

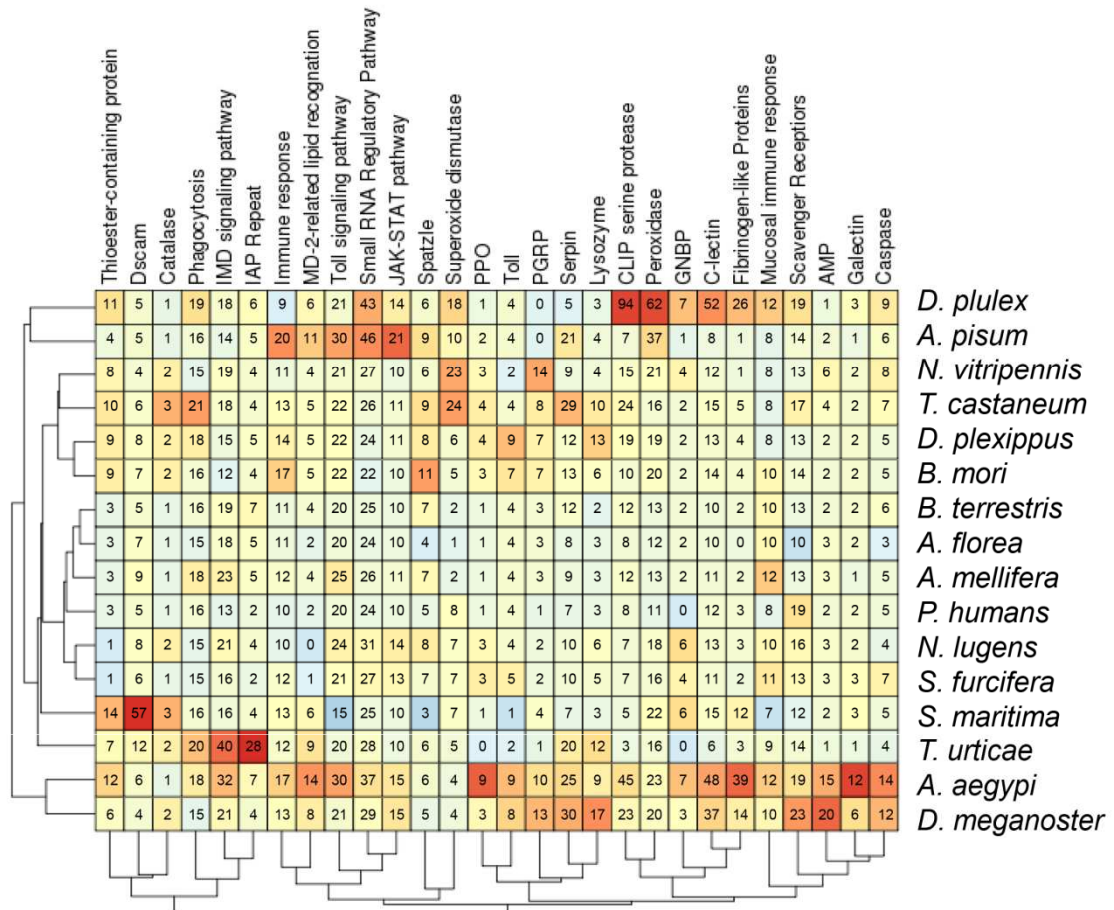
# Understanding the immune system architecture and transcriptome responses to southern rice black-streaked dwarf virus in *Sogatella furcifera*

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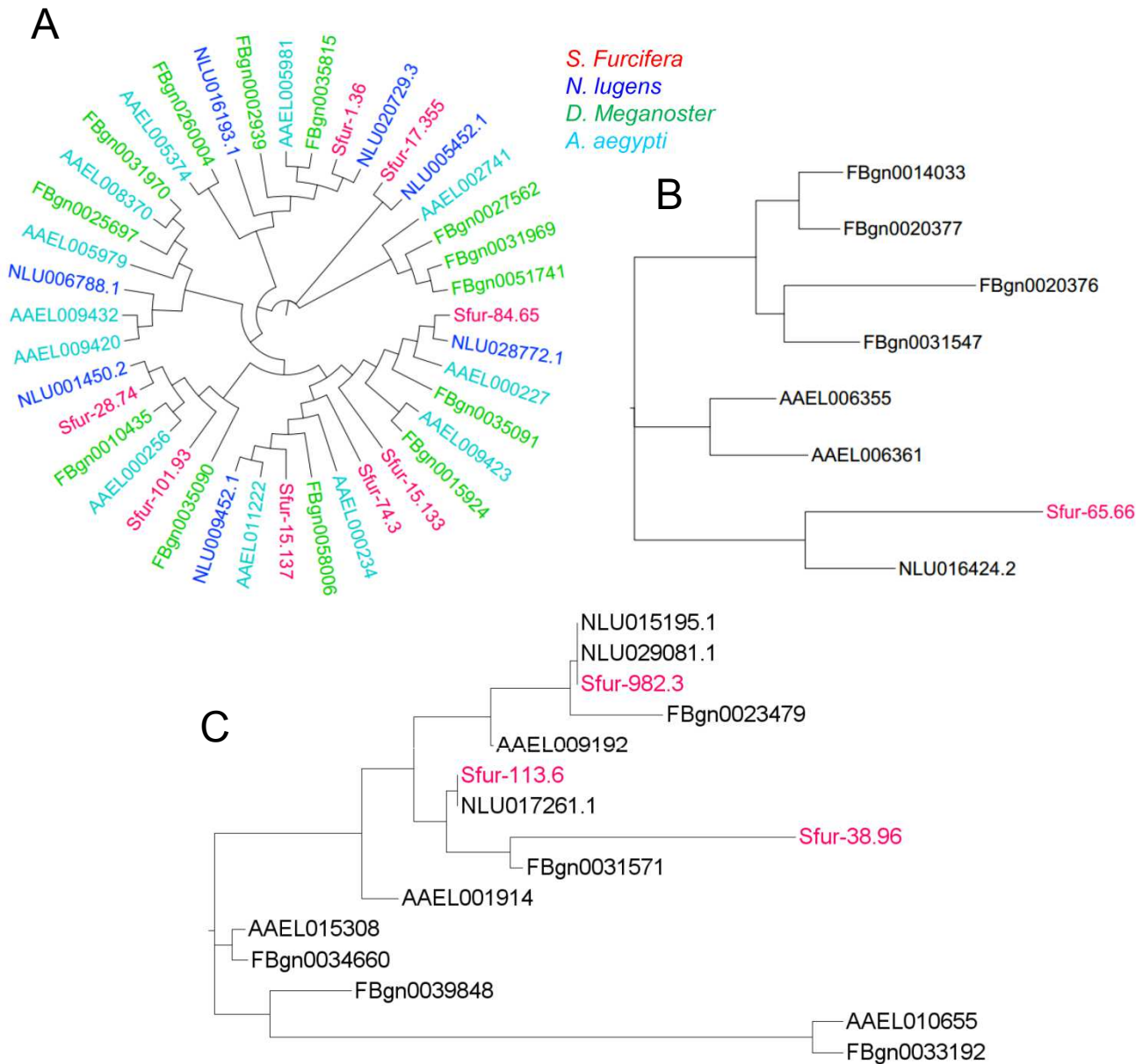
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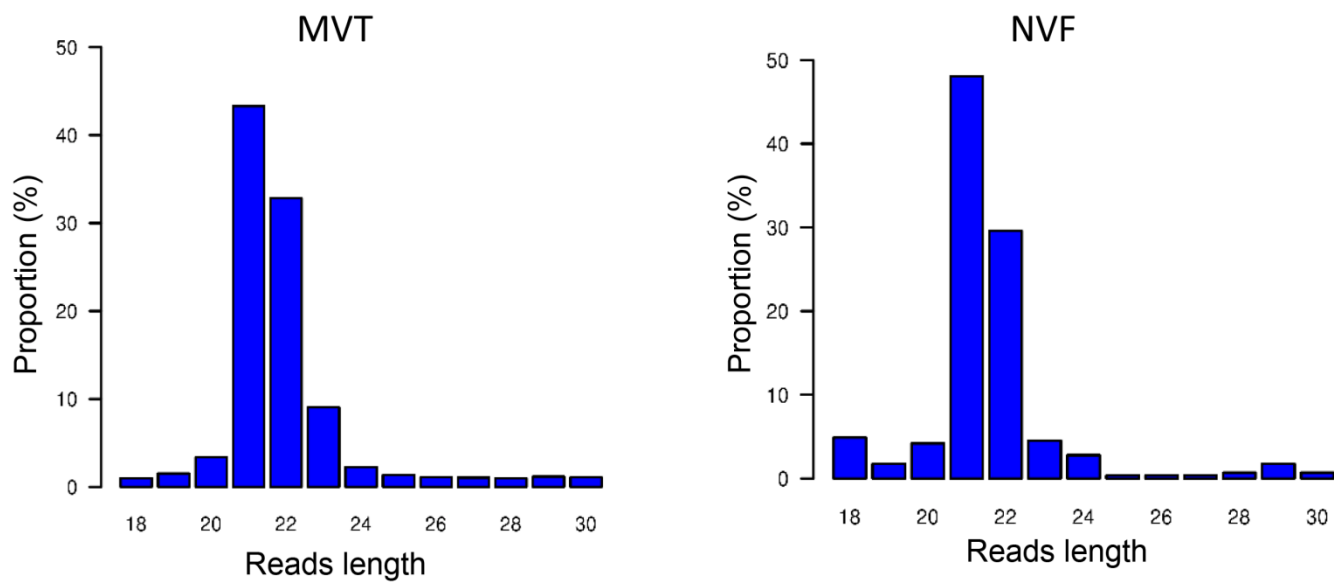
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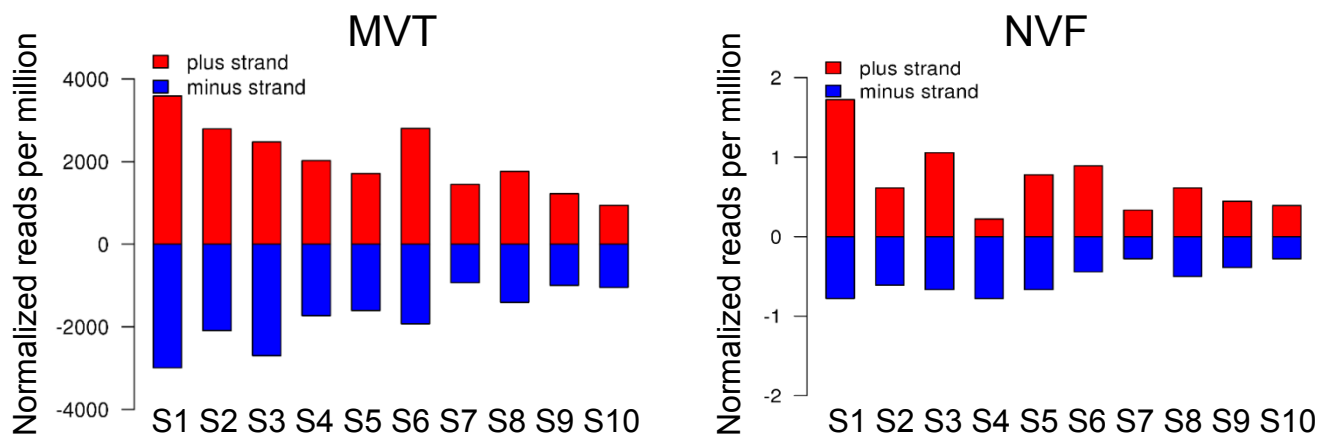
**Figure S1. Heatmap of immune genes belonging to 28 families among 16 insects and arthropod.** The clustering analysis was performed using Euclidean distances based on the number of genes within these families.



