

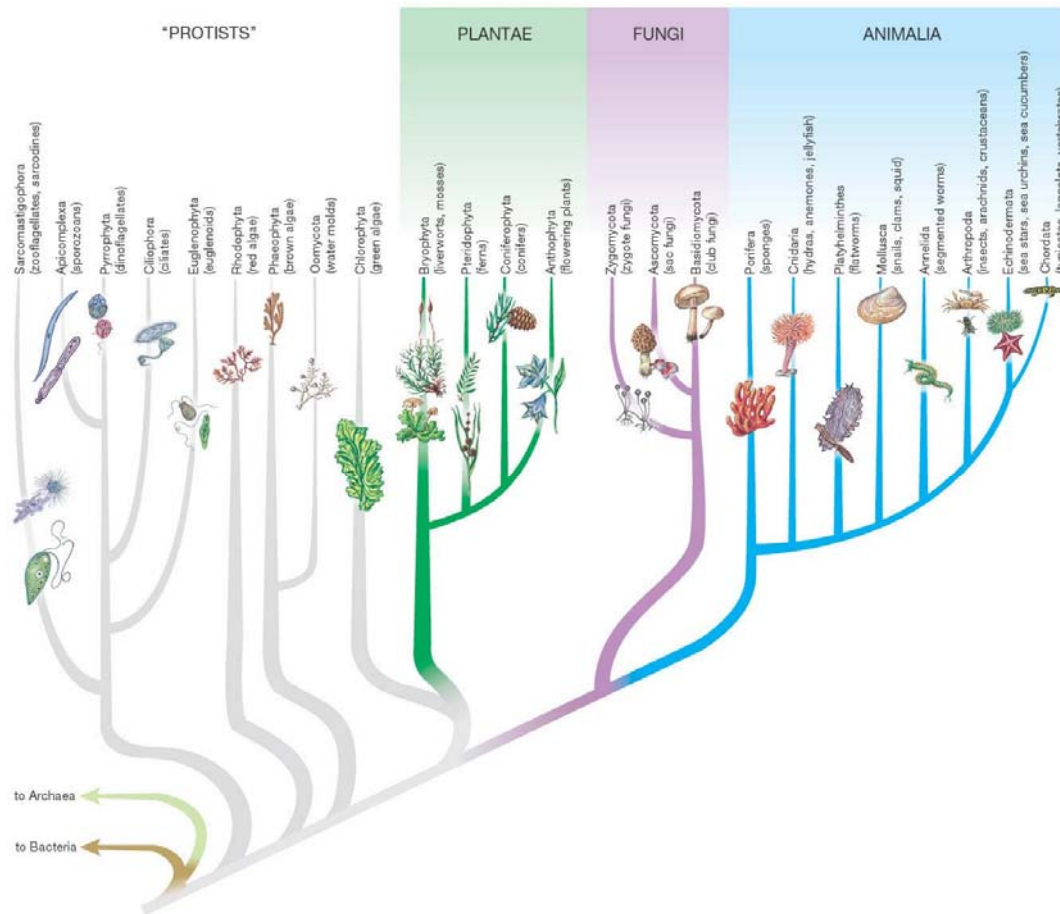
Animal Diversity II: Vertebrates

- Key features of chordates
- Major phyla of chordates



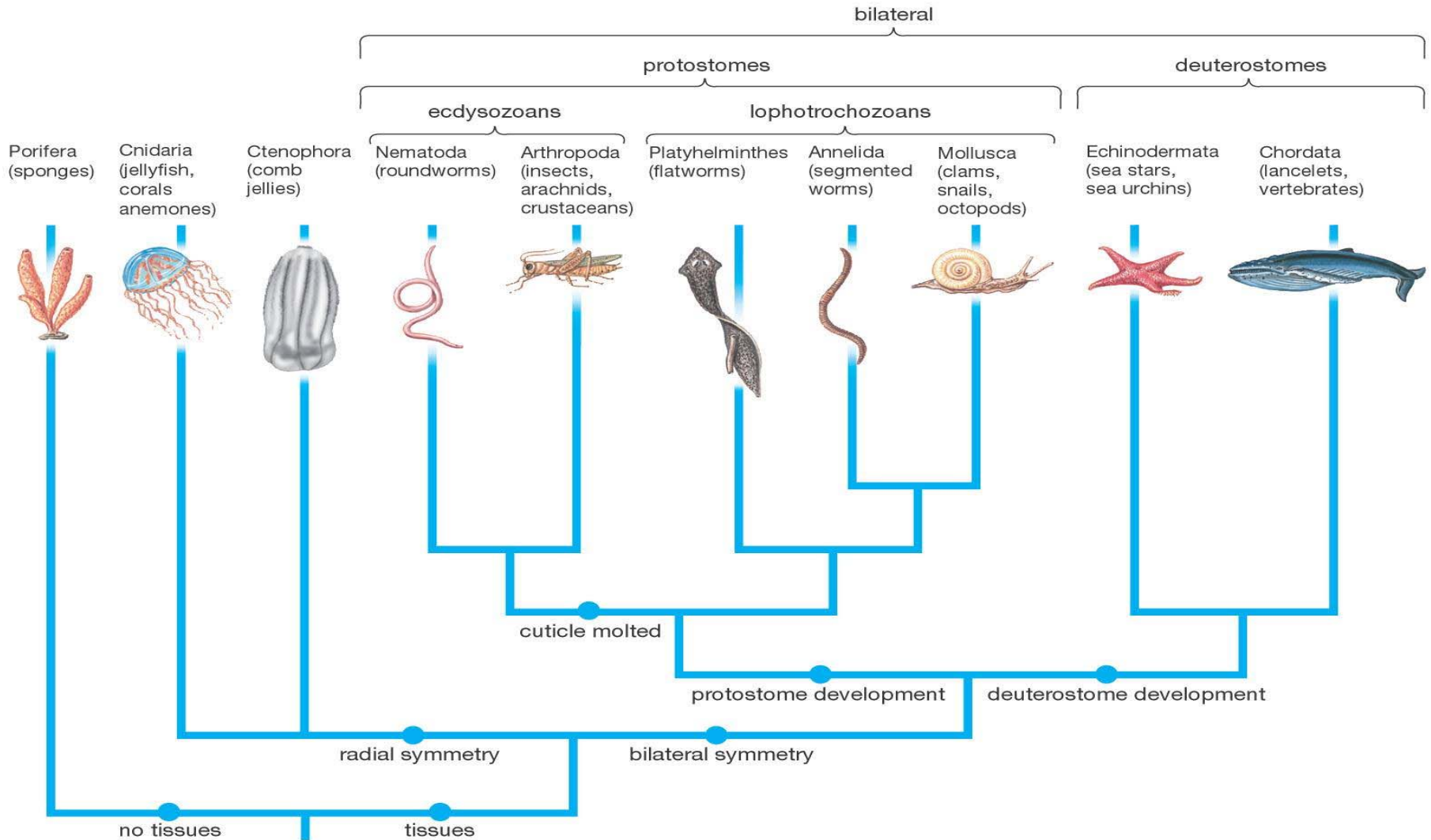
