Table S1. Module preservation statistics across acoustic stimulations

Reference	Test	Module	Zsummary	Zdensity	Zconnectivity	medianRank	moduleSize
PP40	NC	black	-1.172828043	-3.355243846	1.00958776	21	385
PP40	NC	blue	22.74226035	6.514490381	38.97003032	9	1000
PP40	NC	brown	18.14907612	2.74057249	33.55757974	10	889
PP40	NC	cyan	5.568473146	4.316730287	6.820216004	14	117
PP40	NC	darkgreen	-0.181482295	-1.315320881	0.95235629	21	49
PP40	NC	darkred	-0.315716626	-1.484920498	0.853487247	20	52
PP40	NC	gold	28.55656528	11.13525479	45.97787577	6	1000
PP40	NC	green	12.73072025	1.509133802	23.95230671	16	502
PP40	NC	greenyellow	7.580798797	2.623516835	12.53808076	10	149
PP40	NC	grey	-2.830169557	-5.835618168	0.175279054	24	536
PP40	NC	grey60	9.087841876	5.406025292	12.76965846	3	97
PP40	NC	lightcyan	2.507621897	-0.588114226	5.603358021	17	99
PP40	NC	lightgreen	6.029384539	2.050879892	10.00788919	6	94
PP40	NC	lightyellow	3.996837611	2.864562158	5.129113063	5	76
PP40	NC	magenta	6.28630336	-0.042181609	12.61478833	18	170
PP40	NC	midnightblue	4.420147116	0.475620497	8.364673735	11	99
PP40	NC	pink	10.77529743	6.753561833	14.79703303	4	178
PP40	NC	purple	6.223652916	0.573308998	11.87399684	13	170

PP40	NC	red	5.354417656	-0.601521799	11.31035711	18	479
PP40	NC	royalblue	2.942304316	3.203519857	2.681088775	18	56
PP40	NC	salmon	-1.070516296	-2.976750795	0.835718202	23	133
PP40	NC	tan	6.656207956	3.059356513	10.2530594	9	144
PP40	NC	turquoise	35.1418737	25.20500112	45.07874629	1	1000
PP40	NC	yellow	19.47813085	9.110691121	29.84557057	7	658
PP40	PP10	black	0.60447381	-2.405616978	3.614564599	22	385
PP40	PP10	blue	23.85105844	14.24826684	33.45385004	9	1000
PP40	PP10	brown	27.92571464	19.65124031	36.20018896	8	889
PP40	PP10	cyan	2.766931039	-0.622119164	6.155981242	20	117
PP40	PP10	darkgreen	3.878400935	1.681009905	6.075791965	15	49
PP40	PP10	darkred	0.351941244	-0.753836372	1.45771886	20	52
PP40	PP10	gold	24.03330646	9.644490581	38.42212233	11	1000
PP40	PP10	green	9.712111102	-0.234523791	19.658746	17	502
PP40	PP10	greenyellow	11.3118885	5.914821962	16.70895503	11	149
PP40	PP10	grey	-1.614753192	-5.572025954	2.34251957	24	536
PP40	PP10	grey60	10.20182453	7.811834875	12.59181419	5	97
PP40	PP10	lightcyan	6.924006257	5.705354339	8.142658176	8	99
PP40	PP10	lightgreen	11.19515764	14.55519561	7.835119679	4	94
PP40	PP10	lightyellow	9.457306013	8.313768991	10.60084304	2	76

PP40	PP10	magenta	10.45566484	4.079607191	16.83172248	12	170
PP40	PP10	midnightblue	10.87222394	8.05820169	13.68624619	3	99
PP40	PP10	pink	10.97063897	7.905008445	14.03626949	7	178
PP40	PP10	purple	8.53707026	2.695184542	14.37895598	15	170
PP40	PP10	red	2.5582337	-1.124525214	6.240992613	19	479
PP40	PP10	royalblue	2.255083451	0.939523978	3.570642924	17	56
PP40	PP10	salmon	3.611606392	6.148555115	1.074657669	22	133
PP40	PP10	tan	6.219326756	2.715691922	9.722961589	16	144
PP40	PP10	turquoise	35.41934563	28.3801052	42.45858607	3	1000
PP40	PP10	yellow	22.8679067	10.91915358	34.81665982	10	658
PP40	PP80	black	-0.526624725	-2.26636882	1.213119369	21	385
PP40	PP80	blue	19.03624386	5.137333911	32.9351538	11	1000
PP40	PP80	brown	16.34756517	0.35882927	32.33630106	16	889
PP40	PP80	cyan	0.804432123	-1.925318514	3.53418276	21	117
PP40	PP80	darkgreen	6.091299046	3.983126598	8.199471494	10	49
PP40	PP80	darkred	4.709068518	5.240110543	4.178026493	8	52
PP40	PP80	gold	28.06940483	10.12085437	46.01795529	5	1000
PP40	PP80	green	17.80258003	10.64444811	24.96071196	6	502
PP40	PP80	greenyellow	13.81969676	8.799511792	18.83988173	3	149
PP40	PP80	grey	-2.861652052	-6.084623401	0.361319298	24	536

