

Table S1. List of medaka synexpression groups with over-represented GO categories and shared DNA motifs

Synexpression pattern	Best motif Z-score	Best over-represented GO category (corrected <i>P</i> -value)	Number of Ensembl genes	TRN mountains
Cardiovascular system		Gas transport (0.01540299)	8	TRN33 -
Ciliary marginal zone, forebrain proliferative zone, tectum proliferative zone, cerebellum proliferative zone, rhombic lips, pectoral fin	123.15345	DNA-dependent DNA replication (0.03473054)	10	TRN15 -
Ciliary marginal zone, forebrain, midbrain, cerebellum, pectoral fin	33.77132	Spindle organization and biogenesis (4.827E-03)	21	TRN50 -
Ciliary marginal zone, forebrain, midbrain, metencephalon, rhombomeres (N4-8), somites, pectoral fin	15.929607	Cytosolic ribosome (sensu Eukaryota) (8.254E-03)	30	TRN05 - TRN04 -
Ciliary marginal zone, forebrain, midbrain, pectoral fin	10.954736	Ribosomal subunit (7.705E-04)	51	TRN50 - TRN61 - TRN59 -
Ciliary marginal zone, tectum marginal zone		Nucleobase biosynthetic process (0.01477971)	8	TRN18 -
Ciliary marginal zone, tectum marginal zone, tectum proliferative zone	9.52356	Interphase (7.681E-03)	87	TRN29 - TRN31 - TRN30 - TRN17 - TRN15 - TRN16 - TRN21 - TRN18 - TRN63 - TRN09 -
Ciliary marginal zone, tectum proliferative zone	16.4812	DNA-dependent DNA replication (1.703E-03)	36	TRN17 - TRN15 - TRN16 - TRN21 -
Ciliary marginal zone, tectum proliferative zone, pectoral fin	18.57839	DNA-dependent DNA replication (2.89E-04)	26	TRN15 - TRN16 - TRN21 -
Embryo	10.329724	Ribosomal subunit (1.088E-09)	60	TRN01 -
EVL enveloping layer	10.464704	Intermediate filament cytoskeleton (0.01517016)	63	TRN19 - TRN20 - TRN10 - TRN08 -
Eye, otic vesicle, olfactory system, brain, blood, duct of Cuvier, heart, oral cavity, gut, liver, mesenchyme derived from head neural crest, somites, notochord, epidermis, pectoral fin, tail bud, YSL yolk syncytial layer, EVL enveloping layer	8.283605	Cytosolic ribosome (sensu Eukaryota) (7.067E-09)	107	TRN01 - TRN02 - TRN03 - TRN05 - TRN04 -
Forebrain, midbrain	16.971712	Cytosolic ribosome (sensu Eukaryota) (8.254E-03)	31	TRN61 - TRN59 -
Forebrain, midbrain, pectoral fin	11.240835	Ribosomal subunit (6.113E-06)	66	TRN49 - TRN50 - TRN61 - TRN59 -
Retina, brain	13.277704	Ribosomal subunit (1.281E-03)	31	TRN48 - TRN47 -
Retina, brain, pectoral fin	12.390228	Ribosomal subunit (2.884E-06)	40	TRN45 - TRN46 - TRN48 - TRN47 -
Retina, forebrain, midbrain	41.818764	Proteasome complex (sensu Eukaryota) (0.0366369)	16	TRN56 - TRN58 -
Retina, forebrain, midbrain, cerebellum, pectoral fin	10.43542	Cytosolic ribosome (sensu Eukaryota) (1.776E-17)	113	TRN60 - TRN62 - TRN45 - TRN46 - TRN48 - TRN47 - TRN57 - TRN56 - TRN58 - TRN54 - TRN55 - TRN53 - TRN51 - TRN52 -
Retina, forebrain, midbrain, cerebellum, rhombomeres (N4-8), liver, pectoral fin,	28.254759	Cytosolic ribosome (sensu Eukaryota) (1.202E-07)	19	TRN55 - TRN53 - TRN51 - TRN52 -
Retina, forebrain, midbrain, cerebellum, rhombomeres (N4-8), liver, somites, pectoral fin	56.364357	Cytosolic ribosome (sensu Eukaryota) (2.999E-04)	15	TRN04 -
Retina, forebrain, tectum, cerebellum, heart, oral cavity, pectoral fin	28.529606	Cytosolic ribosome (sensu Eukaryota) (2.458E-03)	23	TRN62 -
Retina, forebrain, tectum, cerebellum, pectoral fin	41.694447	Large ribosomal subunit (0.02367476)	14	TRN54 -
Somites		Contractile fiber part (0.01075321)	13	TRN02 -
Somites, pectoral fin	12.719994	Contractile fiber (7.608E-05)	52	TRN02 - TRN03 - TRN05 - TRN04 -

