Supplementary Information

Mechanism of Pentagalloyl Glucose in Alleviating Fat Accumulation in *Caenorhabditis elegans*

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1. The properties of the mutants used in the study were provided as followed:

(1) ZXW618 *hkdIs618*[*dhs-3p*::*dhs-3*::*GFP*] strain expressed green fluorescence protein-fused lipid droplet marker protein DHS-3 (DHS-3::GFP);

(2) XA7702 [*mdt-15* (*tm2182*) III] is a short-lived and toxin sensitive strain with altered fat storage and low brood size;

(3) DG2179 [*tub-1* (*nr2044*) II] is deficient in lipolysis and results in accumulating fatty acid;

(4) BX106 [*fat-6* (*tm331*) IV] lacks the gene encodes stearoyl-CoA desaturases in fatty acid biosynthesis;

(5) BX153 [*fat-7* (*wa36*) IV] lacks the gene encodes stearoyl-CoA desaturases in fatty acid biosynthesis.

(6) RB754 [*aak-2* (ok524) X] lacks the AMP-activated protein kinase gene.

(7) EU1 [*skn-1* (zu67) IV] is sensitive to oxidative stress and have shortened lifespans.

2. Supplementary Figure Captions

Figure S1: The illustrative diagram indicating the treatment methods of PGG.

Figure S2: The efficacy of this strain ZXW618. (A) Representative fluorescence photographs of ZXW618 worms induced with 10 mM glucose for 3 days from eggs. (B) Distribution of lipid droplets in high-fat strain ZXW618. (C) Average number of lipid droplets of high-fat strain ZXW618. (D) Average size of lipid droplets of high-fat strain ZXW618. (E-F) Distribution of lipid droplets in normal and high-fat strain ZXW618 stained with Nile red, respectively. (G) Average number of lipid droplets of strain ZXW618 stained with Nile red. (H) Average size of lipid droplets of strains ZXW618 stained with Nile red.

Figure S3: Effects of PGG on morphology and physiological function in *C. elegans*. (A) Body length of *C. elegans* cultured with PGG for 4 days from eggs. (B) Body width of *C. elegans* cultured with PGG for 4 days from eggs. More than 15 worms for each assay were measured. (C-F) Pharyngeal pumping rate, body bending frequency, head thrash frequency and locomotivity of worms cultured with or without PGG at 800 μM from eggs. More than 10 worms for each assay were measured on days 4, 8, and 12 respectively. Experiments were repeated 3 times.

Figure S4: (A-B) GC traces of fatty acids extract of normal wild-type worms. (C-D) GC traces of fatty acids extract of high-fat wild-type worms.

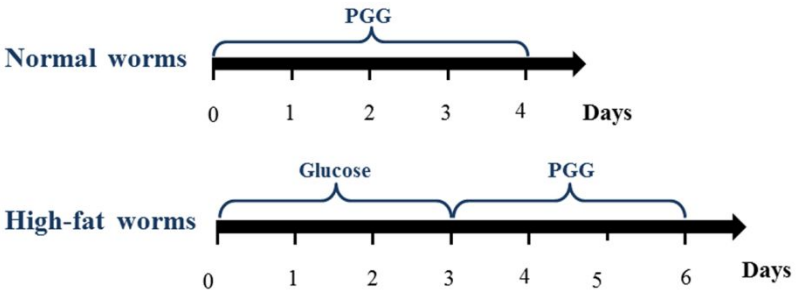
PGG
Normal worms
0
1
2
3
4
Days
Glucose
PGG
High-fat worms
0
1
2
3
4
5
6
Days

