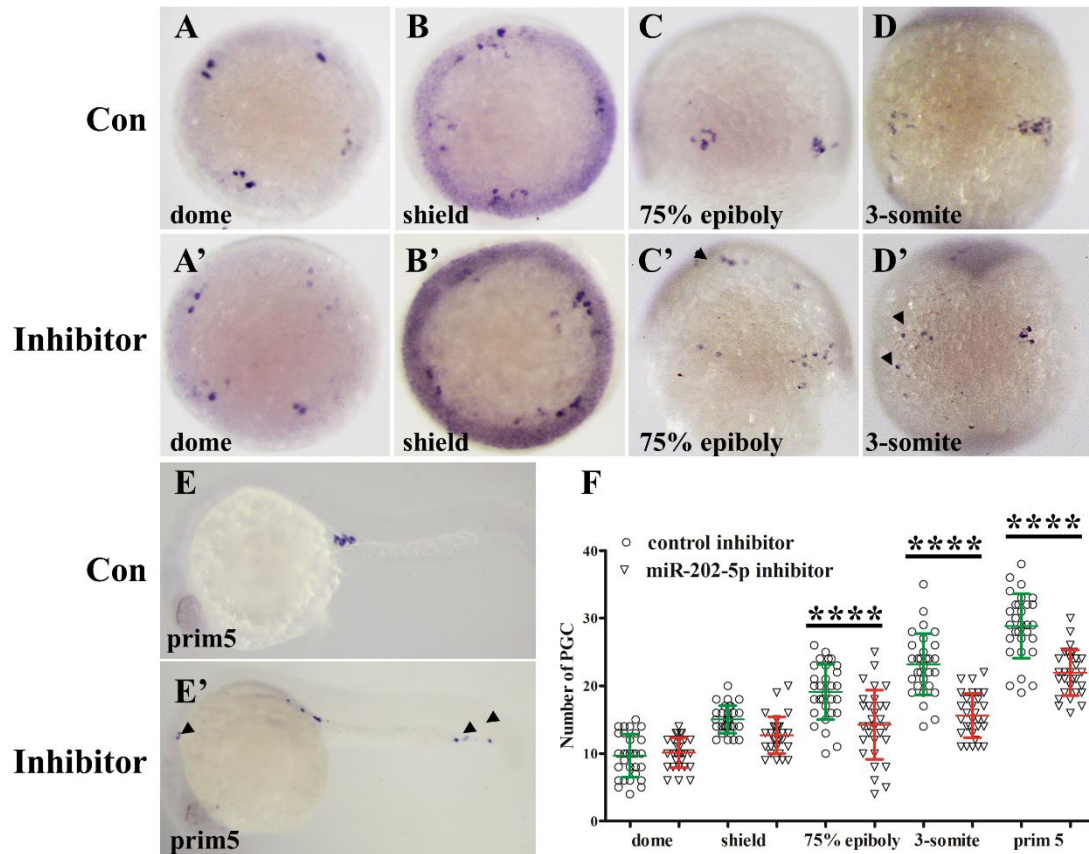
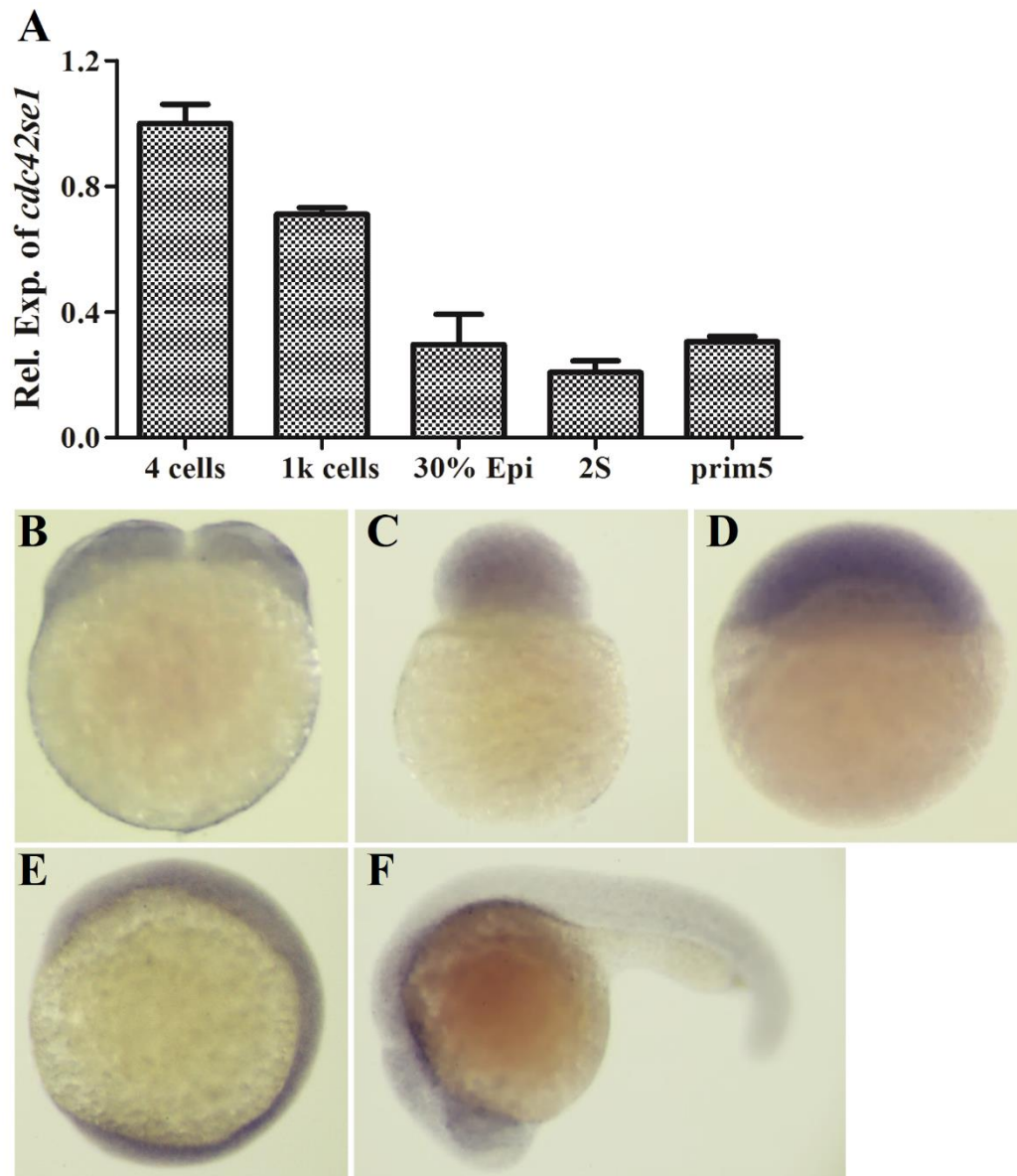


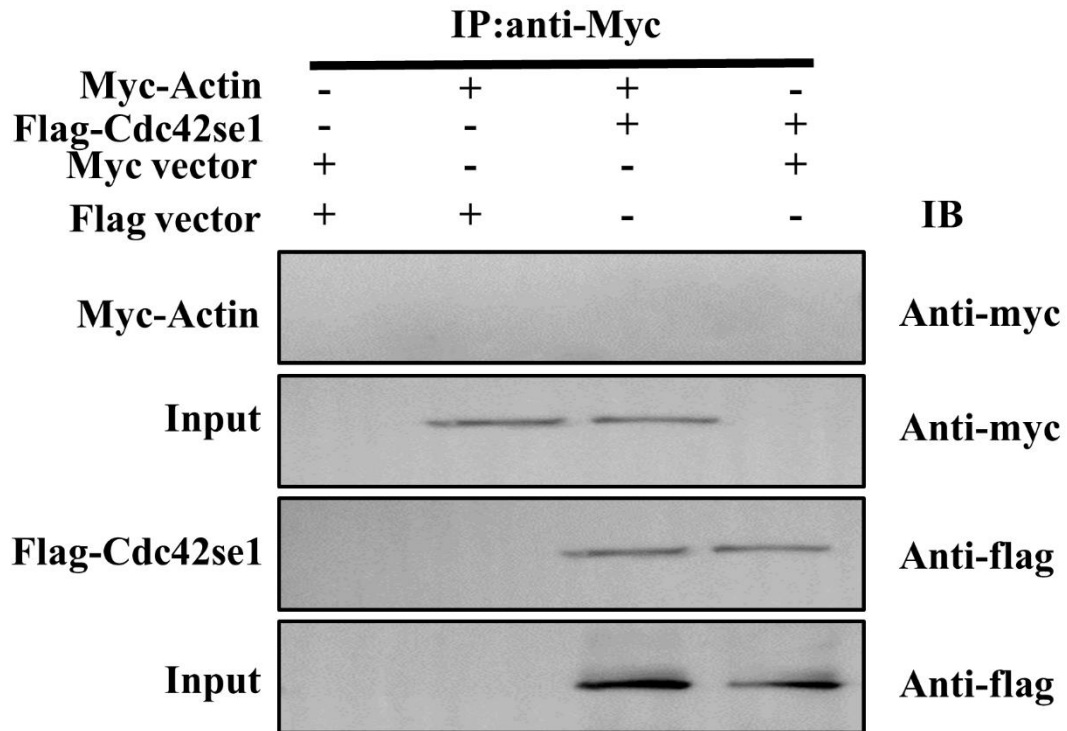
Supplementary Figure S1. Knockdown of miR-202-5p led to PGC reduction and mislocalization in zebrafish. (A-D) qRT-PCR analyses of miR-202-5p, *vasa*, *dnd* and *nanos3* in control and miR-202-5p mimics/inhibitor injected embryos, respectively. (E-G) the representative images of GFP-positive PGCs in transgenic zebrafish (Tg *kop:EGFP-UTR-nos3*) embryos at prim 5 stage. (E) un-injected control; (F) embryo injected with 40 pg miR-202-5p inhibitor; (G) embryo injected with 40 pg miR-202-5p mimics; (H) embryo co-injected with 40 pg miR-202-5p inhibitor and 40 pg miR-202-5p mimics. The panel boxes were magnified image. (I-L) whole mount *in situ* hybridization of *vasa* in embryos as above. (M-O) the representative images of PGCs in embryos injected with different dosages of miR-202-5p inhibitor. (P) the average PGC number in embryos injected with different dosages of miR-202-5p inhibitor. Arrow heads indicated the mislocalized PGCs. **, $p < 0.01$; ****, $p < 0.0001$.



Supplementary Figure S2. Knockdown of miR-202-5p affected PGC migration. Whole mount *in situ* hybridization of *vasa* in embryos injected with miR-202-5p inhibitor or control inhibitor from dome to prim5 stages. (A-E) control inhibitor (Con) injected embryos, (A'-E') miR-202-5p inhibitor (Inhibitor) injected embryos. (F) average numbers of PGCs in control inhibitor and miR-202-5p inhibitor injected embryos. Arrow heads indicated the mislocalized PGCs. ****, $p < 0.0001$.



Supplementary Figure S3. The expression patterns of *Cdc42se1* during embryogenesis. (A) qRT-PCR and (B-F)WISH analysis of *cdc42se1* mRNA during embryogenesis.



Supplementary Figure S4. Co-immunoprecipitation analysis indicated that Cdc42se1 does not interact with Actin. HEK293T cells were co-transfected with Myc-Actin and Flag-Cdc42 plasmids, and cells co-transfected with Flag or Myc vector were used as control. 24 hours later, cells were immunoprecipitated with anti-Flag Abs, followed by Western blot analysis.

