

Supplementary materials

Molecular cloning and gene expression of Type I suppressor of cytokine signaling 6 and 7 (SOCS6 and SOCS7) in white leg shrimps (*Litopenaeus vannamei*)

Gunasekara CWR, Madhuranga WSP, Jiye Lee, and Chan-Hee Kim*

Division of Fisheries Life Science, Pukyong National University, Busan 48513, Korea

*Correspondence: chkim@pknu.ac.kr; Tel.: +82-51-629-5917

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ATGATGAAAAAGGTG AGCATAGCGCTGAGC CGGTCGCCTCGCTAT GGGAGTAGCAGGTGC 60
M M K K V S I A L S R S P R Y G S S R C 20
GGGAGTGCCAACGGC GAGGTGGTCTGGGG TCGTCCTCGGCCACC ACGACCCTCGCCACC 120
G S A N G E V V L G S S S A T T T L A T 40
ACCACCTCCTCGACC TCTTCCTCTTCTGCC TCTTCCTCCTCGCAG CACGACGCCGACAAG 180
T T S S T S S S A S S S Q H D A D K 60
AAGAAAAAGTCGAGA GCCGGCGGGATCCTG CAGACTTTGAGGAAG AAGATCAGCGACAAG 240
K K K S R A G G I L Q T L R K K I S D K 80
CTGGACACTCTCCAG CAGGGCAGCTCGAGT TCGACCTCGTCTCG CGGGCCGCCCCAGG 300
L D T L Q Q G S S S S T S S R A A P R 100
AAGAGCAAAAAGCGTC GAGGGCCTCTCCAAC AGCTTCGGCGGGGAC TCGTTCTCACAGTCG 360
K S K S V E G L S N S F G G D S F S Q S 120
GTGAGTGAGGAGTCC TCTAGTGATGGCCTC AACGCCTCTGGGGGC GGGGGAAGTGGGGGC 420
V S E E S S S D G L N A S G G G G S G G 140
ACACACAAAAAGCAAA ATAGCAAGCGTGCC ATCAGGCCTATCAAC ACTCCCATCAACACG 480
T H K S K H S K R A I R P I N T P I N T 160
CCCATTTGACGCGCAA AACTCATCATCACAT GTGTTGGCAGCCAAT GGCGACGTGGACACA 540
P I A R Q N S S S H V L A A N G D V D T 180
CAAGGGGGCAAGGTC GAAGSTGGCCAGGGC ATCACGGCAGCAGTG TCTCTTTATAGCAAG 600
Q G G K V E G G Q G I T A A V S L Y S K 200
CCTAAAGGTTACATA TCAGATGCATCAGTG CAGAAACAGCAGCAG CAGGTGTTGACTGAA 660
P K G Y I S D A S V Q K Q Q Q Q V L T E 220
GGCCAGGTGCCCAGG GCCAATGGCCGGGAT AAAGTGCCGACAGTG ACAGTGATAGTGTT 720
G Q V P R A N G R D K V P T V T V D S V 240
GGGGGGGTCGAGGAG TGTGTGTACACCAGT GCCAATGTCCCTAGA AGGGGCCTTGGTGTT 780
G G V E E C V Y T S A N V P R R G L G V 260
GCCAAGAATGCTGAC CACAGTGCCATATCG GAGACGTCATCACCA CAGCCCAACCGGACG 840
A K N A D H S A I S E T S S P Q P N R T 280
TGTGGATGCGAGCTG TGGGACCTTCAGGAC ATGAGTCTAGATGCC AGTAAGAGGAGCCTG 900
C G C E L W D L Q D M S L D A S K R S L 300
GCAGAAGAGCTTTTC CATCTGGCAAAGTAC GGATGGTACTGGGGA CCAATCACACGTGCC 960
A E E L F H L A K Y G W Y W G P I T R A 320
GAGGCTGAGGAAAAG CTCTTTTGACCAGCCT GATGGAGCTTTCTCTC GTTCGAGATTCTCT 1020
E A E E K L F D Q P D G A F L V R D S S 340
GACGACAAGTACCTG CTGAGCCTAAGCTTC CGATCGTTCAACAGG ACGTACACACACGC 1080
D D K Y L L S L S F R S F N R T L H T R 360
ATTGAACACAGCAAT GGCTGGTTCAGTTTT TACCCGCATCCAGAA CACGAGGGCCACACC 1140
I E H S N G W F S F Y P H P E H E G H T 380
AGCCTTGTGGGGGTG ATTGACCACAGCATG AGCCACTCTGAGTCA GGTGTCTTCTGCTAT 1200
S L V G L I D H S M S H S E S G V F C Y 400
TCCCGAGCCCGTGGG CCTGGGTCTCCATCC TTCCCTGTGAGGCTC ACCAAGCCAGTCTCC 1260
S R A R G P G S P S F P V R L T K P V S 420
AGTTTACTCAGGTG CGATCCCTACAATAC CTTTGCCGATTGTG ATCAGACAGTACACT 1320
R F T Q V R S L Q Y L C R F V I R Q Y T 440
CGTGTGGACACATA CAGGCTTTGCCGCTG CCAACCAGGATAAAG GGATATCTTGAAGAA 1380
R V D H I Q A L P L P T R I K G Y L E E 460
GGTCACTAC TGA 1392
G H Y * 463

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Figure S1: The LvSOCS6 protein coding nucleotide region (top) and its deduced amino acid sequence (bottom). The start (ATG) and stop (TGA) codons are presented in red color. In the amino acid sequence, SH2 and SOCS-box domain positions are shown in red and blue color boxes.

