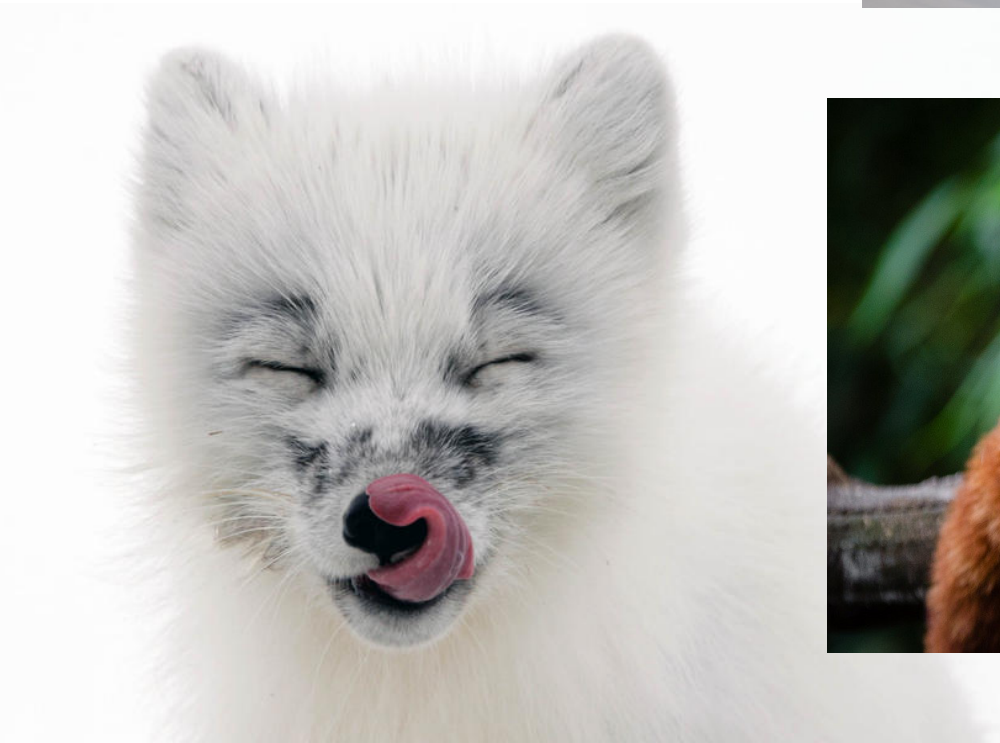
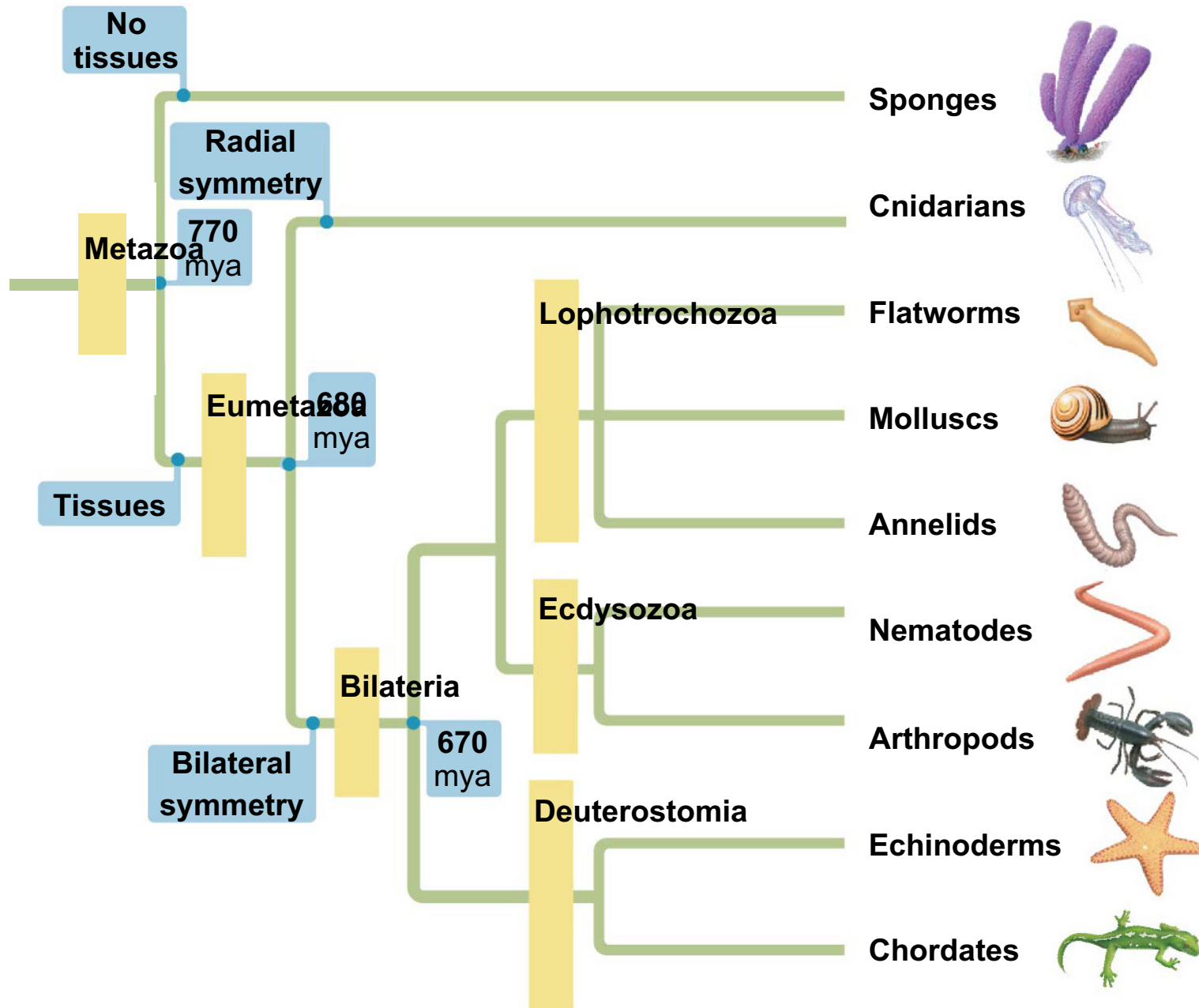


Animals – vertebrates



The animal phylogenetic tree



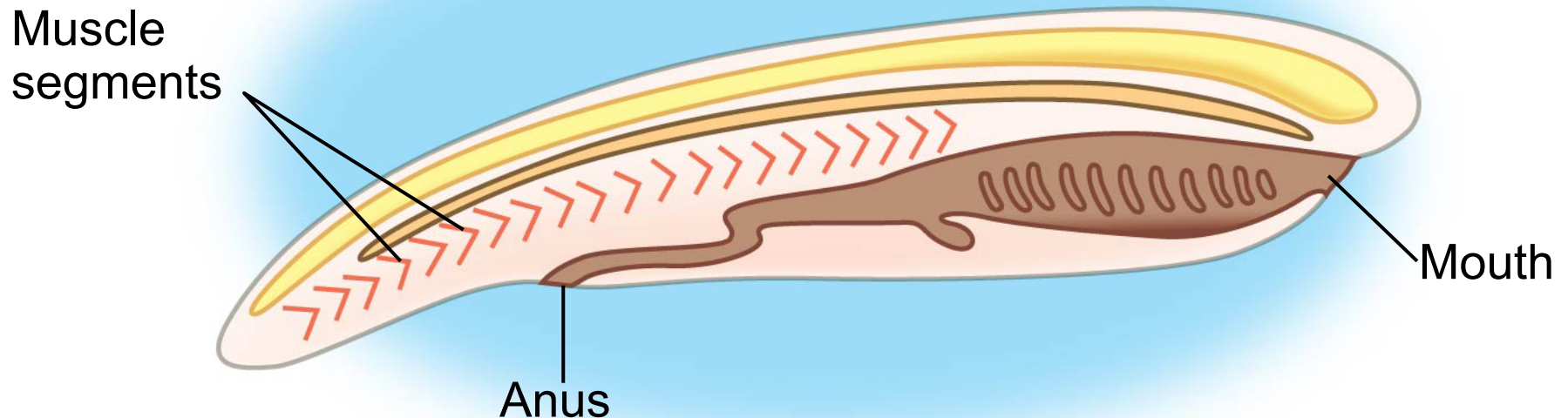
Protostomes:
formation of
mouth, 1st,
anus 2nd

