

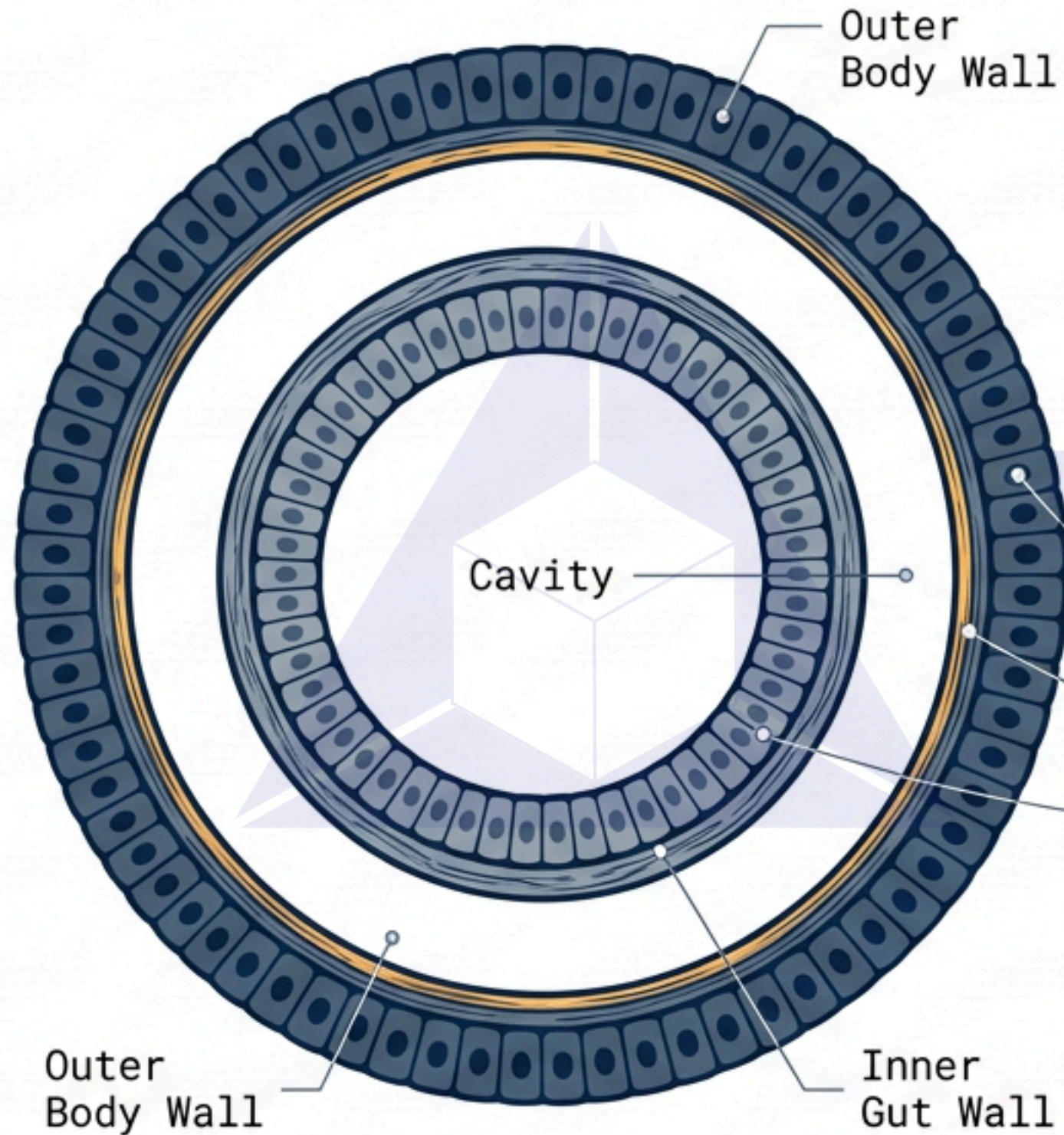
ANIMAL KINGDOM CLASSIFICATION

The Body Cavity That Classifies Animals

Understanding the coelom and its critical role in organizing biological complexity.

SECTION 4.1.4





What is a Coelom?