Table S2. List of medaka synexpression groups with unknown GO category and shared DNA motifs

Synexpression pattern	Best motif Z-score	Number of Ensembl genes	TRN mountains
Brain	12.419819	47	TRN39 - TRN42 - TRN41 - TRN43 - TRN44 - TRN40 -
Brain, heart		6	TRN42 -
Brain, pectoral fin		8	TRN43 -
Ciliary marginal zone	122.007706	10	TRN17 -
Ciliary marginal zone, brain		8	TRN40 -
Ciliary marginal zone, brain, somites, pectoral fin	76.49878	15	TRN05 -
Epidermis	24.450068	24	TRN19 - TRN20 -
Epidermis, EVL enveloping layer	113.0007	12	TRN08 -
Epidermis, YSL yolk syncytial layer		7	TRN07 -
Eye, midbrain		6	TRN29 -
Forebrain, midbrain, midbrain hindbrain boundary (MHB), hindbrain	9.502161	83	TRN25 - TRN37 - TRN38 - TRN36 - TRN35 - TRN39 - TRN42 - TRN41 - TRN43 - TRN44 - TRN40 -
Forebrain, pectoral fin	47.121162	17	TRN49 -
Forebrain, tectum central zone, hindbrain	111.72649	12	TRN36 -
Gut		10	TRN23 -
Heart	28.44234	20	TRN33 - TRN34 - TRN32 -
Hindbrain	56.968285	21	TRN26 - TRN27 -
Midbrain	14.439914	30	TRN18 - TRN63 - TRN09 -
Retina, forebrain, midbrain, pectoral fin	13.837548	32	TRN57 - TRN56 - TRN58 -
Retina, forebrain, tectum marginal zone, pectoral fin	52.665	16	TRN57 -
Retina, tectum marginal zone, oral cavity, pectoral fin	86.59573	10	TRN31 -
Retina, tectum marginal zone, pectoral fin	27.888313	18	TRN31 - TRN30 -
Retina, tectum, pectoral fin	19.973934	24	TRN29 - TRN31 - TRN30 -
Telencephalon		13	TRN22 -
Telencephalon, diencephalon, tectum proliferative zone, hindbrain, pectoral fin	51.76166	15	TRN25 - TRN37 -
Telencephalon, tectum proliferative zone, hindbrain, pectoral fin		11	TRN25 -
YSL yolk syncytial layer	13.489273	40	TRN06 - TRN07 -

