

Additional File 1. Bilaterians searched for *Dact* genes.

Abbreviations of species names are indicated on the left; others: o, order; so, superorder. *Dact* EST sequences are represented by a tick; for genomic sequences, the genomic localization is indicated, following the nomenclature of the 2012 edition of the Ensemble (<http://www.ensembl.org/index.html>), NCBI (<http://www.ncbi.nlm.nih.gov/>), elephant shark genome project (<http://esharkgenome.imcb.a-star.edu.sg/>) and Japanese lamprey genome project (<http://jlampreygenome.imcb.a-star.edu.sg/>) databases. For the Anole lizard, *Xenopus tropicalis*, the coelacanth, and the sea lamprey, in addition the nomenclature used in the 2008 edition of Ensemble is shown.

| Deuterostomes | | | | | | | | | |
|---|--------------|---------------------------------|-----------------------------|---|--|--|---------------|--|---|
| | abbreviation | species | common name | <i>Dact1</i> | <i>Dact2</i> | <i>Dact3</i> or <i>dact3a</i> | <i>dact3b</i> | <i>Dact4</i> | comments |
| classification | | | | | | | | | |
| Phylum: Chordata | | | | | | | | | |
| Subphylum: Vertebrata | | | | | | | | | |
| Infraphylum: Gnathostomata | | | | | | | | | |
| Superclass: Osteichthyes | | | | | | | | | |
| Class: Sarcopterygii | | | | | | | | | |
| Subclass: Tetrapodomorpha | | | | | | | | | |
| Amniota; Synapsids - Infraclass: Mammals; Placentalia | Hs | <i>Homo sapiens</i> | human | chr14✓ | chr6✓ | chr19✓ | | (locus chr11) | <i>Dact4</i> locus is identifiable but lacks a <i>Dact</i> gene |
| | Mm | <i>Mus musculus</i> | mouse | chr12✓ | chr17✓ | chr7✓ | | (locus chr19) | |
| | Bt | <i>Bos Taurus</i> | cattle | chr10 | chr9 | chr18 | | (locus chr29) | |
| | Cf | <i>Canis familiaris</i> | dog | chr8 | chr1 | chr1 | | (locus chr18) | |
| | La | <i>Loxodonta africana</i> | African elephant | s2755 | | s4446 | | | |
| Infraclass: Mammals; Marsupials | Md | <i>Monodelphis domestica</i> | opossum | chr1 | chr2 | chr4 | | (locus chr5) | |
| Infraclass: Mammals; Monotremes | Oa | <i>Ornithorhynchus anatinus</i> | platypus | c214, 26117; c164635 (ex4) | c20694, c22096 | c69853 (ex1), c289003 (ex4) | | | |
| Amniota; Diapsids; Archosauromorpha; Infraclass: Aves | Gg | <i>Gallus gallus</i> | chicken | chr5✓ | chr3✓ | | | | <i>Dact3</i> and 4 loci not conserved |
| | Mg | <i>Meleagris gallopavo</i> | turkey | chr5 | chr2 | | | | |
| | Tg | <i>Taeniopygia guttata</i> | zebrafinch | chr5 | chr3 | | | | |
| | Ap | <i>Anas platyrhynchos</i> | duck | s626 | s530 | | | | |
| | Mu | <i>Melopsittacus undulatus</i> | budgerigar | JH556483 | JH556595 | | | | |
| Amniota; Diapsids; Infraclass: Lepidosauromorpha | Ac | <i>Anolis carolinensis</i> | Anole lizard | GL343459 (formerly s5, s29) and chr2 | chr1 (formerly s549) | GL343568 (formerly s1268) | | GL343928 (formerly s71, s1206) | |
| | Pym | <i>Python molurus</i> | Burmese python | c26513843 c26939700 | c24659227 c26563497 c26659464 c26922077 | c26582260 | | c26563039 c26110406 c25444438 c24942884 | |
| Amniota; Anapsids; Infraclass: Testudines (turtles and tortoises) | Cpb | <i>Chrysemys picta bellii</i> | Western painted turtle | JH584658 | JH584758 | JH584472 | | JH584543 | |
| | Ps | <i>Pelodiscus sinensis</i> | Chinese soft shield turtle | JH212506 | JH208515 | JH209944 | | JH206113 | |
| Infraclass: Amphibia; Anura | Xt | <i>Xenopus tropicalis</i> | Western clawed frog | GL172704 (formerly s68) ✓ | (locus GL172638) | GL172667 (formerly s31) ✓ | | (locus GL173034, formerly s398) | Remnants of <i>Dact2</i> and 4 loci identifiable |
| | Xl | <i>Xenopus laevis</i> | African clawed frog | 1-a, 1-b ✓ | | 3-a, 3-b ✓ | | | |
| | Rc | <i>Rana catesbeiana</i> | | ✓ | | | | | |
| Subclass: Dipnoi (lungfishes) | Pa | <i>Protopterus aethiopicus</i> | African or marbled lungfish | | ✓ | | | | |
| Subclass: Coelacanthimorpha | Lc | <i>Latimeria chalumnae</i> | Coelacanth | JH126564 (formerly c002619-17) | JH129292 (formerly c230613- 11) | JH128225 (formerly c190000,13,18,22) | | JH126593 (formerly c015702) | |
| Class: Actinopterygii Subclass: Neopterygii | | | | | | | | | |
| Infraclass: Holostei (bowfins, gars) | Lo | <i>Lepisosteus oculatus</i> | Spotted gar | LG7 | LG16 | LG2 | | LG28 | Intronless <i>dact4r</i> on LG14 |
| Infraclass: Teleostei | | | | | | | | | |
| o: Cypriniformes | Dr | <i>Danio rerio</i> | zebrafish | chr17✓ | chr13✓ | chr18✓ | chr10✓ | chr14✓ | Intronless <i>dact4r</i> on chr24 ✓ |
| | Pp | <i>Pimephales promelas</i> | Fathead minnow | ✓ | | ✓ | | ✓ | |
| o: Siluriformes | Ip | <i>Ictalurus punctatus</i> | Channel catfish | ✓ | | | | | |

