

Figure S1. Nucleotide and deduced amino acid sequence from *M. sexta* PLIN2. cDNA nucleotide (1-1350) sequence, **JF809664.1**, is shown above the deduced amino acid sequence (1-304), **AEJ33049**. Amino acid residues are aligned with the second nucleotide of each codon. The amino acid sequences underlined represents the matched peptides obtained from the MS/MS analysis of *M. sexta* ovary lipid droplets. These peptides are 100% identical to *Bombyx mori* Lsd2 (NP_001138804). The stop codon TAA is marked by short dash line.

Figure S2. Protein sequence alignment of vertebrate PLIN2 and MsexPLIN2. Alignments were produced with Clustal Omega. The sequences identifiers and abbreviations used are: HsPLIN2: *Homo sapiens* perilipin-2 (NP_001113.2); MmPLIN2: *Mus musculus* perilipin-2 (NP_031434.3); XIPLIN2: *Xenopus laevis* perilipin 2 (NP_001081960.1); MsexPLIN2: *Manduca sexta* lipid storage droplet protein 2 or Perilipin 2 (AEJ33049.1).

Figure S3. A. Protein sequence alignment of PLIN2 from 13 insect species. Alignments were produced with Clustal Omega. The sequences identifiers and abbreviations used are: Hsal: *Harpegnathos saltator* (EFN86125.1); Mr: *Megachile rotundata* (XP_003703225.1); Bi: *Bombus impatiens* (XP_003485735.1); Bt: *Bombus terrestris* (XP_003397531.1); Am: *Apis mellifera* (XP_003249235.1); Af: *Apis florea* (XP_003697663.1); Bm: *Bombix mori* (NP_001138804.1); Msex: *Manduca sexta* (AEJ33049.1); Cc: *Ceratitis capitata* (XP_004524967.1); Dm: *Drosophila melanogaster* (NP_001036276.1); Md: *Musca domestica* (XP_005188653.1); Aa: *Aedes aegypti* (XP_001658058.1); Ag: *Anopheles gambiae* (XP_310971.5)

Figure S4. Identity matrix of PLIN2 proteins. The sequences identifiers and abbreviations used are: Hsal: *Harpegnathos saltator* (EFN86125.1); Mr: *Megachile rotundata* (XP_003703225.1); Bi: *Bombus impatiens* (XP_003485735.1); Bt: *Bombus terrestris* (XP_003397531.1); Am: *Apis mellifera* (XP_003249235.1); Af: *Apis florea* (XP_003697663.1); Bm: *Bombix mori* (NP_001138804.1); Msex: *Manduca sexta* (AEJ33049.1); Cc: *Ceratitis capitata* (XP_004524967.1); Dm: *Drosophila melanogaster* (NP_001036276.1); Md: *Musca domestica* (XP_005188653.1); Aa: *Aedes aegypti* (XP_001658058.1); Ag: *Anopheles gambiae* (XP_310971.5)

Figure S5. Supplement to Figure 7, Protein levels of PLIN2 in 5th-larval fat body. A representative PLIN2 western blot (right panel) image with the corresponding Ponceau S staining (left panel) is shown in the figure. Labels: M, molecular weight marker; 1, 2, 3, 4, and 5 correspond to LDs samples from the fat body of 5th instar larvae on day 1, 2, 3, 4 and 5, respectively. Alternatively, when the age of the larvae is expressed as a fraction of the total length of the feeding period (5 days), Day 1, 2, 3, 4, and 5 of the 5th instar corresponds to fraction 0.2, 0.4, 0.6, 0.8 and 1, respectively.

Figure S6. Supplement to Figure 8, Effect of low caloric diet on the lipid accumulation and PLIN2 protein levels in 5th-larval fat body. A representative PLIN2 western blot (right panel) image with the corresponding Ponceau S staining (left panel) is shown in the figure. Labels: M, molecular weight marker; 1, 2, 3, 4, 5, 6 and 7 correspond to LDs samples from the fat body of 5th instar larvae on day 3, 4, 5, 6, 7 and 8, respectively. Alternatively, when the age of the larvae is expressed as a fraction of the total length of the feeding period (9 days), Day 3, 4, 5, 6, 7, 8 and 9 of the 5th instar corresponds to fraction 0.33, 0.44, 0.56, 0.76, 0.89 and 1, respectively.