PP40	PP80	grey60	9.500779695	5.8787429	13.12281649	5	97
PP40	PP80	lightcyan	-0.876484309	-2.729132351	0.976163733	21	99
PP40	PP80	lightgreen	4.525687157	0.929407199	8.121967115	10	94
PP40	PP80	lightyellow	6.513671252	3.300286009	9.727056495	3	76
PP40	PP80	magenta	7.771732915	0.477394377	15.06607145	14	170
PP40	PP80	midnightblue	2.251047059	-0.688722968	5.190817086	16	99
PP40	PP80	pink	9.668914751	2.934070506	16.403759	6	178
PP40	PP80	purple	6.397126108	0.455187383	12.33906483	15	170
PP40	PP80	red	14.34763816	18.25399817	10.44127814	16	479
PP40	PP80	royalblue	3.856541761	4.822164953	2.890918569	18	56
PP40	PP80	salmon	-1.482375431	-3.068292368	0.103541505	23	133
PP40	PP80	tan	2.200476587	0.664314932	3.736638242	15	144
PP40	PP80	turquoise	35.74223903	26.55433826	44.9301398	2	1000
PP40	PP80	yellow	16.62862237	2.465282116	30.79196262	14	658

Table S2. Key Phenotypes in the *Drosophila* PPI Network

Phenotype	Discription	Count In Network	Strength	Fdr	Signal
FBcv:0000416	Uncoordinated	5 of 133	1.16	0.0022	0.8
FBcv:0000399	Abnormal courtship behavior	5 of 152	1.11	0.0022	0.78
FBcv:0000387	Abnormal behavior	8 of 424	0.86	0.0018	0.67
FBcv:0002030	Lethal - all die during pupal stage	3 of 90	1.11	0.0167	0.57
FBcv:0000388	Abnormal gravitaxis	2 of 37	1.32	0.0304	0.53
FBcv:0000430	Abnormal cell polarity	3 of 114	1.01	0.0244	0.5
FBcv:0000428	Abnormal cell size	5 of 306	0.8	0.0167	0.48
FBcv:0000424	Abnormal cell death	7 of 582	0.67	0.0122	0.45
FBcv:0000392	Increased rate of movement	2 of 55	1.15	0.0479	0.45
FBcv:0000359	Decreased cell number	6 of 522	0.65	0.0185	0.42
FBcv:0000425	Increased cell death	6 of 554	0.62	0.0225	0.39
FBcv:0000375	Semi-fertile	3 of 171	0.83	0.0494	0.39
FBcv:0000351	Lethal	23 of 4340	0.31	0.0022	0.34
FBcv:0002001	Lethal - all die before end of first instar larval stage	9 of 1185	0.47	0.0223	0.34
FBcv:0000709	Abnormal cell number	7 of 826	0.52	0.0307	0.34
FBcv:0000435	Abnormal neuroanatomy	12 of 1836	0.4	0.0167	0.33
FBcv:0002005	Lethal - all die during P-stage	7 of 857	0.5	0.0347	0.33
FBcv:0002002	Lethal - all die before end of larval stage	13 of 2021	0.4	0.0167	0.32
FBcv:0002033	Lethal - all die during embryonic stage	8 of 1080	0.46	0.0346	0.31
FBcv:0002000	Lethal - all die before end of P-stage	17 of 3102	0.33	0.0139	0.3
FBcv:0002027	Lethal - all die before end of pupal stage	15 of 2600	0.35	0.0167	0.3
FBcv:0002015	Partially lethal	16 of 2917	0.33	0.0167	0.3
FBcv:0000385	Short lived	8 of 1170	0.42	0.0467	0.29
FBcv:0002019	Increased mortality during development	24 of 5330	0.24	0.0109	0.27
FBcv:0000352	Partially lethal - majority die	12 of 2142	0.34	0.0347	0.27

Table S3. Log2 Fold Changes and False Discovery Rates of *fruitless* Gene Expression in Cricket Across Multiple Comparisons

