

Supplementary materials

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

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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 S A S 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 CCGGCCGCCCCAGG 300
L D T L Q Q G S S S S T S S R A A P R 100
AAGAGCAAAAGCGTC GAGGGCCTCTCCAAC AGCTTCGGCGGGGAC TCGTTCTCAGATCG 360
K S K S V E G L S N S F G G D S F S Q S 120
GTGAGTGAGGAGTCC TCTAGTGATGGCTC AACGCCTCTGGGGGC GGGGGAAGTGGGGGC 420
V S E E S S S D G L N A S G G G G S G G 140
ACACACAAAAGCAAA CATAGCAAGCGTGCC ATCAGGCCTATCAAC ACTCCCATCAACACG 480
T H K S K H S K R A I R P I N T P I N T 160
CCCATTCGACGCCAA AACTCATCATCATCAT GTGTTGGCAGCAAT 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 TGTGTGTACACAGT 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
GAGGCTGAGGAAAG CTCTTTGACCAGCCT GATGGAGCTTTCTCTC GTTCGAGATTCATCT 1020
E A E E K L F D Q P D G A F L V R D S S 340
GACGACAGTACCTG CTGAGCCTAAGCTTC CGATCGTTCAACAGG ACGCTACACACACGC 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
TCCCGAGCCGTGGG 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 CAGGCTTGGCCGCTG CCAACCAGGATAAAG GGATATCTTGAAGAA 1380
R V D H I Q A L P L P T R I K G Y L E E 460
GGTCACTACTGA 1392
G H Y * 463

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Figure S1: The *Lv*SOCS6 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.

ATGCCAGAGAGGGT 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 AAATGTCTGGCCAG 120
 L E E A L T V S C S I G W S I K C S G Q 40
 TGTCAGCGGGAACAG 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 ATTCCTCTCCTTGGC CTGTCTGTGGGAGC 240
 G G S K G S S R K S S I P L L G L S C G S 80
 CCAGGCTTGTGTGCTG ACGCCAGAGCTACCC TACAGCCCCCTCGCAC 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 CTCATCACCGGCGCT GTGTACATGATGCC TTGCTCTTTCTACT 420
 M D D S H L I T G A V S H D A L L F P T 140
 TCCAAACCAACCAC AGCGATGTAAGTGAC ATTTACAACGTGCCG CTAGATGGAGATATC 480
 S K T N H S D V S D I Y N V P L D G D I 160
 TATGCAGTGCCAGTA GATGTAGTGAAGCCG AAGGAAGGGCAGATA CTACACCCAAAGGCC 540
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 I M H L P K T P H 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 A G T 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
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 G C A L P K 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 AAAGTAGTCTATGAA CAATCTAAATATGC 960
 N K T H R K T P 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 T K 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 CATAACAACCCGTT 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
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 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
 GCCGAGAAGGTGCTG 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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H H Y I F S L T F K L N G F I R H V R I 580
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E H D Q G N F S F G G F T K F K S Q T I 600
GTCGAGTTCATGAA AATGCTGTGGAACAT TCTCGTAGCGGCCGA TATTTGTTTTCTCG 1860
V E F I E N A V E H S R S G R Y L F 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
AAGCACATTGAGAGT 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 TCTTCAGGAGCCACA GTCGAAGGGCTTAGT GTTCCTAGTCAGGTG 2160
N E D S A S S G A T V E G L S V P S Q V 720
CTTACCCCTCGCTA GGAGACCTACAAGAC AACCTTCCTGCACCA CCCACCCCTTTTGCCA 2220
L H P S L G D L Q D N L P A P P T L L P 740
GGCTTCCCCGGTGA 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 CATCATGTGSCAGT 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
TGTTGCTCACCAGCA CACATGGAGCGTGAT AATTACCGTGTGTG 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 GATTTAGGAGGTGTC 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.