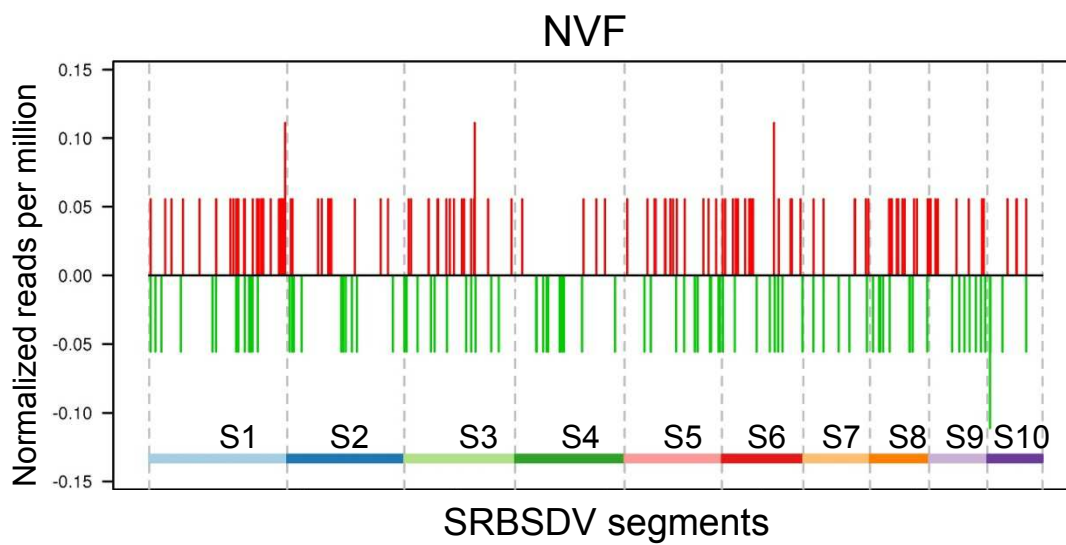
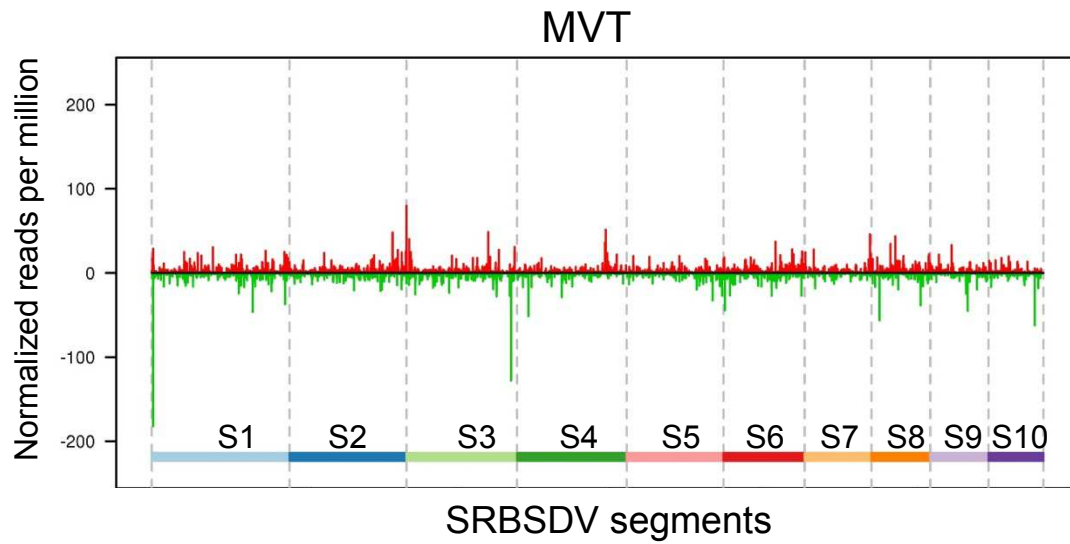
**Figure S2. Phylogenetic analysis of scavenger receptors based on the sequences from four insects *S. furcifera*, *N. lugens*, *D. Melanogaster* and *A. aegypti*.** (A). Phylogenetic analysis of SCR B. (B). Phylogenetic analysis of SCR C. (C). Phylogenetic analysis of SCR A.



**Figure S3. Length distribution of viral small RNAs in MVT and NVF libraries.** These reads were mapped on SRBSDV genome with 0-1 mismatch.



**Figure S4. Distribution of viral small RNAs across SRBSDV segments.** These reads were mapped on SRBSDV genome with 0-1 mismatch. Red bars represent reads mapping to the plus strand of the genome, blue bars depict reads from the minus strand.



**Figure S5. Distribution of 21-22 nt viral siRNAs across the SRBSDV segments.** X-axis represents nucleotide positions of each SRBSDV segment. Y-axis represents the abundance of viral siRNAs derived from plus strand (in red) and minus strand (in green).

**Table S1. The length and genomic location of *S. furcifera* immune-related genes**

Gene families	Gene name	<i>S. furcifera</i>	Length (aa)	Position
RNA interference	AGO2	Sfur-72.600	1428	Scaffold-72:12085052:12144874:-
	Dcr-2	Sfur-139.28	2186	Scaffold-139:532985:590929:-
	r2d2	Sfur-20.248	514	Scaffold-20:6308822:6317874:+
	loqs	Sfur-50.248	767	Scaffold-50:2980448:3005829:-
	Hen1	Sfur-230.43	580	Scaffold-230:703662:716214:-
	drosha	Sfur-223.33	1470	Scaffold-223:591595:600005:-
	pasha	Sfur-504.10	825	Scaffold-504:189208:193788:+
	dicer-1	Sfur-151.9	2408	Scaffold-151:111942:156291:+
	AGO1	Sfur-63.27	941	Scaffold-63:496214:532159:+
	AGO3	Sfur-63.71	638	Scaffold-63:1412610:1447497:-
	translin	Sfur-450.9	217	Scaffold-450:123901:125043:+
		Sfur-148.30	244	Scaffold-148:444188:455617:-
	Fmr1	Sfur-172.36	699	Scaffold-172:749316:779876:-
	armitage	Sfur-326.2	1529	Scaffold-326:28748:68080:+
	spn-E	Sfur-513.9	1348	Scaffold-513:207469:263986:-
	CRIF	Sfur-6.74	255	Scaffold-6:1300928:1301945:+
	CG17265	Sfur-542.11	449	Scaffold-542:230231:236575:+
		Sfur-641.4	446	Scaffold-641:134980:141634:-
	Cbp80	Sfur-19.148	802	Scaffold-19:3422899:3478056:+
	Elp1	Sfur-72.23	2210	Scaffold-72:270020:304665:+
	Tis11	Sfur-267.17	304	Scaffold-267:322278:374007:-
	Ars2	Sfur-17.78	871	Scaffold-17:1515324:1554169:+
	aubergine	Sfur-22.29	949	Scaffold-22:864160:889166:-
	pcm	Sfur-503.9	1518	Scaffold-503:156893:202935:-
bel	Sfur-72.131	1114	Scaffold-72:2169965:2212675:-	
hdc	Sfur-17.133	226	Scaffold-17:2809090:2809767:-	
	Sfur-17.131	360	Scaffold-17:2720970:2787399:-	
Toll signaling pathway	cact	Sfur-184.26	636	Scaffold-184:477522:494628:+
	Myd88	Sfur-169.16	189	Scaffold-169:446528:450576:+
	Pelle	Sfur-95.27	1992	Scaffold-95:430748:481309:-
	spz	Sfur-54.115	566	Scaffold-54:2058372:2079173:+
	spz3	Sfur-24.293	390	Scaffold-24:7169425:7216883:+
	spz4	Sfur-33.150	507	Scaffold-33:2533097:2541457:-
	spz5	Sfur-261.1	1830	Scaffold-261:1218:105685:+
	spz6	Sfur-5.212	507	Scaffold-5:4596404:4604268:-
	Tl	Sfur-33.32	1079	Scaffold-33:381269:392154:+
	Dorsal	Sfur-213.33	1324	Scaffold-213:416851:449531:+
	dif	Sfur-152.4	707	Scaffold-152:37993:59581:-
	tollip	Sfur-1.116	283	Scaffold-1:2070877:2077910:-

	tube	Sfur-23.126	502	Scaffold-23:2433405:2457027:+
	Hel89B	Sfur-72.337	1825	Scaffold-72:6253603:6295642:-
	Pli	Sfur-141.21	405	Scaffold-141:391115:409284:-
	Ulp1	Sfur-374.8	217	Scaffold-374:99750:105290:-
	mop	Sfur-120.31	2042	Scaffold-120:719241:769863:-
		Sfur-222.1	263	Scaffold-222:635:5899:-
	puf	Sfur-76.16	3399	Scaffold-76:399715:465615:-
	krz	Sfur-223.13	812	Scaffold-223:136074:213053:-
	Gprk2	Sfur-20.8	658	Scaffold-20:91299:110624:-
IMD signaling pathway	caspar	Sfur-17.324	640	Scaffold-17:7041532:7068673:-
		Sfur-150.27	909	Scaffold-150:508354:534321:+
	Diap1	Sfur-529.12	592	Scaffold-529:214043:230293:+
	IKKgamma(ke y)	Sfur-13.59	736	Scaffold-13:810071:814236:-
	IKKepsilon	Sfur-410.14	1705	Scaffold-410:302488:373452:+
	imd	Sfur-17.218	250	Scaffold-17:4620946:4627921:+
	Rel	Sfur-1444.20	2434	Scaffold-1444:377656:459802:+
	Tab2	Sfur-186.23	374	Scaffold-186:376453:386186:+
	Tak1	Sfur-9.184	459	Scaffold-9:3264533:3282901:+
	Dredd	Sfur-460.16	658	Scaffold-460:288818:301975:+
	Traf-like	Sfur-17.342	510	Scaffold-17:7444785:7448848:+
	Traf4	Sfur-66.92	454	Scaffold-66:1752324:1781555:+
	Ubc13	Sfur-251.194	152	Scaffold-251:2376907:2378585:+
	TM9SF2	Sfur-184.28	635	Scaffold-184:528926:545514:-
Sfur-396.5		662	Scaffold-396:95424:112169:+	
TM9SF4	Sfur-70.81	628	Scaffold-70:1939943:1955965:-	
JAK-STAT cascade	dome	Sfur-27.95	1146	Scaffold-27:2056152:2110712:+
	hop	Sfur-24.235	1149	Scaffold-24:6194992:6212334:+
	Stat92E	Sfur-86.26	819	Scaffold-86:538648:574609:+
	Su(var)2-10	Sfur-38.48	1346	Scaffold-38:631139:683688:-
	Socs36E	Sfur-101.37	742	Scaffold-101:433811:453034:+
		Sfur-28.3	634	Scaffold-28:27728:38467:+
		Sfur-315.10	498	Scaffold-315:303506:305470:+
	Socs16D	Sfur-289.13	536	Scaffold-289:259475:275878:-
	Socs44A	Sfur-64.68	405	Scaffold-64:1846456:1847958:-
	E(bx)	Sfur-40.46	2809	Scaffold-40:840470:903746:-
	kn	Sfur-114.36	555	Scaffold-114:584316:693007:+
	asrij	Sfur-51.78	467	Scaffold-51:1847845:1856507:-
mask	Sfur-161.6	2812	Scaffold-161:199510:268864:-	
melanization defense response	PPO	Sfur-106.2	1519	Scaffold-106:22332:80613:+
		Sfur-283.14	674	Scaffold-283:250627:263761:-
		Sfur-62.181	693	Scaffold-62:2689850:2708591:+
	serpin	Sfur-204.21	396	Scaffold-204:469759:487164:-