Gene ID	Description	HNC-vs-HCS	FDR	HNC-vs-HPP10	FDR	HNC-vs-HPP80	FDR	QNC-vs-QCS	FDR	QNC-vs-QPP10	FDR	QNC-vs-QPP80	FDR
GBIM_08079	Sex determination protein fruitless	-4.3219	0.9883 4612	-4.3219	0.9999 6029	-4.3219	0.9814 9265	-1.2224	0.9649 4332	-0.9005	0.9917 1827	-1	0.9836 4639
GBIM_08529	Sex determination protein fruitless	0.0408	0.9883 4612	-0.1103	0.9999 6029	-0.07	0.9873 3236	0.0682	0.9685 297	0.0943	0.9917 1827	0.0655	0.9836 4639
GBIM_14708	Fruitless B isoform	-0.1711	0.8432 9694	-0.0323	0.9999 6029	-0.19	0.9361 7481	0.2323	0.5001 5972	0.2903	0.5004 4527	-0.0363	0.9836 4639
GBIM_14709	Fruitless H1 isoform	-0.1641	0.9883 4612	-0.1492	0.9999 6029	-0.5277	0.8464 1482	0.0527	0.9865 0472	0.0703	0.9917 1827	0.2023	0.9704 807
GBIM_14710	Sex determination protein fruitless	-0.1365	0.8979 0798	-0.1127	0.9999 6029	-0.3761	0.4414 1236	0.1394	0.8139 8055	0.1989	0.8600 5202	0.0119	0.9998 9661