Figure S7. Supplement Figure 9, Effect of starvation and refeeding in the expression of PLIN2 in 5th-larval fat body. A representative PLIN2 western blot (right panel) image with the corresponding Ponceau S staining (left panel) of the LDs isolated from the fat body of 5th instar larvae under the following conditions: Fed, day 2 feeding (lane 1); Starved, day 2 subjected to 24h starvation (lane 2); Refeeding, day 2, starved for 24h followed by refeeding for 2h (lane 3); 3h (lane 4); and 6h (lane 5) is shown in the figure.

Figure S8. Supplement Figure 10, Effect of starvation and refeeding in the expression of PLIN2 in the midgut of larvae. A representative PLIN2 western blot (right panel) image with the corresponding Ponceau S staining (left panel) of the LDs isolated from the fat body of 5th instar larvae under the following conditions: Fed, feeding day 2 (lane 1); Starved, day 2, subjected to 24h starvation (lane 2); Refeeding, day 2, starved for 24h followed by refeeding for 2h (lane 3), 6h (lane 4) and 24h (lane 5).

Figure S1

¹gacctggagagtgttctgttaacttagcgcagcagttgatacgttaaagtgcgtaataaatt
⁶²agaaagtaccaatTTTTGTGTTGAATATAATTTAAATCGAAATATGgcaacagaagtgagt
M A T E V S
¹²³caagcaccggcagcattgccacaattgcagtcagtcagccagaaggccatggccttccccact
Q A P A A L P Q L Q S V Q K A M A F P T
¹⁸³gtgggggcagcggtcgaacatggttgagcattctactctaaagtcaaaggagcacactct
V G A A V E H V G A F Y S K V K G A H S
²⁴³ctcctggaatgggactgtccaccgctgaagcgggagtagtgctggcggcatccacagcg
L L E W A L S T A E A G V V L A A S T A
³⁰³gctccctacgtatccgcaccactagcagtcgggtgatgcaaaggctgccgcccgcacatcgac
A P Y V S A P L A V G D A K V A A A I D
³⁶³cagctggagcgcggcgtgccgctcgtcaacgagcagccaaaggctcatcgtcgagactacc
Q L E R R V P L V N E Q P K V I V E T T
⁴²³aaacaagcagtgctttctagaatatcgccgcatgtcaacaaggtttacggagcgcggtgc
K Q A V L S R I S P H V N K V Y G A R V
⁴⁸³gcggcagaggaacgcgctcaagtcgctgaaggaattatcggtgggccaagcgaacgcggtg
A A E E R V K S L K E L S W A K A N A L
⁵⁴³ctctctactgcatacggacagaaggcgatgcacggcgtcgactccggcgccacctacgcc
L S T A Y G Q K A M H G V D S G A T Y A
⁶⁰³atgcagctgctagatcattacctgccgcctgtcgggtgtcactgaggagcgatcaaccgac
M Q L L D H Y L P P V G V T E E R S T D
⁶⁶³atcccccgtcgacggcggacccggcgctgcacacggtgcaaactgtgggcaggctcagc
I T P S T A D P A L H T V Q T V G R L S
⁷²³gctgtcgccgcgagaaggggtgtgggccaacctcgcttacaagatcaacgagcttagacaa
A V A A R R V W A N L A Y K I N E L R Q
⁷⁸³actggcatagaactagacgtgcgctcgttatgtgacagcgttgctagccgccctgcacctc
T G I E L D V R R Y V T A L L A A L H L
⁸⁴³gccaaggtgacgagtcagcagcagcgcgaggagcaggtgcctcctcagcagaacaacgcg
A K V T S Q Q Q R E E Q V P P Q Q N N A
⁹⁰³gagccctccccctctggcccggagccctcccacaacaccgcgagtcggccccaccacc
E P S P S G P E P S H N T R E S A P T T
⁹⁶³gctaacaaggtgaaatccacaccggaggcgaaatccgcggagcattcgcaaaattaatca
A N K V K S T P E A K S A E H S Q N -
ttatatacctattatatacattttaataaagttttgcatttgtataagtgtaattgcatg
aacggcttgtattggcattttataaaaggcaatagccgttagtctaccttgcaaatgatt
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gttagtttataagtattttatcatatttacactgtcagtgaagactgtctaagtgtctt
atatttgtattttatattggcatgaattgtgaagtattttatattggaatgtattttta~~aataa~~
acaacttatacagcaaaaaaaaaaaaaa¹³⁵⁰

