
Coelom

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Coelom in Greek language means a hollow cavity. It is a fluid-filled cavity between alimentary canal and body wall. It is lined on all sides by mesoderm. The peritoneal cavity of abdomen is also a part of coelom and there are similar spaces around our heart and lungs. The structure and mode of development of coelom differs among different group of animals.

Definition of Coelom :

“The coelom is the fluid-filled body cavity present between the alimentary canal and the body wall.”

Early stages of development

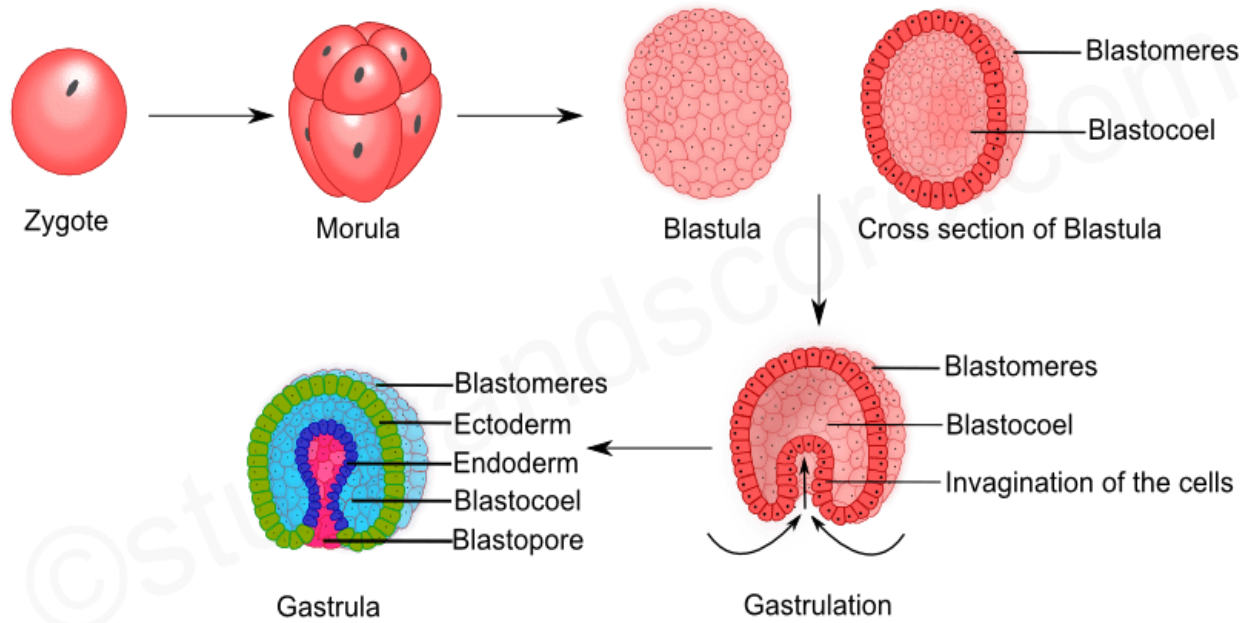
In general, zygote undergoes rapid cell divisions called as **Cleavage** to produce a compact mass of cells called **Morula**. The different cells derived from the cleavage are called as **blastomeres**. Cleavage ends with the formation of **Blastula**. As the cleavage proceeds, the number of blastomeres increases and cells of blastula are arranged into a hollow ball like structure.

The central cavity of blastula is called as blastocoel or segmentation cavity or primary body cavity. Invagination of the cells at one end of the blastula results in the formation of **Gastrula**.

The open cavity of gastrula lined by endoderm is called **Archenteron or primitive gut**. Its opening is called as **Blastopore**. The outer layer of gastrula is the ectoderm and the inner layer is called as endoderm.

And the cavity between the two layers is **Blastocoel**.

