

Fig. S1. Metaphase plate rotation prior to mitosis

The metaphase plate is initially in the plane of imaging, then perpendicular to image plane, parallel to the PML and finally turns perpendicular to the PML, resulting in a planar radial division.

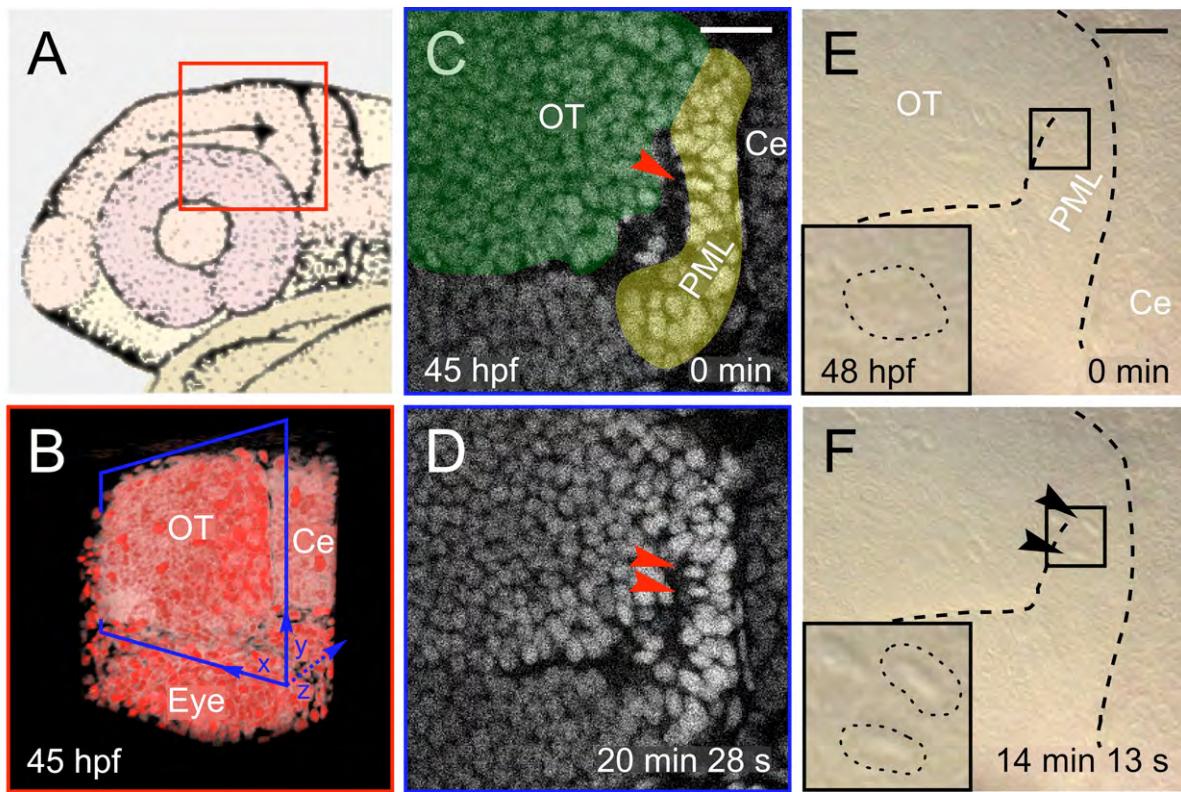


Fig. S2. TPLSM imaging: orientation and non-invasiveness

(A) Schematic drawing of a 31 hpf (prim-16) zebrafish larva head (adapted from (Kimmel et al., 1995)). Fish were mounted laterally so as to have access to the lateral side of the brain with a dipping lens objective. Red square: field of view imaged in (B).

(B) 3D rendering (obtained with Mov-IT) of the imaged field at 45 hpf. Anterior part is on the left and dorsal side on the top. OT: optic tectum; Ce: cerebellum. Blue square: sagittal optical sections in (C) and (D).

(C-F) Location and timing of mitoses in the PML for transgenic fish (TPLSM imaging, C-D) and WT fish (Nomarski imaging [Nikon DXM 1200 camera on Zeiss SV11 (Herbomel, 1999)]], E-F). Prophase (C-E) and telophase (D-F) stages of a mitosis (arrow heads). Scale bars: 20 μm.

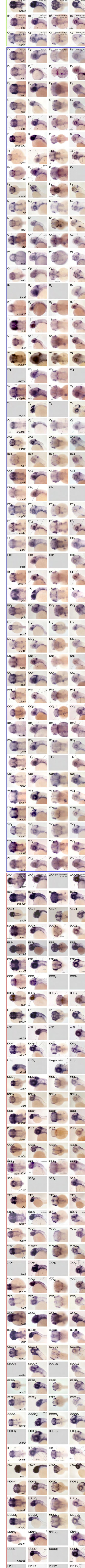


Fig. S3 (linked to Fig. 4). Pattern of PML and proliferation genes extracted from ZFIN

(A) Expression pattern of *cdc20* as an example of genes expressed in all proliferation zones of the anterior nervous system. (B) Expression patterns of the thinly expressed PML-specific gene *cad* at early stages (1–10 somites, 14–15 somites and 20–25 somites to prim-5). (C) Expression pattern of the PML-specific gene *np58* at prim-15 to prim-25 stages ($C_{1,2}$) and at high-pec / long-pec stages ($C_{3,4}$). (D-Z, AA-ZZ) Expression patterns of 49 PML genes (in red frame). Stages and views are indicated at the top of each picture. (AA-ZZZ; AAAA-ZZZZ; AAAAA-PPPPP) Expression patterns show ISH expression pattern in a prim 15–25 embryo (30 hpf – 36 hpf) in dorsal and lateral views, respectively. The third and fourth pictures show the ISH expression pattern in a high-pec / long-pec embryo (42 hpf – 48 hpf) in dorsal and lateral views, respectively.

