

A.anguilla, Amh	CRLQPLSVSLK	---SYVLEPATAAINN	CEGG	CG-FPLA	---EANNHAILLSHESQSG-QPLGRSP	CCVPLRY	---ADLQVVEL	---KGAGTEI-TIKPNMVAMR	CCGR
A.japonica, Amh	CRLQPLSVSLK	---SYVLEPATAAINN	CEGG	CG-FPLA	---EANNHAILLSHESQSG-QPLGRSP	CCVPLRY	---ADLQVVEL	---KGAGTEI-TIKPNMVATRC	CCGR
M.cyprinoides, Amh	CQLHSLTVSLK	---KYVLNPPTTNIK	CQGA	CS-FPLT	---NTNNHVILLNSHWESG-FPLERPP	CCVVPDY	---EDLQVAEL	---DGAGTKI-SIKPNVVAKE	CCGR
O.mykiss, Amh	CRLHSLTVSLE	---KYLLSPPEATIY	CQGV	CS-FPLT	---NGNNHAILLSNQISG-LALERSP	CCVVPDY	---EDLKVVVEL	---DEHGTEI-CYKPNMVAKE	CCGR
S.formosus, Amh	CQLHPLTVSMD	---KYLLSPSTAANN	CQGS	CS-DLPLE	---RITNHAMMLNHRNNG-LPLERGP	CCVVPVEY	---EELCQAVL	---NSEGTEI-QYKPEMVAKE	CCGR
O.niloticus, Amh	CLKALTVSLT	---KLLVGSSANINN	CHGS	CT-FPLT	---NGNNHAILLSNHIETG-NADERSP	CCVVPVAY	---EALQVVDW	---NADGTFI-SIKPDVAVER	CCGR
O.latipes, Amh	CLRLSLTVSFE	---KLLGQPSSANINN	CRGV	CS-FPLI	---NGNNHAILLSHTESV-AEERAP	CCVVPVAY	---DPLEVLDW	---NDEGSFL-SIKPDMIARE	CCGR
X.tropicalis, AMH	CRLQELTISLKPFAEYKQDVLPEEININ		CVGR	CR-FPQTTQ	NDYQTHVLLIQLQERSQSGLARPP	CCVVPVRY	---EEQWLMVV	---EENGIRI-QSYPNMVAKE	CCGR
G.gallus, AMH	CRLQELTIDLR	---DRNFIVMPTVYAANN	CEGG	CR-LPLSTRVP	PGYHSHTVLLGQMERG-SPLQRAP	CCVVPVRY	---SDQLITSV	---SAEGLEV-RKFPMVAE	CCGR
L.chalumnae, AMH	CLRLRELNVDSL	---HETFIQVPEKEYLAN	CAGH	CG-LPMSDQNKYN	SHVILLMKMQERGMN-LKRN	CCVVPVKY	---SGLFVSFR	---IENGLEL-SLYPNMVAED	CCGR
H.sapiens, AMH	CALRELSVDLRA	---ERSVLIPETYQAN	CQGV	CG-WPQSDRNP	FRYGNHVLLLMQVYRG-AALARPP	CCVPTAY	---AGKLLISL	---SEERISA-HHVPNMVATE	CCGR
M.musculus, AMH	CALRELSVDLRA	---ERSVLIPETYQAN	CQGA	CA-WPQSDRNP	FRYGNHVLLLMQVYRG-AALGRLP	CCVPTAY	---AGKLLISL	---SEERISA-HHVPNMVATE	CCGR
M.cyprinoides, Gdf5	CHRKQLHVNFKEMGWDDWIIAPLEYEAYH	CGVC	CO-FPIRSHL	EPTNHAIQTLM	---NSMDPDSTPPT	CCVPTRL	---SPISILYI	---DSANNVVKYQYEDMVVES	CCGR
O.mykiss, Gdf5	CHRKQLHVNFKEMGWDDWIIAPLEYEAYH	CGVC	CO-FPIRSHL	EPTNHAIQTLM	---NSMDPDSTPPT	CCVPTRL	---SPISILYI	---DSANNVVKYQYEDMVVES	CCGR
P.kingsleyae, Gdf5	CHRKQLHVNFKEMGWDDWIIAPLEYDAFH	CGVC	CE-FPIRSHL	EPTNHAIQTLM	---NSMDPDSTPPT	CCVPTRL	---SPISILYI	---DSANNVVKYQYEDMVVES	CCGR
O.niloticus, Gdf5	CHRRRLHVNFKEMGWDDWIIAPLEYDAYH	CGGA	CO-FPIRSHL	EPTNHAIQTLM	---NSMDPESTPPT	CCVPTRL	---SPISILYI	---DSANNVVKYQYEDMVVES	CCGR