Table S3. Co-expressed genes with an over-represented GO category but no motif

Synexpression pattern	Best over-represented GO category (corrected <i>P</i> -value)	Number of Ensembl genes	TRN mountains
Forebrain proliferative zone, forebrain marginal zone, telencephalon, diencephalon, tectum central zone, tectum marginal zone, tectum proliferative zone	Cytosolic ribosome (sensu Eukaryota) (2.273E-24)	557	TRN06 - TRN07 - TRN19 - TRN20 - TRN10 - TRN08 - TRN13 - TRN33 - TRN34 - TRN32 - TRN28 - TRN24 - TRN12 - TRN23 - TRN11 - TRN14 - TRN01 - TRN02 - TRN03 - TRN05 - TRN04 - TRN29 - TRN31 - TRN30 - TRN17 - TRN15 - TRN16 - TRN21 - TRN18 - TRN63 - TRN09 - TRN26 - TRN27 - TRN22 - TRN25 - TRN37 - TRN38 - TRN36 - TRN35 - TRN39 - TRN42 - TRN41 - TRN43 - TRN44 - TRN40 - TRN49 - TRN50 - TRN61 - TRN59 - TRN60 - TRN62 - TRN45 - TRN46 - TRN48 - TRN47 - TRN57 - TRN56 - TRN58 - TRN54 - TRN55 - TRN53 - TRN51 - TRN52 -
Ciliary marginal zone, ganglion cells, forebrain, midbrain, cerebellum, pectoral fin	Cytosolic ribosome (sensu Eukaryota) (2.404E-22)	254	TRN22 - TRN25 - TRN37 - TRN38 - TRN36 - TRN35 - TRN39 - TRN42 - TRN41 - TRN43 - TRN44 - TRN40 - TRN49 - TRN50 - TRN61 - TRN59 - TRN60 - TRN62 - TRN45 - TRN46 - TRN48 - TRN47 - TRN57 - TRN56 - TRN58 - TRN54 - TRN55 - TRN53 - TRN51 - TRN52 -
Ciliary marginal zone, forebrain, tectum, cerebellum, pectoral fin	Cytosolic ribosome (sensu Eukaryota) (3.158E-23)	479	TRN13 - TRN33 - TRN34 - TRN32 - TRN28 - TRN24 - TRN12 - TRN23 - TRN11 - TRN14 - TRN01 - TRN02 - TRN03 - TRN05 - TRN04 - TRN29 - TRN31 - TRN30 - TRN17 - TRN15 - TRN16 - TRN21 - TRN18 - TRN63 - TRN09 - TRN26 - TRN27 - TRN22 - TRN25 - TRN37 - TRN38 - TRN36 - TRN35 - TRN39 - TRN42 - TRN41 - TRN43 - TRN44 - TRN40 - TRN49 - TRN50 - TRN61 - TRN59 - TRN60 - TRN62 - TRN45 - TRN46 - TRN48 - TRN47 - TRN57 - TRN56 - TRN58 - TRN54 - TRN55 - TRN53 - TRN51 - TRN52 -
Ciliary marginal zone, forebrain, midbrain, cerebellum, rhombomeres (N4-8), pectoral fin	Cytosolic ribosome (sensu Eukaryota) (8.583E-22)	268	TRN26 - TRN27 - TRN22 - TRN25 - TRN37 - TRN38 - TRN36 - TRN35 - TRN39 - TRN42 - TRN41 - TRN43 - TRN44 - TRN43 - TRN44 - TRN40 - TRN49 - TRN50 - TRN61 - TRN59 - TRN60 - TRN62 - TRN45 - TRN46 - TRN48 - TRN47 - TRN57 - TRN56 - TRN58 - TRN54 - TRN55 - TRN53 - TRN51 - TRN52 -
Retina, forebrain, midbrain, cerebellum, rhombomeres (N4-8), blood, liver, pectoral fin	Cytosolic ribosome (sensu Eukaryota) (1.281E-04)	3	TRN52 -
Epidermis, pectoral fin	Oxidative phosphorylation (0.01070432)	3	TRN20 -

