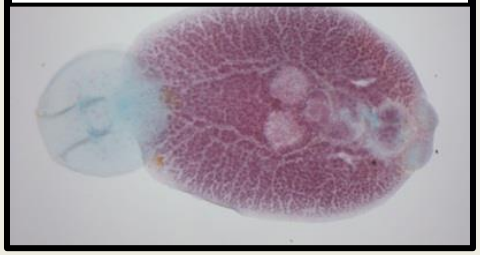
Phylum Platyhelminthes

Class Turbellaria

Class Cestoda

Class Monogenea



Class Trematoda

CLASSIFICATION OF THE PLATYHELMINTHES*

Phylum Platyhelminthes (plat″e-hel-min′thez)
Flatworms; bilateral acoelomates. Over 20,000 species.

Class Turbellaria* (tur″bel-lar′e-ah)
Mostly free-living and aquatic; external surface usually ciliated; predaceous; possess rhabdites, protrusible proboscis, frontal glands, and many mucous glands: mostly hermaphroditic, *Convoluta*, *Notoplana*, *Dugesia*, Over 3,000 species.

Class Monogenea (mon″oh-gen′e-ah)
Monogenetic flukes; mostly ectoparasites on vertebrates (usually on fishes; occasionally on turtles, frogs, copepods, squids); one life-cycle form in only one host; bear opisthaptor. *Disocotyle*, *Gyrodactylus*, *Polystoma*. About 1,100 species.

Class Trematoda (trem″ah-to′dah)
Trematodes; all are parasitic; several holdfast devices present; have complicated life cycles involving both sexual and asexual reproduction. Over 10,000 species.

Subclass Aspidogastrea (= Aspidobothrea)
Mostly endoparasites of molluscs; possess large opisthaptor; most lack an oral sucker. *Aspidogaster*, *Cotylaspis*, *Multicotyl*. About 32 species.

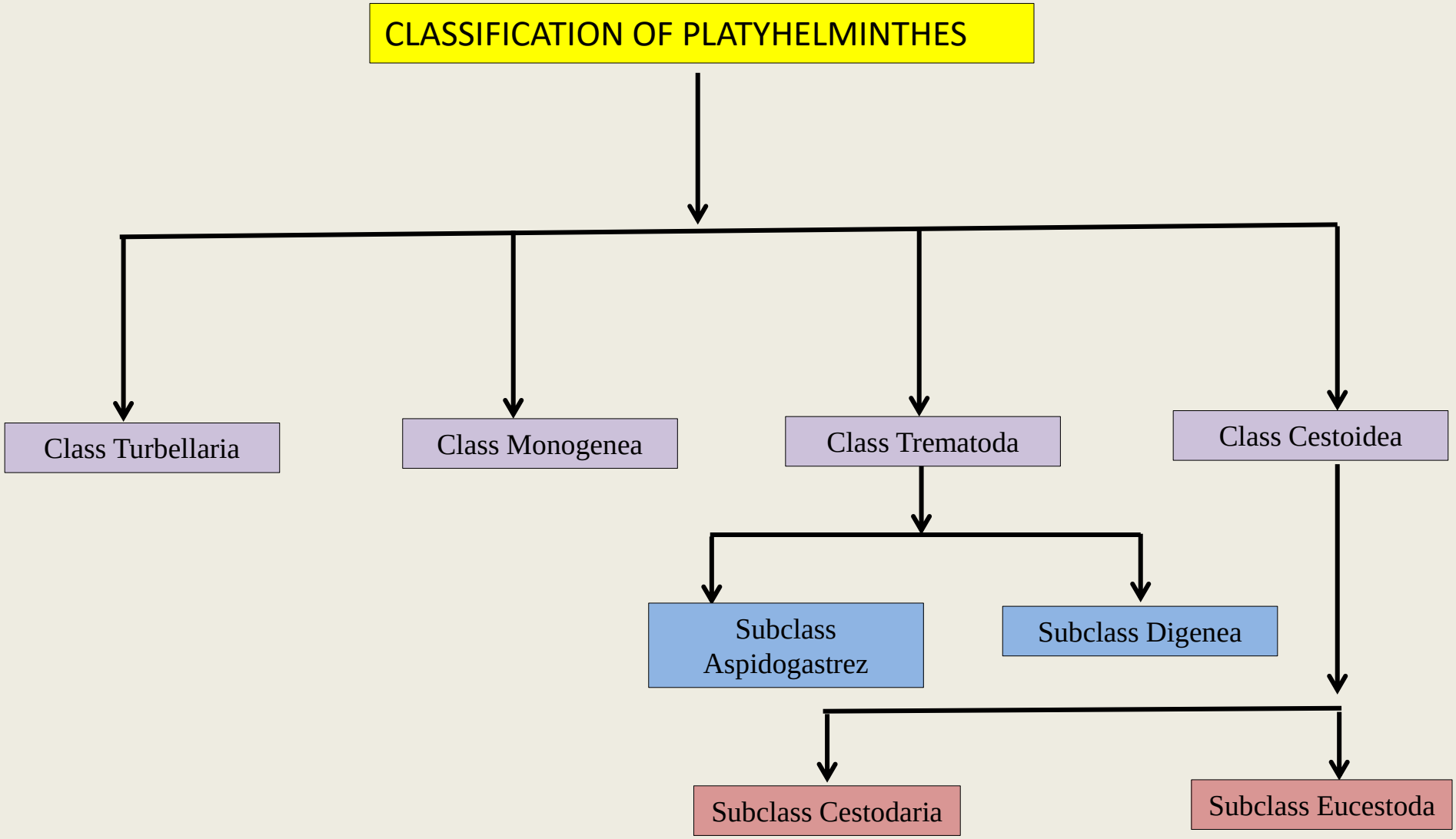
Subclass Digenea
Adults endoparasites in vertebrates; at least two different lifecycle forms in two or more hosts; have oral sucker and acetabulum. *Schistosoma*, *Fasciola*, *Clonorchis*. About 1,350 species.