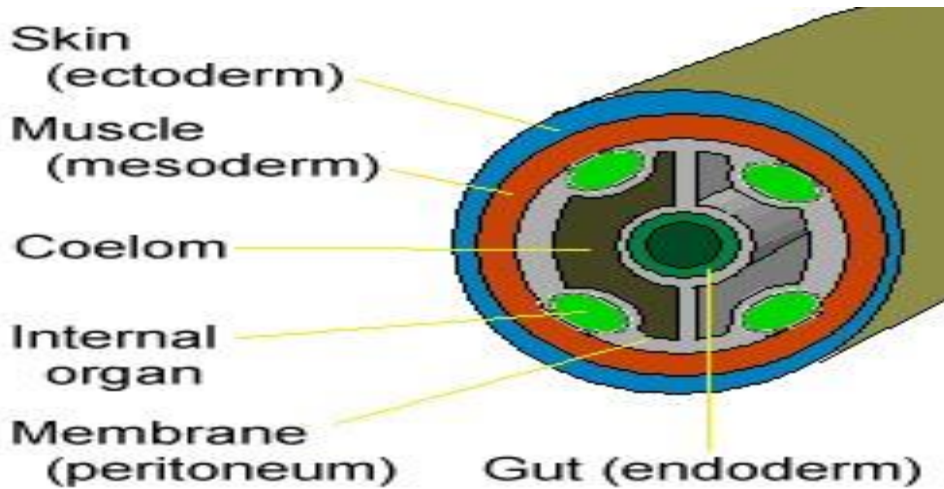
Members of Radiata are diploblastic with ectoderm and endoderm. But Bilaterians are triploblastic with a third germ layer called mesoderm which arises between ectoderm and endoderm. Mesoderm is solid but has loosely organized tissue called mesenchyme.



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EARLY STAGES OF DEVELOPMENT

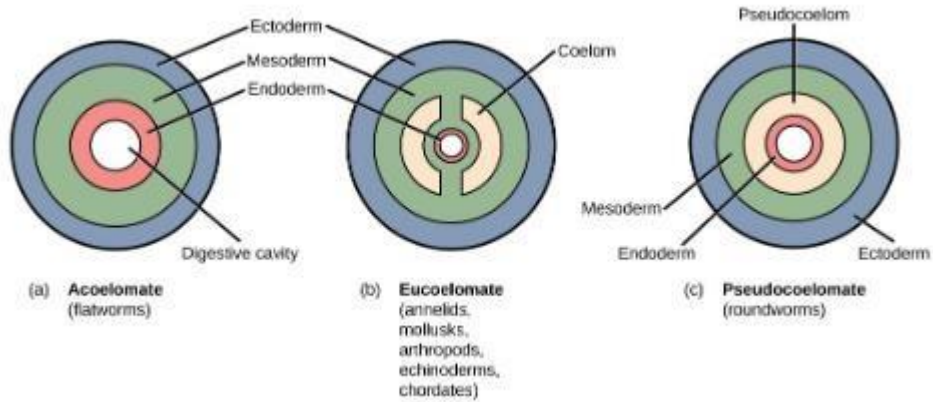
The animal kingdom is divided into three groups on the basis of the nature of coelom.



“The true coelom has a mesodermal origin. It is lined by mesoderm.” The peritoneal cavity present in the abdomen and similar spaces around other organs such as lungs, heart are parts of the coelom. Coelom differs in its structure and formation process.

