SUPPLEMENTARY INFORMATION

Reference for Dataset 1 can be found in (1)

Supplementary Methods

C. elegans Strains

All strains were grown and maintained on standard nematode growth medium (NGM). In Argentina (D.H. laboratory), plates were supplemented with 0.1 mg/mL streptomycin and 100 U/mL nystatin using the *Escherichia coli* OP50-1 strain as the food source. In Pittsburgh (J.L.Y. laboratory), strains were grown on standard NGM seeded with OP50. Temperature-sensitive strains were maintained at 16 °C and shifted to the nonpermissive temperature of 25 °C to induce dauer formation, unless otherwise indicated. All other strains were maintained at 20 °C. All *daf-7* strains were maintained at low density to prevent dauer induction at 16 °C. Dauer studies were performed in both the J.L.Y. and D.H. laboratories to validate results. All *chd-7* alleles were outcrossed at least five times prior to use.

Dauer Formation in Liquid Media.

We obtained dauers in liquid media following a protocol recently described (2). Five plates full of N2 or *chd-7(gk290)* gravid adult worms were bleached and the resulting embryos were resuspended in 10 mL of S-basal with 100 µg/mL streptomycin to avoid contamination and allowed to hatch overnight in a rocker at 20 °C. Next day, L1 larvae were washed and resuspended in 5 mL of S-complete to a concentration of 5 larvae per microliter in HB101 *E. coli* bacteria diluted to final concentration of 1 mg/mL. Worms were cultured in these conditions in a rocker at 20 °C for 1 wk to induce dauer arrest.

fog-2 Mating Assay

To determine if males were capable of siring offspring, eight males from each strain tested were plated with four *fog-2(q71)* adult females on seeded 10-cm plates. After 24 h, *fog-2* females were transferred to new plates and within 48 h the proportion of fertile females were scored. Assay was repeated two times.

CHD-7 translational reporter construction

Strain WBStrain00033709 which carries the transgene stIs11446 [*tag-192*::H1-wCherry + *unc-119*(+) was constructed by Waterson´s lab (*tag-192* is previous *chd-7* denomination). This strain contains a 5205 bp fragment with approximately 4300 bp of chd-7 promoter region and was generated using the following oligos: Forward 5´TTTTCCCGGGAAATTGTACATTTGCCGATTTACCGAAT 3´ and Reverse 5´TTTTCCTAGGATCTGCCATTTGGGACATTTGTGGA 3´. This fragment was cloned into pJIM20 vector between the XmaI and AvrII restriction sites.

Genomic Sequencing of *scd-3*

A 6 cm plate replete with *scd-3* gravid animals was washed with 1 ml M9 and collected in a glass conical tube. Worms were washed extensively and then placed on a nutator for 1 h to allow remaining gut bacteria to be passed into the medium. Worms were again washed 3-4 times and settled by gravity. The worm pellet was transferred to 1.5 ml tubes

and genomic DNA was prepared according to the manufacturer's protocol with the Purelink Genomic DNA Kit (Invitrogen) except that after addition of digestion buffer, worms were pulverized with a microfuge hand dounce prior to incubation at 55°C. Sequencing was performed by Psomagen, Qiagen CLC Genomics Workbench was used to align the DNA against WBcel235 and view the variant.

Oil-Red-O (ORO) staining

Dauers grown at 25°C for 5 days were stained for lipids using ORO, as previously described (3). Animals were mounted on a 4% agarose pad and observed in a Zeiss Axioplan brightfield microscope equipped with a Micropublisher 3.3 camera (Q Imaging). Image J (NIH) was used to quantify the amount of lipids in each animal. At least 20 animals of each strain were quantified. Statistical differences were determined by Student's t-test.

Pathogen Resistance Assay.

The pathogenic bacterial strain used in this study was *P. aeruginosa* (strain PA14). This strain was streaked from a frozen stock onto an LB agar plate, incubated at 37 °C overnight, and then kept at 4 °C (shelf-life of 1 wk). For survival assay, a single PA14 colony was inoculated in King's broth and incubated at 37 °C overnight with shaking. Twenty microliters of this culture was seeded onto slow-killing NGM plates (containing 0.35% peptone instead of 0.25%) and incubated for 24 h at 37 °C. The plates were then left to sit at room temperature for 24 h. The following day, 150 L4 hermaphrodites grown at 15 °C were distributed onto five PA14 plates and incubated at 25 °C. Survival was monitored at intervals of 6 to 12 h and live, dead, and censored animals were recorded. Data and statistics were analyzed using the Kaplan–Meier method, as described in the previous section.

L1 survival

Experiments were done at 20°C. Eggs were obtained by bleaching of gravid adults and kept under gentle shaking in 5 ml sterile M9 supplemented with 0.1 µg/ml streptomycin to hatch (16h). To normalize population density, resulting L1 larvae were diluted to obtain 1 larva/µl in 5 ml of M9 and kept under constant agitation for the remainder of the experiment. Every 48 h, a 100 µl aliquot of L1 larvae were spotted onto a NGM plate and then incubated for 72 h. Animals were scored as alive if developed beyond the L2 stage. Percentage of the population alive was normalized to day 1 seeded L1 larvae.

***daf-9* suppression assays.**

For preparation of *daf-9(RNAi)* plates, bacterial cultures were grown overnight in LB with 10 µg/mL tetracycline and 50 µg/mL carbenicillin and induced with 4 mM IPTG for 4 h. Cultures were spun down, suspended in one-tenth volume and 30 µL of bacteria were seeded on 3-cm NGM plates made with 1 mM IPTG and 50 µg/mL carbenicillin. Plates were grown overnight at 25 °C and stored at 4 °C for no more than 2 wk prior to use.

RNA Preparation and qRT-PCR.

RNA was isolated using RNAzol (Molecular Research). RNA concentration of each sample was measured using a Nanodrop spectrophotometer and 250 to 500 ng of RNA were reverse-transcribed using qScript cDNA SuperMix (QuantaBio). qPCR was performed using the Forget-Me-Not qPCR Master Mix (Biotium) with a BioRad iCycler

thermocycler. Amplification was achieved using oligonucleotides designed with PerlPrimer software or previously validated sequences (see Table S4 for primer sequences). For *Xenopus* RNA extraction, six embryos were combined for each treatment. For worm RNA extraction, dauers and partial dauers were developed for a week at 25 °C and L4 were developed at 20 °C. For *X. laevis*, the relative expression of *col2a1* was normalized to *ODC* expression and determined via the method previously described (Pfaffl). For *C. elegans*, expression was normalized to the housekeeping gene *cdc-42* or *ama-1*.

ChIP-seq analysis

Data from CHD-7 and DAF-16 ChIP-seq generated by ModEncode project (54) were analyzed. Reference for CHD-7-eGFP: https://www.encodeproject.org/experiments/ENCSR010MNU/. Reference for DAF-16-eGFP: https://www.encodeproject.org/experiments/ENCSR946AUI/. Peaks were downloaded in ce10 and annotated using Homer software. Gene lists from the peak calling were generated and used to compare CHD-7 and DAF-16.