Deuterostomes:
Formation of
mouth, 2nd, anus
1st

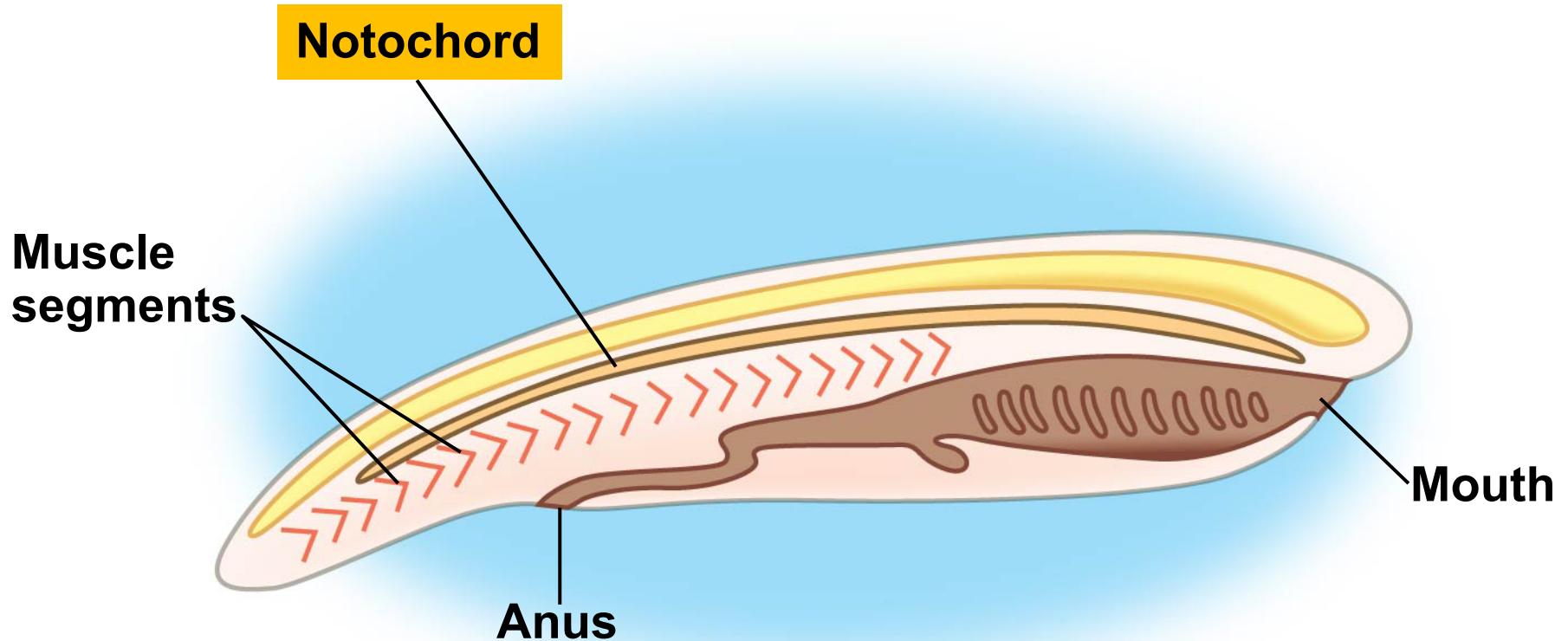
Chordata - our phylum!

- All chordates share 4 characteristics
- These are present at some point in development (larva, adult, or both)

Basic chordate body plan

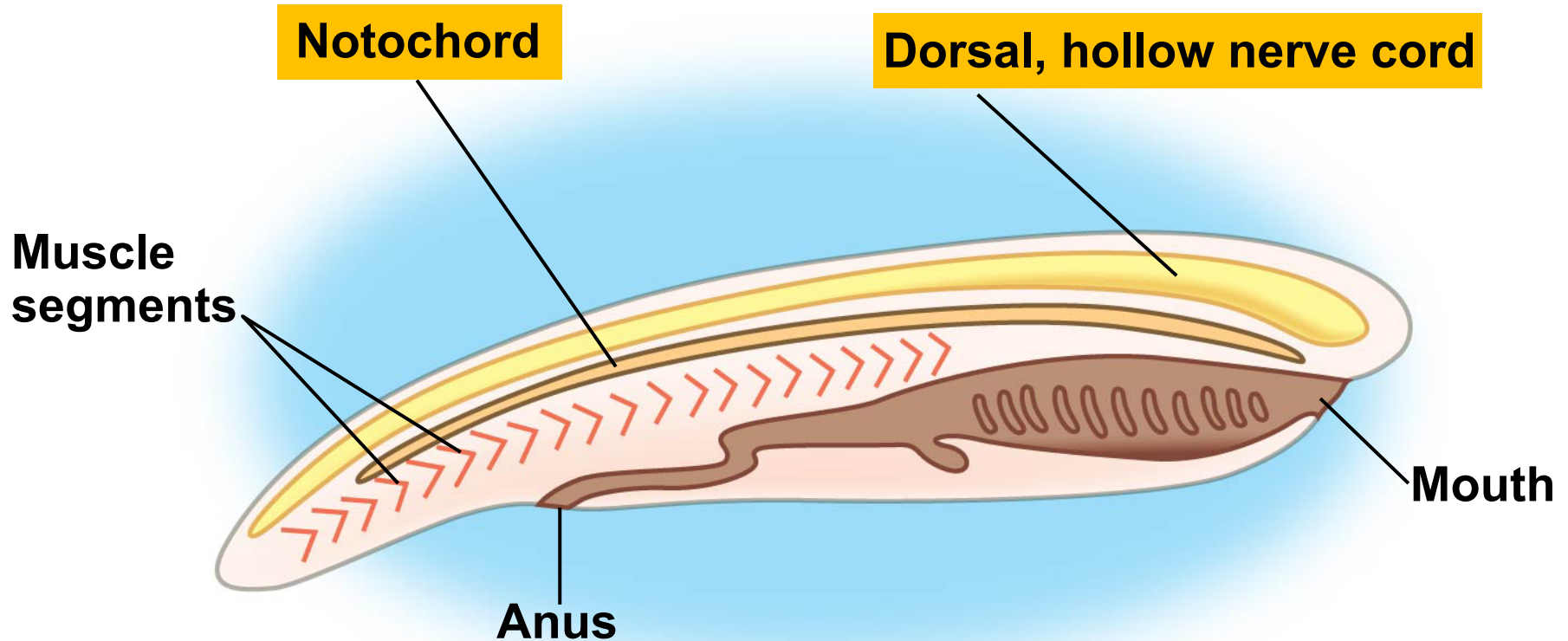


Chordata - our phylum!