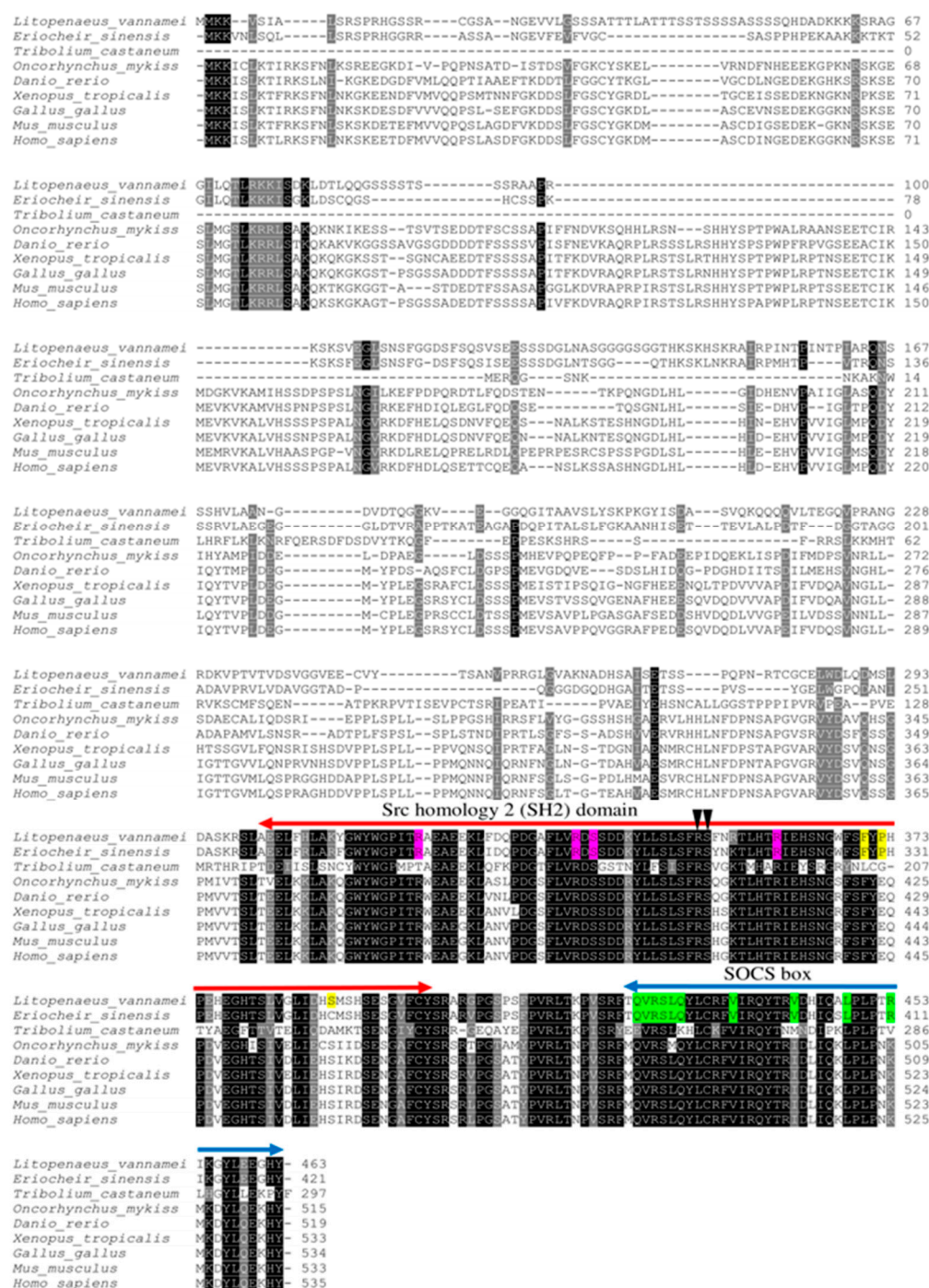


Figure S3: Multiple sequence alignment (MSA) of *LvSOCS6* and its counterparts. Strongly conserved and similar residues are highlighted by black and gray shading and the conserved phosphotyrosine recognition site (pY) of *LvSOCS6* is indicated with (▼). The regions of the phosphotyrosine binding pocket, 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>	MIVVLRQRQVVMATAAGLARQRWVRCAAEEVKMEGPDSPQPQISSPLPPPIIAEEAPHQSPSPPTSTPTSPQLQSLPHTPLR	80
<i>Zeugodacus cucurbita</i>	-----MLEMDTVIRDEDSNY-----	15
<i>Ceratititis 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>	HSPLPHTITPHTPLPHTPLTPHSPLTPLTSQSTLASEASVDGSAHSLDMLHNSCSSFETHALRRRAGSSVSSGTSE	160
<i>Zeugodacus cucurbita</i>	-----NMATS-ASNSSAVSTILQMCQSTCTDY-----	42
<i>Ceratititis capitata</i>	-----NFSTP-SFANSSAVSSILQMCQSSCSY-----	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>	GWLGSLDGDGPAGLEVLPPELWPHSESPTAPGHSLPPSHNSPASPKHSTPTSHRSPTLSCHSPVTMMHSPTTTTATTTTTTT	240
<i>Zeugodacus cucurbita</i>	--VGVLPPPHIDMVSVNSVELNAQTSLSDDSGVPLTTNSSISSG-----DSYRMGLCKHEIDIVESDGE-----	104
<i>Ceratititis capitata</i>	--VGVLPPP-IDMASVNSVELNAQTSLSDDSGVPLTTNSSISSG-----DSYRMGLCKHELEIVESDGE-----	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>	TATTQNHLPPSSEAAISKAIIVPGDSQDPERHSSSPRDNPKEAFSTVIPIHPSALSPTSPLRPG--VVQTGKKRQNFMI	317
<i>Zeugodacus cucurbita</i>	--VSQFDSLDCSEAGMS-----AENFNTLK--KGPLAPIDPPLEFQDSPNITIGRCIMQKLR	158
<i>Ceratititis capitata</i>	--VSQFDSLDCSEAGMS-----AENFNTLK--KGPLAPIDPPLEFQDSPNITMGRICIKQKLR	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--RPPQLMV	74
<i>Mus musculus</i>	-----MV	2
<i>Homo sapiens</i>	-----MV	2
<i>Litopenaeus vannamei</i>	-----	0
<i>Chionoecetes opilio</i>	TVNSAP-----ITESQCGHVFTTEYGC-----SGDEGYENRFCFTKDHLLQENCGLNGVLRKTKTAH	375
<i>Zeugodacus cucurbita</i>	RLSSSHSSLEHSDSEHNENSINGDRIFCKDSDDEVSSQYLAKSHKEVYLKPKIYSSDSILSNKAEN-----	226
<i>Ceratititis capitata</i>	RLSSSHSSLEYSKESEYNENNINHGEKTCCKEADMEITTYQLGKPKELYLMKKPIYSSDSILTNKTEN-----	225
