

Natural Sciences 360

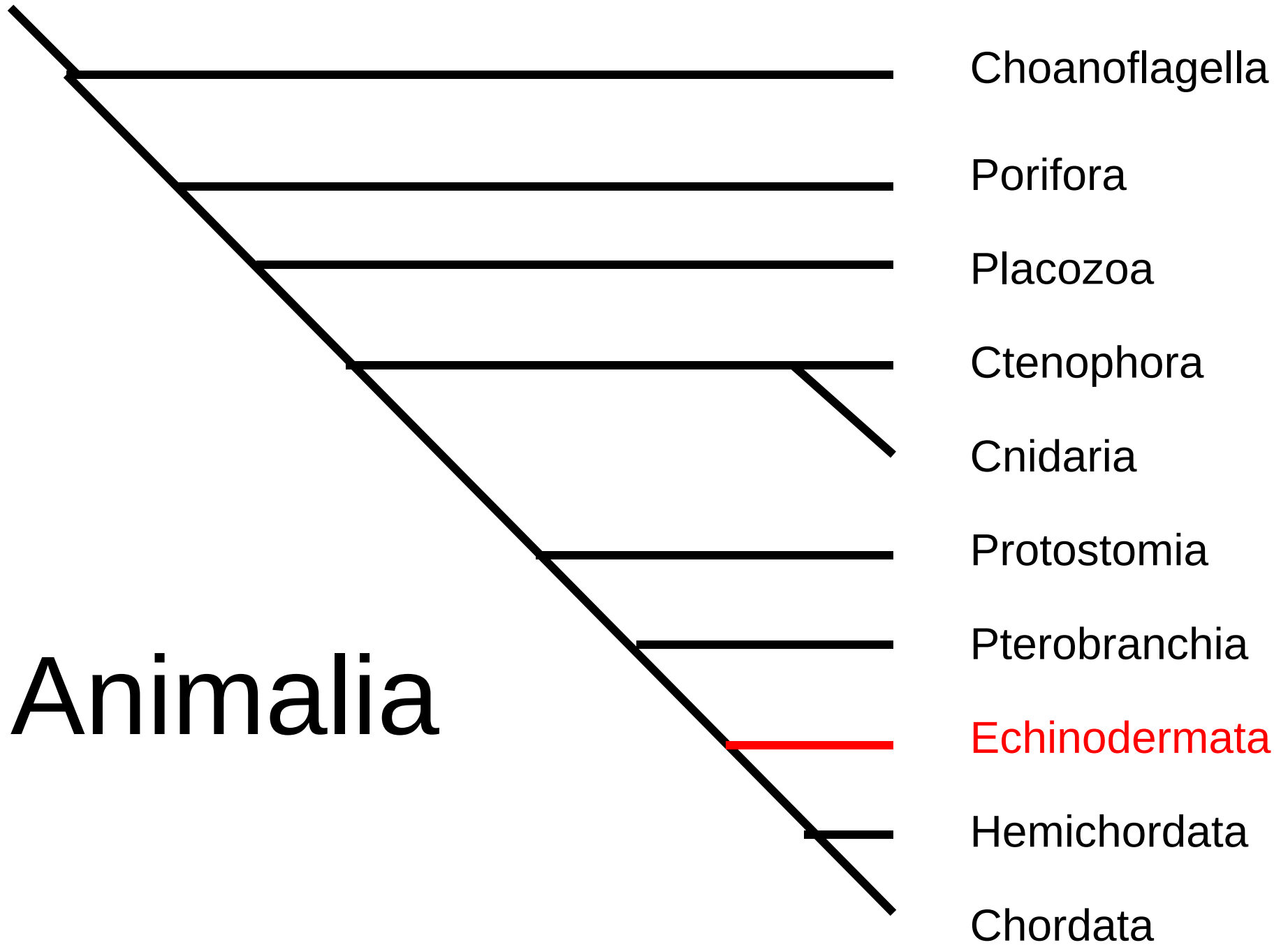
Legacy of Life

Lecture 9

Dr. Stuart S. Sumida

DEUTEROSTOMIA

The Echinoderms



Recall: Bilateralia –
Includes two great groups of
animals:

Protostomia (means 1st mouth)
Deuterostomia (means 2nd
mouth)

ECHINODERMATA:

Characterized by:

- Radial symmetry as adults (bilateral as larvae)
- Water-vascular system

There are many groups of echinoderms. The most important extant groups (those that remain alive) are:

Crinoidea (sea lilies)

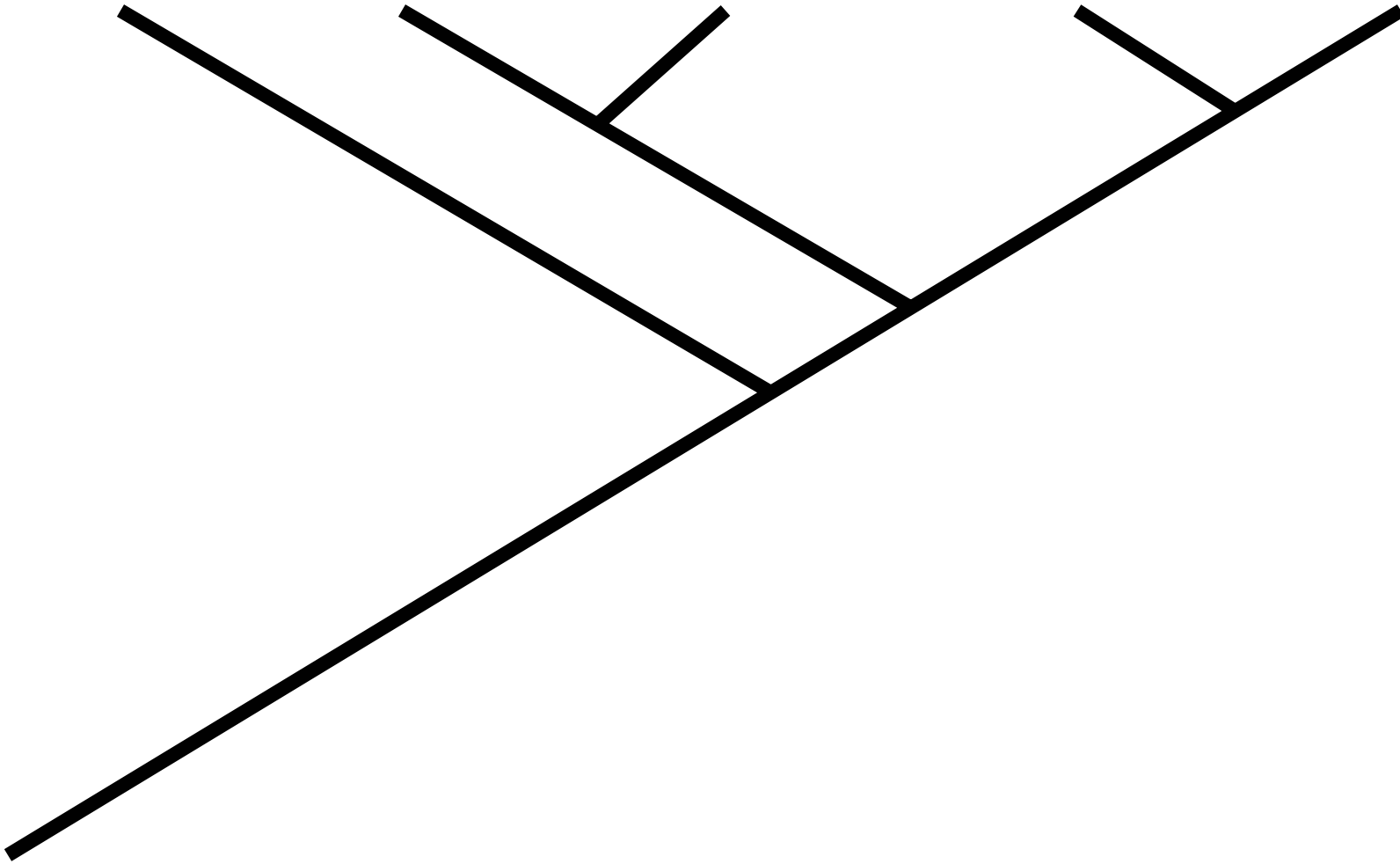
Asteroidea (starfishes)

Ophiuroidea (brittle stars)

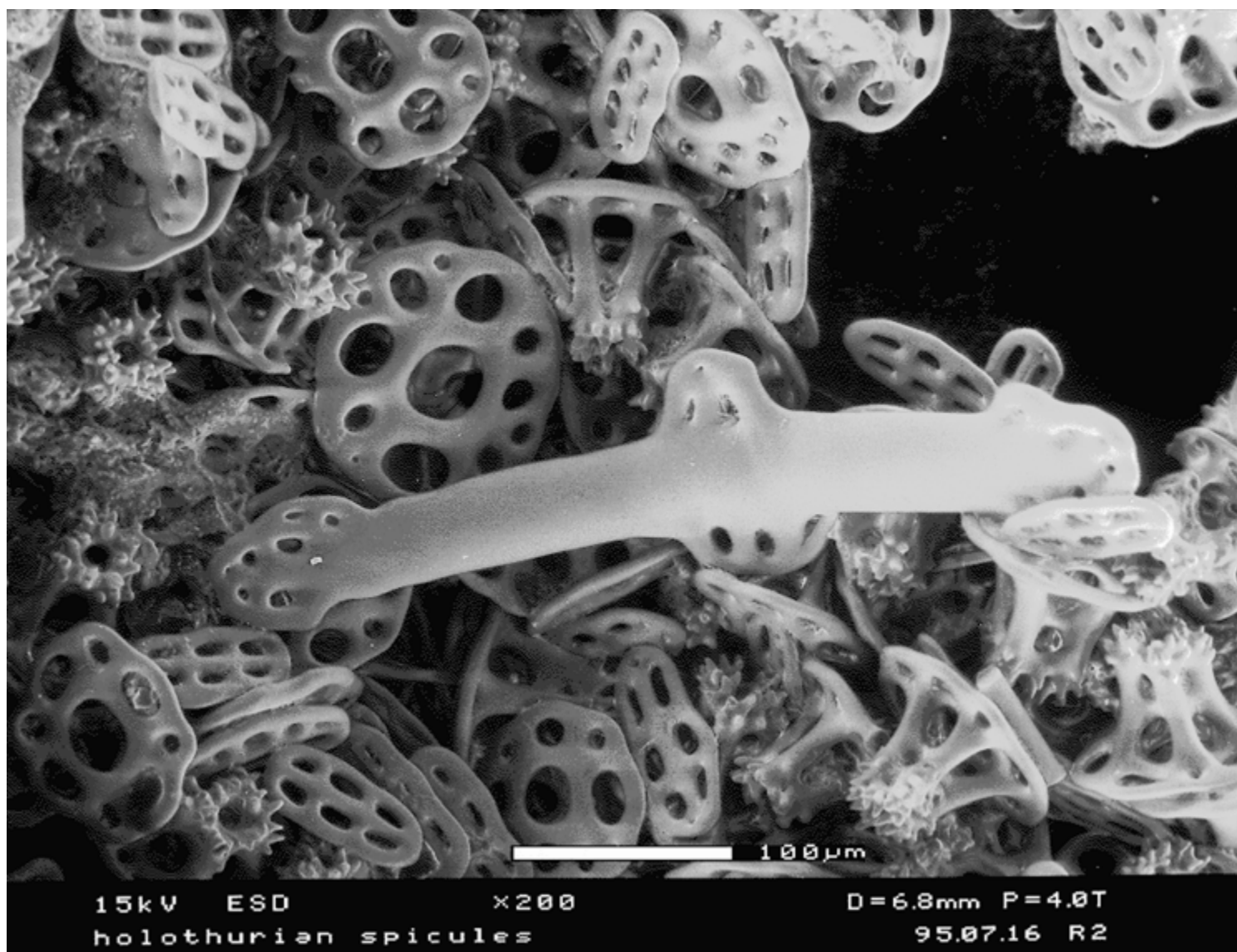
Echinoidea (sea urchins)

Holothuroidea (sea cucumbers)

