Invertebrate Taxonomy

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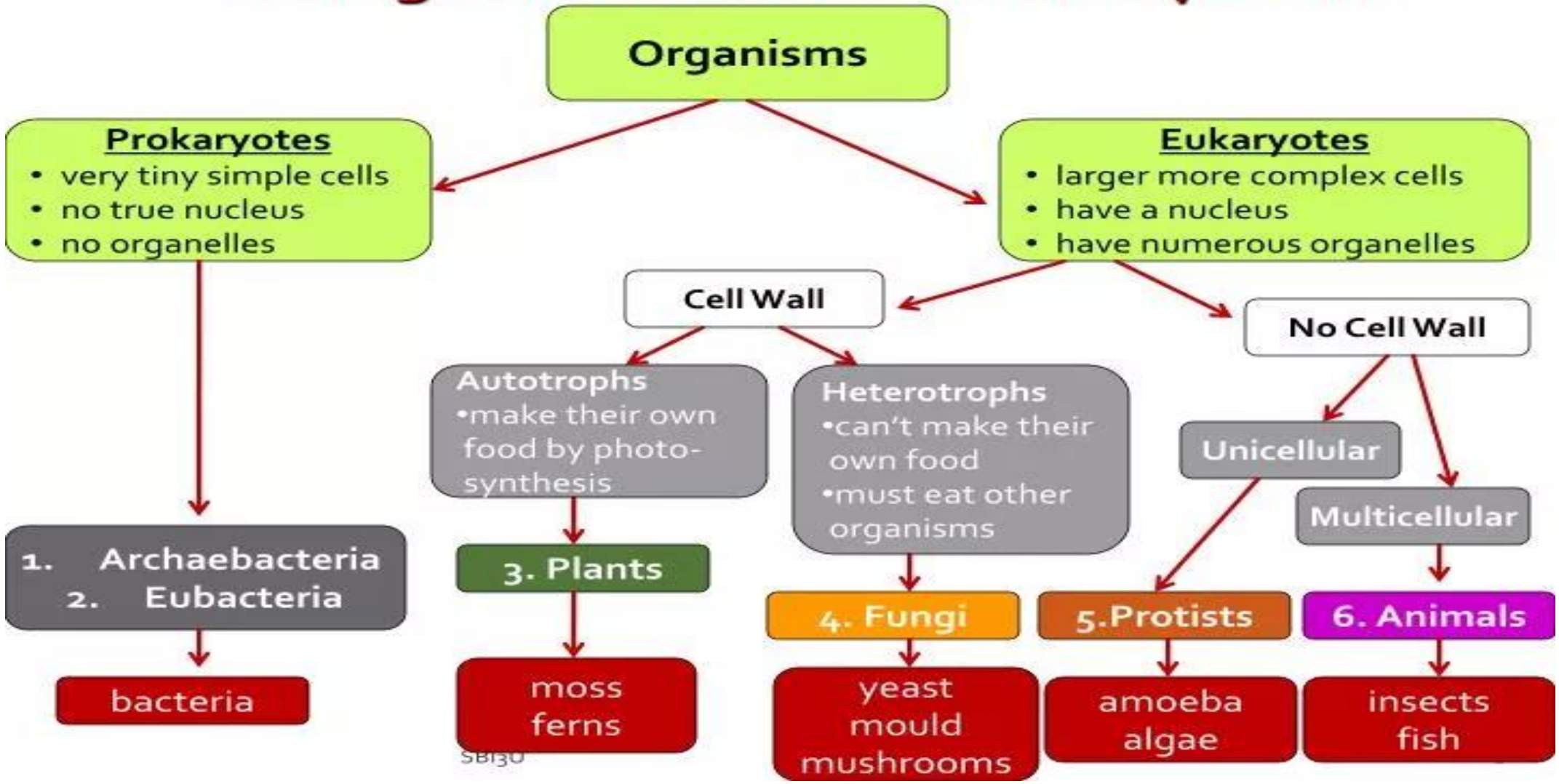
6 Kingdom Classification System



The Five-Kingdom Classification System

Kingdom		Cell Type	Description
Monera	**Archea**	**Prokaryotes** *Single-walled cells lacking membrane-bound internal structures*	Single celled, differ in genetics & chemistry from other prokaryotes
	Bacteria		Single celled, includes the cyanobacteria
Protista		**Eukaryotes*** *Have a membrane-bound nucleus, mitochondria (for energy processing), & plastids (for photosynthesis).*	Single celled, more complex cells
Fungi			Multi-celled
Plantae			Multi-celled, photosynthetic
Animalia			Multi-celled, ingest organics

* Eukaryotic cells formed by *endosymbiosis*, where a larger prokaryote cell trapped a smaller prokaryote organism within it. The smaller organisms became mitochondria and plastids, both of which have their own DNA.

