Supplementary Table 1:

#	Name	Description	d	E	L	MSSYEAPPMVGW	Alt	P-value
51	sw	Motor activity, protein binding	1367	14.2	9	●●●●●●●●●●●	D,A	$6{\cdot}10^{-18}$
52	GluClα	Transport, ion transport, receptor activity	7770	11.3	9	●●●●●●○○●●●●	A,T	$9.1{\cdot}10^{-18}$
53	sw	Motor activity, protein binding	1367	14.2	9	●●●●●●●●●●●	D,A	$9.7{\cdot}10^{-18}$
54	drpr	Phagocytosis, protein binding	5363	23.0	10	●●●●●○○○●●●●	MES,A	$1.3{\cdot}10^{-17}$
55	sls	Mitosis, locomotion, cell cycle, actin binding	3683	22.3	11	●●●●●●●●●	T	$1.5{\cdot}10^{-17}$
56	l(2)01289	Protein binding, isomerase activity	11345	16.8	10	●●●●●●●○●●	MES,A,T	$1.8{\cdot}10^{-17}$
57	CG9650	Protein binding, zinc ion binding	4954	22.8	10	●●●●○●●●●●●	ES,A	$1.9{\cdot}10^{-17}$
58	Sema-1a	Axon guidance, receptor activity	80	15.7	10	●●●●●●○○●●●○		$2.1{\cdot}10^{-17}$
59	CG1674	Protein binding	123	25.5	16	●●●○●●●●●	A	$2.7{\cdot}10^{-17}$
60	kis	DNA binding, ATP binding, ATPase activity	7777	20.6	13	●●●●●●●●●		$3.3{\cdot}10^{-17}$
61	CG33909	Unkown	40678	16.5	10	●○●●●●○○●○		$3.6{\cdot}10^{-17}$
62	CG31291	Protein binding	88	13.9	10	●●●●●○●●●●○		$5.7{\cdot}10^{-17}$
63	Rpb4	DNA binding, transcription, DNA-dependent	1738	17.1	11	●●●●●●●●●	MES,A	$1{\cdot}10^{-16}$
64	RpL23A	RNA binding, translation, RRNA binding	231	22.4	12	●●●●●●●●○○		$1.1{\cdot}10^{-16}$
65	CG33960	Receptor activity	937	15.3	9	●●●●●●●●●○		$1.2{\cdot}10^{-16}$
66	CG7841	Unkown	986	19.5	12	●●●●●●●●○●		$1.3{\cdot}10^{-16}$
67	Caki	ATP binding, cell adhesion, protein binding	246	24.3	14	●●●●●●●●○		$1.5{\cdot}10^{-16}$
68	numb	ATP binding, notch binding, protein binding	13345	18.0	9	●●●●●●●●●		$1.8{\cdot}10^{-16}$
69	RpL3	Translation, protein binding	189	22.0	13	●●●●●○●●●○●○	A,T	$1.9{\cdot}10^{-16}$
70	pdm3	DNA binding, DNA-dependent	212	19.4	12	●●●●●●●●●●●		$2.6{\cdot}10^{-16}$
71	CG31522	Protein binding, transferase activity	819	19.0	9	●○●●●○○●○●●	ES,A	$2.6{\cdot}10^{-16}$
72	Pez	Binding, protein binding, dephosphorylation	616	16.7	11	●●●●●○○●●●○		$2.8{\cdot}10^{-16}$
73	CadN	Axon guidance, cell adhesion, protein binding	4018	26.6	16	●●●●●●●●●●	ES,D	$3.5{\cdot}10^{-16}$
74	CLIP-190	Actin binding, cellularization, protein binding	403	15.1	10	●●●●○●●●●		$6.7{\cdot}10^{-16}$
75	CG6329	Unkown	2389	18.0	12	●●●●●●●○○○●	D	$7{\cdot}10^{-16}$
76	CG32176	Protein binding	1721	25.5	12	●●●●●○●●●●		$7.7{\cdot}10^{-16}$
77	CG30475	Unkown	358	17.6	9	●●●●●●●●○		$1{\cdot}10^{-15}$
78	CG16975	Oogenesis, DNA binding, transcription	354	23.3	15	●●●●●●●●●○○		$1.4{\cdot}10^{-15}$
79	CG3287	Unkown	563	24.2	11	●●●○●●●●●●	IR	$1.6{\cdot}10^{-15}$
80	CG31110	Dephosphorylation	20	17.8	10	●●●●●○●●●●●		$2{\cdot}10^{-15}$
81	CG12424	Unkown	5558	20.4	11	●●●●●●●●●●	D	$2.6{\cdot}10^{-15}$