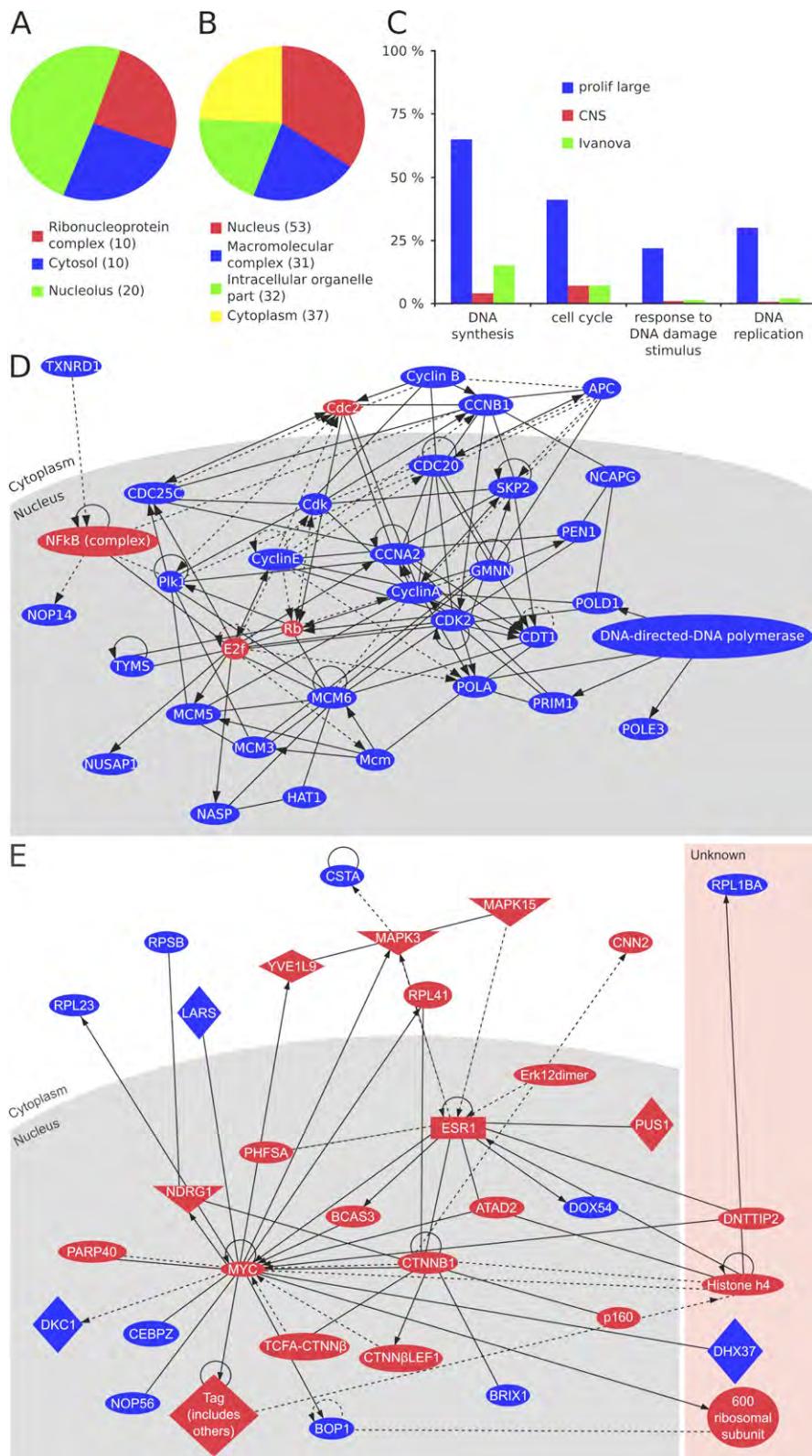
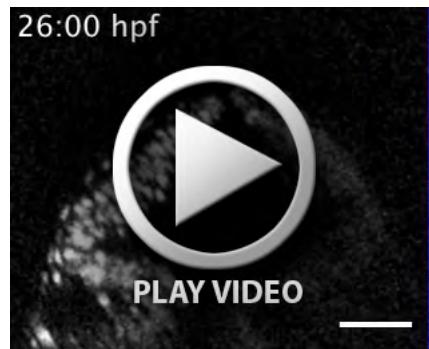
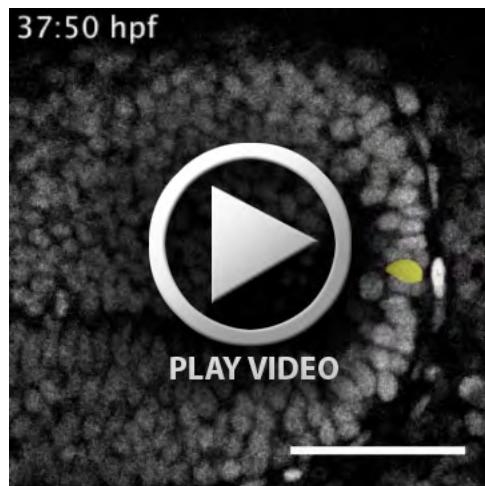


Fig. S4 The highly interconnected network of proliferation genes and the *Drosophila* neuroblast gene network

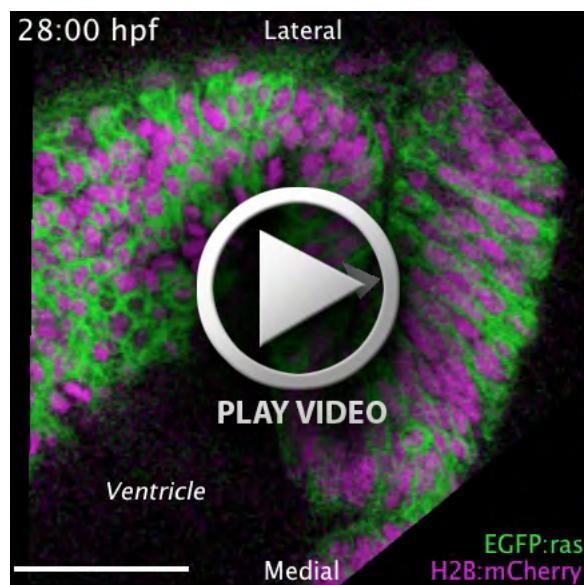
(A, B) Blast2GO cellular component term analysis (A) A multilevel pie chart (cut-off = 10) for the PML-specific genes showing a large proportion of their products are active in the nucleolus. (B) A multilevel pie chart (cut-off = 30) for the group of genes with wide expression patterns showing that a large proportion of their products are active in the nucleus. (C) Histograms illustrating the comparative results of GO enrichment analysis (Fisher's Exact Test) for the list of genes with wide expression pattern (using the lists of CNS genes, and of Ivanova Hematopoiesis Mature Cells (HMC) genes, as backgrounds). (D) Ingenuity® pathway analysis networks for the dataset of genes with a wide expression pattern. (E) The main *Drosophila* neuroblast network is interconnected with the fish network and contains nucleolar and ribosomal proteins (Neumuller et al., 2011).