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Kingdom Animalia



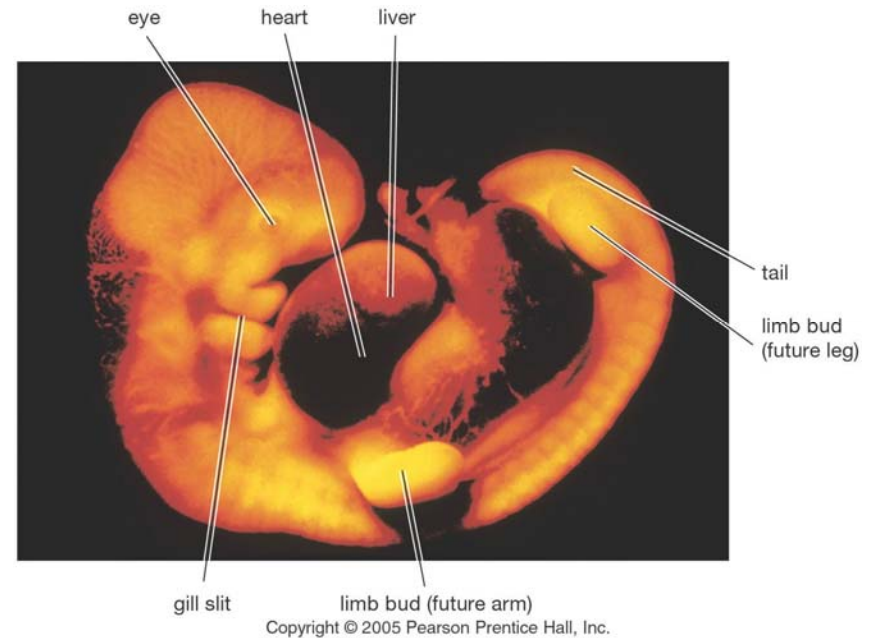
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Phylogeny