82	CG7766	Calmodulin binding, catalytic activity	1014	16.8	11	●●●●●●●●○		$3.1{\cdot}10^{-15}$
83	crol	Ice binding, homoiothermy, cell adhesion	718	22.5	11	●●●●●●●●●●○	ES	$6.7{\cdot}10^{-15}$
84	mtacp1	Protein binding, cofactor binding	124	18.7	10	●●●●●●●●●●	ES,D	$8.1{\cdot}10^{-15}$
85	Glycogenin	Protein binding, mesoderm development	10476	17.7	11	●●●●●●●●○●	A,T	$1.2{\cdot}10^{-14}$
86	SNF4Aγ	Cholesterol homeostasis	16714	29.9	16	●●●●●●●●●		$1.2{\cdot}10^{-14}$
87	Gug	DNA binding, eye development, hydrolase activity	332	19.9	13	●●●●●●●●●●●	D	$1.3{\cdot}10^{-14}$
88	CG3332	Protein binding	541	13.4	9	●●●●●●●○○●	D,A	$2.1{\cdot}10^{-14}$
89	CG1998	Metabolic process, catalytic activity	691	23.2	11	●●○●●●●○○○		$2.3{\cdot}10^{-14}$
90	Nhe2	Transport, ion transport, regulation of pH	315	15.8	13	●●●●●●●●		$3.5{\cdot}10^{-14}$
91	Hr39	DNA binding, transcription, DNA-dependent	670	17.6	9	●●●○●●●●●	D	$7.4{\cdot}10^{-14}$
92	how	RNA binding, MRNA binding, cell adhesion	363	22.4	13	●●●●●●●●●		$1{\cdot}10^{-13}$
93	MED6	Transcription, DNA-dependent, protein binding	343	22.0	13	●●●●●○●●●●	D	$1.1{\cdot}10^{-13}$
94	CG17233	Unkown	556	15.6	10	●●●●●○●●●●●○		$1.3{\cdot}10^{-13}$
95	retn	Oogenesis, DNA binding, gliogenesis, transcription	113	17.0	9	●●●●●●○○●●●		$1.8{\cdot}10^{-13}$
96	CG33147	Transferase activity, sulfotransferase activity	184	17.1	10	●●●●●●●●○○●		$1.8{\cdot}10^{-13}$
97	CG7378	Dephosphorylation	260	15.9	9	●●●●●●●○○●○		$1.9{\cdot}10^{-13}$
98	seq	Axonogenesis, dendrite development	4501	15.1	9	●●●●●●●●●○	ES	$1.9{\cdot}10^{-13}$
99	l(2)01289	Protein binding, isomerase activity	4937	14.1	9	●●●●●○●○●●●	D,A,T	$2.6{\cdot}10^{-13}$
100	alan-shepard	RNA binding, nucleotide binding	1033	12.2	9	●●●●●●●●●●○	D	$3.7{\cdot}10^{-13}$
101	Antp	Thorax, DNA binding, antennal segment	9715	20.5	12	●●○○●○○●●●●	D,T	$4.4{\cdot}10^{-13}$
102	alan-shepard	RNA binding, nucleotide binding	1033	12.2	9	●●●●●●●●●●○	D	$4.8{\cdot}10^{-13}$
103	up	Myofibril assembly, muscle maintenance	1881	14.7	10	●●●●●●●●●○	D,A	$5.3{\cdot}10^{-13}$

Supplementary Table 1: (continued)

104	Syb	Lumen formation, open tracheal system	578	27.7	15	●●●●● ●●○○○○	A	$6.3{\cdot}10^{-13}$
105	Ada2b	DNA binding, DNA-dependent, transcription	287	13.4	9	●●●●●○○○●●○○	A	$9.1{\cdot}10^{-13}$
106	CG7191	Protein binding	395	16.7	10	●●●●●●●● ○○		$1{\cdot}10^{-12}$
107	CG32720	Unkown	644	17.2	10	●●●●●○●● ○○		$1{\cdot}10^{-12}$
108	heph	RNA binding, MRNA processing, protein binding	7505	21.0	11	●●●○●●○○○○○●		$1{\cdot}10^{-12}$
109	wupA	Actin binding, protein binding, heart development	5428	11.8	9	● ●●●●● ●○○	MES,D	$1.3{\cdot}10^{-12}$
110	cutlet	ATP binding, proteolysis, hydrolase activity	121	18.4	11	●●●●●●● ●●○○		$1.8{\cdot}10^{-12}$
111	CG15376	Protein binding	1304	28.6	14	●●●●●●●●○		$1.8{\cdot}10^{-12}$
