

## Supplementary data:

**Table 1.** Identification numbers of sequences used in alignment and phylogenetic analysis.

Species	Gene	Identification numbers
<i>Alligator sinensis</i>	Sox7	XP_006028221.1
<i>Alligator mississippiensis</i>	Sox18	XP_006273131.1
<i>Bos taurus</i>	Sox17	NP_001193180.1
<i>Cyprinus carpio</i>	Sox7	KY860088
	Sox17	KY860089
	Sox18	KY860090
<i>Cyprinodon variegatus</i>	Sox7	XP_015227182.1
<i>Danio rerio</i>	Sox7	NP_001074219.1
	Sox17	NP_571362.2
	Sox18	XP_001337702.1
<i>Erinaceus europaeus</i>	Sox17	XP_007516051.1
	Sox18	XP_007524500.1
<i>Gallus gallus</i>	Sox7	XP_001234628.1
	Sox17	NP_001034415.1
	Sox18	NP_989640.1
<i>Gekko japonicus</i>	Sox7	XP_015284766.1
<i>Homo sapiens</i>	Sox7	NP_113627.1
	Sox17	NP_071899.1
	Sox18	NP_060889.1
<i>Ictalurus punctatus</i>	Sox18	XP_017341862.1
<i>Latimeria chalumnae</i>	Sox18	XP_006010839.1
<i>Macaca fascicularis</i>	Sox7	XP_005562646.1
	Sox17	NP_001270474.1
	Sox18	XP_015285553.1
<i>Mus musculus</i>	Sox7	NP_035576.1
	Sox17	NP_035571.1
	Sox18	NP_033262.2
<i>Oryzias latipes</i>	Sox18	XP_011475950.1
<i>Oreochromis niloticus</i>	Sox7	XP_005460371.1
	Sox17	XP_003439290.1
<i>Poecilia reticulata</i>	Sox7	XP_008396141.1
	Sox17	XP_008401761.1
<i>Parus major</i>	Sox18	XP_015503375.1
<i>Sinocyclocheilus rhinoceros</i>	Sox17a	XP_016396342.1
<i>Xenopus tropicalis</i>	Sox7	NP_001016326.1
	Sox17a	NP_989425.1

	Sox18	NP_001123409.1
<i>Zonotrichia albicollis</i>	Sox7	XP_005493348.1

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**Table 2.** The comparison of transcription factor binding sites of 5' flanking between *C. carpio*, *D. rerio* and *O. latipes SoxF* subgroup. All TF names in figure 5. a, *Sox7*; b, *Sox17*; c, *Sox18*.

TF name	Detailed Information	Zebrafish	Medaka
AP1	Activator protein 1	+	+
BSX	Brain specific homeobox	-	-
BRN2	Brn-2, POU-III protein class	+	+
BRN3	Brn-3, POU-IV protein class	-	+
BRN5	Brn-5 POU domain factors	-	+
CEBPB	CCAAT/enhancer binding protein beta	+	+
E2F	E2F transcription factor 6	+	+
FOXL1	Fork head related activator-7	+	+
GATA3	GATA-binding factor 3	+	+
GATA4	GATA binding protein 4	-	-
HNF1	Hepatic nuclear factor 1	+	+
HNF3	Hepatocyte nuclear factor 3 (alpha, beta) (FOXA1, FOXA2);	+	+
HNF6	Liver enriched Cut-Homeodomain transcription factor HNF6 (ONECUT1)	+	+
MEF3	MEF3 binding sites	+	+
MEF2	MEF2, myocyte-specific enhancer binding factor	+	+
MTBF	Muscle-specific Mt binding site	-	+
NANOG	Homeobox transcription factor Nanog	-	+
NF-Y	Nuclear factor Y (Y-box binding factor)	-	-
Oct1	Octamer-binding factor 1	+	+
Oct6	POU-factor Tst-1/Oct-6	-	-
SOX1	Sex-determining region Y gene product	+	-
SOX3	SRY-box containing gene 3	+	-
SOX4	SRY-related HMG-box gene 4	-	-
SOX5	SRY (sex determining region Y)-box 5	+	+
SOX6	SRY (sex determining region Y)-box 6	+	+
SOX9	SRY-related HMG box gene 9	-	-
SP1	Stimulating protein 1, ubiquitous zinc finger transcription factor	+	+
GSH2	Homeodomain transcription factor Gsh-2	-	+
RUSH	SWI/SNF related nucleophosphoproteins with a RING finger DNA binding motif	+	+
TAL1	T-cell acute lymphocytic leukemia 1, SCL	-	+
MYT1	Myelin transcription factor 1-like, neuronal C2HC zinc finger factor 1	+	+

(a)

(b)

