
COELOM

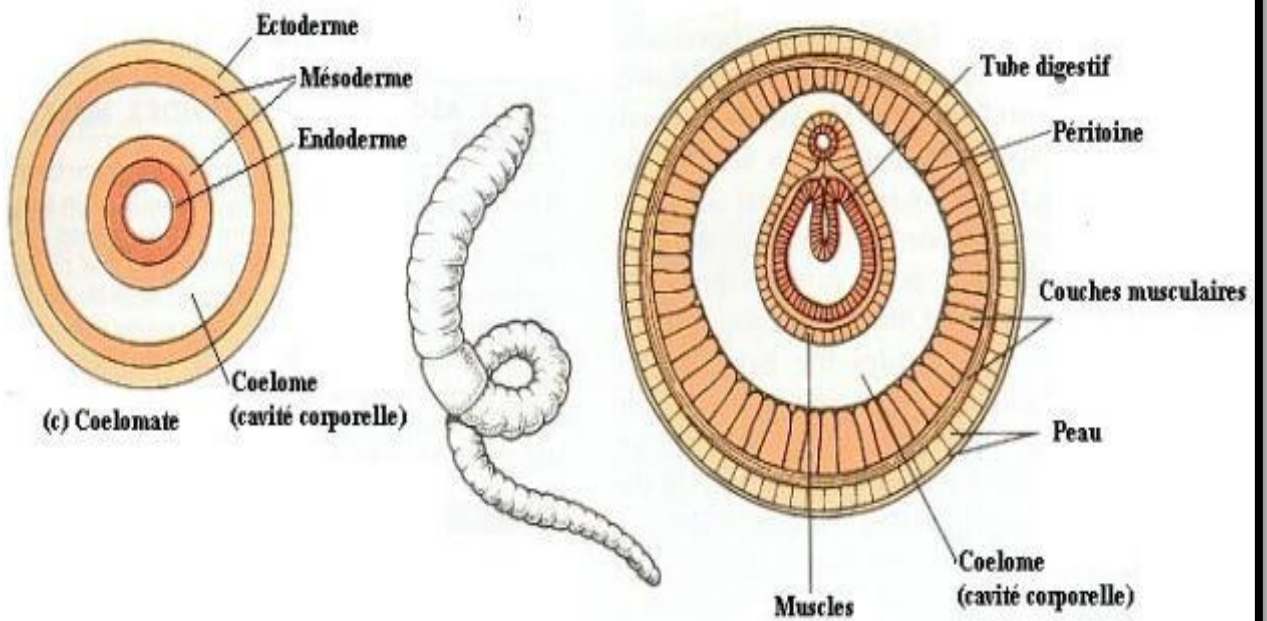
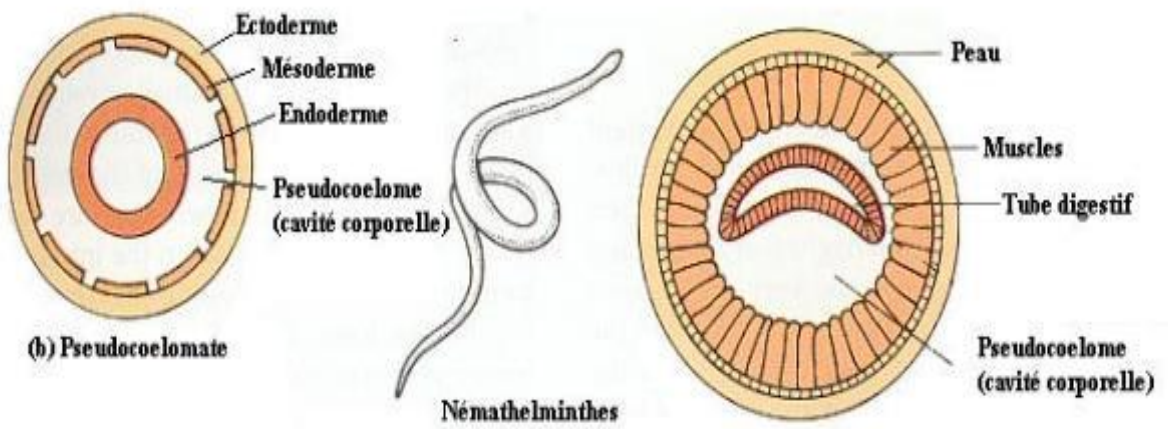
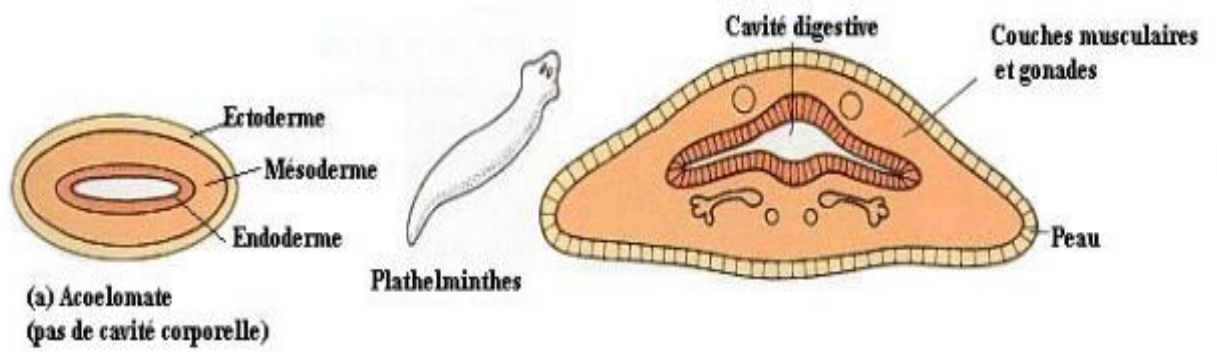
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Dr. Minakshi Kumari