Microscopy and Fluorescence Imaging

For imaging *chd-7;daf-2* dauers and adults, worms were immobilized in a 25 mM sodium azide solution on fresh 4% agarose pads and imaged at 10× and 20× magnification. Images were collected using a Zeiss Axioplan Imaging Microscope with a DIC system and Zeiss Plan-Neofluar 10× and 20× objectives lens. Images were acquired with a Micropublisher 3.3 camera (Q Imaging). For DIC images from liquid culture studies (natural dauer induction conditions), images were obtained on a Leica Thunder Imaging System using a 63× oil immersion objective. ImageJ (NIH) software was used to quantify worm size.

For imaging *pCHD-7::mCherry* fluorescence, worms were immobilized with 1 mM levamisole on fresh 2% agarose pads and imaged immediately using a Nikon A1r confocal microscope equipped with a 40× PLAN APO oil objective. ImageJ (NIH) software was used to quantify fluorescence intensity.

For imaging gonads in *daf-2(e1370)* and mutants, young adults were transferred to seeded plates and permitted to lay eggs for 5 d at 25 °C to form dauers, then collected and fixed with Carnoy's solution (75 µL EtOH, 37.5 µL acetate, 12.5 µL chloroform) and stained with 5 mg/mL DAPI in PBS. Animals were imaged as 0.5 µm *z*-stacks with the Nikon A1r Confocal Microscope with 40× and 60× plan APO oil objectives.

For imaging *ajm-1::GFP*, young adults were transferred to seeded plates and allowed to lay eggs for 5 d at 25 °C to form dauers. The arrested progeny were then washed off plates with M9 into 15-mL glass conical tubes. Collected animals were washed two to three times with M9 and the excess liquid was aspirated off. Animals were then immobilized with levamisole and the seam cells were imaged as *z*-stacks by confocal microscopy, as described immediately above.

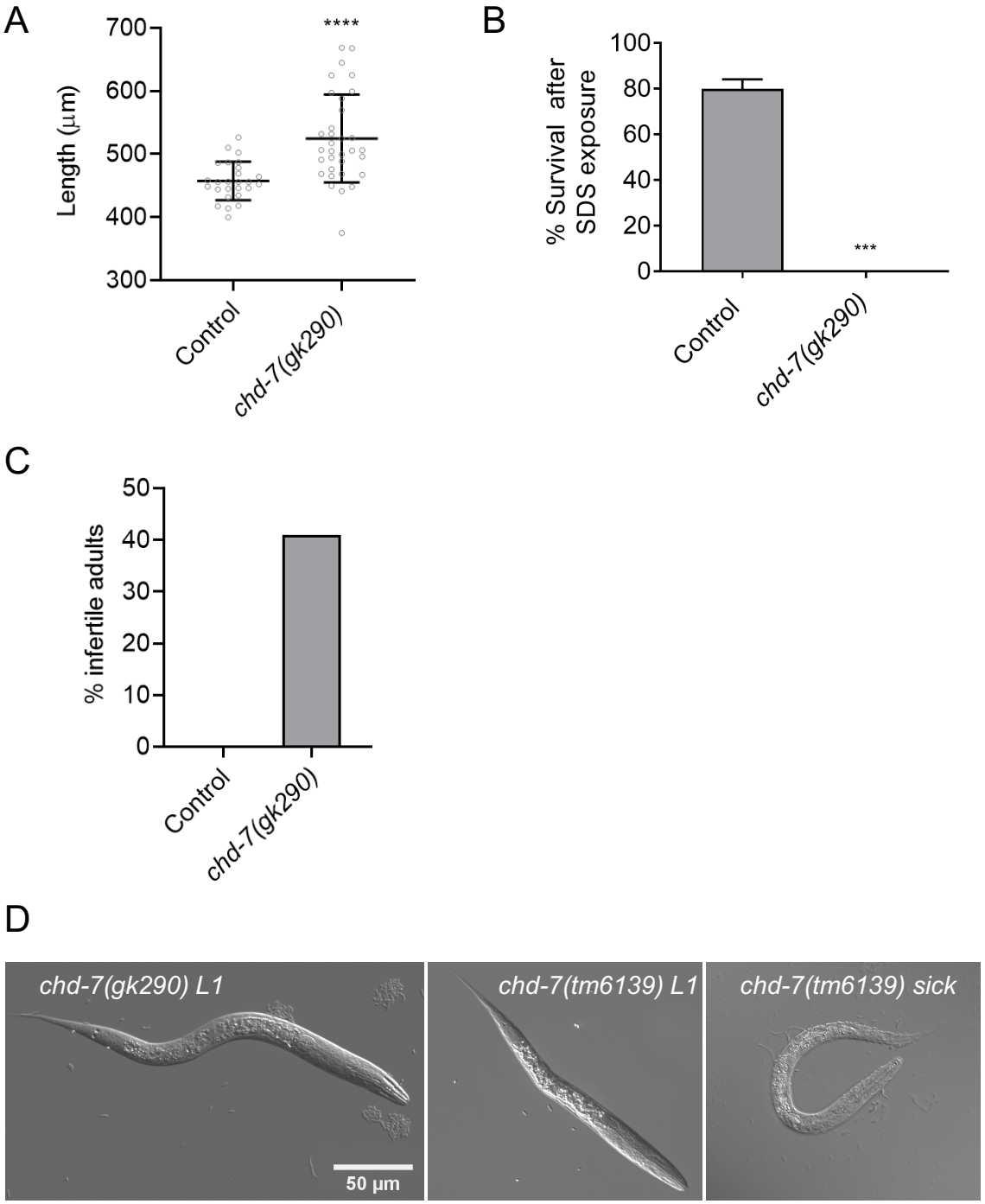
For scanning electron microscopy, worms were fixed by immersing in 2.5% glutaraldehyde in PBS for several hours. Worms were washed 3× in PBS then postfixed in aqueous OsO_4 for 1 h, then washed 3× in PBS, dehydrated through a graded series of ethanol (30 to 100%) then chemically dried with 2× 10-min incubations in hexamethyldisilazane. Dried

worms were sprinkled onto copper double-stick tape on aluminum stubs, sputter-coated with 3.5-nm gold-palladium alloy, then evaluated on a JEOL JEM 6335F microscope at 5 kV.

***X. laevis* Embryo Manipulation and Microinjections.**

pCMV-Sport 6-*col2a1* (Dharmacon) construct was linearized with SalI and transcribed with T7 for antisense probe synthesis. Morphometrics analyses were done on fixed tadpoles using ImageJ (NIH) software. Morphometric measurements were normalized to the mean of the uninjected group in order to compare between independent experiments. For cartilage staining, stage-45 tadpoles were fixed with MEMFA for 24 h at 4 °C, dehydrated into 100% ethanol and stained in 0.01% Alcian blue 8GX in 70% ethanol/30% glacial acetic acid for three nights. Distaining was done in 100% ethanol followed by rehydration in 2% KOH. Animals were cleared in graded glycerol in 2% KOH and skulls were dissected under stereoscope. Images of whole embryos and skulls were collected with a Leica DFC420 camera attached to a Leica L2 stereoscope.