<i>Oncorhynchus mykiss</i>	FQNLLR-----TSDGVFECGL-----QQPPGFQVSEV--DKQEASSVCVMMT-----	42
<i>Danio rerio</i>	-----	0
<i>Xenopus tropicalis</i>	FRNMLR-----GEEEGGEAAP-----EP-----	20
<i>Gallus gallus</i>	FRNAEE-----GRPGEEEAEE-----GG-----	92
<i>Mus musculus</i>	FRNVGR-----PPEEEDAEA-----	17
<i>Homo sapiens</i>	FRNVGR-----PPEEEDVEA-----	17
<i>Litopenaeus vannamei</i>	-----MAREGCVWIDKFASLFVKVLEALTVSC-SIGWSIKCSGQCQREQCREEY-----	50
<i>Chionoecetes opilio</i>	HLATFSEANQIARECIWIDKFASLFVKHIEEALSVSS-CRGWSIKCSGQCQREQCREEY-----	434
<i>Zeugodacus cucurbita</i>	--VYDEP--SNLICNYAFNNAETFESNTSSNVLLLPQASHPPDKVKRDMCPYYQEHSMYFKAIPSDQDSVISAVKKFNT	301
<i>Ceratititis capitata</i>	--VYDEP--NNVICNYALTNTVEFEQHTNSISLSLPQTSPLPERAKRDLCPYYEDHSMYFKAIPSEQDSIMS-TAKFNT	299
<i>Oncorhynchus mykiss</i>	---SDNNMDVQHRLQWHPIMKL--SK-----VVTD-AGDLAGEGDLCHRRLVTDAMDWPPL-----	95
<i>Danio rerio</i>	-----MTVQ-----	4
<i>Xenopus tropicalis</i>	-----EAL--VE-----A-LP-AEG-SPQSAELCNRRHRAAQ-----	47
<i>Gallus gallus</i>	-----GEGPAGGPPELLCPRHRCALDPKAAA-----	117
<i>Mus musculus</i>	-----AREPGFSELLCPRHRCALDPKALPPG-----	43
<i>Homo sapiens</i>	-----APEGPFSELLCPRHRCALDPKALPPG-----	43
<i>Litopenaeus vannamei</i>	-----QRKESNWWAVGGSGKSRKSS-----PLLGL-SCGSPGLQWTPEL--PYSPSH	95
<i>Chionoecetes opilio</i>	-----QKKENTLWSVGGGKGNRKSSI-----PILGL-SCGSPGLQWTPEL--PYSPSH	479
<i>Zeugodacus cucurbita</i>	FGLSEIHDDYLYYGKRNFTQGEN-----SLQKKVL-----YSPRKVTNYGSHHHIYTGPNCGTN	356
<i>Ceratititis capitata</i>	YGLSEIHDDYLYYGKRNQVCEN-----GLQKKVL-----YSPRKVTNYGSHHHIYAGPNNGSN	354
<i>Oncorhynchus mykiss</i>	-----LDKSLCFDILDPRKTCSTGDTNYHHHLDLTVNLARRLGELGQAS--EMLLKERGEMTRCSCQSI--LA--	160
<i>Danio rerio</i>	-----RQLQ-----LPEGPVLELARKFGEIGVAPVPEFL-LKDGLQHCSCQSV-----	47
<i>Xenopus tropicalis</i>	-----PGLGLELQLGALGLRG-----AGGPC-----	68
<i>Gallus gallus</i>	-----G-----GGWGPPGGLLEQLAALGLRPPA--L-GAKGPAAAPCLGP--PA--	156
<i>Mus musculus</i>	-----LAL-----RTWGPVAGLEAQLAALGLGQAPAGPGI-KTAGGGCCPCPCP--PQPPPP	92
<i>Homo sapiens</i>	-----LAL-----RTWGPAAGLEAQLAALGLGQAPAGPV-KTVGGGCCPCPCP--PQPPPP	92