Table S4. Co-expressed genes with no over-represented motifs or GO category

Synexpression pattern	Number of Ensembl genes	TRN mountains
Eye, otic vesicle, olfactory system, brain, blood, duct of Cuvier, heart, oral cavity, gut, liver, mesenchyme derived from head neural crest, somites, notochord, epidermis, pectoral fin, tail bud, YSL yolk syncytial layer, EVL enveloping layer	107	TRN01 - TRN02 - TRN03 - TRN05 - TRN04 -
Ciliary marginal zone, tectum marginal zone, tectum proliferative zone	87	TRN29 - TRN31 - TRN30 - TRN17 - TRN15 - TRN16 - TRN21 - TRN18 - TRN63 - TRN09 -
Embryo	60	TRN01 -
Retina, forebrain, midbrain, cerebellum, pectoral fin	113	TRN60 - TRN62 - TRN45 - TRN46 - TRN48 - TRN47 - TRN57 - TRN56 - TRN58 - TRN54 - TRN55 - TRN53 - TRN51 - TRN52 -
EVL enveloping layer	63	TRN19 - TRN20 - TRN10 - TRN08 -
Ciliary marginal zone, forebrain, midbrain, pectoral fin	51	TRN50 - TRN61 - TRN59 -
Forebrain, midbrain, pectoral fin	66	TRN49 - TRN50 - TRN61 - TRN59 -
Retina, brain, pectoral fin	40	TRN45 - TRN46 - TRN48 - TRN47 -
Somites, pectoral fin	52	TRN02 - TRN03 - TRN05 - TRN04 -
Retina, brain	31	TRN48 - TRN47 -
Ciliary marginal zone, forebrain, midbrain, metencephalon, rhombomeres (N4-8), somites, pectoral fin	30	TRN05 - TRN04 -
Ciliary marginal zone, tectum proliferative zone	36	TRN17 - TRN15 - TRN16 - TRN21 -
Forebrain, midbrain	31	TRN61 - TRN59 -
Ciliary marginal zone, tectum proliferative zone, pectoral fin	26	TRN15 - TRN16 - TRN21 -
Retina, forebrain, midbrain, cerebellum, rhombomeres (N4-8), liver, pectoral fin	19	TRN55 - TRN53 - TRN51 - TRN52 -
Retina, forebrain, tectum, cerebellum, heart, oral cavity, pectoral fin	23	TRN62 -
Ciliary marginal zone, forebrain, midbrain, cerebellum, pectoral fin	21	TRN50 -
Retina, forebrain, tectum, cerebellum, pectoral fin	14	TRN54 -
Retina, forebrain, midbrain	16	TRN56 - TRN58 -
Retina, forebrain, midbrain, cerebellum, rhombomeres (N4-8), liver, somites, pectoral fin	15	TRN04 -
Ciliary marginal zone, forebrain proliferative zone, tectum proliferative zone, cerebellum proliferative zone, rhombic lips, pectoral fin	10	TRN15 -
Somites	13	TRN02 -
Cardiovascular system	8	TRN33 -
Ciliary marginal zone, tectum marginal zone	8	TRN18 -
Forebrain proliferative zone, forebrain marginal zone, telencephalon, diencephalon, tectum central zone, tectum marginal zone, tectum proliferative zone	557	TRN06 - TRN07 - TRN19 - TRN20 - TRN10 - TRN08 - TRN13 - TRN33 - TRN34 - TRN32 - TRN28 - TRN24 - TRN12 - TRN23 - TRN11 - TRN14 - TRN01 - TRN02 - TRN03 - TRN05 - TRN04 - TRN29 - TRN31 - TRN30 - TRN17 - TRN15 - TRN16 - TRN21 - TRN18 - TRN63 - TRN09 - TRN26 - TRN27 - TRN22 - TRN25 - TRN37 - TRN38 - TRN36 - TRN35 - TRN39 - TRN42 - TRN41 - TRN43 - TRN44 - TRN40 - TRN49 - TRN50 - TRN61 - TRN59 - TRN60 - TRN62 - TRN45 - TRN46 - TRN48 - TRN47 - TRN57 - TRN56 - TRN58 - TRN54 - TRN55 - TRN53 - TRN51 - TRN52 -
Ciliary marginal zone, ganglion cells, forebrain, midbrain, cerebellum, pectoral fin	254	TRN22 - TRN25 - TRN37 - TRN38 - TRN36 - TRN35 - TRN39 - TRN42 - TRN41 - TRN43 - TRN44 - TRN40 - TRN49 - TRN50 - TRN61 - TRN59 - TRN60 - TRN62 - TRN45 - TRN46 - TRN48 - TRN47 - TRN57 - TRN56 - TRN58 - TRN54 - TRN55 - TRN53 - TRN51 - TRN52 -
Ciliary marginal zone, forebrain, tectum, cerebellum, pectoral fin	479	TRN13 - TRN33 - TRN34 - TRN32 - TRN28 - TRN24 - TRN12 - TRN23 - TRN11 - TRN14 - TRN01 - TRN02 - TRN03 - TRN05 - TRN04 - TRN29 - TRN31 - TRN30 - TRN17 - TRN15 - TRN16 - TRN21 - TRN18 - TRN63 - TRN09 - TRN26 - TRN27 - TRN22 - TRN25 - TRN37 - TRN38 - TRN36 - TRN35 - TRN39 - TRN42 - TRN41 - TRN43 - TRN44 - TRN40 - TRN49 - TRN50 - TRN61 - TRN59 - TRN60 - TRN62 - TRN45 - TRN46 - TRN48 - TRN47 - TRN57 - TRN56 - TRN58 - TRN54 - TRN55 - TRN53 - TRN51 - TRN52 -
Ciliary marginal zone, forebrain, midbrain, cerebellum, rhombomeres (N4-8), pectoral fin	268	TRN26 - TRN27 - TRN22 - TRN25 - TRN37 - TRN38 - TRN36 - TRN35 - TRN39 - TRN42 - TRN41 - TRN43 - TRN44 - TRN40 - TRN49 - TRN50 - TRN61 - TRN59 - TRN60 - TRN62 - TRN45 - TRN46 - TRN48 - TRN47 - TRN57 - TRN56 - TRN58 - TRN54 - TRN55 - TRN53 - TRN51 - TRN52 -
Retina, forebrain, midbrain, cerebellum, rhombomeres (N4-8), blood, liver, pectoral fin	3	TRN52 -
Epidermis, pectoral fin	3	TRN20 -