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|---|-----|--------------------------------------|---|---|-------------------------------|-----------------|------------------|------------------------------------|--|
| so: Protacanthopterygii | | | | | | | | | |
| o: Salmoniformes | Ssa | <i>Salmo salar</i> | Atlantic salmon | ✓ | | | | | |
| | Ot | <i>Oncorhynchus tshawytscha</i> | Chinook salmon | | | | | ✓ | |
| | Omy | <i>Oncorhynchus mykiss</i> | Rainbow trout | ✓ | | | ✓ | | |
| o: Osmeriformes | Omo | <i>Osmerus mordax</i> | Rainbow smelt | | ✓ | | | | |
| so: Paracanthopterygii | | | | | | | | | |
| o: Gadiformes=Anacanthini | Gmo | <i>Gadus morhua</i> | Atlantic cod | s909/c572298, c143687, | s609/c360826 | s3150 | s4368 | s3610; partial sequences on c76676 | |
| so: Acanthopterygii | | | | | | | | | |
| o: Tetraodontiformes | Tr | <i>Takifugu rubripes</i> | Fugu | (locus on s136) | s53 | s165 | s455 | c187 | <i>dact1</i> locus present, but no <i>dact1</i> gene |
| | Tn | <i>Tetraodon nigroviridis</i> | Green spotted pufferfish | (locus on s7089) | chr17 | chrUn/s14702 | chr7 | chr1 | |
| o: Gasterosteiformes | Ga | <i>Gasterosteus aculeatus</i> | three-spined stickleback | grXV✓ | grVI | grI✓ | (locus on grVII) | grIV✓ | Sequence gap at the position of the <i>dact3b</i> gene |
| o: Beloniformes | OI | <i>Oryzias latipes</i> | Medaka | chr22✓ | chr15✓ | chr13 | chr14✓ | chr10✓ | |
| o: Perciformes | Pf | <i>Perca flavescens</i> | Yellow perch | | | | | ✓ | |
| | DI | <i>Dicentrarchus labrax</i> | European seabass | | | | | ✓ | |
| | On | <i>Oreochromis niloticus</i> | Nile Tilapia | GL831368 | GL831145 | GL831147 | GL831515 | GL831165 | |
| | Hb | <i>Haplochromis burtoni</i> | African cichlid | | | | ✓ | | |
| | Sau | <i>Sparus aurata</i> | Gilthead seabream | | | | | ✓ | |
| o: Cyprinodontiformes | Xm | <i>Xiphophorus maculatus</i> | Southern platyfish | JH557083 | JH556663 | JH556880 | | AGAJO1047724 & JH556834 | |
| Superclass Chondrichthyes | | | | | | | | | |
| Subclass: Elasmobranchii: | | | | | | | | | |
| Subdivision Selachii; so: Squalomorphi | Sac | <i>Squalus acanthias</i> | Spiny dogfish shark | ✓ | | | | | |
| Subdivision / so: Batoidea | Tc | <i>Torpedo californica</i> | Pacific electric ray | | ✓ | | | ✓ | |
| | Le | <i>Leucoraja erinacea</i> | Little skate http://www.marinegenomics.org/node/27111 | | | | | ✓ | |
| Subclass: Holocephali; | | | | | | | | | |
| o: Chimaeriformes | Cm | <i>Callorhynchus milii</i> | Elephant shark | AAVX 014209261.1 01221604.1 01236760.1 01179725.1 01276763.1 | AAVX 01057442.1 01184388.1 | AAVX 01159308.1 | | AAVX 01316550.1 | |
