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Organization of coelom and significance

Coelom is the main body surrounding and contain tree digestive tract and various organs.

1. Developmentally coelom arise as a split of mesoderm which becomes bifurcated into two layers, a somatic layer lying next to the epidermis and a splanchnic layer around the endoderm. Coelom becomes bounded on all sides by coelomic epithelium which secretes coelomic fluid.
2. The greater part of the coelom forms the perivisceral cavity or splanchnocoel. It is a fluid-filled space inside which is lodged the viscera.
3. Because of this packing the viscera remains independent of the movements of the muscles of body wall. In some higher animals part of the perivisceral cavity is kept separate to form restricted if their developmental history is followed.
4. In all probabilities the ancestral coelomate animals had segmentally arranged mesodermal pouches. From these pouches gametes were formed by the process of proliferation of the epithelial lining. Later on, these pouches became modified in structure and function. The evolution of mesodermal pouches is evident in present day coelomates.

Type of coelom:-

- i) Acoelom
- ii) Pseudocoelom

iii) Coelom or Eucoelom

i) Acoelom:-

It means without a coelom or fluid-filled cavity is absent. The space between the gut and body wall is filled by a kind of densely packed connective tissue derived from both ectoderm and endomesoderm (entomesoderm), called parenchyme. Animals are without a body cavity in triploblastic animals, called acoelomates and the group is referred to as acoelomate.

Examples:

Gnathostomulida,
Platyhelminthes and nemertean,
Gastrotricha, Kinorhyncha.

ii) Pseudocoelom:-

It means false cavity. The fluid-filled body cavity lying between the gut and outer body wall musculature and generally formed by persistence of embryonic blastocoel is called Pseudocoelom.

The term 'pseudocoelom' usually refers to the space which does not develop from embryonic mesoderm and not lined by coelomic epithelium derived from the mesoderm.

The body cavity is bounded externally by the fibrous processes of the longitudinal muscle cells (mesoderm) and internally by the intestine (endoderm).

The pseudocoelomic fluid acts as a hydrostatic skeleton to maintain body shape and circulate nutrients. Animals that contain a pseudocoel are called pseudocoelomates or pseudocoelomate animals. Pseudocoelomate animals are also referred to as haemtoelomate or blastocoelomate animals (Brusca and Brusca, 2003)

Examples:-

Rotifera, Nematoda, Nematomorpha, Loricifera. In small free-living nematodes, the pseudocoel is small or non-existent but may be voluminous in large-sized nematodes. The pseudocoel in Nematomorphos contains stellate mesenchymal cells. In rotifers, a spacious fluid-filled pseudocoel occurs beneath the body wall and surrounds the gut and other internal organs.

iii) **Coelom or Eucoelom:**

It is a true coelom lying between the gut and outer body wall musculature and lined by coelomic epithelium derived from the embryonic mesoderm. It is of mesodermal origin and opens to the exterior through the coelomoducts, e.g., the oviducts and the excretory ducts. The coelomic fluid contains amoeboid cells or amoebocytes. The animals containing such a body cavity or coelom, called coelomates.

Examples:

Sipuncula, Echiura, Priapulida, Mollusca, Annelida, Arthropoda, Onychophora, Phoronida, Brachiopoda, Bryozoa, Echinodermata, Chaetognatha, Hemichordata and Chordata.

Mode of Coelom Formation:

According to the mode of coelom formation, there are generally two types which are noted in protostomes and deuterostomes:

1. **Schizocoely:**

The process by which coelom arises by the splitting of mesodermal bands or masses during embryonic development. Protostomia (e.g., Mollusca, Sipuncula, Echiura, Priapulida, Annelida, Arthropoda, Tardigrada and Onychophora).

2. **Enterocoely:**

The process by which coelom is formed by the evagination from the embryonic archenteron. The pouch-like structures are detached from the