

Chapter 4 : Animal Kingdom

Biology Notes | Class 11



LEVELS OF ORGANISATION IN ANIMALS

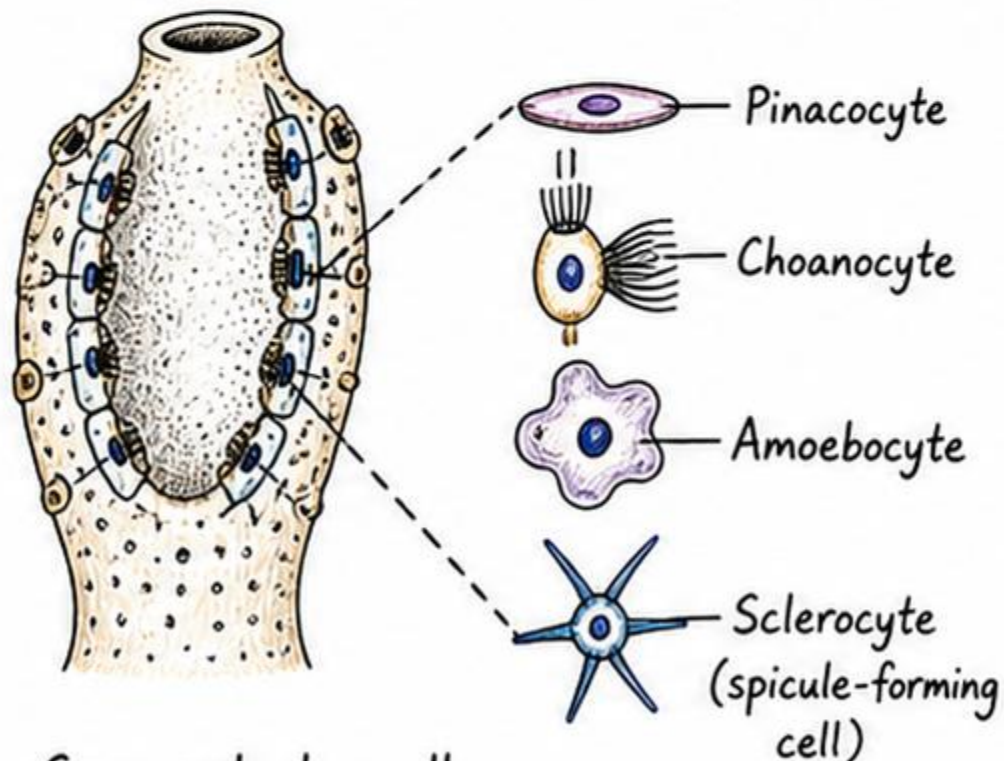
- Classification uses several body-plan characters together.

INCREASING COMPLEXITY →

① CELLULAR LEVEL

cells are loosely arranged and perform different functions.

Example: Porifera.