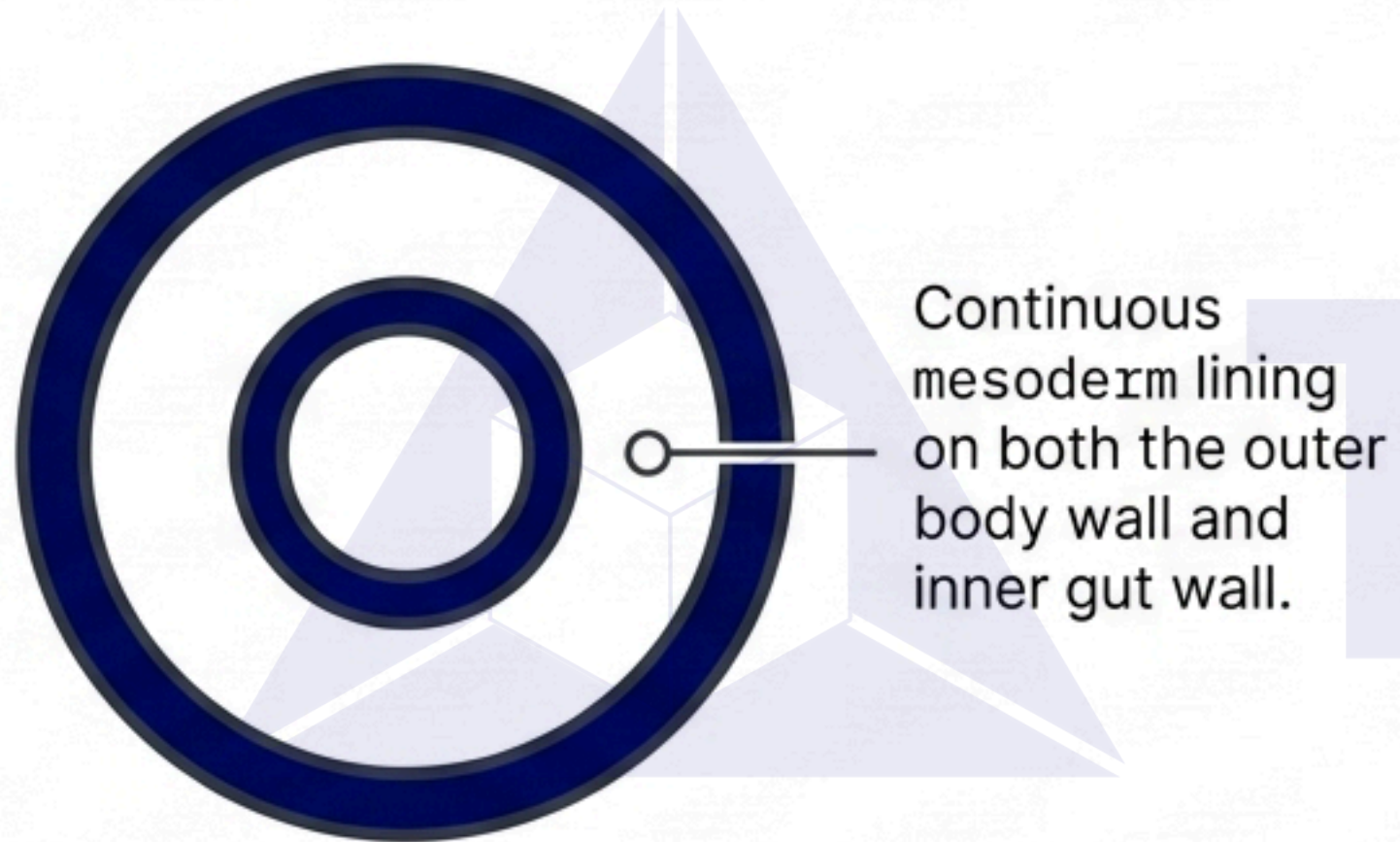
The presence or absence of a specific cavity between the body wall and the gut wall is a fundamental basis for animal classification.

THE DEFINITION

A true coelom is a body cavity that is entirely lined by the mesoderm.

- Ectoderm (Outer layer / Body wall)
- Mesoderm (Middle layer / Cavity lining)
- Endoderm (Inner layer / Gut wall)

Note: The nature of this cavity determines how internal organs can grow, move, and function independently of the outer body wall.



Coelomate Animals

True Cavity Present

Animals possessing a true, fully-lined body cavity. The mesoderm splits to create a protected, fluid-filled space for complex organ systems.