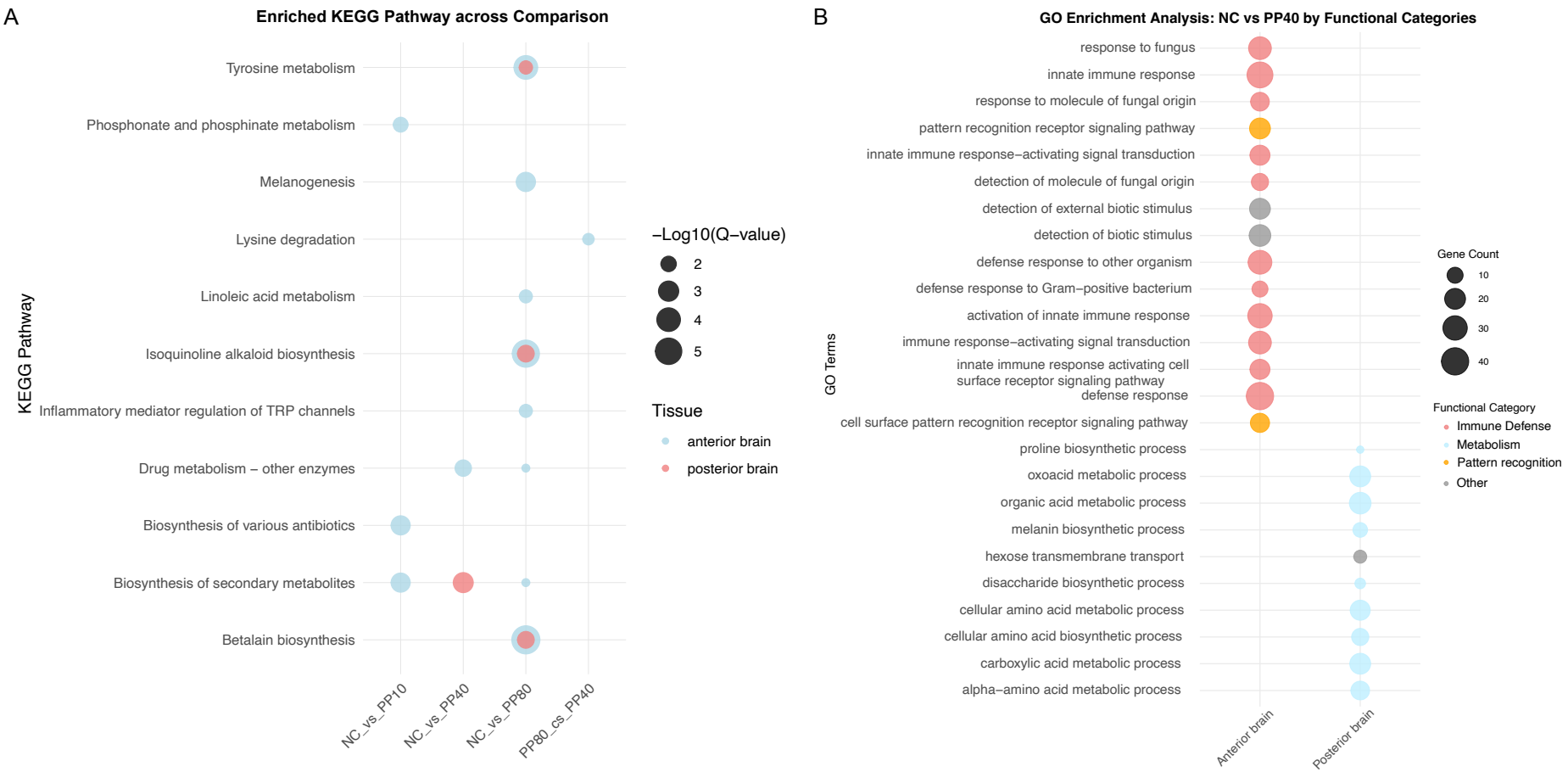


Figure S1. Region-Specific Molecular Responses to PP40 Stimulation. (A) KEGG pathway enrichment analysis in anterior and posterior brain regions; (B) GO enrichment analysis showing immune and metabolic processes.

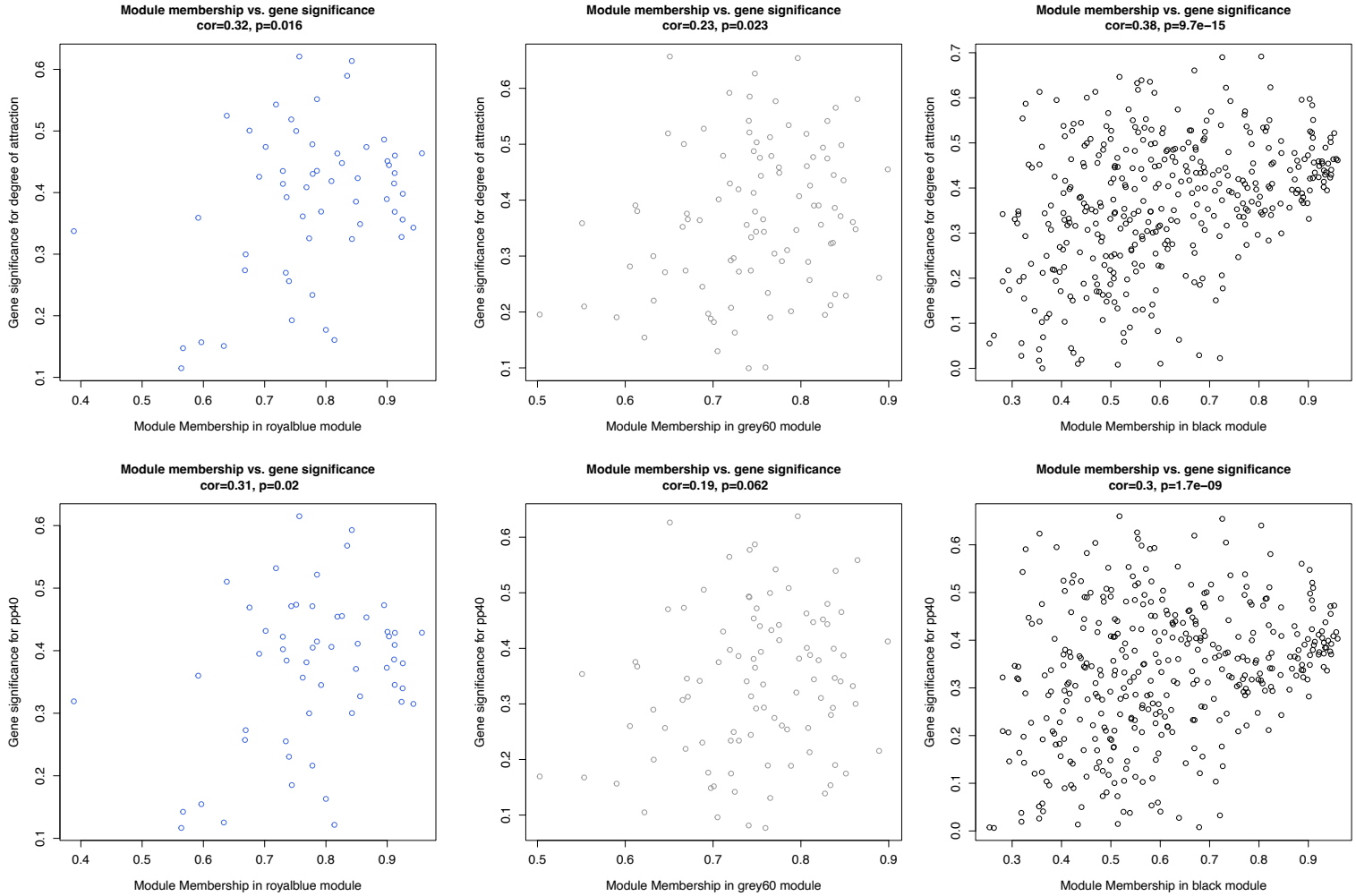


Figure S2. Gene Significance Correlates with Module Membership Across Three Co-Expression Modules.