Table S1. The predicted target genes of miR-202-5p by both PITA and miRanda

Gene	GeneBank ID	Start	End	Seed (se	ddG (c	Location	Gene_sequence	Seed_sequence
aars	NM_001044310	278	271	7:00:00	1.36	chr18:18647208-1864	CATAGGAC	GUCCUAUG
abrab	NM_001003986	30	22	8:00:00	-6.61	chr19:47180422-4718	GCATAGGAA	UUCCUAUGC
acsbg2	NM_001126379	85	78	7:00:00	-6.84	chr8:20158328-20160	CATAGGAA	UUCCUAUG
adipoqb	NM_001045425	170	162	8:01:00	-4.73	chr2:4649990-465019	GCATAGGTT	AACCUAUGC
adralaa	NM_001324454	232	225	7:00:00	-2.17	chr8:5024341-502462	CATAGGAT	AUCCUAUG
adrb2b	NM_001089471	874	867	7:00:00	5.43	chr21:35044276-3504	CATAGGAC	GUCCUAUG
aebp2	NM_213494	751	744	7:00:00	0.19	chr4:2997159-299801	CATAGGAG	CUCCUAUG
ahcyl1	NM_201293	315	308	7:00:00	-2.12	chr8:24952751-24954	CATAGGAC	GUCCUAUG
akr1b1	NM_001002048	37	30	7:00:00	3.08	chr4:14907490-14907	CATAGGAT	AUCCUAUG
ap1s3b	NM_001004635	209	201	8:00:00	-4.6	chr2:47733074-47733	GCATAGGAG	CUCCUAUGC
arl6ip4	NM_001020758	117	110	7:00:00	-6.68	chr5:68973377-68973	CATAGGAA	UUCCUAUG
arrb2a	NM_214681	207	199	8:01:00	-7.81	chr10:22937317-2293	GCATAGGCA	UGCCUAUGC
atp2b1b	NM_001135631	465	457	8:00:00	-12.3	chr25:19511762-1951	GCATAGGAT	AUCCUAUGC
atp5g1	NM_213028	74	66	8:01:00	-1.58	chr3:23468746-23468	GCATAGGCC	GGCCUAUGC
bmpr1b	NM_131457	266	259	7:00:00	-3.45	chr5:6996909-699729	CATAGGAG	CUCCUAUG
brd3b	NM_212702	910	903	7:00:00	1.56	chr5:63730841-63732	CATAGGAC	GUCCUAUG
brms1	NM_200097	239	232	7:00:00	-3.07	chr7:60110136-60110	CATAGGAT	AUCCUAUG
bsg	NM_001312882	868	861	7:00:00	0.75	chr22:18917584-1892	CATAGGAC	GUCCUAUG
bsg	NM_198142	868	861	7:00:00	0.75	chr22:18917584-1892	CATAGGAC	GUCCUAUG
calm2a	NM_199996	875	868	7:00:00	-7.89	chr13:8445610-84465	CATAGGAT	AUCCUAUG
caprin1a	NM_001003484	362	355	7:00:00	-0.51	chr7:26746720-26747	CATAGGAG	CUCCUAUG
cars	NM_001118900	559	552	7:00:00	-8.45	chr7:31525084-31525	CATAGGAG	CUCCUAUG
cbx6a	NM_001003768	368	360	8:01:00	-4.17	chr22:29128511-2912	GCATAGGCG	CGCCUAUGC
ccdc43	NM_200658	327	320	7:00:00	-7.11	chr3:31472043-31473	CATAGGAA	UUCCUAUG
ccdc6b	NM_200241	740	732	8:01:00	-5.6	chr12:7577404-75788	GCATAGGTC	GACCUAUGC
cc119b	NM_001302701	142	135	7:00:00	-3.85	chr10:17822313-1782	CATAGGAA	UUCCUAUG
cdc42se	NM_200060	1179	1172	7:00:00	0.42	chr16:38361861-3836	CATAGGAG	CUCCUAUG
cdh6	NM_001013520	495	488	7:00:00	-5.28	chr2:28393416-28395	CATAGGAG	CUCCUAUG
cdk5	NM_131719	103	96	7:00:00	-0.99	chr24:33880631-3388	CATAGGAT	AUCCUAUG
cebpa	NM_131885	469	461	8:00:00	-2.31	chr7:37813729-37815	GCATAGGAC	GUCCUAUGC
chaf1a	NM_001045013	160	153	7:00:00	0.68	chr22:22251771-2225	CATAGGAG	CUCCUAUG
chtopb	NM_001077306	387	380	7:00:00	0.55	chr16:28951760-2895	CATAGGAT	AUCCUAUG
clasp1a	NM_001115139	659	652	7:00:00	-5.99	chr9:38480193-38481	CATAGGAT	AUCCUAUG
cldn11b	NM_131772	849	842	7:00:00	-0.33	chr24:26294344-2629	CATAGGAT	AUCCUAUG
cx44.1	NM_131809	583	575	8:01:00	-5.1	chr1:46756494-46757	GCATAGGTG	CACCUAUGC
dao.2	NM_214732	235	227	8:00:00	-6.97	chr5:19666909-19667	GCATAGGAG	CUCCUAUGC
dcps	NM_205588	302	294	8:01:00	-2.02	chr10:39371361-3937	GCATAGGTC	GACCUAUGC
ddi2	NM_198375	1461	1454	7:00:00	1.04	chr6:40563039-40565	CATAGGAT	AUCCUAUG
derl1	NM_213444	605	597	8:01:00	-5.01	chr16:25727904-2572	GCATAGGTT	AACCUAUGC
dio2	NM_212789	843	835	8:01:00	-1.78	chr17:16867700-1686	GCATAGGCA	UGCCUAUGC
dmtn	NM_001201409	888	880	8:01:00	-2.6	chr10:20189164-2019	GCATAGGTG	CACCUAUGC
dnajc18	NM_001113588	388	381	7:00:00	-1.34	chr21:30202854-3020	CATAGGAA	UUCCUAUG
dnajc4	NM_212677	844	837	7:00:00	-2.88	chr14:8188723-81905	CATAGGAG	CUCCUAUG
dnajc5g	NM_199623	419	411	8:00:00	-1.7	chr20:38861075-3886	GCATAGGAA	UUCCUAUGC
dpp6	NM_001115122	947	940	7:00:00	4.64	chr2:12723928-12725	CATAGGAC	GUCCUAUG
dyrk2	NM_001044833	232	225	7:00:00	-2.11	chr4:13459768-13460	CATAGGAT	AUCCUAUG
eaf1	NM_001002115	125	118	7:00:00	-9.4	chr16:7014291-70148	CATAGGAG	CUCCUAUG
ednrab	NM_001310095	108	100	8:01:00	-5.23	chr23:45958860-4595	GCATAGGCA	UGCCUAUGC
