

**Supplementary Table 1. List of mutants tested**

Genotype	Allele	Description	Gene function	Reported phenotype	Reference
<i>bli-2</i>	e768	cuticle collagen	strut assembly in adult cuticle	small	Hodgkin*
<i>bli-3</i>	e767	NADPH oxidase of the dual oxidase (DUOX) variety	dityrosine cross-linking of collagen,	dummy	(Thein et al., 2003)
<i>calu-1</i>	tm1783	ortholog of human CALU (calumemin), RCN3 (reticulocalbin 3), and RCN (reticulocalbin 1)	body morphogenesis, cuticle development, determination of lifespan, locomotion, molting cycle, larval development calcium ion binding activity	dummy	(Cho et al., 2009)
<i>che-2</i>	e1033	G-protein beta-like WD-40 repeats	chemotaxis, dauer formation, longevity	small	(Fujiwara et al.)
<i>dpy-1</i>	e1	cuticulin	normal body length, alae formation	dummy	(Brenner, 1974)
<i>dpy-4</i>	e1166	cuticle collagen	normal body morphology, locomotion, larval development	dummy	(Cox et al.; Thein et al., 2003)
<i>dpy-5</i>	e907	Group I cuticle procollagen	body length, cuticle structure, postembryonic growth rate, reproduction	dummy	(Brenner, 1974; Thein et al., 2003)
<i>dpy-7</i>	e88	cuticle collagen	normal cuticular morphology	dummy	(Brenner, 1974; Thein et al., 2003)
<i>dpy-8</i>	e130	collagen with a nematode-specific N-terminal domain	normal body morphology, normal embryonic cell division rate	dummy small	(Brenner, 1974; Maeda et al.; Thein et al., 2003)
<i>dpy-10</i>	e128	cuticle collagen	normal body morphology, movement	dummy	(Brenner, 1974; Cox et al.; Thein et al., 2003)
<i>dpy-11</i>	e224	ortholog of human TMX4 (thioredoxin related transmembrane protein 4) and TMX1 (thioredoxin related transmembrane protein 1)	cellular protein modification, cuticle development, molting cycle, locomotion, oviposition	dummy	(Cox et al.; Thein et al., 2003)
<i>dpy-13</i>	e184	collagen superfamily	normal body morphology, molting cycle	dummy	(Brenner, 1974)
<i>dpy-14</i>	e188	type III (alpha 1) collagen	embryonic, larval and vulval development, proper amphid morphology, regulation of body size and shape	dummy small	(Brenner, 1974; Maeda et al.)
<i>dpy-17</i>	e164	cuticle collagen	normal body morphology, hermaphrodite tail development	dummy	(Brenner, 1974; Thein et al., 2003)
<i>egl-4</i>	n478	cyclic GMP-dependent protein kinase	chemosensory behavior, egg laying, body size, endoreduplication, lethargus	long	(Daniels et al.; Yemini et al., 2013)
<i>egl-30</i>	n686	ortholog of heterotrimeric G protein alpha subunit Gq	viability, locomotion, egg laying, synaptic transmission, pharyngeal pumping	small	Hodgkin*
<i>egl-36</i>	n728	Shaw-type voltage-gated potassium channel	egg laying and defecation	small	Hodgkin*
<i>hnd-1</i>	q740	Hand bHLH transcription factor	normal viability, gonadogenesis, posterior body morphology	dummy	(Baugh et al., 2005)
<i>hsf-1</i>	sy441	heat-shock transcription factor ortholog	stress-induced gene expression, proteotoxicity response, larval development	small	(Walker Ga Fau - Thompson et al.)