<i>Litopenaeus vannamei</i>	RPHSRSSLGSSLSFSHDSLV-SGPRMDDSHLITGAVSHDALLFPTSKTNH-SDVSDIYNVPLGDIY--AVPVDV----	167
<i>Chionoecetes opilio</i>	RPHSRSSLGSSLSFSHDSLV-SGPRMDDSHLITGAVSHDALLFPTSKASHSDVGEIYHVPLGDIY--AVPVDV----	552
<i>Zeugodacus cucurbita</i>	RPNSRNSLNSRLSSSHNSLTSSANKPDDSIPTQAMSHDALLT-----REISDFYNVPIGSDIY--ALPIDMIKT	426
<i>Ceratitis capitata</i>	RPNSRNSLNSRLSSSHNSLTSSANKPDDSIPTQAMSHDALLT-----REISDFYNVPIGSDIY--ALPIDMIQT	424
<i>Oncorhynchus mykiss</i>	---SAT-----GGMGPGED---PSETSDALLVLEGLDS--EEVGE--LGMGGEFCKGVPQGEGET	212
<i>Danio rerio</i>	---LGS-----AGMRQGED---PTETSDALLVLEGLGS--EEVNG---LGIACQK-----PE	89
<i>Xenopus tropicalis</i>	-----EETSDALLVLEAPEA--R-----RLDEQEE-----GE	93
<i>Gallus gallus</i>	-----AEETSDALLVLEALEP--D-----EASCSCE-----EE	182
<i>Mus musculus</i>	QPPPPA-----AAPQAGED---PTETSDALLVLEGLS--EA-ES---LETNSCSE-----EE	136
<i>Homo sapiens</i>	QPPPPA-----AAPQAGED---PTETSDALLVLEGLS--EA-ES---LETNSCSE-----EE	136

<i>Litopenaeus vannamei</i>	-VKPK---EGQILH--PKAIMHPKKRHHRRHGKNSA--SASVLNDASSKRVSSSDHVSSSRQLKESSVTRSRQHSGQSV	239
<i>Chionoecetes opilio</i>	-VKPK---EGQIHH--PKAIMHHPKKRHHRRHKPTSPIVSATLLHDSNSKKVSSFDVLPSTRPVKDGSVSRSRQHSGQSV	626
<i>Zeugodacus cucurbita</i>	KSSLVEYKDDKLTLD--YRKIN-----HLILTEENYCKHSLSRKNNRNRKKK---RNSDTYENDI	481
<i>Ceratitis capitata</i>	KNCRLYEKEDKIKD--YKILN-----NLLLTDDDYSKHSLNRKNNRNRKKK---RNSETYESDV	479
<i>Oncorhynchus mykiss</i>	TGQDR--RGAFSSGSLTGLMRQV-HRLAGEVRACGPQVCP-----SPLDSLGSAAALTSSSLSLASNTTGQV	277
<i>Danio rerio</i>	SQTTE---PGAFALKCFPSVLSGQAMGVSG--GLCSPTCCL-----LR---DSVNNRPQA--PAAD-----K	141
<i>Xenopus tropicalis</i>	AA-----GQAP-----GQAP-----	99
<i>Gallus gallus</i>	PGSPG---PAD-----PQEP--R-----	196
<i>Mus musculus</i>	LSSPG---RGG-----GGVGG-RLL-----LQ---PPGPPLPPVPFPLQD-----L	170
<i>Homo sapiens</i>	LSSPG---RGG-----GG-GG-RLL-----LQ---PPGPPLPPVPFPLQD-----L	169