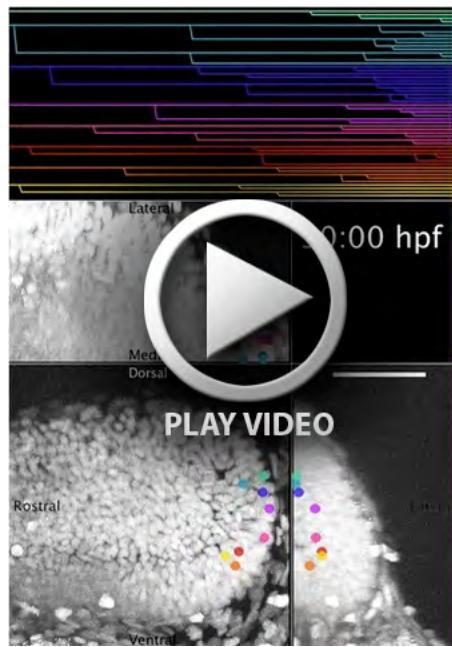
Movie 1 (linked to Fig. 1). Morphogenesis of the midbrain from 26:00 hpf to 46:00 hpf. Transversal section, H2B:Venus. Scale bar: 50 μ m.



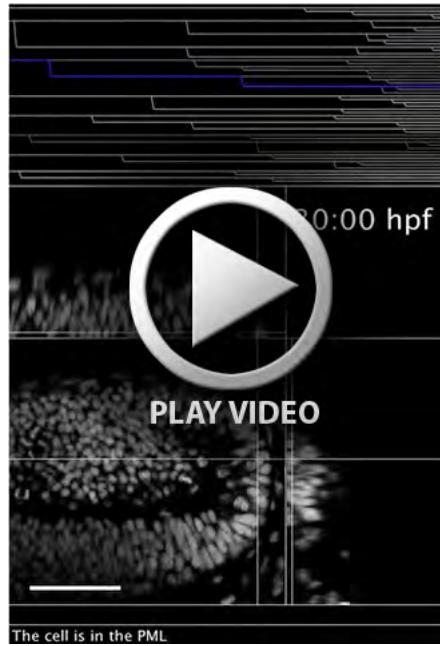
Movie 2 (linked to Fig. 2). Mitoses in the PML (yellow) and in the OT (green). Parasagittal section, H2B:Venus. Scale bar: 50 μ m.



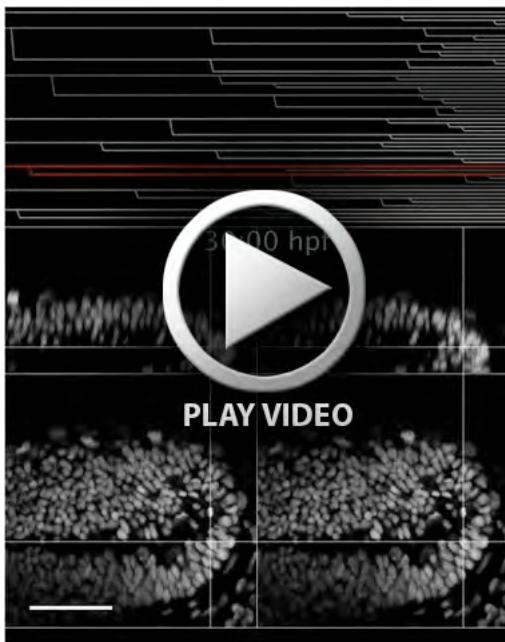
Movie 3 (linked to Fig. 2). Interkinetic migration in the PML. Horizontal section, H2B:mCherry, EGFP:ras. Scale bar: 50 μ m.



Movie 4 (linked to Fig. 3). Cell-tracking of eight clones from the PML to the OT with time course shown on the lineage trees. Trajectories are represented overlaid with the maximal projection of the volume, on the top image: top view projection, on the main image: lateral view projection and on the right image: frontal view projection.



Movie 5 (linked to Fig. 3). Example of typical clone behaviour from the PML to the OT. The blue cell is followed from the PML to the OT. Location of the cell is indicated by the intersection of the lines on each section (top image: horizontal section, main image: parasagittal section and right image: transverse section). Mitosis occurrences and cell location are made explicit in the bottom lines.



Movie 6 (linked to Fig. 3). Example of a clone that give rise to cells located both in the OT and in the TS. At the beginning of the movie, both panels are identical until mitoses occurs, then cells follow their own way, the left one going down the TS and the right one going up the OT, as indicated by the lines that locate either below or upon the ventricle lumen.

Table S1. List of NSC, proliferation and other genes

Data provided from Muller et al. [PluriNet (Muller et al., 2008)], Yan Jaszczyszyn (CNS list, personal communication), Neumuller [Drosophila neuroblasts (Neumuller et al., 2011)] and MSigDB v3.0 (Ivanova Hematopoiesis Mature Cells list (<http://www.broadinstitute.org/gsea/msigdb/index.jsp>)]

Table S2. List of the 20 first hits in the MSig analysis. Most are found on cancer lists.

Table S3. Phenotypes of zebrafish mutants for PML-expressed genes

There are mutant alleles available for 18 of the 51 “thinly” expressed PML genes (36%). Almost all of them have been generated via insertional mutagenesis (Amsterdam et al., 1999). The *cad^{a52}* allele is the only one obtained by ENU-mediated mutagenesis (Solnica-Krezel et al., 1994). Mutant homozygote embryos of the different lines share common phenotypes and almost all of them display smaller head and eyes (HE) if compared to wild-type embryos; vertebrate retinal development, and neurogenesis in general, can be viewed as a sequence of coordinated events. Shared phenotypes include several defects in the development of neuroectodermal derivatives. In most cases, mutant embryos show different levels of CNS cells necrosis (CNS), a pinched midbrain/hindbrain boundary (MHB) and an inflated hindbrain ventricle (IHV). Thinly expressed PML genes encode for ubiquitous proteins participating in pathways such as those for ribosome biogenesis and pyrimidine/purine biosynthesis. Other phenotypes, such as the presence of a pericardial oedema (PO) and underdevelopment of the liver/gut (LG), are often accompanied by an unabsorbed yolk (round grey yolk, RY). All the phenotypes described could be seen between the second and the fifth day of development. Less is known about mutant embryos at later developmental stages. CNS: Central Nervous System necrosis; HE: smaller head and eyes; IHV: inflated hindbrain ventricle; LG: underdeveloped liver/gut; MHB: pinched midbrain/hindbrain boundary; RY: rounder grey yolk.