Annelids

Molluscs

Arthropods

Echinoderms

Hemichordates

Chordates



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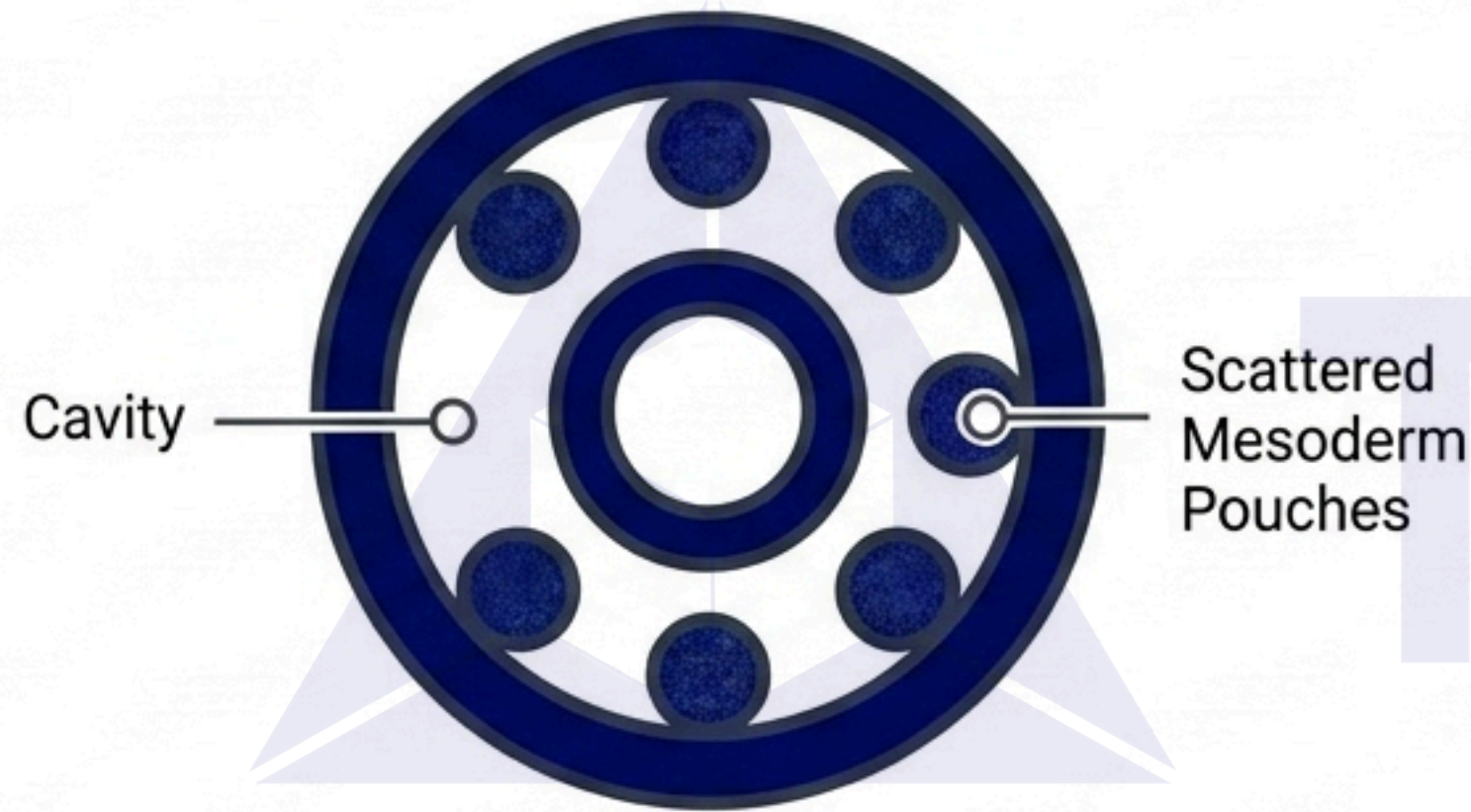
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Pseudocoelomate Animals