Structure, Formation and Types of Coelom

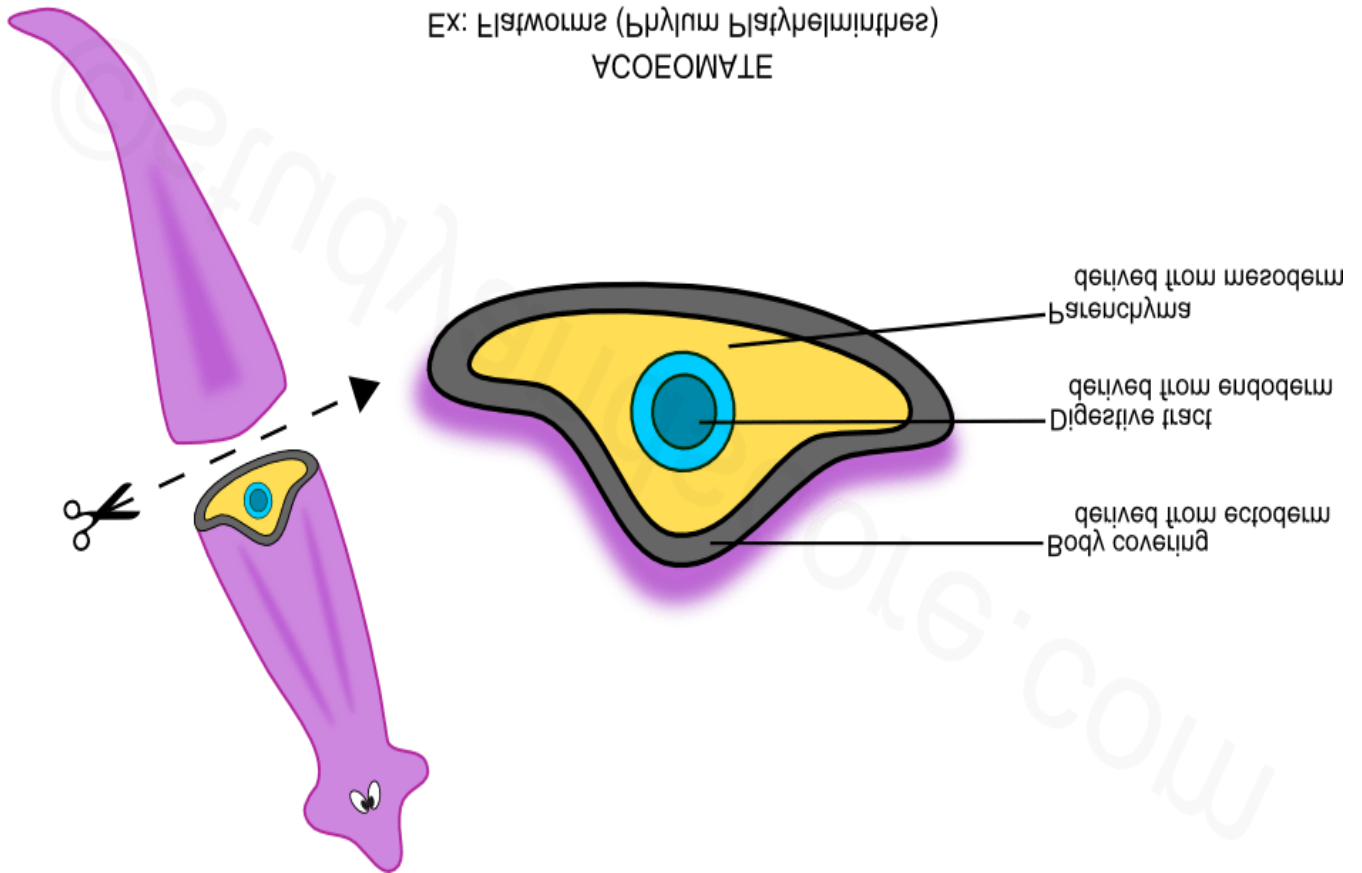
There are three types of structural body formation present in animals related to coelom:



1. Acoelomate:

Coelom is absent. The blastocoel is completely occupied by mesoderm. E.g. Porifera, Coelenterata and Flatworms (Platyhelminthes). There is only spongocoel or coelenteron present.