Table S4. List of probes used for ISH

Plurinet list (<i>Homo sapiens</i>)	Proliferation zones list (<i>Danio rerio</i>)	PML list (<i>Danio rerio</i>)	CNS list (control) <i>Danio rerio</i>	Neuroblast-associated genes involved in ribosome biogenesis (<i>Drosophila melanogaster</i>)	Orthologues (<i>Mus musculus</i>)	IVANOVA hematopoiesis mature cell list (<i>Mus musculus</i>)				
AATF	ENSG00000108270	Ahcy	ENSDARG00000005191	adi1	ENSDARG00000020448	ahcY	ENSDARG00000005191	cdc16	FBgn0025781	1100001G20RIK
ACTA1	ENSG00000143632	anp32b	ENSDARG00000023330	atic	ENSDARG00000016706	ak5l	ENSDARG00000017739	Cdc27	FBgn0012058	1110038D17RIK
ANAPC1	ENSG00000153107	asc1a	ENSDARG00000038386	Bxdc1 (rpf2)	ENSDARG00000043960	aldh2a	ENSDARG00000028087	CG11180	FBgn0034528	Pinx1
ANP32A	ENSG00000140350	ccna2	ENSDARG0000011094	Bysl	ENSDARG0000001057	aldh2b	ENSDARG00000028087	CG11583	FBgn0035524	bxdc2
ANXA2	ENSG00000182718	ccnb1	ENSDARG00000051923	cad	ENSDARG00000041895	alp	ENSDARG00000015546	CG12325	FBgn0033557	pwp2
anxa3	ENSG00000138772	ccnd1	ENSDARG00000035750	cnbp (zff9)	ENSDARG00000045776	anp32b	ENSDARG00000023330	CG1671	FBgn0033454	tbl3
Apex1	ENSG00000100823	ccne2	ENSDARG00000027918	ctps	ENSDARG00000030700	arhgap29b	ENSDARG00000017748	CG1785	FBgn0030061	gltscr2
APOE	ENSG00000130203	ccnf	ENSDARG00000034763	Ddx18	ENSDARG00000030789	ari3l	ENSDARG00000028846	CG32344	FBgn0052344	ddx54
Arid3b	ENSG00000179361	Cdc20	ENSDARG00000020192	dmt1t4	ENSDARG00000036791	arr3l	ENSDARG00000056511	CG33123	FBgn0053123	lars
ARL4A	ENSG00000122644	Cdc25	ENSDARG00000010792	ect2	ENSDARG00000072728	ARX	ENSDARG00000058011	CG4554	FBgn0034734	Utp20
Armc6	ENSG00000105676	cda7	ENSDARG00000076260	Fbl	ENSDARG00000053912	atoh2b	ENSDARG00000020794	CG4806	FBgn0035048	rbm28
ATIC	ENSG00000138363	Cdca8	ENSDARG00000043137	fpgs	ENSDARG00000044809	atp1b1a	ENSDARG00000013144	CG5033	FBgn0028744	BOP1
AURKA	ENSG00000087586	cdk2	ENSDARG00000026577	ftsj	ENSDARG00000076761	AURKB	ENSDARG00000037640	CG5317	FBgn0032404	Rpl7i
AURKB	ENSG00000178999	cdt1	ENSDARG00000051854	gart	ENSDARG00000051855	BARHL2	ENSDARG00000070129	CG5800	FBgn0030855	ddx10
Bak1	ENSG00000030110	chaf1a	ENSDARG00000062152	hells	ENSDARG00000057738	BCAT1	ENSDARG00000045568	CG7338	FBgn0037073	tsr1
bat3	ENSG00000204463	Chtf18	ENSDARG00000058470	imp4	ENSDARG00000054540	BHLHE23	ENSDARG00000037588	CG7728	FBgn0036686	bms1
bccip	ENSG00000107949	cldn5a	ENSDARG00000043716	impdh2	ENSDARG0000006900	c3orf58a	ENSDARG00000012816	CG7839	FBgn0036124	Cebpz
BCL2	ENSG00000171791	Cx43.4	ENSDARG0000007099	kars	ENSDARG00000044220	calr2	ENSDARG00000076290	CG7993	FBgn0038585	bxdc1
BIK	ENSG00000100290	Ddx27	ENSDARG00000091831	lars	ENSDARG00000019280	cdx4	ENSDARG00000036292	CG8064	FBgn0036597	wdr3
BIRC5	ENSG00000089685	dlc	ENSDARG0000002336	metap1	ENSDARG00000033440	col7a1l	ENSDARG00000069692	CG8461	FBgn0038235	rrp36
Blm	ENSG00000197299	dnmt1	ENSDARG00000030756	mki67ip	ENSDARG00000040666	csrp1a	ENSDARG0000006603	CG9246	FBgn0032925	noc3l
BTBD14B	ENSG00000160877	Dsccl	ENSDARG00000019907	Mybbp1a	ENSDARG00000078214	dix1a	ENSDARG00000013125	Dbp73D	FBgn004556	BNIP3L
BUB1B	ENSG00000156970	Dut	ENSDARG00000086768	Myc4	ENSDARG00000045695	dix2a	ENSDARG00000079964	eif-4E	FBgn0015218	C1QB
BXD2C	ENSG00000113460	fen1	ENSDARG00000011404	nap114a	ENSDARG00000070560	dix5a	ENSDARG00000042296	Hlc	FBgn001565	C3
bysl	ENSG00000112578	Gmn	ENSDARG00000035957	nat10	ENSDARG00000054259	dmgb1b	ENSDARG0000002510	ida	FBgn0041147	CCDC142
C1orf103	ENSG00000121931	Hat1	ENSDARG00000034916	nle1	ENSDARG00000057105	efna2	ENSDARG00000031372	kz	FBgn0001330	CCNA2
C8orf32	ENSG00000156795	Hn1l	ENSDARG00000034427	noc3l	ENSDARG0000002487	efna5a	ENSDARG00000057223	lp259	FBgn0025366	CCR4L
CASP6	ENSG00000138794	ipo9	ENSDARG00000016753	noc4l	ENSDARG00000045565	Egfl6	ENSDARG00000045958	Mys45A	FBgn0033379	CD14
Casp9	ENSG00000132906	Kpn2a	ENSDARG00000038066	nop56	ENSDARG00000012820	egr2b	ENSDARG00000042826	Nmd3	FBgn0023542	CDCA3
CCDC5	ENSG00000152240	Mat2a	ENSDARG00000040334	nop58	ENSDARG00000058337	elavl4b	ENSDARG00000027495	Nop56	FBgn0038964	CDK8
CCNA2	ENSG00000145386	Mcm3	ENSDARG00000024204	npm1 (nppm1a)	ENSDARG00000014329	EMX1	ENSDARG00000039569	Nop60B	FBgn0023184	CDKN2D
CCNB1	ENSG00000134057	Mcm5	ENSDARG00000019507	pcca	ENSDARG00000028982	emx2	ENSDARG00000039701	Rpl135	FBgn0003278	CDKN3
CCNB2	ENSG00000157456	Mcm6	ENSDARG00000057683	pccb	ENSDARG00000038910	emx3	ENSDARG00000020417	Rpl10Aa	FBgn0038281	CDR2
CCND1	ENSG00000110092	msh2	ENSDARG00000018022	Pdcdb11	ENSDARG00000052459	eoemesa	ENSDARG0000006640	Rpl23	FBgn0010078	CELA1
CCNE1	ENSG00000105173	Msh6	ENSDARG00000011666	pes	ENSDARG00000018902	EVX1	ENSDARG0000005628	RpS10a	FBgn0027494	CES3
cda	ENSG00000158825	Msi1	ENSDARG00000010710	phb	ENSDARG00000057414	FEZF2	ENSDARG00000070677	RpS29	FBgn0037752	CMAS
CDC2	ENSG00000170312	Nasp	ENSDARG00000039208	pno1	ENSDARG0000008502	FGF22	ENSDARG00000076510	RpS8	FBgn0039713	COL1A1
CDC25C	ENSG00000158402	ncapd2	ENSDARG0000005058	Polr1b	ENSDARG00000077469	foxg1a	ENSDARG00000070769	shtd	FBgn004391	CTSB
Cdc45	ENSG00000093009	ncapg	ENSDARG00000070109	Ppan	ENSDARG00000022232	foxg1b	ENSDARG00000032705			CTSH
CDC7	ENSG00000097046	Nop14	ENSDARG00000033945	ppat	ENSDARG0000004517	foxh1	ENSDARG00000055630			CYBB
CDK7	ENSG00000134058	npepps	ENSDARG00000044943	prcr1	ENSDARG00000090337	fryb	ENSDARG00000056001			DCK
Cdt1	ENSG00000167513	Nusap1	ENSDARG0000002403	prd3	ENSDARG00000032102	fut9	ENSDARG00000067524			DEGS1

