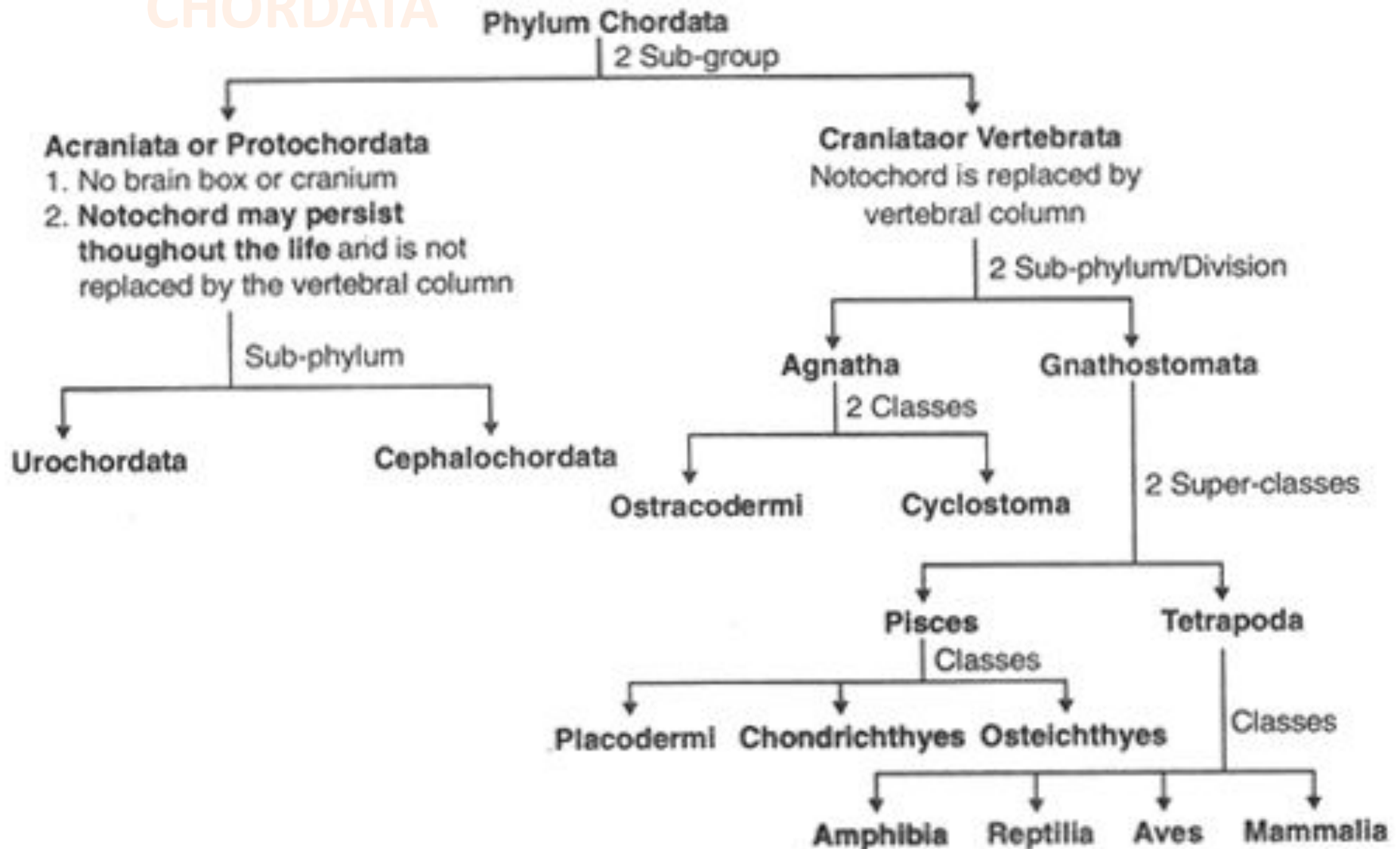


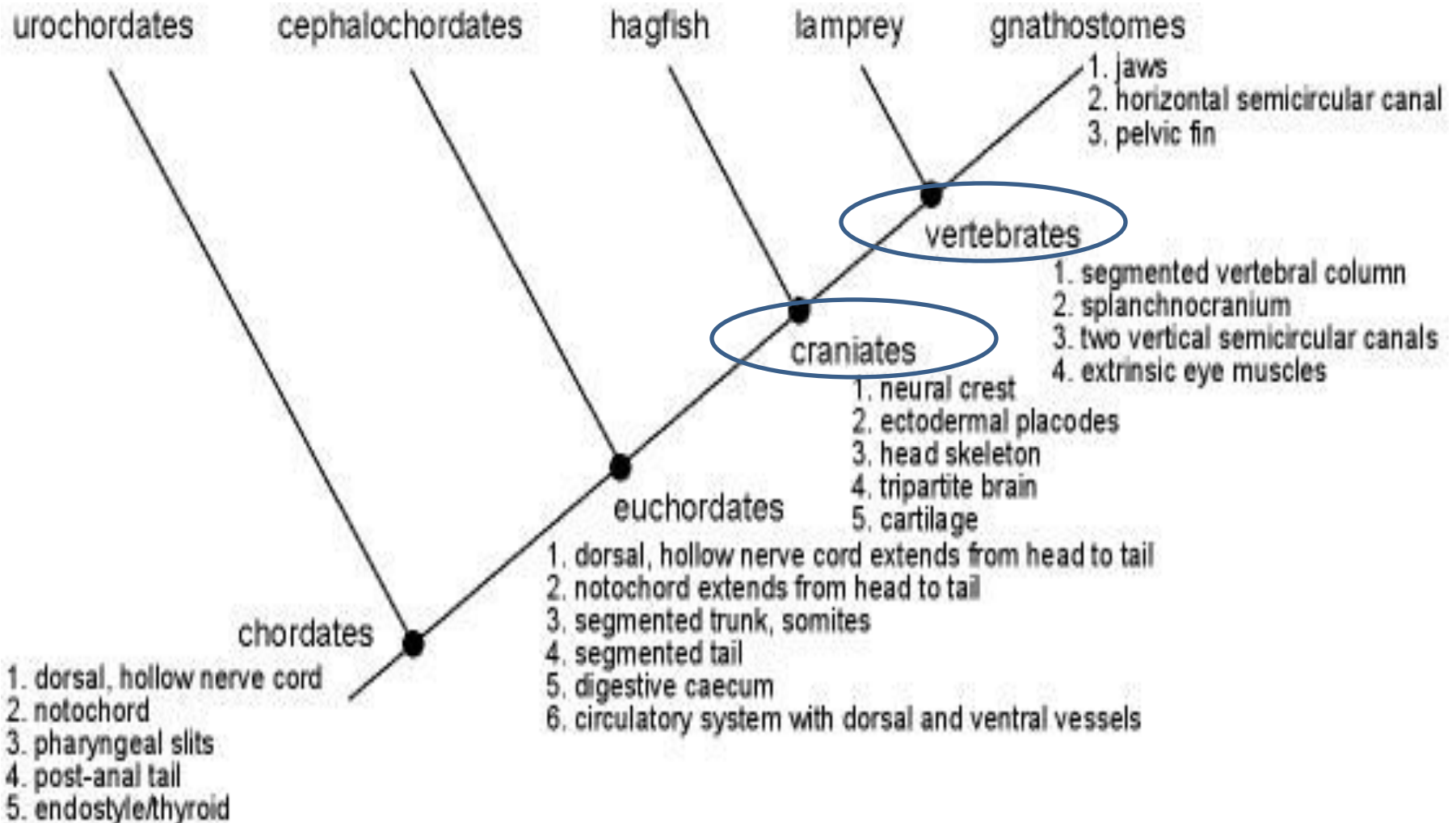
# Phylum Chordata

Prepared by: Alimbayeva Zhanagul

# PHYLUM CHORDATA

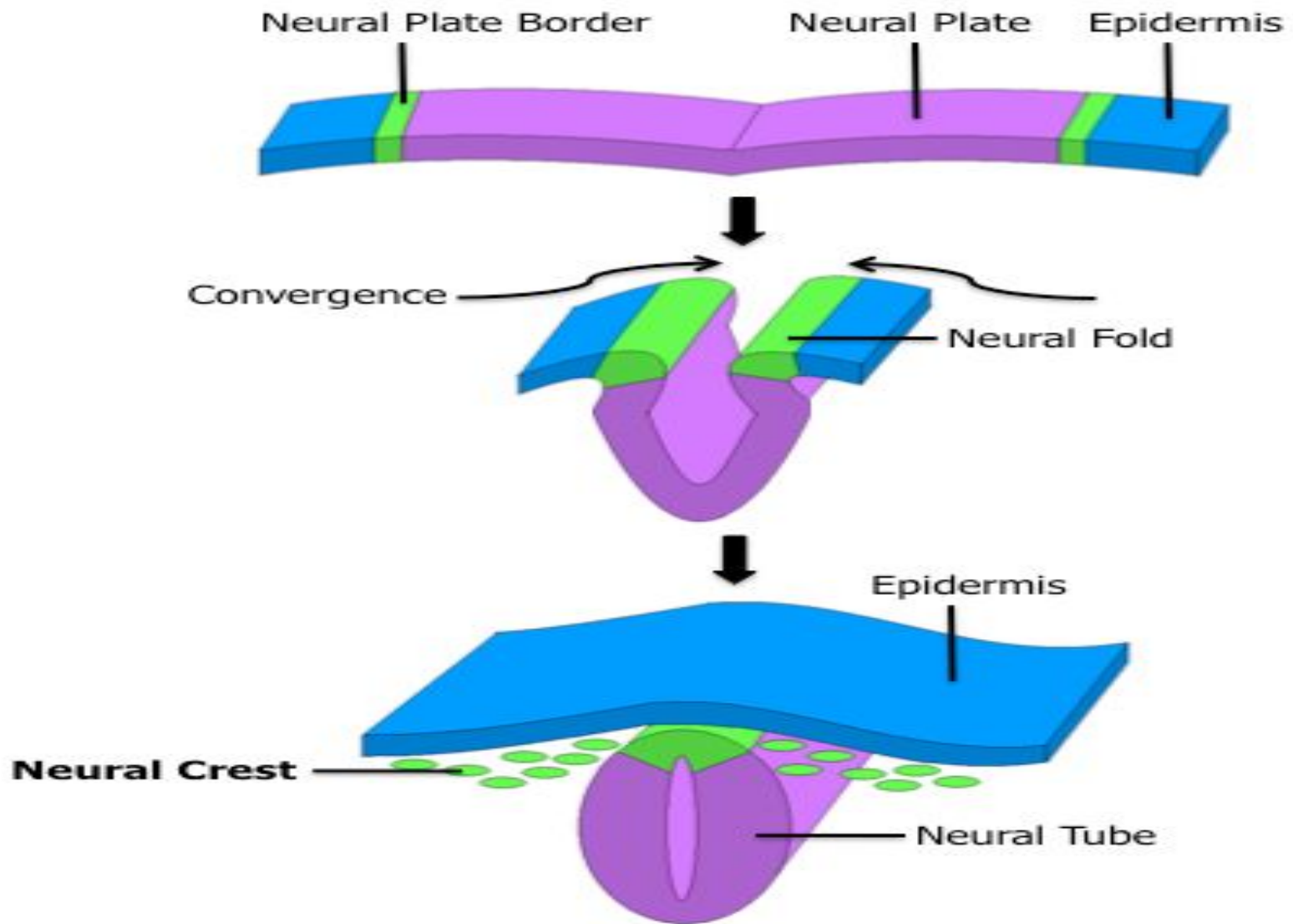


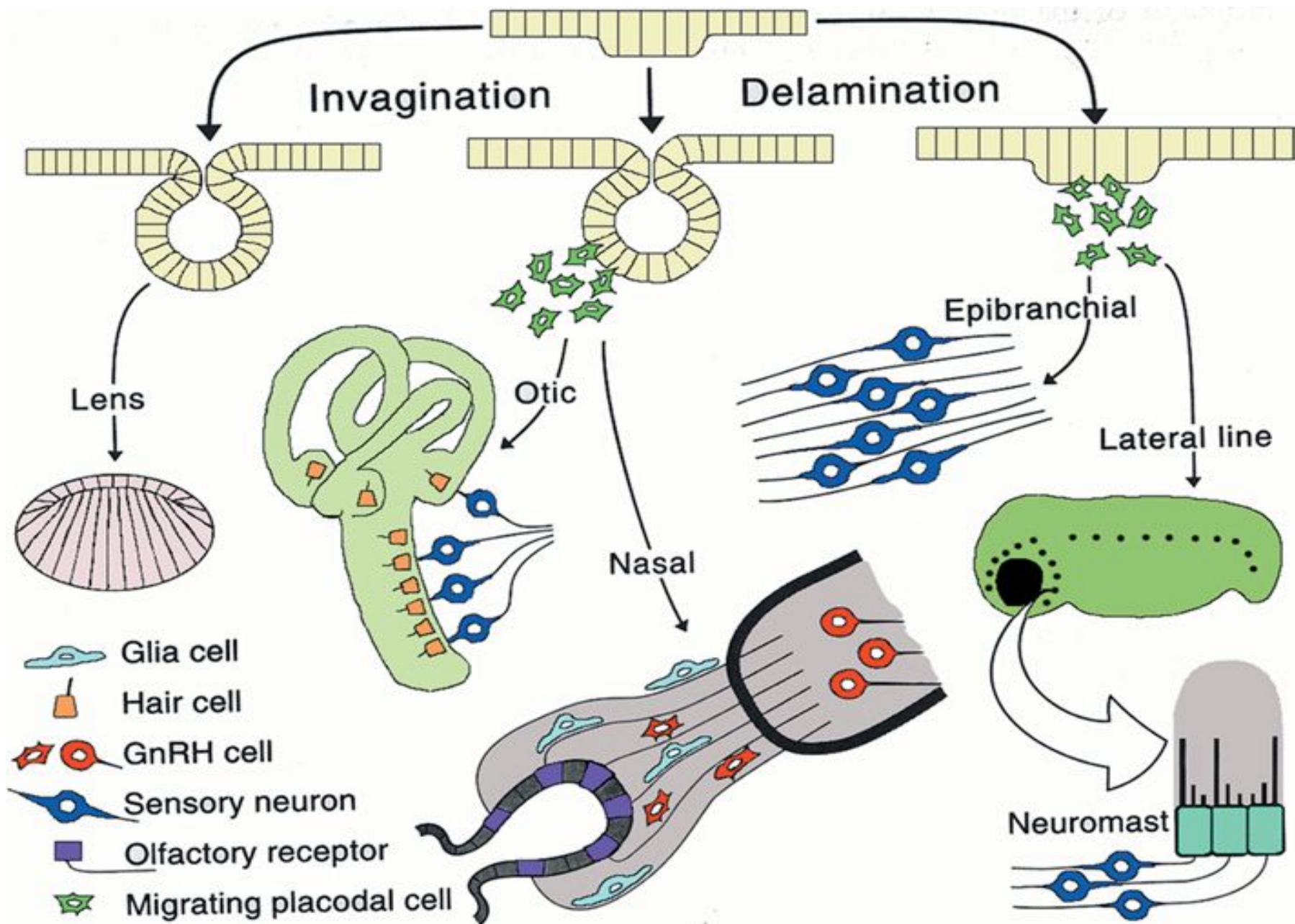
# VERTEBRATE EVOLUTION



# VERTEBRATE

- The vertebrates show affinities with other chordates but share some characters that make them unique. Some have argued that many of the characters that describe vertebrates have been derived from the same set of cells, the **neural crest cells**. These cells appear early in development, and only vertebrates have them. From neural crest cells are derived the skull and jaw bones.





# Subphylum Agnatha

- **Agnatha** , "no jaws"
- Two classes, the Ostracodermi and Cyclostomata
- **Ostracoderms** ("shell-skinned") are any of several groups of extinct, primitive, jawless fishes that were covered in an armor of bony plates. They belong to the taxon Ostracodermi. The fossil of Ostracoderm are found in the Ordovician and Devonian strata of North America and Europe. They were often less than 30 cm (1 ft) long and were probably slow, bottom-dwelling animals
- Ostracoderms existed in two major groups, the more primitive heterostracan and the cephalaspidomorph. The cephalaspids were more advanced than the heterostracans in that they had lateral stabilizers for more control of their swimming.



# Ostracodermi

- Some major groups of ostracoderms are as follows.
- †[Pteraspidomorphi](#)
- †[Thelodonti](#)
- †[Anaspida](#)
- †[Galeaspida](#)
- †[Pituriaspida](#)
- †[Osteostraci](#)