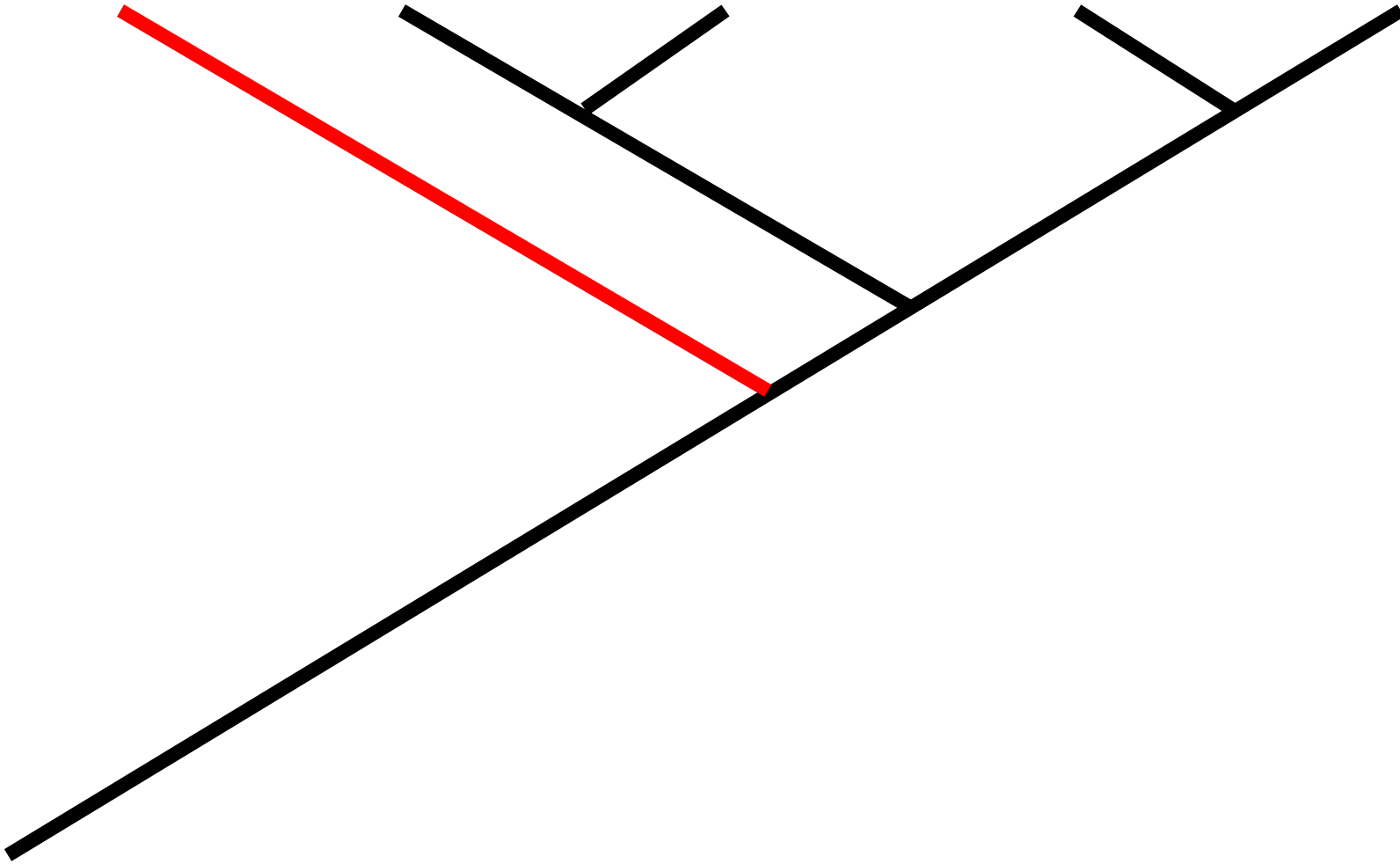
Crinoidea Asteroidea Ophiuroidea Echinoidea Holothuroidea



The echinoderm skeleton is INTERNAL, and composed of elements called ossicles.