Phylum Chordata

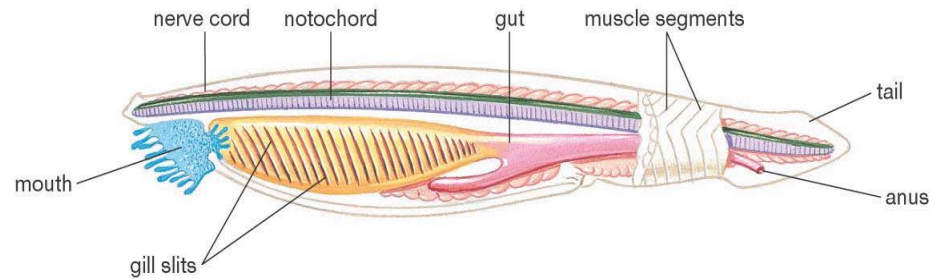
- All are deuterostomes (2nd opening a mouth)
- Notochord: stiff flexible rod
- Dorsal hollow nerve cord
- Pharyngeal gill slits
- Post-anal tail



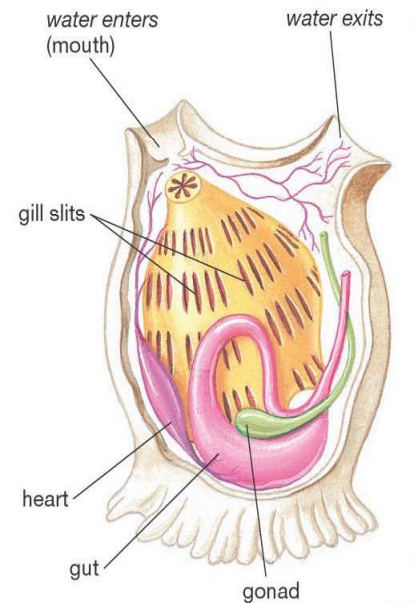
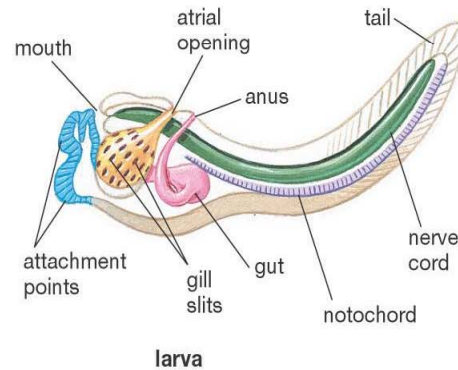
Invertebrate chordates

- Lancelet
- Tunicates

(a) Lancelet



(b) Tunicate



Vertebrates

- Have a backbone
- Bone or cartilage
- Paired appendages
- Size and complexity of the brain

Major Phyla

- Fish: two chambered heart
- Jawless fish
- Hagfish: not true vertebrate
- Lamprey



(a)



(b)

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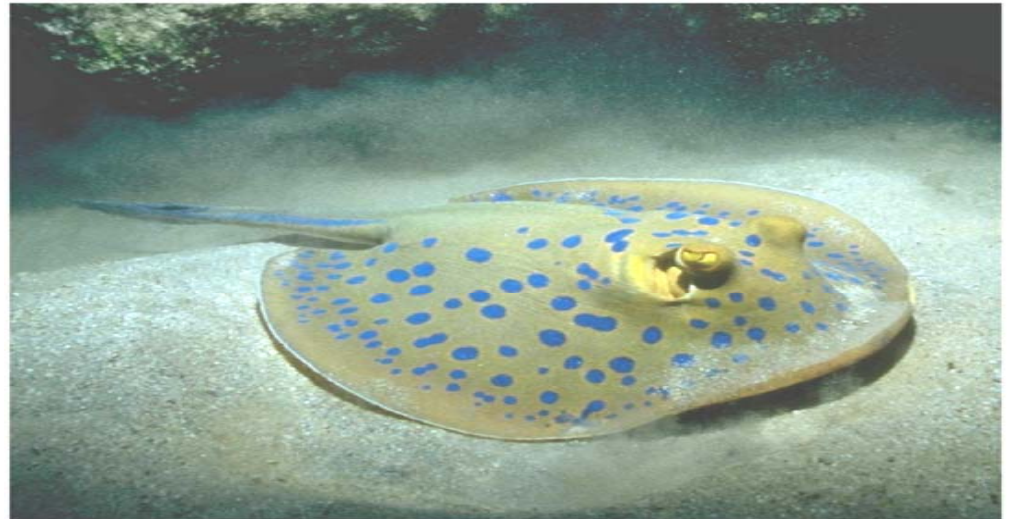
Jawed fish

- Cartilaginous fish
- Chondrichthyes
- Sharks
- Skates
- Rays
- No bone



(a)

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(b)