Table S5. List of chromosomally clustered synexpression groups

Chromosome	Location of gene 1:gene 2	Number of genes between gene 1 and gene 2	Number of genes on chromosome	P-value	Synexpression group
<i>I</i>	31964085-31966685:31982814-31985104	0	914	0	<i>EVL enveloping layer</i>
1	22399584-22401061:22919697-22920776	9	914	0.01918	Hindbrain
1	35258525-35469179:35420648-35422989	Overlapping	914	0	Retina, forebrain, midbrain, cerebellum, pectoral fin
3	29723585-29732093:29746261-29766150	1	769	0.00253	Somites, pectoral fin
4	4439844-4447828:4444286-4454478	Overlapping	901	0	Ciliary marginal zone, tectum marginal zone
6	997648-1004457:1070833-1080623	3	843	0.00695	Somites, pectoral fin
7	28238465-28318159:28333764-28393594	0	871	0	Brain
7	7406697-7410538:7507084-7510003	4	871	0.00962	Brain
8	8390431-8391008:8411256-8412025	3	956	0.00632	Cardiovascular system
9	30630753-30635268:30727688-30834412	3	955	0.00635	Embryo
11	16668308-16672348:16673078-16676632	0	753	0	Eye, otic vesicle, olfactory system, brain, blood, duct of Cuvier, heart, oral cavity, gut, liver, mesenchyme derived from head neural crest, somites, notochord, epidermis, pectoral fin, tail bud, YSL yolk syncytial layer, EVL enveloping layer
11	16598538-16611238:16673078-16676632	6	753	0.01629	Retina, forebrain, midbrain, pectoral fin
12	4971162-4981110:4989140-4991292	1	729	0.00268	Retina, forebrain, midbrain, cerebellum, pectoral fin
<i>13</i>	<i>32816315-32817559:32817065-32818077</i>	<i>Overlapping</i>	<i>834</i>	<i>0</i>	<i>YSL yolk syncytial layer</i>
23	3751680-3760493:3780744-3787930	0	471	0	Somites, pectoral fin
24	5408324-5411677:5421500-5426821	1	700	0.00311	Ciliary marginal zone, forebrain, midbrain, pectoral fin
24	9492210-9494923:9665259-9670351	9	700	0.02543	Ciliary marginal zone, tectum proliferative zone, pectoral fin
Ultracontig88	415263-422636:450452-457065	1	21	0.0990	Ciliary marginal zone