eif4a1a	NM_198366	443	436	7:00:00	-2.95	chr7:26239339-26240	CATAGGAT	AUCCUAUG
emx2	NM_131280	311	303	8:00:00	-8.27	chr13:19195637-1919	GCATAGGAC	GUCCUAUGC
ephb2b	NM_001327743	4537	4530	7:00:00	3.77	chr11:28171812-2817	CATAGGAA	UUCCUAUG
eps8	NM_200242	368	361	7:00:00	-0.75	chr4:117354-117908	CATAGGAG	CUCCUAUG
erbb2ip	NM_001193543	1255	1248	7:00:00	-3.15	chr10:15637980-1564	CATAGGAA	UUCCUAUG
evx2	NM_131232	1151	1143	8:01:00	-1.91	chr9:2004615-200630	GCATAGGTT	AACCUAUGC
exosc4	NM_200739	596	589	7:00:00	-6.7	chr2:1600322-160113	CATAGGAA	UUCCUAUG

eya2	NM_001004558	807	799	8:00:00	-4.31	chr6:55925603-55927	GCATAGGAT	AUCCUAUGC
ezrb	NM_001030285	293	286	7:00:00	-1.25	chr20:13672076-1367	CATAGGAT	AUCCUAUG
fl1r.1	NM_001004667	65	57	8:01:00	-5.47	chr5:29247929-29248	GCATAGGTT	AACCUAUGC
fam13b	NM_001328042	1465	1457	8:00:00	-1.52	chr14:24019525-2402	GCATAGGAT	AUCCUAUGC
fam234t	NM_207053	459	452	7:00:00	-1.78	chr3:1422721-142430	CATAGGAG	CUCCUAUG
fam91a1	NM_200441	254	247	7:00:00	-4.13	chr19:33549339-3355	CATAGGAC	GUCCUAUG
fli1b	NM_001008780	638	630	8:01:00	-4.73	chr16:42095548-4209	GCATAGGTG	CACCUAUGC
flrt3	NM_001256646	468	460	8:01:00	1.3	chr13:33685823-3368	GCATAGGTG	CACCUAUGC
foxf1	NM_001080186	711	704	7:00:00	-3.16	chr18:30872112-3087	CATAGGAA	UUCCUAUG
foxred2	NM_001076660	146	139	7:00:00	-5.58	chr3:25901412-25901	CATAGGAC	GUCCUAUG
ftr64	NM_001327814	94	87	7:00:00	-4.45	chr4:70704351-70704	CATAGGAA	UUCCUAUG
fyna	NM_001007286	541	533	8:01:00	-5.18	chr17:15495032-1549	GCATAGGTA	UACCUAUGC
gas1b	NM_001077801	700	692	8:01:00	-2.73	chr5:31760184-31762	GCATAGGTA	UACCUAUGC
ggact.1	NM_001077717	193	186	7:00:00	-1.21	chr1:2306346-230752	CATAGGAA	UUCCUAUG
gnrh3	NM_182887	49	42	7:00:00	-1.07	chr17:20187335-2018	CATAGGAG	CUCCUAUG
got2a	NM_213379	59	52	7:00:00	-2.16	chr18:21189788-2119	CATAGGAT	AUCCUAUG
gpt2	NM_001098757	266	259	7:00:00	-4.16	chr7:41618824-41619	CATAGGAA	UUCCUAUG
gsk3ab	NM_131390	664	656	8:01:00	-2.9	chr16:11399732-1140	GCATAGGTC	GACCUAUGC
gskip	NM_213435	375	367	8:01:00	-3.38	chr17:43027101-4302	GCATAGGTT	AACCUAUGC
hdlbpa	NM_201474	721	714	7:00:00	1.58	chr6:26884278-26886	CATAGGAA	UUCCUAUG
hmbsa	NM_201154	281	273	8:01:00	-4.72	chr5:29933405-29934	GCATAGGTC	GACCUAUGC
hmox2a	NM_001103139	56	48	8:01:00	-8.82	chr22:26995277-2699	GCATAGGTC	GACCUAUGC
hsd11b1	NM_200323	477	469	8:01:00	-3.09	chr22:19536916-1953	GCATAGGCC	GGCCUAUGC
htra1b	NM_001111182	486	479	7:00:00	-2.13	chr12:11350421-1135	CATAGGAA	UUCCUAUG
igfbp3	NM_205751	352	344	8:01:00	-2.62	chr20:6812249-68142	GCATAGGTA	UACCUAUGC
il17rd	NM_153660	447	439	8:01:00	-2.35	chr11:42428612-4242	GCATAGGTC	GACCUAUGC
irf5	NM_212875	1320	1313	7:00:00	-7.57	chr4:13606758-13609	CATAGGAT	AUCCUAUG
itpk1a	NM_213017	29	21	8:01:00	-10.1	chr20:27150435-2715	GCATAGGTG	CACCUAUGC
jupa	NM_131177	835	828	7:00:00	-1.54	chr11:11793967-1179	CATAGGAG	CUCCUAUG
kat6a	NM_001123312	498	491	7:00:00	-3.17	chr5:13892846-13895	CATAGGAA	UUCCUAUG
klf1	NM_130936	1049	1041	8:00:00	-9.27	chr6:7904178-790539	GCATAGGAA	UUCCUAUGC
leprot	NM_001017787	75	67	8:01:00	-1.21	chr2:14986542-14987	GCATAGGTT	AACCUAUGC
lhx2b	NM_001040010	896	888	8:01:00	-7.64	chr8:3041008-304262	GCATAGGTA	UACCUAUGC
lhx6	NM_001004015	369	362	7:00:00	-4.16	chr10:9559812-95616	CATAGGAC	GUCCUAUG
lmbd2b	NM_199944	1208	1200	8:01:00	-5.92	chr21:22384565-2238	GCATAGGTG	CACCUAUGC
lnpa	NM_199480	555	548	7:00:00	-5.32	chr9:2043962-204471	CATAGGAA	UUCCUAUG
LOC100	NM_001105607	477	469	8:01:00	-3.09	chr22:19536916-1953	GCATAGGCC	GGCCUAUGC
LOC564	NM_001128722	1326	1318	8:00:00	-7.13	chr5:13142950-13144	GCATAGGAA	UUCCUAUGC
lonrf11	NM_001277234	711	703	8:01:00	-5.2	chr8:13749288-13750	GCATAGGTC	GACCUAUGC
lrrc17	NM_205539	1187	1180	7:00:00	-6.49	chr4:20420216-20421	CATAGGAT	AUCCUAUG
marcksb	NM_001015060	1391	1384	7:00:00	-4.85	chr17:15529292-1553	CATAGGAA	UUCCUAUG
med22	NM_001002144	315	308	7:00:00	-7.94	chr5:32690765-32691	CATAGGAA	UUCCUAUG
mfsd8	NM_001045048	187	180	7:00:00	-3.83	chr12:22522841-2252	CATAGGAA	UUCCUAUG