BODY CAVITY AND DEVELOPMENT OF COELOM

Kingdom Animalia

Subkingdom Parazoa

- Multicellular animals without true specific tissues
- Phylum Porifera (Sponges)

Subkingdom Metazoa

- Multicelluar animals with true specific tissues

Division Diploblastica

- Body consists of 2 embryonic layers ectoderm and endoderm
- Phylum Coelenterata (Cnideria)

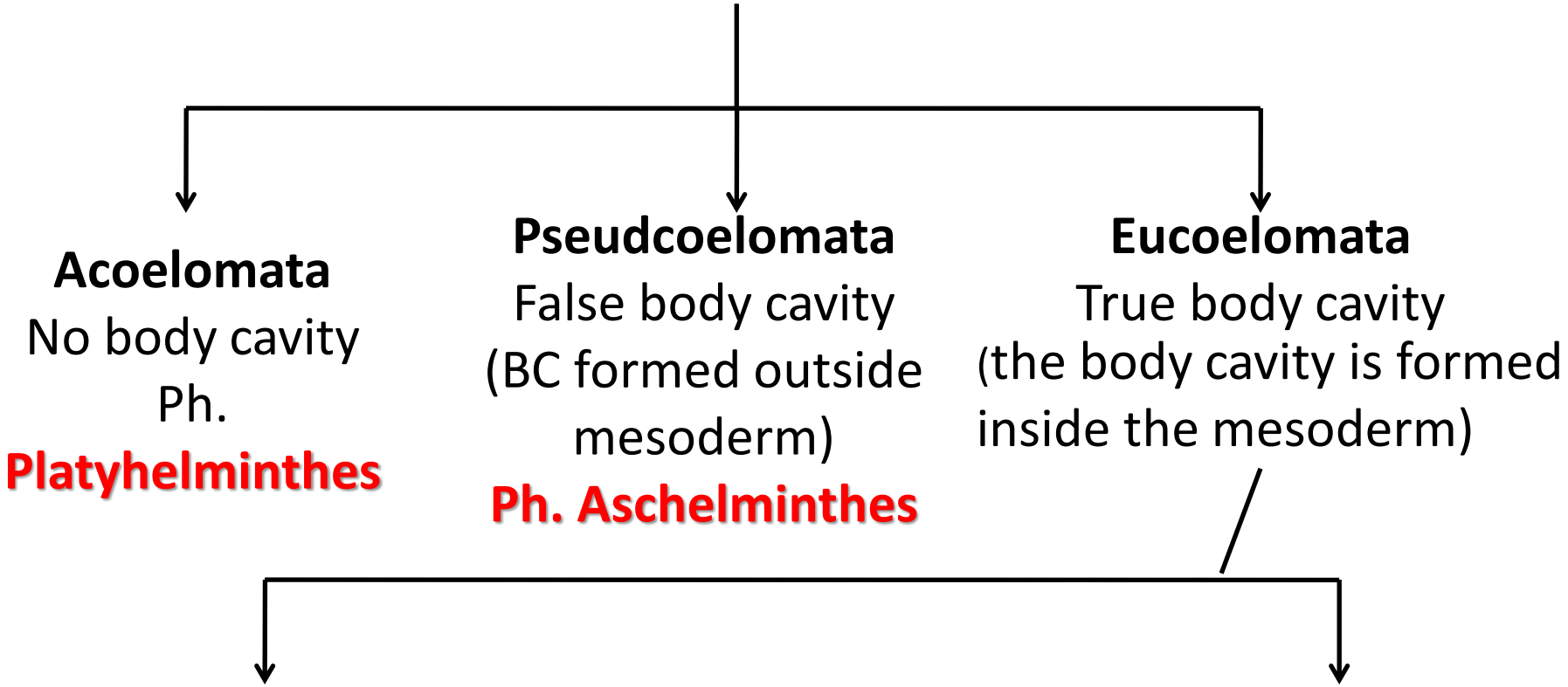
Division Triploblastica

- Body consists of 3 embryonic layers ectoderm, mesoderm and endoderm

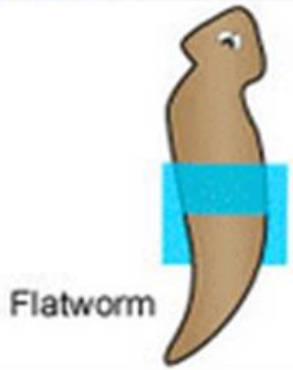
What is the body cavity and coelom?