112	shot	Axonogenesis, branch fusion, actin binding	74	20.3	11	●●●●●●●●○○		$1.9{\cdot}10^{-12}$
113	Usp7	Ubiquitin cycle, protein binding	169	14.5	9	●●●●● ●●		$2.3{\cdot}10^{-12}$
114	CG34394	Unkown	1358	13.1	9	●●●●●●○○ ○●●	ES	$2.6{\cdot}10^{-12}$
115	RpL13A	Translation, protein binding, bristle morphogenesis	223	15.7	10	●●●●●● ●○ ○		$3.7{\cdot}10^{-12}$
116	Tsp97E	Unkown	125	18.9	11	●●● ●●●●		$5{\cdot}10^{-12}$
117	para	Transport, ion transport, response to DDT	1482	17.2	9	● ●●●●●●		$5.1{\cdot}10^{-12}$
118	CG32048	Molecular function, biological process	2825	18.6	11	●●● ●●●●○ ○	D,A	$5.1{\cdot}10^{-12}$
119	slik	ATP binding, cytokinesis, kinase activity	604	23.0	11	●●●●●●●●○●	A	$5.6{\cdot}10^{-12}$
120	CG6043	Unkown	198	18.8	9	●○●●○● ○●○●●	A	$6.3{\cdot}10^{-12}$
121	sm	RNA binding, axon guidance, MRNA processing	928	10.9	9	●●●○●○●● ●	D	$7.5{\cdot}10^{-12}$
122	Ank2	Axon extension, protein binding	29194	25.9	13	● ●●●●●● ●	D,A	$7.7{\cdot}10^{-12}$
123	CG14235	Protein binding, electron transport	2939	13.8	9	●●●○●○●●○○○●	A,T	$9.1{\cdot}10^{-12}$
124	CG14235	Protein binding, electron transport	2939	13.8	9	●●●○●○●●○○○●	A,T	$9.5{\cdot}10^{-12}$
125	btsz	Transport, zinc ion binding, transporter activity	551	30.8	13	●●●●●●●●	A	$1{\cdot}10^{-11}$
126	Drl-2	ATP binding, kinase activity, nucleotide binding	4170	20.8	9	● ●●●●●● ○○		$1.2{\cdot}10^{-11}$
127	Prm	ATP binding, translation, motor activity	4175	23.1	11	●●●●●○ ● ●○		$1.2{\cdot}10^{-11}$
128	CG33995	Unkown	925	13.5	9	●●●●○●●●○○ ○	D	$2.7{\cdot}10^{-11}$
129	nudE	Mitosis, cell cycle, cell division, protein binding	141	13.4	9	●●●●●●○○● ○○		$2.8{\cdot}10^{-11}$
130	Octβ2R	Protein binding, receptor activity	3169	13.2	9	●●●●●●●●○○○○		$2.8{\cdot}10^{-11}$
131	fru	Mating, copulation, DNA binding, transcription	276	9.8	9	●●●●●●●●○ ○	A	$3.1{\cdot}10^{-11}$
132	eIF-1A	Engulfment, RNA binding, translation, phagocytosis	6438	16.9	11	●●●●● ●●○ ○○		$3.4{\cdot}10^{-11}$
133	byn	DNA binding, transcription, DNA-dependent	768	12.4	9	●●●●●●○○●		$3.4{\cdot}10^{-11}$
134	fra	Axon guidance, motor axon guidance	964	16.3	10	● ●●●●●● ○	A	$3.6{\cdot}10^{-11}$
135	bun	Oogenesis, segmentation, transcription	816	15.8	9	●●○●● ●● ●	IR	$4.7{\cdot}10^{-11}$
136	CG9850	Proteolysis, protein binding, zinc ion binding	688	14.7	9	●●●○●●● ●○ ●	A	$4.8{\cdot}10^{-11}$
137	CG4467	Proteolysis, zinc ion binding, hydrolase activity	8369	20.2	11	●●●●●○●●○		$5.7{\cdot}10^{-11}$
138	Syb	Lumen formation, open tracheal system	710	18.1	9	●●●●● ●●○ ○	A	$7.7{\cdot}10^{-11}$
139	Fmr1	Embryonic, chemotaxis, locomotion, phototaxis	1222	14.5	9	●●●●●●○○ ○●○		$8.3{\cdot}10^{-11}$
140	qkr54B	RNA binding	82	14.6	10	● ●●●●●●○○		$1{\cdot}10^{-10}$