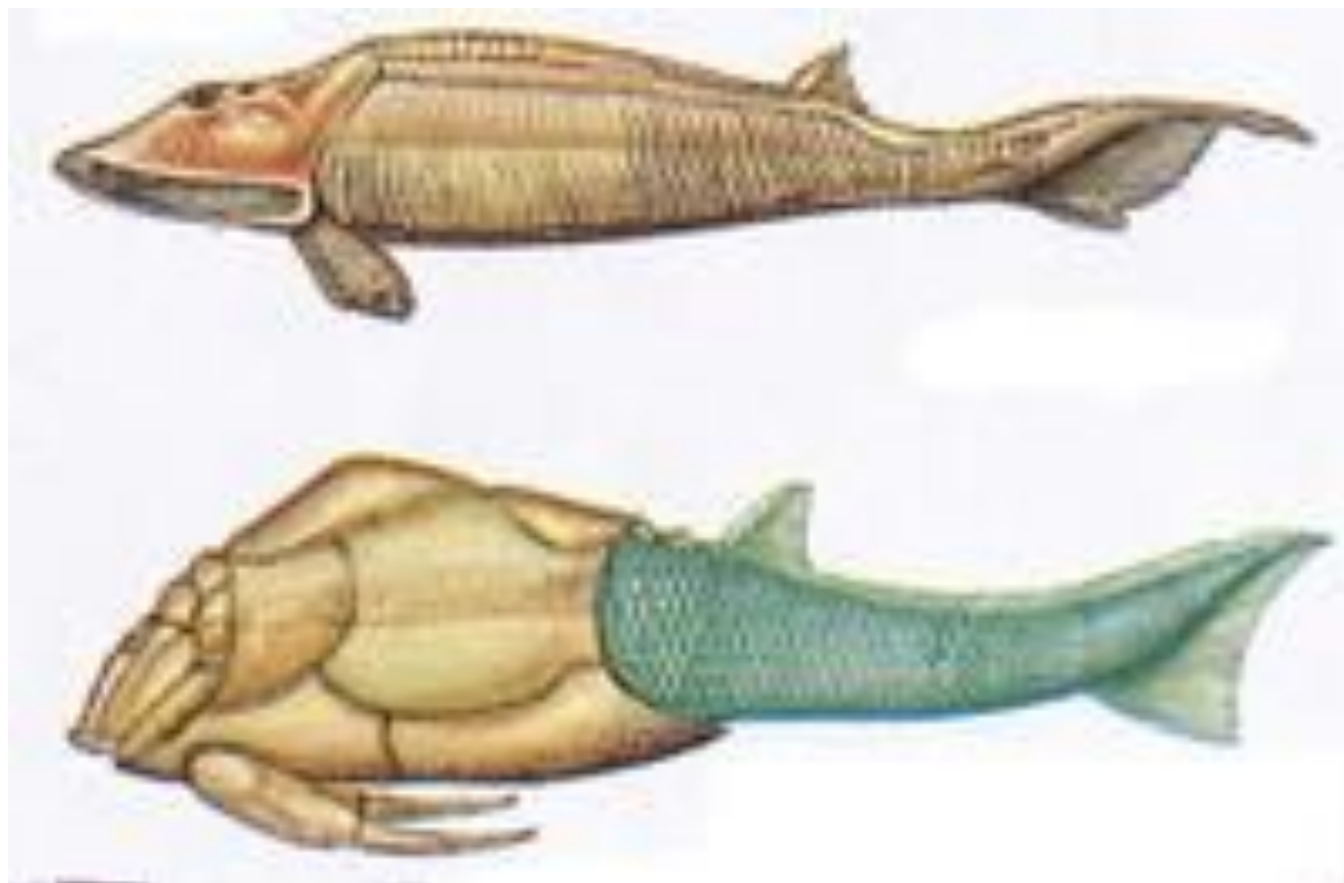


**Pteraspidomorphi** is an extinct subclass of early [jawless fish](#). The fossils show extensive shielding of the head. Some species may have lived in fresh water.



The **Anaspida** ("without shield") are stem [gnathostomes](#),<sup>1</sup> and are classically regarded as the ancestors of lampreys.<sup>1</sup> Anaspids were small marine [agnathans](#) that lacked scales and paired fins, but have a striking highly hypocercal tail. They first appeared in the early [Silurian](#), and flourished until the [Late Devonian Extinction](#) Event, during the late [Devonian](#), where most species, save for [lampreys](#), went extinct due to the environmental upheaval during that time.

- **Cyclostomata** is a group of chordates that comprises the living jawless fishes: the Lamprey and Hagfishes. Both groups have round mouths that lack jaws but have retractable horny teeth. The name Cyclostomata means "round mouths". Their mouths cannot close due to the lack of a jaw, so they have to constantly cycle water through the mouth.