ATGGCCAGAGAGGGT TGTGTGTGGATTGAT AAGTTTGCCTCATTG TTTGTGAAACAAGTG 60
 M A R E G C V W I D K F A S L F V K Q V 20
 CTTGAGGAGGCACTG ACTGTGAGTTGTTCA ATAGGATGGTCCATC AAATGTTCTGGCCAG 120
 L E E A L T V S C S I G W S I K C S G Q 40
 TGTGAGCGGGAACAG TGTCCGGAGGAGTAC CAGAGGAAGGAGAGC AACTGGTGGGCTGTA 180
 C Q R E Q C R E E Y Q R K E S N W W A V 60
 GGTGGGAGCAAAGGG AGTCGCAAGTCAAGC ATTCCCTCCTTGGC CTGTCTGTGGGAGC 240
 G G S K G S R K S S I P L L G L S C G S 80
 CCAGGCTTGTGCTGG ACGCCAGAGCTACCC TACAGCCCCTCGCAC CGGCCGCACTCCCGA 300
 P G L C W T P E L P Y S P S H R P H S R 100
 TCTTCCTTGGGCTCA AGTCTCTCCTTCTCC CATGACTCATTTGGTC AGCTCTGGCCCTCGC 360
 S S L G S S L S F S H D S L V S S G P R 120
 ATGGATGACTCCAC CTCATCACCGCGCT GTGTACATGATGCC TTGCTCTTTCCTACT 420
 M D D S H L I T G A V S H D A L L F P T 140
 TCCAAACCAACAC AGCGATGTAAGTGAC ATTTACAACGTGCCG CTAGATGGAGATATC 480
 S K T N H S K D V S D I Y N V P L D G D I 160
 TATGCATGCCAGTA GATGTAGTGAAGCCG AAGGAAGGGCAGATA CTACACCCAAAGGCC 540
 Y A V P V D V V K P K E G Q I L H P K A 180
 ATTATGCACAGCCC AAGAAGAGACATCAC CGGAGACATGGTAAG AACAGTGCCAGTGCC 600
 I M H Q P K T H R R R H G K N S A S A 200
 AGTGTGCTGAATGAT GCCAGTTCCAAGAGA GTGAGTAGTTCCGAT CACGTTAGCAGTAGC 660
 S V L N D A S S K R V S S S D H V S S S 220
 CGGCAGCTCAAGGAG AGTAGTGTGACGAGG AGCAGACAGCACTCA GGTCAATCTGTGCA 720
 R Q L K E S S V T R S R Q H S G Q S V A 240
 TCAGTCAGTGGTGGT GAATTGTTAAGGGTC AGCAAGCGTCACAGT GTCCCCAGTAACATT 780
 S V S G G E L L R V S K R H S V P S N I 260
 GGTTGTGCCCTCAGC ATGACTCCAAGCAT GGCCCCAGCAAAGAA AATCATGAACCCATT 840
 G C A L S M T P K H G P S K E N H E P I 280
 CACATGACGTTAGAG GAAGTTAGAAAGTCC TTCCACGAGTCTGAT GACACAATAAACTGT 900
 H M T L E E V R K S F H E S D D T I N C 300
 AACAAGACTCATAGA GTTCAACAAGAGAGA AAAGTAGCTCATGAA CAATCTAAATATGC 960
 N K T H R N Q Q E R K V A H E Q S K I C 320
 AGAATAATTCCATTT ACTTCAATGAAGTCA TGCAAAAGAAAAGAC AGCTCTGAAGGGCGT 1020
 R I I P F T S M K S C K R K D S S E G R 340
 CTTGAGGACAACAGA AAGAAAGGCAAAAGT ATATCTAGTAATATC CGTAACACCCTTATT 1080
 L E D N R K K G K S I S S N I R N T L I 360
 ACAATATTTGGTCTG AAAAAGGGAACCAA TCTAGTAGTTCAAGA TTGAAAAGCGGAAGC 1140
 T I F G L K K G T K S S S S R L K S G S 380
 TGTGTGGACGCTGCA TCTCAGGGATTTTCA GAAATCGCCGGCAAT GGGACCACAACCCGT 1200
 C V D A A S Q G F S E I A G N G T T T L 400
 GCTGGCTCCCCGCC TCAGGACCAAAACCC AACAATACAGCCAAC CATACAACCACCGTT 1260
 A G S P A S G P K P N N T A N H T T T V 420
 AGCAAGAACCACCAC AACCAGCAGAACCAT CACAGCAACCACCGC CACTCCAATGGCATT 1320
 S K N H H N Q Q N H H S N H R H S N G I 440
 AACACTGGATTGCTG TCATGCCTGGGAAAC CACAGAGCAGAGGCA GATGACCTACCTGCG 1380
 N T G L L S C L G N H R A E A D D L P A 460
 ACTGTAGCCCCAGCA CCTCAGCAGAACAGC GCTCCCCATCACGA TCACCAGCTATTGTC 1440
 T V A P A P Q Q N S A P P S R S P A I V 480
 ACCAACCGTGCACTG CCTCCTTTGCCCTTG CCCAGTACCGGGGAG GAGGAAGATGCCAAC 1500
 T N R A L P P L P L P S T G E E E D A N 500
 AGTAAGTCGCAGACA GAGTCTGGGAGTGAG CGCAGAGAAGAGGAA GGCTGCGACTTTGCC 1560
 S K S Q T E S G S E R R E E E G C D F **A** 520
 TCCATCATTGAAAA GTCAAAGATTGTGGG TGGTATTGGGGTCCA ATCAGCGGGGAGGCA 1620
 S I I E K V K D C G W Y W G P I S G E A 540
 GCGGAGAAGGTGCTG GCCAACGAACCCGAT GGGTCCTTCATTGTG AGGGATTGCTCTGAC 1680
 A E K V L A N E P D G S F I V R D S S D 560