Cebpz	ENSG00000115816	Parp2	ENSDARG00000079202	prps1a	ENSDARG00000015524	GBX1	ENSDARG00000071418	EAR1
CENPE	ENSG00000138778	Pik1	ENSDARG00000058471	rpl7l1	ENSDARG00000042864	glra4a	ENSDARG0000006865	EAR2
CHAF1A	ENSG00000167670	pola1	ENSDARG00000045308	rrp1	ENSDARG00000027515	HADHA	ENSDARG00000057128	EGFR
CHEK1	ENSG00000149554	Pold1	ENSDARG00000027689	rrp12	ENSDARG00000022410	hoxa2b	ENSDARG00000023031	EMR1
CHEK2	ENSG00000183765	pole3	ENSDARG00000008551	Shmt1	ENSDARG00000052816	hoxa3a	ENSDARG00000036231	EPOR
cks1b	ENSG00000173207	Ppm1g	ENSDARG00000075559	umps	ENSDARG00000012215	hoxa4a	ENSDARG00000057724	EPS15
CKS2	ENSG00000123975	Prim1	ENSDARG00000040163	wdr12	ENSDARG00000003287	hoxa5a	ENSDARG00000001784	FCNA
COIL	ENSG00000121058	psat1	ENSDARG00000016733	wdr46	ENSDARG00000095879	hoxa9a	ENSDARG0000009461	FPR1
Cops3	ENSG00000141030	Ptgr1	ENSDARG00000024877	wdr75	ENSDARG00000040730	hoxb1b	ENSDARG00000054033	FPR2
Cops6	ENSG00000168090	rars	ENSDARG00000054530			hoxb2a	ENSDARG00000000175	GADD45A
CROP	ENSG00000108848	rfc2	ENSDARG00000014274			hoxb5a	ENSDARG00000013057	GCNT1
CTBP2	ENSG00000175029	rfc4	ENSDARG00000042458			hoxb5b	ENSDARG00000054030	GOLIM4
cxadr	ENSG00000154639	Rpa3	ENSDARG0000002613			hoxb6a	ENSDARG00000010630	GP49A
DAXX	ENSG00000204209	Rrm1	ENSDARG00000014017			hoxb6b	ENSDARG00000026513	GPX4
DAZAP1	ENSG00000071626	Rrm2	ENSDARG00000020711			hoxb8a	ENSDARG00000056027	GPX4
DDX11	ENSG0000013573	Rrs1	ENSDARG00000003941			hoxc1a	ENSDARG00000070337	GRINA
DHCR24	ENSG00000116133	Skp2	ENSDARG00000004937			hoxc4a	ENSDARG00000070338	GTF2A1
DHFR1	ENSG00000178700	smc2	ENSDARG00000017744			hoxc6a	ENSDARG00000070343	GTPBP2
DIAPH1	ENSG00000131504	smc4	ENSDARG00000038882			hoxc8a	ENSDARG00000070346	GYPA
DNMT3B	ENSG00000088305	Ssb	ENSDARG00000029252			hoxd3a	ENSDARG00000059280	H2-T24
dppa2	ENSG00000163530	tacc3	ENSDARG0000005454			hoxd4a	ENSDARG00000059276	HAGH
DSCC1	ENSG00000136982	Txnr1	ENSDARG00000017864			hprt1l	ENSDARG00000014866	HBA-A1
ELAC2	ENSG0000006744	Txnr3	AY221258 ZDB-GENE-030327-3	irx2a		igfbp1a	ENSDARG00000014947	HBA-A1
Erbb3	ENSG00000065361	tyms	ENSDARG00000042894				ENSDARG00000001785	HBB-B2
ERCC5	ENSG00000134899	xpo4	ENSDARG00000010281			irx6a	ENSDARG00000034420	HBB-B2
EU176320	ENSG00000130332	xrc6	ENSDARG00000071551			irx7	ENSDARG0000002601	HEBP1
EWSR1	ENSG00000182944					kcnip1b	ENSDARG00000034808	HEMGN
Exo1	ENSG00000174371					klf7l	ENSDARG00000043821	HGSNAT
Exosc3	ENSG00000107371					lbx1a	ENSDARG00000018611	HIATL1
EXOSC7	ENSG00000075914					lbx1b	ENSDARG00000018611	HIATL1
EXOSC8	ENSG00000120699					lft1	ENSDARG00000019920	HTATIP2
EXOSC9	ENSG00000123737					lhx1a	ENSDARG00000014018	ITGAM
FBL	ENSG00000105202					lhx8a	ENSDARG00000002330	ITGB2L
Fbp1	ENSG00000165140					lhx9	ENSDARG00000056979	KLF3
FEN1	ENSG00000168496					LMO1	ENSDARG00000034504	LAMP2
FKBP3	ENSG00000100442					mab21l1	ENSDARG00000055089	LGMN
FLJ14668	ENSG00000035141					Mab21l2	ENSDARG00000015266	LILRB3
FOXO4	ENSG00000184481					MMP23B	ENSDARG0000009825	LOC100045163
FUBP1	ENSG00000162613					MORN4	ENSDARG00000039062	LRG1
fus	ENSG00000089280					MPPED2	ENSDARG00000034443	LY6G
GADD45A	ENSG00000116717					MPZ	ENSDARG00000038609	MGST3
GDF9	ENSG00000164404					neurod	ENSDARG00000019566	MKRN1
GEMIN6	ENSG00000152147					nkx2.1b	ENSDARG00000019835	MMP8
GEMIN7	ENSG00000142252					nkx2.2a	ENSDARG00000053298	MPP1
gmnn	ENSG00000112312					nkx2.2b	ENSDARG00000052550	MRC1
GMPS	ENSG00000163655					nkx2.9	ENSDARG00000020332	MRPL53
gnl3	ENSG00000163938					nkx6.2	ENSDARG00000044075	MTHFD2
Got2	ENSG00000125166					nr2e1	ENSDARG00000017107	OTUD5
GPRIN2	ENSG00000204175					nr5a1b	ENSDARG00000023362	PCX

