

Table S1. Information of genes used for sequence, phylogeny and structure analysis in present study

Source	Accession No.	Gene name	Species	Application
GenBank	XP_019217488.1	hRas	<i>Oreochromis niloticus</i>	DP,DOA
GenBank	XP_003439035.4	cRaf	<i>Oreochromis niloticus</i>	DP,DOA
GenBank	XP_003440493.1	MEK1	<i>Oreochromis niloticus</i>	DP,DOA,MSA,3D,PA
KEGG	5604	MEK1	<i>Homo sapiens</i>	PA
KEGG	100446021	MEK1	<i>Pongo abelii</i>	PA
KEGG	100009316	MEK1	<i>Oryctolagus cuniculus</i>	PA
KEGG	478347	MEK1	<i>Canis familiaris</i>	PA
KEGG	26395	MEK1	<i>Mus musculus</i>	MSA,3D,PA
KEGG	170851	MEK1	<i>Rattus norvegicus</i>	PA
KEGG	415549	MEK1	<i>Gallus gallus</i>	MSA,PA
KEGG	102096091	MEK1	<i>Columba livia</i>	PA
KEGG	104683880	MEK1	<i>Corvus cornix</i>	PA
KEGG	102563228	MEK1	<i>Alligator mississippiensis</i>	PA
KEGG	102373880	MEK1	<i>Alligator sinensis</i>	MSA,PA
KEGG	101949355	MEK1	<i>Chrysemys picta</i>	PA
KEGG	108712802	MEK1	<i>Xenopus laevis</i>	MSA,PA
KEGG	493420	MEK1	<i>Xenopus tropicalis</i>	PA
KEGG	108784101	MEK1	<i>Nanorana parkeri</i>	PA
KEGG	406728	MEK1	<i>Danio rerio</i>	PA
KEGG	101162677	MEK1	<i>Oryzias latipes</i>	MSA,PA
KEGG	104922316	MEK1	<i>Larimichthys crocea</i>	PA
KEGG	110160811	MEK1	<i>Boleophthalmus pectinirostris</i>	PA
KEGG	107388720	MEK1	<i>Nothobranchius furzeri</i>	PA
KEGG	103186399	MEK1	<i>Callorhinchus milii</i>	PA
GenBank	XP_020378439.1	MEK1	<i>Rhincodon typus</i>	PA
KEGG	BRAFLDRAFT_124326	MEK1	<i>Branchiostoma floridae</i>	PA
GenBank	XP_781505.3	MEK1	<i>Strongylocentrotus purpuratus</i>	PA
GenBank	XP_011677450.1	MEK1	<i>Strongylocentrotus purpuratus</i>	PA
KEGG	Dmel_CG15793	MEK1	<i>Drosophila melanogaster</i>	PA
KEGG	100742289	MEK1	<i>Bombus impatiens</i>	PA
KEGG	KGM_206256	MEK1	<i>Danaus plexippus</i>	PA
KEGG	105339480	MEK1	<i>Crassostrea gigas</i>	PA
KEGG	106880850	MEK1	<i>Octopus bimaculoides</i>	PA
KEGG	LOAG_12861	MEK1	<i>Loa loa</i>	PA
KEGG	Tsp_10801	MEK1	<i>Trichinella spiralis</i>	PA
GenBank	XP_003438241.1	MEK2	<i>Oreochromis niloticus</i>	DP,DOA,MSA,3D,PA
KEGG	5605	MEK2	<i>Homo sapiens</i>	PA
KEGG	26396	MEK2	<i>Mus musculus</i>	MSA,3D,PA
KEGG	100450988	MEK2	<i>Pongo abelii</i>	PA
KEGG	58960	MEK2	<i>Rattus norvegicus</i>	PA
KEGG	109687808	MEK2	<i>Castor canadensis</i>	PA