Figure S1

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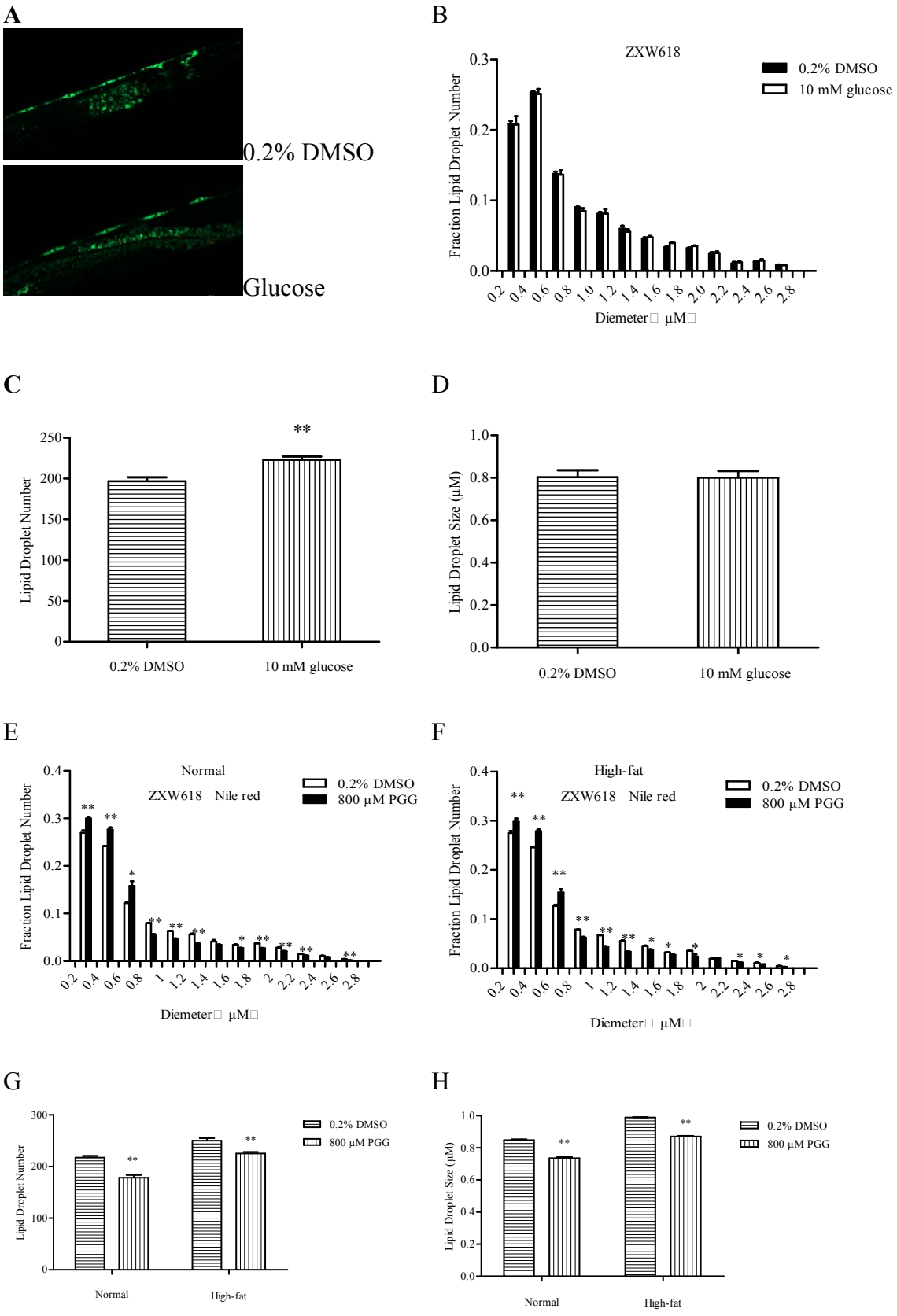
A
0.2% DMSO
Glucose
B
ZXW618
0.2% DMSO
10 mM glucose
Fraction Lipid Droplet Number
Diemeter□ μM□
C
Lipid Droplet Number
0.2% DMSO
10 mM glucose
D
Lipid Droplet Size (μM)
0.2% DMSO
10 mM glucose
E
Normal
ZXW618 Nile red
0.2% DMSO
800 μM PGG
Fraction Lipid Droplet Number
Diemeter□ μM□
F
High-fat
ZXW618 Nile red
0.2% DMSO
800 μM PGG
Fraction Lipid Droplet Number
Diemeter□ μM□
G
Lipid Droplet Number
0.2% DMSO
800 μM PGG
Normal
High-fat
H
Lipid Droplet Size (μM)
0.2% DMSO
800 μM PGG
Normal
High-fat