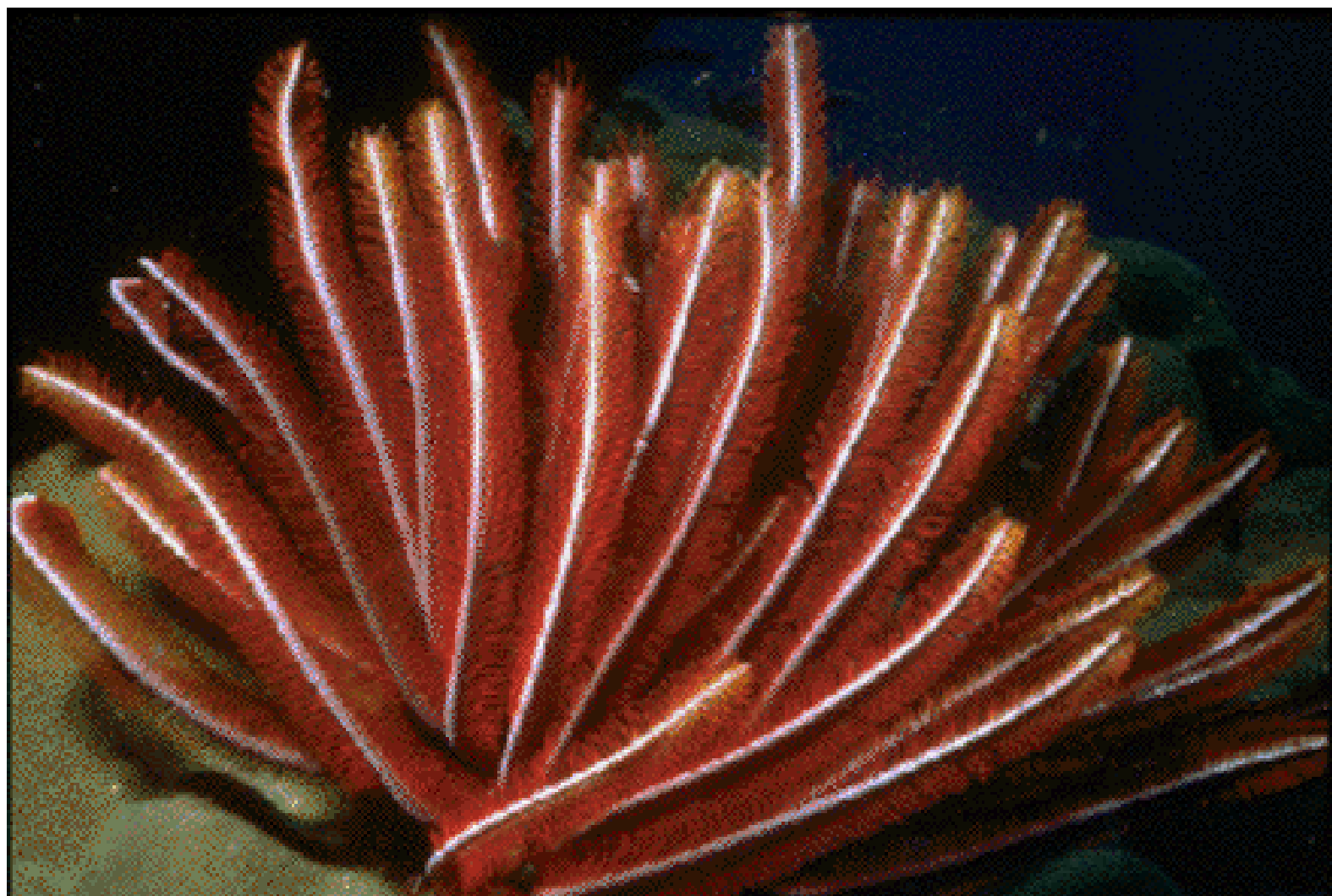


Crinoidea Asteroidea Ophiuroidea Echinoidea Holothuroidea

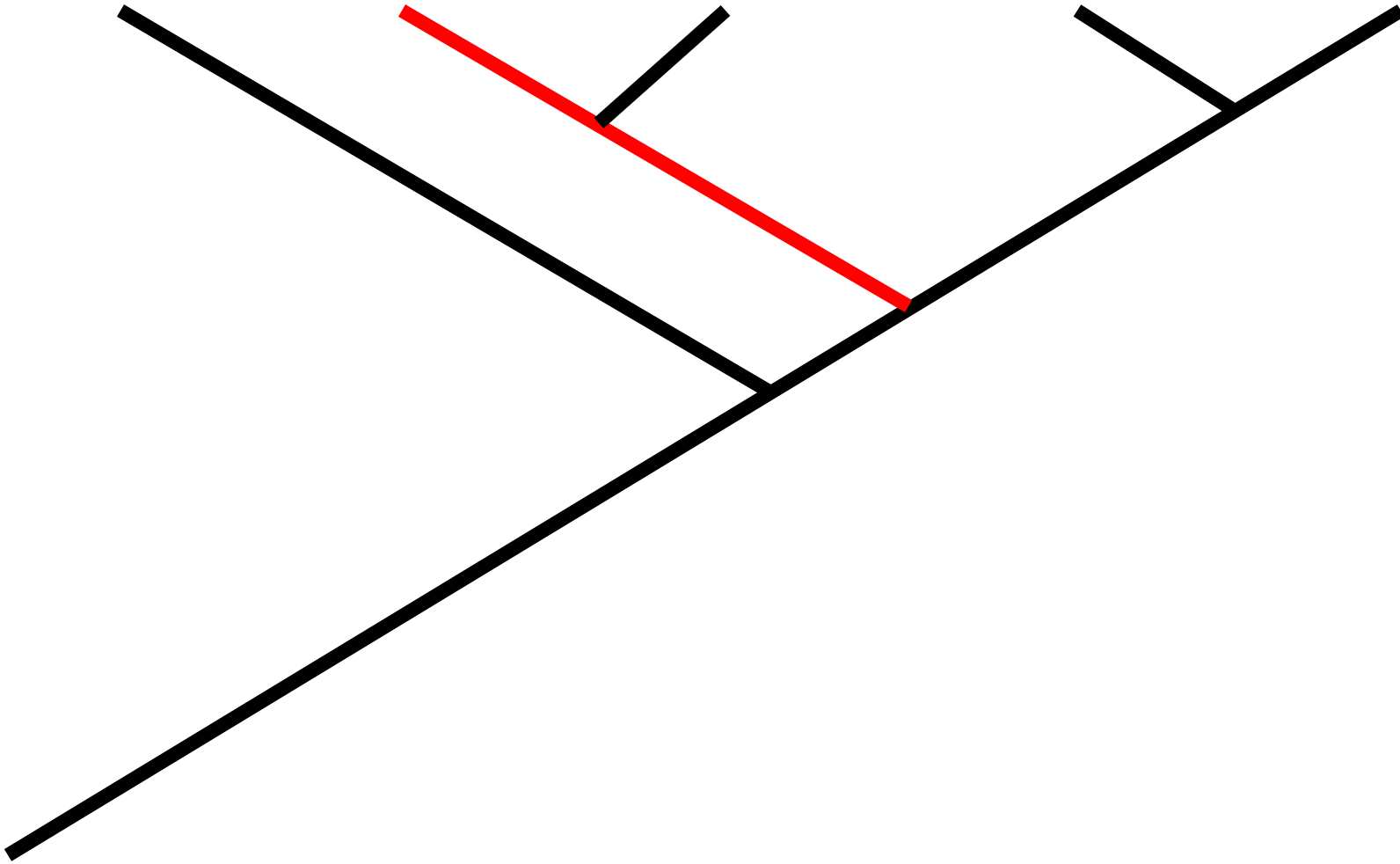








Crinoidea **Asteroidea** Ophiuroidea Echinoidea Holothuroidea





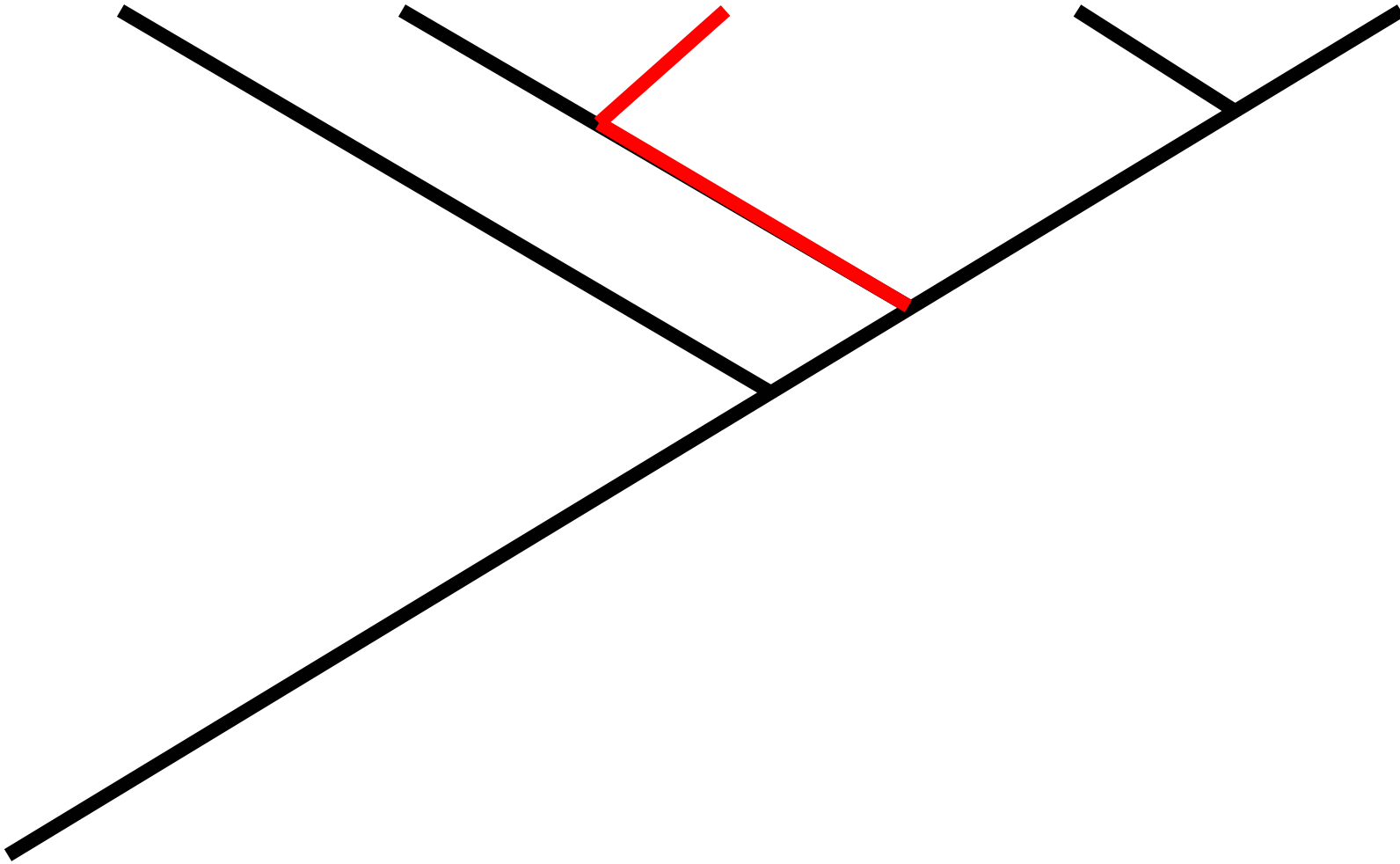


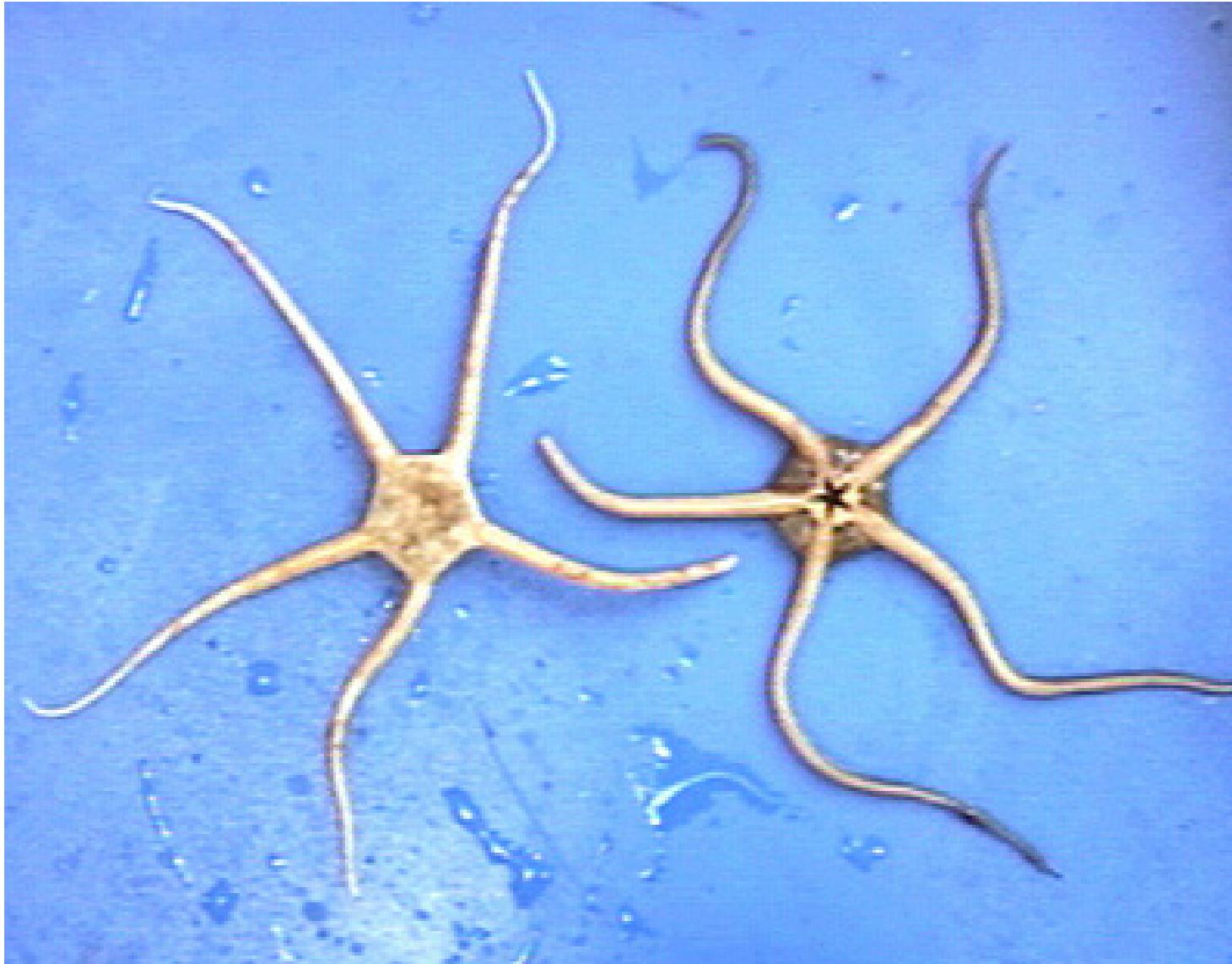


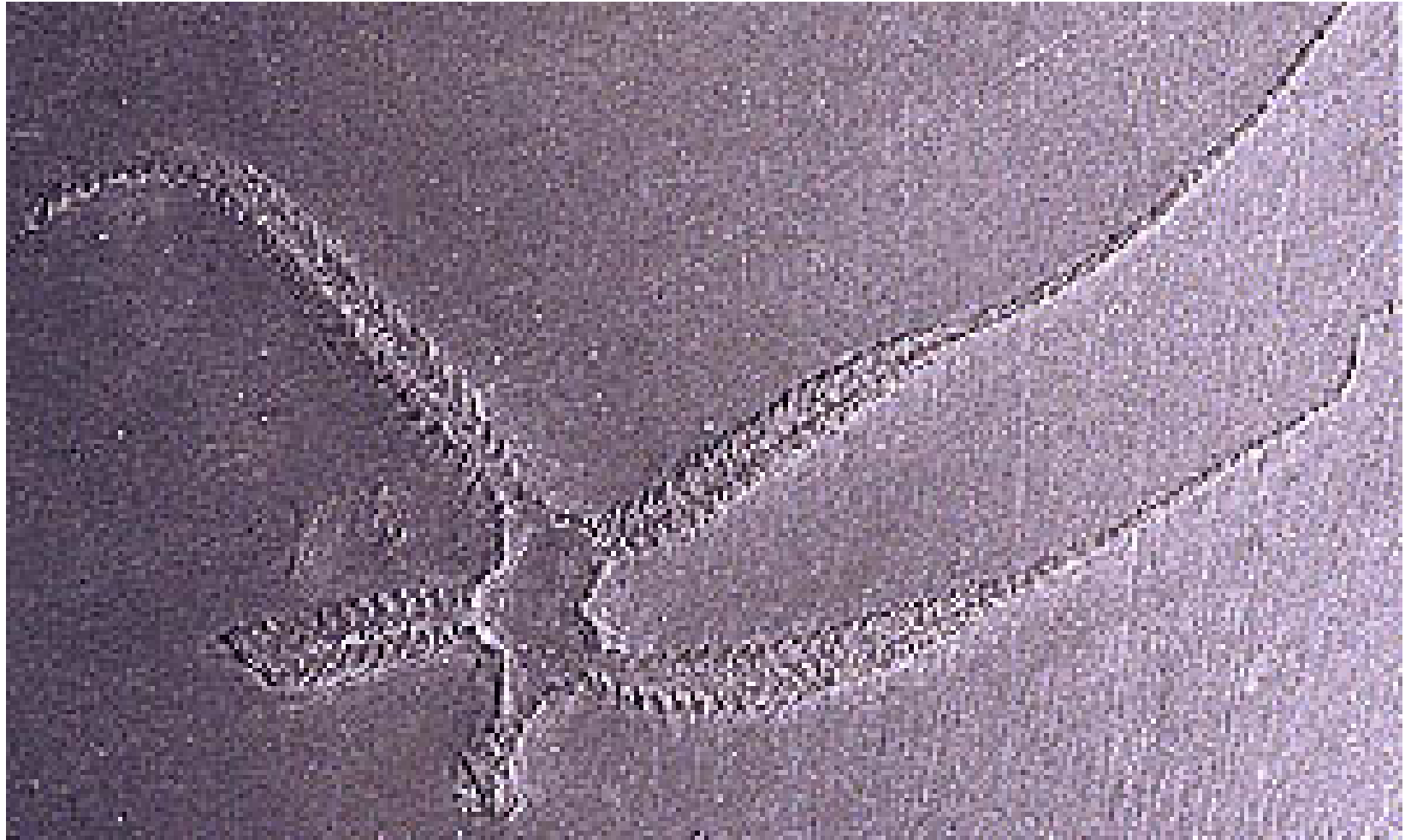




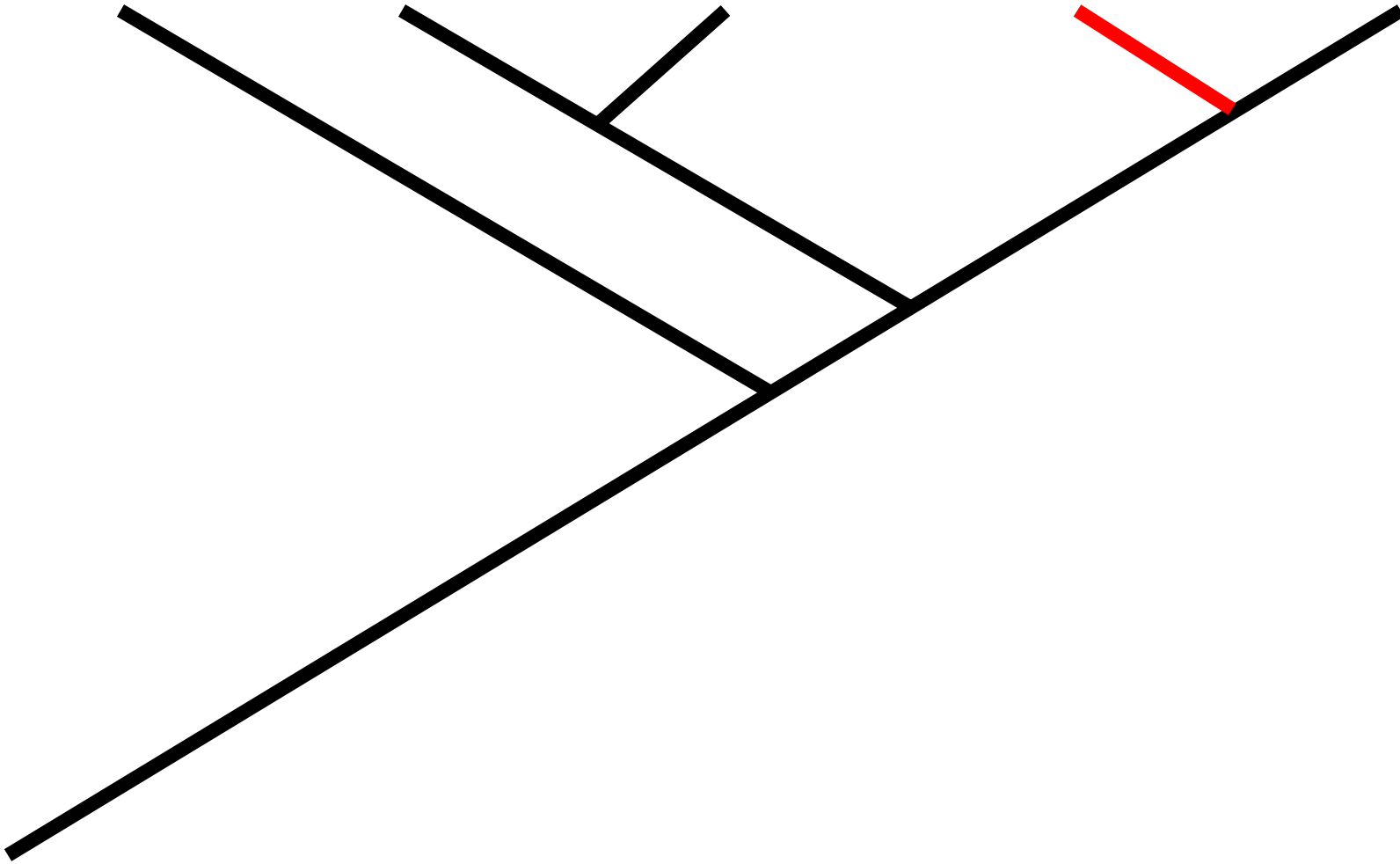
Crinoidea Asteroidea **Ophiuroidea** Echinoidea Holothuroidea





