Table S1
A list of Deuterostomia genomes that were analyzed

Species name	Taxonomic group	Completeness of the genome data	Location of the genome data
Strongylocentrotus purpuratus	Echinodermata	Complete	WGS
Ciona intestinalis	Urochordata	Complete	WGS
Ciona savignyii	Urochordata	Complete	WGS
Branchiostoma floridae	Cephalochordata	Complete, not assembled yet	TraceDb
Petromyzon marinus	Cyclostomata	Partial (2.4 million sequence traces)	TraceDb
Squalus acanthias	Chondrichthyes	Partial (7 BAC clones)	HTGS
Ginglymostoma cirratum	Chondrichthyes	Partial (10 BAC clones)	HTGS
Danio rerio	Teleostei	Complete	WGS
Takifugu rubripes	Teleostei	Complete	WGS
Tetraodon nigroviridis	Teleostei	Complete	WGS
Oryzias latipes	Teleostei	Complete, not assembled yet	NIG
Gasterosteus aculeatus	Teleostei	Complete	WGS
Latimeria menadoensis	Coelacanthimorpha	Partial (8 BAC clones)	HTGS
Xenopus tropicalis	Amphibia	Complete	Ensembl
Sphenodon punctatus	Sauropsida, Lepidosauria	Partial (11 BAC clones)	HTGS
Gopherus agassizii	Sauropsida, Testudines	Partial (7 BAC clones)	HTGS
Alligator mississippiensis	Sauropsida, Archosauria, Crocodylia	Partial (21 BAC clones)	HTGS
Galus gallus	Sauropsida, Archosauria, Aves	Complete	WGS
Ornithorhynchus anatinus	Mammalia, Monotremata	Complete, not assembled yet	TraceDb
Monodelphis domestica	Mammalia, Metatheria	Complete	WGS
Loxodonta africana	Mammalia, Eutheria, Afrotheria	Complete	WGS
Echinops telfairi	Mammalia, Eutheria, Afrotheria	Complete	WGS
Dasypus novemcinctus	Mammalia, Eutheria, Xenarthra	Complete	WGS
Canis familiaris	Mammalia, Eutheria, Laurasiatheia	Complete	WGS
Felis catus	Mammalia, Eutheria, Laurasiatheia	Complete, not assembled yet	TraceDb

Bos taurus	Mammalia, Eutheria, Laurasiatheia	Complete	WGS
Sorex araneus	Mammalia, Eutheria, Laurasiatheia	Complete	WGS
Erinaceus europaeus	Mammalia, Eutheria, Laurasiatheia	Complete	WGS
Myotis lucifugus	Mammalia, Eutheria, Laurasiatheia	Complete, not assembled yet	TraceDb
Sus scrofa	Mammalia, Eutheria, Laurasiatheia	Complete, not assembled yet	TraceDb
Rattus norvegicus	Mammalia, Eutheria, Euarchontoglires	Complete	WGS
Mus musculus	Mammalia, Eutheria, Euarchontoglires	Complete	WGS
Spermophilus tridecemlineatus	Mammalia, Eutheria, Euarchontoglires	Complete, not assembled yet	TraceDb
Cavia porcellus	Mammalia, Eutheria, Euarchontoglires	Complete	WGS
Oryctolagus cuniculus	Mammalia, Eutheria, Euarchontoglires	Complete	WGS
Tupaia belangeri	Mammalia, Eutheria, Euarchontoglires	Complete, not assembled yet	TraceDb
Homo sapiens	Mammalia, Eutheria, Euarchontoglires	Complete	WGS
Pan troglodytes	Mammalia, Eutheria, Euarchontoglires	Complete	WGS
Macaca mulatta	Mammalia, Eutheria, Euarchontoglires	Complete	WGS
Pongo pygmaeus	Mammalia, Eutheria, Euarchontoglires	Complete, not assembled yet	TraceDb
Otolemur garnettii	Mammalia, Eutheria, Euarchontoglires	Complete, not assembled yet	TraceDb
Callithrix jacchus	Mammalia, Eutheria, Euarchontoglires	Complete, not assembled yet	TraceDb

All other vertebrate species analyzed (mostly mammals) were obtained at the HTGS Db of NCBI and are part of the largest ongoing project at NISC (http://www.nisc.nih.gov) that involves the generation of genomic sequences from 66 species of vertebrates for comparative genomic analyses.

Table S2

PCR analysis of L1 retrotransposons from a lungfish (Dipnoi), Amphibia and Reptilia.

Class	Order	Suborder	Family	Species	PCR	Number of sequenced clones
Dipnoi	Ceratodontiformes		Ceratodontidae	*Neoceratodes forsteri*	+	4
Amphibia	Gymnophiona		Caeciliidae	*Typhlonectes natans*	+	4
	Anura	Archeobatrachia	Bombinatoridae	*Bombina bombina*	-	-
		Mesobatrachia	Pipidae	*Xenopus sp.*	+	-
		Neobatrachia	Bufonidae	*Bufo bufo*	-	-
				Bufo viridis	-	-
			Ranidae	*Rana temporaria*	+	3
				Rana dalmatina	+	6
				Rana ridibunda	+	-
			Hylidae	*Hyla arborea*	+	6
	Caudata		Salamandridae	*Salamandra*	-	-

				salamandra		
				Triturus alpestris	+	1
				Triturus cristatus	+	4
			Proteidae	*Proteus anguinus*	+	5
				Necturus lewisi	+	3
Reptilia	Squamata	Serpentes	Viperidae	*Vipera ammodytes*	+	4
				Vipera palaestinae	+	3
				Echis coloratus	+	4
				Crotalus horridus	+	3
				Bothrops alternatus	+	3
			Elapidae	*Walterinnesia aegyptia*	+	3
				Notechis scutatus	+	4
			Colubridae	*Natrix tessellata*	+	4
				Clelia rustica	+	-
			Boidae	*Boa constrictor*	+	4