<i>Litopenaeus vannamei</i>	-A---SVSGGELLRVSK--RHSVPSNIGALSMTPKHGSPKENHEPIHMTLEEVRKSFHESDDTINCNKTHRVQQRKV	312
<i>Chionoecetes opilio</i>	-T---SVS-GDLLKASK--RHSVPSNIGALSMTPKHNSKENHEPIHMTLEEVRKSFHESDDTINCNSNRDQESNKG	698
<i>Zeugodacus cucurbita</i>	KYDNYKFTSNAFKLKNNKTTILNETEDYGSHTSNTQLDL-NEPQERLHMTLSEVKKYQTIYTKTK-NRTNINN---	554
<i>Ceratitis capitata</i>	KCDNYKFATNALKLNNKADTLNESEDYGLHTSAHTLLNSSAPPQERLNMTLNEVKKYQTIYTRTK-NRSSIQN----	553
<i>Oncorhynchus mykiss</i>	-VEASATLSGTLPSKDPP--S-QTSQSLPQSRAATPKLGVMLRAASPLVV-----	323
<i>Danio rerio</i>	-L-PEVISQAEPSQETP--C-SS-----QASTPKARSSSRAHLS--A-----	177
<i>Xenopus tropicalis</i>	-----GAAAAA---RR-----A-----	99
<i>Gallus gallus</i>	-----GAAAAA---RR-----A-----	206
<i>Mus musculus</i>	-V-PPGRLSRGEQQQ---Q-----QPPPP-----P-P-----	191
<i>Homo sapiens</i>	-V-PLGRLSRGEQQQ---Q---Q-----QPPPP-----P-P-----	193

<i>Litopenaeus vannamei</i>	AHEQSKICRIIPFTSMKSKRKDSSEGRLEDNRKKKKSISNINNTLITIFGLKKGTKSSSSRLKSG-----SCVDAAS	386
<i>Chionoecetes opilio</i>	MNEHSKICRIIPFTAMKSKRKDSSENRLDDNRKKKRSISSNINNTLITIFGLKKGTKSSGTRLKSS-----NCVDAAS	772
<i>Zeugodacus cucurbita</i>	--ESDKT-----AFKKQSE-----YTKNDSSPSRST-----NLCSIGENVSTECKVTTR	597
<i>Ceratitis capitata</i>	--ESDKI-----DCVKPPI-----ELGNDSSSPCSRI-----NQSSNEENNSAECKTNIR	596
<i>Oncorhynchus mykiss</i>	-----EGAGGGE--KTTRKSRKGSGLIRLSKLFRTKSSSGSSRHLDK---RPSLASSTSG	375
<i>Danio rerio</i>	-----ASGGEKT--LKVPKSRKGSGLIRLSKLFRTKSCSGSNLLDK---RPSVTFISISA	229
<i>Xenopus tropicalis</i>	-----SRRQRNKASLRNLSRIFRTKSCAGPPGTAERELGGSGG-----	139
<i>Gallus gallus</i>	-----VP-----GPGAGGRKGSRLVRLSRLFRTKSCSGSAPGDDGGGSRGAE-LTASA	256
<i>Mus musculus</i>	-----PP--GPL--RPLA--PSRKGSFIRLSRLFRTKSCNGSGGGDGTG-KRPSGD-LAASA	243
<i>Homo sapiens</i>	-----PP--GPL--RPLA--PSRKGSFIRLSRLFRTKSCNGSGGGDGTG-KRPSGE-LAASA	245