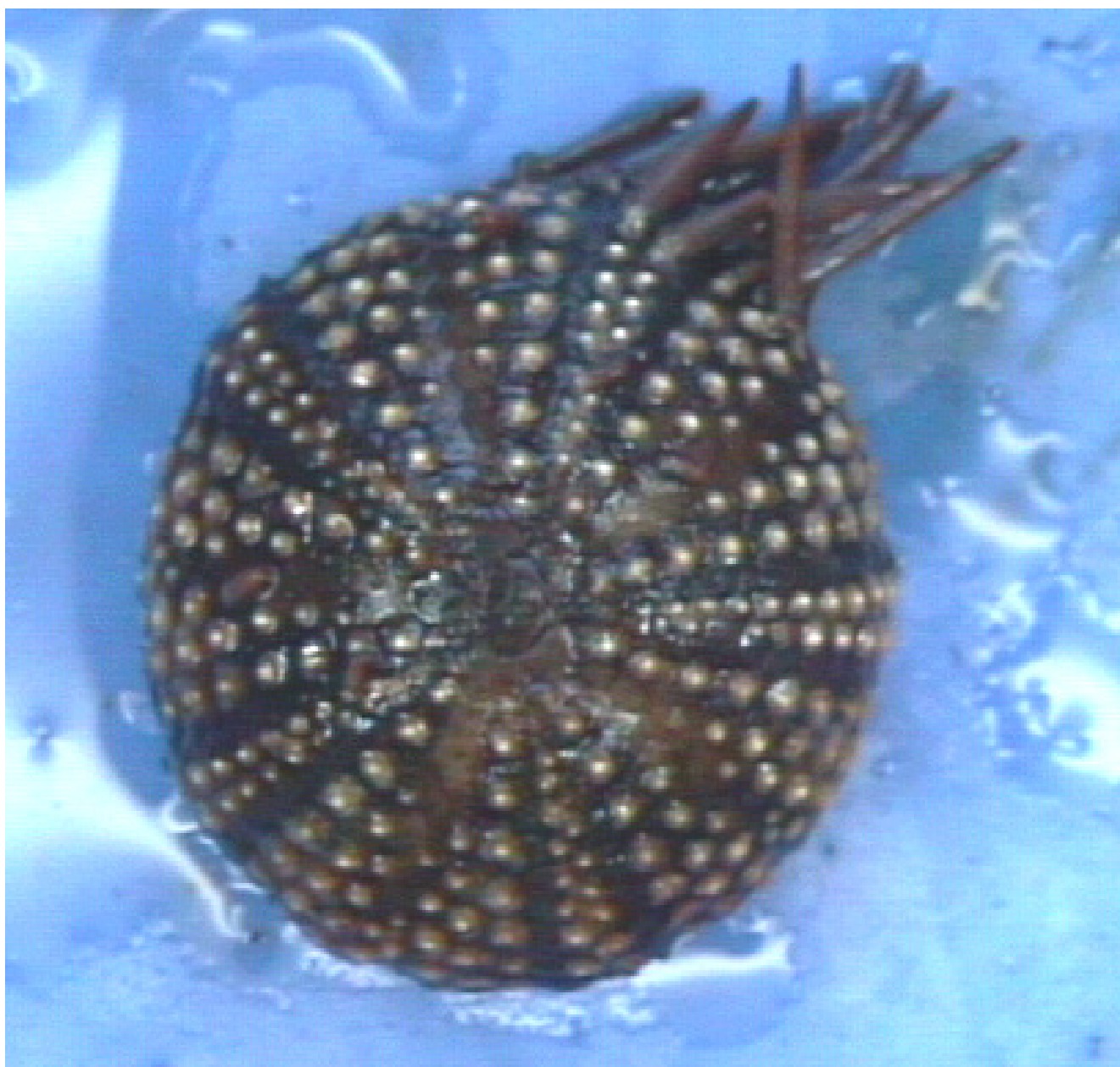


Crinoidea Asteroidea Ophiuroidea Echinoidea Holothuroidea





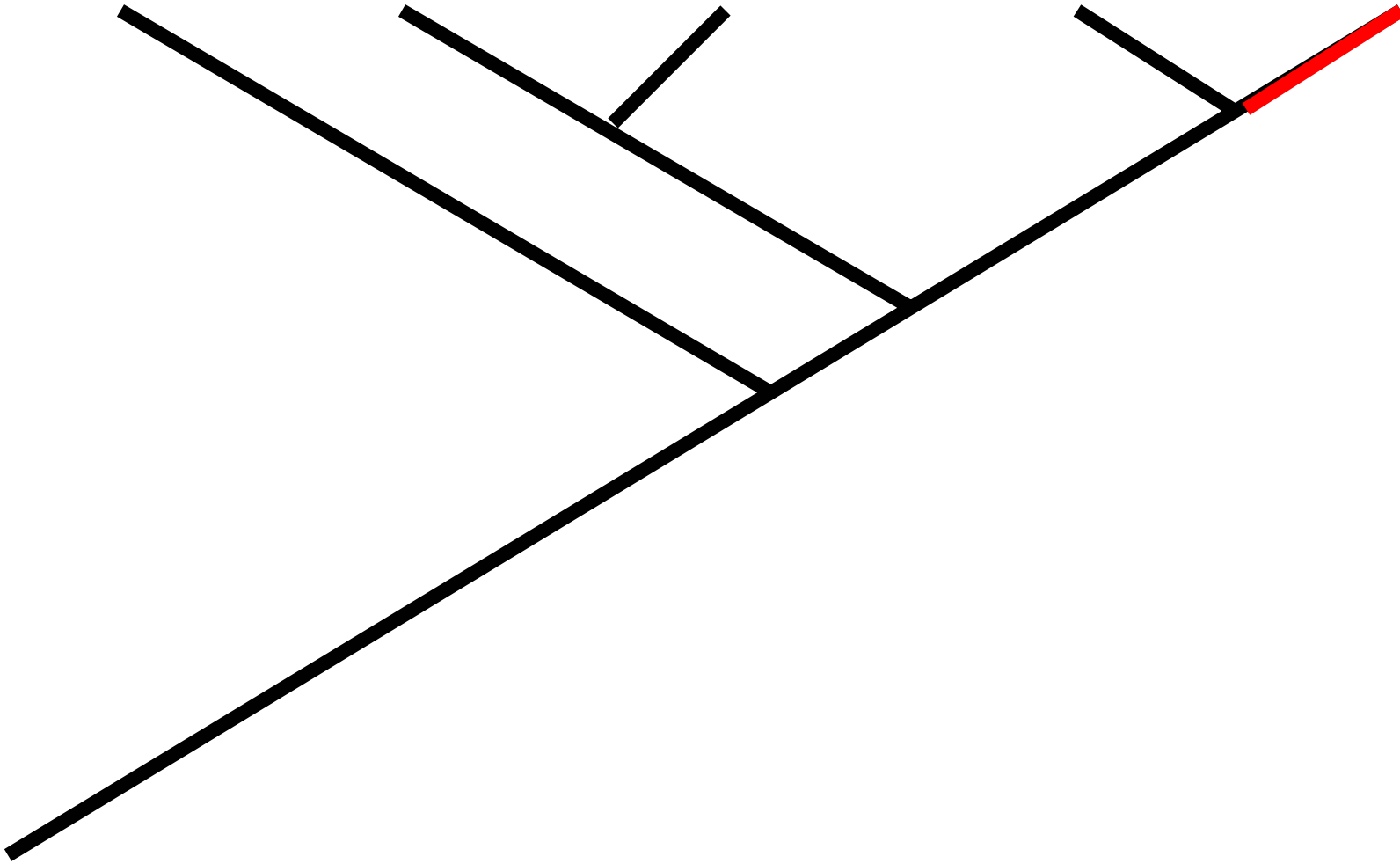


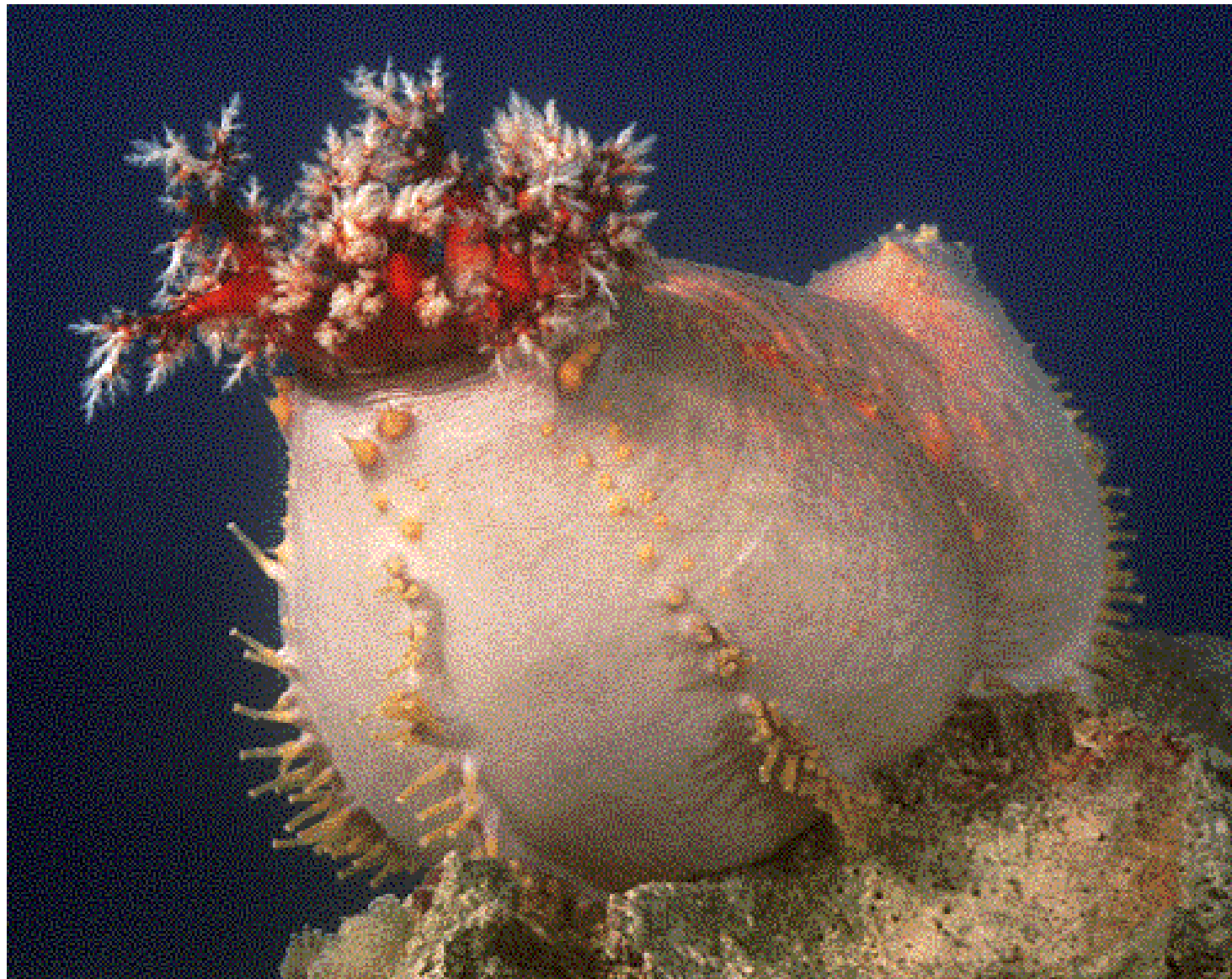