TF name	Detailed Information	Zebrafish	Medaka
AP1	Activator protein 1	+	+
BRN2	Brn-2, POU-III protein class	+	+
BRN3	Brn-3, POU-IV protein class	+	+
CEBPB	CCAAT/enhancer binding protein beta	+	+
E2F	E2F transcription factor 6	-	+
FOXL1	Fork head related activator-7	-	-
GATA1	GATA-binding factor 1	+	+
HNF3	Hepatocyte nuclear factor 3 (alpha, beta) (FOXA1, FOXA2);	+	-
Oct6	POU-factor Tst-1/Oct-6	-	-
SOX1	Sex-determining region Y gene product	+	+
GSH2	Homeodomain transcription factor Gsh-2	+	+
RUSH	SWI/SNF related nucleophosphoproteins with a RING finger DNA binding motif	+	+
MYT1	Myelin transcription factor 1-like, neuronal C2HC zinc finger factor 1	+	+

(c)

TF name	Detailed Information	Zebrafish	Medaka
AP1	Activator protein 1	+	+
BSX	Brain specific homeobox	+	+
BRN2	Brn-2, POU-III protein class	+	+
BRN3	Brn-3, POU-IV protein class	+	+
BRN4	POU domain transcription factor brain 4	-	+
BRN5	Brn-5 POU domain factors	+	-
CEBPB	CCAAT/enhancer binding protein beta	+	+
E2F	E2F transcription factor 6	+	+
FOXL1	Fork head related activator-7	+	-
GATA1	GATA-binding factor 1	+	+
GATA2	GATA-binding factor 2	-	-
GATA3	GATA-binding factor 3	+	+
HNF1	Hepatic nuclear factor 1	+	-
HNF3	Hepatocyte nuclear factor 3 (alpha, beta) (FOXA1, FOXA2);	+	+
MEF2	MEF2, myocyte-specific enhancer binding factor	+	+
MTBF	Muscle-specific Mt binding site	+	+
Oct1	Octamer-binding factor 1	+	+
Oct4	POU domain, class 5, transcription factor 1	-	-
SOX1	Sex-determining region Y gene product	-	+
SOX2	SRY (sex determining region Y)-box 2	-	-
SOX3	SRY-box containing gene 3	+	+
SOX5	SRY (sex determining region Y)-box 5	+	-
SOX6	SRY (sex determining region Y)-box 6	+	+
SOX7	SRY (sex determining region Y)-box 7	-	-
SOX9	SRY-related HMG box gene 9	-	+
SP1	Stimulating protein 1, ubiquitous zinc finger transcription factor	-	+
GSH2	Homeodomain transcription factor Gsh-2	+	-
RUSH	SWI/SNF related nucleophosphoproteins with a RING finger DNA binding motif	+	+
MYT1	Myelin transcription factor 1-like, neuronal C2HC zinc finger factor 1	+	+

The '+' indicated the same transcription factor binding sites among *C. carpio*, *D. rerio* and *O. latipes*. The '-' indicated the different transcription factor binding sites among *C. carpio*, *D. rerio* and *O. latipes*.

**Table 3.** Relative expression values of *SoxF*.

	Sox7		Sox17		Sox18	
	$2^{-\Delta\Delta ct}$	SD	$2^{-\Delta\Delta ct}$	SD	$2^{-\Delta\Delta ct}$	SD
Eye	0.339936	0.069758	0.033726	0.004656	0.038473	0.00879
Fin	0.208772	0.037479	0.011359	0.000936	0.003852	0.000243
Forebrain	0.933033	0.017036	0.001922	0.000817	0.061925	0.018767
Foregut	0.031467	0.004058	0.003122	0.001705	0.010333	0.00093
Gill	0.130912	0.033314	0.016213	0.000925	0.004091	0.001411
Heart	0.66128	0.356708	0.014714	0.003742	0.198884	0.03257
Hindbrain	1	0.074735	0.012402	0.003428	0.112656	0.011185
Hindgut	0.043185	0.004711	0.00296	0.000547	0.013792	0.000814
Kidney	0.116091	0.04265	0.000992	0.000625	0.020333	0.010239
Liver	0.059678	0.017611	0.002167	0.00171	0.004809	0.001736
Muscle	0.266093	0.062826	0.005002	0.002516	0.024069	0.014651
Scal	0.160058	0.009178	0.009142	0.001175	0.00657	0.001478
Spleen	0.467596	0.069826	0.019823	0.002889	0.054159	0.014894
Gonad	0.005921	0.003726	0.004405	0.004391	0.015916	0.01296
Blastula period	0.015027	0.010096	0.00693	0.003469	0.00032	0.001357
Gastrula period	0.85698	0.198506	2.66475	0.496925	0.004615	0.000942
Neurula period	0.016573	0.008118	0.639493	0.060966	0.001266	0.001315
Tail bud period	0.169145	0.054996	0.009289	0.000101	0.004731	0.003169
Hatching period	0.124424	0.012702	0.004206	0.001061	0.006615	0.010812
Diencephalon	1.918528	0.208009	0.03082	0.00399	0.011023	0.004598
Mesencephalon	5.883467	0.404617	0.006302	0.005406	0.071463	0.005523
Macromyelon	1.148698	0.135804	0.010404	0.003466	0.049951	0.00559
Epencephalon	3.638474	0.302378	0.103187	0.006101	0.006848	0.001853
Telencephalon	2.841527	0.528742	0.01323	0.009395	0.005706	0.00053