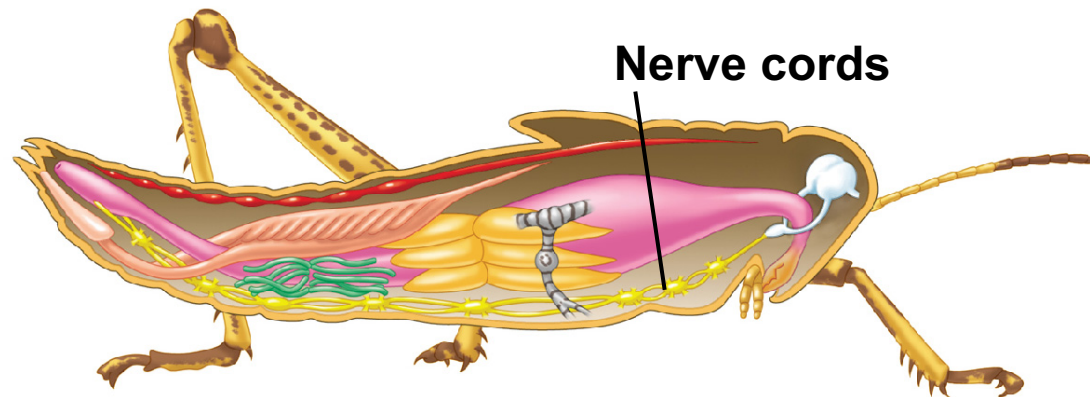
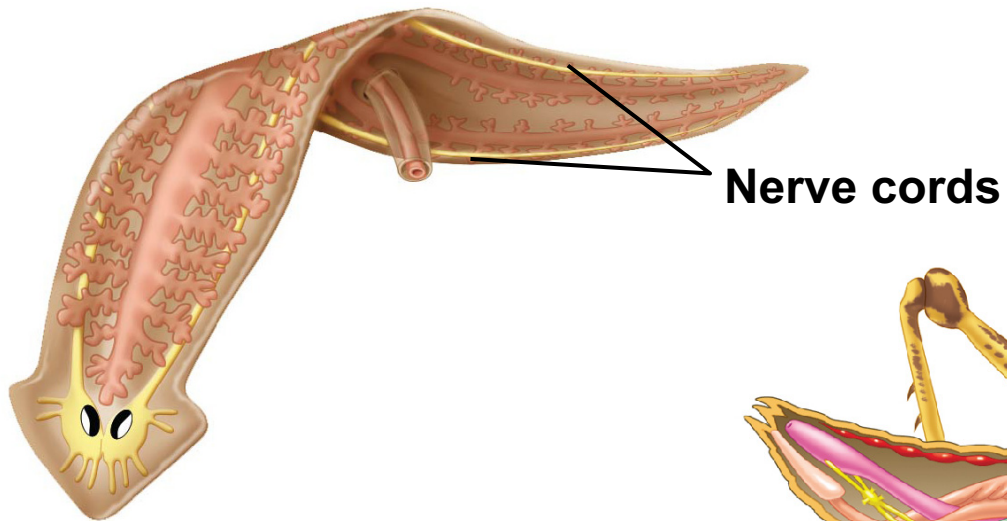
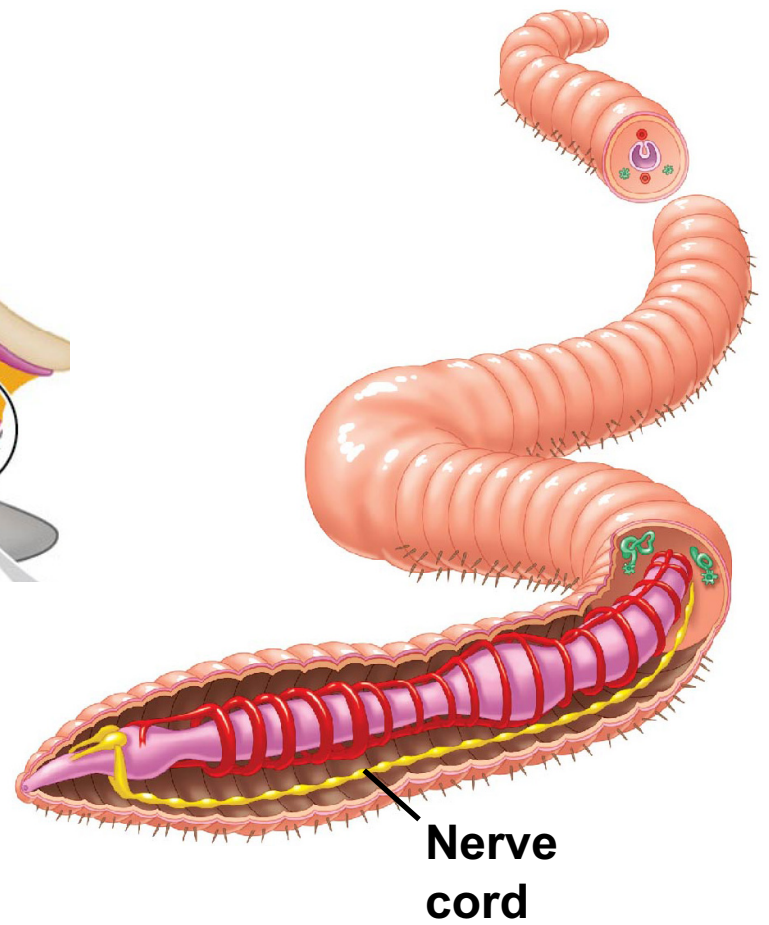
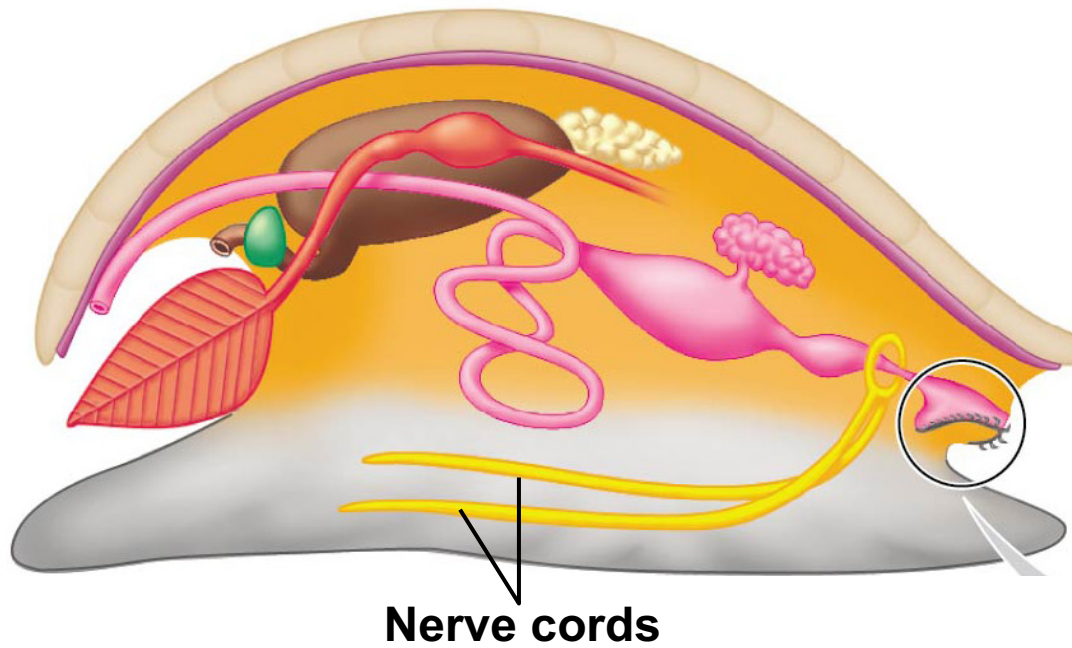


- Longitudinal rod of fluid-filled cells and fibrous tissue
- Provides skeletal support through the organism's length for muscles to pull against for swimming
- In vertebrates a hard skeleton forms around it and the notochord is reduced

