

**Supplementary table 1.** Globin sequences used in this study, along with the corresponding accession numbers.

Sequence Name	Species	Taxonomic Group	Accession number	Source
Amphioxus Gb1	<i>Branchiostoma floridae</i>	Cephalochordate	XP_002589215	GenBank
Amphioxus Gb2	<i>Branchiostoma floridae</i>	Cephalochordate	XP_002596037	GenBank
Amphioxus Gb3	<i>Branchiostoma floridae</i>	Cephalochordate	XP_002598546	GenBank
Amphioxus Gb4	<i>Branchiostoma floridae</i>	Cephalochordate	XP_002601010	GenBank
Amphioxus Gb5	<i>Branchiostoma floridae</i>	Cephalochordate	XP_002601012	GenBank
Amphioxus Gb6	<i>Branchiostoma floridae</i>	Cephalochordate	XP_002605405	GenBank
Amphioxus Gb7	<i>Branchiostoma floridae</i>	Cephalochordate	XP_002605450	GenBank
Amphioxus Gb8	<i>Branchiostoma floridae</i>	Cephalochordate	XP_002608200	GenBank
Amphioxus Gb9	<i>Branchiostoma floridae</i>	Cephalochordate	XP_002608525	GenBank
Amphioxus Gb10	<i>Branchiostoma floridae</i>	Cephalochordate	XP_002608548	GenBank
Amphioxus Gb11	<i>Branchiostoma floridae</i>	Cephalochordate	XP_002608549	GenBank
Amphioxus Gb12	<i>Branchiostoma floridae</i>	Cephalochordate	XP_002610016	GenBank
Amphioxus Gb13	<i>Branchiostoma floridae</i>	Cephalochordate	XP_002610160	GenBank
Amphioxus Gb14	<i>Branchiostoma floridae</i>	Cephalochordate	XP_002610875	GenBank
Anole lizard Cygb	<i>Anolis carolinensis</i>	Tetrapod	ENSACAG00000008394*	Ensembl
Anole lizard GbY	<i>Anolis carolinensis</i>	Tetrapod	AAWZ01045931*	Ensembl
Anole lizard Hba	<i>Anolis carolinensis</i>	Tetrapod	ENSACAG00000016421	Ensembl
Anole lizard Hbb	<i>Anolis carolinensis</i>	Tetrapod	ENSACAG00000012173	Ensembl
Anole lizard Mb	<i>Anolis carolinensis</i>	Tetrapod	ENSACAG00000016595	Ensembl
Chicken Cygb	<i>Gallus gallus</i>	Tetrapod	NM_001008789	GenBank
Chicken GbE	<i>Gallus gallus</i>	Tetrapod	NM_001008786	GenBank
Chicken Hba	<i>Gallus gallus</i>	Tetrapod	NM_001004376	GenBank
Chicken Hbb	<i>Gallus gallus</i>	Tetrapod	NM_001081704	GenBank
Chicken Mb	<i>Gallus gallus</i>	Tetrapod	XM_416292	GenBank
Frog Cygb	<i>Xenopus tropicalis</i>	Tetrapod	NM_001006869	GenBank
Frog GbX	<i>Xenopus tropicalis</i>	Tetrapod	NP_001011196	GenBank
Frog GbY	<i>Xenopus tropicalis</i>	Tetrapod	BC158411	GenBank
Frog Hba	<i>Xenopus tropicalis</i>	Tetrapod	NM_203529	GenBank
Frog Hbb	<i>Xenopus tropicalis</i>	Tetrapod	NM_203528	GenBank
Frog Ngb	<i>Xenopus tropicalis</i>	Tetrapod	ENSXETG00000027106	Ensembl
Hagfish Hb1	<i>Myxine glutinosa</i>	Cyclostome	AF156936	GenBank
Hagfish Hb2	<i>Myxine glutinosa</i>	Cyclostome	AF157494	GenBank
Hagfish Hb3	<i>Myxine glutinosa</i>	Cyclostome	AF184047	GenBank
Hagfish Hb4	<i>Myxine glutinosa</i>	Cyclostome	AF184239	GenBank
Houndshark Hba	<i>Mustelus griseus</i>	Cartilaginous fish	BAA75399	GenBank
Houndshark Hbb	<i>Mustelus griseus</i>	Cartilaginous fish	BAA75400	GenBank
Houndshark Mb	<i>Mustelus griseus</i>	Cartilaginous fish	P14399	GenBank
Human Cygb	<i>Homo sapiens</i>	Tetrapod	NM_134268	GenBank
Human Hba	<i>Homo sapiens</i>	Tetrapod	NM_000558	GenBank
Human Hbb	<i>Homo sapiens</i>	Tetrapod	NM_000518	GenBank
Human Mb	<i>Homo sapiens</i>	Tetrapod	NG_007075	GenBank
Human Ngb	<i>Homo sapiens</i>	Tetrapod	NP_067080	GenBank
Arctic lamprey Hb 1	<i>Lethenteron japonicum</i>	Cyclostome	AB294235	GenBank
Arctic lamprey Hb 2	<i>Lethenteron japonicum</i>	Cyclostome	AB294236	GenBank