Grb7	ENSG00000141738	otpa	ENSDARG00000014201	PGLYRP1
Hdac1	ENSG00000116478	otp ^b	ENSDARG00000058379	PIGQ
HDAC2	ENSG00000196591	otx1a	ENSDARG00000030703	PPOX
Hist1h2bc	ENSG00000180596	Otx2	ENSDARG00000011235	PPP3R1
HMGA1	ENSG00000137309	otx5	ENSDARG00000043483	PQLC3
HMGB1	ENSG00000189403	pax6a	ENSDARG00000045936	PRC1
HMMR	ENSG00000072571	pax6b	ENSDARG00000045936	RAB24
Hnrnpab	ENSG00000197451	prdm8	ENSDARG00000025017	RAB6
Hnrnpk	ENSG00000165119	prdm8b	ENSDARG00000054683	RBMS1
HPRT1	ENSG00000165704	rock2b	ENSDARG00000004877	RHAG
HSP90AB1	ENSG00000096384	rrp1	ENSDARG00000027515	RHD
HSPA14	ENSG00000187522	rtk8	ENSDARG00000027112	RNF141
Hspa2	ENSG00000126803	shox2	ENSDARG00000075713	RNF167
HSPA8	ENSG00000109971	si	ENSDARG00000075347	RNF19A
HSPA9	ENSG00000113013	six3a	ENSDARG00000058008	SCD1
HSPD1	ENSG00000144381	six3b	ENSDARG00000054879	SDCBP
HSPE1	ENSG00000115541	sncga	ENSDARG00000034423	SLC11A1
HSPH1	ENSG00000120694	ST8SIA2	ENSDARG00000018788	SLC16A1
ITGB3BP	ENSG00000142856	STC2	ENSDARG00000056680	SLC1A5
JTV1	ENSG00000106305	TBR1	ENSDARG00000004712	SLC4A1
KIT	ENSG00000157404	TBX20	ENSDARG00000005150	SLC7A8
KPNA2	ENSG00000182481	tpbgl	ENSDARG00000040216	SLFN3
KPNB1	ENSG00000108424	VAX1	ENSDARG00000021916	SLFN4
LCK	ENSG00000182866	wu	ENSDARG00000027515	SNCA
LOC728340	ENSG00000145736	zgc	ENSDARG00000070081	SPNA1
LSM1	ENSG00000175324	zgc	ENSDARG00000035810	SRI
LSM3	ENSG00000170860	zgc	ENSDARG00000028087	ST3GAL5
LSM4	ENSG00000130520	zgc	ENSDARG00000017710	STX2
LSM5	ENSG00000106355	zgc	ENSDARG00000079964	TBCEL
Ism6	ENSG00000164167	zgc	ENSDARG00000067524	TCEA1
matK	ENSG00000007264	zgc	ENSDARG00000052109	TLR6
MBD2	ENSG00000134046	zgc	ENSDARG00000038794	TMEM56
Mcm10	ENSG00000065328			TMPO
mcm2	ENSG00000073111			TPRGL
MCM3	ENSG00000112118			TSPAN8
MCM4	ENSG00000104738			UBAC1
Mcm5	ENSG00000100297			UBLCP1
MCM6	ENSG00000076003			USP7
Mnat1	ENSG00000020426			XPO7
MPP6	ENSG00000105926			
mre11a	ENSG00000020922			
mRpS12	ENSG00000128626			
Msh2	ENSG00000095002			
msh3	ENSG00000113318			
msh6	ENSG00000116062			
MT1G	ENSG00000125144			
mtfhd1	ENSG00000100714			
Mutyh	ENSG00000132781			
myb	ENSG00000118513			
mybbp1a	ENSG00000132382			

MYBL2	ENSG00000101057
MYC	ENSG00000136997
Myst2	ENSG00000136504
NANOG	ENSG00000111704
ncl	ENSG00000115053
NFKBIB	ENSG00000104825
NLE1	ENSG00000073536
Nme1	ENSG0000011052
noc2l	ENSG00000188976
Nop56	ENSG00000101361
NOLA1	ENSG00000109534
NOLC1	ENSG00000166197
NOP58	ENSG0000055044
NP	ENSG00000198805
Npm1	ENSG00000181163
nppb	ENSG00000120937
nthl1	ENSG0000065057
Nudt1	ENSG00000106268
NUP153	ENSG00000124789
NUP50	ENSG0000093000
Orc1l	ENSG0000085840
ORC2L	ENSG00000115942
ORC6L	ENSG0000091651
Otx2	ENSG0000165588
PA2G4	ENSG00000170515
Pak1	ENSG00000149269
Pak3	ENSG0000077264
parp1	ENSG00000143799
PASK	ENSG00000115687
PBX1	ENSG00000185630
pcnA	ENSG00000132646
Pcyt1b	ENSG00000102230
pelp1	ENSG00000141456
pfdn6	ENSG00000204220
pfn1	ENSG00000108518
Phb	ENSG00000167085
PHC1	ENSG00000111752
Phf10	ENSG00000130024
PHGDH	ENSG00000092621
PIAS2	ENSG00000078043
plscr1	ENSG00000188313
PMAIP1	ENSG00000141682
pmf1	ENSG00000160783
PNN	ENSG00000100941
Pold1	ENSG00000062822
Pold2	ENSG00000106628
POLG2	ENSG00000136480
POLQ	ENSG0000051341
Polarc	ENSG00000171453
POLR1D	ENSG00000186184