O.latipes, Gdf5	CHRKHLHVNFKEMGWDDWIIAPLEYDAFH	CSGC	CO-FPIRSHL	EPTNHAIQTLM	---NSMDPKSTPPT	CCVPTRL	---SPISILYI	---DSANNVVKYQYEDMVVES	CCGR
A.anguilla, Gdf5	CHRRQLHVNFKEMGWDDWIIAPLEYEAYH	CEGA	CO-FPIRSHL	EPTNHAIQTLM	---NSMDPDSTPPT	CCVPTRL	---SPISILYI	---DSANNVVKYQYEDMVVES	CCGR
H.sapiens, GDF5	CHRKALHVNFKDMGWDDWIIAPLEYEAFH	CEGI	CE-FPLRSHL	EPTNHAVIQTLM	---NSMDPESTPPT	CCVPTRL	---SPISILFI	---DSANNVVKYQYEDMVVES	CCGR
M.musculus, GDF5	CHRKALHVNFKDMGWDDWIIAPLEYEAFH	CEGI	CE-FPLRSHL	EPTNHAVIQTLM	---NSMDPESTPPT	CCVPTRL	---SPISILFI	---DSANNVVKYQYEDMVVES	CCGR
G.gallus, GDF5	CHRKALHVNFKDMGWDDWIIAPLEYEAYH	CEGI	CE-FPLRSHL	EPTNHAVIQTLM	---NSMDPESTPPT	CCVPTRL	---SPISILFI	---DSANNVVKYQYEDMVVES	CCGR
L.chalumnae, GDF5	CHRKALHVNFKDMGWDDWIIAPLEYEAYH	CEGI	CE-FPLRSHL	EPTNHAVIQTLM	---NSMDPESTPPT	CCVPTRL	---SPISILYI	---DSANNVVKYQYEDMVVES	CCGR
X.tropicalis, GDF5	CHKKPLHVNFKDMGWDDWIIAPLEYEAYH	CEGI	CE-FPLRSHL	EPTNHAVIQTLM	---NSMDPETTPPT	CCVPTRL	---SPISILYT	---DSANNVVKYQYEDMVVES	CCGR
M.cyprinoides, Tgfb1	CCVRKLYIDFRKDLGKWKIHKPKGYHAN	CMGS	CTYI	---WNAENKYSQILALYKHHNPGASAP	CCVPOVL	---EPLPILYY	---VGRQHKV-EQLSNMIVKSC	CKCS	
O.mykiss, Tgfb1	CCVRKLYIDFRKDLGKWKIHKPKGYHAN	CMGS	CTYI	---WNAENKYSQILALYKHHNPGASAP	CCVPOVL	---EPLPILYY	---VGRQHKV-EQLSNMIVKSC	CKCS	
O.niloticus, Tgfb1	CCCLKLYIDFRKDLGKWKIHKPTGYHAN	CMGS	CTYI	---WDAENKYSQILALYKHHNPGASAP	CCAPQTL	---EPLPIIYY	---VGRQHKV-EQLSNMIVKSC	CKCS	
A.anguilla, Tgfb1	CCSVRLYIDFRKDLGKWKIHEPAGYHAN	CMGS	CTYI	---WNAENKYSQILALYKHHNPGASAP	CCVPOVL	---EPLPILYY	---VGRQHKV-EQLSNMIVKSC	CKCS	
O.latipes, Tgfb1	CCMQSLYIDFRKDLGKWKIHKPTGYHAN	CKGS	CSYI	---WNAENKYSQILALYKHHNPGASAP	CCVPOTL	---EPLPILYY	---VGRQHKV-EQLSNMIVKSC	CKCS	
H.sapiens, TGFb1	CCVRQLYIDFRKDLGKWKIHEPKGYHAN	CLGH	CPYI	---WSLDQYSKVLALYNQHNPGASAP	CCVPOAL	---EPLPIVYY	---VGRKPKV-EQLSNMIVKSC	CKCS	
M.musculus, TGFb1	CCVRQLYIDFRKDLGKWKIHEPKGYHAN	CLGH	CPYI	---WSLDQYSKVLALYNQHNPGASAP	CCVPOAL	---EPLPIVYY	---VGRKPKV-EQLSNMIVKSC	CKCS	
L.chalumnae, TGFb1	CCVRPLYIDFRKDLGKWKIHEPKGYHAN	CMGI	CPYI	---WSMDQYSKVLALYNQHNPDASAP	CCVPOVL	---EPLPILYY	---VGRQAKV-EQLSNMIVKSC	CKCS	
G.gallus, TGFb1	CCVRPLYIDFRKDLGKWKIHEPKGYMAN	CMGI	CPYI	---WSADQYTKVLALYNQHNPGASAP	CCVPOTL	---EPLPIIYY	---VGRNVV-EQLSNMIVKSC	CKCS	