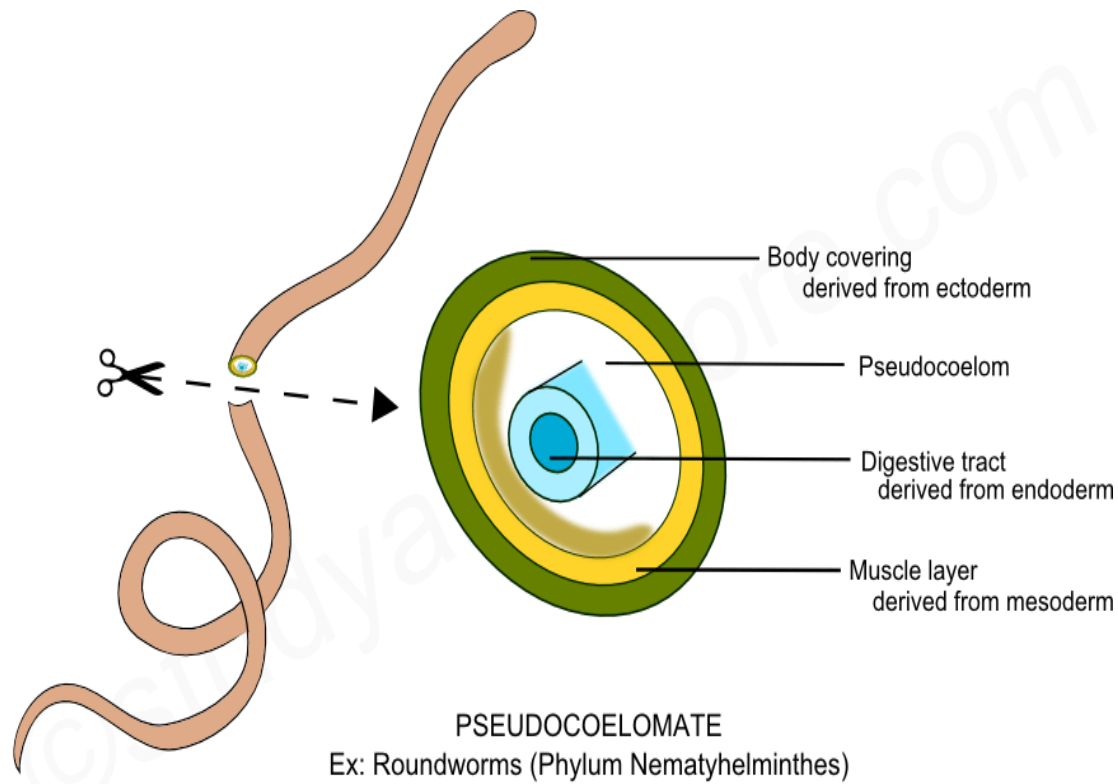
EX: Flatworms (Platyhelminthes)
ACOELOMATE



2. Pseudocoelomate:

True coelom is not present. The blastocoel is partly filled by mesodermal cells. The body cavity is lined by mesoderm only towards the body wall and mesoderm is not present towards the gut.

E.g. Roundworms (Aschelminthes)