micu2	NM_001017539	335	328	7:00:00	-0.4	chr5:36008475-36009	CATAGGAA	UUCCUAUG
mix11	NM_130940	1142	1135	7:00:00	3.49	chr20:43818084-4381	CATAGGAA	UUCCUAUG
mllt1b	NM_001040384	297	289	8:00:00	-5.34	chr2:23314490-23315	GCATAGGAA	UUCCUAUGC
mob2b	NM_001045317	1494	1486	8:01:00	0.6	chr18:50040880-5004	GCATAGGCA	UGCCUAUGC
mpp6a	NM_001256189	227	220	7:00:00	-6.45	chr16:21636543-2164	CATAGGAA	UUCCUAUG
msrb1a	NM_178288	1954	1947	7:00:00	-5.74	chr3:18649165-18651	CATAGGAT	AUCCUAUG
mtmr1a	NM_001020721	51	44	7:00:00	-2.65	chr7:25605576-25605	CATAGGAA	UUCCUAUG
mtus1a	NM_001077608	498	491	7:00:00	-3.15	chr14:30015813-3001	CATAGGAC	GUCCUAUG
mylipb	NM_001080022	185	178	7:00:00	-0.58	chr16:25633214-2563	CATAGGAG	CUCCUAUG
myo1cb	NM_001317189	454	447	7:00:00	-1.41	chr15:28417089-2841	CATAGGAA	UUCCUAUG
nagpa	NM_001109715	468	461	7:00:00	0.72	chr16:40591302-4059	CATAGGAA	UUCCUAUG
nanos1	NM_001305661	264	256	8:01:00	-6.16	chr14:4810925-48126	GCATAGGTT	AACCUAUGC
nck2a	NM_200997	519	512	7:00:00	-2.13	chr9:6417152-641838	CATAGGAT	AUCCUAUG
nck2b	NM_001003492	391	384	7:00:00	-4.57	chr6:15115528-15116	CATAGGAG	CUCCUAUG

ndfip11	NM_001002503	1850	1843	7:00:00	-3.03	chr21:36240269-3624	CATAGGAA	UUCCUAUG
ndufa4	NM_213025	184	176	8:01:00	-5.83	chr12:9845658-98464	GCATAGGTC	GACCUAUGC
neurod6	NM_131817	155	147	8:01:00	-2.25	chr2:50894382-50894	GCATAGGTC	GACCUAUGC
nfe2l3	NM_213231	1271	1264	7:00:00	-3.68	chr19:18680740-1868	CATAGGAC	GUCCUAUG
nitr13	NM_001127254	87	80	7:00:00	5.07	chr14:41210404-4121	CATAGGAT	AUCCUAUG
nitr4a	NM_198344	493	486	7:00:00	-4.79	chr7:17326090-17327	CATAGGAC	GUCCUAUG
nkiras2	NM_001003433	1257	1249	8:01:00	2.48	chr3:17717386-17719	GCATAGGTC	GACCUAUGC
nkx6.1	NM_001002475	230	222	8:00:00	-8.89	chr21:19036452-1903	GCATAGGAA	UUCCUAUGC
nr2e3	NM_001007368	155	147	8:01:00	-5.6	chr25:22180616-2218	GCATAGGTT	AACCUAUGC
nt5e	NM_200932	118	111	7:00:00	-2.66	chr20:826874-827242	CATAGGAG	CUCCUAUG
nucb2b	NM_201479	309	302	7:00:00	-1.76	chr18:38228413-3822	CATAGGAT	AUCCUAUG
oard1	NM_001020755	242	234	8:01:00	-9.61	chr23:19294039-1929	GCATAGGTA	UACCUAUGC
olfcw1	NM_001018147	522	515	7:00:00	-4.47	chr18:32164914-3216	CATAGGAG	CUCCUAUG
otud4	NM_001312659	218	210	8:01:00	-4.98	chr23:43889846-4389	GCATAGGTA	UACCUAUGC
oxsr1b	NM_201175	154	147	7:00:00	-6.9	chr24:19919669-1992	CATAGGAT	AUCCUAUG
pank1b	NM_001083841	507	500	7:00:00	0.84	chr12:16841623-1684	CATAGGAT	AUCCUAUG
pdpk1a	NM_001077344	513	505	8:00:00	-3.74	chr3:47333757-47334	GCATAGGAT	AUCCUAUGC
pdzk1ip	NM_001007760	2097	2090	7:00:00	-3.29	chr22:16536950-1654	CATAGGAA	UUCCUAUG
pias4a	NM_213403	1671	1663	8:00:00	-5.8	chr22:20381881-2038	GCATAGGAA	UUCCUAUGC
pon2	NM_212734	24	17	7:00:00	-4.73	chr16:24754851-2475	CATAGGAG	CUCCUAUG
ppm1bb	NM_001007313	111	104	7:00:00	-3.25	chr12:25391925-2539	CATAGGAA	UUCCUAUG
ppm1da	NM_201090	754	747	7:00:00	-5.13	chr15:27005772-2700	CATAGGAT	AUCCUAUG
ppm1k	NM_001327744	1224	1217	7:00:00	-3.87	chr1:49949885-49952	CATAGGAA	UUCCUAUG
ppp3cca	NM_001166628	36	29	7:00:00	-6.71	chr5:27324613-27324	CATAGGAT	AUCCUAUG
prdm12l	NM_001007457	513	506	7:00:00	-6.83	chr5:62817118-62817	CATAGGAT	AUCCUAUG
prfl.6	NM_001089507	1021	1013	8:01:00	-6.41	chr8:29661295-29662	GCATAGGCA	UGCCUAUGC
proza	NM_001327792	1593	1586	7:00:00	-4.05	chr3:62146031-62147	CATAGGAA	UUCCUAUG
prrg4	NM_001017637	416	409	7:00:00	-9.09	chr18:45676964-4567	CATAGGAC	GUCCUAUG
purba	NM_001160159	1326	1318	8:00:00	-7.13	chr5:13142950-13144	GCATAGGAA	UUCCUAUGC
pycrl	NM_001044938	712	704	8:01:00	0.74	chr20:52735058-5273	GCATAGGTT	AACCUAUGC
rab10	NM_001002566	141	134	7:00:00	-2.08	chr20:47540149-4754	CATAGGAT	AUCCUAUG
rab32a	NM_201332	339	332	7:00:00	-7.66	chr20:32106394-3210	CATAGGAC	GUCCUAUG
rassfl	NM_001004550	312	305	7:00:00	-8.5	chr22:10628371-1062	CATAGGAA	UUCCUAUG
rdh12l	NM_001009912	142	135	7:00:00	-3.89	chr24:32659260-3265	CATAGGAT	AUCCUAUG
rhbdl2	NM_201204	1087	1079	8:00:00	-11.3	chr16:33197256-3319	GCATAGGAA	UUCCUAUGC
rhogb	NM_200040	56	48	8:00:00	-16.4	chr21:30913981-3091	GCATAGGAA	UUCCUAUGC