X.tropicalis, TGFb1	CCVVKPLYINFRKDLGKWKIHEPKGYEANY	CLGN	CPYI	---WSTDQYSKVLALYNQHNPGASAP	CCVPOVL	---EPLPIIYY	---VGRNAKV-EQLSNMIVKSC	CKCS	
A.japonica, Gsdf	CCQLASQIFINDLGWENWIFPDFTFTYTQ	C-AVCO	---	PHLDPKAPKCRANSPEPNTPSK	CCQPTSH	---VMVPPFFYL	---DELNTPVISSVA	---LTNQCSCK	
A.anguilla, Gsdf	CCQLASQIFINDLGWENWIFPDFTFTYTQ	C-AVCO	---	PHLDPKAPKCRANSPEPNTPSK	CCQPTSH	---VMVPPFFYL	---DELNTPVISSVA	---LTNQCSCK	
M.cyprinoides, Gsdf	CCQLVLSQIFIDLGWENWVVIYPTFTYTQ	C-TVCT	---	PNLDLTVPYRTHSPPEPTSSK	CCQPTSQ	---ELVPIFYM	---DEFNLTVISSVH	---LARGCSCK	
O.mykiss, Gsdf	CCPLASQIFLKDGLWENWVIYPTFTYTQ	C-SICK	---	SRLDLSPSRCPSPHAPPAQDTPSQMP	CCQTTST	---EHVPPFLYM	---DEFSTLTIPSQV	---LTRACPSG	
O.niloticus, Gsdf	CCSIASEIFMKDLGWDNWIHPLSLTYVQ	C-AICN	---	SAMTTVQCPSSQVNVQDANTQDQVP	CCRPTSQ	---EEVPIVYM	---DGSIAIVMSSMQ	---LTRSCICE	
O.latipes, Gsdf	CCSMQAEVFMKDLGWDNWIHPLSLTIIDFC	C-AICN	---	SSDQTAQCPAAHDGQVQIRGSQDQAS	CCCKPTSL	---EIVPIVFM	---DETSTVISSVQ	---LARGCSCK	
L.oculatus, Inha	CHRAELNISFEELGWDNWIHVPKVFTFYI	CHGN	CS	---SWDRMTTILGMKQ	CCAPVPG	---TMSRLRFRITTS	---DGGYSFKYETLPNIIAED	CCICI	
A.spatula, Inha	CHRAELNISFEELGWDNWIHVPKVFTFYI	CHGN	CS	---SWDRMTTILGMKQ	CCAPVPG	---TMSRLRFRITTS	---DGGYSFKYETLPNIIAED	CCICI	
M.cyprinoides, Inha	CHREELNISFQELGWDNWIHVPKVFTFYI	CHGN	CS	---SWDRMTTILGIKQ	CCTPVPG	---TMKSLRFRITTS	---DGGYSFKYETLPNIIAED	CCICI	
P.kingsleyae, Inha	CHREELNISFADLGWENWIHVPKVFTFYI	CHGN	CS	---SWNRMTTLLGIKQ	CCAPLPG	---TMKSLRFRITTS	---DGGYSFKYETLPNIIAED	CCICI	
O.niloticus, Inha	CHRAEIDISFEELGWDNWIHVPKVLFTFYI	CHGN	CS	---GGDRITAMLGITQ	CCAPVPG	---TMSRLRITTS	---DGGYSFKYETLPNIIAED	CCICI	
A.ruthenus, Inha	CHRMELNISFEELGWDNWIHVPRAFTFYH	CHGN	CS	---NTERMTTFLGIKQ	CCAPVPG	---TMKSLKFRITTS	---DGGYSFKYETLPNIIAED	CCICI	
P.spathula, Inha	CHRMALNISLEELGWDNWIHVPRAFTFYH	CHGN	CS	---SREHMTTYLGIKQ	CCAPVPG	---TMKSLKFRITTS	---DGGYSFKYETLPNIIAED	CCICI	
A.anguilla, Inha	CHREELNISFQELGWDNWIHVPKVFTFYH	CHGN	CS	---SQDRITTMLGIRQ	CCAPVPG	---TMKPLRVRTTS	---DRGYSVKYETLPNIIAED	CCICI	
O.latipes, Inha	CJRGGEISFEELGWDNWIHVPKVTFTFYI	CHGN	CS	---AADRTTAMLGMSQ	CCAPVHG	---SMRSLKVTTS	---DGGYSFKLETLPNIIPEEC	CCICI	
O.mykiss, Inha	CJRETINISFQELGWDNWIHVPKVLNFYI	CHGN	CS	---ALDRTTAMLGIRQ	CCAPVPG	---TMSRLRFTTS	---DGGYSFKYETLPNIIPEEC	CCICI	