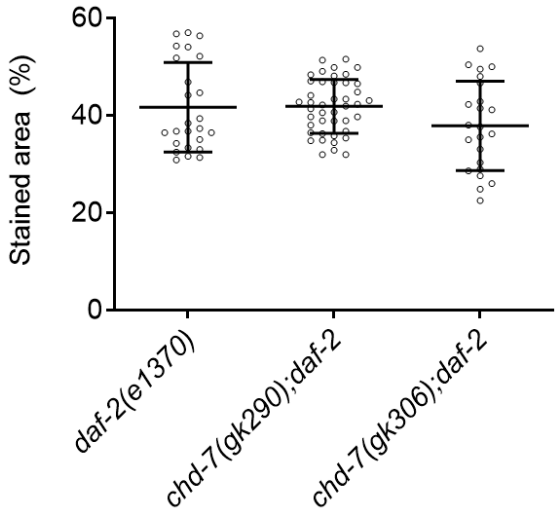
SUPPLEMENTARY FIGURES



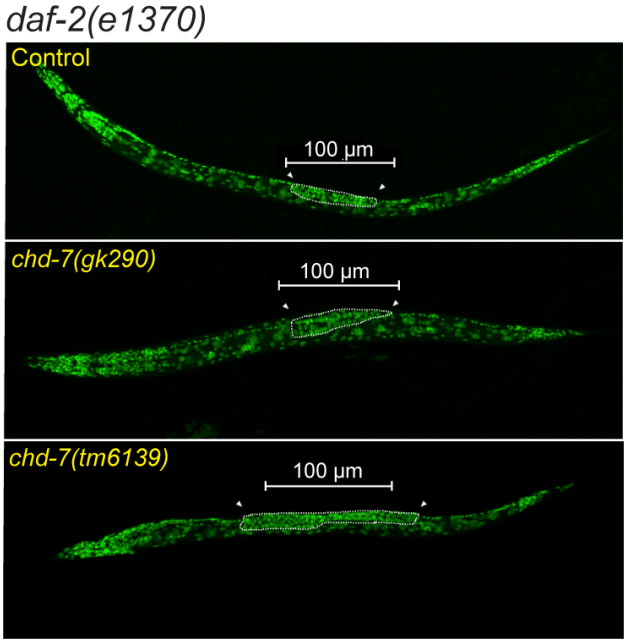
Supplementary Figure 1: Characterization of *chd-7(gk290)* arrest upon dauer inducing conditions. A) Length quantification of Control (N2 wildtype) dauers and *chd-7(gk290)* L3 grown in liquid culture at 20°C. Two biological replicates were scored (n=26-33/replicate). Horizontal black lines represent mean with SD. Unpaired t-test, ****p<0.0001. B) *chd-7*(*gk290*) develop as L3-like larvae which are sensitive to SDS exposure. n>450 animals/strain tested. C) Arrested worms were plated in NGM plates with food and allowed to recover for up to 6 days. Number of infertile adults was counted (n>82). Bars and horizontal black lines represent mean percentage with SD. Unpaired t-test, ****p<0.0001. D) In *chd-7* mutants grown in liquid media, a fraction of the population remains arrested as L1 or are sick. Representative DIC photomicrographs are shown.

A

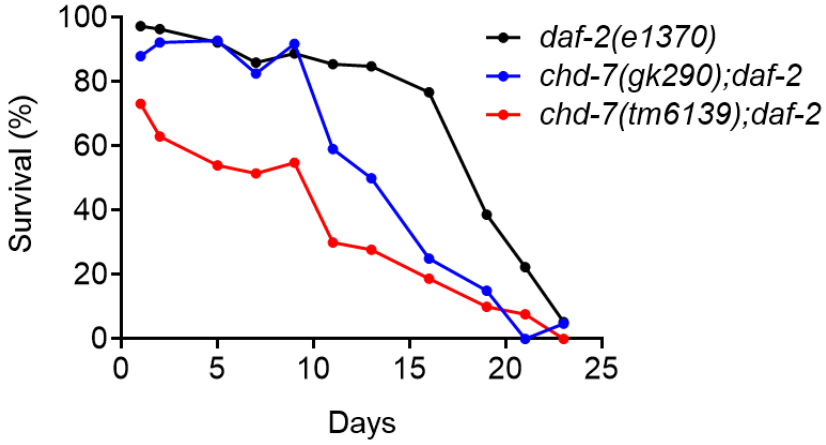
B



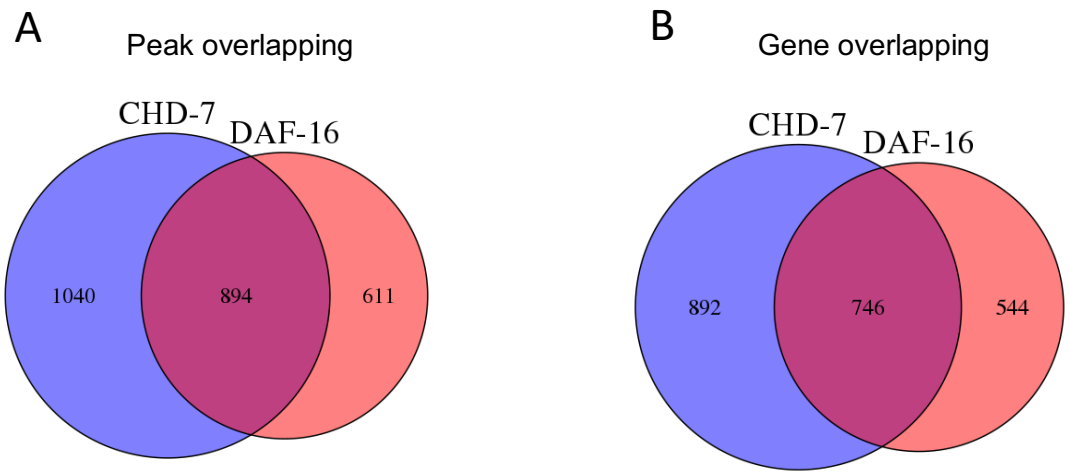
Supplementary Figure 2: *chd-7* does not affect fat storage. Dauers of the shown genotypes were grown at 25°C for 5 days prior to lipid staining with Oil Red O (ORO). A) Representative photomicrographs of ORO-strained worms. B) Quantification of total area of ORO staining/ worm (Image J, see methods) reveals no significant differences in fat accumulation between control and *chd-7* mutants. Three biological replicates were scored with at least 16 individual dauers per replicate. Horizontal black lines represent mean with SD. Statistical analysis was calculated using two-tailed unpaired t test.