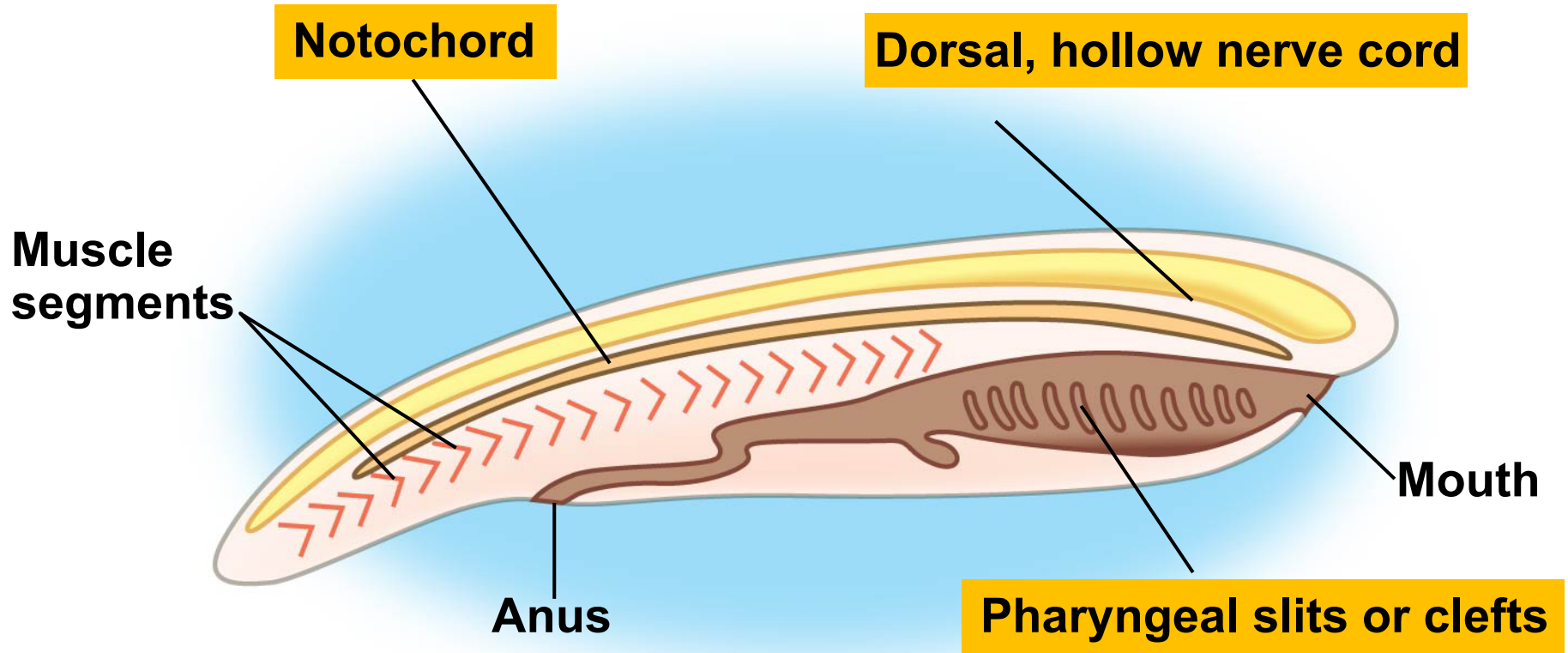
Chordata - our phylum!



- Unique feature in chordates
- Develops into the central nervous system (aka brain and spinal cord)

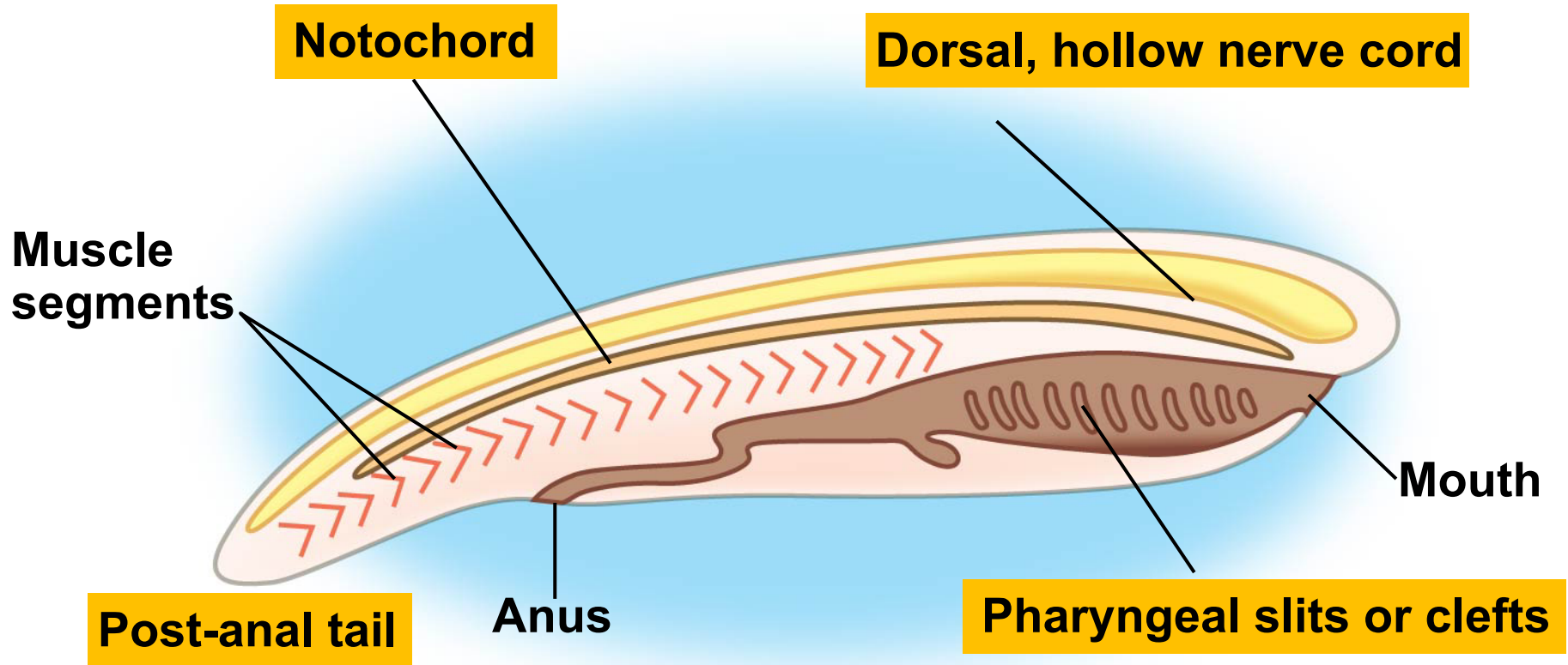


Chordata - our phylum!



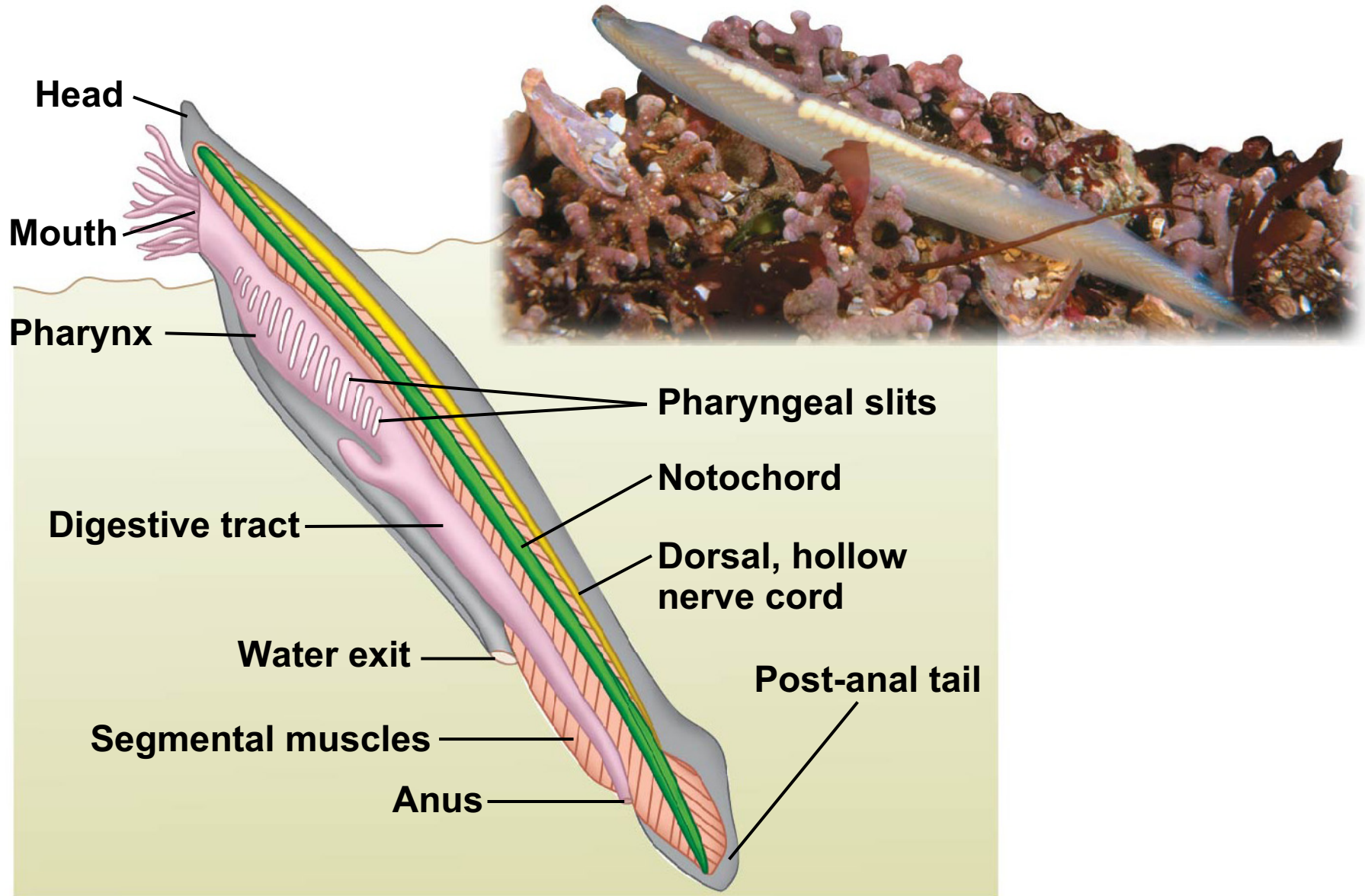
- Series of arches separated by grooves along the outer surface of pharynx
- Water can come in mouth and exit at the pharynx
- Develop into gills in some chordates
- Part of our ear!