Figure S2

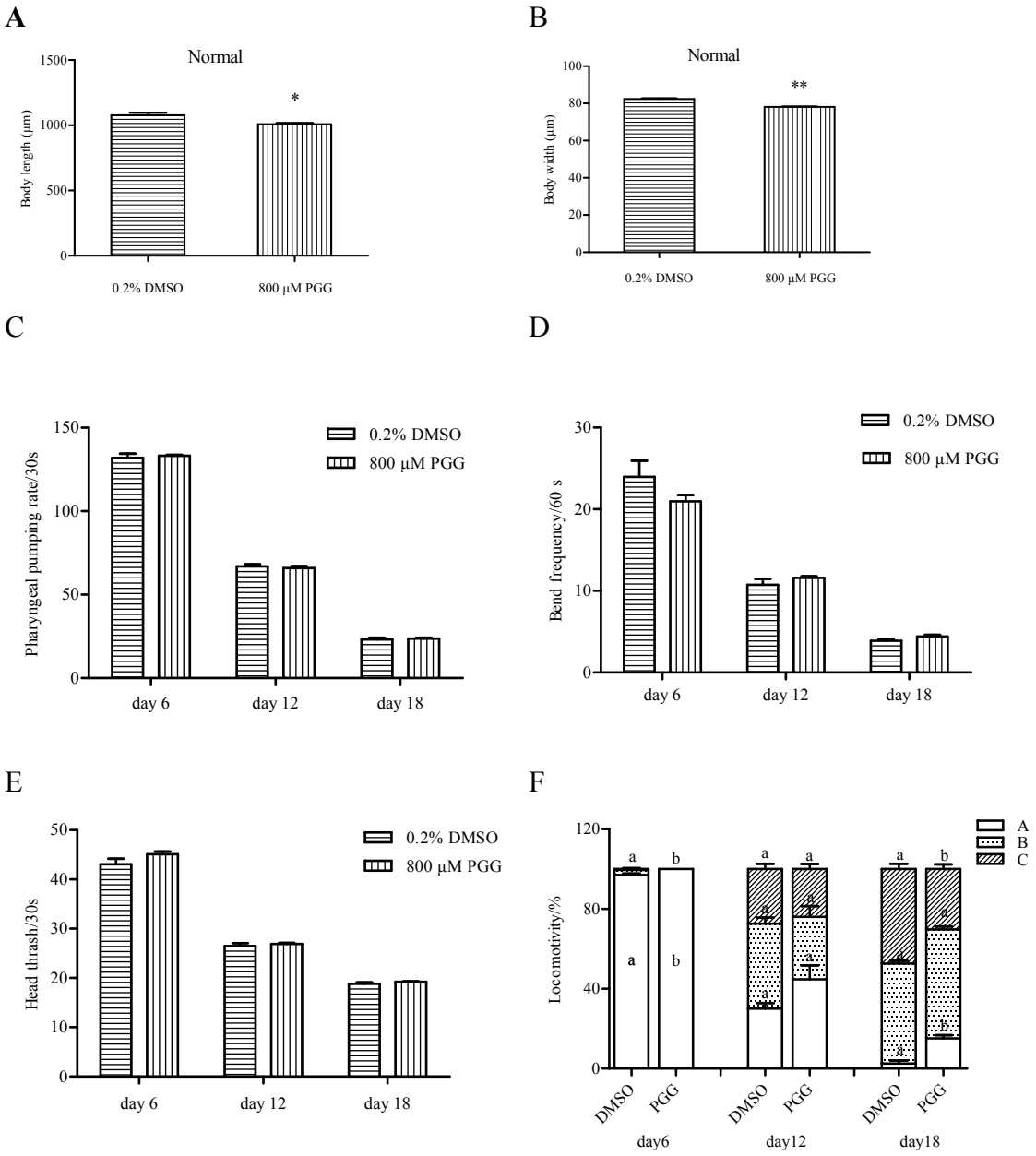
A
Normal
Body length (μm)
1500
1000
500
0
*
0.2% DMSO
800 μM PGG
B
Normal
Body width (μm)
100
80
60
40
20
0
**
0.2% DMSO
800 μM PGG
C
Pharyngeal pumping rate/30s
150
100
50
0
0.2% DMSO
800 μM PGG
day 6
day 12
day 18
D
Bend frequency/60 s
30
20
10
0
0.2% DMSO
800 μM PGG
day 6
day 12
day 18
E
Head thrash/30s
50
40
30
20
10
0
0.2% DMSO
800 μM PGG
day 6
day 12
day 18
F
Locomotivity/%
120
80
40
0
A
B
C
a
b
DMSO
PGG
day6
day12
day18