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CACCCTACATCTTC TCCCTTACCTTCAAG CTCATGGCTTCATT CGGCACGTCAGGATT 1740
H H Y I F S L T F K L N G F I R H V R I 580
GAACATGATCAAGGA AATTTCAGTTTGGT GGGTTTACCAAGTTC AAAAGCCAGACCATA 1800
E H D Q G N F S F G G F T K F K S Q T I 600
GTCGAGTTCATGAA AATGCTGTGAACAT TCTCGTAGCGGCCGA TATTTGTTTTCTCG 1860
V E F I E N A V E H S R S G R Y L E F L 620
CACCGTCGCCCTGTC CTGGGACCCATGAGG GTTCAGCTTCTCCAC CCAGTGTCTCGCTTT 1920
H R R P V L G P M R V Q L L H P V S R F 640
AAGCACATTCAGAGT CTTCAGCATTGTGT CGATTGTATTGTG AAGCATGTCCGCCGT 1980
K H I Q S L Q H L C R F V I V K H V R R 660
GACCTGATTGGTGAG CTGCCACTACCTCAG CGACTGAAAGACTAT TTGTGCTCCCCGCAT 2040
D L I G E L P L P Q R L K D Y L C S P H 680
TACTATCCGAAATG GTTGAGCAATGCATG GCAGCCGCTGCGGCC GCTGCAGCTTCTGAT 2100
Y Y S E M V E Q C M A A A A A A A A A S D 700
AATGAAGACAGTGT TCCTCAGGAGCCACA GTCGAAGGGCTTAGT GTTCCTAGTCAGGTG 2160
N E D S A S S G A T V E G L S V P S Q V 720
CTTCAACCCCTCGCTA GGAGACCTACAAGAC AACCTTCCTGCACCA CCCACCCCTTTGCCA 2220
L H P S L G D L Q D N L P A P P T L L P 740
GGCTTCCCCGGTGTA CCTCAGCCTGTGATG GACCGTGCCTCCAG ACCTCCCAGGCGGCT 2280
G F P G V P Q P V M D R A S Q T S Q A A 760
TCCCCCAACCCACCA CCGTCACAGGAGGAC GACCTGAACCTCCAA GCTCACCAGGATTTA 2340
S P N P P P S Q E D D L N L Q A H Q D L 780
GATAATTCCAATCTA CAAGAGACCAGCCCA AACCAACAACATCC ACTGTACTTCAACCC 2400
D N S N L Q E T S P N H N T S T V L Q P 800
CTAATAGACCCGAC CATCATGTGCAGT ATAACACAGCCTTTG CCAGAGCCCAACCAC 2460
L I D P D H H V S S I T Q P L P E P N H 820
CTCACCATGAACCCC CCAGCCAGTGTAAC GACGACTCCACCATC AGTCACTCCCCTACA 2520
L T M N P P A S V N D D S T I S H S P T 840
TGTTGCTCACCCGCA CACATGGAGCGTGAT AATTACCGTGTGTGC CCACAGGTGACCCTA 2580
C C S P A H M E R D N Y R V C P Q V T L 860
ACCAGCCAGGCTCAT GCTGCCAGTGCCTCA CCTGCCCTACAGGGT AACCTTGCCTTCGCC 2640
T S Q A H A A S A S P A L Q G N L A F A 880
CACCAACACACGACC AGTGCCAGTGGGCCT CTCTCACTCGTCTCC TCAAAGAGTGACGCG 2700
H Q H T T S A S G P L S L V S S K S D A 900
CAGGACGATAGAAGT TTCCCTATTGACAGA GCACCCATGTTCACT GACAGTGCTCGCAGT 2760
Q D D R S F P I D R A P M F T D S A R S 920
GATGCAGGCAGAATA AAAGCGAATGCAATG GGCTCTGGAGACTTT GTTAGAATCAACCCA 2820
D A G R I K A N A M G S G D F V R I N P 940
TGTCGTGGTCTGGAT GACCATGTTTTTGAA GATTAGGAGGTGTC TGA 2868
C R G L D D H V F E D L G G V * 955

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Figure S2: The LvSOCS7 protein coding nucleotide region (top) and its deduced amino acid sequence (bottom). The start (ATG) and stop (TGA) codons are presented in red color. In the amino acid sequence, SH2 and SOCS-box domain positions are shown in red and blue color boxes.



Figure S3: Multiple sequence alignment (MSA) of LvSOCS6 and its counterparts. Strongly conserved and similar residues are highlighted by black and gray shading and the conserved phosphotyrosine recognition site (pY) of LvSOCS6 is indicated with (▼). The regions of the phosphotyrosine binding pocket, hydrophobic binding pocket, and putative elongin B/C binding pockets are indicated in purple, yellow, and green color respectively. The species and the GenBank accession numbers used for the MSA were as follows: SOCS6 from *H. sapiens* (NP_004223.2), *M. musculus* (NP_061291.2), *G. gallus* (NP_001120784.1), *X. tropicalis* (NP_001096240.1), *D. rerio* (XP_687041.2), *O. mykiss* (NP_001182102.1), *E. sinensis* (ATW63847.1) and *T. castaneum* (XP_008190646).