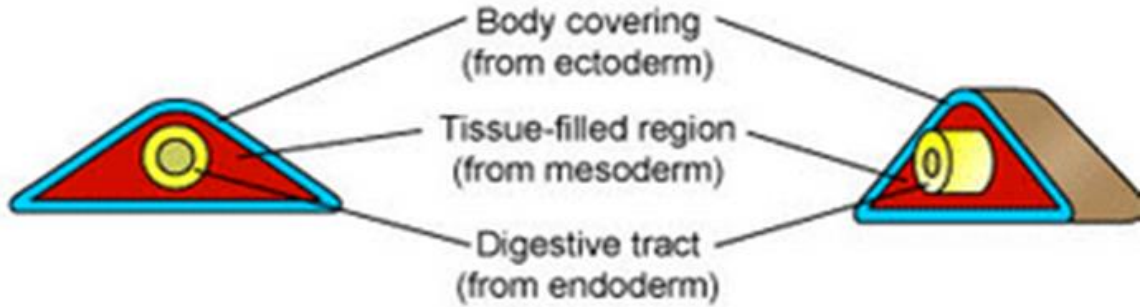
- A fluid-filled body cavity is found between the ectoderm and endoderm. This cavity is called the **coelom**, and the fluid in it is called **coelomic fluid**.
- Therefore, coelom can be defined as a fluid-filled body cavity located between the body's outer wall and the digestive tract.
- Coelom is common in metazoans.