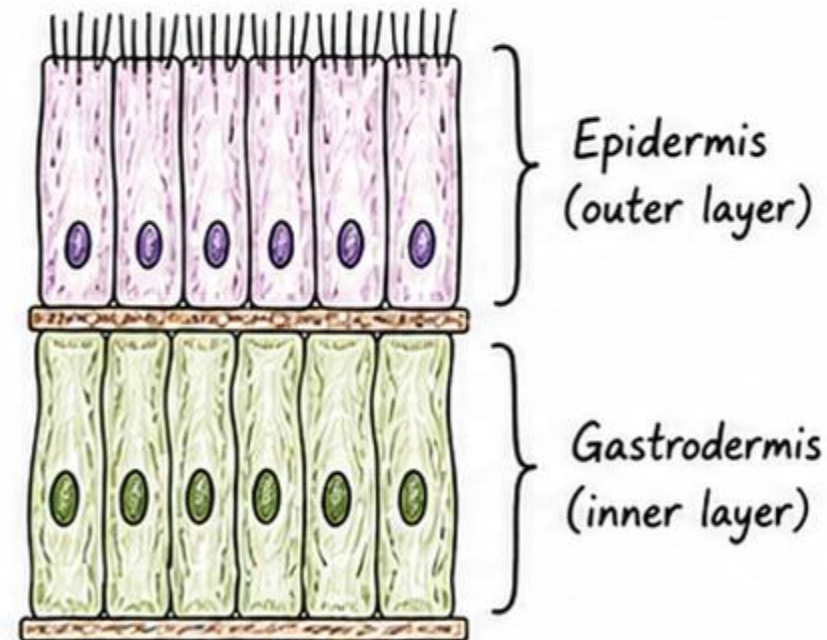


Sponge body wall (cells)

② TISSUE LEVEL

similar cells form tissues that perform a common function.

Examples: Cnidaria and Ctenophora.

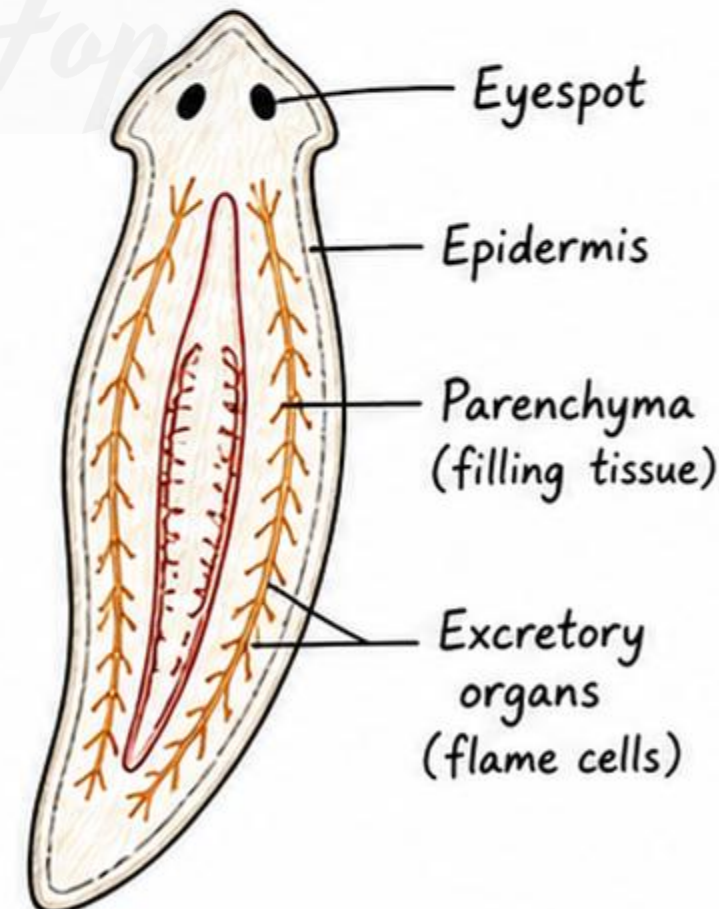


Two-layer tissue wall (Cnidarian body wall)

③ ORGAN LEVEL

different tissues combine to form organs.