<i>Litopenaeus vannamei</i>	-----	0
<i>Chionoecetes opilio</i>	MIVVLRCRQVVMATAAGLARQRWVRCAAEEVKMEGPDSPQPPQISSPLPPPIIAEEAPHQSPSPPPQTSPTSPLQSLPHTPLR	80
<i>Zeugodacus cucurbita</i>	-----MLEMDTVIRDEDSNY-----	15
<i>Ceratitidis capitata</i>	-----MLEMDTTSKDEDSNC-----	15
<i>Oncorhynchus mykiss</i>	-----	0
<i>Danio rerio</i>	-----	0
<i>Xenopus tropicalis</i>	-----	0
<i>Gallus gallus</i>	-----	0
<i>Mus musculus</i>	-----	0
<i>Homo sapiens</i>	-----	0
<i>Litopenaeus vannamei</i>	-----	0
<i>Chionoecetes opilio</i>	HSPLPHTPITPHTPLPHTPLTPHSPLTPLTSQSTLASEASVDSGVASAHSLDMLHNSCSSFETHALRRRAGSSVSSGTSE	160
<i>Zeugodacus cucurbita</i>	-----NMATS-ASNNSAVSTILQMCQSTCTDY-----	42
<i>Ceratitidis capitata</i>	-----NFSTP-SFANSSAVSSILQMCQSSCSDY-----	42
<i>Oncorhynchus mykiss</i>	-----	0
<i>Danio rerio</i>	-----	0
<i>Xenopus tropicalis</i>	-----	0
<i>Gallus gallus</i>	-----MQRAELRD--GEAA-----	12
<i>Mus musculus</i>	-----	0
<i>Homo sapiens</i>	-----	0
<i>Litopenaeus vannamei</i>	-----	0
<i>Chionoecetes opilio</i>	GWLGSLDGDGPAGLEVLPELWPHSESPTAPGHSLPPSHNSPASPKHSTPTSHRSPTLSCHSPVTMHHSPTTTTATTTTTTT	240
<i>Zeugodacus cucurbita</i>	--VGVLPPPHIDMVSVNSVELNAQTSLSDDSGVPLTTNSSISSG-----DSYRMGLCKHEIDIVESDGE-----	104
<i>Ceratitidis capitata</i>	--VGVLPPP-IDMASVNSVELNAQTSLSDDSGVPLTTNSSISSG-----DSYRMGLCKHEIDIVESDGE-----	103
<i>Oncorhynchus mykiss</i>	-----	0
<i>Danio rerio</i>	-----	0
<i>Xenopus tropicalis</i>	-----	0
<i>Gallus gallus</i>	-----AAASYRVLSRLLGYGAGPEAGAA-----	35
<i>Mus musculus</i>	-----	0
<i>Homo sapiens</i>	-----	0
<i>Litopenaeus vannamei</i>	-----	0
<i>Chionoecetes opilio</i>	TATTQNLHPPSSEAAISKAIVPGDSQDPERHSSSPRDNPKAEFSTVIPIHPSALSPTSPPLRPG--VVQTGKKRQNFMI	317
<i>Zeugodacus cucurbita</i>	-VSQFDSLDCNSEAGMS-----AENFNTLK--KGPLAPIDPPELFQDSPNITIGRCIMQKLR	158
<i>Ceratitidis capitata</i>	-VSQFDSLDCNSEAGMS-----AENFNTLK--KGPLAPIDPPELFQDSPNITMGRICIKQKLR	157
<i>Oncorhynchus mykiss</i>	-----MV-----	2
<i>Danio rerio</i>	-----	0
<i>Xenopus tropicalis</i>	-----MV-----	2
<i>Gallus gallus</i>	-----GGPGSGAAVAGPPGPGGAR-----L--PLPVPA--PGGAP-----RPPQQLMV	74
<i>Mus musculus</i>	-----MV-----	2
<i>Homo sapiens</i>	-----MV-----	2
<i>Litopenaeus vannamei</i>	-----	0
<i>Chionoecetes opilio</i>	TVNSAP-----ITESQCGHVFTEYGC-----SGDEGYENRFCFTKDHLLQENCGLNGVLRKTKTAH	375
<i>Zeugodacus cucurbita</i>	RLSSSHSSLEHSDKDEHNENSINGDRIFCKSDDEDVSSQYLAKSHKEVLIKKPIYSSDSILNSKAEN-----	226
<i>Ceratitidis capitata</i>	RLSSSHSSLEYSKESEYNNENNTHGEKTCCKEADMEITTYLQKPHKELYLMKKPIYSSDSILNTNKEN-----	225
<i>Oncorhynchus mykiss</i>	FQNLRL--TSDGVFECGL-----QQPPGFQVSEV--DKQEASSVCVMMT-----	42
<i>Danio rerio</i>	-----	0
<i>Xenopus tropicalis</i>	FRNMLR--GEEEGGEAAP-----EP-----	20
<i>Gallus gallus</i>	FRNAAE--GRPGEEEA--GG-----	92
<i>Mus musculus</i>	FRNVGR--PPEEEDAEA-----	17
<i>Homo sapiens</i>	FRNVGR--PPEEEDVEA-----	17
<i>Litopenaeus vannamei</i>	-----MAREGCVMWDKFFASLFVKQVLEEALTVSC-SIGWSIKCSGQCQREQCREEY-----	50
<i>Chionoecetes opilio</i>	HLATFSEANQIARECIWIDKFASLFVKHIIIEALSVSS-CRGWSIKCSGQCQREQCRQEY-----	434
<i>Zeugodacus cucurbita</i>	--VYDEP--SNLICNYAFNNAETESNTSSNVLLLPQASHPPDKVKRDMCPYYQEHSMYFKAIPSDQDSVISAVKKFNT	301
<i>Ceratitidis capitata</i>	--VYDEP--NNVICNYALTNTVEFQHTNSISLSLPQTSPPERAKRDLCPPYEDHSMYFKAIPSEQDSIMS-TAKFNT	299
<i>Oncorhynchus mykiss</i>	---SDNNMDVQHQRLOQWHPIMKL--SK-----VVTD-AGDLAGEGDGLCHRRHLVTDAMDWPPL-----	95
<i>Danio rerio</i>	-----MTVQ-----	4
<i>Xenopus tropicalis</i>	-----EAL--VE-----A-LP-AEG-SPQSAELCNRRHRKAAQ-----	47
<i>Gallus gallus</i>	-----GEGPAGGPELLCPRHRCALEPKAAA-----	117
<i>Mus musculus</i>	-----AREPGPSELLCPRHRCALDPKALPPG-----	43
<i>Homo sapiens</i>	-----APEPGPSELLCPRHRCALDPKALPPG-----	43
<i>Litopenaeus vannamei</i>	-----QRKESNWWAVGGSKGSRKSSI-----PLLGL-SCGSPGLCWTPEL--PYSPSH	95
<i>Chionoecetes opilio</i>	-----QKENTLWSVGGGKGNRKSSI-----PILGL-SCGSPGLCWTPEL--PYSPSH	479
<i>Zeugodacus cucurbita</i>	FGLSEIHDYDLYYGIKRNTFQGEN-----SLQKKVL-----YSPRKVTNYCHSHHIYTGPNCGTN	356
<i>Ceratitidis capitata</i>	YGLSEIHDYDLYYGIKRNAVQCEN-----GLQKKVL-----YSPRKVTNYCHSHHIYAGPNNGSN	354
<i>Oncorhynchus mykiss</i>	-----LDKSLCFDILDPRKTCSTGDTNYHHHLDVTNLNARRLGELGQAS--EMLLKERGEMTRGSCQSI--LA----	160
<i>Danio rerio</i>	-----RQLQ-----LPEGFVLELARKFGEIGVAPVPEFLL-KDGELOHSCQSV-----	47
<i>Xenopus tropicalis</i>	-----PGLGLELQLGALGLRG-----AGGPC-----	68
<i>Gallus gallus</i>	-----G-----GGWGPPGGLLEQLAALGLRPPA--L-GAKGPAAQPCIGP--PA----	156
<i>Mus musculus</i>	-----LAL-----RTWGPVAGLEAQLAALGLGQAPAGPI-KTAGGGCCPCPCP--PQPPPP	92
<i>Homo sapiens</i>	-----LAL-----RTWGPAAGLEAQLAALGLGQAPAGPV-KTVGGGCCPCPCP--PQPPPP	92