Division Triploblastica

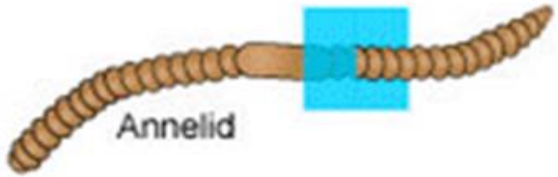


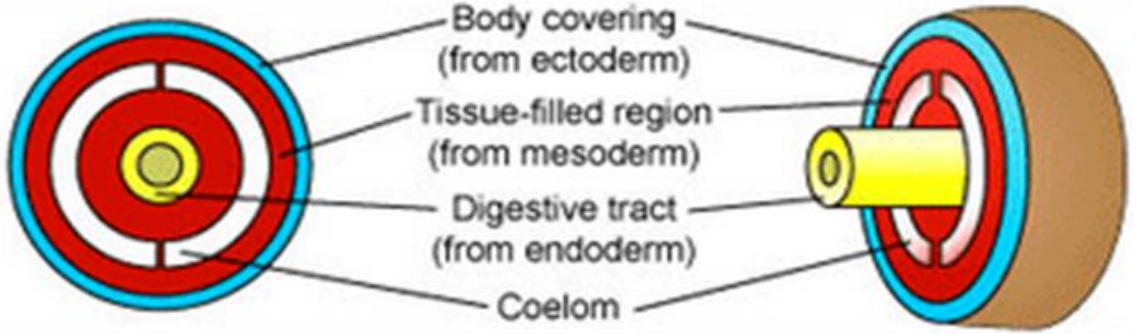
Acoelomate



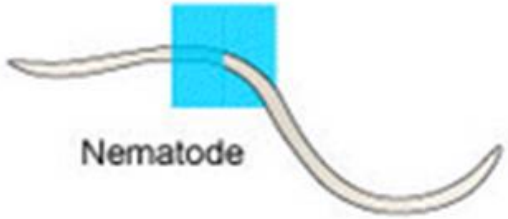


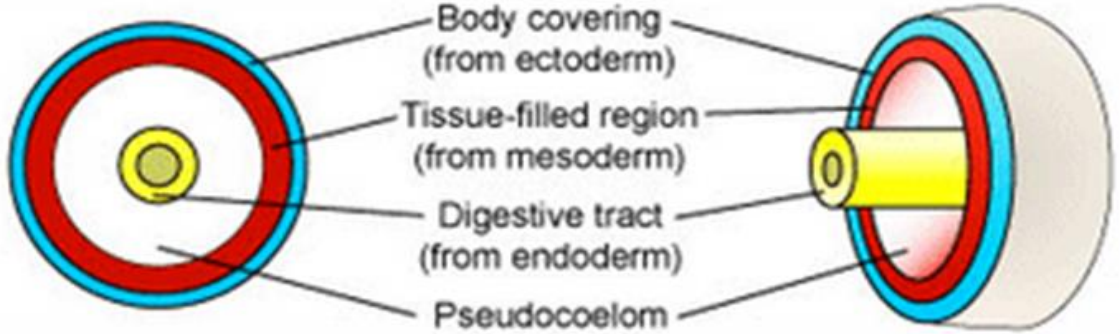
Coelomate

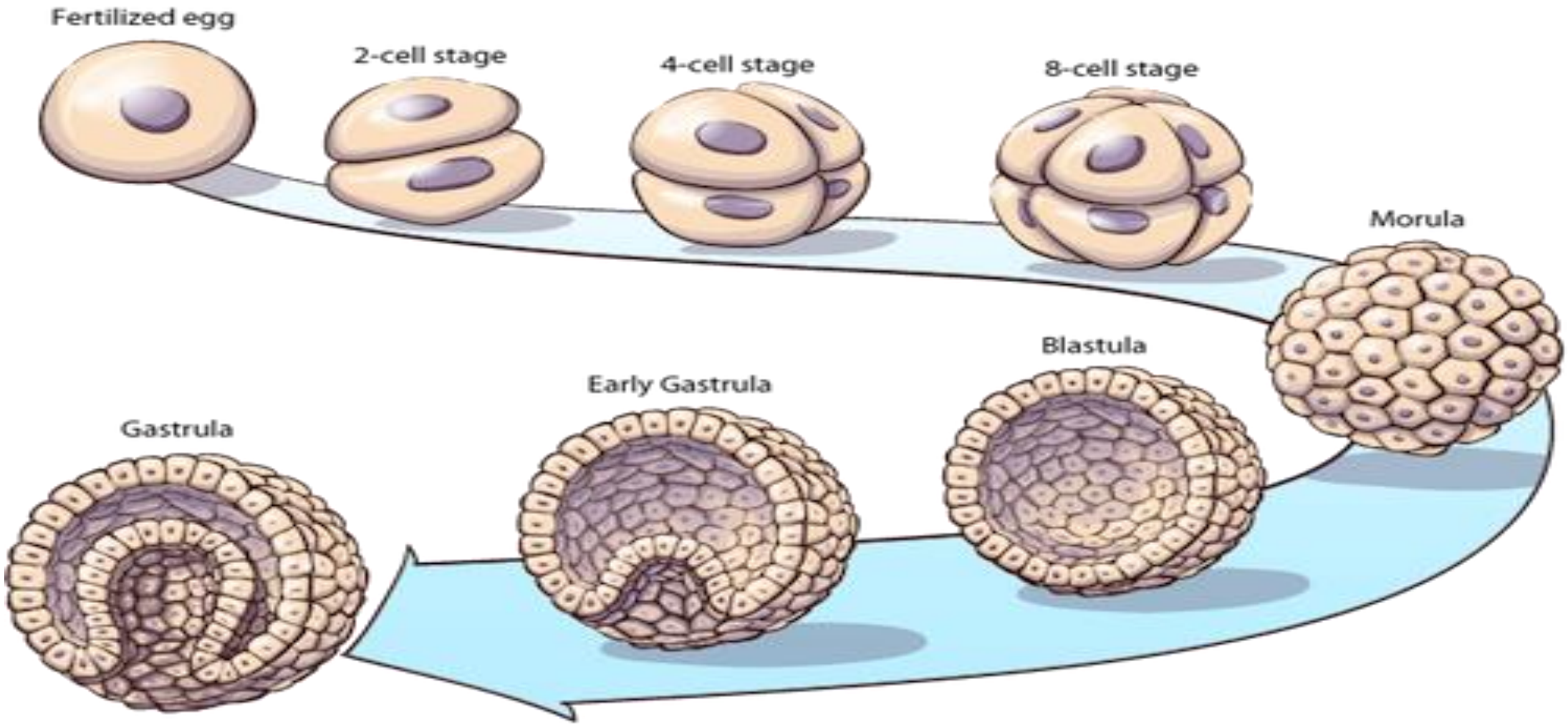




Pseudocoelomate







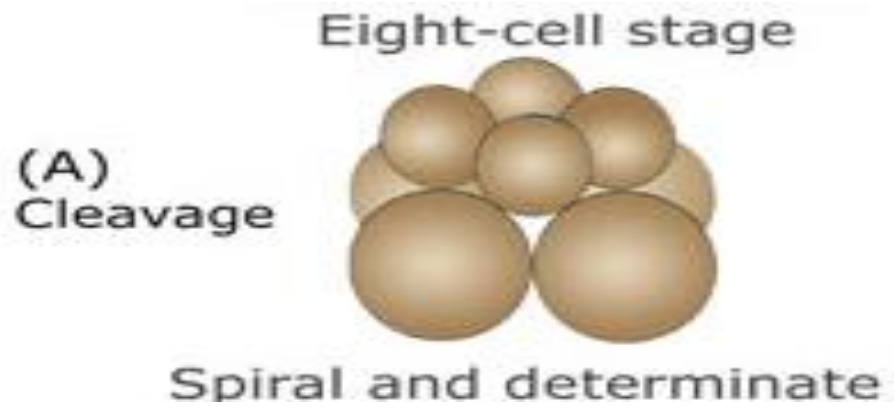
Cell Cleavage

Process by which the number of cells in a developing embryo is multiplied through cell division.