Introduction and definition :

Coelom, in Greek language means a hollow cavity. It is lined on all sides by mesoderm. A coelom is a fluid-filled body cavity that is completely lined by tissue created from the mesoderm, the middle layer of the primary cells found in an embryo. It is typically found in **multicellular organisms**, which are living things that have more than one cell. The most common types of multicellular organisms are found under the domain eukarya ; more simplistic prokaryotic organisms are generally unicellular organisms. Most bilateral animals, those with a left and a right side, have a coelom, as well as vertebrates, or animals with a backbone.

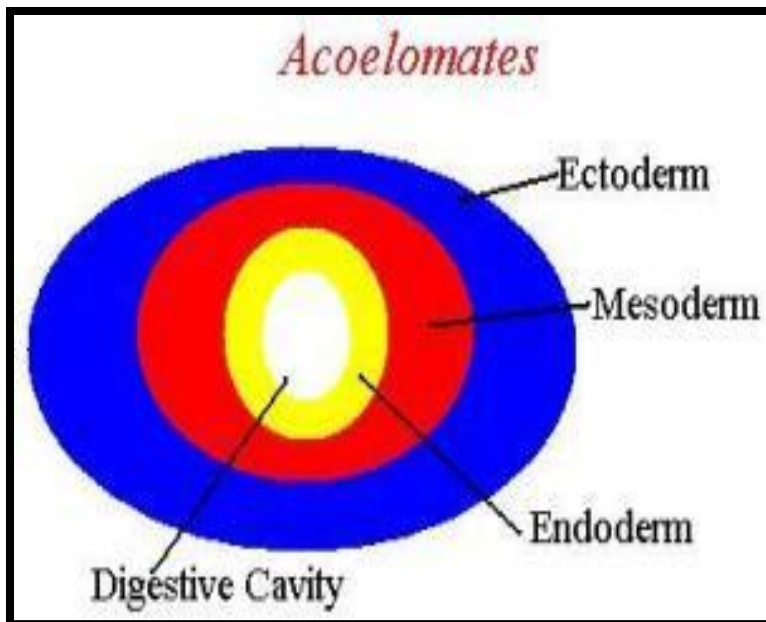


- Fig : In **Acoelomates**, blastocoel is completely occupied by mesenchyme.
- In **Pseudocoelomates**, blastocoel is partly filled by mesenchyme and the unoccupied portion exists as pseudocoelom.
- In **Coelomates**, blastocoel is completely replaced by true coelom. Evolution of the body cavity is the third key transition in the evolution of the animal body plan. The evolution of efficient organ systems was not possible until the evolution of a body cavity around the gut for supporting organs and distributing materials. So coelom has an importance in evolution in animal body. **Coelom plays an important role in the classification of triploblastic animals.** So coelom has taxonomical importance. According to the presence or absence of coelom, triploblastic animals are differentiated into