Litopenaeus vannamei RPHSRSSLGSSLSFSHDSLVLS-SGPRMDDSHLITGAVSHDALLFPTSKTNH-SDVSDIYNVPLGDIY--AVPVDV--- 167
Chionoecetes opilio RPHSRSSLGSSLSFSHDSLVLS-SGPRMDDSHLITGAVSHDALLFPTSKASHSDVGEIYHVPLGDIY--AVPVDV--- 552
Zeugodacus cucurbita RPNRSRNLNSRLSSSHNSLSTSSANKPDDSIPTQAMSHDALLT-----REISDFYNVPIGSDIY--ALPIDMIKTD 426
Ceratitis capitata RPNRSRNLNSRLSSSHNSLSTSSANKPDDSIPTQAMSHDALLT-----REISDFYNVPIGSDIY--ALPIDMIQTD 424
Oncorhynchus mykiss ---SAT-----GGMGPGED---PSEUSDALLVLEGLDS--EEVGE---LGMGGEFCKGVPQGEGETD 212
Danio rerio ---LGS-----AGMRQGED---PTEUSDALLVLEGLGS--EEVNG---LGINACQK-----PE 89
Xenopus tropicalis -----EETSDALLVLEAPEA--R-----RLGEQEE-----GE 93
Gallus gallus -----AEETSDALLVLEALEP--D-----EASCSCE-----EE 182
Mus musculus QPPPPA-----AAPQAGED---PTEUSDALLVLEGLGS--EA-ES---LETNSCSE-----EE 136
Homo sapiens QPPPPA-----AAPQAGED---PTEUSDALLVLEGLGS--EA-ES---LETNSCSE-----EE 136

Litopenaeus vannamei -VKPK---EGQILH--PKAIMHQPKKRHHRRHGKNSA--SASVLNDASSKRVSSSDHVSSRQLKESSVTRSRQHSQGQSV 239
Chionoecetes opilio -VKPK---EGQIILH--PKAIMHHPKKRHHRRHKPTSPIVSATLLHDSNSKKVSSFDVPLSTRPVKDGSVSRSRQHSQGQSV 626
Zeugodacus cucurbita KSSLVEYKDKDLTD--YRKIN-----HLILTEENYCKHSLSRKNNRNRKKK---RNSDTYENDI 481
Ceratitis capitata KNCRLYEKEDIKD--YKILN-----NLLLTDDDYSKHSLNRKNNRNRKKK---RNSETYESDV 479
Oncorhynchus mykiss TGQDR--RGAFSSGSLTGLMRQV-HRLAGEVRACGPQVCP-----SPLDSLGSAAALTSSSLSLASNTTGQOV 277
Danio rerio SQTTE---PGAFALKCFPSVLSGQAMGVSG--GLCSPTCCL-----LR---DSVNNRPQA--PAAD-----K 141
Xenopus tropicalis AA-----QAP-----QAP----- 99
Gallus gallus PGSPG---PAD-----PQEP--R----- 196
Mus musculus LSSPG---RGG-----GGVGG-RLL-----LQ---PPGPELPPVPFPLQD-----L 170
Homo sapiens LSSPG---RGG-----GG-GG-RLL-----LQ---PPGPELPPVPFPLQD-----L 169