<i>Litopenaeus vannamei</i>	QGFSEIAGNGTTTLGASPASGPKPNNTANHTTT-V-SKNHHNQNHHSNHRHS--NGTNTGLLSCLGN---HRA-----	453
<i>Chionoecetes opilio</i>	QGFSEVAGNGTATLVCSPTSGPQHNTTNPASNTVTRNHQNNQNHHSNPRHS--NGTNTGLLSCLGN---LRA-----	841
<i>Zeugodacus cucurbita</i>	TFKS-----YENNDKINNNINNIIVLANNYSITENQMIKVDADLSQVIRSEK	647
<i>Ceratitis capitata</i>	TSKS-----YENNDKINNNLNNIIVLANNYSITENQMIKADVDISQVVRNEK	646
<i>Oncorhynchus mykiss</i>	GSQMDVWVGSGSTST--DQDTGSKLQHSRP-----QSAFSPVAF--GPAFTDTFLR-----G-----	422
<i>Danio rerio</i>	GSLVDM--SGAIGG--EQDTSSQPLGTRA-----QSAFSAASF--TPFTGETVSLVDVDSIQRG-----	283
<i>Xenopus tropicalis</i>	-SLT---DMSRDR--EELGRKPRLTR-----QSAFSPVSF--SPFTGETVSLVDVDSIQRG-----	190
<i>Gallus gallus</i>	HSLSDG--GGARGR--GQEEGRKRLTRT-----QSAFSPVVF--SPFTGETVSLVDVDSIQRG-----	310
<i>Mus musculus</i>	ASLTDM--GGSAGR--ELDTGRKPRLTR-----QSAFSPVSF--SPFTGETVSLVDVDSIQRG-----	297
<i>Homo sapiens</i>	ASLTDM--GGSAGR--ELDAGRKPKLTR-----QSAFSPVSF--SPFTGETVSLVDVDSIQRG-----	299

<i>Litopenaeus vannamei</i>	-----EADDLPA--TVAPAPQONSAPPSRSPAIVT-----NRALPPLPL--PSTGEE--	496
<i>Chionoecetes opilio</i>	-----ETDEQPVSTPSIPTQ--TVAPSRSPAIVT-----NRALPPLPL--PASPEN--	883
<i>Zeugodacus cucurbita</i>	KTQFSLNLKQKFCNIFRIRRTQPQCINLPQTEQNNRNERRKST-VE-----KHKKVQSRALPPLPKKTES----	712
<i>Ceratitis capitata</i>	KTQFSLNLKQKFCNIFRIRRTQPQCINLPQTEQNNRNERRKST-VE-----KHKKVQSRALPPLPKKTES----	709
<i>Oncorhynchus mykiss</i>	-----LPRPIP-----LP-----GD--	432
<i>Danio rerio</i>	-----RNSPHPTPPP-----PPRSLSLDDAIFRALPHSAAS-PME-----NPA-----	322
<i>Xenopus tropicalis</i>	-----SSSTHPTPPP-----PPRSLSLDDIGGIQAPASVLVGMGSSQLQSFPLPPPPPPHAP	244
<i>Gallus gallus</i>	-----LSSPHPTPPP-----PPRSLSLDDISGLTPTSVLVGPMGSSQLQSFPLPPPPPPHAP	364
<i>Mus musculus</i>	-----LTSHPPTPPP-----PPRSLSLDDISGLTPTSVLVAPMGSSQLQSFPLPPPPPPHAP	351
<i>Homo sapiens</i>	-----LTSHPPTPPP-----PPRSLSLDDISGLTPTSVLVAPMGSSQLQSFPLPPPPPPHAP	353

<i>Litopenaeus vannamei</i>	-----EDANSKSQTESGSEEREEEGCDFASTIEKTKDGGWYWGPISEAAEKVLANEPDGSFIVRDSDDHYI	564
<i>Chionoecetes opilio</i>	-----EDSPKTPDGEAAGERREEEGCDFASTIEKTKDGGWYWGPISEAAEKVLANEPDGSFIVRDSDDHYI	951
<i>Zeugodacus cucurbita</i>	-----YIEQCKGNSTKKEEARSLQFTSSIEKTKDYGYWYGPLSSAAEKVLSTESDGSFIVRDSDDHYI	777
<i>Ceratitis capitata</i>	-----IMTQNKSSQKQEGRTLQFTSSIEKTKDYGYWYGPLSSAAEKVLSTESDGSFIVRDSDDHYI	774
<i>Oncorhynchus mykiss</i>	-----GQNSRVDQRMLCPLSRPDASSATSSREIEKKGWYWGPMNWDAAEMKIKAKPGDGFIVRDSDDERYI	501
<i>Danio rerio</i>	-----P-ARLAPPQVMCLPRGADSSATSSREIEKKGWYWGPMNWDAAEMKIKAKPGDGFIVRDSDDERYI	388
<i>Xenopus tropicalis</i>	EPLRLVPLRPTTECVPLVPLQPLQKQDPSSAASREIEKKGWYWGPMNWDAAEMKIKAKPGDGFIVRDSDDERYI	324
<i>Gallus gallus</i>	DAFPRVPLRPTTEPAPIQPAHPLQCPLYRPDSSSFAASREIEKKGWYWGPMNWDAAEMKIKAKPGDGFIVRDSDDERYI	444
<i>Mus musculus</i>	DAFPRIAPIRASELSHQPQHLQCPLYRPDSSSFAASREIEKKGWYWGPMNWDAAEMKIKAKPGDGFIVRDSDDERYI	431
<i>Homo sapiens</i>	DAFPRIAPIRAESELSHQPQHLQCPLYRPDSSSFAASREIEKKGWYWGPMNWDAAEMKIKAKPGDGFIVRDSDDERYI	433