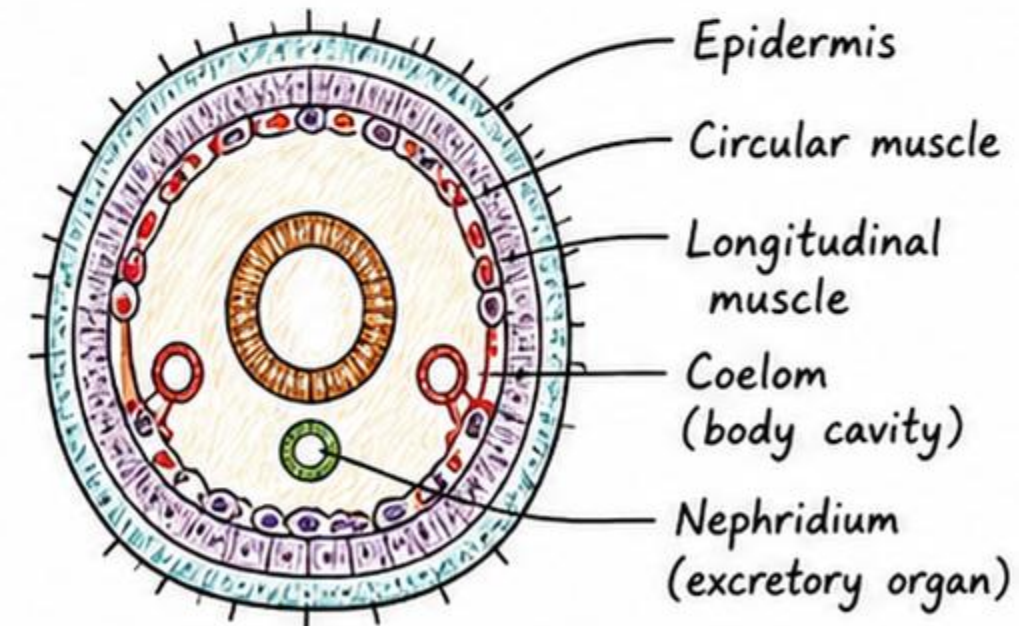
Example: Platyhelminthes.



④ ORGAN-SYSTEM LEVEL

organs work together as systems.

Found from Aschelminthes/Nematoda onward.