# Myxiniformes



- **Hagfish** are marine craniates of the class Agnatha or **Myxini**, also known as **Hyperotreti**. Some researchers regard Myxini as not belonging to the vertebrate. That is, they are the only living animals that have a skull but not a vertebral column.
- The skeleton is composed of cartilage, and lacks bone.
- The earliest fossil record dates back approximately 550 million years, or earlier to the lower cambrian period

# Petromizontiformes

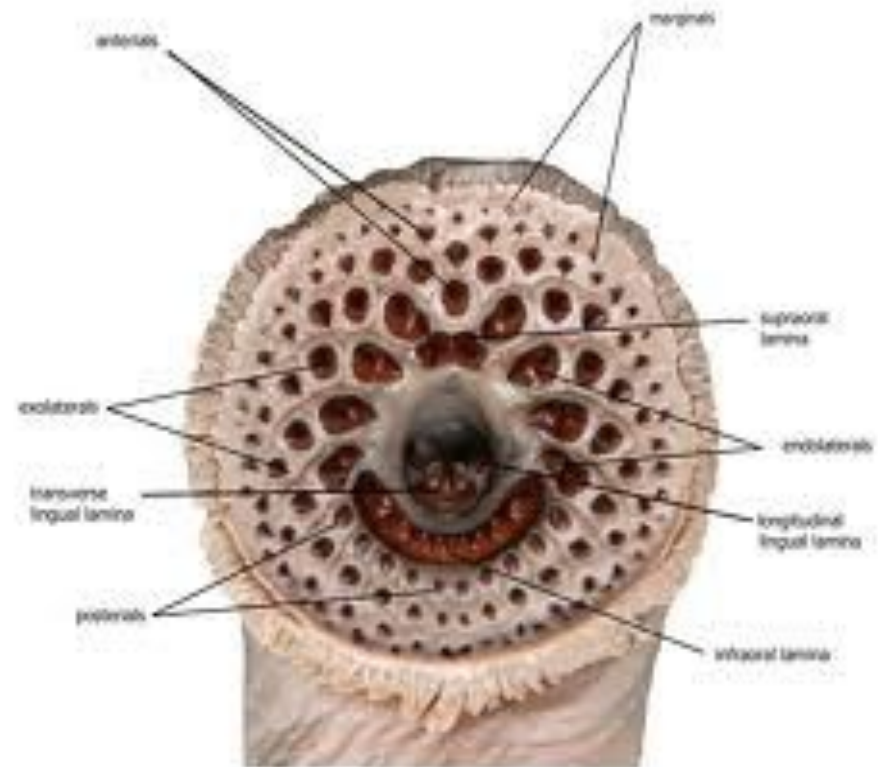
- **Lampreys** (sometimes also called **lamprey eels**) are jawless, whose adults are characterized by a toothed, funnel-like sucking mouth. Translated from an admixture of latin and greek, lamprey means stone lickers (lambere: to lick, and petra: stone). While lampreys are well-known for those species which bore into the flesh of other fish to suck their blood, most species of lamprey are non-parasitic and never feed on other fish

- Lampreys are anadromous or fresh water, eel-shaped jawless fishes. They can be readily recognized by the large, rounded sucker which surrounds their mouth and by their single "nostril" on the top of their head. The skin of lampreys is entirely naked and slimy, and their seven gill openings extend behind the eyes.
- Whether marine or fresh water, lampreys always spawn and lay eggs in brooks and rivers. During most of their life (about seven years), they are larval; then they undergo a metamorphose and become an adult. Anadromous lampreys, when adult, return to the sea, where they become mature, and live there for one or two years. Then they return to rivers, reproduce and generally die.
- Many lampreys are parasites. They attach on other fishes by means of their sucker, scrape their skin with their rasping tongue, and suck their blood. All lampreys, however can also feed on small invertebrates. The sucker is also for them a means to travel upstreams in rivers. They use it to attach on stones to rest (*Petromyzon*, the name of the European lamprey, means "stone sucker").

- Recent lampreys, or Petromyzontiformes, include ten genera: *Ichthyomyzon*, *Petromyzon*, *Caspiomyzon*, *Geotria*, *Mordacia*, *Eudontomyzon*, *Tetrapleurodon*, *Entosphenus*, *Lethenteron*, and *Lampetra*.
- Lampreys have an amphitropical distribution and are restricted to relatively cold waters. *Geotria* and *Mordacia* are the only lampreys of the southern hemisphere, all other genera live in the northern hemisphere.



- The skull of lampreys is, like that of hagfishes, made up of cartilaginous plates and bars, but it is more complex and includes a true cartilaginous braincase. The gills, although enclosed in muscularized pouches in the adult, are supported by unjointed gill arches, which form a "branchial basket". The gill arches lie externally to the gill filaments and associated blood vessels. Lampreys possess, like hagfishes, a very large notochord.



**Thanks for your attention!**