1. The type of cleavage

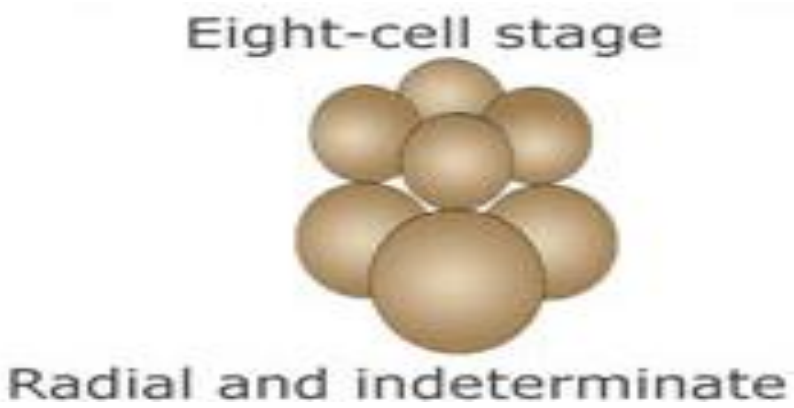
Spiral cleavage

- The cleavage plane is oriented **obliquely** to the embryo's polar axis
- Determinate, if one cell of the four-celled stage is isolated, that cell has the potential to produce **only one-fourth** of the protostomate animal
- **PROTOSTOMES**



Radial cleavage

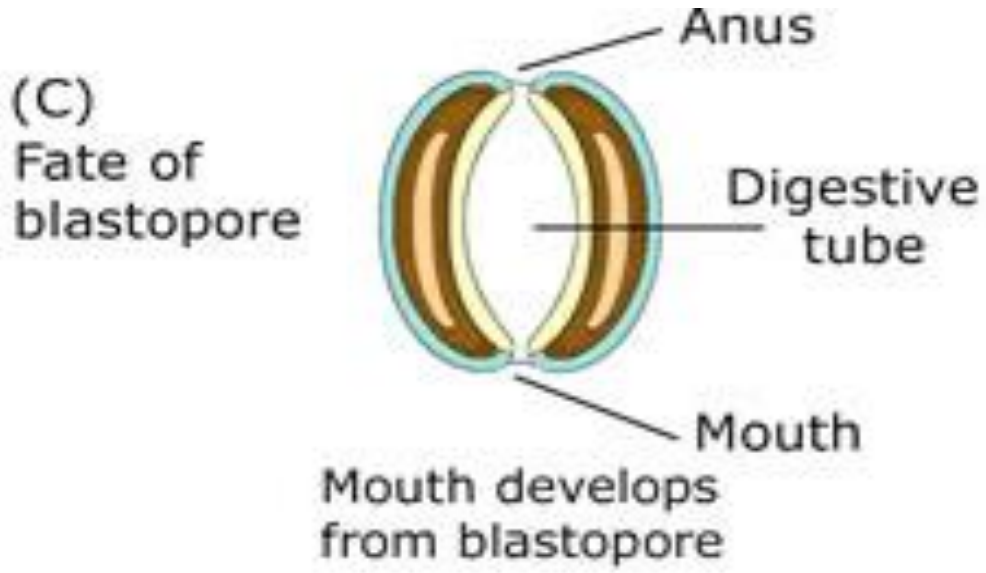
- The cleavage plane is **perpendicular** to the polar axis of the embryo
- Indeterminate. A cell isolated from an early deuterostomate embryo maintains the potential to develop into **an entire** organism
- **DEUTEROSTOMES**