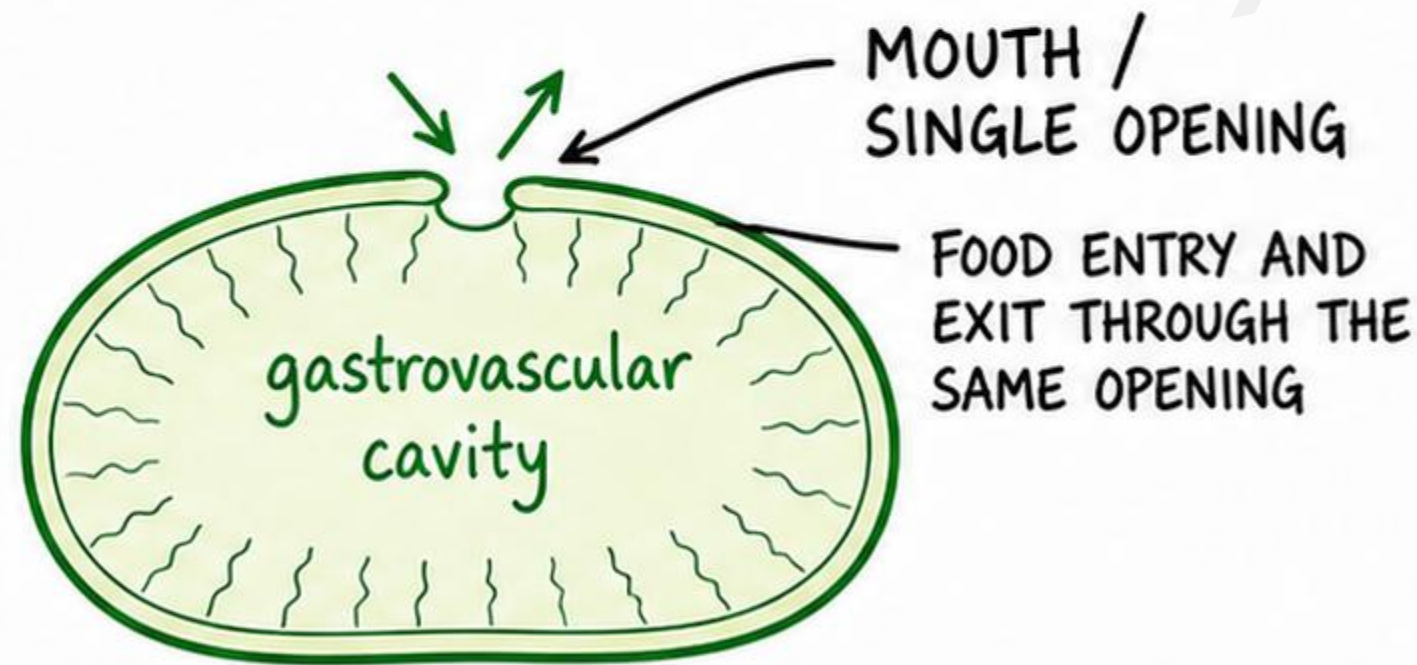


Simplified cross-section of an annelid

DIGESTIVE SYSTEM BODY PLANS

INCOMPLETE DIGESTIVE SYSTEM

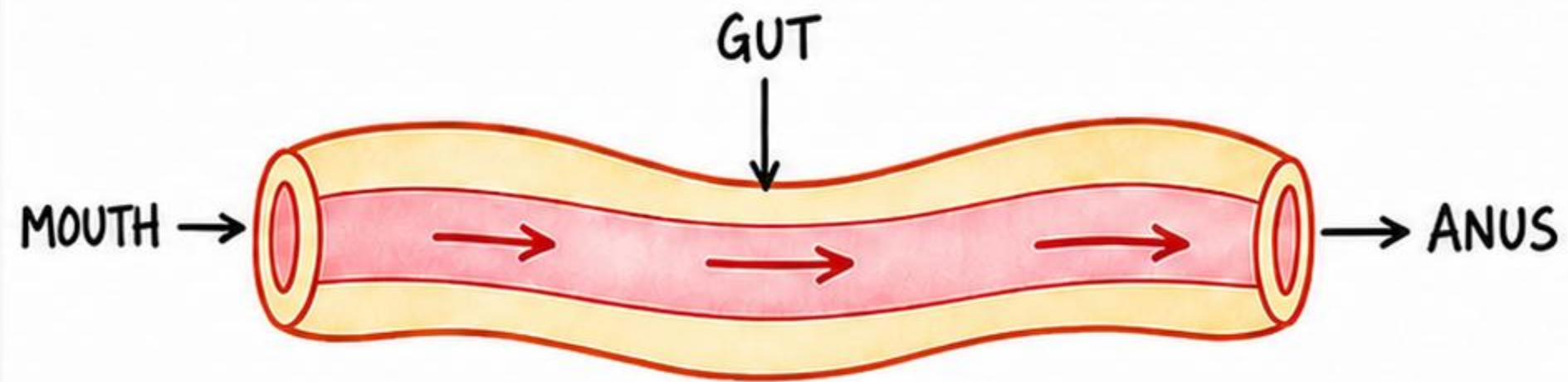
- Gastrovascular cavity has only one opening.
- The same opening serves as mouth; a separate anus is absent.
- Food enters and undigested material leaves through the same opening.
- Seen in cnidarians and many flatworms.



ONE OPENING = INCOMPLETE

COMPLETE DIGESTIVE SYSTEM

- Alimentary canal has two separate openings: mouth and anus.
- Food moves in one direction: MOUTH → GUT → ANUS.
- Different regions can become specialised for digestion and absorption.
- Seen from Aschelminthes / Nematoda onward.