False Cavity



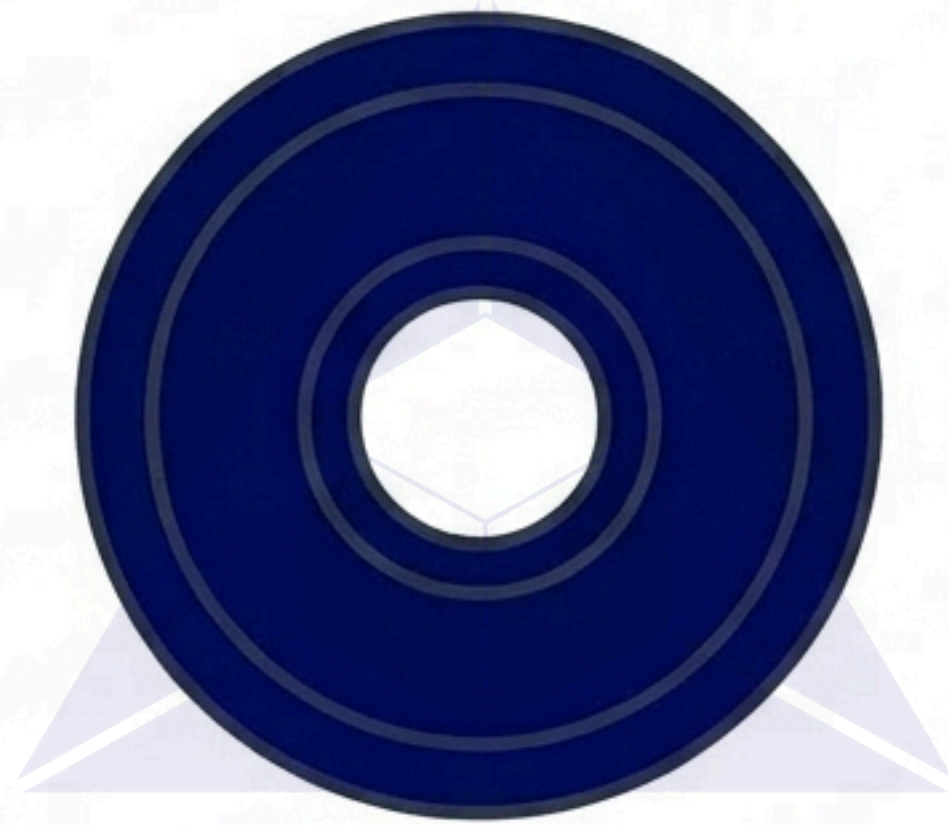
The body cavity exists, but it is not lined by the mesoderm. Instead, the mesoderm is present only as scattered pouches between the ectoderm and endoderm.

Aschelminthes (Roundworms)

Wait, why Pseudo?

pseudo + coelom + ate
(false) (cavity) (possessing)

Because the cavity isn't fully encapsulated by the middle tissue layer, it lacks the structural integrity of a true coelom, limiting the complexity of the organs it can support.



Acoelomate Animals

Cavity Absent

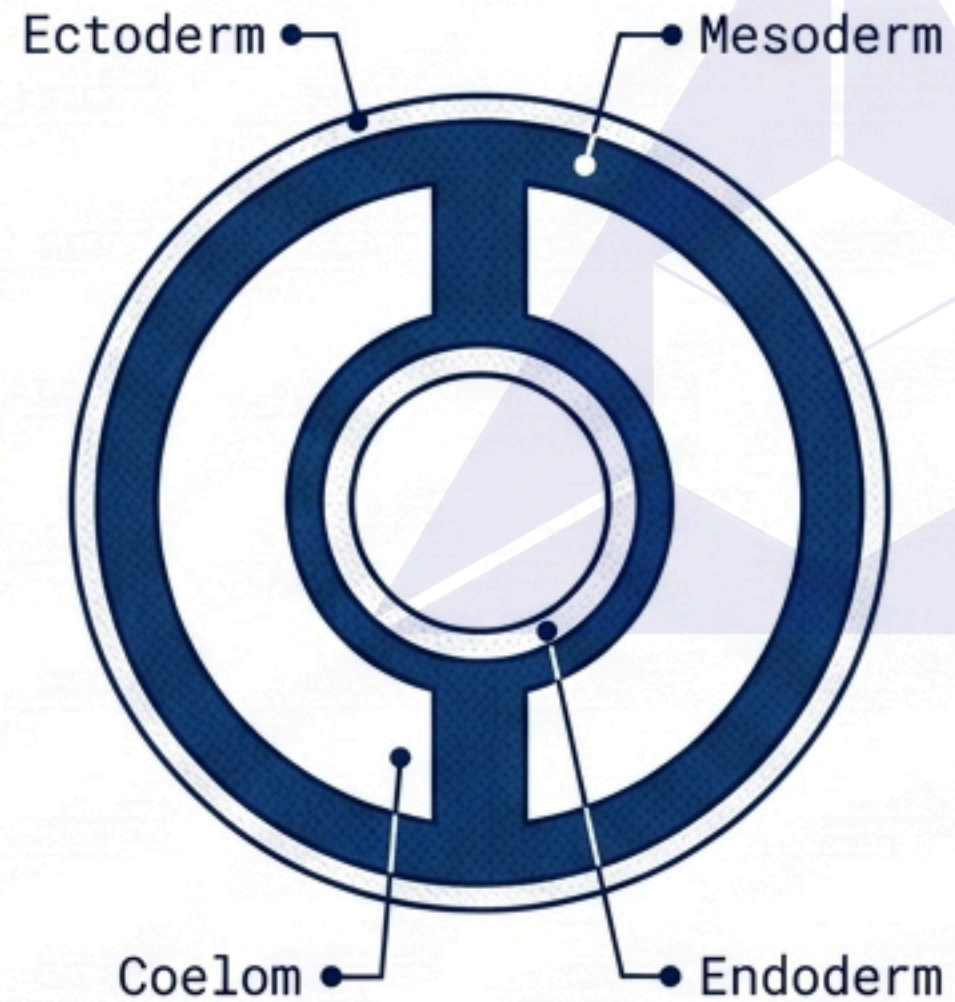
Animals in which the body cavity is entirely absent. The space between the gut and the outer body wall is packed solid with mesoderm tissue.

