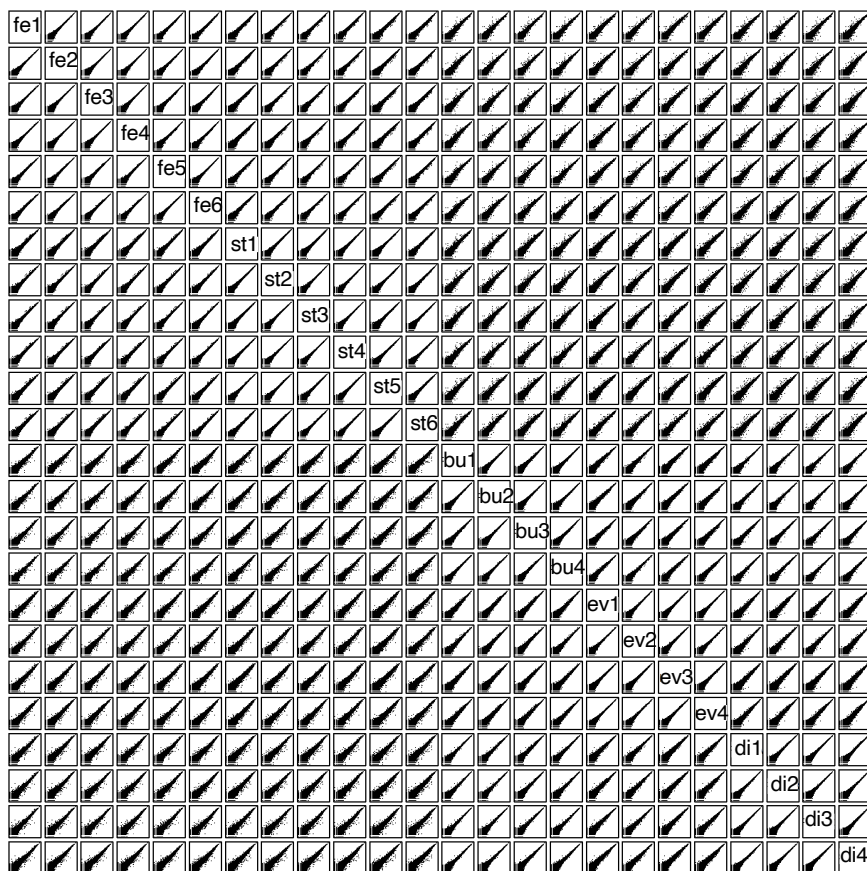


Fig. S5 F1 eggs from fed and starved parents have similar polysome profiles

A



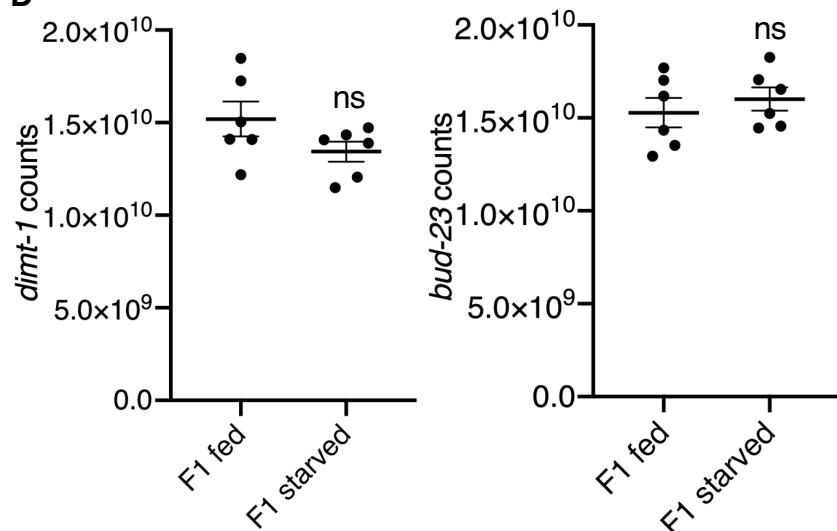
B

GO Term mRNAseq KD <i>bud-23</i> or <i>dimt-1</i>	P value
Embryo development	2.01E-24
Reproduction	1.64E-18
Nematode larval development	5.05E-14
mRNA splicing	1.38E-10
Receptor-mediated endocytosis	9.38E-10
Structural constituent of ribosome	4.65E-9
Translation	7.14E-8
Apoptotic process	1.83E-5
Ribosome	6.71E-5
Regulation of meiotic nuclear division	3.59E-4
Protein folding	4.00E-4
Germ cell development	2.13E-3
Determination of adult lifespan	6.65E-3
Growth	2.43E-3
Mitochondrial electron transport	3.34E-2
RNA processing	3.59E-2
Cell cycle	3.84E-2
Ribosome biogenesis	3.91E-2
Translation initiation	3.91E-2