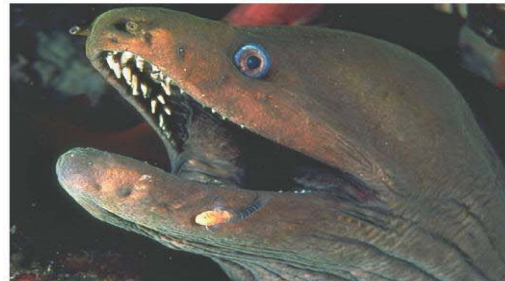
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Bony fish

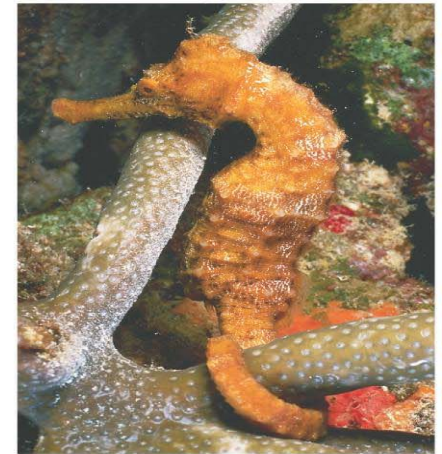
- Most diverse vertebrate group
- Class Osteichthyes
- 17,000 spp



(a)



(b)



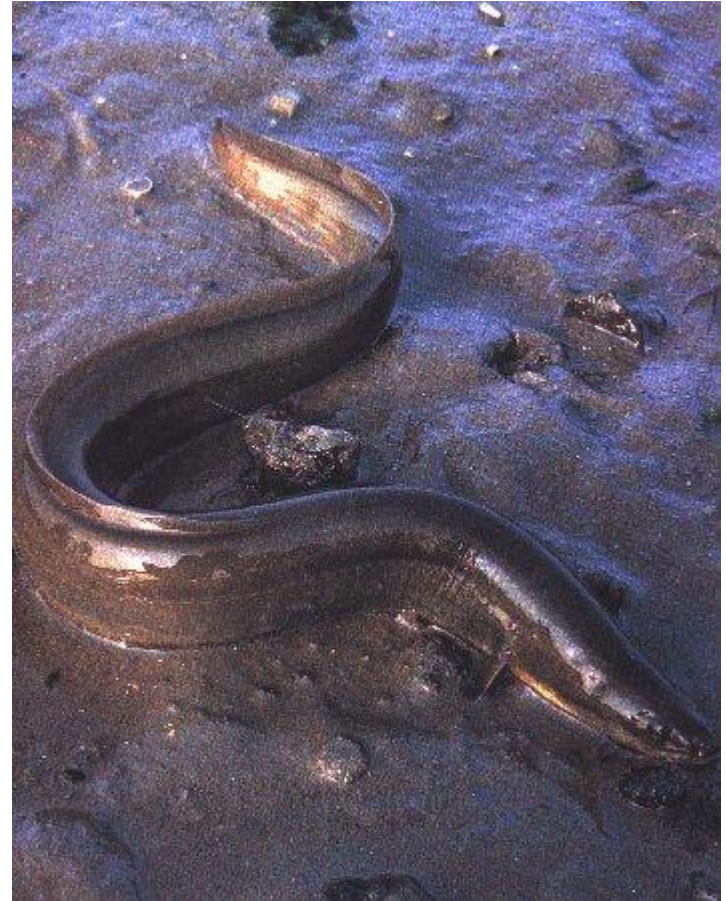
(c)

Swim bladder for buoyancy

Lungfish



Here's a living species of *Lepidosiren*. If you look carefully, you can see the four slender "fins" of this fish, which are homologous to the four legs of terrestrial vertebrates.



Amphibians

- Live aquatic and terrestrial
- Three chambered heart
- Lungs replace gills
- Supplemented by moist skin
- Reproduction requires water

Diversity of amphibians



(a)



(b)



(c)

Reptila



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(a)



(b)



(c)

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- 250 million years ago
- Scales
- Shelled eggs
- Amniote egg: enclose embryo in fluid
- More efficient lungs
- Birds are feathered reptiles

Reptiles: Birds



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(a)



(b)



(c)

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- Archaeopteryx: transition fossil
- Hollow bones
- Shelled egg
- Maintain body temperature
- Four chambered heart
- Air sacs

Class Mammalia

- 250 million years ago
- 65 million years diversified
- Mammary glands
- Hair
- Three groups
- Monotremes: egg laying
- Marsupials: pouches
- Placentals: longer uterine development

Monotremes & Marsupials



(a)



(b)

Diversity of Mammals



(a)



(b)



(c)



(d)

Humans