		Sfur-335.4	1580	Scaffold-335:52395:70236:+
		Sfur-350.3	541	Scaffold-350:94048:100689:-
		Sfur-377.2	1130	Scaffold-377:20825:57190:-
		Sfur-45.55	422	Scaffold-45:1207498:1233798:+
		Sfur-470.6	902	Scaffold-470:94763:113675:-
		Sfur-2570.1	144	Scaffold-2570:521:9244:+
		Sfur-71.69	839	Scaffold-71:1251056:1271974:-
		Sfur-88.14	599	Scaffold-88:238566:256328:-
		Sfur-97.15	283	Scaffold-97:281314:286609:+
	CLIP-domain serine protease	Sfur-364.6	725	Scaffold-364:117445:141627:-
		Sfur-389.3	674	Scaffold-389:31857:88292:-
		Sfur-745.2	773	Scaffold-745:67730:84072:+
		Sfur-49.2	1600	Scaffold-49:86919:138347:+
		Sfur-234.17	393	Scaffold-234:414952:424743:-
		Sfur-54.75	569	Scaffold-54:1485881:1504889:+
		Sfur-9.240	542	Scaffold-9:4261579:4288294:-
	bsk	Sfur-95.52	722	Scaffold-95:940615:1011164:-
	egr	Sfur-88.72	381	Scaffold-88:1406853:1451622:+
	hep	Sfur-105.58	1468	Scaffold-105:1080031:1152391:+
	Rho1	Sfur-15.272	193	Scaffold-15:6382420:6398542:-
Sfur-39.58		198	Scaffold-39:1396821:1400937:+	
pattern recognition receptor	C-lectin	Sfur-115.19	1399	Scaffold-115:395000:437892:+
		Sfur-1233.4	87	Scaffold-1233:24696:25315:-
		Sfur-135.14	284	Scaffold-135:155503:164681:-
		Sfur-7.132	1220	Scaffold-7:3368036:3409056:+
		Sfur-1591.2	377	Scaffold-1591:14026:22754:-
		Sfur-20.43	210	Scaffold-20:1250883:1255841:+
		Sfur-276.9	226	Scaffold-276:206934:228516:+
		Sfur-925.2	207	Scaffold-925:54977:59363:+
		Sfur-635.1	1222	Scaffold-635:130696:171774:+
		Sfur-308.14	2533	Scaffold-308:357433:462847:-
		Sfur-438.7	774	Scaffold-438:180639:295948:-
		GNBP	Sfur-168.43	1729
	Sfur-449.5		2161	Scaffold-449:123216:177396:+
	Sfur-186.24		542	Scaffold-186:388922:408037:+
	Sfur-71.64		1205	Scaffold-71:1083269:1138287:+
	PGRP-LC	Sfur-122.48	1364	Scaffold-122:1078566:1117556:+
	PGRP-LB	Sfur-20.196	499	Scaffold-20:5382138:5388174:-
	Draper	Sfur-78.16	944	Scaffold-78:344988:407245:-
	dscam	Sfur-115.24	14063	Scaffold-115:540151:720943:-
		Sfur-160.34	1636	Scaffold-160:643330:739246:+
		Sfur-17.263	2171	Scaffold-17:5671259:5736018:-
		Sfur-205.33	3270	Scaffold-205:546848:690961:+

		Sfur-413.23	1301	Scaffold-413:376783:437386:+
		Sfur-79.65	1860	Scaffold-79:1228387:1280718:+
	Eater	Sfur-13.168	1618	Scaffold-13:2870923:2897529:+
	galectin	Sfur-133.5	1153	Scaffold-133:124471:166675:-
		Sfur-169.42	2011	Scaffold-169:789485:872547:-
		Sfur-9.77	1312	Scaffold-9:1295870:1322459:+
	hemocytin	Sfur-199.20	4409	Scaffold-199:448045:536423:-
		Sfur-769.5	3557	Scaffold-769:81176:118211:+
defense response to virus	Atg18a	Sfur-78.63	455	Scaffold-78:1262805:1294285:+
	Atg7	Sfur-146.38	366	Scaffold-146:731158:735420:+
		Sfur-602.5	593	Scaffold-602:68037:77373:+
	CG10333	Sfur-347.22	653	Scaffold-347:400887:410359:-
	me31B	Sfur-169.35	449	Scaffold-169:687218:700687:+
	Mt2	Sfur-3.151	331	Scaffold-3:2892126:2904582:+
	Toll-7	Sfur-11.171	1323	Scaffold-11:3191439:3195849:+
	Toll-6	Sfur-176.31	1288	Scaffold-176:731355:735465:+
	Toll-8	Sfur-29.104	1721	Scaffold-29:1823673:1855334:-
	Toll-10	Sfur-230.19	1296	Scaffold-230:225496:259339:-
	Toll-13	Sfur-122.298	866	Scaffold-122:5156187:5168119:-
	FoxK	Sfur-72.391	552	Scaffold-72:7390551:7418684:-
G9a	Sfur-11.142	1375	Scaffold-11:2817660:2844784:-	
antimicrobial humoral response	alphaTub84B	Sfur-114.27	450	Scaffold-114:390989:395994:-
		Sfur-45.44	856	Scaffold-45:908888:927508:+
		Sfur-450.13	504	Scaffold-450:174663:179960:+
		Sfur-22.63	451	Scaffold-22:1702506:1744788:-
		Sfur-214.43	808	Scaffold-214:740479:759618:-
		Sfur-9.290	685	Scaffold-9:5208697:5237177:+
	Dlg5	Sfur-33.149	1937	Scaffold-33:2476623:2525174:+
	dos	Sfur-19.265	668	Scaffold-19:5424741:5445662:+
	Eip75B	Sfur-40.72	942	Scaffold-40:1654489:1681434:+
	lola	Sfur-124.39	355	Scaffold-124:859866:869751:-
	lysozyme	Sfur-11.139	154	Scaffold-11:2779444:2782951:-
		Sfur-145.15	307	Scaffold-145:293700:304175:-
		Sfur-53.22	174	Scaffold-53:313172:333372:+
		Sfur-85.10	278	Scaffold-85:229207:239997:+
		Sfur-85.9	156	Scaffold-85:223212:227637:+
	mbo	Sfur-7.118	501	Scaffold-7:3076245:3112006:+
	Mef2	Sfur-35.38	709	Scaffold-35:554076:603181:+
	Ntf-2	Sfur-9.95	131	Scaffold-9:1506325:1512416:+
	par-1	Sfur-14.79	579	Scaffold-14:1657393:1695616:+
	Parp	Sfur-72.107	1092	Scaffold-72:1769730:1789955:-
PCNA	Sfur-74.129	261	Scaffold-74:1594683:1599801:-	
smog	Sfur-56.66	675	Scaffold-56:1559920:1575568:-	

	Ptip	Sfur-49.48	1425	Scaffold-49:1229167:1288615:+
	Pvr	Sfur-27.55	2106	Scaffold-27:917936:947832:-
		Sfur-170.3	818	Scaffold-170:25331:45602:+
	Rab11	Sfur-13.193	216	Scaffold-13:3151181:3168837:+
	scrib	Sfur-347.18	1837	Scaffold-347:240129:358804:+
	Spt6	Sfur-98.17	1806	Scaffold-98:343206:382860:-
	Thor	Sfur-207.15	119	Scaffold-207:346434:353919:+
	Tlk	Sfur-682.3	933	Scaffold-682:17219:73518:+
	Vps15	Sfur-270.24	1339	Scaffold-270:459835:498283:+
	vvl	Sfur-250.11	433	Scaffold-250:190874:192196:-
	zfh1	Sfur-36.98	912	Scaffold-36:2026389:2055531:-
antimicrobial peptide	Defensin	Sfur-10.120	340	Scaffold-10:2352765:2370451:+
		Sfur-33.51	262	Scaffold-33:660700:668230:+
	NOS	Sfur-9.52	1383	Scaffold-9:663560:726000:-
encapsulation of foreign target	alpha-Man-Ia	Sfur-17.159	525	Scaffold-17:3405714:3418388:-
	alpha-Man-Ib	Sfur-241.29	834	Scaffold-241:636578:661827:+
		Sfur-489.8	585	Scaffold-489:254802:271669:-
	alpha-Man-IIa	Sfur-39.3	1116	Scaffold-39:15322:46715:-
	alpha-Man-IIb	Sfur-129.28	1650	Scaffold-129:429695:442551:-
		Sfur-825.7	588	Scaffold-825:85354:94586:+
		Sfur-70.20	1030	Scaffold-70:239001:296085:+
	Als2	Sfur-494.2	1647	Scaffold-494:26614:63132:-
	aPKC	Sfur-116.56	597	Scaffold-116:1045903:1097143:+
	Cdc42	Sfur-171.14	650	Scaffold-171:343914:368853:+
	Cdk5alpha	Sfur-50.56	303	Scaffold-50:739988:745845:-
		Sfur-150.22	282	Scaffold-150:434390:435235:-
		Sfur-150.19	213	Scaffold-150:407613:409827:-
	DCTN1-p150	Sfur-85.11	1283	Scaffold-85:241112:278049:-
	DCX-EMAP	Sfur-518.5	410	Scaffold-518:98833:107254:+
	Dhc64C	Sfur-63.19	4660	Scaffold-63:296196:374130:-
	dia	Sfur-20.194	1060	Scaffold-20:5305796:5347302:+
	Eph	Sfur-18.207	835	Scaffold-18:3960077:4010736:-
	Ephrin	Sfur-15.173	554	Scaffold-15:4094700:4142237:+
	Exn	Sfur-877.3	1999	Scaffold-877:14368:47954:+
	Flo2	Sfur-229.21	425	Scaffold-229:370218:371492:-
	LanA	Sfur-359.5	3683	Scaffold-359:105895:174267:+
	OstDelta	Sfur-223.18	1578	Scaffold-223:267985:291271:+
	Ostgamma	Sfur-324.8	699	Scaffold-324:181936:222244:-
	RhoBTB	Sfur-33.154	1331	Scaffold-33:2587153:2633646:-
	RhoGEF3	Sfur-18.90	1075	Scaffold-18:1959210:1997732:-
	Shc	Sfur-11755.1	153	Scaffold-11755:17:677:-
Sfur-54.85		597	Scaffold-54:1579537:1581507:-	
Sfur-54.99		1176	Scaffold-54:1742096:1780551:-	