Litopenaeus vannamei -A---SVSGGELLRVSK--RHSVPSNIGCALSMTPKHGSPKENHEPIHMTLEEVRKSFHESDDTINCNKTRHVQQRKV 312
Chionoecetes opilio -T---SVS-GDLLKASK--RHSVPSNIGCALSMTPKHNSSKENHEPIHMTLEEVRKSFHESDDTINCNSNRDQESNKG 698
Zeugodacus cucurbita KYDNYKFTSNAFKLKKNKTTILNETEDYGSHTSNTQLDL-NEPQERLHMTLSEVKYQTIYTKTK-NRTNINN--- 554
Ceratitis capitata KCDNYKFATNALKLKKNKADTLNESEDYGLHTSAHTLLNSSAPPQERLNMTLNEVKYQTIYTRTK-NRSSIQN--- 553
Oncorhynchus mykiss -VEASATLSGTLPSKDP--S-QTSQSLPQSRAATPKLGVMLRAASPLVV----- 323
Danio rerio -L-IPEVISQAEPSQETP--C-SS-----QASTPKARSSSRAHLS--A----- 177
Xenopus tropicalis ----- 99
Gallus gallus -----GAAAAA---RR-----A----- 206
Mus musculus -V-PPGRLSRGEQQQ---Q-----QPPPP-----P-P----- 191
Homo sapiens -V-PLGRLSRGEQQQ---Q---Q-----QPPPP-----P-P----- 193

Litopenaeus vannamei AHEQSKICRIIPFTAMKSCRRKDSSEGRLEDNRKKKRSISSNIENLTITIFGLKKGTKSSSSRLKSG-----SCVDAAS 386
Chionoecetes opilio MNEHSKICRIIPFTAMKSCRRKDSSENRLDDNRKKRSISSNIENLTITIFGLKKGTKSSGTRLKSS-----NCVDAAS 772
Zeugodacus cucurbita --ESDKT-----AFKKQSE-----YTKNDSSPRST-----NLCSIGENVSTECKVTTR 597
Ceratitis capitata --ESDKI-----DCVKPII-----ELGNDSSPCSR-----NQSSNEENNSAECKTNIR 596
Oncorhynchus mykiss -----EGAAGGE--KTTRKSRKGSGLIRLSKLFRTKSSSGSRHLDK---RPSLASSTSG 375
Danio rerio -----ASGEKT--LKVPKSRKGSGLIRLSKLFRTKSCSGSNLLDK---RPSVTFISSA 229
Xenopus tropicalis -----SRRLQNRKASLRNLSRIFRTKSCAGPPGTAERELGGSGG----- 139
Gallus gallus -----VP-----GPGAGGRKGSGLRRLSRLFRTKSCSGSAPGDDGGSGRRGAE-LTASA 256
Mus musculus -----PP--GPL--RPLAGPSRKGSFIRLSRLFRTKSCNGSGGGDGTG-KRPSGD-LAASA 243
Homo sapiens -----PP--GPL--RPLAGPSRKGSFIRLSRLFRTKSCNGSGGGDGTG-KRPSGE-LAASA 245

Litopenaeus vannamei QGFSEIAGNGTTLAGSPASGPKPNNTANHTTT-V-SKNHNNQNNHNSNHRHS--NGINTGLLSCLGN---HRA----- 453
Chionoecetes opilio QGFSEVAGNGTATLVCSPSTSGPQHNTHTNPASNTVTRNHQNNQNNHNSNPRHS--NGINTGLLSCLGN---LRA----- 841
Zeugodacus cucurbita TFKS-----YNNNDKINNINNINIVLANNYSITENQMIKADVDLSDSQVIRSEK 647
Ceratitis capitata TSKS-----YNNNDKINNINNINIVLANNYSITENQMIKADVDLSDSQVIRNEK 646
Oncorhynchus mykiss GSDQMDVWGSSTST--DQDTGSKLQHSRP-----CSAFSPVAF--GPFTDTFLR-----G----- 422
Danio rerio GSLVDM--SGAIGG--EQDTSSQPLGTRA-----CSAFSAASF--TPFTGETVSLVDVDISQR----- 283
Xenopus tropicalis -SLT---DMSRDR--EELGRKPRLTR-----CSAFSPVSF--SPFTGETVSLVDVDISQR----- 190
Gallus gallus HSLSDG--GGARGR--GQEEGRKRLTRT-----CSAFSPVVF--SPFTGETVSLVDVDISQR----- 310
Mus musculus ASLTDM--GGSAGR--ELDTGRKPRLTR-----CSAFSPVSF--SPFTGETVSLVDVDISQR----- 297
Homo sapiens ASLTDM--GGSAGR--ELDAGRKPKLTR-----CSAFSPVSF--SPFTGETVSLVDVDISQR----- 299

Litopenaeus vannamei -----EADDLPATVAPAPQONSAPPSRSPAIVT-----NRALPPLPL--PSTGEE- 496
Chionoecetes opilio -----ETDEQPVSTPSIPTQ--TVAPSRSPAIVT-----NRALPPLPL--PASPEN- 883
Zeugodacus cucurbita KTQFSLNLKQKFCNIFRIRRTQPQCQNLPGTEQNNRNREKST-VE-----KHKKVQSRALPPLPKKTES----- 712
Ceratitis capitata KTQFSLNLKQKFCNIFRIRRTQPQSQNTPEE--RTINERERST-VE-----KHKKVQSRALPPLPKKTES----- 709
Oncorhynchus mykiss -----LPRPIP-----LP-----GD----- 432
Danio rerio -----RNSPHPTPPP-----PPRSLSLDDAFFRALPHSAAS-PME-----NPA----- 322
Xenopus tropicalis -----SSSTHPTPPP-----PPRSLSLDDIGGIQAPSVLVGPMGSSLSQSFPLPPPPPPHAP 244
Gallus gallus -----LSSPHPTPPP-----PPRSLSLDDISGTLPTSVLVGMGSSLSQSFPLPPPPPPHAP 364
Mus musculus -----LTSHPPTPPP-----PPRSLSLDDISGTLPTSVLVAFMGSSLSQSFPLPPPPPPHAP 351
Homo sapiens -----LTSHPPTPPP-----PPRSLSLDDISGTLPTSVLVAFMGSSLSQSFPLPPPPPPHAP 353