<i>lon-1</i>	e185	PR-protein superfamily	polypoidization, body length, DBL-1 signaling	long	(Brenner, 1974; Kusch M Fau - Edgar and Edgar; Morita et al.; Thein et al., 2003)
<i>lon-2</i>	e678	glypican family of heparan sulfate proteoglycan	body length, DBL-1/BMP signaling	long	(Brenner, 1974; Gumienny and Savage-Dunn; Thein et al., 2003; Yemini et al., 2013)
<i>lon-3</i>	e2175	ortholog of human COLQ (collagen like tail subunit of asymmetric acetylcholinesterase)	body morphogenesis, negative regulation of growth	long	(Thein et al., 2003)
<i>mod-1</i>	ok103	serotonin-gated chloride channel	locomotion, response to bacterial food source	long	(Yemini et al., 2013)
<i>osm-3</i>	p802	kinesin-2 family member	intraflagellar transport, osmotic stimuli, dauer formation	unknown	(Frøkjær-Jensen et al.)
<i>osm-5</i>	p813	ortholog of murine polycystic kidney disease gene Tg737 and human IFT88	cilia morphology, intraflagellar transport, osmotic avoidance, chemotaxis, dauer formation, male mating, lifespan	unknown	(Haycraft et al.; Simon and Sternberg)
<i>osm-6</i>	p811	ortholog of IFT52 component of the intraflagellar transport particle	sensory cilium structure and neuron function	unknown	(Ou et al.)
<i>ser-1</i>	ok343	ortholog of mammalian 5-HT2 metabotropic serotonin receptor	egg-laying, male mating, pharyngeal pumping	long	(Yemini et al., 2013)
<i>sma-1</i>	ru18	beta-H spectrin	normal body length, pharynx morphology	small dumpy	(Brenner, 1974; Raharjo et al.)
<i>sma-3</i>	e491	Smad protein	body size, male tail sensory ray, spicule formation, DBL-1/SMA-6 TGF-beta signaling	small	(Brenner, 1974; Morita et al.)
<i>sma-4</i>	e729	Smad protein, homolog of human DPC4	body size, male tail sensory ray, spicule formation, DBL-1/SMA-6 TGF-beta signaling	small	(Brenner, 1974; Morita et al.)
<i>sma-6</i>	e1482	serine/threonine protein kinase, ortholog of type I TGF-beta receptors	body length, male tail, reproductive aging	small dumpy	(Simmer et al.)
<i>sqt-3</i>	e24	Predicted structural component of cuticle	cuticle development and molting cycle	dumpy	(Brenner, 1974)
<i>sup-9</i>	n180	TWK potassium channel subunit	pharyngeal, body wall, egg-laying, enteric muscle activation	long	(Yemini et al., 2013)
<i>tax-6</i>	ok2065	ortholog of calcineurin A	inhibition and adaptation of sensory neurons, egg-laying regulation, lifespan	small	(Gottschalk et al.)
<i>unc-4</i>	e120			large short thin	Hodgkin* (Yemini et al., 2013)
<i>unc-4</i>	e2309	paired-class homeodomain protein	movement, axon guidance, synapse formation	unknown	
<i>unc-4</i>	gk668			unknown	
<i>unc-4</i>	gk705			short	(Yemini et al., 2013)
<i>unc-4</i>	wd44			unknown	

<i>unc-11</i>	e47	isoform of clathrin-adaptor protein AP180	clathrin-mediated endocytosis, embryogenesis, locomotion, pharyngeal pumping, neurotransmitter release	small	Hodgkin*
<i>unc-13</i>	e1091	protein isoform	neurotransmitter release, pharyngeal pumping, lifespan, brood size, body size	small	Hodgkin*
<i>unc-22</i>	e66	kinase domain homologous to titin	actomyosin regulation, muscle morphology	small	(Tischler et al.)
<i>unc-32</i>	e189	ortholog of subunit a of membrane-bound (V0) domain of vacuolar proton-translocating ATPase	locomotion, synaptic vesicle morphology, embryonic development	small	Hodgkin*
<i>unc-68</i>	e587	ortholog of ryanodine receptor	normal body tension, locomotion	small	Hodgkin*
<i>unc-76</i>	e911	FEZ (fasciculation and elongation protein; zygin/zeta-1) family of proteins	axonal outgrowth, fasciculation, locomotion	dumpy	Hodgkin*
<i>unc-104</i>	e1265	kinesin-like motor protein	anterograde axonal transport, differentiation of synaptic domains	dumpy	(Shephard et al.)
<i>unc-120</i>	st364	MADS-box family of transcription factors	locomotion, muscle development	dumpy	(Baugh et al., 2005)

\*person evidence reported in the Wormbase ([www.wormbase.org](http://www.wormbase.org))