Class Cestoidea (ses-toid′e-ah)
All parasitic with no digestive tract; have great reproductive potential; tapeworms. About 3,500 species.

Subclass Cestodaria
Body not subdivided into proglottids; larva in crustaceans, adult in fishes. *Amphilina*, *Gyrocotyle*. About 15 species.

Subclass Eucestoda
True tapeworms; body divided into scolex, neck, and strobila; strobila composed of many proglottids; both male and female reproductive systems in each proglottid; adults in digestive tract of vertebrates. *Protocephalus*, *Taenia*, *Echinococcus*, *Taeniarhynchus*; *Diphyllobothrium*. About 1,000 species.

*In some of the current literature, the class Turbellaria has been abandoned as a formal taxonomic category. This is based, in part, on ultrastructural studies and cladistic analyses. There is also much uncertainty about the interrelationships among other platyhelminth groups. Until there is greater stability, we retain here the older, simpler classification scheme.


CLASSIFICATION OF PLATYHELMINTHES
Class Turbellaria
Class Monogenea
Class Trematoda
Class Cestoidea
Subclass Aspidogastrez
Subclass Digenea
Subclass Cestodaria
Subclass Eucestoda

EVOLUTIONARY PERSPECTIVE

- ✓ First animals to exhibit bilateral symmetry.
- ✓ Triploblastic acoelomate body plan is an important intermediate between the radial, diploblastic plan and the triploblastic coelomate plan.
- ✓ Evolution from radial ancestors could have involved a larval stage that became sexually mature in its larval body form.
- ✓ Sexual maturity in a larval body form is called paedomorphosis.
- ✓ Recent discovery of a small group of worms (*Lobatocercebridae*, Annelida) that shows both flatworm and annelid characteristics. In this case the flatworms would represent a side branch that resulted from the loss of a body cavity