Litopenaeus vannamei -----EDANSKQTESGSEEREEEGCDFASTIEKTKDYGWYWGPISEBAAEKVLANEPDGSFIVRDSDDHYI 564
Chionoecetes opilio -----EDSPKTPDGEAAGEREEEGCDFASTIEKTKDYGWYWGPISEBAAEKVLANEPDGSFIVRDSDDHYI 951
Zeugodacus cucurbita -----YIEQCKGNSTKKEARLQFTSSIEKTKDYGWYWGPISEBAAEKVLANEPDGSFIVRDSDDHYI 777
Ceratitis capitata -----IMTQNKGSQKQEGRTLOFTSSIEKTKDYGWYWGPISEBAAEKVLANEPDGSFIVRDSDDHYI 774
Oncorhynchus mykiss -----GQNQSRVDQRPMLCLPLSPDASSPATISREIEKCGWYWGPMNWDAAEMKIKAKPDGAFIVRDSDDHYI 501
Danio rerio -----P-ARLAPPQVMCLPLRGADSSSTASIREIEKCGWYWGPMNWDAAEMKIKAKPDGAFIVRDSDDHYI 388
Xenopus tropicalis EPLRLVPLRPTTECPVPLVQPLQCLPKQDPSSAASIREIEKCGWYWGPMNWDAAEMKIKAKPDGAFIVRDSDDHYI 324
Gallus gallus DAFRVVPLRPTTEPAPIQPAHLQCLPLRPDSSSAASIREIEKCGWYWGPMNWDAAEMKIKAKPDGAFIVRDSDDHYI 444
Mus musculus DAFPRIAPIRAESLHSQPPQHLQCLPLRPDSSSAASIREIEKCGWYWGPMNWDAAEMKIKAKPDGAFIVRDSDDHYI 431
Homo sapiens DAFPRIAPIRAESLHSQPPQHLQCLPLRPDSSSAASIREIEKCGWYWGPMNWDAAEMKIKAKPDGAFIVRDSDDHYI 433