Platyhelminthes (Flatworms)

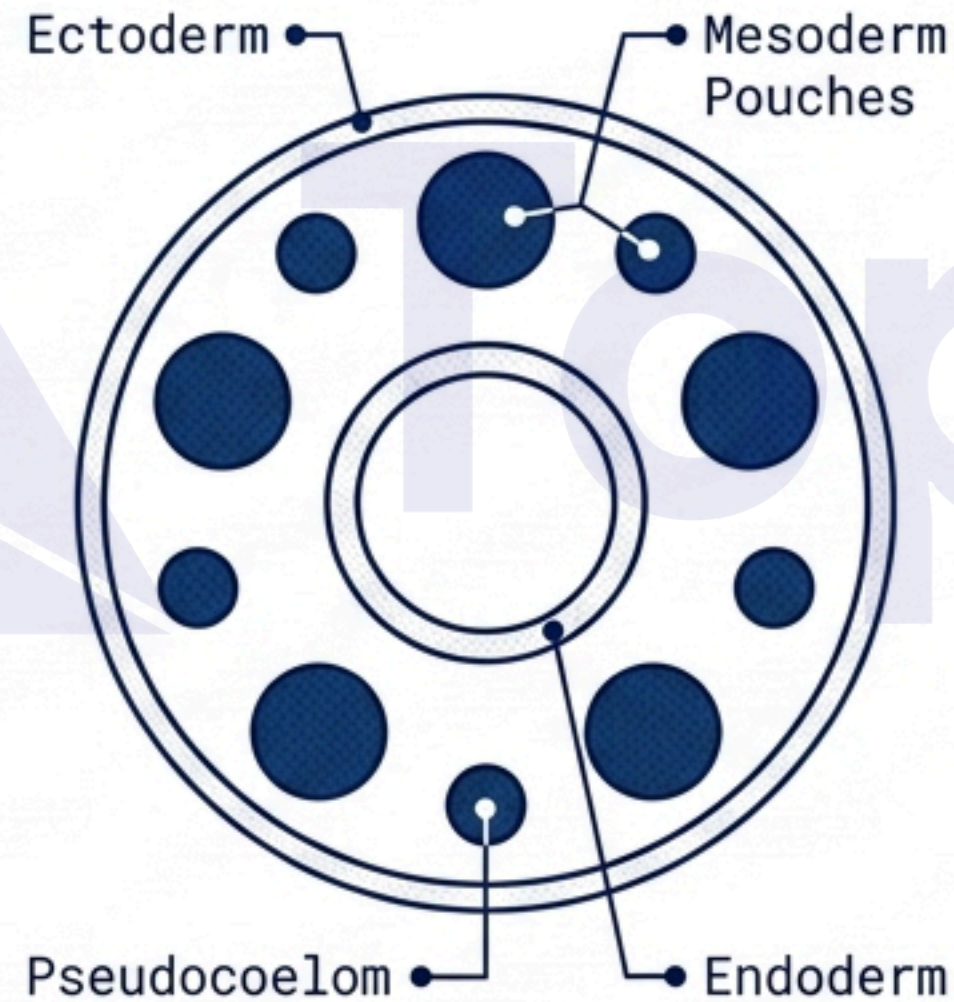
Because there is no cavity to transport nutrients or house complex circulatory systems, these animals must remain extremely flat (dorso-ventrally flattened) to allow for simple diffusion.