1. **Acoelomates**

2. **Pseudocoelomates**

3. **Coelomates**



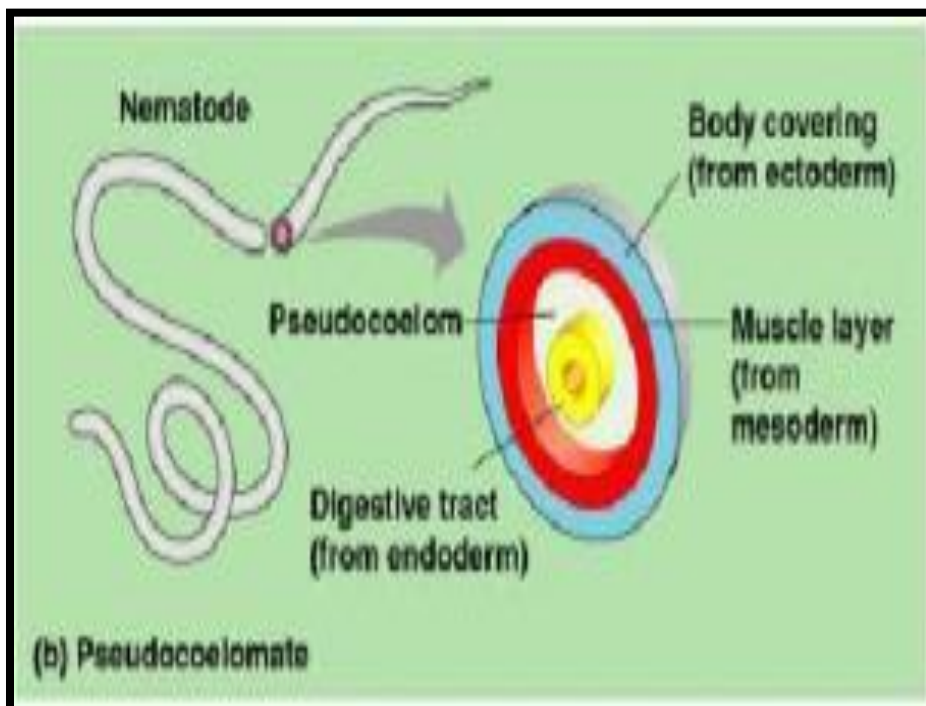
1. Acoelomates:

In acoelomates, triploblastic animals, the space between the body wall and alimentary canal is filled by mesenchymal cells, muscle fibres. So space does not exist. Hence the condition is 'acoelom' and these animals are referred as acoelomates.

e.g.: Platyhelminthes.

Flat worms of phylum Platyhelminthes are acoelomates. They exhibit solid body plan with a dense parenchyma between the gut and the body wall in the adults. The parenchyma comprises cells and small lacunae. The space around the internal organs is filled with parenchyma. Hence there is no body cavity surrounding the internal organs. Parenchyma restricts the movement of the internal organs.

2. Pseudocoelomates:



coelom or space between the body wall and the alimentary canal exists . But it is not covered by coelomic epithelial layers. So the coelom considered as

‘ Pseudo- coelom’ and the animals are ‘ Pseudo coelomate’.

Ex: Nematelminthes.

In pseudocoelomates the mesoderm is confined to the body wall and the gut wall is almost entirely nonmuscular and made up of only endoderm. Hence the digested food absorbed by the alimentary canal is diffused into the pseudo coelomic fluid for distribution, as circulatory system is absent.

Formation of Pseudocoelom: During the development of pseudocoelomates, mesoderm occupies only a part of blastocoel adjoining the ectoderm. The blastocoel or segmentation cavity fails to disappear in the adult. It persists in the adult in between the body wall and the alimentary canal in the form of ‘Pseudocoelom’.