Figure S2

Msex Lsd2 vs PLIN2 from vertebrates

CLUSTAL O(1.2.1) multiple sequence alignment

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MsexPLIN2      MATEVSQA-PAALPQLQSVQKAMAFPTVGAAVEHVGAFYSKVKGHAHSLLEWALSTAEAGV  59
Xenopous      ----MSAAVEQQEQQQSVVDRIINLPEVSSSTYDMVSSAYTNTKENHPYIKSVCDVAEKSV  56
MmPLIN2       -----MAAAVVDPPQSVVMRVANLPLVSSSTYDLVSSAYVSTKQOYPYLRSVCEMAEKGV  54
HsPLIN-2      -----MASVAVDPQPSVVTRVVNLPLVSSSTYDLMSSAYLSTKQOYPYLKSVCEMAENGV  54
                *      * . * : : * * . . . . . * . . * : : . . . * * . *

MsexPLIN2      VLAASTA----AP---YVSAPLAVGDAKVA AAI DQLERRVPLVNEQPKVIIVETTKQAVL-  111
Xenopous      KSITSVALTSAMPPIIHRLEPQIAIANNIACIGLQKIEEKLPILYQPSDKIVSNASDAVAG  116
MmPLIN2       KTVTSAAMTSALPIIQKLEPQIAVANTYACKGLDRMEERLPIILNQPTSEIVASARGAVTG  114
HsPLIN-2      KTITSVAMTSALPIIQKLEPQIAVANTYACKGLDRIEERLPIILNQPTQIVANAKGAVTG  114
                : * . *      *      : . : * : : . . . : * : * . . . : * : : : * * : . *

MsexPLIN2      -----SRISPHVNKVYGARVA AAEERVKSLKELSWAKANALLSTAYGQK  154
Xenopous      AK-----ETVLQSI TGVVDKTKGAVHDSVEMTKAV---VNGSINTVLGSGVQVQM  162
MmPLIN2       AKDVVTTTTMAGAKDSVASTVSGVVDKTKGAVTGSVERTKSV---VNGSINTVLG--MVQF  169
HsPLIN-2      AKDAVTTTTVTGAKDSVASTITGVMDKTKGAVTGSVEKTKSV---VSGSINTVLGSRMMQL  171
                . : : : * . * * : * . * : : . . * : : * . *

MsexPLIN2      AMHGVDSGATYAMQLLDHYLPPVGVTEERSTDITPST-ADPALHTVQTVGRLSAVAARRV  213
Xenopous      MNTGVNTALTTSENLEQYLPPTDEELAIEAAKTEGFESGKQPNYYVRLGSLSTKARKRA  222
MmPLIN2       MNSGVDNAITKSELLVDQYFPLTQEELEMEAKKVEGFDVMVQKPSNYERLESSTKLCSRA  229
HsPLIN-2      VSSGVENALTKSELLVEQYLP LPT EEEEELEKEAKKVEGFDLVQKPSYYVRLGSLSTKLHSRA  231
                * * : . . * : * : : * : * . . . . . : * * : * .

MsexPLIN2      WANLAYKINELRQTGIELDVRRYVTALLAALHLAKVT-----SQQQREEQVPPQQ--NNA  266
Xenopous      YQQALGRISDAKRSRQE-----AIAQLNKTMDLIEFAKKNVNSANQ-----KLYNTWV  270
MmPLIN2       YHQALSRVKEAKQKSQE-----TISQLHSTVHLIEFARKNMHSANQKIQGAQDKLYVSWV  284
HsPLIN-2      YQQALSRVKEAKQKSQQ-----TISQLHSTVHLIEFARKNVYSANQKIQDAQDKLYLSWV  286
                : : : : : : . . : : * : : * : : : * : * : : . .

MsexPLIN2      EPSPSGPEPSHNTRESAPTTANKVKSTPEAKSAEHSQN-----  304
Xenopous      DWTKSSGDP-----ANEGNESAEQIESRILSMTRNLTQQLQTTCHSLVM  314
MmPLIN2       EWKRSIGYD-----DTDESHCVEHIESRTLAIARNLTQQLQTTCTVTVLV  328
HsPLIN-2      EWKRSIGYD-----DTDESHCAEHIESRTLAIARNLTQQLQTTCHTLLS  330
                : . * . . . . * : : .