rpe	NM_001243424	582	575	7:00:00	-5.84	chr9:24214640-24215	CATAGGAA	UUCCUAUG
scn8aa	NM_131628	492	485	7:00:00	-6.24	chr23:27325088-2732	CATAGGAG	CUCCUAUG
sebox	NM_001320052	152	145	7:00:00	13.71	chr5:66700255-66703	CATAGGAT	AUCCUAUG
sec61a1	NM_153659	645	637	8:00:00	-4.22	chr6:40067674-40068	GCATAGGAG	CUCCUAUGC
sepn1	NM_001004294	351	344	7:00:00	-3.39	chr17:24675781-2467	CATAGGAT	AUCCUAUG
sertad2b	NM_212794	1663	1655	8:01:00	2.61	chr13:24389817-2439	GCATAGGCG	CGCCUAUGC
sesn3	NM_213519	900	892	8:00:00	-7.73	chr15:35232597-3523	GCATAGGAC	GUCCUAUGC
setdb1a	NM_001044767	78	71	7:00:00	-0.14	chr19:9225231-92254	CATAGGAG	CUCCUAUG
sfrp1b	NM_001083571	355	347	8:00:00	-2.05	chr10:20394032-2039	GCATAGGAT	AUCCUAUGC
sfxn5a	NM_001243309	163	156	7:00:00	-5.19	chr13:14889830-1489	CATAGGAT	AUCCUAUG
sh2b1	NM_001110455	309	301	8:00:00	-6.05	chr3:15241942-15242	GCATAGGAA	UUCCUAUGC
sh3bgr	NM_001003524	1217	1210	7:00:00	-0.28	chr15:5975386-59808	CATAGGAT	AUCCUAUG
shisa2	NM_001003631	161	154	7:00:00	-0.29	chr5:21566176-21566	CATAGGAG	CUCCUAUG
si:ch211	NM_001145765	45	38	7:00:00	-5.79	chr13:32991446-3299	CATAGGAG	CUCCUAUG
si:ch211	NM_001305574	112	105	7:00:00	-4.29	chr15:14148895-1414	CATAGGAA	UUCCUAUG
si:ch211	NM_001145579	1348	1340	8:01:00	-0.51	chr13:18380131-1838	GCATAGGTT	AACCUAUGC
si:ch211	NM_001017868	413	406	7:00:00	-5.32	chr21:2278389-22791	CATAGGAA	UUCCUAUG
si:ch73-	NM_001122628	153	146	7:00:00	-3.05	chr23:4453253-44537	CATAGGAA	UUCCUAUG
si:dkey-	NM_001326551	145	137	8:01:00	-3.04	chr5:66784439-66784	GCATAGGCC	GGCCUAUGC
si:dkey-	NM_001130400	980	972	8:01:00	4.28	chr9:36031369-36033	GCATAGGTG	CACCUAUGC
si:dkey-	NM_001303054	32	25	7:00:00	-1.54	chr1:22167011-22167	CATAGGAA	UUCCUAUG

slc18a3a	NM_001077550	389	382	7:00:00	-0.1	chr13:29291599-2929	CATAGGAA	UUCCUAUG
slc25a1	NM_205715	266	258	8:01:00	-3.07	chr3:13337647-13338	GCATAGGCG	CGCCUAUGC
slc26a6l	NM_001114417	70	63	7:00:00	-4.53	chr6:40734680-40735	CATAGGAT	AUCCUAUG
slc29a2	NM_001012501	369	362	7:00:00	-4.57	chr21:27370798-2737	CATAGGAC	GUCCUAUG
slit1a	NM_001034968	434	427	7:00:00	-2.37	chr13:425029-426646	CATAGGAG	CUCCUAUG
smad5	NM_131368	178	170	8:00:00	-5.82	chr14:26169095-2616	GCATAGGAA	UUCCUAUGC
sod3a	NM_001099236	288	281	7:00:00	-5.86	chr7:71099876-71100	CATAGGAC	GUCCUAUG
sp8a	NM_213241	944	937	7:00:00	-1.72	chr19:2483468-24846	CATAGGAT	AUCCUAUG
spra	NM_001024430	1521	1514	7:00:00	-5.37	chr5:71345202-71346	CATAGGAG	CUCCUAUG
srebf2	NM_001089466	463	456	7:00:00	-3.22	chr3:1361296-136224	CATAGGAA	UUCCUAUG
srsf1a	NM_213015	833	826	7:00:00	0.75	chr15:16136061-1613	CATAGGAT	AUCCUAUG
srsf1b	NM_200593	1411	1404	7:00:00	-0.37	chr21:39523837-3952	CATAGGAG	CUCCUAUG
ssh2b	NM_001135103	531	523	8:00:00	-10.4	chr21:40452175-4045	GCATAGGAA	UUCCUAUGC
stat1b	NM_200091	103	96	7:00:00	-5.11	chr9:41444460-41445	CATAGGAG	CUCCUAUG
stmn1b	NM_001017850	293	285	8:01:00	-6.18	chr16:34572058-3457	GCATAGGTC	GACCUAUGC
stxbp3	NM_213471	523	516	7:00:00	-3.86	chr23:1688463-16895	CATAGGAA	UUCCUAUG
suv39h1	NM_001126482	1043	1035	8:01:00	-0.15	chr8:25731824-25733	GCATAGGTT	AACCUAUGC
syncrip	NM_214696	339	332	7:00:00	-7.07	chr20:2725211-27258	CATAGGAA	UUCCUAUG
syt1a	NM_001327829	1938	1931	7:00:00	-2.09	chr4:21590705-21594	CATAGGAG	CUCCUAUG
tada2b	NM_001024443	167	160	7:00:00	-3.53	chr7:39470460-39470	CATAGGAA	UUCCUAUG
tbl1xr1a	NM_001020583	171	163	8:00:00	-4.75	chr11:8665727-86669	GCATAGGAG	CUCCUAUGC
tbx15	NM_153664	700	693	7:00:00	-5.22	chr9:21224026-21224	CATAGGAA	UUCCUAUG
tcf3b	NM_001172683	289	282	7:00:00	-1.57	chr22:20288330-2029	CATAGGAA	UUCCUAUG
tfap2b	NM_001024665	1400	1393	7:00:00	-3.62	chr20:48211718-4821	CATAGGAA	UUCCUAUG
tgfbr2	NM_182855	264	257	7:00:00	-1.78	chr16:39555136-3955	CATAGGAG	CUCCUAUG
thbs4a	NM_001114424	45	38	7:00:00	-2.44	chr5:51295571-51296	CATAGGAG	CUCCUAUG
tlx3b	NM_170766	775	767	8:00:00	-10.4	chr10:22081602-2208	GCATAGGAC	GUCCUAUGC
tmem17	NM_001098391	1278	1271	7:00:00	-6.09	chr25:28150339-2815	CATAGGAA	UUCCUAUG