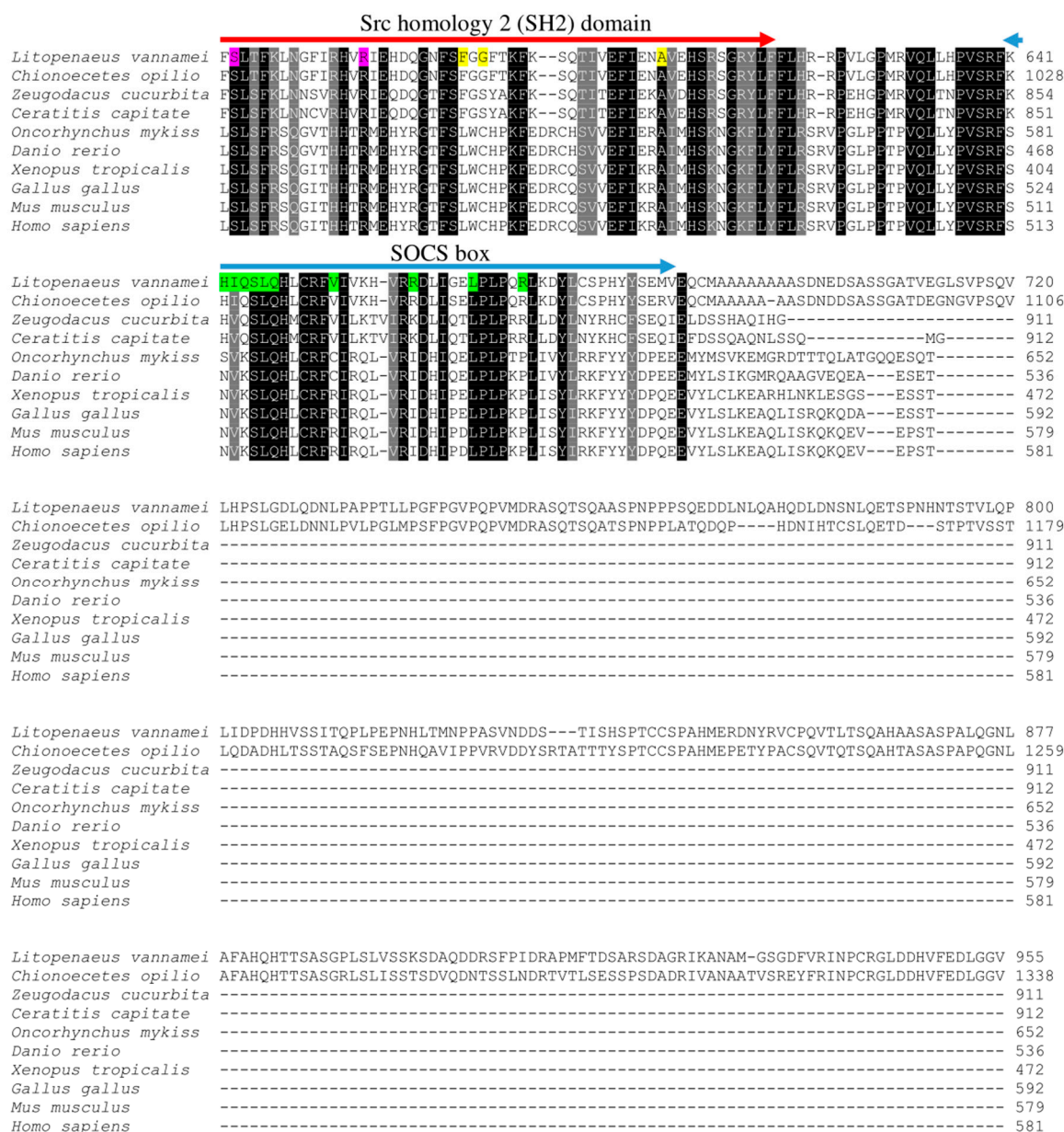


Figure S4: Multiple sequence alignment (MSA) of *Lvsocs7* and its counterparts. Strongly conserved and similar residues are highlighted by black and gray shading and the regions of phosphotyrosine binding motif, hydrophobic binding motif, and putative elongin B/C binding motifs are indicated in purple, yellow, and green color respectively. The species and the GenBank accession numbers used for the *Lvsocs7* 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).