MsexPLIN2      -----  304
Xenopous      SVQGLPQNIQDKTHRVGAMAGEMYHNF RSASSLKEVSDNILTNSRGQLQKMKDSMDDVMD  374
MmPLIN2       NAQGLPQNIQDQAKHLGVMAGDIYSVFRNAASFKEVSDGVLTSKGLQKMKESLDEVMD  388
HsPLIN-2      NIQGVQPQNIQDQAKHMGVMAGDIYSVFRNAASFKEVSDSLLTSSKGLQKMKESLDDVMD  390

MsexPLIN2      -----  304
Xenopous      YLVNNTPLNWLVPDF SITDLSSSEM DENPDVLEEDEM EMQDFSRLNGRVVNRDIS  428
MmPLIN2       YFVNNTPLNWLVGPFYPQSTEVNKA--SLKVQQSEVKA-----Q-----  425
HsPLIN-2      YLVNNTPLNWLVGPFYPQLTESQNA--QDQGAEMDKSSQETQRSEHKTH-----  437

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1: MsexPLIN2	100.00	22.30	24.63	24.09
2: Xenopous	22.30	100.00	57.49	59.67
3: MmPLIN2	24.63	57.49	100.00	82.59
4: HsPLIN-2	24.09	59.67	82.59	100.00

Figure S4

Identity Matrix of Insect PLIN2 Proteins

	Hsal	Mrot	Bi	Bt	Am	Af	Bm	Msex	Cc	Dm	Md	Aa	Ag
Hsal	100.0	67.6	67.7	67.3	64.0	63.3	23.7	24.1	27.0	27.8	27.0	26.7	27.5
Mrot	67.6	100.0	70.1	70.1	67.6	68.1	21.8	22.2	24.4	26.0	24.1	25.3	24.5
Bi	67.7	70.1	100.0	98.1	81.1	80.4	24.0	24.4	28.0	29.2	27.6	28.1	27.7
Bt	67.3	70.1	98.1	100.0	80.3	79.6	24.0	24.4	28.4	29.6	28.0	28.1	27.7
Am	64.0	67.6	81.1	80.3	100.0	95.4	20.9	20.1	27.8	28.6	27.8	26.7	25.1
Af	63.3	68.1	80.4	79.6	95.4	100.0	21.6	20.8	27.7	28.5	27.7	27.0	25.4
Bm	23.7	21.8	24.0	24.0	20.9	21.6	100.0	80.2	32.0	34.7	33.5	37.1	38.3
Msex	24.1	22.2	24.4	24.4	20.1	20.8	80.2	100.0	33.3	33.8	33.6	37.0	37.9
Cc	27.0	24.4	28.0	28.4	27.8	27.7	32.0	33.3	100.0	72.6	79.2	55.3	54.0
Dm	27.8	26.0	29.2	29.6	28.6	28.5	34.7	33.8	72.6	100.0	81.1	55.9	55.4
Md	27.0	24.1	27.6	28.0	27.8	27.7	33.5	33.6	79.2	81.1	100.0	55.5	56.7
Aa	26.7	25.3	28.1	28.1	26.7	27.0	37.1	37.0	55.3	55.9	55.5	100.0	74.8
Ag	27.5	24.5	27.7	27.7	25.1	25.4	38.3	37.9	54.0	55.4	56.7	74.8	100.0

FIGURE S7

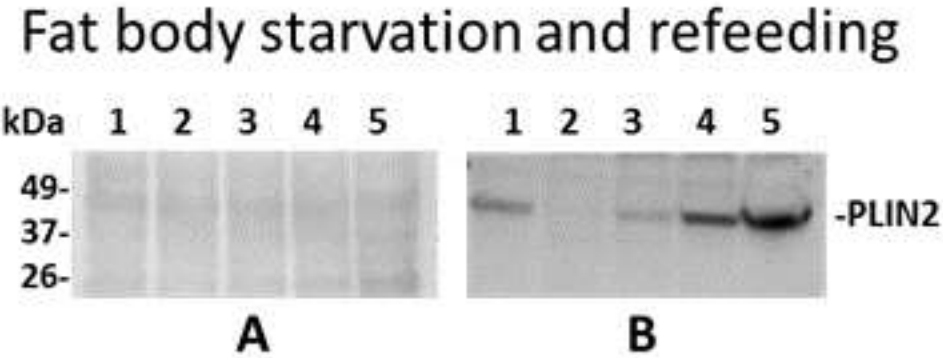


FIGURE S8