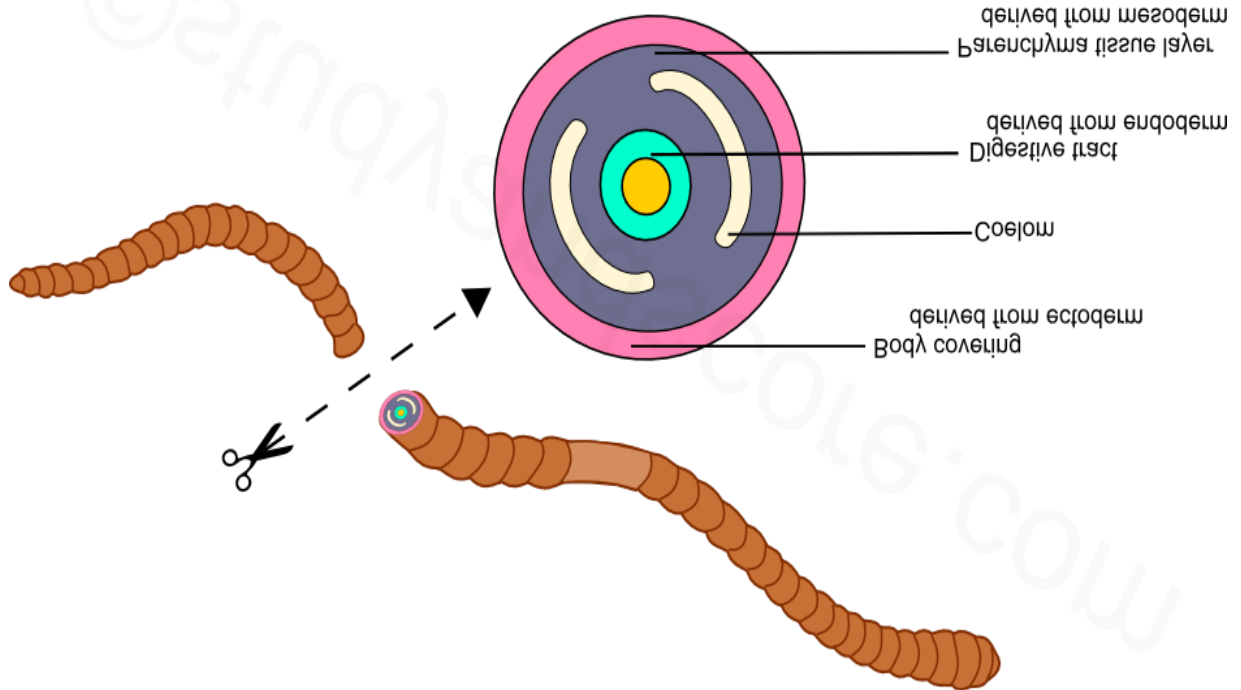


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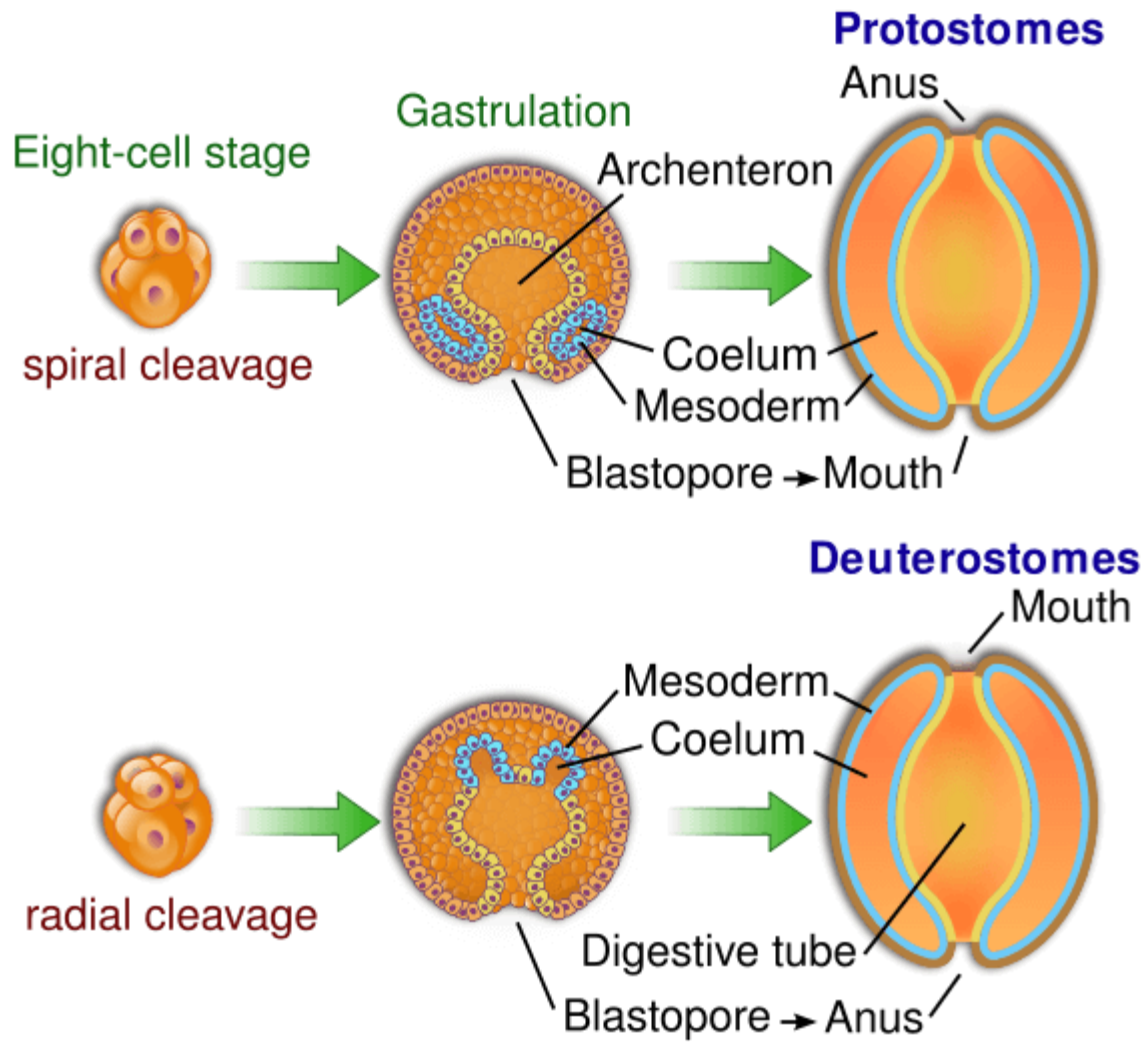
3. Eucoelomate:

Animals that have a true coelom. The coelom is lined by mesoderm on both the sides, towards the body wall and towards the gut. The blastocoel present in the gastrula gets completely replaced by a true coelom. The body organs are suspended in the coelom by mesenteries. E.g. from the phylum Annelida to Chordata.

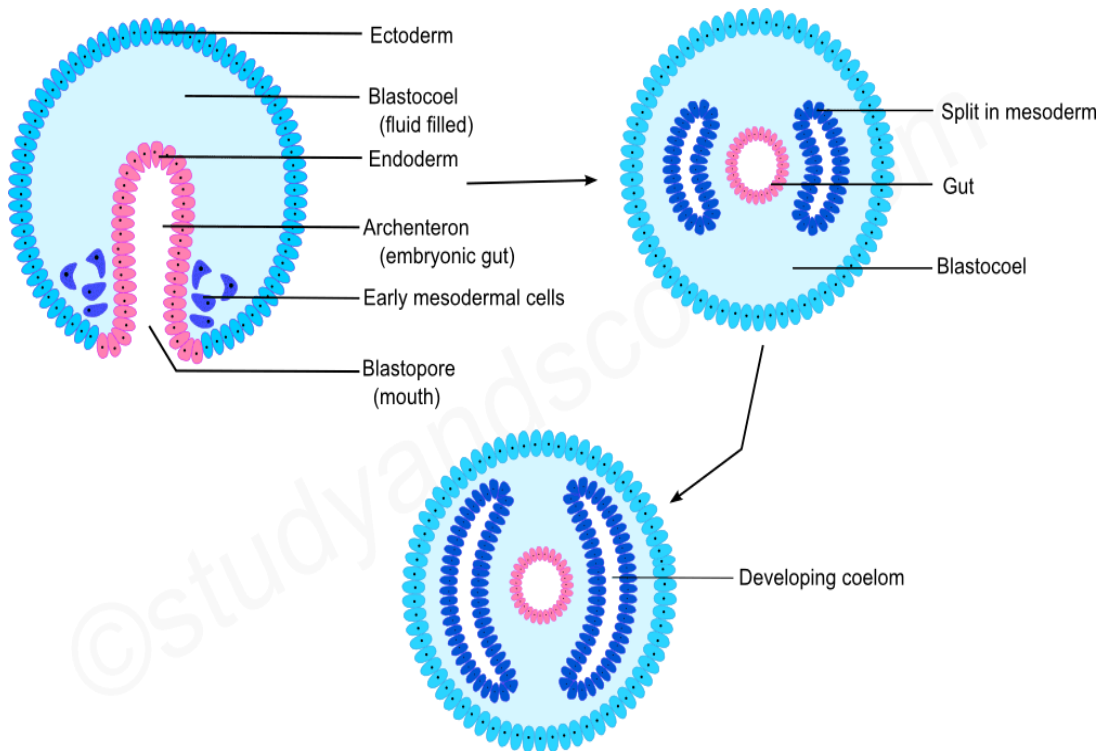
EX: Phylum Annelids, Arthropods, Molluscs, Echinoderms, Chordata
COELOMATE



Eucoelomates are further divided into **Protostomes** and **Deuterostomes** on the basis of different embryonic development. The process of coelom formation in protostomes and deuterostomes is different. The coelom is categorised into two types on the basis of formation, namely, **Schizocoelom** and **Enterocoelom**.