2. Mouth formation

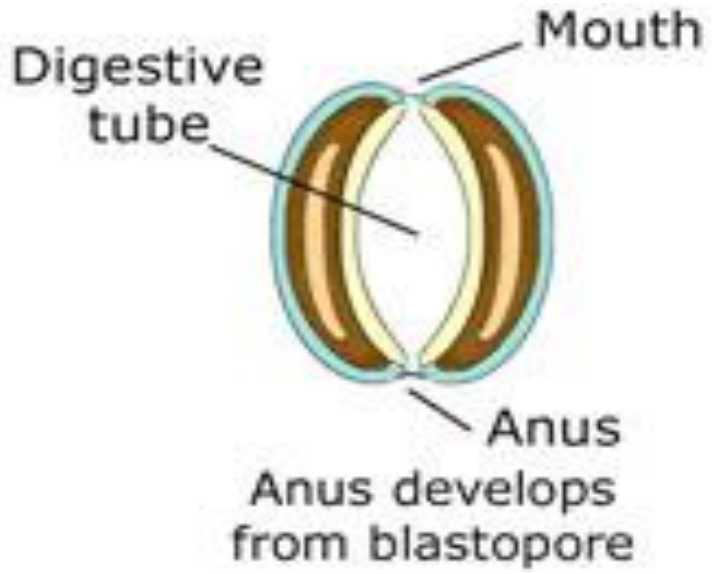
PROTOSTOMES

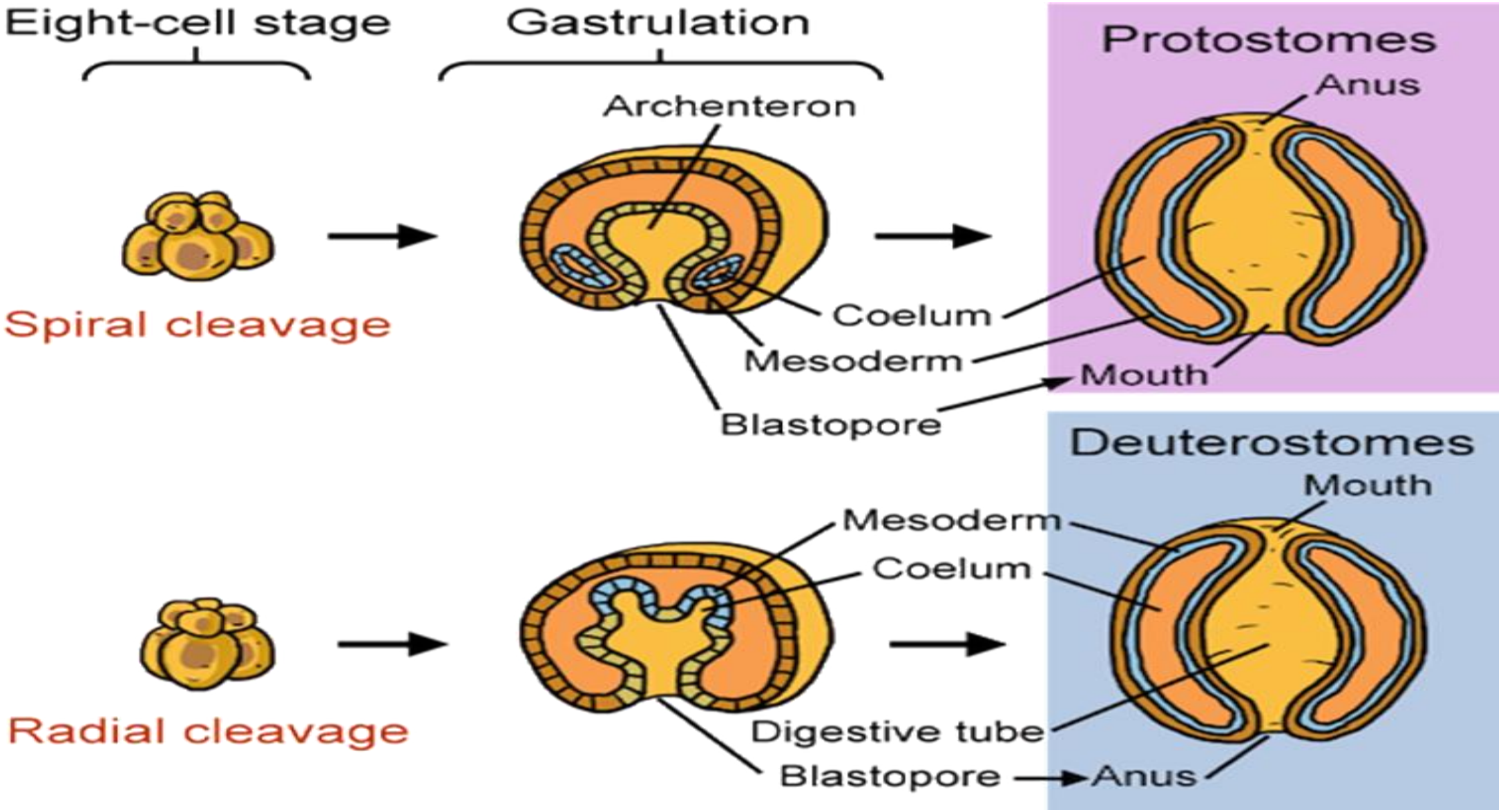
- Blastopore form mouth



DEUTEROSTOMES

- The blastopore form anus.
- The mouth is the second formed gut opening




Eight-cell stage
Gastrulation
Archenteron
Spiral cleavage
Coelum
Mesoderm
Blastopore
Protostomes
Anus
Mouth
Deuterostomes
Mouth
Mesoderm
Coelum
Radial cleavage
Digestive tube
Blastopore
Anus