Chordata - our phylum!

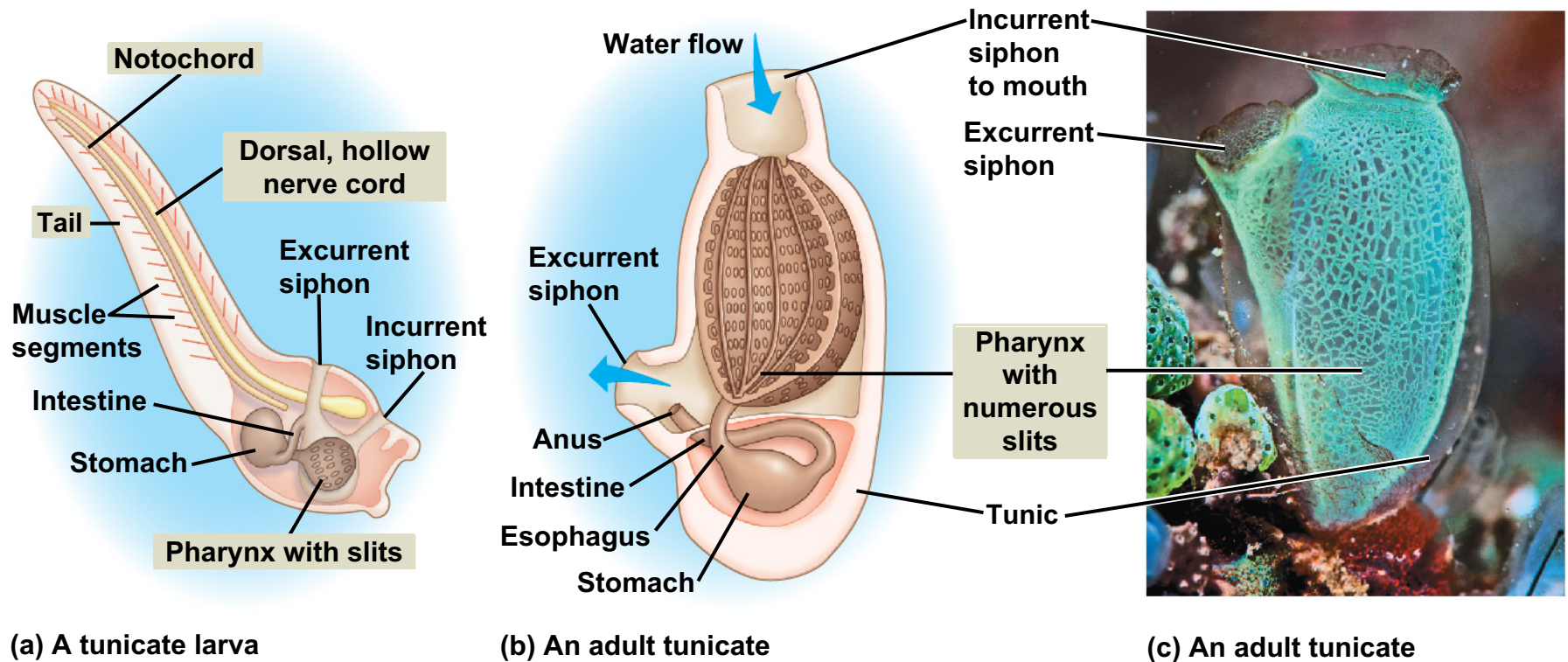


- Digestive tract does not go to the end of the body
- Made of muscle and skeletal segments
- Great for swimming
- Muscle segments = segmentation