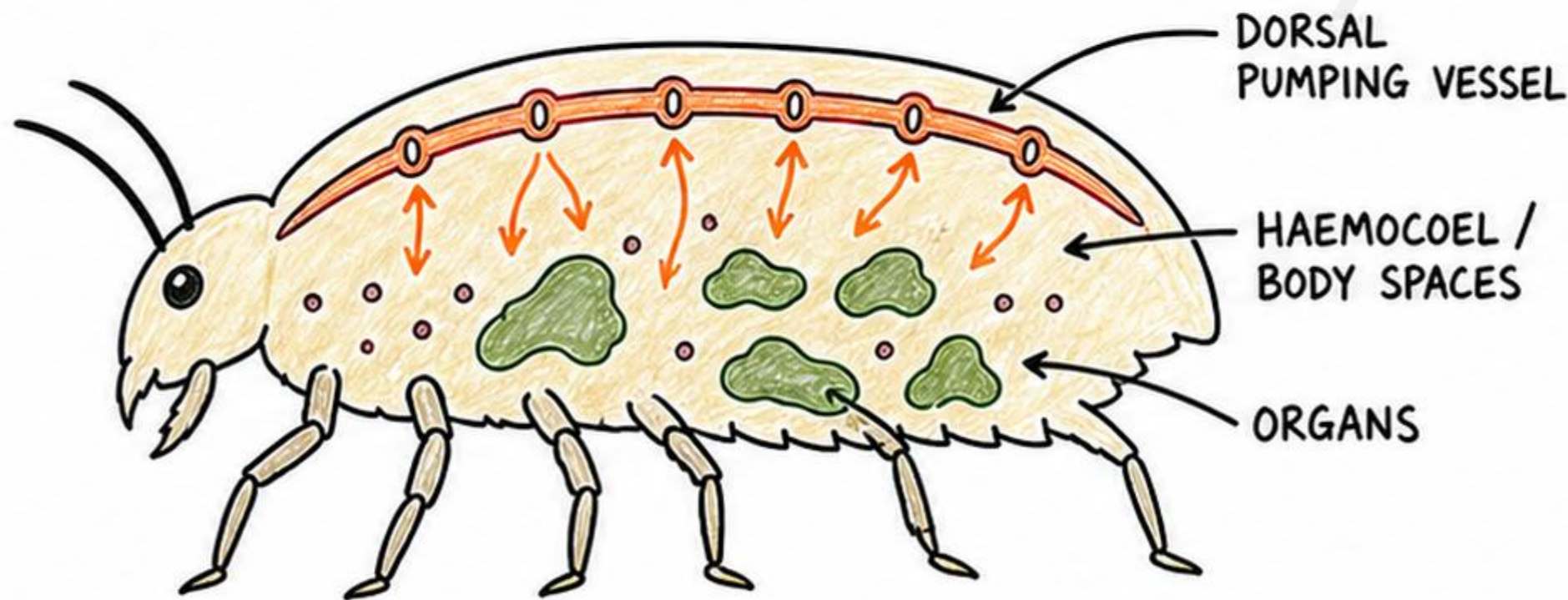


TWO OPENINGS = COMPLETE

OPEN AND CLOSED CIRCULATORY SYSTEMS

OPEN CIRCULATORY SYSTEM

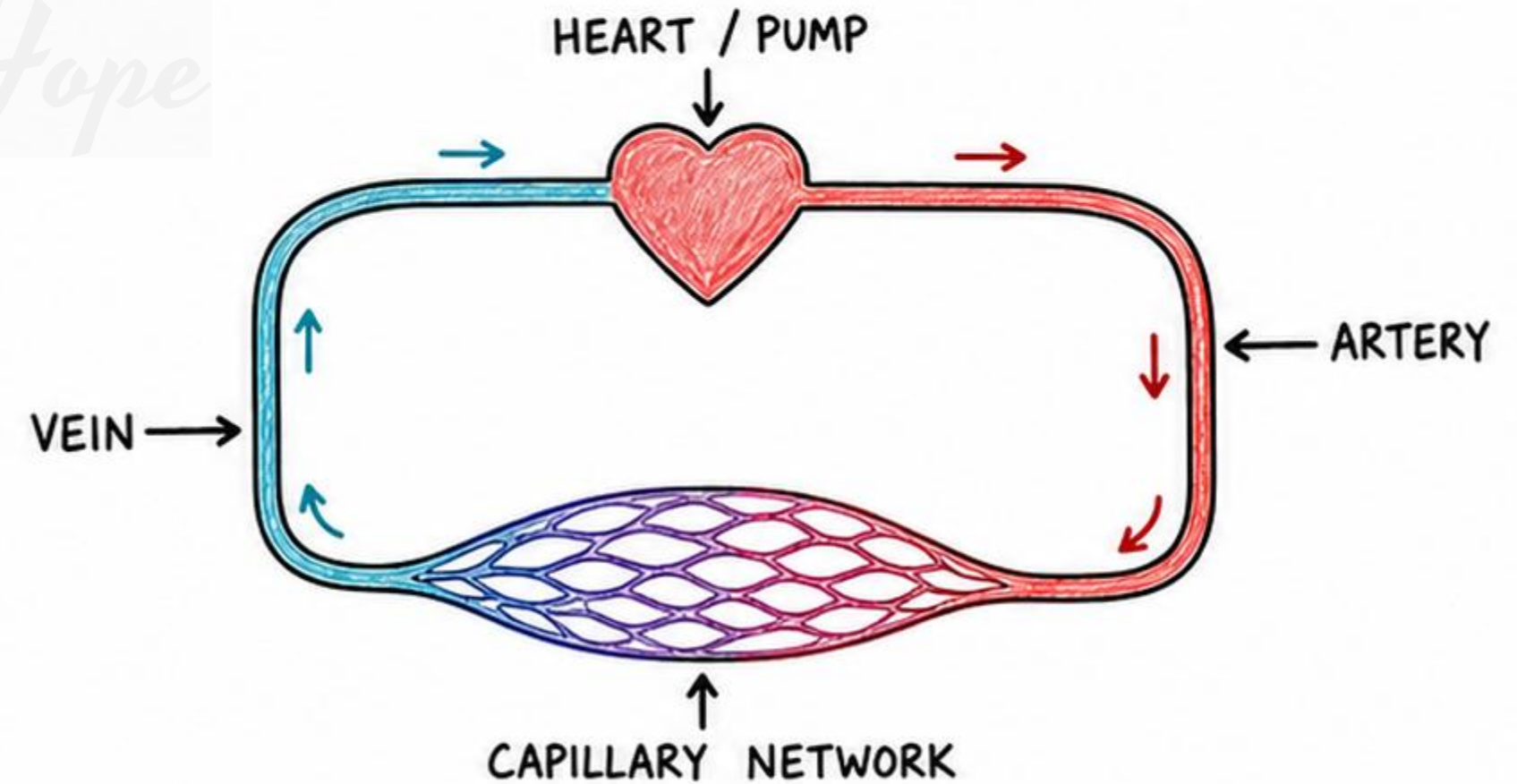
- Circulatory fluid is called haemolymph.
- Haemolymph leaves vessels and bathes organs directly in body spaces (haemocoel).
- It returns to the pumping organ through openings.
- Pressure is generally lower and flow is less precisely directed.
- Examples: Arthropoda and most Mollusca.



OPEN: HAEMOLYMPH ENTERS BODY SPACES

CLOSED CIRCULATORY SYSTEM

- Blood always remains inside vessels.
- Arteries carry blood away from the pumping organ; veins return it.
- Capillaries allow exchange with tissues.
- Pressure can be higher and flow is directed.
- Examples: Annelida and Vertebrata.