	Vav	Sfur-23.69	1713	Scaffold-23:1307574:1338992:-
	Zir	Sfur-1433.1	1661	Scaffold-1433:28:24184:-
		Sfur-440.5	2606	Scaffold-440:306742:330262:+
phagocytosis	crq	Sfur-51.4	1564	Scaffold-51:42730:124978:+
		Sfur-13.116	547	Scaffold-13:1948339:1978094:+
	brm	Sfur-108.44	1476	Scaffold-108:763820:783750:-
		Sfur-598.8	1267	Scaffold-598:148332:179894:+
	EcR	Sfur-50.12	619	Scaffold-50:203218:222293:-
	pnt	Sfur-57.78	392	Scaffold-57:1777646:1805416:-
	betaCOP	Sfur-431.10	916	Scaffold-431:152224:163621:+
	gcm	Sfur-28.6	572	Scaffold-28:112031:121193:-
		Sfur-84.70	629	Scaffold-84:1328003:1344380:-
	Trn	Sfur-69.5	929	Scaffold-69:126622:205028:+
	DMAP1	Sfur-85.55	2735	Scaffold-85:981301:1019407:+
	Nup98-96	Sfur-16.163	1988	Scaffold-16:3378124:3436367:+
		Sfur-1672.1	572	Scaffold-1672:1280:19310:+
		Sfur-1251.1	253	Scaffold-1251:6001:18296:+
kuz	Sfur-192.21	789	Scaffold-192:451807:476216:+	
mucosal immune response	bbg	Sfur-38.58	1436	Scaffold-38:897161:916430:-
	Duox	Sfur-829.6	816	Scaffold-829:73630:99301:-
		Sfur-921.1	422	Scaffold-921:5453:14209:+
	Galphaq	Sfur-72.236	354	Scaffold-72:3794880:3840867:-
	lic	Sfur-14.118	331	Scaffold-14:2407999:2417460:+
	Mekk1	Sfur-17.172	1315	Scaffold-17:3644468:3679361:-
	Mkp3	Sfur-67.335	662	Scaffold-67:4917358:4947390:+
	norpA	Sfur-268.14	1904	Scaffold-268:197055:265330:-
		Sfur-68.11	1079	Scaffold-68:201289:241336:+
Sfur-226.20		1202	Scaffold-226:343583:379944:+	
p38	Sfur-17.307	622	Scaffold-17:6675902:6707748:+	
negative regulation of immune response	Atg6	Sfur-596.2	373	Scaffold-596:22962:36274:-
	dnr1	Sfur-20.247	883	Scaffold-20:6267460:6306119:-
	Dsp1	Sfur-246.15	210	Scaffold-246:252378:274923:-
		Sfur-246.14	1047	Scaffold-246:220688:247583:-
	faf	Sfur-8.174	2764	Scaffold-8:3190206:3253519:+
	GlyP	Sfur-487.5	1675	Scaffold-487:130966:195898:+
	Lam	Sfur-197.34	549	Scaffold-197:575614:600981:+
	MED6	Sfur-295.17	214	Scaffold-295:294849:302320:+
		Sfur-951.1	234	Scaffold-951:46501:56132:-
	Prx5	Sfur-68.55	818	Scaffold-68:1213546:1255072:-
	Rala	Sfur-727.2	308	Scaffold-727:65697:77873:+
	RYBP	Sfur-7.142	669	Scaffold-7:3890807:3912355:-
sax	Sfur-20.106	651	Scaffold-20:3024141:3078538:+	
scny	Sfur-84.32	1041	Scaffold-84:431035:455442:+	

	slif	Sfur-230.42	1500	Scaffold-230:665771:699639:-
		Sfur-50.193	727	Scaffold-50:2444004:2475761:+
		Sfur-345.27	957	Scaffold-345:420402:455888:+
	SP2353	Sfur-197.44	308	Scaffold-197:788821:808743:+
	tefu	Sfur-158.19	2853	Scaffold-158:190732:276365:+
	Tim10	Sfur-338.15	96	Scaffold-338:290741:295170:+
	unc-45	Sfur-97.14	946	Scaffold-97:277855:280692:+
	Usp2	Sfur-20.70	517	Scaffold-20:2065496:2082524:+
	Nrf2	Sfur-9.282	637	Scaffold-9:4962381:5019134:-
	wun	Sfur-273.10	279	Scaffold-273:78819:104116:+
positive regulation of immune response	att-ORFA	Sfur-622.8	321	Scaffold-622:155464:169124:+
	CG2051	Sfur-16.19	411	Scaffold-16:349132:369417:-
	CG32795	Sfur-32.48	646	Scaffold-32:380915:398262:+
	chico	Sfur-77.62	1062	Scaffold-77:999570:1011562:-
	Crag	Sfur-89.92	1869	Scaffold-89:1344519:1427737:-
	Etl1	Sfur-181.1	1542	Scaffold-181:1329:26514:+
	HBS1	Sfur-134.8	1321	Scaffold-134:193802:219154:-
	Hr78	Sfur-162.14	656	Scaffold-162:279768:292433:+
	htl	Sfur-27.19	1019	Scaffold-27:447830:489575:-
	Ide	Sfur-36.56	967	Scaffold-36:1028818:1051118:+
	kug	Sfur-369.15	3149	Scaffold-369:201228:270273:+
		Sfur-316.19	2937	Scaffold-316:361388:448023:+
		Sfur-6.221	3111	Scaffold-6:3682324:3750622:+
		Sfur-316.13	612	Scaffold-316:221741:223576:+
		Sfur-6.194	1141	Scaffold-6:3372268:3375690:+
	LanB1	Sfur-24.172	1752	Scaffold-24:4571900:4606027:+
	Mmp2	Sfur-259.18	494	Scaffold-259:381746:394957:+
	mtd	Sfur-8.143	960	Scaffold-8:2391353:2526890:-
PDCD-5	Sfur-169.12	130	Scaffold-169:413640:417815:-	
puc	Sfur-167.52	266	Scaffold-167:758620:801656:+	
Sec31	Sfur-11.25	1849	Scaffold-11:621923:686736:+	
immune response	Atf3	Sfur-125.49	525	Scaffold-125:908975:918974:+
	cher	Sfur-7.140	2355	Scaffold-7:3611650:3797156:+
	CSN5	Sfur-44.49	345	Scaffold-44:814419:818993:-
	Deaf1	Sfur-438.6	500	Scaffold-438:156032:178237:+
	eya	Sfur-20.138	776	Scaffold-20:3947459:3975228:+
	modSP	Sfur-102.37	1173	Scaffold-102:890003:915418:+
		Sfur-79.44	712	Scaffold-79:726696:746148:-
	Reeler	Sfur-159.27	270	Scaffold-159:455725:466829:+
	Uba2	Sfur-594.3	642	Scaffold-594:33778:53907:-
		Sfur-691.11	577	Scaffold-691:147456:160638:-
	Vps16B	Sfur-97.22	440	Scaffold-97:493395:503004:+
Vps33B	Sfur-107.10	738	Scaffold-107:221949:231075:-	

Caspase	Caspase	Sfur-17.341	291	Scaffold-17:7425599:7442532:+
	Caspase	Sfur-6.178	1178	Scaffold-6:3076669:3121666:+
	Caspase	Sfur-1194.2	602	Scaffold-1194:25502:35039:-
	Caspase	Sfur-23.136	781	Scaffold-23:2651782:2681095:-
	Caspase	Sfur-739.1	598	Scaffold-739:13669:21225:+
	Caspase	Sfur-460.16	658	Scaffold-460:288818:301975:+
	Caspase	Sfur-24.353	793	Scaffold-24:8701529:8717817:+
Catalase	Catalase	Sfur-314.12	504	Scaffold-314:185421:217844:-
Fibrinogen-like Proteins	Fibrinogen-like Proteins	Sfur-418.10	746	Scaffold-418:136687:164330:-
	Fibrinogen-like Proteins	Sfur-72.247	1931	Scaffold-72:3955028:3966237:+
IAP Repeat	IAP Repeat	Sfur-234.14	4551	Scaffold-234:284350:376956:+
	IAP Repeat	Sfur-119.29	235	Scaffold-119:602787:617554:-
MD-2-related lipid recognition	MD-2-related lipid recognition	Sfur-283.24	172	Scaffold-283:474795:478468:+
Scavenger Receptors	Scavenger Receptors	Sfur-28.74	911	Scaffold-28:1397713:1437306:+
	Scavenger Receptors	Sfur-65.66	1310	Scaffold-65:1462168:1501916:+
	Scavenger Receptors	Sfur-101.93	931	Scaffold-101:1324443:1379975:-
	Scavenger Receptors	Sfur-84.65	198	Scaffold-84:1250921:1256071:+
	Scavenger Receptors	Sfur-38.96	2869	Scaffold-38:1336839:1445976:+
	Scavenger Receptors	Sfur-982.3	611	Scaffold-982:43664:55543:-
	Scavenger Receptors	Sfur-113.6	3665	Scaffold-113:75649:181553:+
	Scavenger Receptors	Sfur-74.3	467	Scaffold-74:32128:58667:-
	Scavenger Receptors	Sfur-168.24	1040	Scaffold-168:469889:496900:-
	Scavenger Receptors	Sfur-17.355	596	Scaffold-17:7698657:7718981:+
	Scavenger Receptors	Sfur-15.137	586	Scaffold-15:3005222:3080960:+
	Scavenger Receptors	Sfur-1.36	507	Scaffold-1:740692:752444:+
	Scavenger Receptors	Sfur-15.133	1136	Scaffold-15:2944056:2982430:+