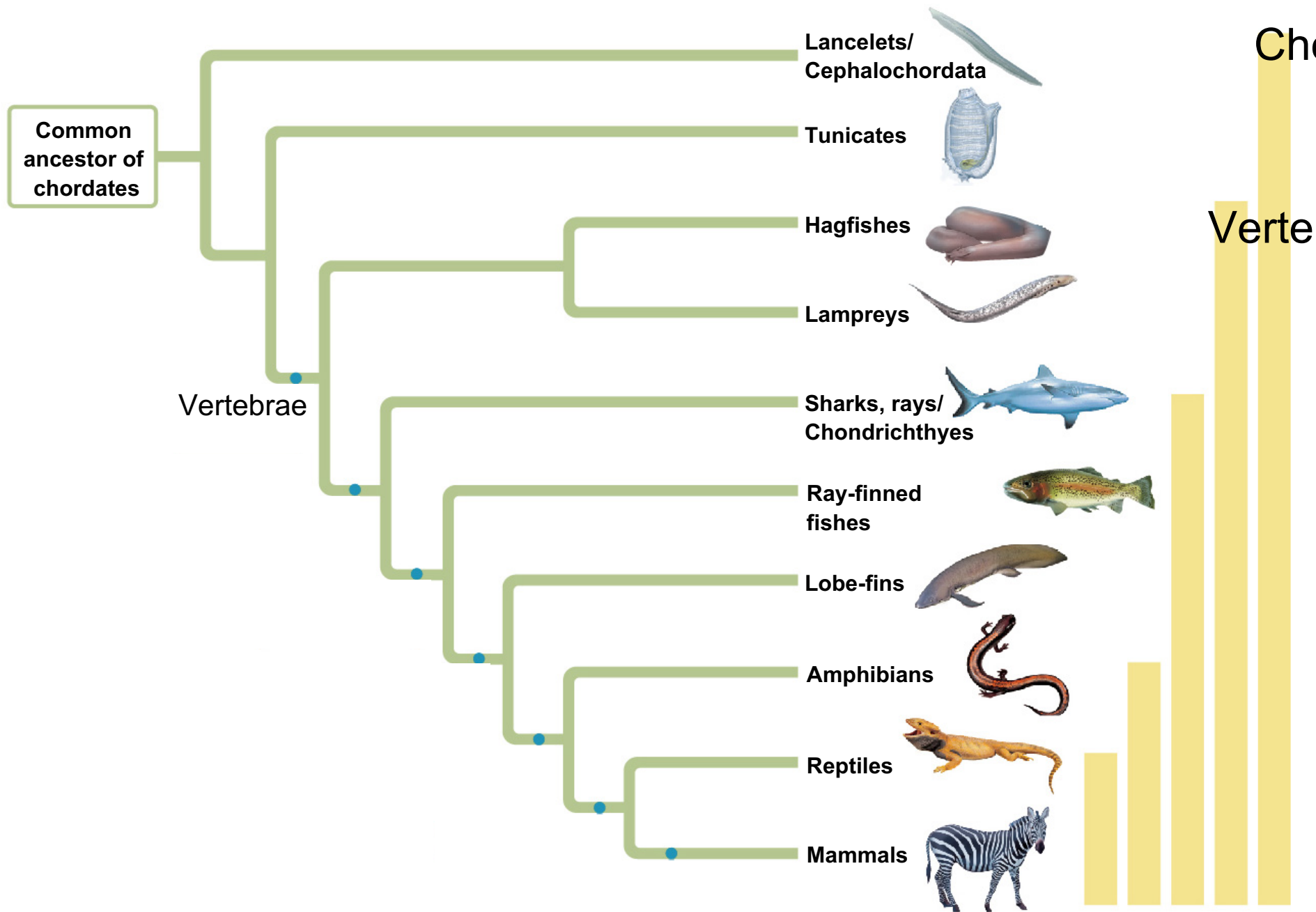
Invertebrate chordates - lancelets



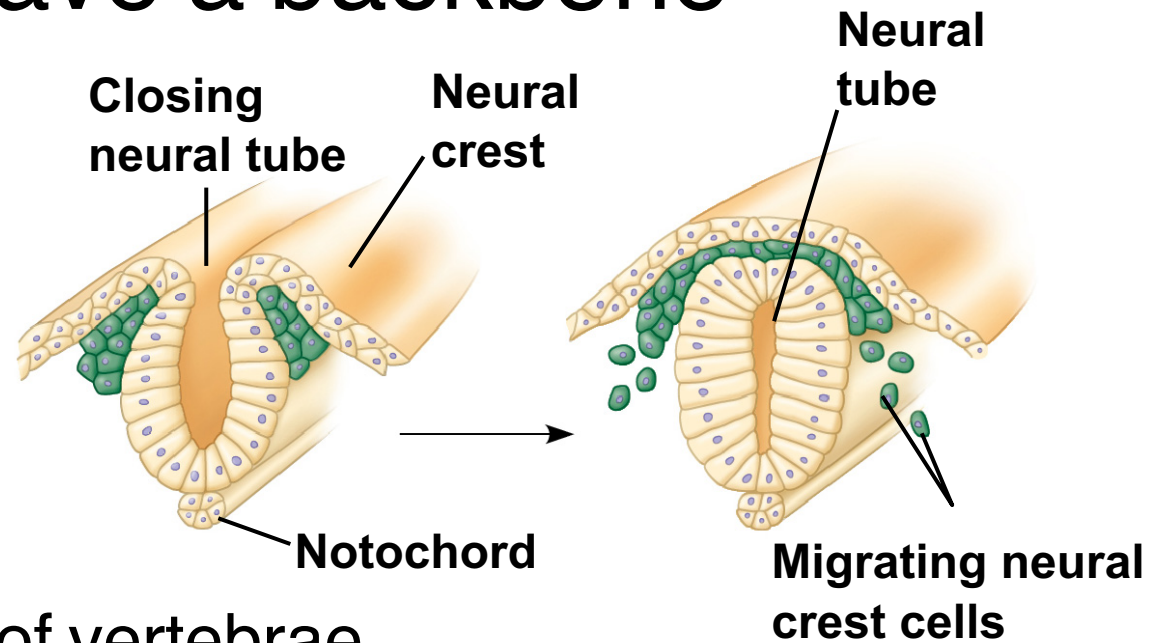
Invertebrate chordates - tunicates



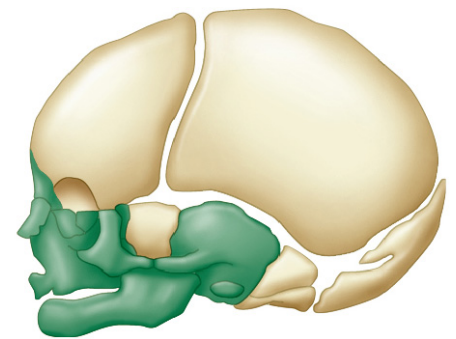
- Loss of many features from larva to adult