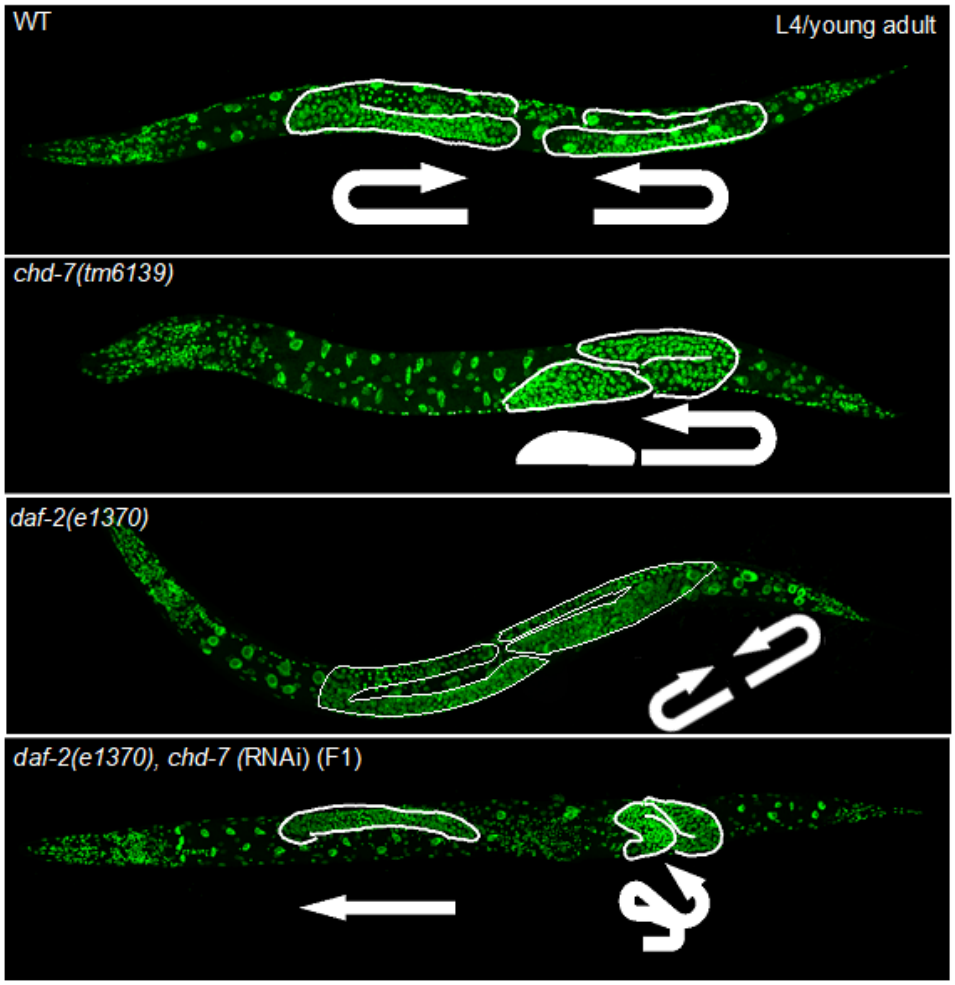
Supplementary Figure 3: Gonad overproliferation in chd-7 mutants. Germ cells in *chd-7;daf-2(e1370)* mutants overproliferate and arrest as L3-like germ cells. Representative Z-projections *daf-2(e1370)* dauers or *chd-7;daf-2(e1370)* partial dauers stained with DAPI (green). Arrowheads denote the anterior and posterior ends of the developing gonad arms.



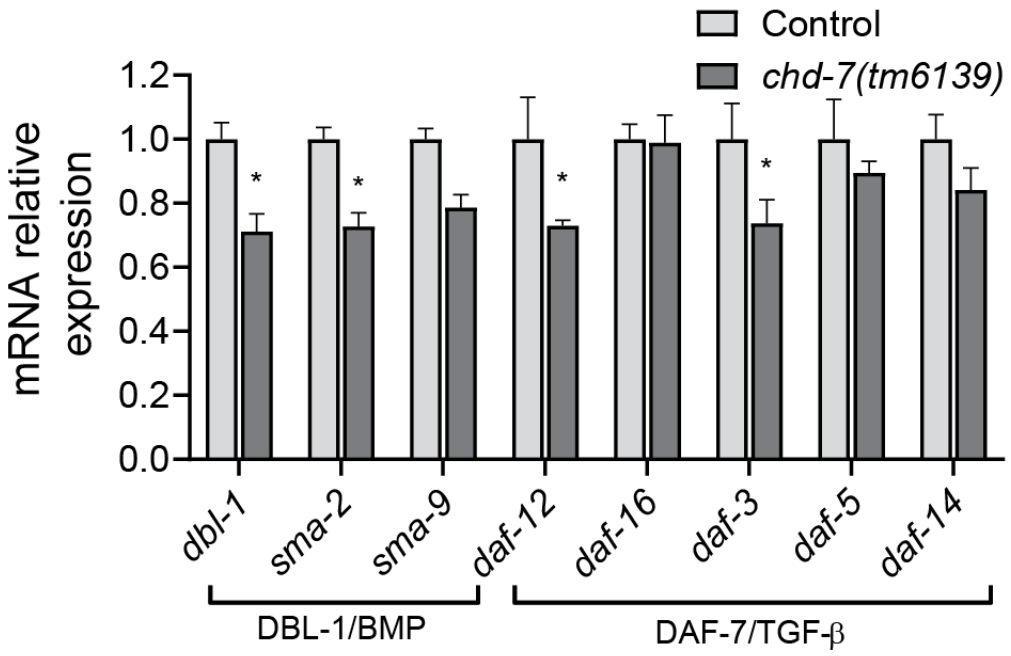
Supplementary Figure 4: Loss of *chd-7* reduces survival of starved L1 larvae in *daf-2(e1370)*. L1 animals hatched from bleached egg preps into sterile M9 with 0.1 µg/ml of streptomycin were diluted to a density of 1 larva/µl and kept at 20°C with constant agitation. Every 48 h, 100 µl aliquot was spotted onto a seeded NGM plate, and scored 72 h later for development beyond the L2 larval stage. Percentage of the population alive was obtained by comparing the initial number of worms at t=0. Each dot represents at least 50 L1 worms.



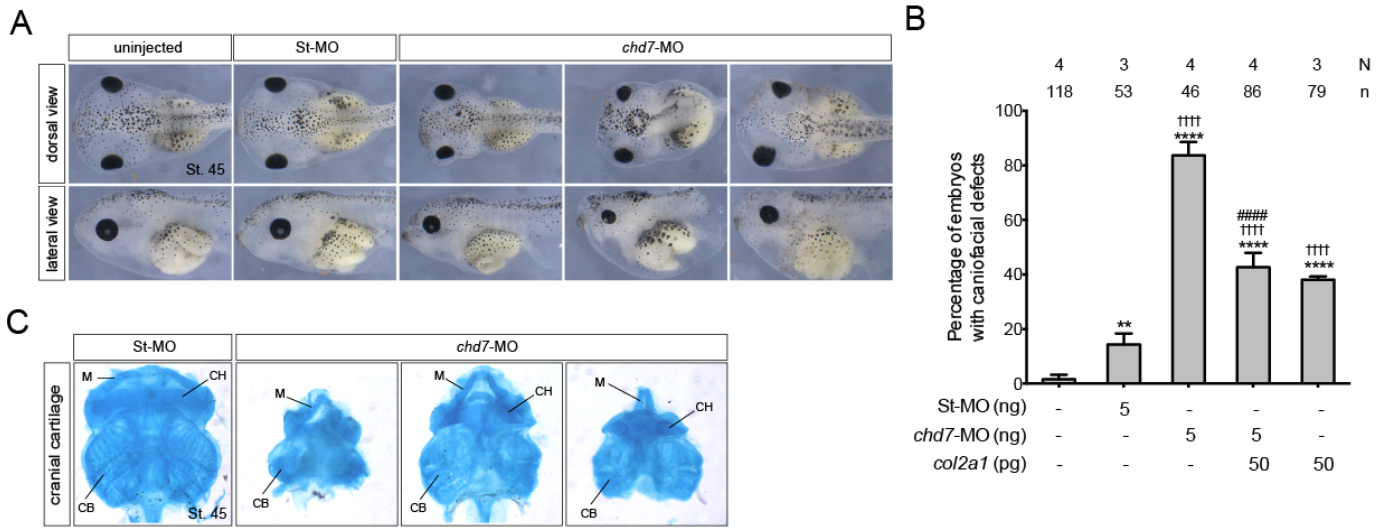
Supplementary Figure 5: Analysis of of CHD-7 and DAF-16 ChIP-Seq data generated by ModEncode. Comparison of gene lists from peak calling of CHD-7::GFP (young adult) and DAF-16::GFP (L4) using Homer software. A) Venn diagram of ChIP peaks for CHD-7 and DAF-16. Overlap was defined as sharing at least one base in common. B) Common genes shared by CHD-7::GFP and DAF-16::GFP peaks. CHIP-seq data was obtained from publicly available data from the ModEncode project.