KEGG	396349	MEK2	<i>Gallus gallus</i>	MSA,PA
KEGG	107215477	MEK2	<i>Parus major</i>	PA
KEGG	100551337	MEK2	<i>Meleagris gallopavo</i>	PA
KEGG	102375508	MEK2	<i>Alligator sinensis</i>	MSA,PA
KEGG	106736997	MEK2	<i>Alligator mississippiensis</i>	PA
KEGG	102931357	MEK2	<i>Chelonia mydas</i>	PA
KEGG	110072466	MEK2	<i>Pogona vitticeps</i>	PA
KEGG	100002225	MEK2	<i>Danio rerio</i>	MSA,PA
KEGG	102225775	MEK2	<i>Xiphophorus maculatus</i>	MSA,PA
KEGG	112250875	MEK2	<i>Oncorhynchus tshawytscha</i>	PA
KEGG	107719582	MEK2	<i>Sinocyclocheilus rhinoceros</i>	PA
KEGG	107586388	MEK2	<i>Sinocyclocheilus grahami</i>	PA
KEGG	101173453	MEK2	<i>Oryzias latipes</i>	PA
KEGG	103183530	MEK2	<i>Callorhynchus milii</i>	PA
GenBank	XP_020366735.1	MEK2	<i>Rhincodon typus</i>	PA
UniProt	A0A2S2NGA6	MEK2	<i>Schizaphis graminum</i>	PA
UniProt	A0A2P8XJR2	MEK2	<i>Blattella germanica</i>	PA
UniProt	A0A0B2UUA8	MEK2	<i>Toxocara canis</i>	PA
GenBank	CAA98732.1	MEK2	<i>Saccharomyces cerevisiae</i>	PA
GenBank	XP_003454034.2	MAPK3/ERK1	<i>Oreochromis niloticus</i>	DP,DOA,MSA,3D,PA
KEGG	5595	MAPK3/ERK1	<i>Homo sapiens</i>	PA
KEGG	454037	MAPK3/ERK1	<i>Pan troglodytes</i>	PA
KEGG	26417	MAPK3/ERK1	<i>Mus musculus</i>	MSA,3D,PA
KEGG	50689	MAPK3/ERK1	<i>Rattus norvegicus</i>	PA
KEGG	103059169	MAPK3/ERK1	<i>Python bivittatus</i>	MSA,PA
KEGG	114582021	MAPK3/ERK1	<i>Podarcis muralis</i>	PA
GenBank	JAB54277.1	MAPK3/ERK1	<i>Micrurus fulvius</i>	PA
KEGG	399480	MAPK3/ERK1	<i>Danio rerio</i>	MSA,PA
GenBank	NP_001167267.1	MAPK3/ERK1	<i>Salmo salar</i>	PA
GenBank	AKC01948.1	MAPK3/ERK1	<i>Clarias batrachus</i>	PA
GenBank	TSK28023.1	MAPK3/ERK1	<i>Bagarius yarrelli</i>	PA
GenBank	ATA63313.1	MAPK3/ERK1	<i>Siniperca chuatsi</i>	PA
GenBank	SBQ96754.1	MAPK3/ERK1	<i>Nothobranchius kuhntae</i>	PA
GenBank	SBP09727.1	MAPK3/ERK1	<i>Iconisemion striatum</i>	PA
GenBank	XP_006005975.1	MAPK3/ERK1	<i>Latimeria chalumnae</i>	PA
KEGG	101937531	MAPK3/ERK1	<i>Chrysemys picta</i>	MSA
GenBank	XP_003444522.1	MAPK1/ERK2	<i>Oreochromis niloticus</i>	DP,DOA,MSA,3D,PA
KEGG	5594	MAPK1/ERK2	<i>Homo sapiens</i>	PA
KEGG	458680	MAPK1/ERK2	<i>Pan troglodytes</i>	PA
KEGG	26413	MAPK1/ERK2	<i>Mus musculus</i>	MSA,3D,PA
KEGG	373953	MAPK1/ERK2	<i>Gallus gallus</i>	MSA,PA
KEGG	106486864	MAPK1/ERK2	<i>Apteryx australis mantelli</i>	PA
KEGG	102561718	MAPK1/ERK2	<i>Alligator mississippiensis</i>	MSA,PA
KEGG	101936664	MAPK1/ERK2	<i>Chrysemys picta</i>	PA

KEGG	549881	MAPK1/ERK2	<i>Xenopus tropicalis</i>	PA
KEGG	108794889	MAPK1/ERK2	<i>Nanorana parkeri</i>	PA
KEGG	360144	MAPK1/ERK2	<i>Danio rerio</i>	MSA,PA
KEGG	108255782	MAPK1/ERK2	<i>Ictalurus punctatus</i>	PA
KEGG	104932685	MAPK1/ERK2	<i>Larimichthys crocea</i>	PA
KEGG	108891348	MAPK1/ERK2	<i>Lates calcarifer</i>	PA
KEGG	106570952	MAPK1/ERK2	<i>Salmo salar</i>	PA
KEGG	103188576	MAPK1/ERK2	<i>Callorhinchus milii</i>	PA
KEGG	BRAFLDRAFT_60037	MAPK1/ERK2	<i>Branchiostoma floridae</i>	PA
KEGG	100376998	MAPK1/ERK2	<i>Saccoglossus kowalevskii</i>	PA
KEGG	Dmel_CG12559	MAPK1/ERK2	<i>Drosophila melanogaster</i>	PA
KEGG	101889743	MAPK1/ERK2	<i>Musca domestica</i>	PA
KEGG	AgaP_AGAP009207	MAPK1/ERK2	<i>Anopheles gambiae</i>	PA
KEGG	5578960	MAPK1/ERK2	<i>Aedes aegypti</i>	PA
KEGG	100743744	MAPK1/ERK2	<i>Bombus impatiens</i>	PA
KEGG	692466	MAPK1/ERK2	<i>Bombyx mori</i>	PA
KEGG	105334418	MAPK1/ERK2	<i>Crassostrea gigas</i>	PA
KEGG	110461316	MAPK1/ERK2	<i>Mizuhopecten yessoensis</i>	PA

Note:

MSA: multiple sequence alignment; PA: phylogenetic analysis; 3D: 3D structure analysis; DOA: domain organization analysis; DP: domain prediction.