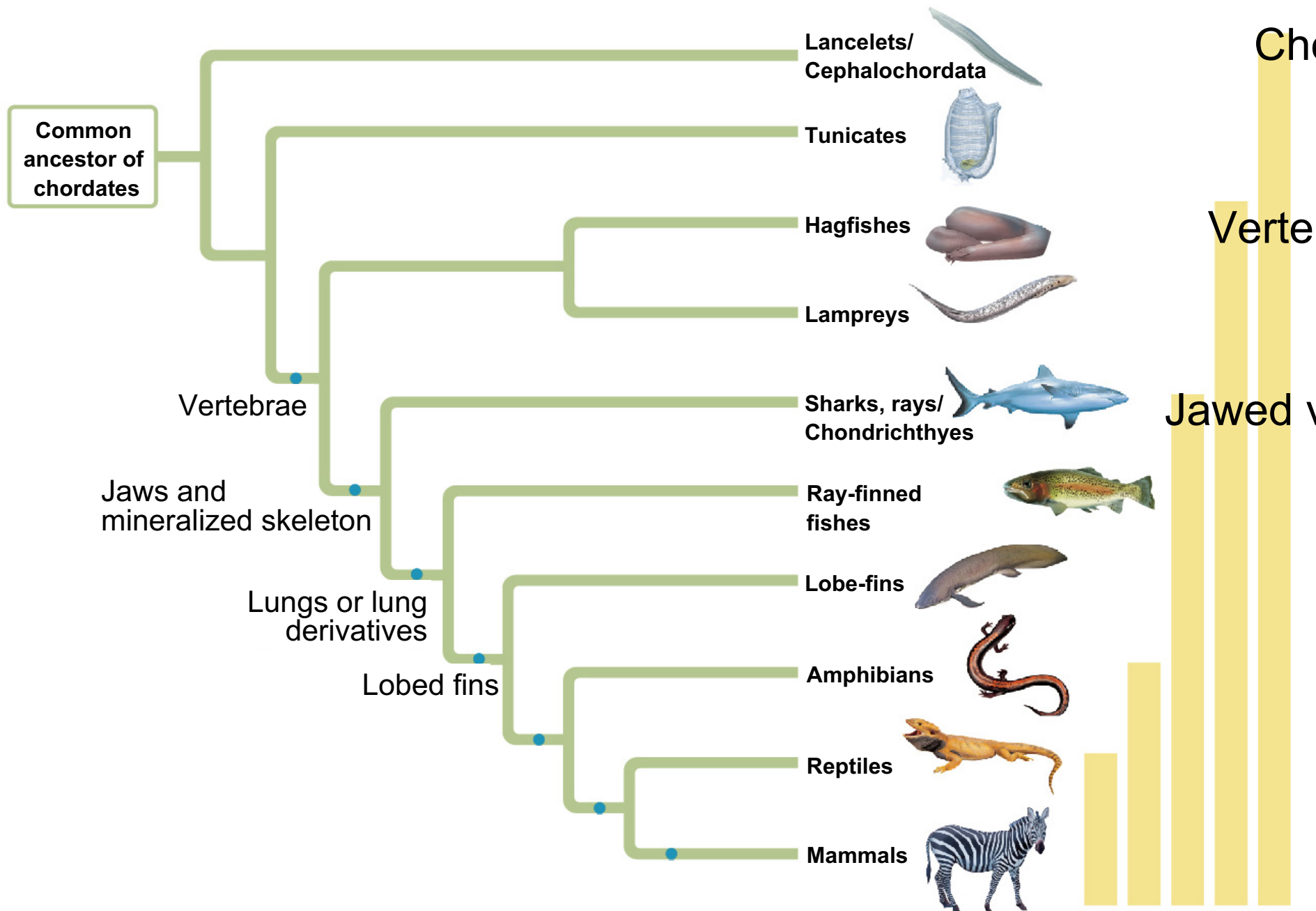


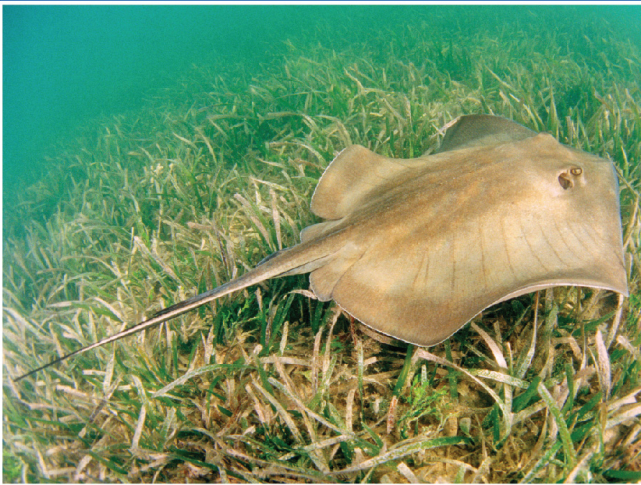
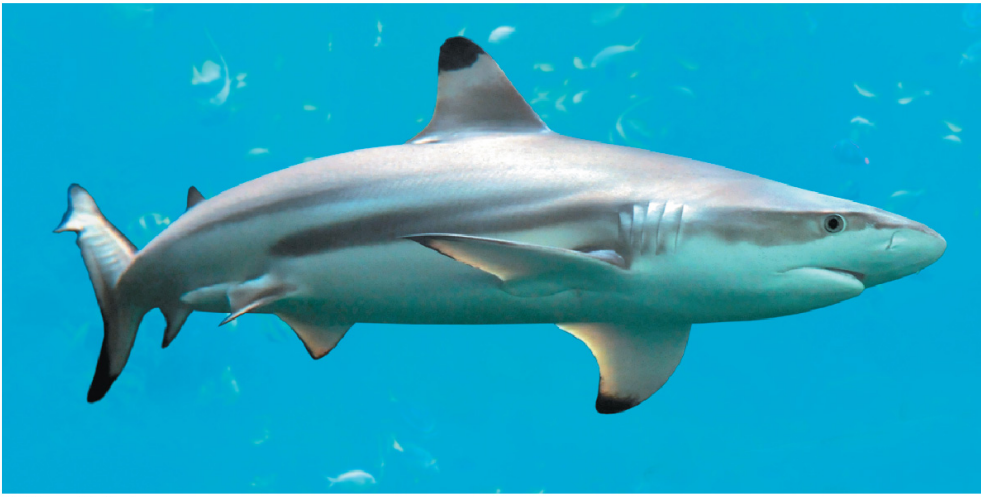
Vertebrates have a backbone



- Vertebral column of vertebrae
- Takes over most of the role of notochord
- Neural crest cells = teeth, bones, cartilage of the skull, neurons, and sensory capsules