141	CG14235	Protein binding, electron transport	2939	13.8	9	●●●●●○●●	A,T	$1.1{\cdot}10^{-10}$
142	CG5484	Protein binding	196	16.2	9	●●●●●○○○○●●	D	$1.1{\cdot}10^{-10}$
143	Tm1	Oogenesis, actin binding, protein binding	1936	18.8	11	●●●●● ●●○○○	ES,D	$1.2{\cdot}10^{-10}$
144	nkd	Protein binding, zinc ion binding	343	13.4	10	●●●●●●●●○ ○		$1.2{\cdot}10^{-10}$
145	beat-IIIb	Unkown	1486	19.3	9	●●●●●○○○●○○●		$1.2{\cdot}10^{-10}$
146	CG6206	Protein binding, metabolic process	230	21.7	10	●●●●●● ● ○○	ES,D	$1.5{\cdot}10^{-10}$
147	CG12063	Unkown	394	22.8	11	●●●●●○●●○○○●		$1.5{\cdot}10^{-10}$
148	CycG	Unkown	6952	16.3	11	●●●●● ●● ●	D,A	$1.6{\cdot}10^{-10}$
149	CG8408	Molecular function, biological process	1061	31.2	16	●●●●● ●● ○○○		$2.2{\cdot}10^{-10}$
150	Pka-R1	CAMP binding, molting cycle, protein binding	1003	13.2	10	●●●●●●○○ ●	D,A	$2.3{\cdot}10^{-10}$
151	CG11206	Cell surface receptor linked signal transduction	467	12.4	9	●●●●●●● ○○ ○		$3.3{\cdot}10^{-10}$
152	sif	Protein binding, hydrolase activity	851	11.4	9	●●●●● ●●○○		$3.7{\cdot}10^{-10}$
153	tws	Protein binding, mitotic anaphase	149	28.3	14	●●●●● ●● ●○	D,A	$3.8{\cdot}10^{-10}$
154	esn	Zinc ion binding, metal ion binding	4134	12.4	9	●●●●● ● ● ○		$3.8{\cdot}10^{-10}$
155	Pkn	ATP binding, dorsal closure, kinase activity	1534	17.0	9	●●●●●○●●○ ○	D	$4{\cdot}10^{-10}$
156	CG4467	Proteolysis, zinc ion binding, hydrolase activity	2155	19.6	9	●●●●●○●●	D,A	$4.4{\cdot}10^{-10}$
157	CG5484	Protein binding	196	16.2	9	●●●●●○○○○●●	D	$5.6{\cdot}10^{-10}$

Supplementary Table 1: (continued)

158	shot	Axonogenesis, branch fusion, actin binding	4337	23.1	12	●●●●●○○○○○●	D,A	$5.6{\cdot}10^{-10}$
159	Moca-cyp	Protein folding, isomerase activity	446	13.7	10	●●○●●●●○○○○	A	$5.7{\cdot}10^{-10}$
160	CG31048	GTP binding, GTPase binding	19	19.2	9	●●●●●●● ●●●●		$6.4{\cdot}10^{-10}$
161	Antp	Thorax, DNA binding, antennal segment	9715	17.1	11	●●○○●○○○●●●	D,T	$7.9{\cdot}10^{-10}$
162	CG16953	Unkown	64	16.3	9	●●●●● ●● ○○●		$8.7{\cdot}10^{-10}$
163	Vha68-2	Transport, ATP binding, ion transport	695	23.1	11	●●●●● ●●○○	D	$1{\cdot}10^{-9}$
164	CG31140	Phosphorylation, zinc ion binding	648	16.0	9	●●●●●●● ●	D	$1{\cdot}10^{-9}$
165	CG30271	Unkown	316	15.5	9	●●●●●○○○○○●		$1.1{\cdot}10^{-9}$
166	CG1674	Protein binding	83	17.1	10	●●●●●●●● ●	D,A	$1.1{\cdot}10^{-9}$
167	Trl	Mitosis, oogenesis, cell cycle, DNA binding	15	30.5	14	●●●●●●●●● ○	D	$1.4{\cdot}10^{-9}$
168	CG5484	Protein binding	196	16.2	9	●●●●●○○○○●●		$1.4{\cdot}10^{-9}$
169	CG31145	Protein binding	493	24.8	15	●●●●●●●● ○○○		$2.1{\cdot}10^{-9}$
170	Akap200	Autophagic cell death, type I hypersensitivity	2020	27.3	17	●●●●● ●●	ES,D	$2.2{\cdot}10^{-9}$
171	Glu-RIB	Transport, ion transport, receptor activity	7192	12.5	9	●●●●●○●● ○○○		$2.5{\cdot}10^{-9}$