S.formosus, Inha	CRRTTELNISFEDLGWDNWIHVPKVLFTFSI	CHGN	CT	---SRDRVTTVLGLRQ	CCAPVPE	---TMKSLHFHTTS	---DGGYSFKYETLPNIIAED	CCICI	
M.cyprinoides, Bdnf	SRRGELSVCDSI	---SQWVTAVDKKTAIDMSGQTVTVLEKVPVPNGQLKQYFYETK				CNPMGYTKDGCGRGIDKRHYSQ	CRRTQSYVRALTMDSKKIGWRFRIR	---IDTSCVCT	
A.anguilla, Bdnf	SRRGELSVCDSI	---SQWVTAVDKKTAIDMSGQTVTVLEKVPVPNGQLKQYFYETK				CNPMGYTKDGCGRGIDKRHYSQ	CRRTQSYVRALTMDSKKIGWRFRIR	---IDTSCVCT	
O.mykiss, Bdnf	SRRGELSVCDSI	---SQWVTAVDKKTAIDMSGQTVTVLEKVPVPNGQLKQYFYETK				CNPMGYTKDGCGRGIDKRHYSQ	CRRTQSYVRALTMDSKKIGWRFRIR	---IDTSCVCT	
P.kingsleyae, Bdnf	ARRGELSVCDSI	---SQWVTAVDKKTAIDMSGQTVTVLEKVPVPNGQLKQYFYETK				CNPMGYTKDGCGRGIDKRHYSQ	CRRTQSYVRALTMDSKKIGWRFRIR	---IDTSCVCT	
O.latipes, Bdnf	SRRGELSVCDSI	---SQWVTAVDKKTAIDMSGQTVTVMEKVPVPNGQLKQYFYETK				CNPMGYTKDGCGRGIDKRHYSQ	CRRTQSYVRALTMDSKKIGWRFRIR	---IDTSCVCT	
O.niloticus, Bdnf	SRRGELSVCDSI	---SQWVTAVDKKTAIDMSGQTVTVMEKVPVPNGQLKQYFYETK				CNPMGYTKDGCGRGIDKRHYSQ	CRRTQSYVRALTMDSKKIGWRFRIR	---IDTSCVCT	
H.sapiens, BDNF	ARRGELSVCDSI	---SEWVTAAADKKTAIDMSGQTVTVLEKVPVPNGQLKQYFYETK				CNPMGYTKDGCGRGIDKRHYSQ	CRRTQSYVRALTMDSKKIGWRFRIR	---IDTSCVCT	
M.musculus, BDNF	ARRGELSVCDSI	---SEWVTAAADKKTAIDMSGQTVTVLEKVPVPNGQLKQYFYETK				CNPMGYTKDGCGRGIDKRHYSQ	CRRTQSYVRALTMDSKKIGWRFRIR	---IDTSCVCT	
L.chalumnae, BDNF	ARRGELSVCDSI	---SEWVTAAADKKTAIDMSGQTVTVLEKVPVPNGQLKQYFYETK				CNPMGYTKDGCGRGIDKRHYSQ	CRRTQSYVRALTMDSKKIGWRFRIR	---IDTSCVCT	
G.gallus, BDNF	ARRGELSVCDSI	---SEWVTAAEKKTAIDMSGQTVTVLEKVPVPNGQLKQYFYETK				CNPMGYTKDGCGRGIDKRHYSQ	CRRTQSYVRALTMDSKKIGWRFRIR	---IDTSCVCT	
X.tropicalis, BDNF	ARRGELSVCDSI	---SEWVTAAANKKTAIDMSGQTVTVLEKVPVPNGQLKQYFYETK				CNPMGYTKDGCGRGIDKRHYSQ	CRRTQSYVRALTMDSKKIGWRFRIR	---IDTSCVCT	

TGFB domain

NGF domain

TGFB domain

NGF domain

Figure S2: Alignment of 50 TGF- $\beta$  domain and 11 NGF domain amino acid sequences used in the phylogeny analysis (in Figure 3). Multiple alignment of TGF- $\beta$  domain (transforming growth factor-beta family) of Amh, Gdf5, Gsdf, Inha and Tgfb1; and NGF domain (nerve growth factor) sequences of Bdnf. Conserved amino acids of the cysteine knot of TGF- $\beta$  domain are boxed.