COELOM

- **The third key transition** in the evolution of the animal body plan was the **evolutioon of the body cavity.**
- The fluid - filled body cavity acts like shock - absorber, hydrostatic skeleton and aids in locomotion
- The hollow cavity containing embryonic stage of multicellular animals is **blastula**
- Central cavity of the blastula is called the blastocoel, or the segmentation cavity, or the primary body cavity.
- Invagination of cells at one end of the blastula results in the formation of a **gastrula**
- The open cavity of the gastrula lined by endoderm is called the **archenteron or the primitive gut**
- The opening of the gastrula is called **blastropore**
- The outer wall of the gastrula is ectoderm and inner wall is endoderm
- In bilaterians a third cellular germ layer called mesoderm develops between ectoderm and endoderm
- Based on the body cavity triploblastic animals can be classified into acoelomates, pseudocoelomates, and coelomates

ACOELOM

- **Acoelomates :** flatworms of the phylum platyheliminthes are acoelomates.
- Acoelomates exhibit a solid bauplan with a dense parenchyma between the gut (absent in tapeworms) and the body wall in the adults
- Parenchyma restricts the movement of the internal organs it is a **disadvantages to acoelomates**

PSEUDOCOELOM

- Roundworms of the phylum Nematoda, rotifers and some others posses a **pseudocoelom or blastocoelom**
- Pseudocoelom is neither formed in the mesoderm nor is lined by mesodermal peritoneum
- Pseudocoelom represent **persistent blastocoel**
- In the development of pseudocoelomates mesoderm occupies only a part of blastocoel adjoining the ectoderm
- As mesoderm is confined to the body wall mesculature is confined to thebody wall and the gut wall is almost entirely nonmuscular.
- The intestinal wall is made up of only endodermal epithelium in pseudocoelomates
- In the evolution of animals a tube - within a tube arrangement is seen for the first time in pseudocoelomates.

EUCOELOM

- A coelom, or true coelom is a fluid-filled cavity that develops within the mesoderm and is lined by mesodermal epithelium called peritoneum.
- The outer wall of the coelom is called the parietal, or somatic peritoneum, and the portion that covers the internal organs suspended within the cavity including the gut is called the visceral, or splanchnic peritoneum.
- A double layred peritoneum which connects some visceral organs to the dorsal body wall is called mesentery.
- Retroperitoneal organs are kidneys

- Retroperitoneal organs will occur out side the coelom and are covered by peritoneum only on the surface facing the coelom.
- Annelids, arthropods and molluscs are schizocoelomates.
- Schizocoelomates undergo spiral cleavage.
- In schizocoelomates mesoderm is derived from a single micromere called 4d blastomere or mesentoblast cells.
- Schizocoelom is formed by splitting of mesoderm
- Coelom of protostomes is schizocoelom
- In arthropods and molluscs schizocoelom is reduced and the functional body cavity is haemocoel.
- **Enterocoelomates** of animal kingdom ae echinoderms, hemichordates and chordates.
- In enterocoelomates mesoderm arises as pouches that evaginate from the wall of archenteron.
- Enterocoelomates are deuterostomes
- In enterocoelomates mouth is derived from the secondary opening of the archenteron.
- In coelomates both body wall and visceral organs are muscular hence visceral organs show contractions and relaxations which are independent of body wall.
- Gametes are released into coelomic fluid in **some invertebrates and in female vertebrates.**
- A major advantage of the coelomate body plan is it allows **primary induction** during development.
- **Primary induction** is a kind of interaction between tissues of different origin involved in the development of specialized tissues.