172	Caki	ATP binding, cell adhesion, protein binding	658	31.2	15	●●●●● ●● ●	D,A	$4{\cdot}10^{-9}$
173	CG17274	Transport, ion transport, receptor activity	16	14.8	9	●●●●●●○○●●●○		$4.7{\cdot}10^{-9}$
174	htt	Binding	846	14.1	9	●●●●●●●●○○○○		$6.7{\cdot}10^{-9}$
175	cbt	Dorsal closure, zinc ion binding	1060	18.3	10	●●●●● ●● ○		$7{\cdot}10^{-9}$
176	CG30118	Unkown	108	13.5	9	●●●●●○●●○○○○		$8.1{\cdot}10^{-9}$
177	CG12424	Unkown	7231	15.6	11	●●●●● ●●○ ○	D	$1.1{\cdot}10^{-8}$
178	CG32352	Protein binding	89	15.6	9	●●●●●●●●○ ○		$1.3{\cdot}10^{-8}$
179	CG3632	Zinc ion binding, dephosphorylation	268	13.5	9	●●●●● ●●	D,A	$2.3{\cdot}10^{-8}$
180	CG33298	Transport, ATP binding, ATPase activity	78	21.2	16	●●●●●●●● ●	D	$2.3{\cdot}10^{-8}$
181	htt	Binding	298	12.5	9	●●●●● ●●○ ○		$2.6{\cdot}10^{-8}$
182	CG11882	Protein binding, identical protein binding	40	16.3	9	●●●●●○●●○○○		$2.7{\cdot}10^{-8}$
183	ATPCL	Binding, ATP binding, metabolic process	1350	13.6	9	●●●●●○●●○○ ○		$2.7{\cdot}10^{-8}$
184	CG34371	Unkown	11775	13.2	9	●●●●●●○○○●○		$3{\cdot}10^{-8}$
185	CG3638	Transport, engulfment, phagocytosis, ion transport	20	20.8	10	●●○●●●● ●	IR	$3.2{\cdot}10^{-8}$
186	AGO1	MRNA cleavage, miRNA binding, synaptogenesis	426	14.3	9	●●●●●● ●		$3.3{\cdot}10^{-8}$
187	jim	Zinc ion binding, nucleic acid binding	337	13.1	9	●●●●● ●●○○○○		$3.4{\cdot}10^{-8}$
188	CG6686	Protein binding	53	15.9	9	●●○●●●●○●	A	$3.5{\cdot}10^{-8}$
189	CG11265	Transferase activity, sister chromatid cohesion	74	18.5	9	●●●●● ○○●● ●		$3.7{\cdot}10^{-8}$
190	Mbs	Oogenesis, dorsal closure, protein binding	706	26.9	12	●●●●●● ●	A	$1.1{\cdot}10^{-7}$
191	CG12029	Protein binding, zinc ion binding	491	23.6	13	●●●●●● ●○		$1.2{\cdot}10^{-7}$
192	Gug	DNA binding, eye development, hydrolase activity	332	19.9	13	●●●●●●●● ●	D	$1.6{\cdot}10^{-7}$
193	up	Myofibril assembly, muscle maintenance	1881	14.7	10	● ●●●●●●	D,A	$3.1{\cdot}10^{-7}$
194	CG12814	Unkown	8894	16.3	9	●●●●●○●●○ ○○		$6.7{\cdot}10^{-7}$
195	par-1	ATP binding, protein binding, kinase activity	2104	13.8	10	●●●●●●●●○○○○	A	$1.7{\cdot}10^{-6}$
196	sls	Mitosis, cell cycle, locomotion, actin binding	53	18.1	11	●●●●●○○○●●○●		$3.3{\cdot}10^{-6}$
197	seq	Axonogenesis, dendrite development	1398	12.4	9	● ●●●●●●○○○○	A	$5.2{\cdot}10^{-6}$
198	CG31302	Motor activity, ciliary or flagellar motility	2726	12.2	9	●●●●●○●●○○○○		$5.8{\cdot}10^{-6}$
199	GluClα	Transport, ion transport, receptor activity	708	11.3	9	●●●●●●○○ ●	A	$3.5{\cdot}10^{-5}$
200	CG30183	Protein binding	75	18.4	11	●●●●● ●●○○○		$2.8{\cdot}10^{-4}$
201	VhaSFD	Binding, transport, ATP binding, ion transport	25	11.3	9	●●●●●●●●●●●		$4{\cdot}10^{-4}$
202	CG3999	Lyase activity, protein binding, catalytic activity	36	13.8	9	●●●●● ●●○○○		$6.4{\cdot}10^{-4}$