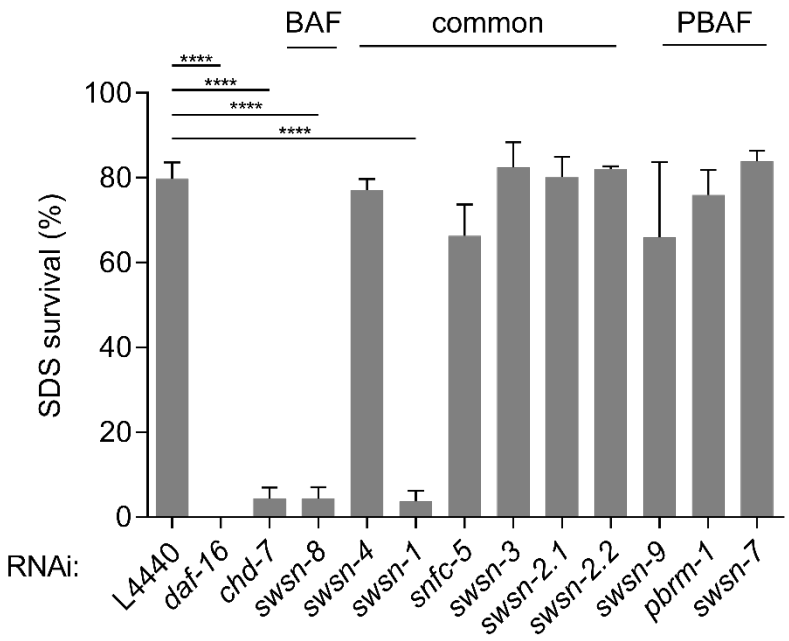
Supplementary Figure 6: c*hd-7* mutants show altered gonad proliferation and migration. Whole mount fixation and DAPI (green) staining of late L4/young adult animals from the relevant strains grown at 20°C. RNAi sample was obtained by growing *daf-2(e1370)* for two generations on *chd-7* dsRNA-producing *E. coli.*



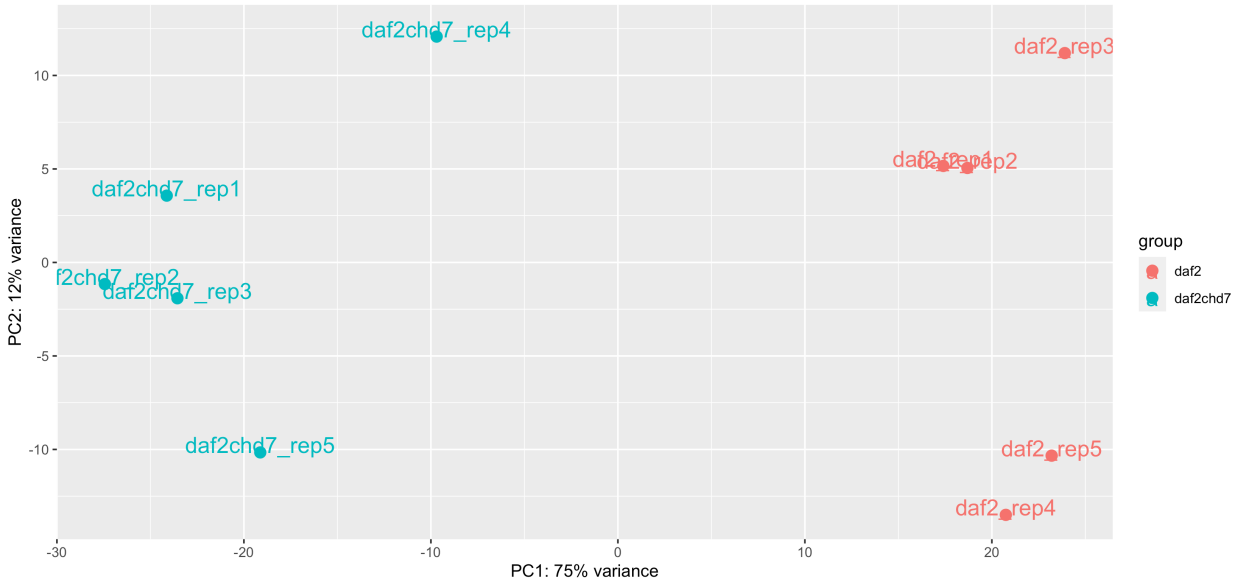
Supplementary Figure 7: CHD-7 regulates components of the DBL-1/BMP and DAF-7/TGF-β pathways. Relative mRNA levels of genes from DBL-1/BMP and DAF-7/TGF-β pathways in *chd-7(tm6139)* or N2 young adults determined by RT-qPCR. Error bars indicate standard error from three repeats with different biological samples. *ama-1* was used as housekeeping gene for normalization. Statistical significance was calculated using t-test for multiple comparisons. *p<0.05.



Supplementary Figure 8: Craniofacial defects of *Chd7* knock-down *Xenopus* tadpoles. A) Gross morphology of surviving tadpoles at St. 45. Embryos were injected into both D1 blastomeres at the 8-cell stage with St-MO (5 ng) and *chd7*-MO (5 ng) as indicated. Tadpoles position is anterior to the left. Embryos are representative. B) Quantification of *Xenopus* tadpoles with craniofacial defects at stage 45. Embryos were injected as indicated in A and in the graph. Data on graph is presented as means with standard error. Fisher's exact test (**p< 0.01, ****,††††,####p< 0.0001). *Comparison to un-injected group, †comparison to St-MO group, #comparison to *chd7*-MO group. N = number of experiments, n = number of embryos. C) Examples of Alcian blue-stained craniofacial skeletal elements from St. 45 tadpoles injected with St-MO (5 ng) and *chd7*-MO (5 ng). M: Meckel's, CH: ceratohyle and CB: ceratobranchial cartilages. *chd7*-MO injected tadpoles presented a high incidence of gross head malformations, reduced head and eyes sizes, and abnormal development of craniofacial cartilages.



Supplementary Figure 9*: swsn-1* and *swsn-8* share dauer suppression phenotypes with *chd-7*. *daf-7(e1372)* L1 synchronized larvae were placed on the indicated RNAi bacteria and grown at 25°C for 4 days to induce dauer formation. Dauer were identified after 4-5 days based on morphology and their resistance to 1% SDS for 15 min. Common SWI/SNF subunits and BAF or PBAF subclasses are indicated on top. Lines above bars represent standard error of the mean (SEM) from three independent experiments. At least 60 animals were assayed for each RNAi. One-way ANOVA. ****p <0.0001. *Comparison to the control, L4440 RNAi.



Supplementary Figure 10: Principal Component Analysis (PCA) of *daf-2(e1370) and chd-7(gk290);daf-2(e1370)* RNA-Seq. Cyan and red denote *chd-7;daf-2* and *daf-2* samples respectively. PC1 and PC2 explains the 75% and the 12% of the variance, for each.