Spatzle	Spatzle	Sfur-54.115	566	Scaffold-54:2058372:2079173:+
	Spatzle	Sfur-5.212	507	Scaffold-5:4596404:4604268:-
	Spatzle	Sfur-24.293	390	Scaffold-24:7169425:7216883:+
	Spatzle	Sfur-166.29	436	Scaffold-166:571154:592970:+
	Spatzle	Sfur-261.1	1830	Scaffold-261:1218:105685:+
	Spatzle	Sfur-72.508	541	Scaffold-72:10049305:10066841:-
	Spatzle	Sfur-33.150	507	Scaffold-33:2533097:2541457:-
Superoxide dismutase	Superoxide dismutase	Sfur-13.25	930	Scaffold-13:297893:301420:-
	Superoxide dismutase	Sfur-41.88	2235	Scaffold-41:2344888:2360466:+
	Superoxide dismutase	Sfur-8.79	1684	Scaffold-8:1073640:1081782:-
	Superoxide dismutase	Sfur-23.71	349	Scaffold-23:1354194:1372952:-
	Superoxide dismutase	Sfur-33.90	465	Scaffold-33:1452813:1478112:-
	Superoxide dismutase	Sfur-67.126	561	Scaffold-67:1680925:1698744:-
	Superoxide dismutase	Sfur-67.143	348	Scaffold-67:1838161:1869273:-
Thioester-containing protein	Thioester-containing protein	Sfur-70.51	2555	Scaffold-70:831849:919436:+
peroxidase	peroxidase	Sfur-219.18	1120	Scaffold-219:248013:300149:+
	peroxidase	Sfur-126.46	1216	Scaffold-126:746464:797465:-
	peroxidase	Sfur-46.51	2353	Scaffold-46:1175066:1240084:-
	peroxidase	Sfur-77.96	1362	Scaffold-77:1494315:1530461:-
	peroxidase	Sfur-18.30	576	Scaffold-18:655849:697622:-
	peroxidase	Sfur-120.36	2359	Scaffold-120:852675:919715:+
	peroxidase	Sfur-273.7	234	Scaffold-273:62169:73061:+
	peroxidase	Sfur-47.125	2918	Scaffold-47:2235742:2293595:-
	peroxidase	Sfur-30.107	1499	Scaffold-30:2304735:2336216:+
	peroxidase	Sfur-15.277	199	Scaffold-15:6434239:6443533:-
	peroxidase	Sfur-65.41	1425	Scaffold-65:860460:898413:+
	peroxidase	Sfur-17.242	3270	Scaffold-17:5223007:5297678:+
	peroxidase	Sfur-430.8	409	Scaffold-430:169988:185780:-
	peroxidase	Sfur-6.74	255	Scaffold-6:1300928:1301945:+
	peroxidase	Sfur-22.68	265	Scaffold-22:1849864:1857820:-
	peroxidase	Sfur-128.19	221	Scaffold-128:569294:576632:+
peroxidase	Sfur-22.79	184	Scaffold-22:2064821:2069885:-	

Note: The detailed gene sequence will be available on the link <http://staff.ustc.edu.cn/~wuqf/resources.html>

**Table S2. Classification of immune related genes of *S. furcifera*, *N. lugens* and *D. Melanogaster***

category	gene name	<i>S. furcifera</i>	<i>N. lugens</i>	<i>D. melanogaster</i>
RNA interference	AG02	S. fur-72. 600	NLU002433. 1	FBgn0087035
	Dcr-2	S. fur-139. 28	NLU028676. 1	FBgn0034246
	r2d2	S. fur-20. 248	NLU009200. 1	FBgn0031951
	loqs	S. fur-50. 248	NLU021888. 1	FBgn0032515
	Hen1	S. fur-230. 43	NLU016076. 1, NLU019297. 1, NLU016075. 1	FBgn0033686
	drosha	S. fur-223. 33	NLU024074. 1	FBgn0026722
	pasha	S. fur-504. 10	NLU019062. 1, NLU025792. 1	FBgn0039861
	dicer-1	S. fur-151. 9	NLU006786. 1	FBgn0039016
	AG01	S. fur-63. 27	NLU002737. 1	FBgn0262739
	AG03	S. fur-63. 71	NLU019917. 2	FBgn0250816
	translin	S. fur-450. 9	/	/
		S. fur-148. 30		
	Fmr1	S. fur-172. 36	NLU028700. 1	FBgn0028734
	armitage	S. fur-326. 2	NLU005908. 1	FBgn0041164
	spn-E	S. fur-513. 9	NLU012389. 1	FBgn0003483
	CRIF	S. fur-6. 74	NLU004434. 1	FBgn0037102
	CG17265	S. fur-542. 11	NLU010721. 1, NLU016057. 1	FBgn0031488
		S. fur-641. 4		
	Cbp80	S. fur-19. 148	NLU019101. 1	FBgn0022942



	Cbp20	/	NLU017365. 1	FBgn0022943
	Elp1	S. fur-72. 23	/	FBgn0037926
	Tis11	S. fur-267. 17	NLU026267. 1	FBgn0011837
	Ars2	S. fur-17. 78	NLU025386. 1	FBgn0033062
	blanks	/	/	FBgn0035608, FBgn0035571
	piwi	/	NLU020171. 1	FBgn0004872
	aubergine	S. fur-22. 29	NLU014209. 1	FBgn0000146
	ppk29	/	/	FBgn0034965
	pcm	S. fur-503. 9	NLU016288. 1	FBgn0020261
	bel	S. fur-72. 131	NLU014452. 1	FBgn0263231
	hdc	S. fur-17. 133 S. fur-17. 131	NLU003528. 1, NLU003527. 1	FBgn0010113
Toll signaling pathway	cact	S. fur-184. 26	NLU007600. 1	FBgn0000250
	Myd88	S. fur-169. 16	NLU015637. 1, NLU015640. 1	FBgn0033402
	Pelle	S. fur-95. 27	NLU007825. 1	FBgn0010441
	spz	S. fur-54. 115	NLU023813. 1	FBgn0003495
	spz2	/	/	FBgn0261526
	spz3	S. fur-24. 293	NLU021391. 1, NLU019692. 1	FBgn0031959
	spz4	S. fur-33. 150	NLU006163. 1	FBgn0032362
	spz5	S. fur-261. 1	NLU021217. 1	FBgn0035379
	spz6	S. fur-5. 212	NLU021599. 1, NLU021596. 1	FBgn0035056
	T1	S. fur-33. 32	NLU007992. 1, NLU025956. 1	FBgn0262473
	Dorsal	S. fur-213. 33	NLU004660. 1	FBgn0260632

	Dif	S. fur-152. 4	NLU001982. 1	FBgn0011274
	tollip	S. fur-1. 116	NLU024621. 1	/
	tube	S. fur-23. 126	/	FBgn0003882
	lwr	/	NLU009395. 1	FBgn0010602
	Hel89B	S. fur-72. 337	NLU002799. 1	FBgn0022787
	Pli	S. fur-141. 21	NLU008334. 3	FBgn0025574
	Ulp1	S. fur-374. 8	/	FBgn0027603
	mop	S. fur-120. 31	NLU007526. 1	FBgn0036448
		S. fur-222. 1		
	puf	S. fur-76. 16	NLU015336. 1, NLU015334. 1	FBgn0039214
	krz	S. fur-223. 13	NLU028087. 2	FBgn0040206
	Gprk2	S. fur-20. 8	NLU001194. 1	FBgn0261988
IMD signaling pathway	caspar	S. fur-17. 324	NLU013036. 1, NLU017992. 1	FBgn0034068
		S. fur-150. 27	NLU019739. 1	/
		/	/	FBgn0025608
	Diap2	/	NLU021557. 1, NLU021593. 1	FBgn0015247
	Diap1	S. fur-529. 12	NLU002427. 1, NLU025325. 1	FBgn0260635
	IKKbeta	/	NLU025262. 1	FBgn0024222
	IKKgamma (key)	S. fur-13. 59	/	FBgn0041205
	IKKepsilon	S. fur-410. 14	NLU019937. 1	FBgn0086657
	imd	S. fur-17. 218	NLU011186. 1	FBgn0013983
	Rel	S. fur-1444. 20	NLU002823. 1	FBgn0014018
	Tab2	S. fur-186. 23	NLU006103. 1	FBgn0086358
	Tak1	S. fur-9. 184	NLU003382. 2	FBgn0026323

	Dredd	S. fur-460. 16	/	FBgn0020381
		/		
	Traf-like	S. fur-17. 342	NLU005471. 1	FBgn0030748
	Traf4	S. fur-66. 92	NLU024884. 1	FBgn0026319
	Traf6	/	NLU016291. 2, NLU017152. 1	FBgn0265464
	Ubc13	S. fur-251. 194	NLU022111. 1	FBgn0000173
	TM9SF2	S. fur-184. 28	NLU010276. 1	FBgn0032880
		S. fur-396. 5		
	TM9SF4	S. fur-70. 81	NLU013705. 1, NLU024056. 2	FBgn0028541
	Npc2a	/	/	FBgn0031381
	Npc2e	/	/	FBgn0051410
pirk	/	/	FBgn0034647	
JAK-STAT cascade	dome	S. fur-27. 95	/	FBgn0043903
	hop	S. fur-24. 235	NLU018705. 1, NLU018707. 1	FBgn0004864
	Stat92E	S. fur-86. 26	NLU009978. 1	FBgn0016917
	Su(var)2-10	S. fur-38. 48	NLU002060. 2	FBgn0003612
	upd1	/	/	FBgn0004956
	upd2	/	/	FBgn0030904
	upd3	/	/	FBgn0053542
	vir-1	/	/	FBgn0043841
	Socs36E	S. fur-101. 37	NLU008288. 1, NLU027078. 1, NLU005783. 1	FBgn0041184
		S. fur-28. 3		
		S. fur-315. 10		
Socs16D	S. fur-289. 13	NLU004891. 1	FBgn0030869	
Socs44A	S. fur-64. 68	NLU007597. 1	FBgn0033266	

	E(bx)	S. fur-40. 46	NLU007175. 1, NLU007172. 1	FBgn0000541
	kn	S. fur-114. 36	NLU011325. 1	FBgn0001319
	asrij	S. fur-51. 78	NLU017830. 3	FBgn0034793
	mask	S. fur-161. 6	NLU006840. 1	FBgn0043884
melanization defense response	PPO	S. fur-106. 2, S. fur-283. 14, S. fur-62. 181	NLU002909. 1, NLU022227. 1, NLU 022111. 1, NLU006547. 1, NLU002 910. 1	FBgn0033367, FBgn02613 63, FBgn0261362
	serpin	S. fur-204. 21	NLU003320. 1, NLU017458. 1	/
		S. fur-335. 4	NLU005641. 1, NLU002506. 1	FBgn0263109
		S. fur-350. 3	NLU028092. 1	FBgn0039795
		S. fur-377. 2	NLU013115. 1	FBgn0037772
		S. fur-45. 55	NLU010255. 1	FBgn0038299, FBgn00289 84
		S. fur-470. 6	NLU008425. 1	FBgn0031973
		S. fur-2570. 1		
		S. fur-71. 69	NLU002705. 1	/
		S. fur-88. 14	NLU025039. 1	/
		S. fur-97. 15	/	/
		/	/	FBgn0028990
		/	/	FBgn0262057, FBgn00369 69, FBgn0036970
		/	/	FBgn0015586, FBgn00522 03
/	/	/		