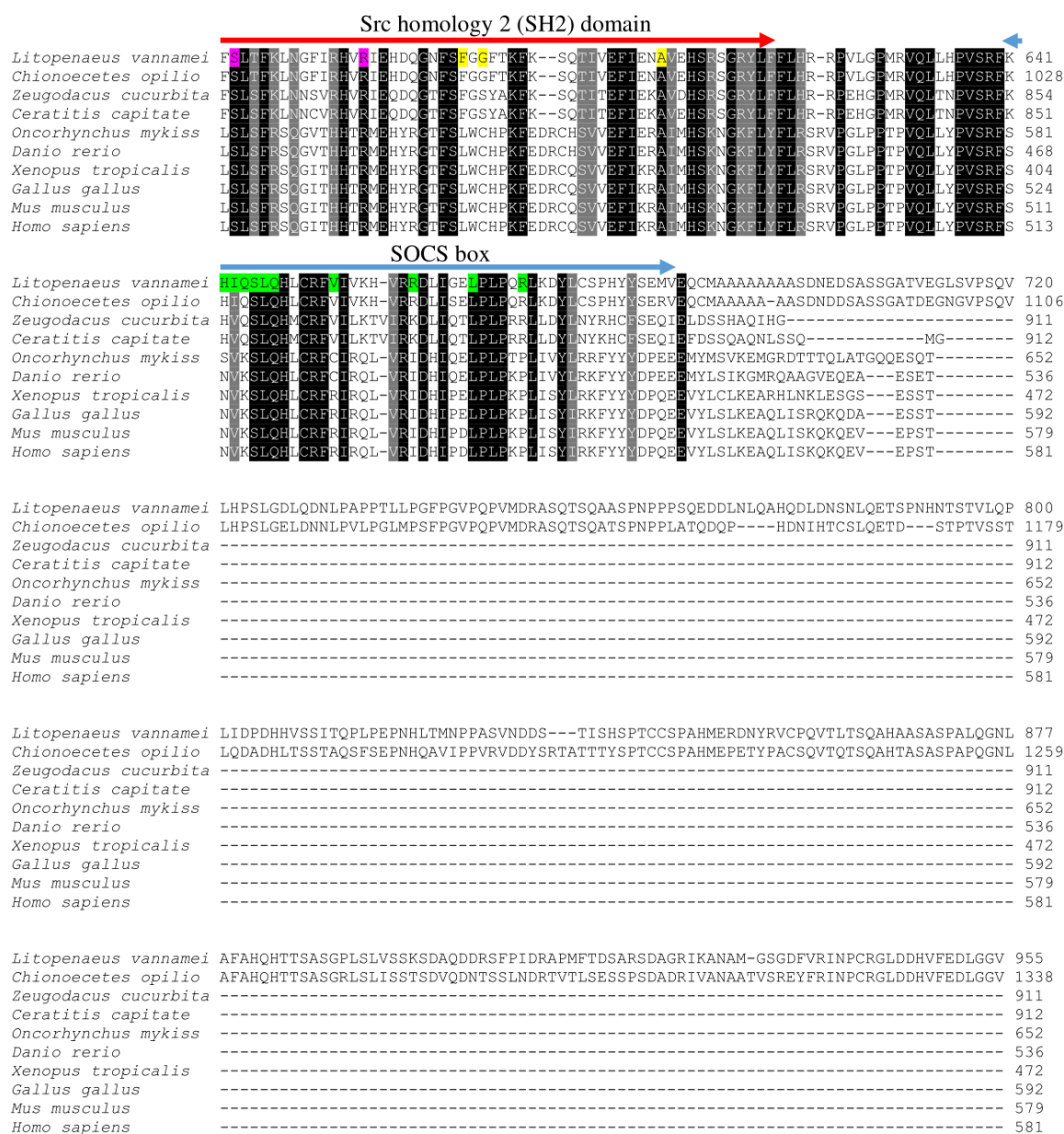


Figure S4: Multiple sequence alignment (MSA) of LvSOCS7 and its counterparts (Only the regions associated with SH2 and SOCS box are represented in the MSA analysis). Strongly conserved and similar residues are highlighted by black and gray shading and the regions of phosphotyrosine binding motif, hydrophobic binding motif, and putative elongin B/C binding motifs are indicated in purple, yellow, and green color respectively. The species and the GenBank accession numbers used for the MSA were as follows: *C. opilio* (KAG0725835.1), *Z. cucurbita* (JAD11819), *C. capitata* (JAC02138), *O. mykiss* (CAP17279.1), *D. rerio* (ABM68038.1), *X. tropicalis* (NP_001121531.1), *G. gallus* (XP_040509254.1), *M. musculus* (NP_619598.1) and *H. sapiens* (NP_055413.1).

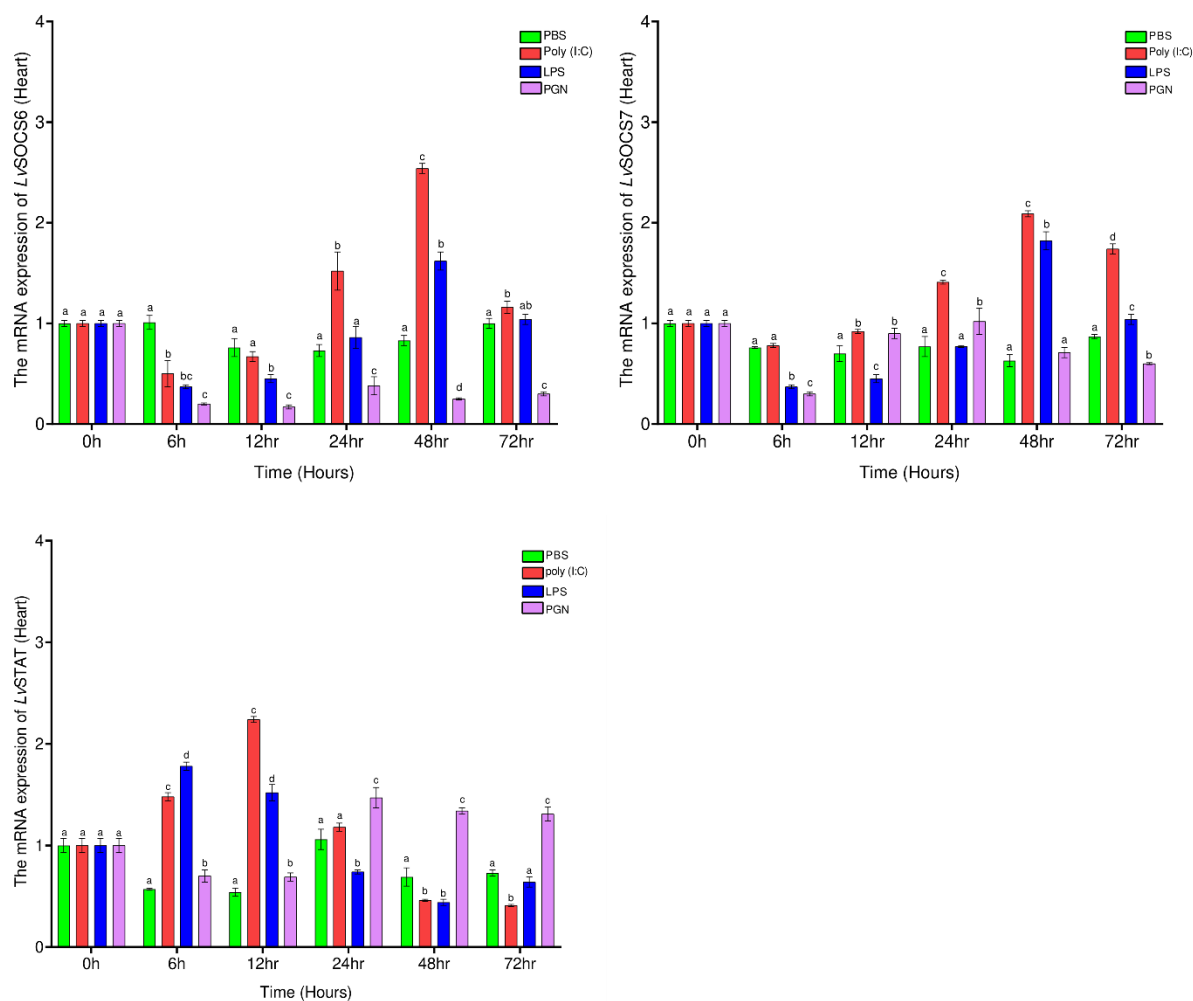


Figure S5: Temporal mRNA expression analysis of (A) LvSOCS6, (B) LvSOCS7, and (C) LvSTAT in heart tissue as determined by qPCR following stimulation of the immune response. Shrimps were challenged with LPS, poly (I:C), PGN, or phosphate-buffered saline (PBS), as a control. The expression of LvSOCS6 was normalized to EF1 α internal control gene. Results are represented as the mean \pm S.E (N= 3). Statistically significant values ($P < 0.05$) are denoted with alphabets.