tmem18	NM_213520	1268	1261	7:00:00	-0.74	chr3:42250307-42251	CATAGGAA	UUCCUAUG
tmem18	NM_001017718	2034	2027	7:00:00	-5.16	chr12:19216157-1921	CATAGGAA	UUCCUAUG
tmem23	NM_200387	251	243	8:01:00	-5.2	chr25:34354564-3435	GCATAGGCC	GGCCUAUGC
tmem24	NM_001077341	80	73	7:00:00	-1.77	chr11:30393506-3039	CATAGGAG	CUCCUAUG
tmem51	NM_001077730	309	302	7:00:00	-3.15	chr8:26681899-26682	CATAGGAC	GUCCUAUG
tnfrsf19	NM_001044904	1785	1778	7:00:00	-6.67	chr15:8259460-82613	CATAGGAA	UUCCUAUG
tpma	NM_131105	379	372	7:00:00	-4.39	chr7:29689005-29689	CATAGGAA	UUCCUAUG
trh	NM_001012365	496	489	7:00:00	1.06	chr8:54107709-54108	CATAGGAA	UUCCUAUG
trmt44	NM_001006086	154	146	8:01:00	-7.43	chr7:59414436-59414	GCATAGGTT	AACCUAUGC
tspan7	NM_214774	1025	1017	8:00:00	-5.17	chr14:41102224-4110	GCATAGGAA	UUCCUAUGC
tspan7b	NM_001130818	430	422	8:00:00	-4.06	chr22:11411023-1141	GCATAGGAT	AUCCUAUGC
tyrobp	NM_001100103	67	59	8:01:00	-5.76	chr16:25285345-2528	GCATAGGTT	AACCUAUGC
uba3	NM_213467	229	222	7:00:00	-10.9	chr11:17650547-1765	CATAGGAG	CUCCUAUG
ube2g1b	NM_213530	287	280	7:00:00	-2.46	chr21:16994999-1699	CATAGGAT	AUCCUAUG
ubiad1	NM_001199726	526	518	8:01:00	-5.23	chr8:53587152-53588	GCATAGGCT	AGCCUAUGC
vamp5	NM_001256607	726	719	7:00:00	-1.89	chr5:27706410-27707	CATAGGAG	CUCCUAUG
vip	NM_001114553	67	59	8:00:00	-5.69	chr13:46698116-4669	GCATAGGAC	GUCCUAUGC
vps36	NM_199977	377	370	7:00:00	-12.4	chr10:24707416-2470	CATAGGAA	UUCCUAUG
vrk3	NM_001013568	30	23	7:00:00	-4.6	chr7:28807271-28809	CATAGGAG	CUCCUAUG
vsig10	NM_001100094	284	276	8:01:00	-8.72	chr5:12062664-12062	GCATAGGTG	CACCUAUGC
wdr48a	NM_001077795	142	134	8:00:00	-2.54	chr24:41176453-4117	GCATAGGAG	CUCCUAUGC
xpot	NM_001044852	541	533	8:01:00	-4.66	chr4:661385-661970	GCATAGGTT	AACCUAUGC
yaf2	NM_001045268	144	137	7:00:00	-0.57	chr4:13906673-13907	CATAGGAT	AUCCUAUG
yars	NM_201316	148	140	8:00:00	-3.74	chr19:31307431-3130	GCATAGGAG	CUCCUAUGC
zdhhc5a	NM_001039640	1211	1204	7:00:00	-5.67	chr1:43863753-43865	CATAGGAT	AUCCUAUG
zdhhc7	NM_001002602	54	47	7:00:00	1.82	chr18:5215312-52156	CATAGGAC	GUCCUAUG
zfand5a	NM_213039	250	242	8:00:00	-2.94	chr5:25092977-25094	GCATAGGAC	GUCCUAUGC
zgc:100	NM_001003528	1421	1414	7:00:00	-1.26	chr20:52716748-5272	CATAGGAG	CUCCUAUG
zgc:101	NM_001044327	224	217	7:00:00	-4.44	chr22:1406955-14075	CATAGGAA	UUCCUAUG

zgc:113	NM_001030240	461	454	7:00:00	-0.3	chr2:303094-303870:-	CATAGGAA	UUCCUAUG
zgc:153	NM_001045430	102	94	8:01:00	0.67	chr5:29069447-29069	GCATAGGCC	GGCCUAUGC
zgc:158	NM_001123055	2985	2977	8:00:00	-5.61	chr7:64319006-64323	GCATAGGAG	CUCCUAUGC
zgc:158	NM_001080628	1214	1206	8:00:00	-8.1	chr19:29687162-2968	GCATAGGAA	UUCCUAUGC
zgc:162	NM_001082979	369	361	8:00:00	-7.45	chr14:8313012-83134	GCATAGGAT	AUCCUAUGC
zgc:172	NM_001128299	367	359	8:01:00	-2.42	chr3:1243248-124402	GCATAGGCA	UGCCUAUGC
zgc:174	NM_001113584	515	507	8:00:00	-4.51	chr16:13968502-1396	GCATAGGAA	UUCCUAUGC
zgc:562	NM_200217	3290	3282	8:01:00	-4.31	chr10:3317274-33220	GCATAGGTT	AACCUAUGC
zgc:566	NM_199737	40	33	7:00:00	-5.9	chr18:13225400-1322	CATAGGAA	UUCCUAUG
zgc:567	NM_200116	158	150	8:00:00	-8.47	chr3:17910815-17912	GCATAGGAA	UUCCUAUGC
zgc:664	NM_200527	26	18	8:00:00	-11.7	chr13:24556812-2455	GCATAGGAA	UUCCUAUGC
zgc:664	NM_200055	384	377	7:00:00	-4.64	chr8:25688928-25690	CATAGGAG	CUCCUAUG
zgc:778	NM_199602	212	205	7:00:00	-2.19	chr1:8017621-801857	CATAGGAT	AUCCUAUG
zgc:921	NM_001004593	847	839	8:01:00	-8.21	chr8:19370668-19372	GCATAGGCC	GGCCUAUGC
zmp:000	NM_001204200	5688	5680	8:00:00	-6.59	chr10:4910698-49183	GCATAGGAT	AUCCUAUGC
znf1117	NM_001327996	421	413	8:00:00	-8.85	chr4:67843794-67844	GCATAGGAA	UUCCUAUGC
znf451	NM_001013496	318	310	8:01:00	-2.82	chr22:1343538-13442	GCATAGGTC	GACCUAUGC
znf513	NM_001309467	472	465	7:00:00	-3.77	chr20:19531790-1953	CATAGGAA	UUCCUAUG
znf800b	NM_200436	656	648	8:01:00	2.3	chr4:3461029-346204	GCATAGGCT	AGCCUAUGC
znf865	NM_001083075	77	70	7:00:00	0.26	chr19:10282245-1028	CATAGGAC	GUCCUAUG

Supplementary Table S2. Primer information.