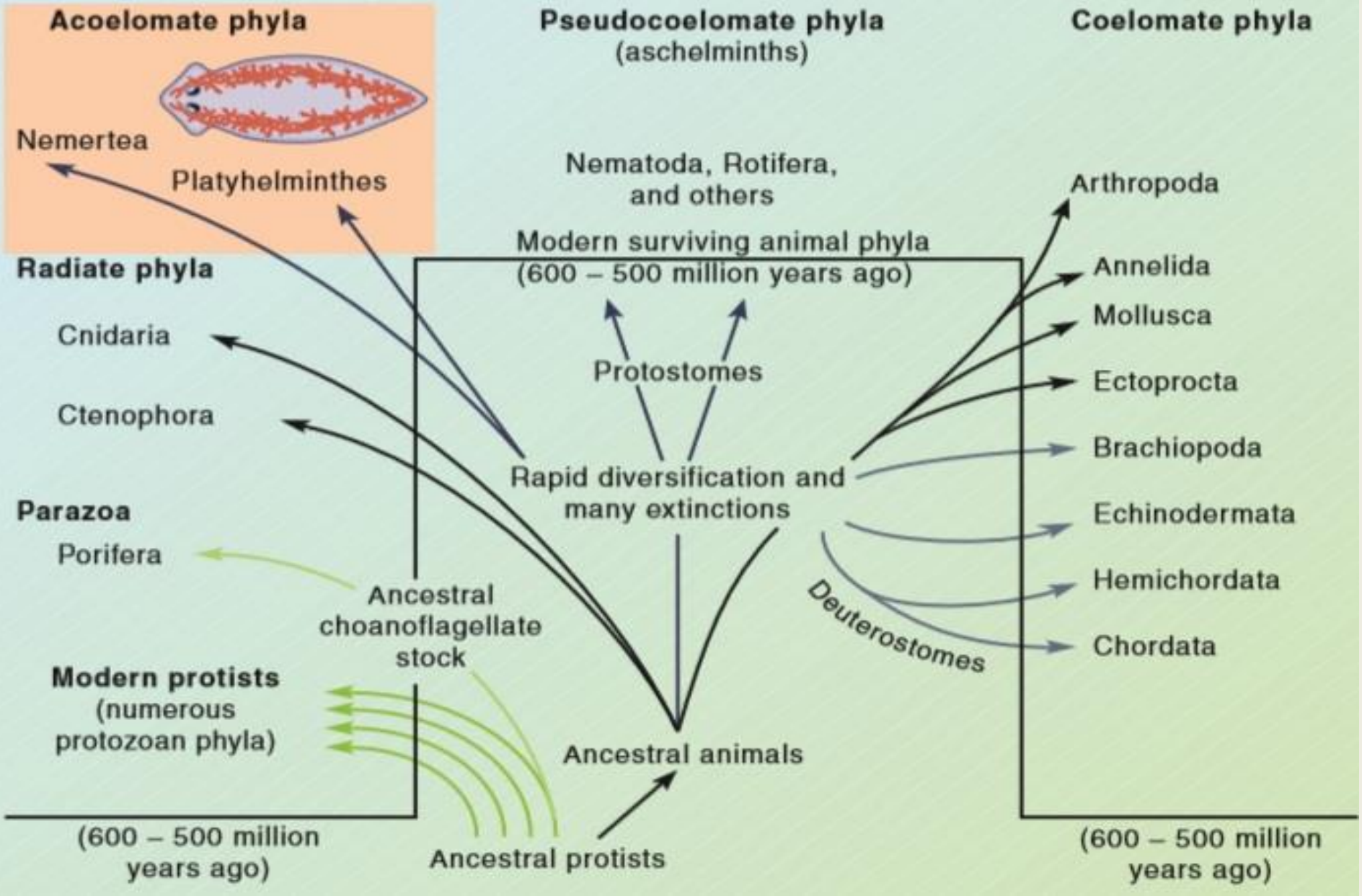


Fig: Acoelomate Phyla. A generalized evolutionary tree depicting the major events and possible lines of descent for the acoelomates (shaded in orange).

Characteristics of the phylum Platyhelminthes include:

- Platyhelminthes includes the flatworms.
- Free living (e.g., turbellarians) or parasitic (e.g., flukes and tapeworms)
- Over 20,000 species.
- Usually flattened dorsoventrally, triploblastic, acoelomate, bilaterally symmetrical.
- Unsegmented worms (members of the class Cestoidea are strobilated).
- Incomplete gut usually present; gut absent in Cestoidea.
- Somewhat cephalized, with an anterior cerebral ganglion and usually longitudinal nerve cords.
- Protonephridia as excretory/osmoregulatory structures.
- Hermaphroditic; complex reproductive systems

CLASSES:

- Class Turbellaria - Free Living Worms
- Class Trematoda - Flukes
- Class Monogenea - Flukes
- Class Cestoidea - Tapeworms

CLASS TURBELLARIA:

THE FREE-LIVING FLATWORM

Characteristics :

- ✓ Mostly free-living bottom dwellers in freshwater and marine environments.
- ✓ Over three thousand species.
- ✓ Turbellarians are predators and scavengers.
- ✓ Most turbellarians are less than 1 cm long, the terrestrial, tropical ones may reach 60 cm in length.
- ✓ Coloration is mostly in shades of black, brown, and gray, although some groups display brightly colored patterns.

Body Wall

- ✓ Outer layer of circular muscle and an inner layer of longitudinal muscle lie beneath the basement membrane.
- ✓ Between the longitudinal muscles and the gastrodermis are the loosely organized parenchymal cells.
- ✓ Endodermally derived gastrodermis.
- ✓ Gastrodermis consists of a single layer of cells that comprise the digestive cavity.
- ✓ The gastrodermis secretes enzymes that aid in digestion, and it absorbs the end products of digestion.