Crinoidea Asteroidea Ophiuroidea Echinoidea **Holothuroidea**

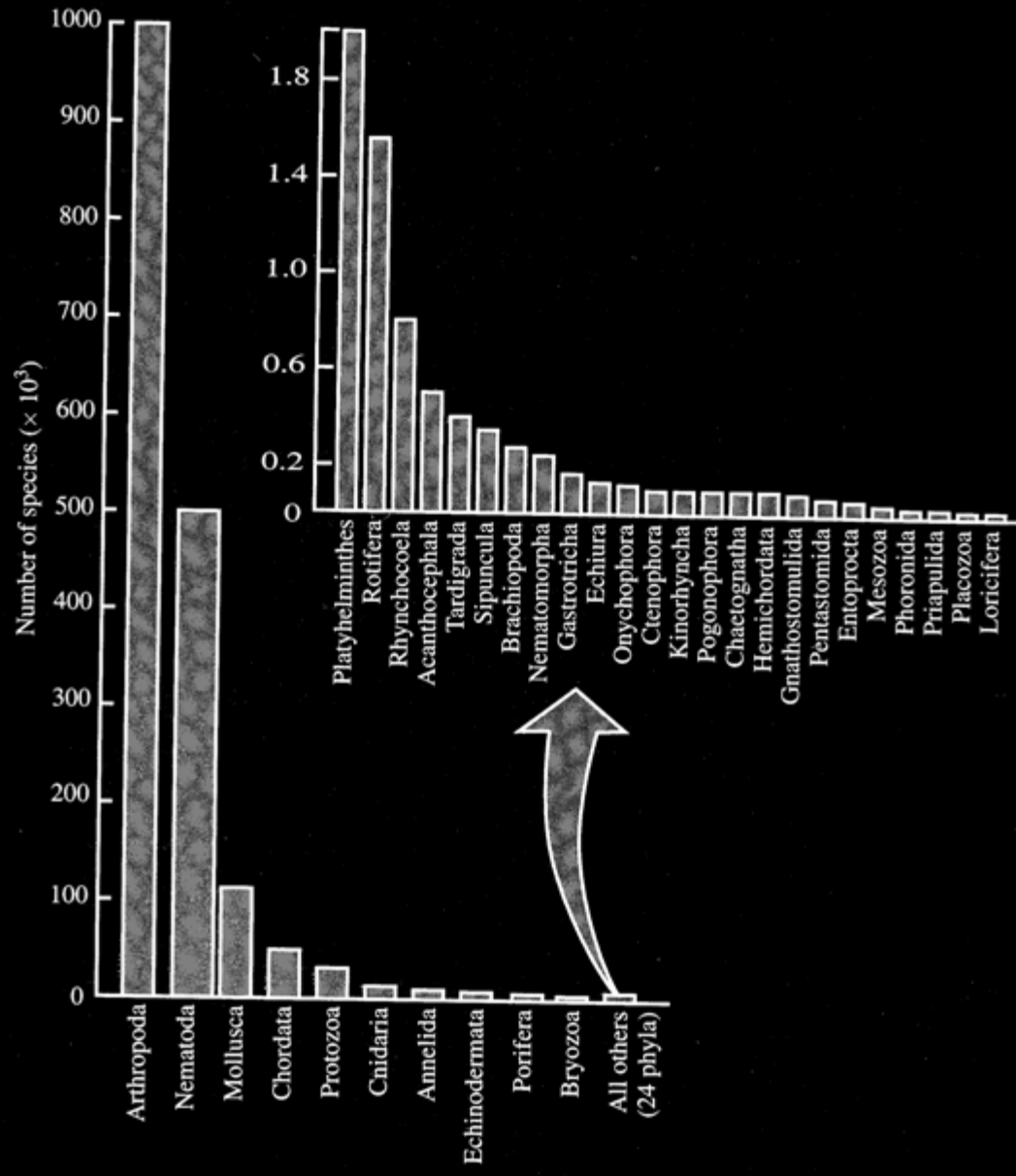


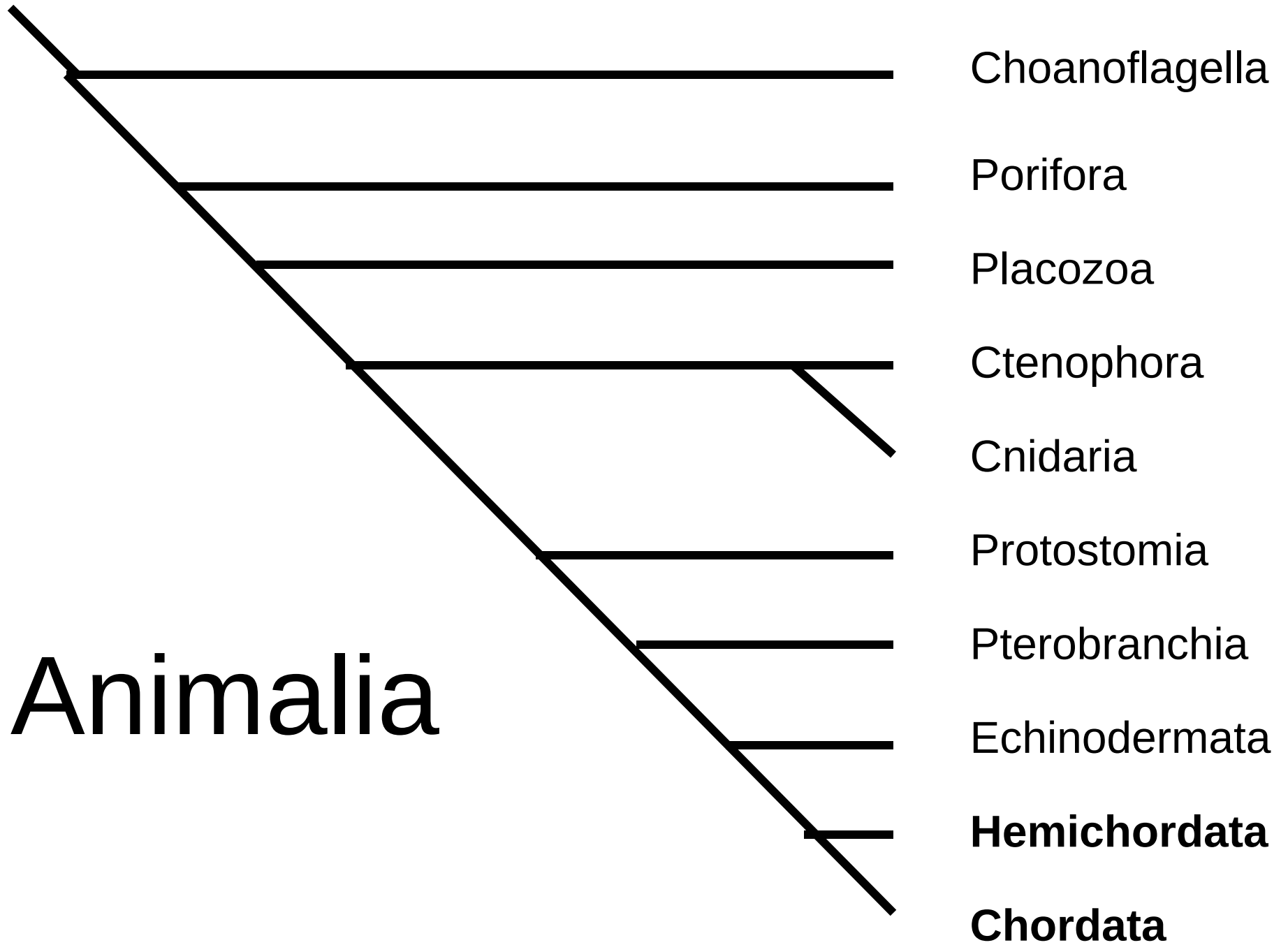




DEUTEROSTOMIA

Phylum Chordata



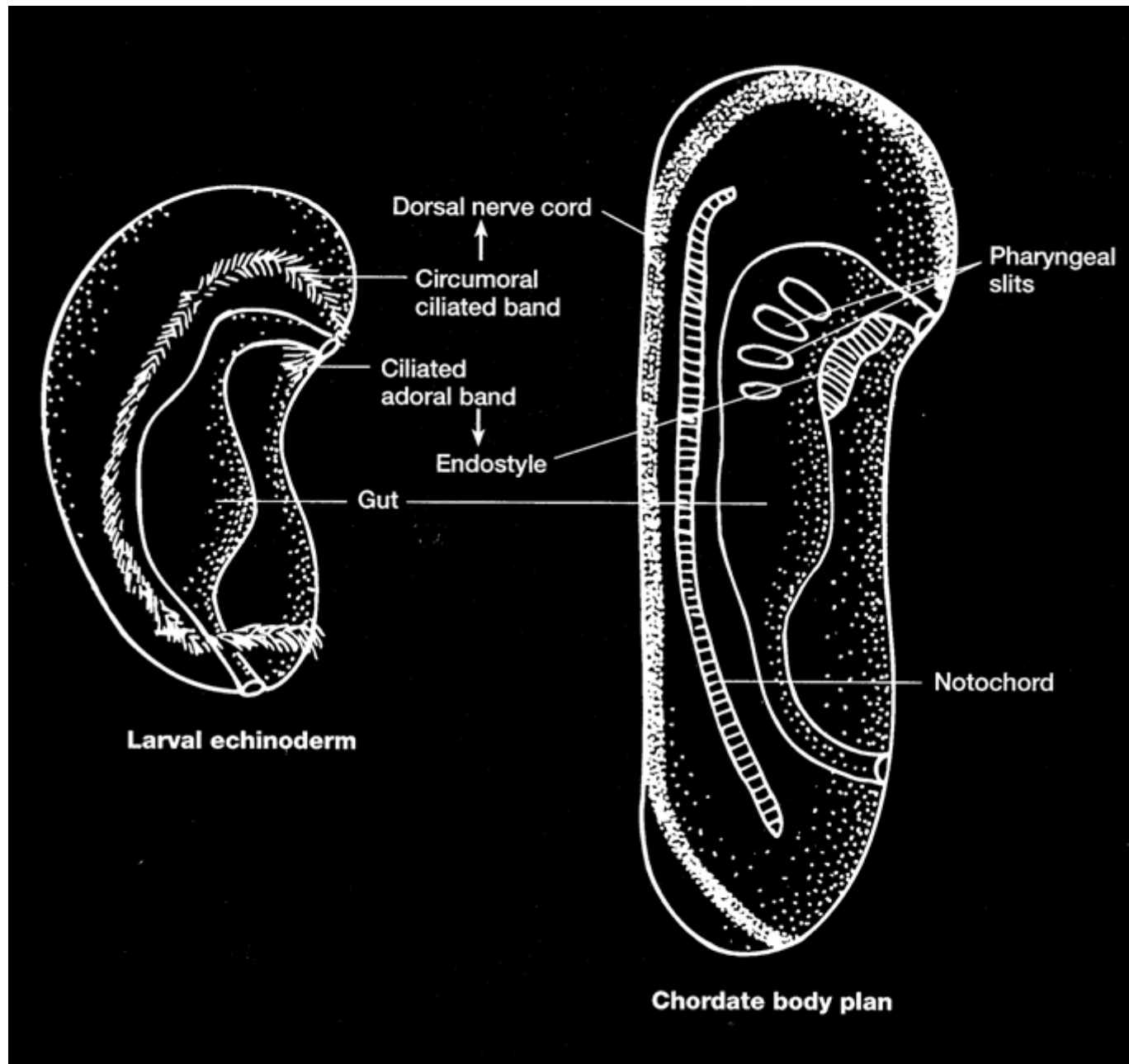


Recall from last week:

Bilateria – Includes two great groups of animals:

Protostomia (means 1st mouth)

Deuterostomia (means 2nd mouth)

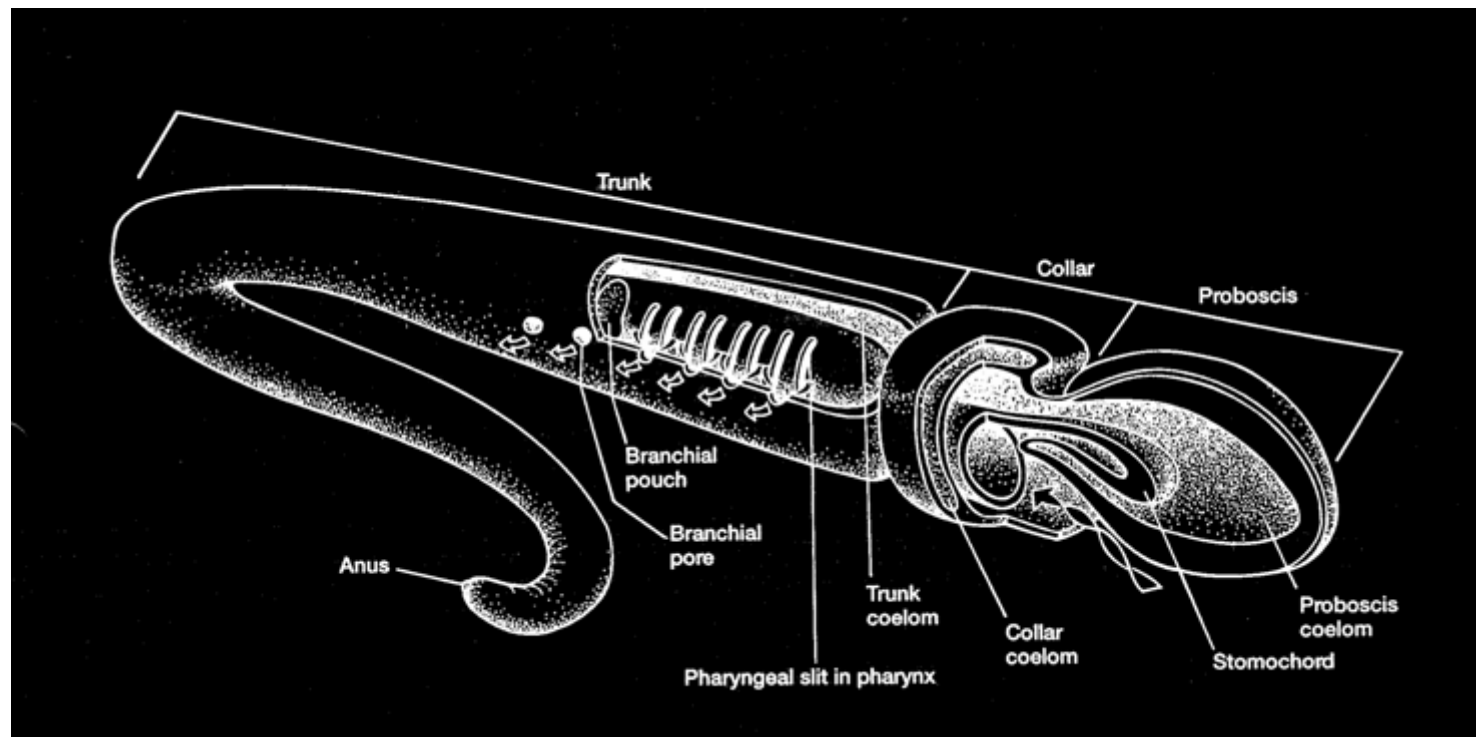


The best known of the Deuterostomia:

- Pterobranchia
- Echinodermata
- Hemichordata
- Chordata

PHYLUM CHORDATA:

Deuterostomes with GILL SLITS
(Original function of gill slits NOT for breathing; for FILTER FEEDING.)



PHYLUM CHORDATA

Deuterostomes with the following synapomorphies:

- Pharyngeal gill slits
- Dorsal hollow nerve cord
- Notochord
- Post-anal tail

PHYLUM CHORDATA

Includes the following subphyla:

- Urochordata
- Cephalochordata
- Vertebrata

- (People used to think Hemichordata were included, but they turn out to be the sistergroup.)

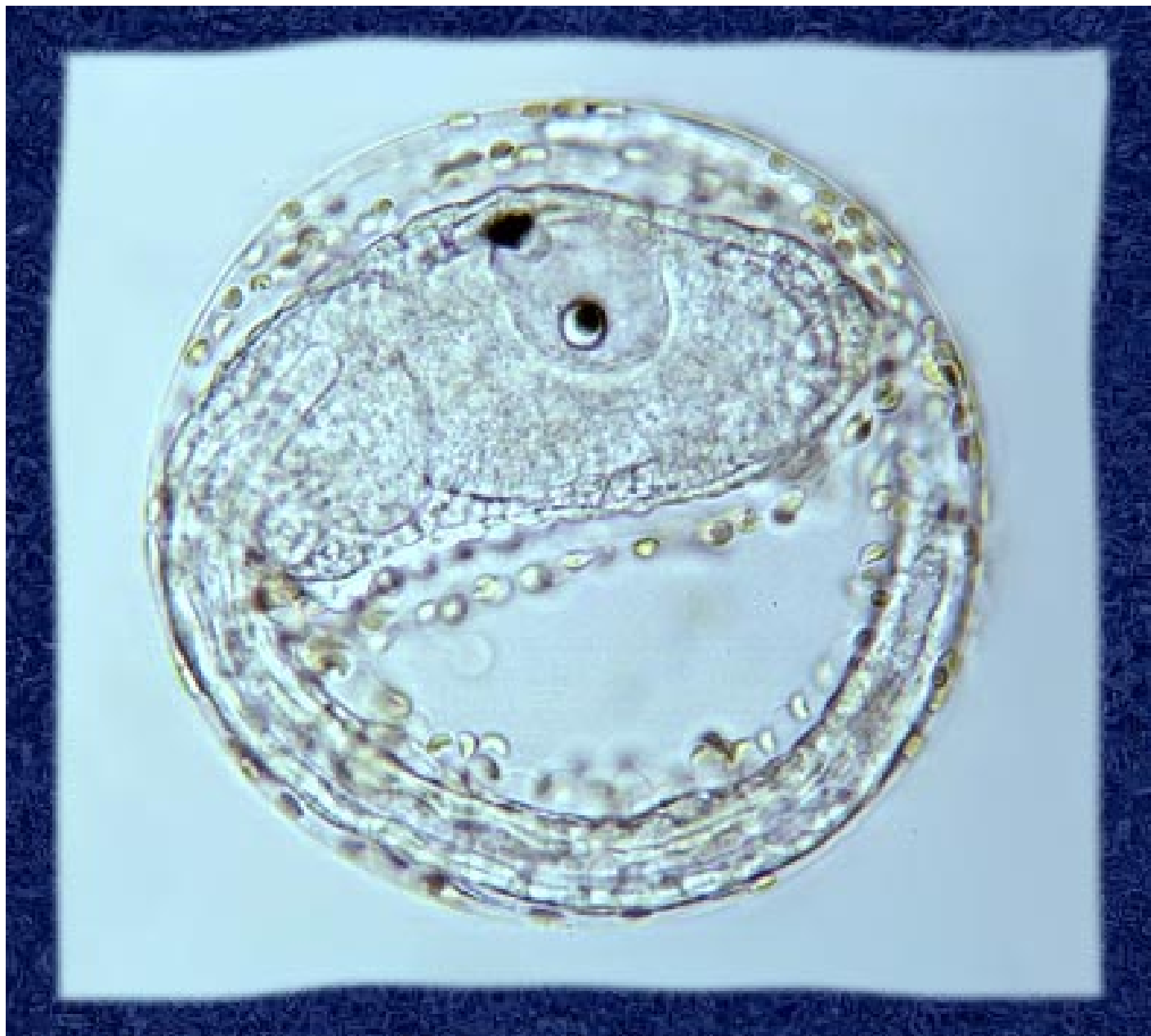
SUBPHYLUM UROCHORDATA

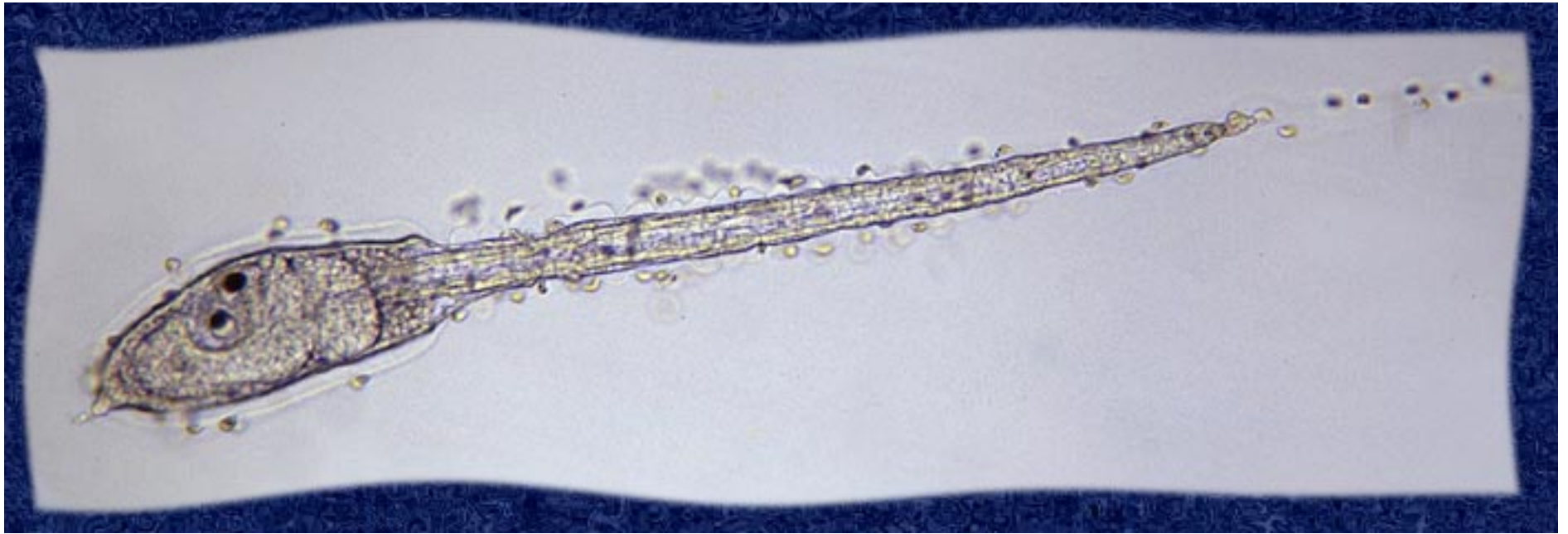


How can something like this be related to chordates like us?