	/	/	FBgn0028983, FBgn0028985, FBgn0033112,
	/	/	FBgn0002930, FBgn0032178, FBgn0044011, FBgn0024293, FBgn0024294, FBgn0034195,
	/	/	FBgn0028986, FBgn0028987, FBgn0028988, FBgn0083141, FBgn0051902, FBgn0053121, FBgn0033113, FBgn0033574, FBgn0033115
CLIP-domain serine protease	S. fur-364. 6	NLU015564. 1, NLU008637. 5	FBgn0038727, FBgn0036891
	S. fur-389. 3		
	S. fur-745. 2	NLU028830. 1	FBgn0030927
	S. fur-49. 2	NLU018819. 2, NLU018820. 1	FBgn0035501, FBgn0052260
	S. fur-234. 17	NLU018349. 1, NLU016731. 1	FBgn0003450, FBgn0030051
	S. fur-54. 75		
	S. fur-9. 240		
	/	/	FBgn0085438
	/	/	FBgn0030925, FBgn0030926
	/	/	FBgn0039494, FBgn0039495

		/	/	FBgn0019929
		/	/	FBgn0039759, FBgn0039798
		/	/	FBgn0039758, FBgn0000533, FBgn0027930, FBgn0039102, FBgn0038250, FBgn0039101, FBgn0042106
		/	/	FBgn0051728
		/	/	/
		/	/	/
	bsk	S. fur-95. 52	NLU019825. 1	FBgn0000229
	Dark	/	/	FBgn0263864
	Dronc	/	/	FBgn0026404
	egr	S. fur-88. 72	/	FBgn0033483
	hep	S. fur-105. 58	NLU015503. 1	FBgn0010303
	Rho1	S. fur-15. 272	/	FBgn0014020
		S. fur-39. 58		
pattern recognition receptor	C-lectin	S. fur-115. 19	NLU015710. 1, NLU010305. 1	FBgn0001083
		S. fur-1233. 4	/	FBgn0035199
		S. fur-135. 14	NLU018769. 1	FBgn0038315
		S. fur-7. 132	NLU009485. 1	FBgn0037240, FBgn0034317, FBgn0034318
		S. fur-1591. 2	NLU005367. 1	FBgn0262720, FBgn0040502, FBgn0033067

	S. fur-20. 43	NLU018248. 1	FBgn0031629
	S. fur-276. 9		
	S. fur-925. 2	NLU016070. 1, NLU012907. 1	FBgn0031918
	S. fur-635. 1	NLU008455. 1	FBgn0038017
	S. fur-308. 14	NLU011397. 1, NLU025259. 1	FBgn0035031
	S. fur-438. 7	NLU009896. 1, NLU009897. 1	FBgn0030617
	/	/	FBgn0029814, FBgn0261258
	/	/	FBgn0053533, FBgn0040093, FBgn0040092, FBgn0030050, FBgn0262357, FBgn0259958, FBgn0053532, FBgn0016675, FBgn0040104, FBgn0264341, FBgn0259230, FBgn0040102, FBgn0040099, FBgn0031910, FBgn0031373, FBgn0040503, FBgn0040107, FBgn0040106, FBgn0031273, FBgn0040097, FBgn0040098, FBgn0015583
	/	/	FBgn0054033, FBgn0040096, FBgn0031879
	/	/	FBgn0031571, FBgn00327

			70
GNBP	S. fur-168. 43	NLU026651. 1	/
	S. fur-449. 5	NLU018508. 1, NLU022390. 1, NLU 029010. 1	/
	S. fur-186. 24	NLU006102. 1, NLU014039. 2	FBgn0040322 (GNBP2)
	S. fur-71. 64		
	/	/	FBgn0040323 (GNBP1)
	/	/	FBgn0040321 (GNBP3)
	/	/	/
	/	/	/
PGRP-LC	S. fur-122. 48	NLU001564. 1	FBgn0035976
PGRP-LB	S. fur-20. 196	NLU006527. 1	FBgn0037906
PGRP-LA	/	/	FBgn0035975
PGRP-LD	/	/	FBgn0260458
PGRP-LE	/	/	FBgn0030695
PGRP-LF	/	/	FBgn0035977
PGRP-SA	/	/	FBgn0030310
PGRP-SB1	/	/	FBgn0043578
PGRP-SB2	/	/	FBgn0043577
PGRP-SC1a	/	/	FBgn0043576
PGRP-SC1b	/	/	FBgn0033327
PGRP-SC2	/	/	FBgn0043575
PGRP-SD	/	/	FBgn0035806



	Draper	S. fur-78. 16	NLU010296. 1	FBgn0027594
	dscam	S. fur-115. 24	NLU015558. 1, NLU025113. 1	/
		S. fur-160. 34	NLU001230. 1	/
		S. fur-17. 263	NLU024552. 1	/
		S. fur-205. 33	NLU026279. 1	/
		S. fur-413. 23	NLU002721. 1	FBgn0263218 (Dscam2)
		S. fur-79. 65	/	FBgn0263219 (Dscam4)
		/	NLU012705. 3	FBgn0033159 (Dscam1)
		/	/	FBgn0261046 (Dscam3)
		/	/	/
	Eater	S. fur-13. 168	NLU028308. 1	FBgn0243514
	galectin	S. fur-133. 5	/	/
		S. fur-169. 42	NLU004153. 1	FBgn0031213, FBgn0031214
		S. fur-9. 77	NLU014787. 2	FBgn0052226
		/	/	FBgn0031289, FBgn0034365
		/	/	FBgn0038419
	hemocytin	S. fur-199. 20	NLU018484. 2	FBgn0029167
		S. fur-769. 5		
defense response to virus	Atg18a	S. fur-78. 63	NLU020875. 1	FBgn0035850
	Atg7	S. fur-146. 38	NLU009932. 1	FBgn0034366
		S. fur-602. 5		

	CG10333	S. fur-347. 22	NLU014381. 1	FBgn0032690
	CG12780	/	/	FBgn0033301
	me31B	S. fur-169. 35	NLU015620. 3	FBgn0004419
	Mt2	S. fur-3. 151	/	FBgn0028707
	Toll-7	S. fur-11. 171	NLU009021. 1	FBgn0034476
	Toll-6	S. fur-176. 31	NLU008392. 1	FBgn0036494
	Toll-8	S. fur-29. 104	NLU027363. 1	FBgn0029114
	Toll-10	S. fur-230. 19	NLU022764. 1	/
	Toll-13	S. fur-122. 298	NLU027922. 1	/
	Toll-2	/	/	FBgn0004364
	Toll-3	/	/	FBgn0015770
	Toll-4	/	/	FBgn0032095
	Toll-5	/	/	FBgn0026760
	Toll-9	/	/	FBgn0036978
	DIP1	/	NLU014786. 1	FBgn0024807
	FoxK	S. fur-72. 391	NLU006150. 1	FBgn0036134
	G9a	S. fur-11. 142	NLU019099. 2	FBgn0040372
antimicrobial humoral response	alphaTub84B	S. fur-114. 27	NLU005428. 1, NLU004930. 1	/
		S. fur-45. 44	NLU007674. 1, NLU010638. 1	/
		S. fur-450. 13	/	FBgn0003884 (alphaTub8 4B)
		S. fur-22. 63	/	FBgn0003886 (alphaTub8 5E)
		S. fur-214. 43, S. fur-9. 290	NLU005541. 1, NLU009958. 1, NLU	FBgn0087040 (alphaTub6

		020924. 1, NLU008983. 1	7C)
	/	/	FBgn0003885 (alphaTub8 4D)
cad	/	NLU005601. 1	FBgn0000251
Dlg5	S. fur-33. 149	NLU006162. 1, NLU022716. 1	FBgn0032363
dos	S. fur-19. 265	NLU009379. 1	FBgn0016794
dup	/	NLU015058. 1, NLU015059. 1	FBgn0000996
E2f1	/	NLU014009. 1	FBgn0011766
Eip75B	S. fur-40. 72	NLU006196. 1	FBgn0000568
IMPPP	/	/	FBgn0033835
kay	/	/	FBgn0001297
lola	S. fur-124. 39	NLU007358. 1	FBgn0005630
lysozyme	S. fur-11. 139	NLU018928. 1	FBgn0035813
	S. fur-145. 15	NLU013788. 1	/
	S. fur-53. 22	NLU027010. 1	/
	S. fur-85. 10	NLU021394. 1, NLU008673. 1	/
	S. fur-85. 9		/
	/	NLU017394. 1	FBgn0025827, FBgn0034162, FBgn0034165, , FBgn0046999
	/	/	FBgn0034539, FBgn0029765, FBgn0034538

	/	/	FBgn0004425, FBgn0004426, FBgn0004427, FBgn0004428, FBgn0004429, FBgn0004430, FBgn0004431, FBgn0050062, FBgn0034092
	/	/	/
mbo	S. fur-7. 118	/	FBgn0026207
MED25	/	NLU002125. 3, NLU023106. 1	FBgn0038760
Mef2	S. fur-35. 38	NLU018410. 1, NLU018409. 1	FBgn0011656
Ntf-2	S. fur-9. 95	NLU013180. 3	FBgn0031145
par-1	S. fur-14. 79	NLU011670. 2, NLU011671. 1	FBgn0260934
Parp	S. fur-72. 107	NLU018225. 1, NLU027931. 1	FBgn0010247
PCNA	S. fur-74. 129	NLU007941. 1	FBgn0005655
smog	S. fur-56. 66	NLU022287. 1, NLU028367. 1	FBgn0051660
Ptip	S. fur-49. 48	NLU019373. 1	FBgn0052133
Pvr	S. fur-27. 55	NLU002246. 1, NLU004968. 1	FBgn0032006
	S. fur-170. 3		
Rab11	S. fur-13. 193	NLU026714. 1	FBgn0015790
scrib	S. fur-347. 18	NLU017397. 1	FBgn0263289
Spt6	S. fur-98. 17	NLU022796. 3	FBgn0028982
Tep1	S. fur-70. 51	NLU024076. 1	FBgn0041183
Tep2			FBgn0041182

	Tep3			FBgn0041181
	Tep4			FBgn0041180
	Thor	S. fur-207. 15	NLU001242. 1, NLU015401. 1	FBgn0261560
	Tlk	S. fur-682. 3	/	FBgn0086899
	Vps15	S. fur-270. 24	NLU026186. 1, NLU002513. 1	FBgn0260935
	vvl	S. fur-250. 11	NLU025618. 1	FBgn0086680
	zfh1	S. fur-36. 98	NLU017934. 2	FBgn0004606
antimicrobial peptide	Attacin-A	/	/	FBgn0012042
	Attacin-B	/	/	FBgn0041581
	Attacin-C	/	/	FBgn0041579
	Attacin-D	/	/	FBgn0038530
	Cecropin A1	/	/	FBgn0000276
	Cecropin A2	/	/	FBgn0000277
	Cecropin B	/	/	FBgn0000279
	Cecropin C	/	/	FBgn0000278
	Defensin	S. fur-10. 120	NLU011311. 1, NLU007940. 1	FBgn0010385
		S. fur-33. 51		
	Diptericin A	/	/	FBgn0004240
	Diptericin B	/	/	FBgn0034407
	Drosocin	/	/	FBgn0010388
	Drosomycin	/	/	FBgn0010381
Drosomycin-like 1	/	/	FBgn0052274	