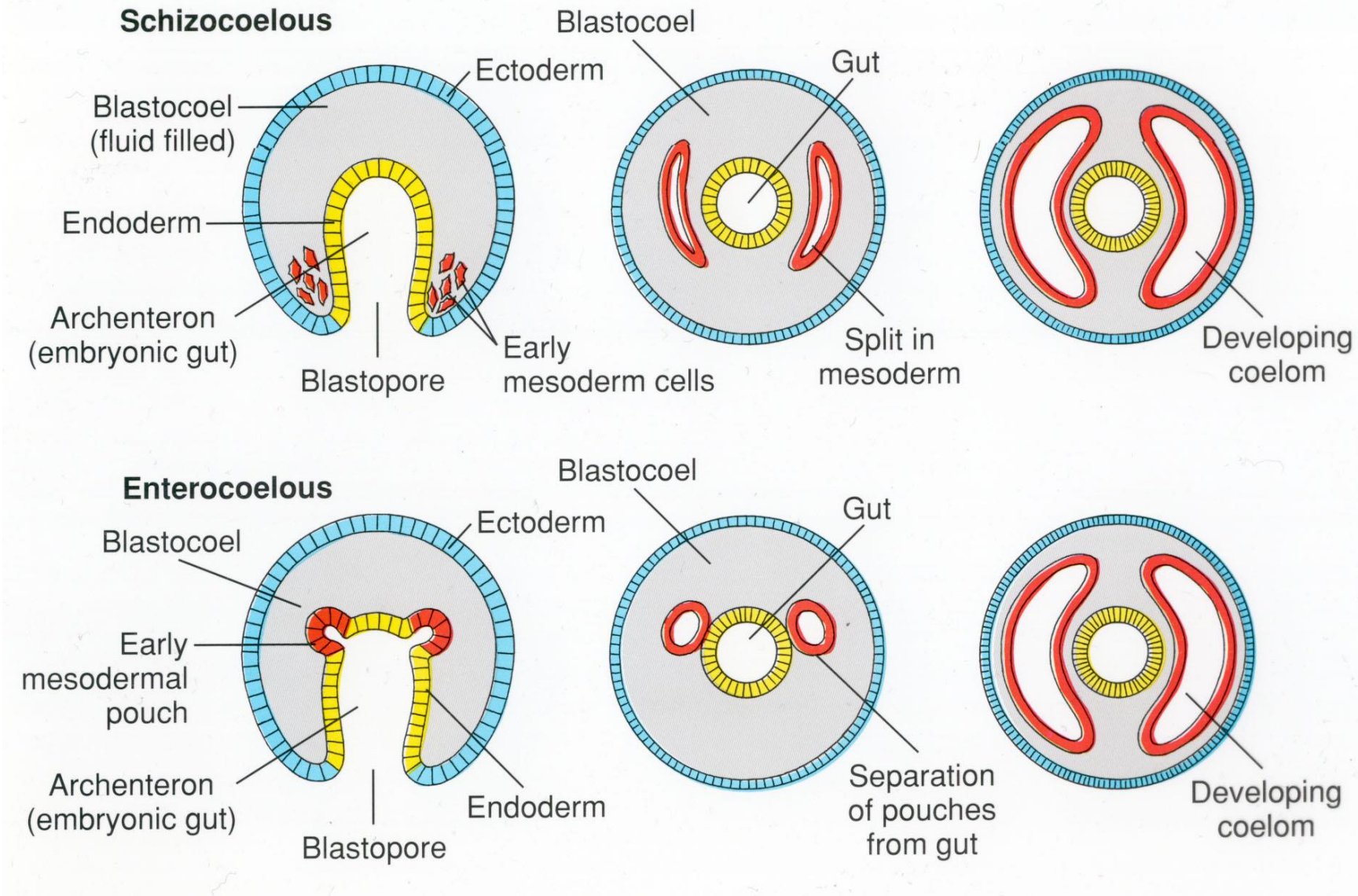
3. The origin of mesoderm and coelom

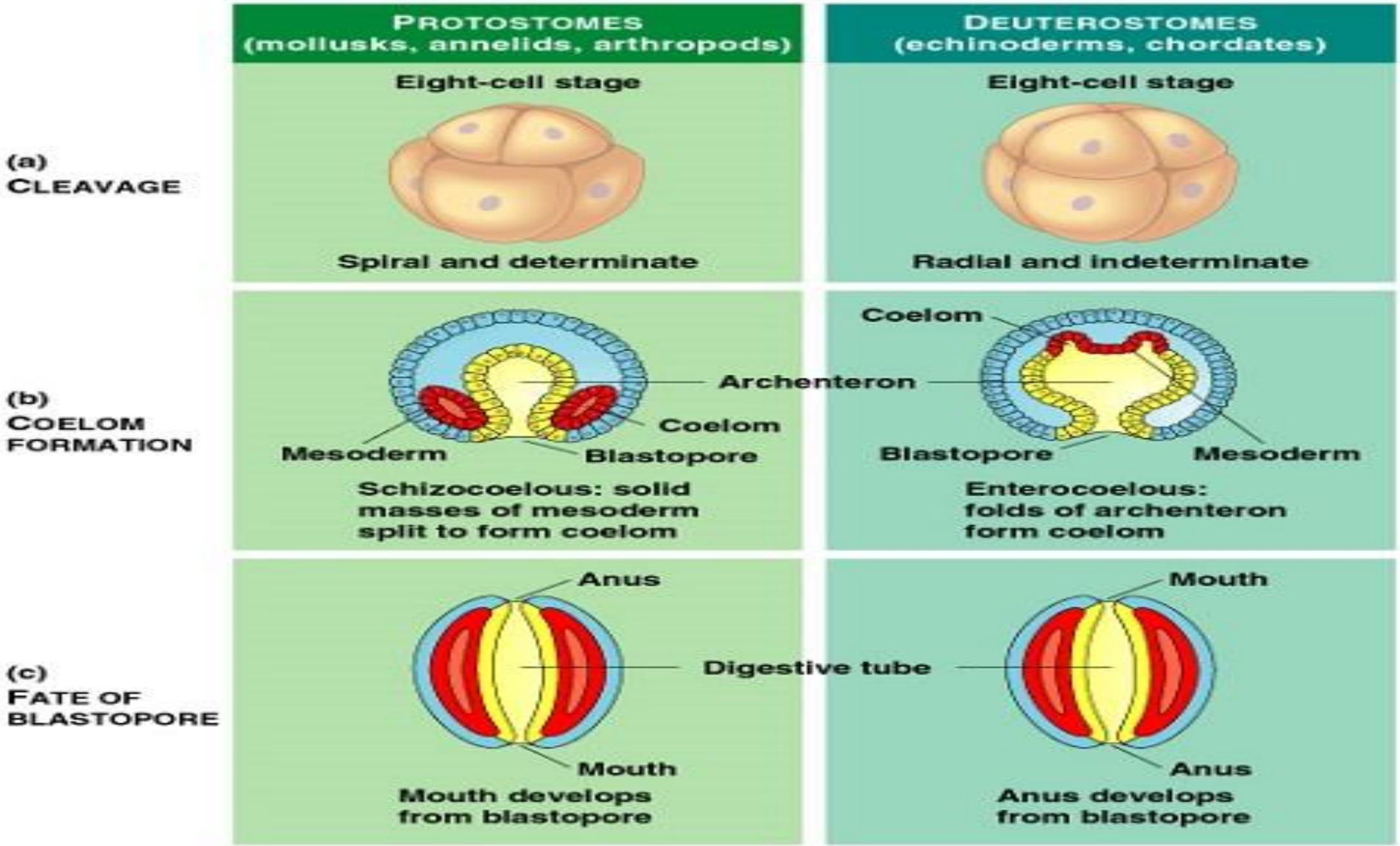
Schizocoely

- The mesoderm arises from a **single**, **mesodermally fated cell**.
- This cell divided to form two cells each of which gives a zone of mesodermal tissues along its side of the split develops within each mesodermal zone. This split widens into cavity

Enterocoely

- Evaginations of the wall of the **primitive gut** expand and eventually separated as lateral pouches.
- The pouch wall represent the future mesoderm of the organism, while the pouch cavity itself is the forerunner of the deuterostomate coelom.


Schizocoelous
Blastocoel
(fluid filled)
Ectoderm
Endoderm
Archenteron
(embryonic gut)
Blastopore
Early
mesoderm cells
Blastocoel
Gut
Split in
mesoderm
Developing
coelom
Enterocoelous
Blastocoel
Ectoderm
Early
mesodermal
pouch
Archenteron
(embryonic gut)
Blastopore
Endoderm
Blastocoel
Gut
Separation
of pouches
from gut
Developing
coelom



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Thank You

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