| Infraphylum: Agnatha | | | | | | | | | |
| Superclass: Cyclostomata | | | | | | | | | |
| Class Hyperoartia/Petromyzontida | Pm | <i>Petromyzon marinus</i> | Sea lamprey | dactA (exons 3+4, GL476511/c36439); dactB (exons 3+4, c37220 and c20195); dactD (exon 4, c54804) | | | | | At least 3 genes |
| | Lj | <i>Lenthenteron japonicum</i> | Japanese lamprey | dactA (KE993709); dactB (KE993739); dactC (exons 2-4, KE993726; similar exon 4 on KE999188/KE99520); dactD (exon 4, KE994909); orphan exon 1: APJL01152884/APJL01160608 | | | | | At least 4 genes |
| Phylum: Chordata | | | | | | | | | |
| Subphylum: Tunicata/Urochordata | | | | | | | | | |
| Class: Appendicularia | Oik | <i>Oikopleura dioica</i> | | | | | | | No significant hit |
| Class: Ascidiacea | Cii | <i>Ciona intestinalis</i> | Vase tunicate | | | | | | |
| | Cis | <i>Ciona savignyi</i> | | | | | | | |
| Phylum: Chordata | | | | | | | | | |
| Subphylum: Cephalochordata | | | | | | | | | |
| Class Leptocardii | Bfl | <i>Branchiostoma floridae</i> | Florida lancelet | | | s65 ✓ | | | |
| Phylum: Hemichordata | | | | | | | | | |
| Class: Enteropneusta | Sak | <i>Saccoglossus kowalevskii</i> | Acorn worm | | | | | | No significant hit |
| Phylum: Echinodermata | | | | | | | | | |
| Class: Echinoidea | Spu | <i>Strongylocentrotus purpuratus</i> | California purple sea urchin | | | | | | No significant hit |

Protostomes - lophotrochozoa

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|--------------------------|-----|----------------------------|--|--|--|--|--|--|--------------------|
| Phylum: Mollusca | Apc | <i>Aplysia californica</i> | California sea slug or California sea hare | | | | | | No significant hit |
| Class: Gastropoda | | | | | | | | | |

Protostomes - ecdysozoa

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|---------------------------|-----|--------------------------------|-----------------------|--|--|--|--|--|--------------------|
| Phylum: Arthropoda | Drm | <i>Drosophila melanogaster</i> | Fruit fly | | | | | | No significant hit |
| Class: Insecta | Trc | <i>Tribolium castaneum</i> | Red flour beetle | | | | | | |
| | Bom | <i>Bombyx mori</i> | domesticated silkworm | | | | | | |

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|------------------|-----|-------------------|------------------|--|--|--|--|--|--------------------|
| Phylum: Nematoda | Cel | <i>C.elegans</i> | | | | | | | No significant hit |
| | Cbr | <i>C.briggsae</i> | | | | | | | |
| | Loa | <i>Loa loa</i> | African eye worm | | | | | | |