	Drosomycin-like 2	/	/	FBgn0052279
	Drosomycin-like 3	/	/	FBgn0052283
	Drosomycin-like 4	/	/	FBgn0052282
	Drosomycin-like 5	/	/	FBgn0035434
	Drosomycin-like 6	/	/	FBgn0052268
	Metchnikowin	/	/	FBgn0014865
	NOS	S. fur-9. 52	NLU025650. 1	FBgn0011676
encapsulation of foreign target	alpha-Man-Ia	S. fur-17. 159	NLU026219. 1	FBgn0259170
	alpha-Man-Ib	S. fur-241. 29	NLU014338. 1	FBgn0039634
		S. fur-489. 8		
	alpha-Man-IIa	S. fur-39. 3	NLU004974. 2	FBgn0011740
	alpha-Man-IIb	S. fur-129. 28	NLU011543. 1, NLU023574. 1	FBgn0026616
		/		
		S. fur-825. 7		
		S. fur-70. 20		
	Als2	S. fur-494. 2	NLU012777. 1, NLU012778. 1	FBgn0037116
	aPKC	S. fur-116. 56	NLU007726. 1	FBgn0261854
	Cdc42	S. fur-171. 14	NLU025556. 1	FBgn0010341
	Cdk5	S. fur-50. 56	NLU014959. 1	FBgn0013762
	Cdk5alpha	S. fur-150. 22	NLU001312. 1, NLU005199. 1	FBgn0027491
		S. fur-150. 19		
DCTN1-p150	S. fur-85. 11	NLU008672. 1	FBgn0001108	
DCX-EMAP	S. fur-518. 5	NLU003351. 1	FBgn0259099	
Dhc64C	S. fur-63. 19	NLU017272. 1, NLU017748. 1, NLU005440. 1	FBgn0261797	

	dia	S. fur-20. 194	NLU006524. 1	FBgn0011202
	Eb1	/	NLU007853. 3	FBgn0027066
	Eph	S. fur-18. 207	NLU018445. 1, NLU018446. 1	FBgn0025936
	Ephrin	S. fur-15. 173	NLU007920. 1	FBgn0040324
	Exn	S. fur-877. 3	NLU011083. 1	FBgn0261547
	Flo2	S. fur-229. 21	NLU012648. 1	FBgn0264078
	Itgbn	/	/	FBgn0010395
	LanA	S. fur-359. 5	/	FBgn0002526
	Mgat1	/	NLU007274. 1	FBgn0034521
	OstDelta	S. fur-223. 18	NLU015744. 1	FBgn0034277
	Ostgamma	S. fur-324. 8	NLU017277. 1	FBgn0032015
	poly	/	/	FBgn0086371
	RhoBTB	S. fur-33. 154	NLU011755. 1	FBgn0036980
	RhoGEF3	S. fur-18. 90	NLU007117. 1	FBgn0264707
	RhoL	/	/	FBgn0014380
	Shc	S. fur-11755. 1	NLU026268. 1	FBgn0015296
		S. fur-54. 85		
		S. fur-54. 99		
	Vav	S. fur-23. 69	NLU028815. 2	FBgn0040068
	Zir	S. fur-1433. 1	NLU003059. 2, NLU010547. 1	FBgn0031216
		S. fur-440. 5		
phagocytosis	crq	S. fur-51. 4	NLU006788. 1	FBgn0015924
		/	/	/
		S. fur-13. 116	NLU028772. 1	/
		/	/	FBgn0025697

	Rac1	/	/	FBgn0010333
	brm	S. fur-108. 44	NLU011826. 1, NLU022334. 1, NLU014082. 1	FBgn0000212
		S. fur-598. 8		
	EcR	S. fur-50. 12	NLU001978. 1	FBgn0000546
	Jra	/	NLU005583. 1, NLU018476. 1	FBgn0001291
	pnt	S. fur-57. 78	NLU015813. 2	FBgn0003118
	betaCOP	S. fur-431. 10	NLU010209. 1	FBgn0008635
	Syx5	/	NLU017315. 1	FBgn0011708
	gcm	S. fur-28. 6	/	FBgn0014179
		S. fur-84. 70		
	Trn	S. fur-69. 5	NLU011103. 1	FBgn0024921
	DMAP1	S. fur-85. 55	NLU010679. 1	FBgn0034537
	Nup98-96	S. fur-16. 163	NLU007944. 1	FBgn0039120
		S. fur-1672. 1		
		S. fur-1251. 1		
	psidin	/	NLU012476. 2	FBgn0243511
	kuz	S. fur-192. 21	NLU006855. 1	FBgn0259984
mucosal immune response	bbg	S. fur-38. 58	NLU017024. 1	FBgn0087007
	Duox	S. fur-829. 6	NLU016480. 1, NLU016482. 1	FBgn0031464
		S. fur-921. 1		
	Galphaq	S. fur-72. 236	NLU015017. 2	FBgn0004435
	lic	S. fur-14. 118	NLU003122. 1	FBgn0261524
	Mekk1	S. fur-17. 172	NLU002028. 1	FBgn0024329
	Mkp3	S. fur-67. 335	NLU004064. 1	FBgn0036844
norpA	S. fur-268. 14	/	/	



		S. fur-68. 11	/	/
		S. fur-226. 20	NLU020344. 3	FBgn0004611
		/	/	FBgn0262738
		/	/	/
		/	/	/
		/	NLU005122. 2, NLU019427. 2	/
	p38a	S. fur-17. 307	NLU014343. 1	FBgn0015765
	p38b			FBgn0024846
negative regulation of immune response	Atg6	S. fur-596. 2	NLU024452. 1	FBgn0264325
	dnr1	S. fur-20. 247	NLU011940. 1	FBgn0260866
	Dsp1	S. fur-246. 15	NLU015101. 1, NLU021892. 1	FBgn0011764
		S. fur-246. 14		
	faf	S. fur-8. 174	NLU006079. 2, NLU012546. 1, NLU 021571. 1	FBgn0005632
	GlyP	S. fur-487. 5	NLU021959. 1	FBgn0004507
	Gst02	/	NLU027429. 1	FBgn0035906
	Lam	S. fur-197. 34	NLU027896. 1	FBgn0002525
	MED6	S. fur-295. 17	NLU019881. 1	FBgn0024330
		S. fur-951. 1		
	Nxt1	/	/	FBgn0028411
	Prx5	S. fur-68. 55	NLU020315. 1	FBgn0038570
	Rala	S. fur-727. 2	/	FBgn0015286
RYBP	S. fur-7. 142	NLU003809. 1	FBgn0034763	
sax	S. fur-20. 106	/	FBgn0003317	

	scny	S. fur-84. 32	NLU007457. 1	FBgn0260936
	slif	S. fur-230. 42	NLU019298. 1, NLU020309. 1	/
		S. fur-50. 193	NLU023326. 1	FBgn0036493, FBgn0036764
		S. fur-345. 27	NLU000066. 1, NLU020081. 1	/
		/	/	FBgn0037203
		/	/	/
	SP2353	S. fur-197. 44	/	FBgn0034070
	tefu	S. fur-158. 19	NLU004916. 1, NLU028531. 1	FBgn0045035
	Tim10	S. fur-338. 15	/	FBgn0027360
	unc-45	S. fur-97. 14	NLU005097. 1	FBgn0010812
	Usp2	S. fur-20. 70	NLU013381. 1	FBgn0031187
	<b>Nrf2</b>	S. fur-9. 282	NLU002199. 1	FBgn0262975
	wun	S. fur-273. 10	NLU004856. 2	FBgn0016078
positive regulation of immune response	akirin	/	/	FBgn0082598
	att-ORFA	S. fur-622. 8	NLU019757. 1	FBgn0067783
	CG13994	/	/	FBgn0031772
	CG17680	/	/	FBgn0062440
	CG2051	S. fur-16. 19	NLU023404. 1	FBgn0037376
	CG32795	S. fur-32. 48	NLU021502. 1	FBgn0040384
	CG9925	/	/	FBgn0038191
	chico	S. fur-77. 62	NLU003485. 1, NLU024952. 1	FBgn0024248
	Crag	S. fur-89. 92	NLU026389. 1	FBgn0025864
	Etl1	S. fur-181. 1	NLU020728. 1	FBgn0032157
	HBS1	S. fur-134. 8	NLU014461. 1	FBgn0042712

	Hr78	S. fur-162. 14	NLU015534. 1	FBgn0015239
	ht1	S. fur-27. 19	/	FBgn0005592, FBgn0010389
	Ide	S. fur-36. 56	NLU013696. 3	FBgn0001247
	kug	S. fur-369. 15	NLU005127. 1, NLU018506. 1, NLU018507. 1	FBgn0001075
		S. fur-316. 19	NLU008341. 1	/
		S. fur-6. 221	NLU010443. 1, NLU016499. 1	/
		S. fur-316. 13	NLU015764. 1,	FBgn0000497
		S. fur-6. 194	NLU007013. 1	/
		/	/	FBgn0261574
	LanB1	S. fur-24. 172	NLU025937. 2	FBgn0261800
	Mmp2	S. fur-259. 18	NLU025213. 1	FBgn0033438
	mtd	S. fur-8. 143	NLU003015. 1, NLU003011. 1, NLU003010. 1	FBgn0013576
	Nsun5	/	/	FBgn0259704
	PDCD-5	S. fur-169. 12	NLU008889. 1	FBgn0036580
	Pplalpha-96A	/	NLU011463. 1	FBgn0003134
	puc	S. fur-167. 52	NLU023509. 1, NLU016695. 1	FBgn0243512
	RluA-2	/	NLU002857. 1	FBgn0032256
	Sec31	S. fur-11. 25	NLU003794. 1, NLU003795. 1	FBgn0033339
immune response	Atf3	S. fur-125. 49	NLU020429. 1	FBgn0028550
	cher	S. fur-7. 140	NLU003806. 1	FBgn0014141
	CSN5	S. fur-44. 49	NLU027652. 1	FBgn0027053
	Deaf1	S. fur-438. 6	NLU009895. 1	FBgn0013799