Figure S3

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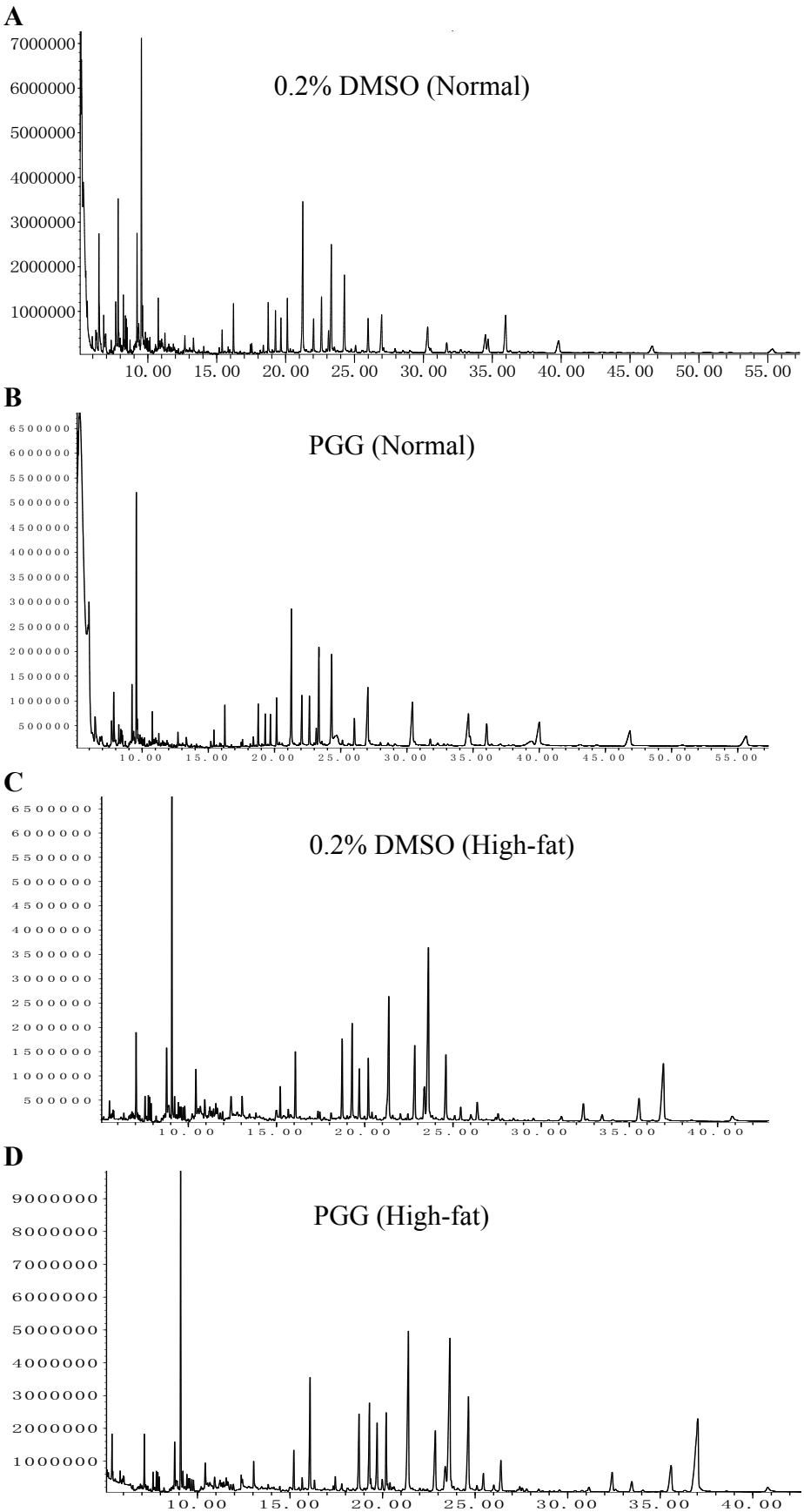

Figure S4

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3. Primer sequences for qRT-PCR analysis

Gene	Primer
mdt-15	AACATCAGCTCAGGCAAGAAA (F)
	TCTGTCCACCTGGACGAATAC (R)
nhr-49	AGGCTCGTGTCAATCAAGAGA (F)
	CTTCCATCGAAAGATCCATGA (R)
sbp-1	CTACTCGCACCATTCTTCTCG (F)
	CCAAATCTCAACTGCTTCTGC (R)
fat-5	TGTCGCTTTATTTGTGGCTCT (F)
	GAAAGCGATCGAGTTGATGAG (R)
fat-6	CTTGTGCTGCTTCATTCTTCC (F)
	GAAGTTGTGACCTCCCTCTCC (R)
fat-7	ACCCGTGGATTCTTCTTCACT (F)
	AACGGGGATAATTGTTGGAAG (R)
fasn-1	ACTGTCGGATCAGCTGAGAAA (F)
	GACGAGCCAAACATCTGAGAG (R)
pod-2	AAGACGATCCTCGAGAAGGAG (F)
	CATCATGCTGAGAGACACGAA (R)
elo-2	ATGCCCTCACATTTGTCTACG (F)
	CCAGGAACAGAATCAGCAGAC (R)
acs-2	GGCTGAACAACAACGCATATT (F)
	CGGAACATGGTAGGACTTTGA (R)
vit-2	CTGAGCAAATCCAAGAAGTCG (F)
	AGTGGGAGAATGTCCTCGTTT (R)
lipl-4	ATGGCCGAGAAGTTCCTACAT (F)
	ATACATGTTTCCGGCTGTACG (R)
aak-2	CATATCATCCGCCTCTACCAA (F)
	GTCCGCAATCTTCACATTGTT (R)
tub-1	AGAGTCCACAATGGAACGATG (F)
	GTTTTCCGTGGAAACTTGTCA (R)
act-1	TCCAAGAGAGGTATCCTTAC (F)
	CGGTTAGCCTTTGGATTGAG (R)