POP1	ENSG00000104356
pop5	ENSG00000167272
POP7	ENSG00000172336
pou5f1	ENSG00000206454
POU5F1	ENSG00000204531
ppan	ENSG00000130810
Ppap2c	ENSG00000141934
ppID	ENSG00000171497
PPM1B	ENSG00000138032
prmt5	ENSG00000100462
PRNP	ENSG00000171867
PSIP1	ENSG00000164985
Psma3	ENSG00000100567
Psma6	ENSG00000100902
Psmd11	ENSG00000108671
PSME3	ENSG00000131467
PTMA	ENSG00000187514
PTPN6	ENSG00000111679
PXN	ENSG00000089159
rad51	ENSG00000051180
RAD54L	ENSG00000085999
RAD9A	ENSG00000172613
RASL11B	ENSG00000128045
RBM14	ENSG00000173959
Rbpms	ENSG00000157110
RCHY1	ENSG00000163743
Recql4	ENSG00000160957
RFC2	ENSG00000049541
RFC3	ENSG00000133119
Rfc4	ENSG00000163918
RFC5	ENSG00000111445
RMDN5B	ENSG00000145916
RND1	ENSG00000172602
RNMTL1	ENSG00000171861
RPA1	ENSG00000132383
RPA2	ENSG00000117748
Rpa3	ENSG00000106399
RPP40	ENSG00000124787
Ruvbl1	ENSG00000175792
sall4	ENSG00000101115
sephs1	ENSG00000086475
set	ENSG00000119335
SFRS1	ENSG00000136450
SFRS2	ENSG00000161547
SFRS3	ENSG00000112081
SIGLEC12	ENSG00000160296
sip1	ENSG00000092208
sirt1	ENSG00000096717
Slc19a1	ENSG00000173638
Smarcad1	ENSG00000163104

smin2	ENSG00000172062
SMNDC1	ENSG00000119953
snrpa	ENSG00000077312
SNRPB	ENSG00000125835
Snrpc	ENSG00000124562
SNRPD1	ENSG00000167088
SNRPE	ENSG00000182004
SNRPF	ENSG00000139343
SNRPN	ENSG00000214265
SNURF	ENSG00000128739
Socs1	ENSG00000185338
sp1	ENSG00000185591
SPAG5	ENSG0000076382
ssb	ENSG00000138385
stip1	ENSG00000168439
STRBP	ENSG00000165209
STX3	ENSG00000166900
STXBP2	ENSG00000076944
STXBP3	ENSG00000116266
Sumo1	ENSG00000116030
Supt3h	ENSG00000196284
SYNCRIP	ENSG00000135316
TARBP2	ENSG00000139546
tcerg1	ENSG00000113649
TCOF1	ENSG00000070814
TDGF3	ENSG00000163828
Tgif1	ENSG00000177426
tk1	ENSG00000167900
TMPO	ENSG00000120802
TMSB4Y	ENSG00000154620
TNFRSF8	ENSG00000120949
TNNI3	ENSG00000129991
toe1	ENSG00000132773
tp53	ENSG00000141510
Tpx2	ENSG00000088325
TRAIP	ENSG00000183763
TRIM28	ENSG00000130726
Trip13	ENSG00000071539
Ttrap	ENSG00000111802
tuba3c	ENSG00000198033
u2af1	ENSG00000160201
UNC119	ENSG00000109103
ung	ENSG00000076248
Vamp8	ENSG00000118640
Vasp	ENSG00000125753
WDR33	ENSG00000136709
WDR77	ENSG00000116455
Wdr8	ENSG00000116213
wee1	ENSG00000166483
wrn	ENSG00000165392

XRCC5	ENSG00000079246
XTP3TPA	ENSG00000179958
Zfp42	ENSG00000179059
ZNF165	ENSG00000197279
ZNF281	ENSG00000162702
znf593	ENSG00000142684

Gene Set Name [# Genes (K)]	Description	# Genes in overlap (k)	p value	Genes
CAIRO_HEPATOBLASTOMA_CLASSES_UP [611]	Genes up-regulated in robust Cluster 2 (rC2) of hepatoblastoma samples compared to those in the robust Cluster 1 (rC1).	19	0 e ⁰	GART, DDX18, PHB, PPAT, ATIC, CAD, BYSL, WDR12, NLE1, NAT10, FBL, NPM1, ECT2, IMP4, MYBBP1A, PDCD11, WDR46, IMPDH2, KARS
DODD_NASOPHARYNGEAL_CARCINOMA_DN [1375]	Genes down-regulated in nasopharyngeal carcinoma (NPC) compared to the normal tissue.	19	2.91 e ⁻¹³	GART, DDX18, PHB, PPAT, ATIC, CAD, FBL, NPM1, ECT2, UMPS, CTPS, MKI67IP, POLR1B, WDR75, NOC3L, HELLS, PPRC1, LARS, RPL7L1
KRIGE_RESPONSE_TO_TOSEDOSTAT_24HR_DN [1022]	Genes down-regulated in HL-60 cells (acute promyelocytic leukemia, APL) after treatment with the aminopeptidase inhibitor tosedostat (CHR-2797) for 24 h.	16	6.54 e ⁻¹²	GART, DDX18, PHB, BYSL, FBL, IMP4, MYBBP1A, PDCD11, WDR46, UMPS, MKI67IP, POLR1B, WDR75, NOC3L, PPAN, NOC4L
WEI_MYCN_TARGETS_WITH_EBOX [797]	Genes whose promoters contain E-box motifs and whose expression changed in MYCN-3 cells (neuroblastoma) upon induction of MYCN	14	4.3 e ⁻¹¹	DDX18, PHB, PPAT, BYSL, WDR12, IMP4, UMPS, CTPS, MKI67IP, POLR1B, WDR75, HELLS, PPRC1, SHMT1
BILD_MYC_ONCOGENIC_SIGNATURE [206]	Genes selected in supervised analyses to discriminate cells expressing c-Myc [Gene ID=4609] from control cells expressing GFP.	8	2.57 e ⁻⁹	DDX18, PHB, ATIC, WDR12, NLE1, NPM1, IMP4, MYBBP1A
DANG_MYC_TARGETS_UP [130]	Genes up-regulated by MYC [Gene ID=4609] and whose promoters are bound by MYC, according to MYC Target Gene Database.	7	2.9 e ⁻⁹	DDX18, PHB, PPAT, CAD, NPM1, SHMT1, PRDX3
RHEIN_ALL_GLUCOCORTICOID_THERAPY_DN [366]	Genes down-regulated in ALL (acute lymphoblastic leukemia) blasts after 1 week of treatment with glucocorticoids.	9	1.26 e ⁻⁸	ATIC, FBL, NPM1, ECT2, IMPDH2, PRDX3, CNBP, PCCA, PCCB
KINSEY_TARGETS_OF_EWSR1_FLI1_FUSION_UP [1281]	Genes up-regulated in TC71 and EWS502 cells (Ewing's sarcoma) upon knockdown of the EWSR1-FLII fusion [Gene ID=2130, 2314].	14	2 e ⁻⁸	GART, DDX18, PPAT, NPM1, ECT2, MYBBP1A, UMPS, CTPS, MKI67IP, NOC3L, HELLS, LARS, SHMT1, PRDX3
MARZEC_IL2_SIGNALING_UP [107]	Genes up-regulated by IL2 [Gene ID=3558] in cells derived from CD4+ [Gene ID=920] cutaneous T-cell	6	3.37 e ⁻⁸	GART, PPAT, PDCD11, UMPS, CTPS, POLR1B