Primer name	Primer Sequence (5'-3')	Description
18s rRNA-F	TCGCTAGTTGGCATCGTTTATG	qRT-PCR
18s rRNA-R	CGGAGGTTTCGAAGACGATCA	
<i>Cdc42se1</i> -F-RT	GCGTTCTGGCATAAGATTGG	
<i>Cdc42se1</i> -R-RT	GGCGTGAGGCACCTTTGGAT	
Vasa-F-RT	GGCTCCCACCAGAGAACTTATC	
Vasa-R-RT	AGGTCGTACACAGGTCCCGTA	
<i>Cdc42</i> -F-RT	CGTCGTTGTTGGTGATGGTG	
<i>Cdc42</i> -R-RT	GCAGTATCAAACAGCCCCAGG	
<i>MiR</i> -202-5p-RT	TTCCTATGCATATACCTCTTTG	
<i>MRQ</i> -3'-R	TTTTTTTTTTTTTTTTTTTT	
<i>Cdc42</i> -pro-Kpn I-F	GGGGTACCTTTGTGGTGGAGGAAACATT	
<i>Cdc42</i> -pro-Hind III-R	CCCAAGCTTAGCTGTGCTTTTATAAATCC	
<i>Cdc42se1</i> -Xho I-F	CCGCTCGAGTCGGAGAGCCCACAAACT	PsiCHECK2
<i>Cdc42se1</i> -Not I-R	ATAAGAATGCGGCCGCAATTTCCAAGGACCACGG	
<i>Cdc42se1</i> -Mir Mut-F	TACACGCGAGAGCCTAAG	
<i>Cdc42se1</i> -Mir Mut-R	TTAGGCTCTCGCGTGTAG	
<i>Cdc42se1</i> -ORF-F	CGGGATCCGTCGCTGAGTGTTGAGGATTA	pCS2+ mRNA synthesis
<i>Cdc42se1</i> -ORF-R	GCTCTAGACGTTTAGGTTGAGGATACTTT	
<i>Cdc42se1</i> -ORF-3'UTR-F	GGAATTCATGAGTGCCTTCTGGCATAAGA	
<i>Cdc42se1</i> -ORF-3'UTR-R	GCTCTAGAATTCTTCTAAAACAGCCC	
<i>Cdc42</i> -ORF-F	CGGGATCCCGTTCTGGAAACCCCAAGCG	
<i>Cdc42</i> -ORF-R	GCTCTAGAGCGGGAAGTGTGGGGAGTTAGA	
<i>Cdc42se1</i> -ORF-F	CGGGATCCGTCGCTGAGTGTTGAGGATTA	pCDNA3.1- <i>cdc42se1</i>
<i>Cdc42se1</i> -Not I-R	ATAAGAATGCGGCCGCAATTTCCAAGGACCACGG	
<i>Cdc42-Q61L-F1</i>	GGAATTCATGCAGACGATCAAGTG	pEGFPN3- <i>Cdc42Q61L</i>
<i>Cdc42-Q61L-F2</i>	CAGACCTGCAGTATCAAA	
<i>Cdc42-Q61L-R1</i>	TTTGATACTGCAGGTCTG	
<i>Cdc42-Q61L-R2</i>	CGGGATCCAAATATACAGCACTCCG	
<i>Cdc42se1</i> -Flag-EcoR I-F	GGAATTCGGAGTGCCTTCTGGCATAAGA	pCMV-Myc/Flag expression plasmid
<i>Cdc42se1</i> -Flag-EcoR I-R	CCGCTCGAGATTCTTCTAAAACAGCCC	
<i>Cdc42</i> -Myc/Flag-EcoR I-F	GGAATTCGCAGACGATCAAGTGC	
<i>Cdc42</i> -Myc/Flag-Xho I-R	CCGCTCGAGTTAAAATATACAGCACTCCG	
<i>Actin</i> -Myc-EcoR I-F	GGAATTCGGGATGAGGAAATCGCTGC	
<i>Actin</i> -Myc-Xho I-R	CCGCTCGAGTAAGAAGCACTTCTGTG	
Vasa-F	AGATCTCAACCACAAGCATCCA	<i>In situ</i> hybridization
Vasa-R-T7	TAATACGACTCACTATATGTTACAGTCAGTCACT	
<i>Cdc42se1</i> -R-T7	TAATACGACTCACTATAGCAGTATCAAACAGCCCCAGG	
<i>miR</i> -202 GF	AAACATCTTTTAGTGGCACT	miR-202 phenotype
<i>miR</i> -202 GR	GACTTTTATTTTGCAT	