Diagrammatic Sectional View of Germinal Layers

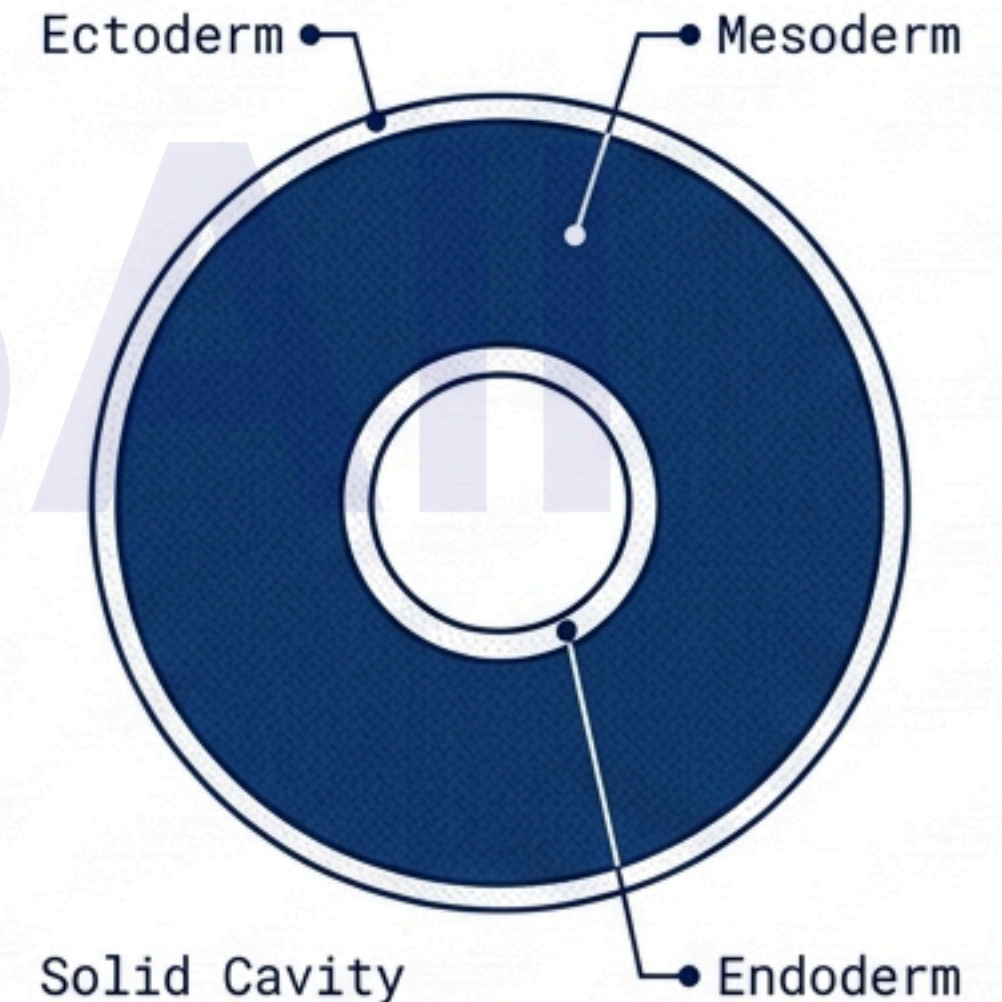
(a) Coelomate



(b) Pseudocoelomate



(c) Acoelomate

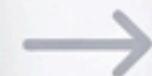


The Evolutionary Blueprint

Key Takeaway

The evolution of the coelom was a crucial step in animal complexity. By creating a protected, internal space lined with mesoderm, animals could develop complex, independently functioning organ systems—separating the movement of the gut from the movement of the outer body.

Acoelomate →
Simple, solid



Pseudocoelomate →
Pouched, transitional



Coelomate →
Complex, fully lined



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