Supplementary Table 1: Lifespan experiments

Strain	Genotype	* Animals	Mean LS	Standard Error	Median diff. from cntl	Max LS	Bonferroni P value	Ref. Cntl.
N2	*Wildtype*	118/200	18.12	0.46		31		
OP609	*CHD-7::GFP*	80/201	13.39	0.45	-26.10%	24	0	vs N2
VC606	*chd-7(gk290)*	95/200	14.91	0.46	-17.71%	27	0.0000028	vs N2
VC676	*chd-7(gk306)*	101/201	16.53	0.44	-8.77%	27	0.0134	vs N2
N2	*Wildtype*	104/211	19.02	0.48		29		
OP609	*CHD-7::GFP*	67/209	14.99	0.54	-21.18%	29	0.000001	vs N2
VC606	*chd-7(gk290)*	68/203	15.86	0.46	-16.61%	27	0.000002	vs N2
VC676	*chd-7(gk306)*	86/216	17.26	0.53	-9.25%	27	0.0856	vs N2
N2	*Wildtype*	66/100	18.1	0.64		32		
VC606	*chd-7(gk290)*	60/100	15.38	0.5	-15.02%	21	0.0005	vs. N2
N2	*Wildtype*	47/125	17.65	0.65		31		
VC606	*chd-7(gk290)*	45/122	13.79	0.54	-21.86%	24	0.000006	vs. N2
N2	*Wildtype*	94/150	17.79	0.71		32		
VC606	*chd-7(gk290)*	79/155	16.17	0.69	-9.10%	32	0.1081	vs. N2
N2	*Wildtype*	77/150	19.72	0.53		26		
OP609	*CHD-7::GFP*	74/150	15.06	0.55	-23.63%	26	3.70E-09	vs N2
N2	*Wildtype*	62/120	17.65	0.6		29		
OP609	*CHD-7::GFP*	49/127	18.09	0.86	2.49%	31	0.6754	vs N2
N2	*Wildtype*	107/182	17.85	0.5		33		
OP609	*CHD-7::GFP*	57/180	14.35	0.58	-19.60%	24	0.000035	vs N2
N2	*Wildtype*	82/225	19.26	0.38		36		
OP609	*CHD-7::GFP*	73/225	21.02	0.45	9.13%	38	0.0013	vs N2
CB1370	*daf-2(e1370)*	56/119	27.83	1.61		50		
DAH001	*chd-7(gk290);daf-2(e1370)*	81/122	13.17	1.06	-52.67%	47	0	vs. *daf-2*
CB1370	*daf-2(e1370)*	101/165	35.58	0.88		55		
DAH001	*chd-7(gk290);daf-2(e1370)*	69/194	17.47	1.2	-50.89%	45	0	vs. *daf-2*
	chd-7(gk306);daf-2(e1370)	60/152	37.18	1.58	4.49%	62	0.0892	vs. *daf-2*
	daf-16(mu86);daf-2(e1370)	79/155	18.85	0.67	-52.97%	35	0	vs. *daf-2*
CB1370	*daf-2(e1370)*	120/175	35.94	1.1		66		
DAH001	*chd-7(gk290);daf-2(e1370)*	98/210	21.49	1.26	-40.20%	53	0	vs. *daf-2*
	chd-7(gk306);daf-2(e1370)	91/175	37.59	1.77	4.59%	70	0.1141	vs. *daf-2*
	chd-7(gk290);daf-2(e1370);CHD-7::GFP	103/175	37.85	1.54	5.31%	63	0.1145	vs. *daf-2*
CB1370	*daf-2(e1370)*	70/228	27.9	1.31		55		
DAH001	*chd-7(gk290);daf-2(e1370)*	28/210	19.13	1.69	-31.43%	36	0.0002	vs. *daf-2*
	chd-7(gk290);daf-2(e1370);CHD-7::GFP	44/204	30.84	1.47	10.53%	47	0.6571	vs. *daf-2*
	daf-16(mu86);daf-2(e1370)	62/146	14.48	0.54	-48.10%	25	0	vs. *daf-2*
CB1370	*daf-2(e1370)*	116/145	40.54	0.97		63		
	chd-7(gk290);daf-2(e1370);CHD-7::GFP	109/140	44.3	1.4	9.27%	68	0.0001	vs. *daf-2*
CF1903	*glp-1(e2144)*	103/128	30.4	1.27		56		
DAH002	*chd-7(gk290);glp-1(e2144)*	116/153	25.46	0.75	-16.25%	44	0.0000042	vs. *glp-1*
CF1658	*glp-1(e2144);daf-12(rh61rh411)*	120/153	21.36	0.99	-29.73%	40	1.90E-07	vs. *glp-1*
CF1903	*glp-1(e2144)*	92/126	31.15	0.96		46		
DAH002	*chd-7(gk290);glp-1(e2144)*	118/137	23.26	0.52	-25.32%	35	0	vs. *glp-1*
CF1658	*daf-12(rh61rh411);glp-1(e2144)*	88/125	25.63	0.84	-17.72	46	0.000022	vs. *glp-1*
CF1903	*glp-1(e2144)*	143/150	32.9	1.15		77		
DAH002	*chd-7(gk290);glp-1(e2144)*	113/148	28.37	0.79	-13.76%	55	0.0021	vs. *glp-1*
CF1658	*glp-1(e2144);daf-12(rh61rh411)*	131/148	25.99	0.96	-21.00%	63	0.000043	vs. *glp-1*

Supplementary Table 2: Differentially-expressed genes in dauer-arrested *chd-7;daf-2* compared to *daf-2*