	lymphoma (CTCL).			
PUJANA_BRCA1_PCC_NETWORK [1671]	Genes constituting the BRCA1-PCC network of transcripts whose expression positively correlated (Pearson correlation coefficient, PCC >= 0.4) with that of BRCA1 [Gene ID=672] across a compendium of normal tissues.	15	7.33 e ⁻⁸	GART, DDX18, ATIC, CAD, BYSL, FBL, NPM1, IMP4, IMPDH2, KARS, CTPS, PRDX3, CNBP, PCCB, METAP1
WELCSH_BRCA1_TARGETS_1_DN [125]	Upregulated by induction of exogenous BRCA1 in EcR-293 cells	6	8.55 e ⁻⁸	PPAT, ATIC, CAD, BYSL, PDCD11, CTPS
RODRIGUES_THYROID_CARCINO MA_POORLY_DIF DIFFERENTIATED_UP [640]	Genes up-regulated in poorly differentiated thyroid carcinoma (PDTC) compared to normal thyroid tissue.	10	1.26 e ⁻⁷	GART, PPAT, ATIC, WDR12, NPM1, ECT2, CTPS, MKI67IP, WDR75, HELLs
KRIGE_RESPONSE_TO_TOSEDOST AT_6HR_DN [920]	Genes down-regulated in HL-60 cells (acute promyelocytic leukemia, APL) after treatment with the aminopeptidase inhibitor tosedostat (CHR-2797) for 6 h.	11	3.9 e ⁻⁷	GART, DDX18, PHB, IMP4, MYBBP1A, PDCD11, WDR46, UMPS, k MKI67IP, POLR1B, PPAN

Gene	Mutant	Mutant Phenotype						
		CNSn	MHB	HE	PO	LG	IHV	RY
<i>bysl</i>	<i>bysl</i> ^{hi3351Tg}	x		x	x	x	x	x
<i>cad</i>	<i>cad</i> ^{a52} , <i>cad</i> ^{hi2694Tg}			x	x	x		x
<i>ddx18</i>	<i>ddx18</i> ^{hi1727Tg}	x		x		x	x	
<i>ect2</i>	<i>ect2</i> ^{hi3820aTg}	x		x				x
<i>fbl</i>	<i>fbl</i> ^{hi2581Tg} ; <i>fbl</i> ^{hi3580Tg}	x		x	x		x	x
<i>gart</i>	<i>gart</i> ^{hi3526bTg}							
<i>kars</i>	<i>kars</i> ^{hi2586Tg}			x	x	x		
	<i>mki67ip</i> ^{hi1581Tg}							
<i>mki67ip</i>	<i>mki67ip</i> ^{hi2827bTg}	x					x	
	<i>mki67ip</i> ^{hi4003aTg}							
<i>mybbp1a</i>	<i>mybbp1a</i> ^{hi1552Tg}	x		x	x	x		x
<i>noc3l</i>	<i>noc3l</i> ^{hi1019Tg}	x		x	x	x		x
	<i>noc3l</i> ^{hi3783Tg}							
<i>nop56</i>	<i>nop56</i> ^{hi3101Tg}	x	x	x	x		x	x
<i>nop58</i>	<i>nop58</i> ^{hi3118Tg}	x		x	x	x	x	x
<i>pes</i>	<i>pes</i> ^{hi2Tg}			x		x		
<i>rpl7l1</i>	<i>rpl7l1</i> ^{hi1793Tg}			x	x			
<i>rrp1</i>	<i>rrp1</i> ^{hi2689Tg}			x	x	x	x	x
	<i>rrp1</i> ^{hi2705aTg}							
<i>wdr12</i>	<i>wdr12</i> ^{hi3120Tg}			x	x	x		
<i>wdr46</i>	<i>wdr46</i> ^{hi1451Tg}	x	x	x	x	x	x	x
<i>wdr75</i>	<i>wdr75</i> ^{hi2404Tg}	x	x		x	x		

CNS: Central Nervous System necrosis

MHB: Pinched MHB

HE: Smaller head eyes

PE: pericardial edema

LG: underdeveloped liver/gut

IHV: Inflated hindbrain ventricule

RY: Round grey (unconsumed) yolk

<i>ect2</i>	ENSDARG00000007278	Fwd	CCCTGTCCCAGATCAGAAGA
		Rev	ATTAAATCGCCCAGACGTG
<i>pes</i>	ENSDARG00000018902	Fwd	TGGGC GGATTACAAAAGAAG
		Rev	GCGGGTAGACAAGGTTGAGA
<i>nop56</i>	ENSDARG0000001282	Fwd	TGGTCAA ACTGAGTGC GTTC
		Rev	ACCAATGAGAGCTGCGAGAT
<i>cad</i>	ENSDARG00000041895	Fwd	CTTCATGCCCAATACAGT
		Rev	ACGCCCTTCTGGACATCTT
<i>pcna</i>	ENSDARG00000054155	Fwd	GGCACACATCAAGCTCTCACA
		Rev	TTAAGGGTTGACTGGATGAA