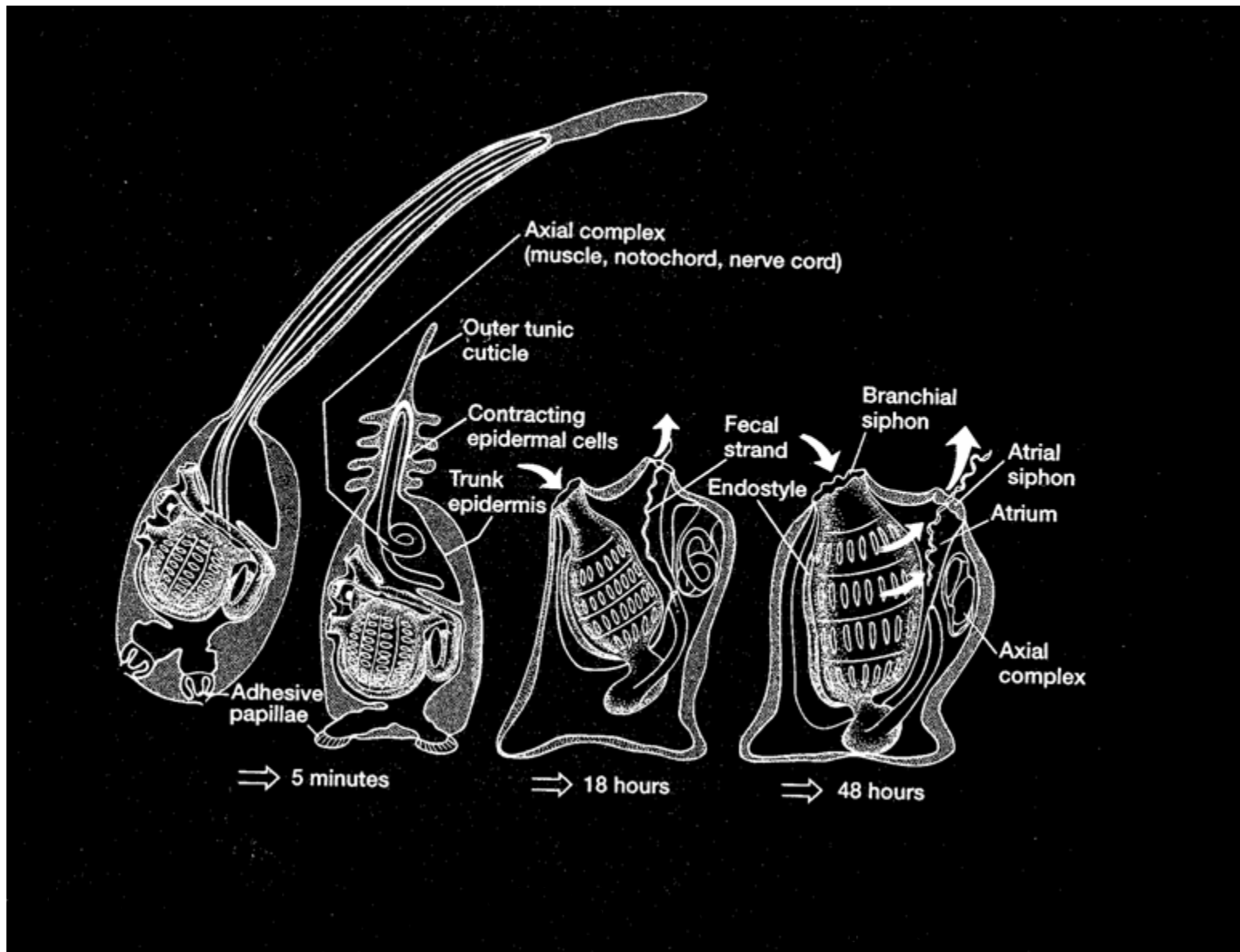
Addition of a new life stage: a mobile larval stage.

CAENOGENESIS: Interpolation of a new life stage into the lifecycle.



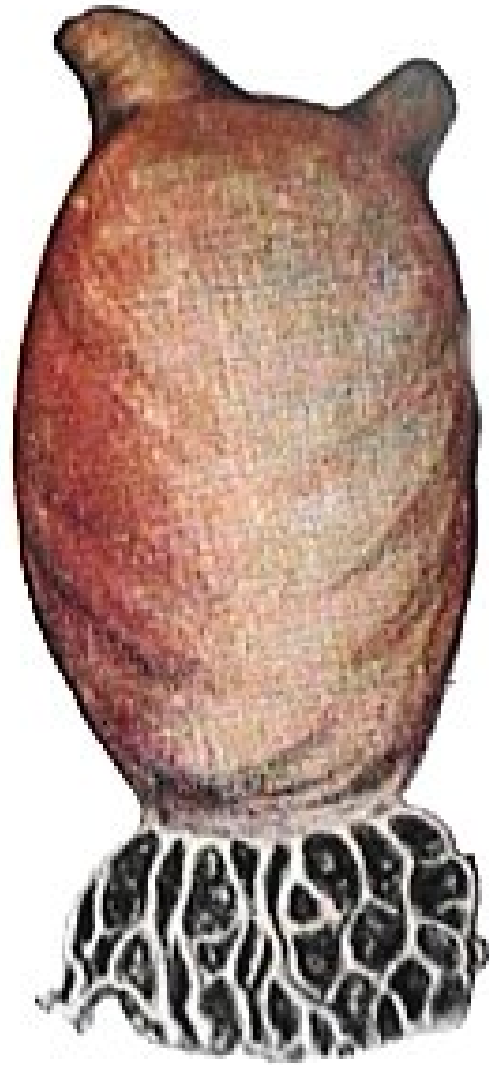


The new larval stage of a urochordate

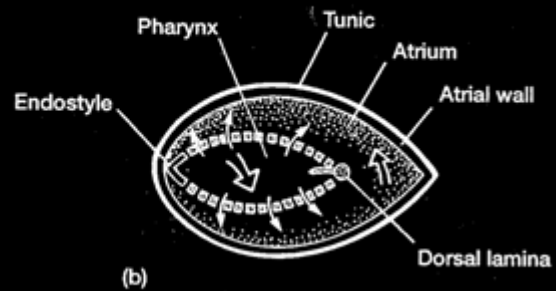
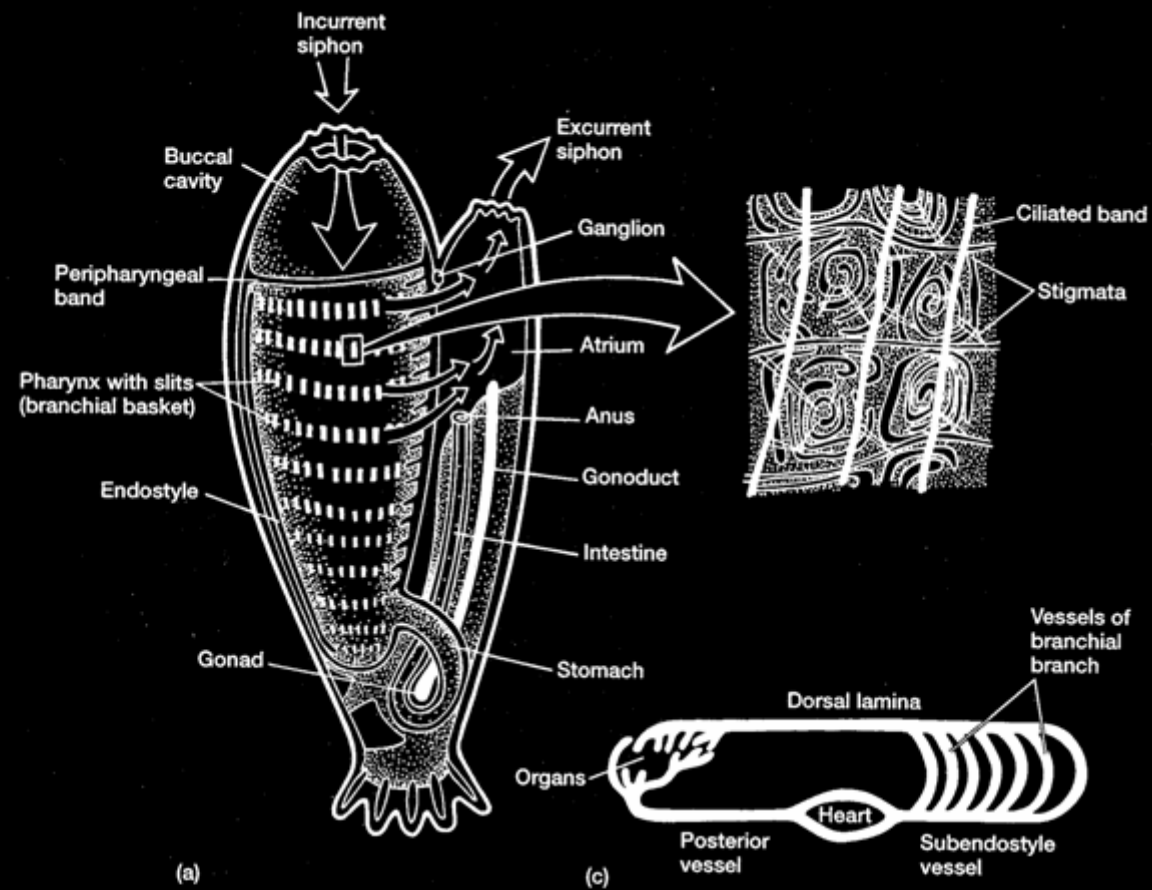