Gene Name	baseMean	log2FoldChange	lfcSE	stat	pvalue	padj	weight
F25B3.2	374.5997229	-5.887048014	0.291744963	-13.32344514	1.69E-40	4.45E-36	0.687145094
Y65B4BL.1	910.0630242	4.166960267	0.173356796	12.50000181	7.46E-36	1.11E-31	0.610157159
srw-85	463.4226994	3.983861256	0.185714961	10.68229099	1.23E-26	1.08E-22	0.687145094
col-42	4961.859556	4.258835123	0.21346774	10.58162289	3.63E-26	6.70E-22	0.244850004
F48C1.9	99.20482845	6.353098098	0.467488574	9.311667371	1.26E-20	1.89E-17	2.412346955
dpy-9	216.1255975	5.071084011	0.332164956	9.245659293	2.34E-20	1.10E-16	0.641759821
daf-9	140.1534564	6.622265277	0.553163836	8.356051093	6.49E-17	7.28E-14	2.303473556
ztf-30	67.52371187	5.279586579	0.394311627	8.317245428	9.00E-17	1.03E-13	1.976976207
F14H8.2	97.11061271	6.610454591	0.565053196	8.159328406	3.37E-16	3.43E-13	1.976976207
H39E23.3	376.9851457	4.821418676	0.354846318	7.951100327	1.85E-15	4.87E-12	0.687145094
H02F09.3	80.06747958	4.440736244	0.325339294	7.502125584	6.28E-14	4.48E-11	2.303473556
ref-1	182.7213741	4.229296685	0.289066171	7.712063565	1.24E-14	1.16E-10	0.16068607
K03D3.2	1105.178555	3.864090826	0.249837954	7.461199546	8.57E-14	1.74E-10	0.687145094
grsp-1	327.3043131	4.78013862	0.372391133	7.465641292	8.29E-14	4.37E-10	0.244850004
col-103	3256.557059	3.18886961	0.149969538	7.927407282	2.24E-15	9.89E-10	0.002729932
str-18	130.7431868	-5.312210578	0.474235487	-6.984316161	2.86E-12	1.34E-09	2.412346955
fkb-7	210.3297877	3.820187327	0.274073137	6.641246747	3.11E-11	4.82E-08	0.687145095
Y37H2C.1	161.9303031	-3.826296395	0.276351571	-6.608597843	3.88E-11	5.67E-08	0.687145095
col-141	64.20937918	3.858224742	0.281256644	6.606865235	3.93E-11	5.95E-08	0.628052003
cdh-10	305.9890026	3.850672363	0.258585972	7.1568939	8.25E-13	1.41E-07	0.005300532
Y59E9AL.4	38.17906576	4.522031265	0.403891581	6.2443274	4.26E-10	1.59E-07	2.303473556
nhr-155	36.84630171	8.03100562	0.967588017	6.233030498	4.57E-10	1.63E-07	2.303473556
T05F1.7	51.05262558	-4.828753289	0.487790534	-5.799114764	6.67E-09	2.61E-06	2.009566777
E02H4.8	34.57357871	-8.019643269	1.075330479	-5.597947221	2.17E-08	5.24E-06	3.122425002
nhr-150	38.91507255	4.461517164	0.436562448	5.638407924	1.72E-08	6.18E-06	2.009566777
str-112	90.60037728	4.329400892	0.414269889	5.622906605	1.88E-08	7.32E-06	1.784414333
col-50	13945.41644	3.360215366	0.239039531	5.690336479	1.27E-08	1.39E-05	0.610157159
str-166	21.50797429	-7.328089528	0.98725147	-5.396891968	6.78E-08	1.40E-05	3.122425002
nas-9	1187.94075	4.222615522	0.395729904	5.616496254	1.95E-08	1.89E-05	0.641759821
F35F10.5	254.8731929	4.048489492	0.325031353	6.302436585	2.93E-10	3.33E-05	0.005300532
C10C5.4	106.3479227	-3.447169433	0.272910302	-5.302729224	1.14E-07	3.73E-05	1.784414333
dsl-5	38.21932886	3.898796099	0.367042997	5.173225242	2.30E-07	7.29E-05	1.784414333
F57B9.3	65.0833442	3.384161904	0.270110877	5.124421208	2.98E-07	9.17E-05	1.784414333
F53G2.1	41.36970496	-4.297313735	0.471547855	-4.871857036	1.11E-06	0.000329658	1.784414333
T25B2.2	73.65188368	-3.490213882	0.3105384	-4.798807103	1.60E-06	0.000348214	2.303473556
lips-10	647.5438281	3.763679537	0.348366209	5.062717025	4.13E-07	0.000348214	0.610157159
R148.7	26.86485451	5.20737268	0.679592546	4.719552468	2.36E-06	0.000370127	3.122425002
T05F1.8	99.12254839	-4.019454633	0.424300633	-4.759490032	1.94E-06	0.000462158	1.976976207
Y39B6A.1	115.3308484	3.481994975	0.303641363	4.880741418	1.06E-06	0.000462158	1.060797185
fbxa-165	48.03580377	4.722747252	0.577437907	4.71522084	2.41E-06	0.000468071	2.303473556

lys-7	1342.473523	3.77542724	0.358419103	4.95349502	7.29E-07	0.000468071	0.687145094
C28C12.11	30.25874501	-4.051741098	0.446632957	-4.593796913	4.35E-06	0.000600431	3.122425002
F22G12.7	23.82658352	4.878943198	0.632280773	4.553267031	5.28E-06	0.000664622	3.343572547
chil-18	167.9572213	3.910021331	0.377118587	5.064776432	4.09E-07	0.000686603	0.244850004
col-142	276.4873247	3.950330051	0.404394706	4.822837748	1.42E-06	0.000828038	0.687145094
tag-344	19.67343023	-4.86986398	0.641070876	-4.476671904	7.58E-06	0.000867444	3.437334933
F57G4.11	20.89277578	4.844311641	0.62518375	4.549561057	5.38E-06	0.001046661	1.976976207
dpy-2	50.20489792	3.485453429	0.32811367	4.527252489	5.98E-06	0.001139195	1.976976207
nhr-234	18.71700611	4.692433335	0.611747647	4.401215681	1.08E-05	0.00117134	3.343572547
oac-42	29.91618544	-4.049839444	0.466507701	-4.394009874	1.11E-05	0.00117134	3.437334933
K11H12.11	42.0465653	4.474272264	0.55382011	4.467646114	7.91E-06	0.00139172	1.976976207
catp-2	52.93905544	3.641568769	0.348611399	4.708878629	2.49E-06	0.00139172	0.628052003
srx-16	17.26010889	-4.877496541	0.661873159	-4.347504502	1.38E-05	0.001405707	3.343572547
irld-38	16.47830006	-5.419190405	0.82347365	-4.15215521	3.29E-05	0.00151419	7.287150191
srbc-32	20.68967177	-4.736624822	0.639568512	-4.278861089	1.88E-05	0.001797604	3.437334933
asp-18	25.14720942	5.655215557	0.8567942	4.266153478	1.99E-05	0.001869073	3.437334933
B0207.1	27.76790284	-4.84018047	0.66832358	-4.249708608	2.14E-05	0.001976417	3.437334933
Y42H9AR.5	137.5404961	3.619936899	0.370845552	4.368225235	1.25E-05	0.003683118	1.060797185
srw-65	9.541443653	-6.165616077	1.031013646	-4.040311292	5.34E-05	0.005242031	3.122425002
F56A4.3	6.99987317	-6.289604112	1.048383803	-4.091635239	4.28E-05	0.005794916	2.228716537
T05E12.3	49.88176252	-5.723633151	0.915681685	-4.066514829	4.77E-05	0.006144169	2.303473556
H04M03.3	658.9062957	3.323097845	0.304660391	4.342861377	1.41E-05	0.006725655	0.610157159
ule-1	1102.225036	-5.066082298	0.710405806	-4.315958952	1.59E-05	0.007175274	0.635973269
sru-40	63.56921254	3.6644561	0.387883469	4.291124101	1.78E-05	0.008001064	0.628052003
dct-7	18.61198097	4.146581684	0.549916128	3.903471046	9.48E-05	0.008452213	3.122425002
ptr-8	1047.814402	2.5508141	0.13142748	4.191011639	2.78E-05	0.011078145	0.687145094
Y25C1A.14	26.45566089	-4.226870647	0.624947835	-3.563290443	0.000366235	0.013570317	7.287150191
C34F11.8	573.8695501	2.947395221	0.215723263	4.391715616	1.12E-05	0.013732672	0.21786912
spe-11	11.98258182	6.412634638	1.077376077	4.095723614	4.21E-05	0.013893139	0.794222672
clec-60	1116.317442	4.200523589	0.537753037	4.092070963	4.28E-05	0.016080167	0.687145094
ins-16	24.89398782	4.205712418	0.576374797	3.826871734	0.000129782	0.016268708	1.976976207
pals-8	16.32837309	3.905695992	0.544927247	3.497156735	0.000470245	0.016268708	7.287150191
srx-34	56.66307613	-2.960178056	0.24912217	-3.85424571	0.000116087	0.016268708	1.784414333
ZK105.13	149.9845443	3.155916537	0.282533659	4.091252496	4.29E-05	0.016344285	0.641759821
grl-4	78.05772802	3.059022253	0.281409104	3.763283557	0.000167697	0.017560749	2.303473556
col-184	420.1067581	3.646038923	0.409452248	4.020099855	5.82E-05	0.021577518	0.641759821
F59A6.12	22.8578933	-4.652414851	0.734179604	-3.612760199	0.000302955	0.022795953	3.122425002
srw-67	13.07899644	-4.754424691	0.743596797	-3.704191171	0.000212066	0.0248793	1.976976207
F35F10.1	112.2840446	3.34830481	0.36938976	3.650087132	0.000262151	0.026061798	2.303473556
C54D2.1	19.8820345	-3.677961565	0.45711617	-3.670755215	0.000241835	0.027662412	1.976976207
T22C1.8	19.46718926	-4.317743219	0.665480864	-3.482809715	0.000496181	0.031979747	3.437334933
srd-39	15.28910286	-4.221594813	0.633412325	-3.507343833	0.000452604	0.031979747	3.122425002