	Dlip3	/	/	FBgn0040465
	eya	S. fur-20. 138	NLU019650. 1	FBgn0000320
	modSP	S. fur-102. 37	NLU026230. 2	FBgn0051217
		S. fur-79. 44		
	POSH	/	NLU011904. 2, NLU024807. 1	FBgn0040294
	Reeler	S. fur-159. 27	NLU024648. 1	FBgn0039648, FBgn0261534
	Uba2	S. fur-594. 3	NLU006181. 1	FBgn0029113
		S. fur-691. 11		
	Vps16B	S. fur-97. 22	NLU025446. 3	FBgn0039702
	Vps33B	S. fur-107. 10	/	FBgn0039335
Caspase	Caspase	S. fur-17. 341	NLU005472. 1	FBgn0028381
	Caspase	S. fur-6. 178	NLU005810. 1	FBgn0026404
	Caspase	S. fur-1194. 2	NLU006137. 1	FBgn0036967
	Caspase	S. fur-23. 136	NLU002884. 1	FBgn0010501
	Caspase	S. fur-739. 1	/	FBgn0019972
	Caspase	S. fur-460. 16	/	FBgn0036449
	Caspase	S. fur-24. 353	/	FBgn0028406
	Caspase	/	/	FBgn0033051
	Caspase	/	/	FBgn0033659
	Caspase	/	/	FBgn0033661
	Caspase	/	/	FBgn0020381
Catalase	Catalase	/	/	FBgn0038465
	Catalase	S. fur-314. 12	NLU001797. 1	FBgn0000261
Fibrinogen-like	Fibrinogen-like	/	/	FBgn003016

Proteins	Proteins			FBgn0030164
	Fibrinogen-like Proteins	/		FBgn0031804 FBgn0050281
	Fibrinogen-like Proteins	/	/	FBgn0033312 FBgn0034160 FBgn0050280
	Fibrinogen-like Proteins	S. fur-418. 10	NLU010459. 1	
	Fibrinogen-like Proteins	S. fur-72. 247	NLU023744. 1	
	Fibrinogen-like Proteins	/	/	
	Fibrinogen-like Proteins	/	/	
	Fibrinogen-like Proteins	/	/	FBgn0087011
	Fibrinogen-like Proteins	/	/	FBgn0038365
	Fibrinogen-like Proteins	/	/	FBgn0003326
IAP Repeat	IAP Repeat	/	/	FBgn0037808
	IAP Repeat	S. fur-234. 14	NLU004965. 1	FBgn0260635
	IAP Repeat	S. fur-119. 29	NLU001578. 1	FBgn0015247
	IAP Repeat	/	/	FBgn0264291
MD-2-related lipid recognition	MD-2-related lipid recognition	/	/	FBgn0031381
	MD-3-related	/	/	FBgn0039801

	lipid recognition			
	MD-4-related lipid recognition	/	/	FBgn0051410
	MD-5-related lipid recognition	/	/	FBgn0037783
	MD-6-related lipid recognition	/	/	FBgn0037782
	MD-7-related lipid recognition	/	/	FBgn0038198
	MD-8-related lipid recognition	S. fur-283. 24	/	FBgn0039154
	MD-9-related lipid recognition	/	/	FBgn0039800
	MD-10-related lipid recognition	/	/	FBgn0039801
	MD-11-related lipid recognition	/	/	FBgn0039801
Scavenger Receptors	Scavenger Receptors	/	/	FBgn0015924
	Scavenger Receptors	/	/	FBgn0025697
	Scavenger Receptors	S. fur-28. 74	NLU001450. 2	FBgn0010435
	Scavenger Receptors	S. fur-65. 66	NLU016424. 2	FBgn0014033
	Scavenger	S. fur-101. 93	NLU015195. 1	FBgn0020377

	Receptors			
	Scavenger Receptors	S. fur-84. 65	NLU029081. 1	FBgn0031547
	Scavenger Receptors	S. fur-38. 96	NLU017261. 1	FBgn0020376
	Scavenger Receptors	S. fur-982. 3	NLU011924. 1	FBgn0034660
	Scavenger Receptors	S. fur-113. 6	NLU028762. 1	FBgn0027562
	Scavenger Receptors	S. fur-74. 3	NLU005452. 1	FBgn0023479
	Scavenger Receptors	S. fur-168. 24	NLU009452. 1	FBgn0031571
	Scavenger Receptors	S. fur-17. 355	NLU020729. 3	FBgn0260004
	Scavenger Receptors	S. fur-15. 137	NLU009453. 1	FBgn0033192
	Scavenger Receptors	S. fur-1. 36	NLU016193. 1	FBgn0035091
	Scavenger Receptors	S. fur-15. 133	NLU011927. 1	FBgn0058006
	Scavenger Receptors	/	/	FBgn0035815
	Scavenger Receptors	/	/	FBgn0035090
Spatzle	Spatzle	S. fur-54. 115	NLU023813. 1	FBgn0003495

	Spatzle	S. fur-5. 212	NLU021599. 1	FBgn0035056
	Spatzle	S. fur-24. 293	NLU021391. 1	FBgn0031959
	Spatzle	S. fur-166. 29	NLU021217. 1	FBgn0035379
	Spatzle	S. fur-261. 1	NLU009098. 1	FBgn0052343
	Spatzle	S. fur-72. 508	NLU004373. 1	FBgn0032362
	Spatzle	S. fur-33. 150	NLU006163. 1	FBgn0085438
	Spatzle	/	NLU019692. 1	FBgn0039102
	Spatzle	/	NLU021596. 1	/
Superoxide dismutase	Superoxide dismutase	S. fur-13. 25	/	/
	Superoxide dismutase	S. fur-41. 88	/	FBgn0034962
	Superoxide dismutase	S. fur-8. 79	/	FBgn0039386
	Superoxide dismutase	S. fur-23. 71	NLU015321. 2	FBgn0003462
	Superoxide dismutase	S. fur-33. 90	NLU000900. 1	FBgn0010213
	Superoxide dismutase	S. fur-67. 126	NLU014615. 1	FBgn0033631
	Superoxide dismutase	S. fur-67. 143	NLU011195. 1	FBgn0052850
Thioester-contain ing protein	Thioester-contain ing protein	S. fur-70. 51	NLU024076. 1	FBgn0041180
	Thioester-contain ing protein	/	NLU015403. 1	FBgn0041182



	Thioester-containing protein	/	/	FBgn0041181
	Thioester-containing protein	/	/	FBgn0041183
	Thioester-containing protein	/	/	FBgn0039854
	Thioester-containing protein	/	/	FBgn0039855
peroxidase	peroxidase	S. fur-219. 18	NLU019777. 1	FBgn0038511
	peroxidase	S. fur-126. 46	NLU001846. 1	FBgn0010053
	peroxidase	S. fur-46. 51	NLU003657. 1	FBgn0035438
	peroxidase	S. fur-77. 96	NLU020527. 1	FBgn0031464
	peroxidase	S. fur-18. 30	NLU024356. 2	FBgn0032685
	peroxidase	S. fur-120. 36	NLU021034. 1	FBgn0040309
	peroxidase	S. fur-273. 7	NLU011776. 1	FBgn0038519
	peroxidase	S. fur-47. 125	NLU015971. 1	FBgn0040305
	peroxidase	S. fur-30. 107	NLU026271. 1	FBgn0037102
	peroxidase	S. fur-15. 277	NLU025371. 1	FBgn0040308
	peroxidase	S. fur-65. 41	NLU026550. 1	FBgn0259233
	peroxidase	S. fur-17. 242	NLU003276. 1	FBgn0033520
	peroxidase	S. fur-430. 8	NLU021340. 1	FBgn0033521
	peroxidase	S. fur-6. 74	NLU004434. 1	FBgn0033518
	peroxidase	S. fur-22. 68	NLU016990. 1	FBgn0031479
	peroxidase	S. fur-128. 19	NLU006818. 1	FBgn0038465
peroxidase	S. fur-22. 79	NLU019027. 2	FBgn0011828	

**Table S3. Summary of the 11 RNA-seq libraries used in this study**

Sample		Clean Reads	Clean Base (G)	Total Genome Map reads	Total Genome Map Rate (%)	Uniq Genome Map Reads	Uniq Genome Map Rate (%)	SRBSDV Map Rate (%)	Total mapping (%)
HVT	C1	22,037,322	6.04	4,828,667	21.91%	3,050,280	13.84%	38.31%	60.22%
	C2	24,570,532	6.68	5,831,096	23.73%	3,226,271	13.13%	26.70%	50.43%
MVT	A1	32,580,835	8.96	7,366,039	22.61%	4,124,258	12.66%	25.35%	47.96%
	A2	27,972,323	7.70	6,443,219	23.03%	3,327,296	11.89%	23.30%	46.33%
	A3	28,857,802	7.91	7,651,278	26.51%	4,250,958	14.73%	15.53%	42.04%
NVF	B1	32,940,740	8.92	20,507,542	62.26%	10,686,618	32.44%	0.12%	62.38%
	B2	29,828,260	8.00	17,682,796	59.28%	9,013,809	30.22%	0.13%	59.41%
	B3	33,855,507	9.25	15,111,096	44.63%	9,008,779	26.61%	0.16%	44.79%
Healthy	O1	19,263,210	5.30	11,875,751	61.65%	8,717,036	45.25%	0.09%	61.74%
	O2	19,934,219	5.49	12,153,259	60.97%	8,134,962	40.81%	0.09%	61.06%
	O3	20,968,250	5.76	12,795,336	61.02%	9,040,440	43.11%	0.07%	61.09%

**Table S4. The down- regulated and up-regulated immune-related genes in NVF, MVT and HVT**

Down/Up-regulated	Gene ID	Gene name	NFV	MVT	HVT
	Sfur-10.120	Defensin	Yes	No	Yes
	Sfur-107.10	immune response	Yes	Yes	Yes
	Sfur-166.29	Spatzle	No	Yes	Yes
	Sfur-18.207	encapsulation of foreign target	No	Yes	No
	Sfur-184.28	IMD signaling pathway	No	Yes	No
	Sfur-197.44	negative regulation of immune response	No	Yes	Yes
	Sfur-219.18	Peroxidase	Yes	Yes	Yes
	Sfur-22.68	Peroxidase	Yes	Yes	Yes
	Sfur-22.79	Peroxidase	Yes	Yes	Yes
Down-regulated		negative regulation of immune response			
	Sfur-295.17	response	Yes	No	No
	Sfur-430.8	Peroxidase	No	Yes	No
	Sfur-49.2	CLIP-domain serine protease	No	Yes	No
	Sfur-54.75	CLIP-domain serine protease	Yes	No	No
	Sfur-602.5	Atg7	No	No	Yes
	Sfur-65.41	Peroxidase	No	Yes	No
	Sfur-67.126	Superoxide dismutase	Yes	Yes	Yes
	Sfur-74.3	Scavenger Receptors	Yes	Yes	Yes
	Sfur-829.6	mucosal immune response	Yes	Yes	Yes
	Sfur-925.2	C-lectin	No	Yes	No
Up-regulated	Sfur-11755.1	encapsulation of foreign target	No	Yes	Yes

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Sfur-126.46	Peroxidase	Yes	No	No
Sfur-24.293	Spatzle	Yes	No	No
Sfur-2570.1	Serpin	Yes	Yes	Yes
Sfur-335.4	Serpin	No	Yes	No
Sfur-377.2	Serpin	No	No	Yes
Sfur-418.10	Fibrinogen-like Proteins	Yes	No	No
Sfur-54.85	encapsulation of foreign target	Yes	Yes	Yes

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