larva to adult

rom

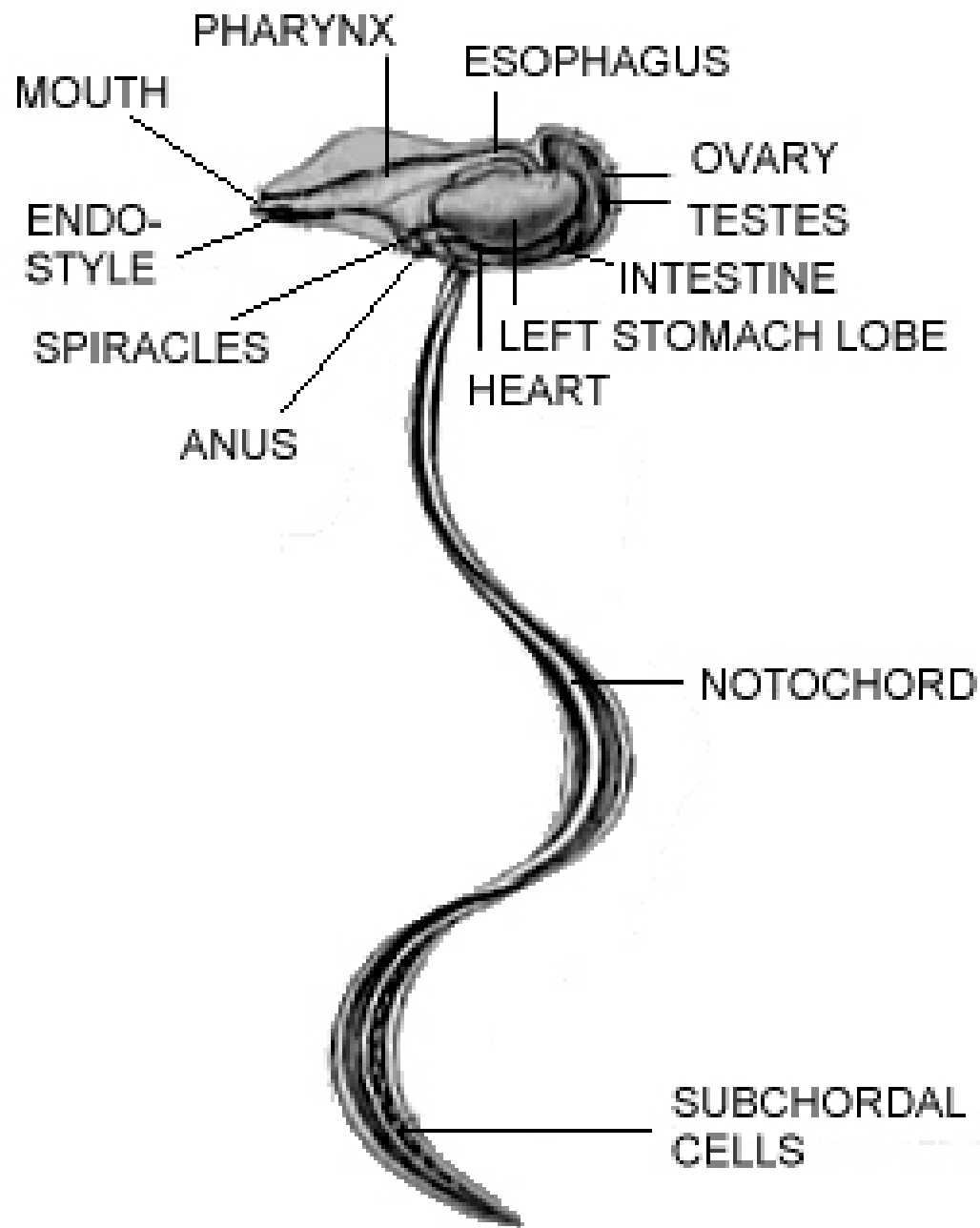


Adult
urochordate



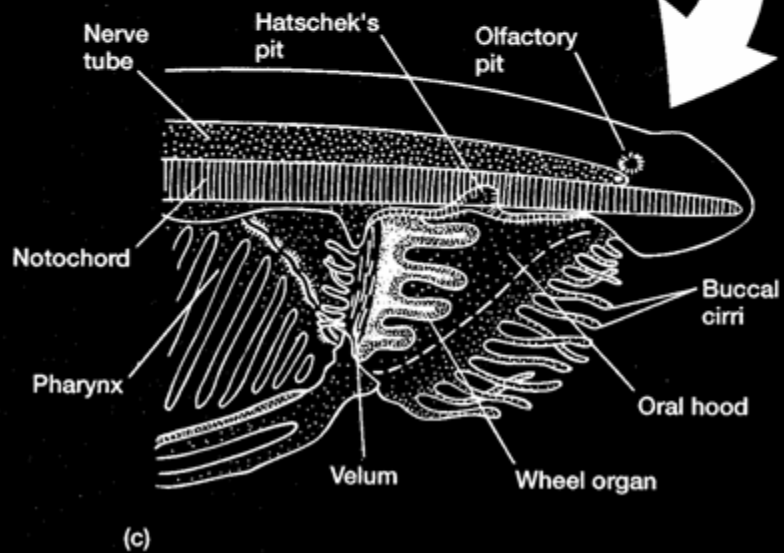
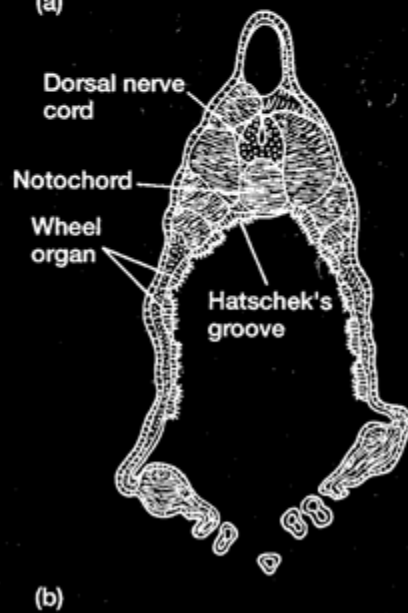
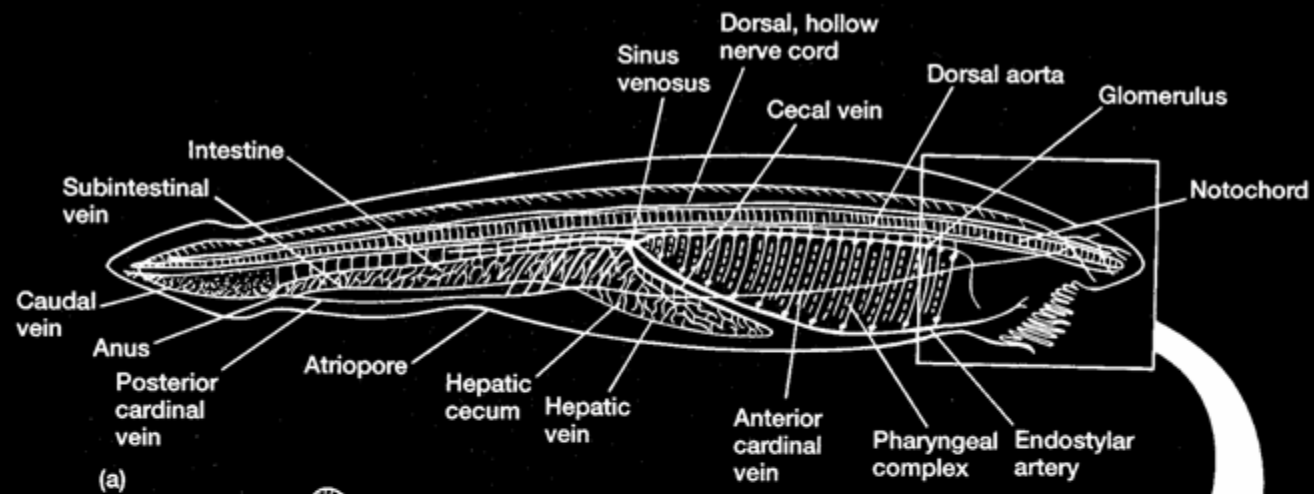
Some urochordates stay larval all life long, but they become sexually mature – an example of NEOTONY.

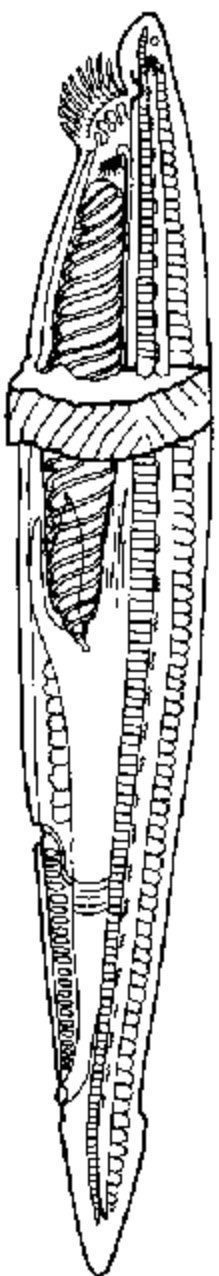
Where else have we heard of neotony?

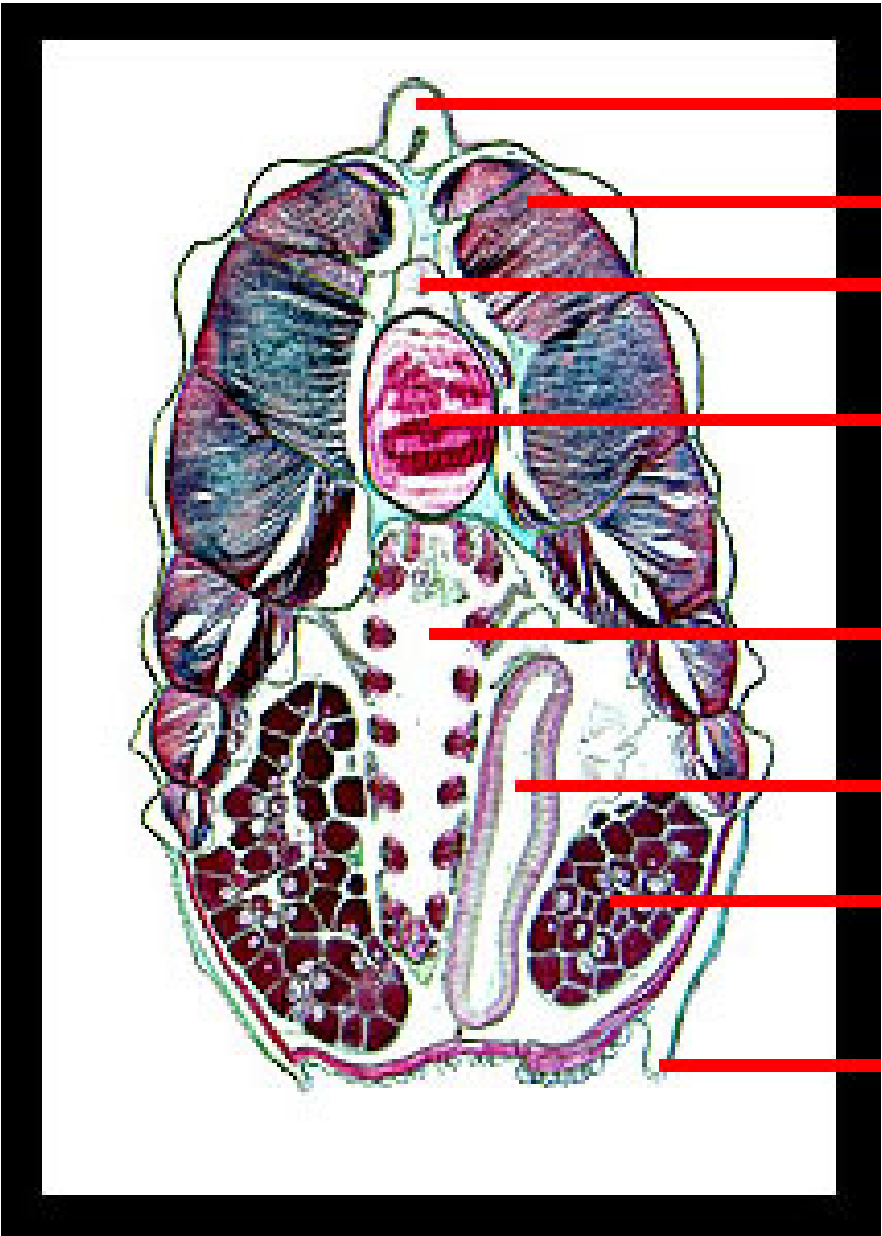


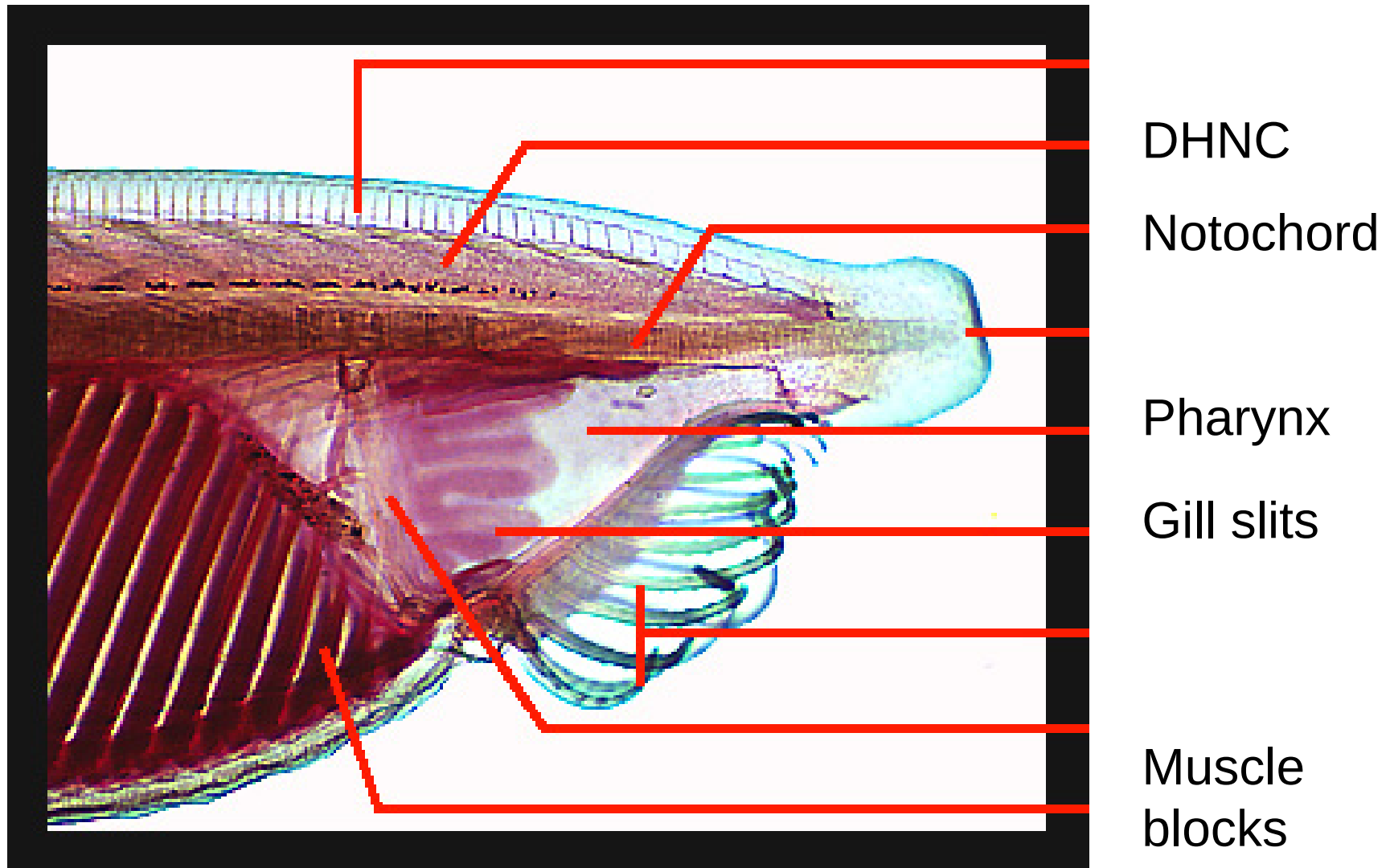
More “fish-like” PHYLUM CEPHALOCHORDATA











Cephalochordate – *Branchiostoma* (“Amphioxus”)



So, then
what's a
vertebrate...?