C14C6.3	6.318471554	6.056799749	1.065050033	3.809022697	0.000139517	0.038288628	0.794222672
pals-5	128.9008272	3.134646512	0.305091309	3.719039116	0.000199982	0.040601494	1.060797185

Supplementary Table 3: Strains used in this study

Strain Name	Genotype	Reference
N2	Wild type	CGC
OP609	*unc-119(tm4063) III; wgIs609* [chd-7::TY1::EGFP::3xFLAG + unc-119(+)]	CGC
VC606	*chd-7(gk290) I*	CGC
VC676	*chd-7(gk306) I*	CGC
QP1200	*chd-7(tm6139) I*	NBRP
CB1370	*daf-2(e1370) III*	CGC
DAH001	*chd-7(gk290) I;daf-2(e1370) III*	This Study
QP1239	*chd-7(gk306) I;daf-2(e1370) III*	This Study
QP1886	*chd-7(tm6139) I;daf-2(e1370) III*	This Study
CF1489	*daf-16(mu86) I;daf-2(e1370) III*	CGC
QP1770	*chd-7(gk290) I;daf-2(e1370) III;wgIs609 [chd-7::TY1::EGFP::3xFLAG + unc-119(+)]*	This Study
CF1903	*glp-1(e2144) III*	CGC
DAH002	*chd-7(gk290) I;glp-1(e2144) III*	This Study
CF1658	*glp-1(e2144) III;daf-12(rh61rh411) X*	CGC
RW11431	*unc-119(tm4063) III; stIs11431 [tag-192::H1-wCherry + unc-119(+)]*	CGC
QP1867	*unc-119(tm4063) III; stIs11431 [tag-192::H1-wCherry + unc-119(+)]; daf-12(rh61rh411) X*	This Study
QP1979	*daf-2(e1370) III;ncIs13[ajm-1::GFP]*	This study
QP1980	*chd-7(gk290) I;daf-2(e1370) III;ncIs13*	This study
QP1981	*chd-7(tm6139) I;daf-2(e1370) III;ncIs13*	This study
CB1372	*daf-7(e1372) III*	CGC
QP2017	*chd-7(gk290) I;daf-7(e1372) III*	This study
QP2019	*chd-7(gk306) I;daf-7(e1372) III*	This study
QP2018	*chd-7(tm6139) I;daf-7(e1372) III*	This study
DR609	*daf-1(m213) IV*	CGC
QP2012	*chd-7(gk290) I; daf-1(m213) IV*	This study
QP2-13	*chd-7(tm6139) I; daf-1(m213) IV*	This study
DR77	*daf-14(m77) IV*	CGC
QP2043	*chd-7(gk290) I; daf-14(m77) IV*	This study
CB4108	*fog-2(q71) V*	CGC
QP1975	*chd-7(gk290) I; him-5(ok1896) V*	This study
QP2023	*chd-7(tm6139) I; him-5(ok1896) V*	This study
QP1988	*chd-7(tm6139) I; him-5(ok1896) V;wgIs609[chd-7::TY1::EGFP::3xFLAG + unc-119(+)]*	This study
GL228	*rrf-3(pk1426) II;daf-2(e1371) III*	
QP1238	*chd-7(gk290) I; glp-1(e2141) III; daf-12(rh61rh411) X*	This study
QP2026	*chd-7(tm6139)* I; *daf-2(e1370) III; wgIs609[chd-7::TY1::EGFP::3xFLAG + unc-119(+)]*	This study
ST65	*ncIs13[ajm-1::GFP]*	CGC

Supplementary Table 4. qRT-PCR Primers

Gene	Name	Sequence 5′-3′
dbl-1	dbl-1_qPCR F	AGACCTGATGAAGTACCGCC
dbl-1	dbl-1_qPCR R	CAAGATTCAACCCGCATGTC
sma-2	sma-2_qPCR F	TTGAATACAAGAGTCGGAGAACAG
sma-2	sma-2_qPCR R	GGTTAGCTTGACACCGTTTCC
sma-9	sma-9_qPCR F	GACAACAACTCATCAGACGA
sma-9	sma-9_qPCR R	CTTCAACAAGACACCAACGA
daf-9	daf-9_qPCR_F	ATTCCCCACAAAACAATCGAAGAAT
daf-9	daf-9_qPCR_R	GAGATTCAAACACGTTTGGATCG
cdc-42	cdc-42_qPCR_F	CTGCTGGACAGGAAGATTACG
cdc-42	cdc-42_qPCR_R	CTCGGACATTCTCGAATGAAG
daf-3	daf-3_qPCR_F	GCCAAATCCAATTAGAGAACCAG
daf-3	daf-3_qPCR_R	ACCCAGAAGTGACAAATACCG
daf-5	daf-5_qPCR_F	TTCCTCTGCCGATTGTGAC
daf-5	daf-5_qPCR_R	GAAGAGCTGGAGATGACATGG
daf-14	daf-14_qPCR_F	GTACCCAGATCAAGTTCACTTACC
daf-14	daf-14_qPCR_R	GGTTTCAAAGAAGATTGGCTTGAG
ama-1	ama-1_qPCR_F	CCTACGATGTATCGAGGCAAA
ama-1	ama-1_qPCR_R	CCTCCCTCCGGTGTAATAATG
daf-12	daf-12_qPCR_F	GATCCAGTCATCCACAGTCC
daf-12	daf-12_qPCR_R	CTGACGTCGTCGACTCTCTT
daf-16	daf-16_qPCR_F	AAGCCGATTAAGACGGAACC
daf-16	daf-16_qPCR_R	GTAGTGGCATTGGCTTGAAG
col2a1 (X. laevis)	col2a1_qPCR_1F	TCCCTGTTGATGTTGAAGCC
col2a1 (X. laevis)	col2a1_qPCR_1R	CAATAGTCACCGCTCTTCCA
odc (X. laevis)	ODC_qPCR_1F	CAAAGCTTGTTCTACGCATAGCA
odc (X. laevis)	ODC_qPCR_1R	GGTGGCACCAAATTTCACACT

Supplementary Data 1. Binding sites of CHD-7 and DAF-16. Analysis of ChIP-Seq datasets from CHD-7 and DAF-16 generated by ModEncode from L4/young adult larvae (54).

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