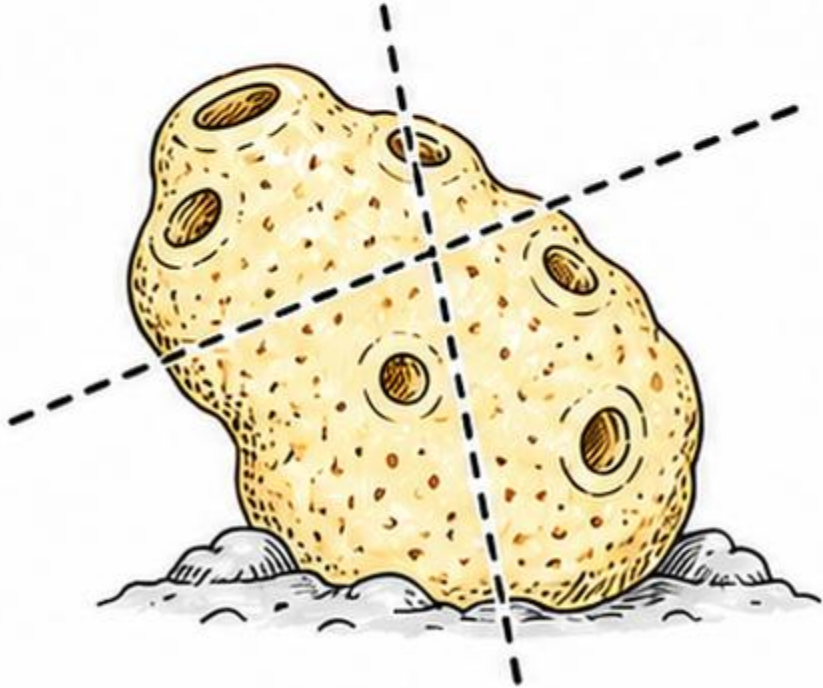


CLOSED: BLOOD STAYS IN VESSELS

SYMMETRY IN ANIMALS

1. ASYMMETRY

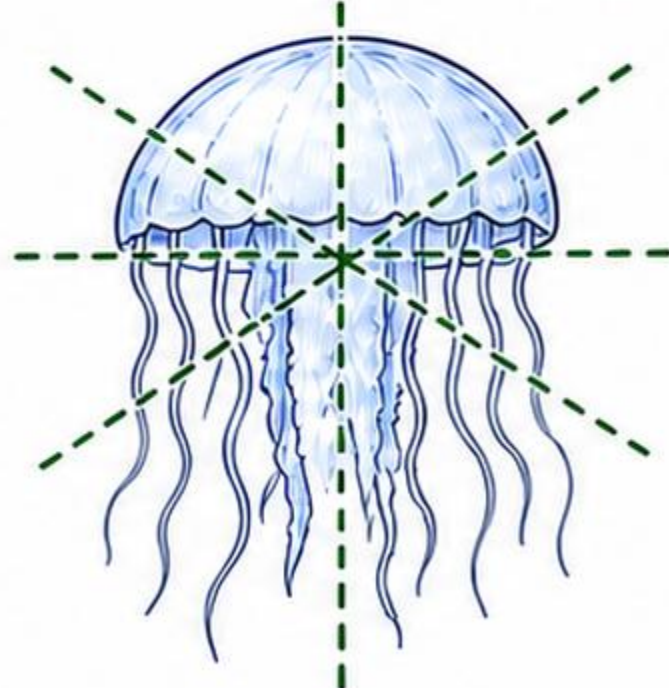
- No plane passing through the body divides it into two equal halves.
- Common in most sponges.
- The body has an irregular arrangement.



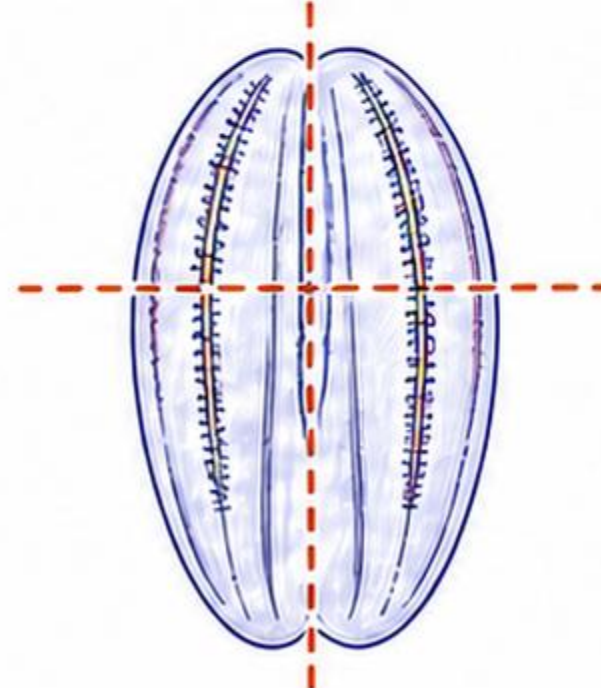
2. RADIAL / BIRADIAL SYMMETRY

- **Radial**: any plane passing through the central axis divides the body into similar halves.
- Seen in **cnidarians**, such as a jellyfish.
- **Biradial**: only two planes through the central axis produce similar halves.
- Usually seen in **ctenophores**.