Advantages of Pseudocoelom:

1. Pseudocoelom provides space for the various internal organs.
2. Pseudocoelom with coelomic fluid serves as ‘hydrostatic skeleton’ during locomotion.
3. The coelomic fluid protects the internal organs from mechanical shocks.
4. The coelomic fluid helps in distribution of the nutrients, collection and storage of nitrogenous wastes till the time of excretion.

In the evolution of animals the pseudocoelomic condition results ‘ tube – within – a tube’ arrangement.

3.Coelomates [Eucoelomates]:

The cavity that is present in between the body wall and the alimentary canal is lined on either side by epithelial layers is called Eucoelom or true coelom. It is lined by means of mesoderm.

The coelomic epithelium present below the body wall is referred as

partial layer or somatic layer. The coelomic epithelium present above the gut wall is referred as visceral layer or Splachnic layer.

Both the layers are mesodermal in origin.

Based on the mode of formation of coelom, coelomates are classified into two types; they are

- 1) **Schizocoelomates**
- 2) **Enterocoelomates.**

1) **Schizocoelomates:**

The cavity formed by the splitting of embryonic mesoderm is called 'Schizocoelom', and these animals are referred as Schizocoelomates.

E.g. :Annelida, Arthropoda , Mollusca.

In Schizocoelomates the Zygote exhibits spiral cleavage. Embryonic mesoderm is formed through Teloblastic method. In this method a single micromere called 4d blastomere or mesentoblast cell present at the rim of blastomere or mesentoblast cell present at the rim of blastopore proliferates to form mesoderm between the developing archenteron(endoderm) and the body wall (ectoderm), in the blastocoel. Generally a series of poured blocks of mesoderm develops. A split appears within each block making them hollow. The two bands come into contact below the body wall and above the alimentary canal. Thus Parietal layer below the body wall and visceral layer above the alimentary canal are formed with a true coelomic space at the middle of the layers.

In Arthropods and molluscs Schizocoelom is reduced and the functional body cavity is haemocoel.

2) Enterocoelomates:

In Enterocoelomates the lumen from the alimentary canal extends in to the mesoderm in the form of pouches to form coelom. So the coelom is referred as entero – coelom.

Ex: Echinoderms, hemichordates and chordates.

In the embryonic condition, archenteron produces a pair of lateral pouches. These pouches get pinched off from the archenteron into the blastocoel. The cavity within these pouches is the enterocoelom. As these pouches enlarge and fuse, the blastocoel is replaced into somatic layer below the body wall and splachnic layer above the alimentary canal.

Enterocoelom vs Schizocoelom		
	More Information Online WWW.DIFFERENCEBETWEEN.COM	
	Enterocoelom	Schizocoelom
DEFINITION	Enterocoelom is a true body cavity formed from outpocketing of the embryonic gut (enteron)	Schizocoelom is a true body cavity formed from the splitting of the mesodermal mass
ARISING FROM	The wall of the embryonic gut or enteron	The splitting of mesodermal embryonic tissues
ORGANISMS	Animals belonging to phyla Echinodermata and Chordata	Animals belonging to phyla Annelida, Mollusca and Arthropoda

Advantages of Eucoelom :'

1. Due to the presence of mesodermal epithelial layer over the digestive system the alimentary canal is provided with musculature. This facilitates peristaltic movements in the alimentary canal; Because of this ingestion of food and egestion of waste is made easy.
 2. Due to the presence of large space / coelom alimentary canal get elongated to form coiles. So that the absorptive surface of the canal has increased.
 3. Eu coelom furnishes space for the accumulation of nitrogen waste and excess water. These can be discharged by the excretory ducts.
 4. As the gonads project into the coelom ample space is provided for the enlargement and production of large yolked eggs.
- What is the Difference Between Enterocoelom and Schizocoelom?

Enterocoelom is a coelom formed from the wall of the embryonic gut or enteron as hollow outgrowths. Schizocoelom is a coelom that originates from the splitting of the mesoderm creating the pocket-like cavity. Thus, this is the key difference between enterocoelom and schizocoelom.

Moreover, enterocoelom is found in deuterostomes (phyla Echinodermata and Chordata) while schizocoelom is found in protostomes (phyla Mollusca, Annelida and Arthropoda).