C

GO Term mRNAseq F1 starved up	P value
Ribosome	3.77E-8
Response to heat	3.95E-7
Structural constituent of ribosome	7.26E-7
Translation	2.01E-5
Innate immune response	2.51E-5
ER unfolded protein response	4.82E-4
Flavonoid glucuronidation	2.56E-2

D



E

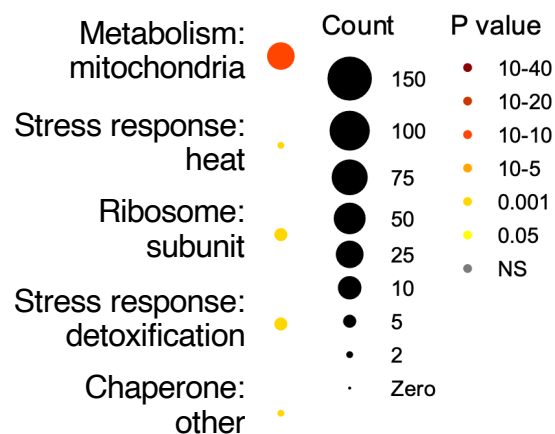
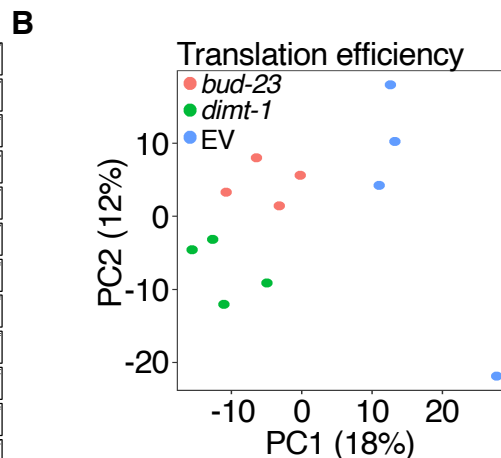
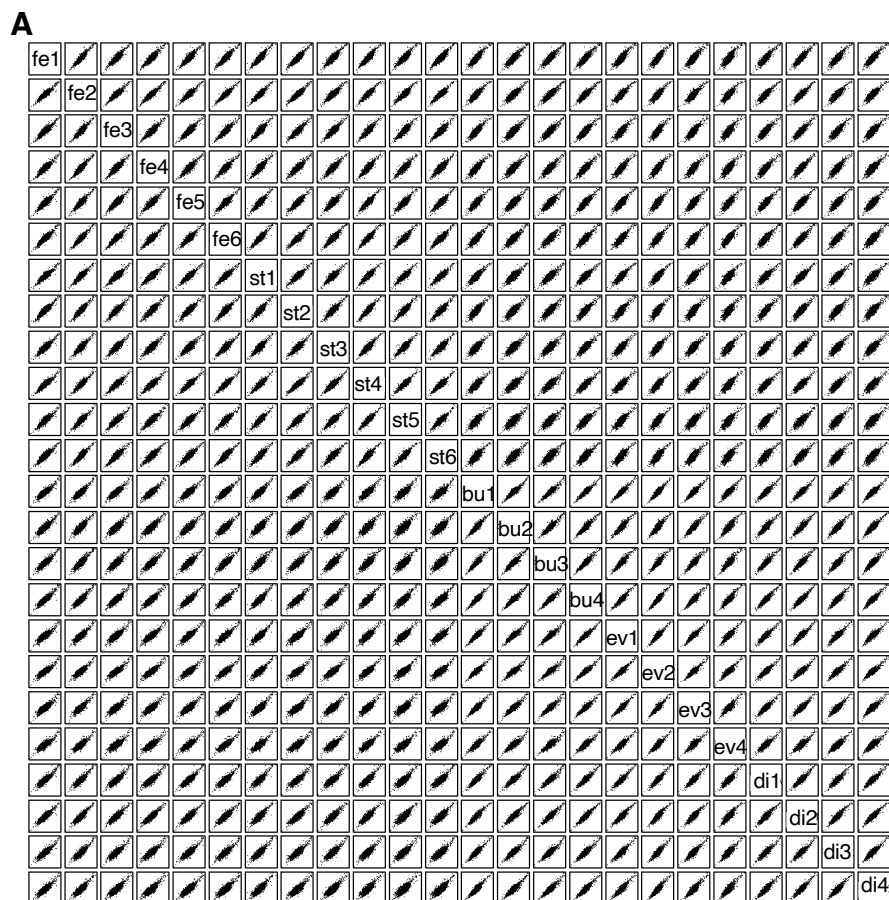