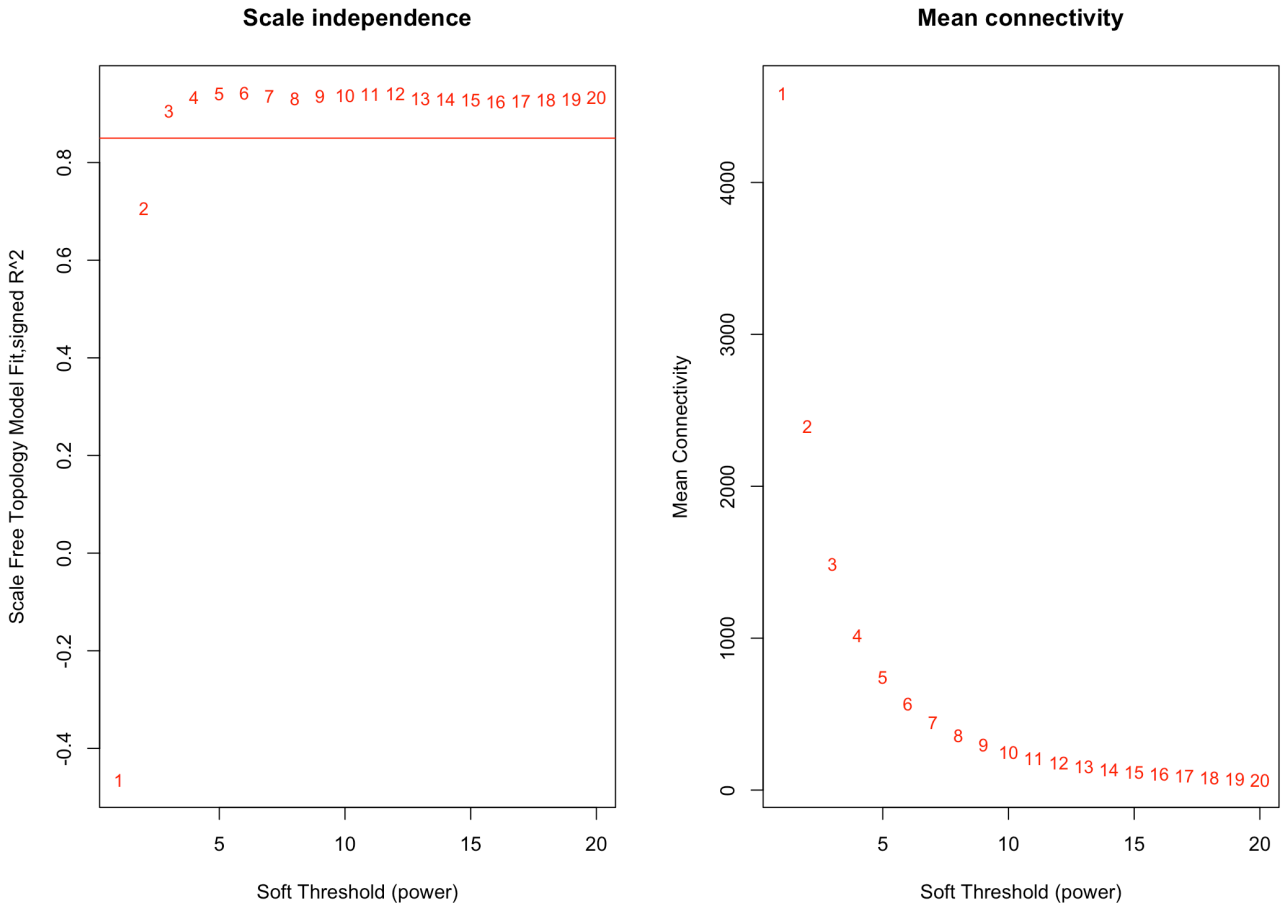


Figure S3. Determination of soft-thresholding power for WGCNA. (A) Scale-free topology model fit (R^2) as a function of soft-thresholding power. The red line indicates the threshold of $R^2 = 0.85$. Numbers indicate the corresponding soft-thresholding power. (B) Mean connectivity as a function of soft-thresholding power.