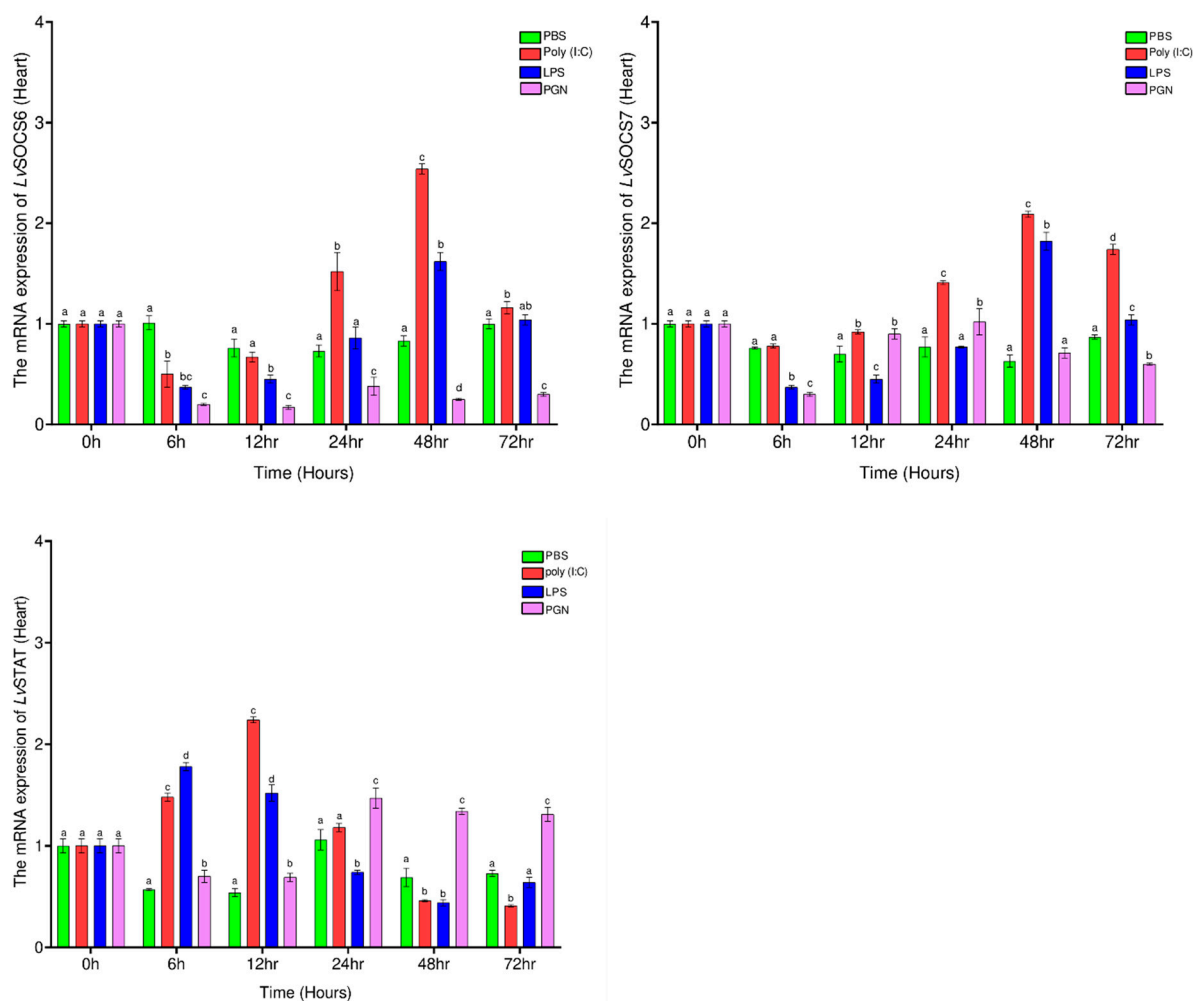


Figure S5: Temporal mRNA expression analysis of (A) *LvSOCS6*, (B) *LvSOCS7*, and (C) *LvSTAT* in heart tissue as determined by qPCR following stimulation of the immune response. Shrimps were challenged with LPS, poly (I:C), PGN, or phosphate-buffered saline (PBS), as a control. The expression was normalized to EF1 α internal control gene and analyzed using the $2^{-\Delta\Delta CT}$ method. Results are represented as the mean \pm S.E (N= 3). Statistically significant values ($p < 0.05$) are denoted with different letters.