Fig. S6 Transcriptome Supplementary Analysis



C

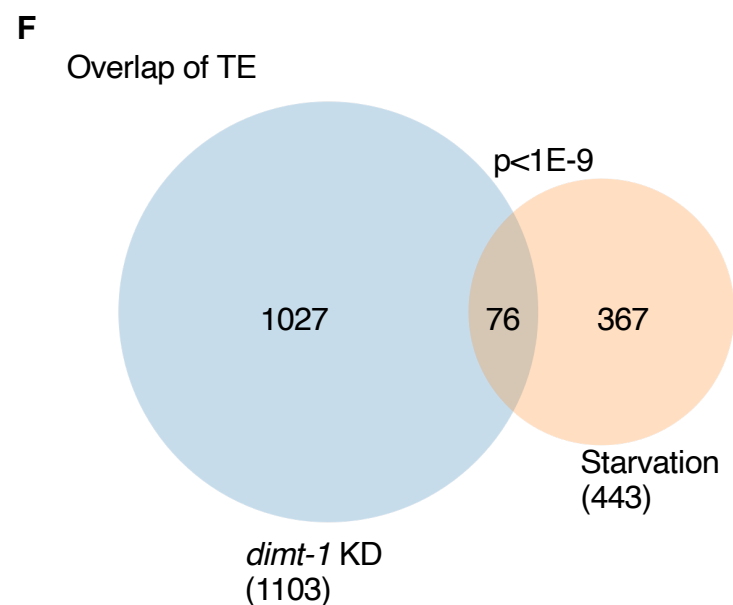
GO Term TE <i>bud-23</i> KD	P value
Determination of adult lifespan	3.28E-4
Regulation of multicellular growth	4.12E-3
Nematode larval development	4.95E-3
Locomotion	6.39E-3
Chemosensory behavior	9.11E-3
Positive regulation of gene expression	1.04E-2
Signal transduction	1.40E-2
Embryo development	2.11E-2
Reproduction	2.90E-2
Negative regulation of trans from RNA pol II	3.74E-2
Multicellular development	5.06E-2

D

GO Term TE <i>dimt-1</i> and <i>bud-23</i> KD	P value
Determination of adult lifespan	1.53E-4
Regulation of multicellular growth	3.54E-3
Nematode larval development	6.42E-3
Chemosensory behavior	7.83E-3
Positive regulation of gene expression	8.95E-3
Signal Transduction	1.01E-2
Embryo development	4.51E-2
Lipid storage	6.09E-2

E

GO Term TE starved	P value
Embryo development	3.28E-4
Reproduction	4.12E-3
Nematode larval development	4.95E-3
Gamete generation	6.39E-3
Translation	9.11E-3
Determination of adult lifespan	1.04E-2
RNA interference	1.40E-2
Apoptotic process	2.11E-2
Ribosome biogenesis	2.90E-2
Regulation of translation	3.74E-2
P granule organization	5.06E-2



G

GO Term TE KD <i>dimt-1</i> and starvation	P value
Embryo development	3.48E-5
Nematode larval development	1.77E-4
Translation	4.90E-4
Protein catabolic process	1.58E-3
Reproduction	4.73E-3
Receptor mediated endocytosis	5.69E-3
Calcium ion transport	9.30E-3
tRNA aminoacylation for protein translation	1.14E-2
Determination of adult lifespan	3.60E-2
Regulation of translation fidelity	4.25E-2
Proteolysis	4.97E-2
Growth	5.92E-2
Secretion by cell	6.53E-2
Dopamine receptor signaling pathway	6.82E-2
Cellular response to stress	8.33E-2