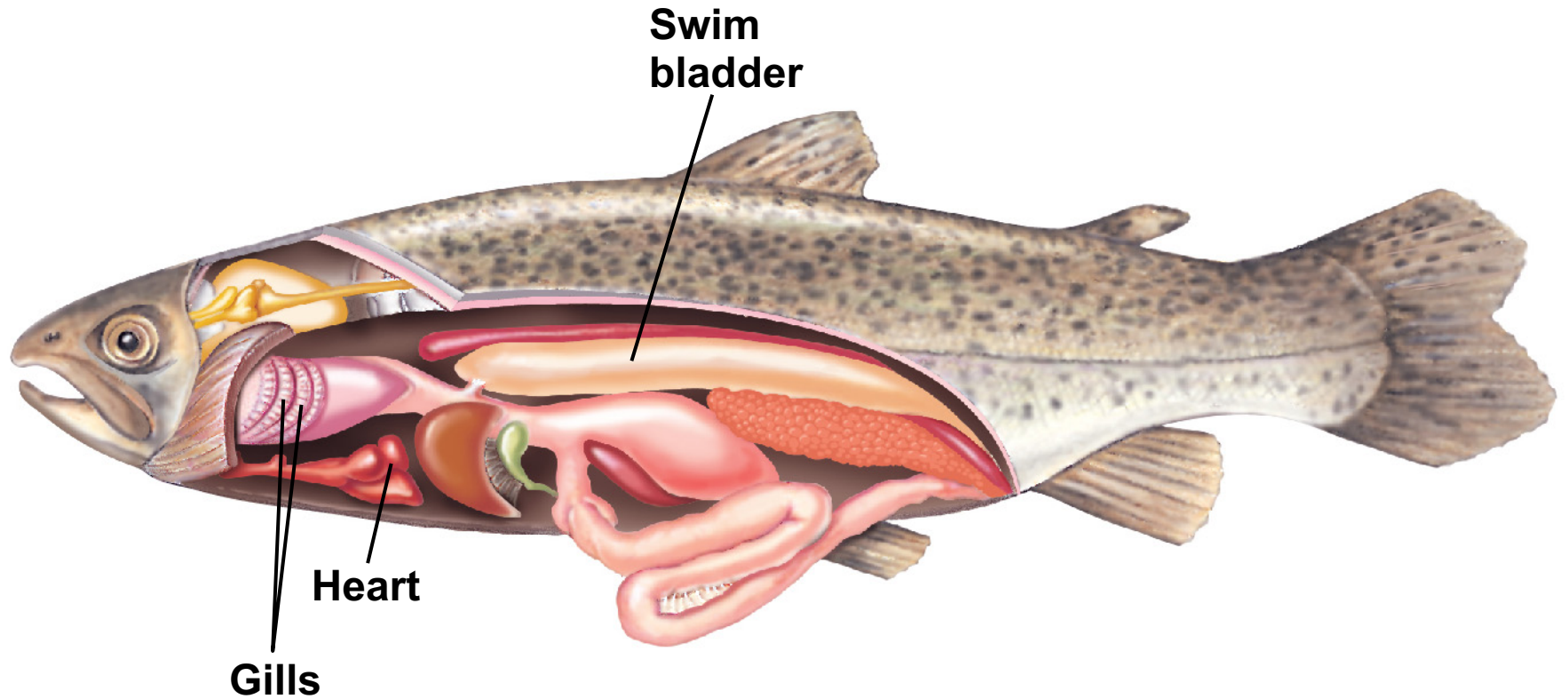


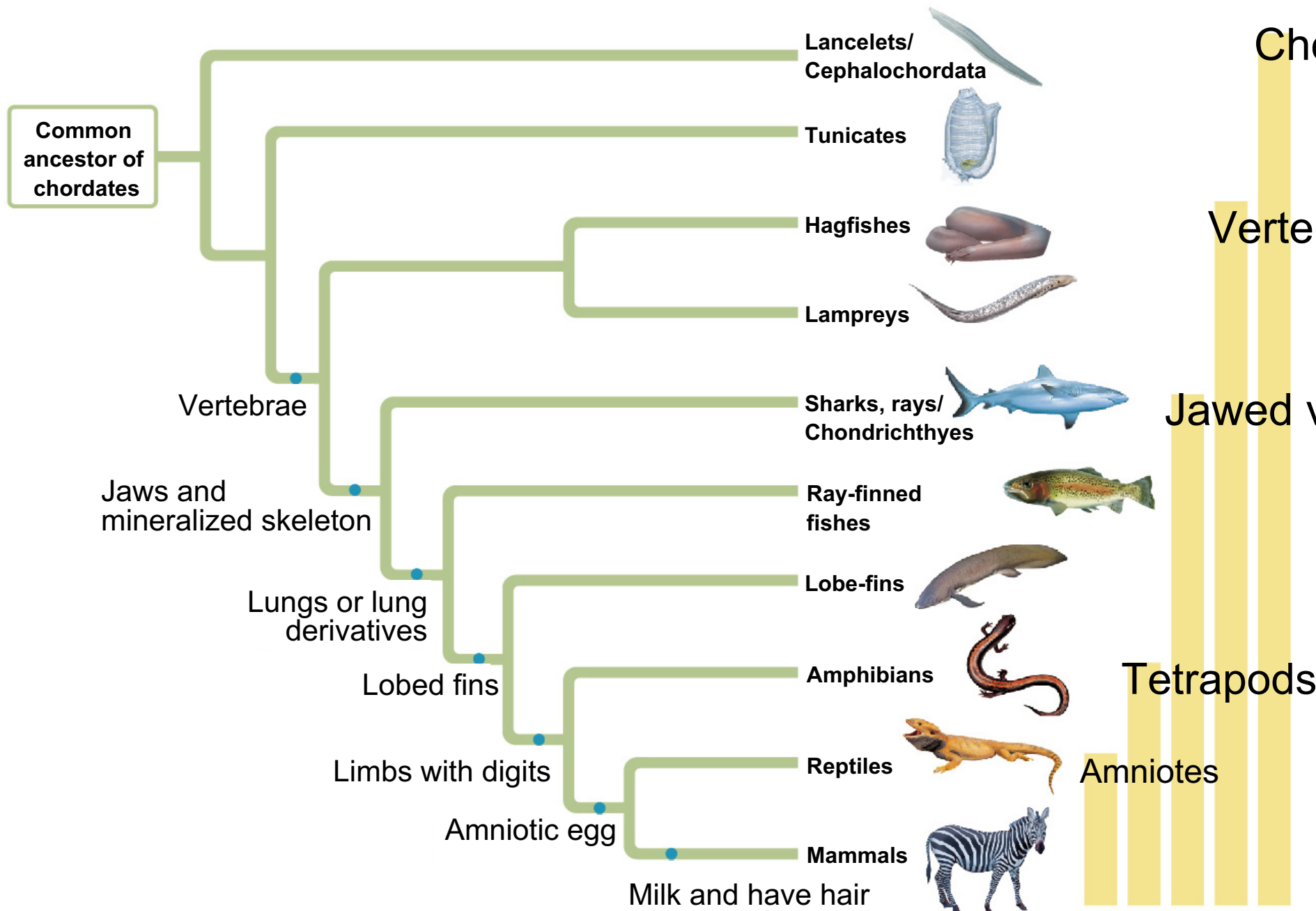


Chondrichthyes
vs
Osteichthyes



Lungs or lung derivatives???





Amphibians



(a) The tadpole



(b) During metamorphosis



(c) The adults return to water to mate

Reptiles (including birds): shelled eggs, amnion, and other extraembryonic membranes



- Bring the water with you
- No longer need a body of water to complete life cycle!

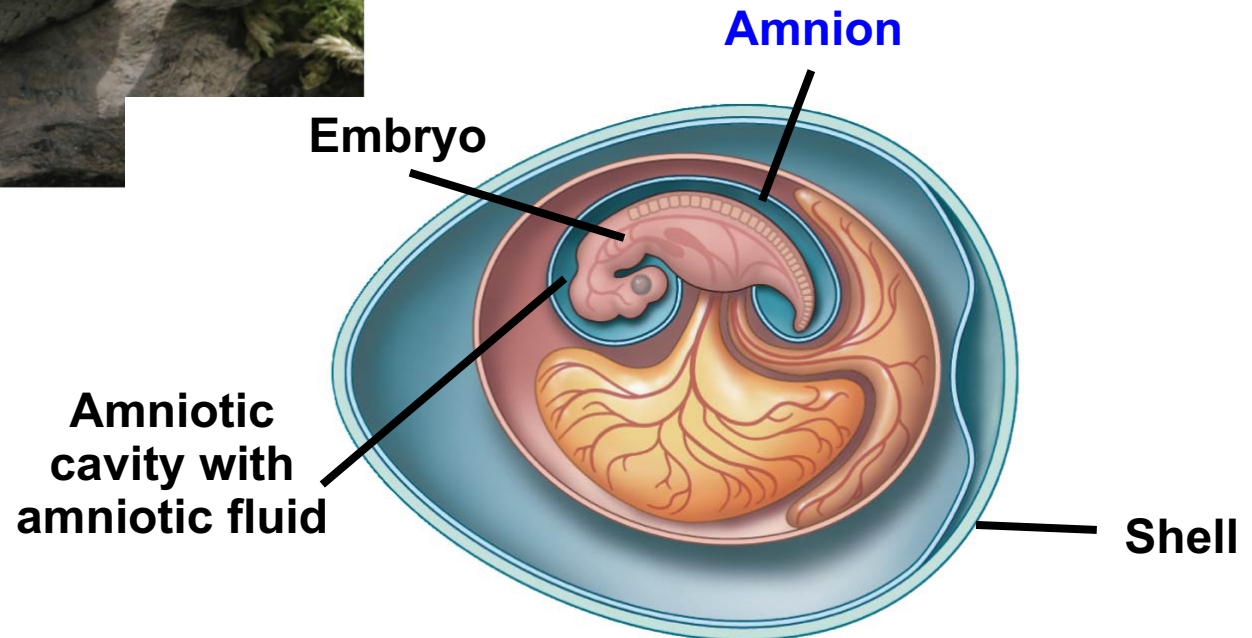
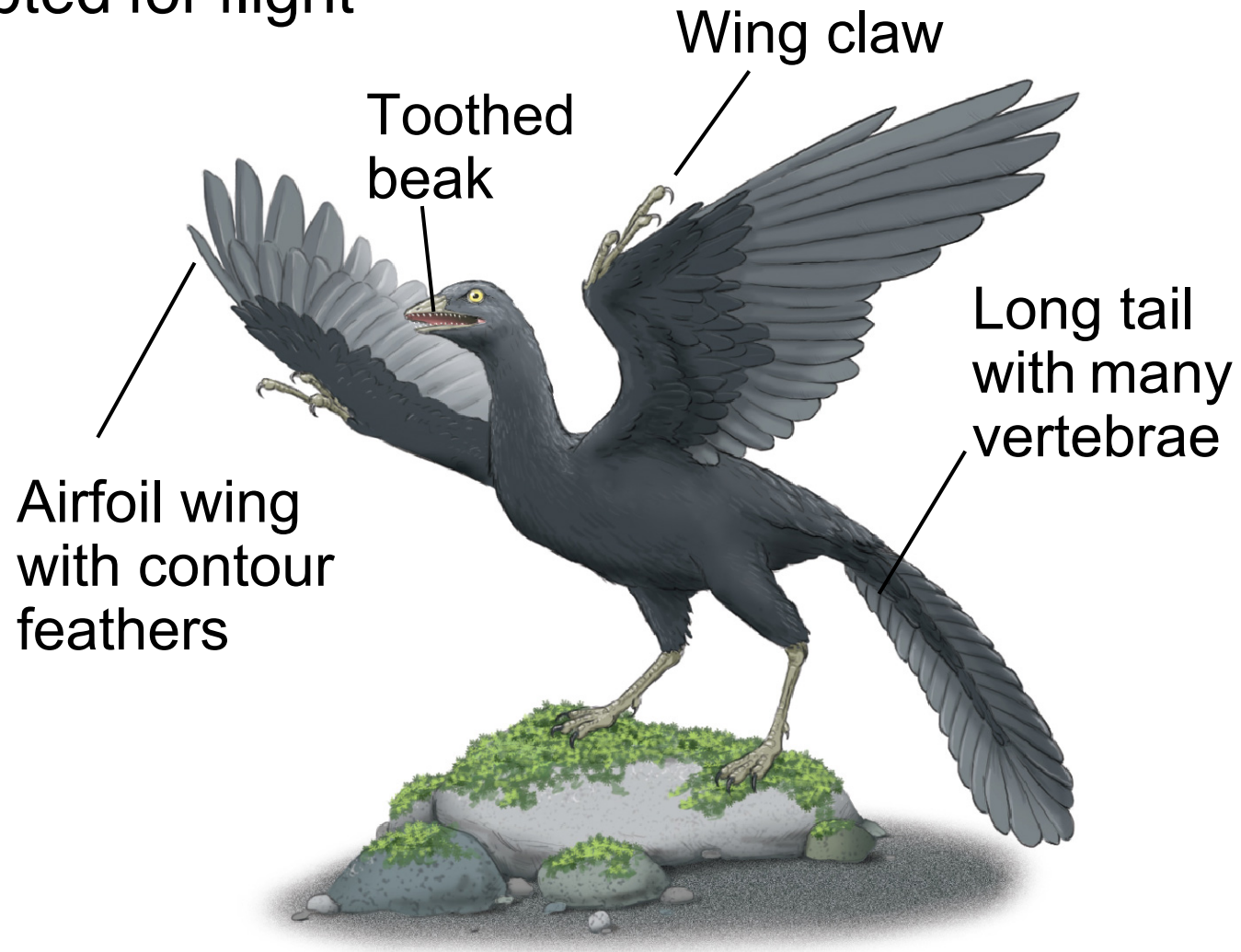


Figure 19.6a

Birds – living dinosaurs

- feathers coopted for flight
- endothermic



Mammals - Monotremes

- egg-laying mammals
- oldest group



Mammals - Marsupials

- nurtured by a **placenta**
- **short gestation**



Mammals - Eutherian mammals

- nurtured by a **placenta**
- **long gestation**