RADIAL (JELLYFISH)

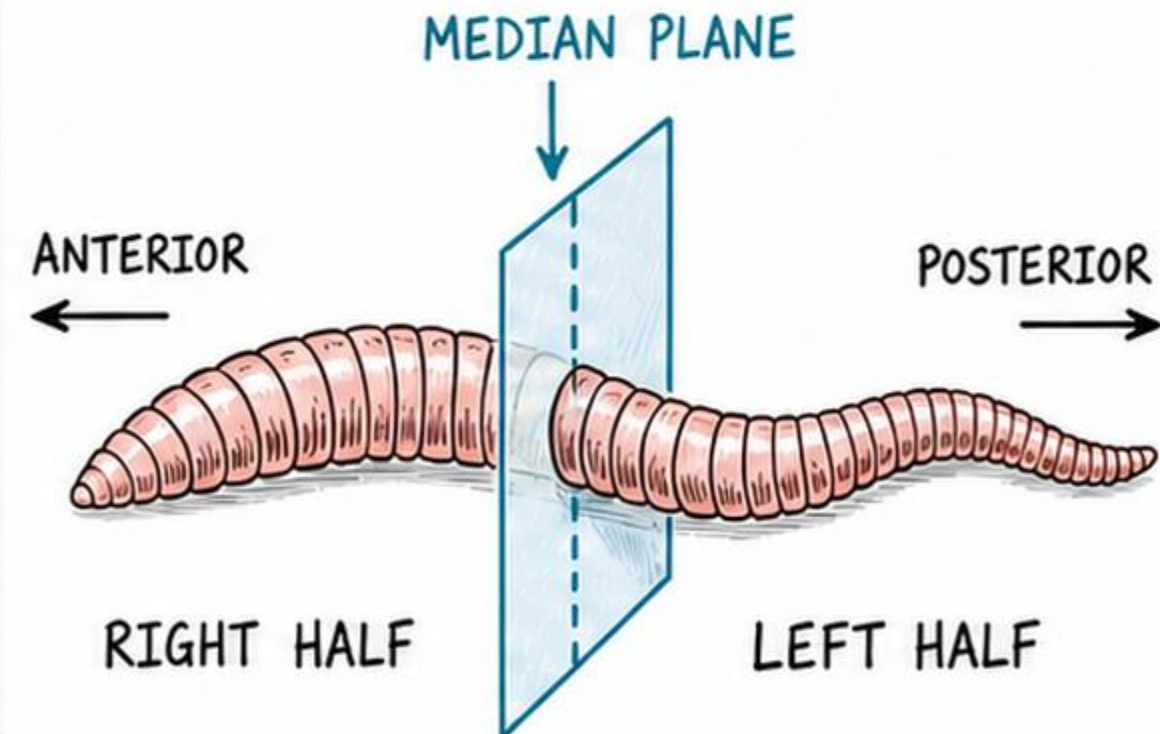


BIRADIAL (CTENOPHORE)



3. BILATERAL SYMMETRY

- Only one median plane divides the body into right and left mirror halves.
- Body usually has distinct anterior and posterior ends.
- Seen in **annelids**, **arthropods** and **vertebrates**.



ASYMMETRY: NONE

RADIAL: MANY PLANES

BIRADIAL: TWO PLANES

BILATERAL: ONE PLANE

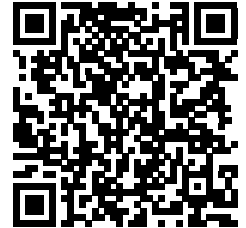


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