Rhabdites

- ✓ Rodlike cells that swell and form a protective mucous sheath around the body, possibly in response to attempted predation or desiccation.

Adhesive glands

- ✓ Open to the epithelial surface and produce a chemical that attaches part of the turbellarian to a substrate.

Releaser glands

- ✓ Secrete a chemical that dissolves the attachment as needed.

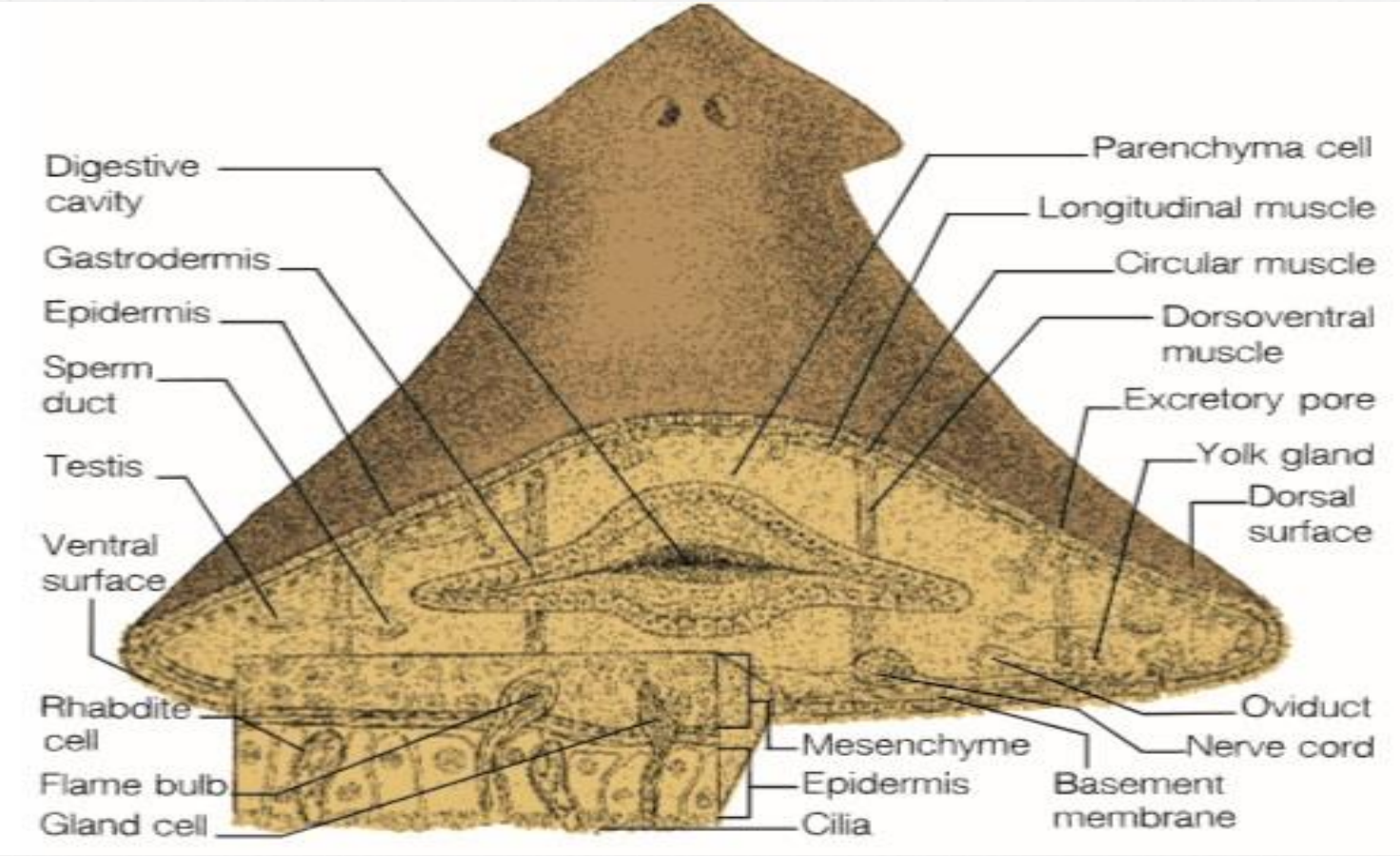


Fig: Phylum Platyhelminthes: Class Turbellaria. Cross section through the body wall of a sexually mature turbellarian (the planarian, *Dugesia*), showing the relationships of the various body structures.