Fig. S7 Translation Efficiency Supplementary Analysis

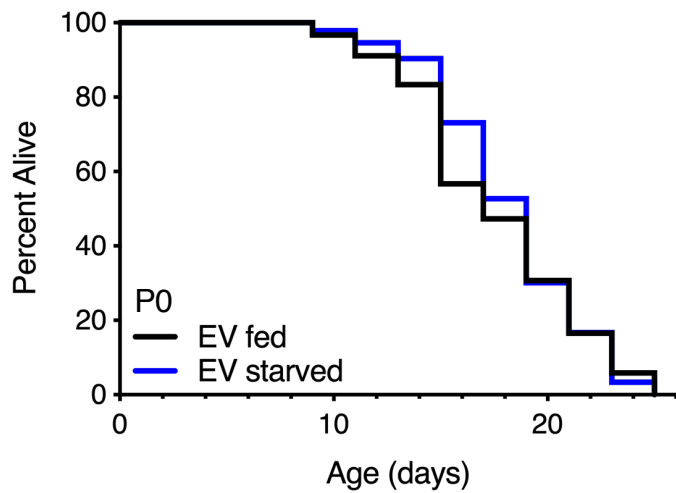
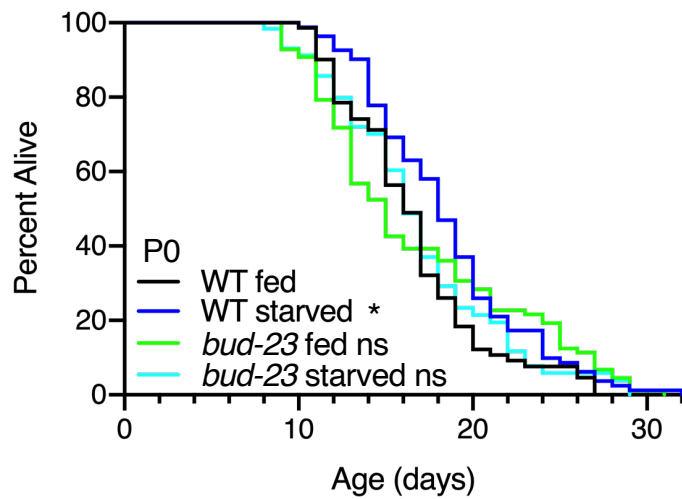
A**B**

Fig. S8 *bud-23* is necessary for parental longevity extension in response to starvation

Generation	Strain	Mean +/- SD	Median	p values	# worms	Figure
P0	WT fed	15.692	15		78/98	1c
P0	WT starved	17.548	17	0.0009	73/94	1c
F1	WT fed	15.951	17		82/96	1f
F1	WT starved	17.416	17	0.0051	77/96	1f
P0	WT fed	17.120	17		83/96	
P0	WT starved	20.358	19	<0.0001	81/96	
F1	WT fed	16.816	17		87/96	
F1	WT starved	18.671	19	0.0463	81/96	
P0	WT fed	17.841	17		88/96	
P0	WT starved	19.543	19	0.0432	81/95	
F1	WT fed	17.706	19		86/96	
F1	WT starved	20.101	19	0.0030	89/96	
P0	WT fed Empty vector	17.488	17		86/96	S6a
P0	WT starved Empty vector	18.130	19	0.6368	92/96	S6a
P0	WT fed Empty vector	19.132	19		91/96	
P0	WT starved Empty vector	20.241	19	0.0350	87/96	
P0	WT fed	16.448	16		67/77	S6b
P0	WT starved	18.457	18	0.0120	81/84	S6b
P0	<i>bud-23(tm5768)</i> fed	16.652	15	0.3866	92/98	S6b
P0	<i>bud-23(tm5768)</i> starved	16.315	16	0.7249	54/62	S6b
P0	WT fed	18.190	19		84/96	
P0	WT starved	19.597	19	0.0198	67/96	
P0	<i>bud-23(tm5768)</i> fed	15.370	15	0.0742	54/71	
P0	<i>bud-23(tm5768)</i> starved	16.176	15	0.5224	68/96	
P0	WT fed	16.183	16		83/97	
P0	WT starved	17.405	18	0.0725	42/96	
P0	<i>bud-23(tm5768)</i> fed	16.871	15	0.1077	85/96	
P0	<i>bud-23(tm5768)</i> starved	16.377	16	0.9069	53/96	
F1	WT fed	17.649	17		77/87	
F1	WT starved	19.557	19	0.0159	79/89	
F1	<i>bud-23(tm5768)</i> fed	16.729	15	0.9979	59/93	
F1	<i>bud-23(tm5768)</i> starved	16.92	17	0.9201	50/90	
F1	WT fed	15.568	15		88/98	
F1	WT starved	17.169	17	0.0081	83/99	
F1	<i>bud-23(tm5768)</i> fed	16.313	15	0.1350	67/97	
F1	<i>bud-23(tm5768)</i> starved	14.463	15	0.0425	67/94	

Supplementary Table 1. Parental starvation causes an increase in lifespan in the P0 and F1 generation in WT worms but not in *bud-23(tm5768)* mutant worms The figure panels in which specific experiments are shown or used are indicated in the right column. The mean lifespan and SD values were calculated by Prism from triplicate samples of 30 worms each (90 worms total). # worms: number of observed dead worms at the end of the experiment/number of alive worms at the beginning of the experiment. The difference between both numbers corresponds to the number of censored worms (worms that underwent “matricide”, exhibited ruptured vulva, or crawled off the plates). P values are calculated by log rank (Mantel-Cox) statistical test.