A. Schizocoelom: It is present in the protostomes. The body cavity or coelom originates from the splitting of the mesoderm. One part attaches to ectoderm and the other surrounds the endoderm. The space between them develops into the coelom. The blastopore forms the mouth. Examples of **schizocoelous** animals are Annelida, Arthropoda and Mollusca. In Arthropoda and Mollusca the coelom is filled by blood and is known as **Haemocoel**.



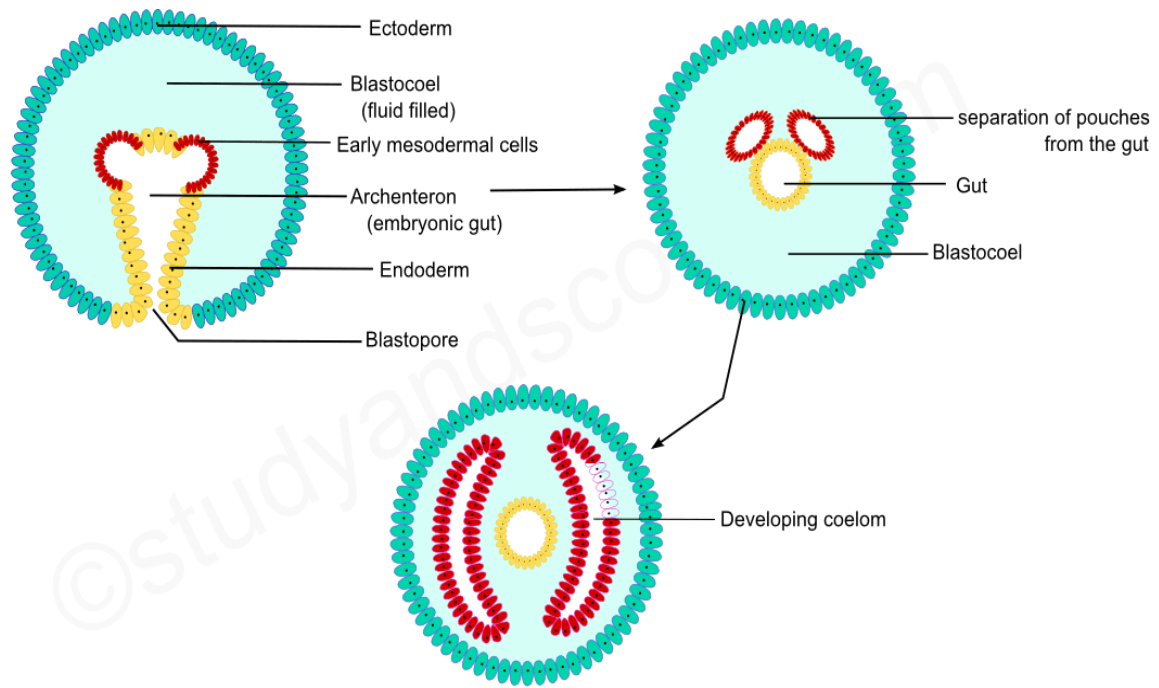
SCHIZOCOELOMATE

Ex: Phylum Annelida, Arthropoda and Mollusca

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B. Enterocoelom: It is present in the deuterostomes. The coelom is formed from the fusion of the internal outgrowths of the archenteron, that pinches off and fuses together to form coelom lined by mesoderm.

Examples of **enterocoelous** animals are Echinodermates and Chordates.



ENTEROCOELOMATE

Ex: Phylum Echinodermata and Chordata