			Python molurus	+	1
	Sauria	Lacertidae	*Podarcis muralis*	+	5
		Teiidae	*Tupinambis teguixin*	-	-
		Anguidae	*Anguis fragilis*	+	-
Crocodylia	Eusuchia	Crocodylidae	*Alligator mississippiensis*	-	-
			Caiman latirostris	-	-
Testudines	Cryptodira	Emydidae	*Trachemys scripta elegans*	-	-
		Testudinidae	*Geochelone chilensis*	-	-

Table S3

L1 retrotransposon repertoires in completed Deuterostomia genomes

Taxonomic group	Species	Total number of L1 families	Copy numbers	L1 group A families	L1 group B families	L1 group C families
Echinodermata	*Strongylocentrotus purpuratus*	**15**	low	15	0	0
Urochordata	*Ciona intestinalis*	**5**	low	5	0	0
	C. savignyi	**6**	low	6	0	0
Cephalochordata	*Branchiostoma floridae*	**40**	low	40	0	0
Cyclostomata	*Petromyzon marinus*	**0**	?	0	0	0
Actinopterygii	*Tetraodon nigroviridis*	**0**	0	0	0	0
	Takifugu rubripes	**1**	low	0	1	0
	Gasterosteus aculeatus	**0**	0	0	0	0
	Oryzias latipes	**17**	low	4	11	2
	Danio rerio	**59**	Low to	18	32	9

			moderate			
Amphibia	*Xenopus tropicalis*	**126**	very low	0	53	73
Sauropsida	4 species					
Lepidosauria	*Sphenodon punctatus*	**?**	?	0	?	**>3**
Testudines	*Gopherus agassizii*	**0**	0	0	0	0
Archosauria	2 species	**0**	0	0	0	0
Crocodylia	*Alligator mississippiensis*	**0**	0	0	0	0
Aves	*Gallus gallus*	**0**	0	0	0	0
Mammalia	44 species	**1**	high	0	0	1
Prototheria	*Ornithorhynchus anatinus*	**0**	0	0	0	0
Metatheria	4 species	**1**	high to very high	0	0	1
Eutheria	39species	**1**	high	0	0	1
Afrotheria	2 species	**1**	high	0	0	1

Xenarthra	*Dasypus novemcinctus*	**1**	high	0	0	1
Laurasiatheria	14 species	**1**	high	0	0	1
Euarchontoglires	22 species	**1**	high	0	0	1

Mammalian species not listed in the table are the following: Metatheria [Dasyuromorphia (*Sminthopsis macroura*), Didelphimorphia (*Didelphis virginiana*, *Monodelphis domestica*) and Diprotodontia (*Macropus eugenii*)] and Eutheria [superoder Afrotheria (*Loxodonta africana*, *Echinops telfairi*), superorder Laurasiatheria (*Canis familiaris*, *Felis catus*, *Neofelis nebulosa*, *Bos taurus*, *Ovis aries*, *Muntiacus muntjak*, *Sus scrofa*, *Rhinolophus ferrumequinum*, *Carollia perspicillata*, *Artibeus jamaicensis*, *Atelerix albiventris*, *Erinaceus europaeus*, *Sorex araneus*, *Equus caballus*) and superorder Euarchontoglires (*Oryctolagus cuniculus*, *Mus musculus*, *Rattus norvegicus*; *Homo sapiens*, *Pan troglodytes*, *Gorilla gorilla*, *Pongo pygmaeus*, *Nomascus leucogenys*, *Papio anubis*, *Papio hamadryas*, *Cercopithecus aethiops*, *Colobus guereza*, *Macaca mulatta*, *Callithrix jacchus*, *Saimiri boliviensis*, *Aotus nancymaae*, *Callicebus moloch*, *Otolemur garnettii*, *Nycticebus coucang*, *Microcebus murinus*, *Eulemur macaco*, *Lemur catta*)]. *: for reptiles only partial genome data are available.

Table S4

Evolutionary distribution pattern of diverse L1 groups in Deuterostomia

Taxonomic group	L1 group A	L1 group B	L1 group C
Echinodermata	yes	no	no
Urochordata	yes	no	no
Cephalochordata	yes	no	no
Cyclostomata	exp	?	?
Chondrichthyes	exp	yes	?
Actinopterygii	yes	yes	yes
Coelacanthimorpha	?	yes	exp
Dipnoi	?	exp	yes
Amphibia	no	yes	yes
Sauropsida	no	?	yes
Lepidosauria	no	?	yes
Testudines	no	no	no
Archosauria	no	no	no
Crocodilia	no	no	no
Aves	no	no	no
Mammalia	no	no	yes
Prototheria	no	no	no
Metatheria	no	no	yes
Eutheria	no	no	yes

Symbols: exp: presence is expected under SVT hypothesis; ?: no genome data available yet, therefore the presence is currenttly not known.

Table S5

Phylogenomic analysis of L1 groups in Deuterostomia

L1 group	origin	diversification (duplication)	loss	horizontal transfer
group A	ancestral deuterostome	rich	a) pufferfishes b) Sarcopterygii or Tetrapoda c) pufferfish (Tetraodon)	absent
group B	Basal vertebrates (Cyclostomata or cartilaginous fishes)	rich	d) Amniota or Synapsida	absent
group C	Basal vertebrates (Cyclostomata or cartilaginous fishes)	rich	e) pufferfishes f) Testudines g) Archosauria (crocodiles and birds) h) Prototheria (platypus)	absent