Sequence Name	Species	Taxonomic Group	Accession number	Source
Arctic lamprey Hb 4	<i>Lethenteron japonicum</i>	Cyclostome	AB294237	GenBank
Medaka Cygb-1	<i>Oryzias latipes</i>	Teleost fish	NM_001104767	GenBank
Medaka Cygb-2	<i>Oryzias latipes</i>	Teleost fish	NM_001104768	GenBank
Medaka GbX	<i>Oryzias latipes</i>	Teleost fish	ENSORLGG00000017054	Ensembl
Medaka Hba	<i>Oryzias latipes</i>	Teleost fish	ENSORLGG00000005267	Ensembl
Medaka Hbb	<i>Oryzias latipes</i>	Teleost fish	ENSORLGG00000003020	Ensembl
Medaka Mb	<i>Oryzias latipes</i>	Teleost fish	ENSORLGG00000004130	Ensembl
Medaka Ngb	<i>Oryzias latipes</i>	Teleost fish	ENSORLT00000020359	Ensembl
Platypus GbY	<i>Ornithorhynchus anatinus</i>	Tetrapod	AC203513*	GenBank
Platypus Hba	<i>Ornithorhynchus anatinus</i>	Tetrapod	AC203513*	GenBank
Platypus Hbb	<i>Ornithorhynchus anatinus</i>	Tetrapod	AC190020*	GenBank
Platypus Hbw	<i>Ornithorhynchus anatinus</i>	Tetrapod	AC203513*	GenBank
Platypus Mb	<i>Ornithorhynchus anatinus</i>	Tetrapod	XM_001513063	GenBank
Platypus Ngb	<i>Ornithorhynchus anatinus</i>	Tetrapod	XP_001508417	GenBank
Port Jackson shark Mb	<i>Heterodontus portusjacksoni</i>	Cartilaginous fish	P02206	GenBank
Pufferfish Cygb-1	<i>Tetraodon nigroviridis</i>	Teleost fish	AJ635230	GenBank
Pufferfish Cygb-2	<i>Tetraodon nigroviridis</i>	Teleost fish	AJ635231	GenBank
Pufferfish GbX	<i>Tetraodon nigroviridis</i>	Teleost fish	CAG25725	GenBank
Pufferfish Hba	<i>Tetraodon nigroviridis</i>	Teleost fish	ENSTNIG00000018576	Ensembl
Pufferfish Hbb	<i>Tetraodon nigroviridis</i>	Teleost fish	ENSTNIG00000012913	Ensembl
Pufferfish Mb	<i>Tetraodon nigroviridis</i>	Teleost fish	ENSTNIG00000005518	Ensembl
Pufferfish Ngb	<i>Tetraodon nigroviridis</i>	Teleost fish	CAC59974	GenBank
Sea lamprey Hb PMII	<i>Petromyzon marinus</i>	Cyclostome	AF248645	GenBank
Sea lamprey Hb1a	<i>Petromyzon marinus</i>	Cyclostome	P09967	GenBank
Sea lamprey Hb1b	<i>Petromyzon marinus</i>	Cyclostome	P21197	GenBank
Sea lamprey Hb2	<i>Petromyzon marinus</i>	Cyclostome	Q9I9I3	GenBank
Sea lamprey Hb3	<i>Petromyzon marinus</i>	Cyclostome	P09968	GenBank
Sea lamprey Hb5	<i>Petromyzon marinus</i>	Cyclostome	P02208	GenBank
Sea squirt Glb1	<i>Ciona intestinalis</i>	Urochordate	CAD68145	GenBank
Sea squirt Glb2	<i>Ciona intestinalis</i>	Urochordate	CAD68146	GenBank
Sea squirt Glb3	<i>Ciona intestinalis</i>	Urochordate	CAD68147	GenBank
Sea squirt Glb4	<i>Ciona intestinalis</i>	Urochordate	CAD89600	GenBank
Stingray Hba	<i>Dasyatis akajei</i>	Cartilaginous fish	BAA75249	GenBank
Stingray Hbb	<i>Dasyatis akajei</i>	Cartilaginous fish	BAA75250	GenBank
Zebra finch Cygb	<i>Taeniopygia guttata</i>	Tetrapod	XM_002195407	GenBank
Zebra finch GbE	<i>Taeniopygia guttata</i>	Tetrapod	XM_002196350	GenBank
Zebra finch Hba	<i>Taeniopygia guttata</i>	Tetrapod	XM_002196096	GenBank
Zebra finch Hbb	<i>Taeniopygia guttata</i>	Tetrapod	XM_002190485	GenBank
Zebra finch Mb	<i>Taeniopygia guttata</i>	Tetrapod	XM_002199380	GenBank
Zebrafish Cygb1	<i>Danio rerio</i>	Teleost fish	NM_152952	GenBank
Zebrafish Cygb2	<i>Danio rerio</i>	Teleost fish	NM_001024224	GenBank
Zebrafish GbX	<i>Danio rerio</i>	Teleost fish	CAG25723	GenBank
Zebrafish Hba	<i>Danio rerio</i>	Teleost fish	NM_131257	GenBank
Zebrafish Hbb	<i>Danio rerio</i>	Teleost fish	NM_131020	GenBank
Zebrafish Mb	<i>Danio rerio</i>	Teleost fish	NM_200586	GenBank
Zebrafish Ngb	<i>Danio rerio</i>	Teleost fish	NP_571928	GenBank

\* These sequences were re-annotated manually.