

Evolution of Coelom.

Regarding the origin of ~~Coelom~~ Coelom & initially two theories were proposed.

1. The acoelomate theory: which states that Coelom evolved from an acoelomate ancestor.

2. The enterocoel theory: which states that Coelom evolved from gastric pouches of cnidarian ancestors.

Later, ~~Clark (1964)~~ there are four basic theories which have been discussed in details by Clark (1964).

1. Enterocoel theory
2. Gono-coel theory
3. Nephrocoel theory
4. Schizocoel theory.

1. Enterocoel theory :- This theory argues that the coelomate evolved

from the gastric pouches of some cnidarian ancestors such as anthozoans or scyphozoans.

These gastric pouches separated out from the main gastric cavity to form the coelomic pouches.

This theory ~~proposes~~ proposes that all bilateral animals are basically coelomates and that acelomate forms like flatworms are secondarily derived from coelomate ancestors by the loss of the cavity.

The enterocoelus mode of ~~celo~~ coelom formation in the embryology of echinoderms, hemichordates and chordates is the main supporting evidence of this theory.

2. Gonocoel theory: It regards coelom as the cavity of an expanded gonad and its origin is based on the common association between

the gonads and the Coelomic epithelium. This theory has no ~~existence~~ embryological support because gonads do not arise before the Coelom.

e. Nephrocoel theory:- Proposed by Lomkester in 1874. The Coelom is originated as an expanded nephridia. This theory however, was never taken seriously because protonephridia has been described in Coelomates and also excretory organs are ~~absent~~ absent in some Coelomates like echinoderms.

4. Schizocoel theory: According to this theory, the Coelomates evolved from an ancestral acoelomates like flatworms by hollowing out of the

~~paren~~ Parenchymal cells of the mesenchyme. Some of ~~these~~ these cells formed the peritoneum. According to this theory, the acoelomate body plan is primary and ancestral to the coelomate plan.

the acoelomate flatworms, thus, form the basic group in the evolution of bilateral animals. The Schizocoel mode of coelom formation in the embryonic ~~stages~~ development of annelids and molluscs would claim as supporting evidence of this theory.

Coelom encountered for the first time in ~~some~~ annelids,

Evolution of Metamerism:

There are several conflicting theories have been put forward to explain the origin of or evolution of metamerism.

1. Fission theory: -

(a) this theory proposed annelid might have developed from platyhelminths

(b) Metamerism is derived from a non-segmented ancestor, which might have undergone transverse fissions repeatedly to develop metamerism.

Drawbacks: -

1. Fission gives rise to separate individuals by they will not unite together to form a metameric individual.

2. Generally, reproduction by fission occurs in sessile animals by not in free moving organism.

2. Pseudometamerism theory:

This theory states that the body parts like coelom, blood vessels, nephridia muscles etc. will be repeatedly formed with septa in between them. This in turn led to development of metamerism which can be seen in some larval forms and adults of some annelids.

3. Embryological theory: -

In the embryonic stage by some stress in the ~~metamerism~~ mesoderm caused fragmentation on that developed into metamers.

4. Locomotory theory: -

This theory is based on combination of Pseudometamerism theory and embryological theory which states that metamerism is derived as an adaptation to locomotion.

(a) In ~~an~~ annelids the segmentation is developed as an adaptation for burrowing.

(b) in chordates the metameres is developed as an adaptation for swimming, undulatory movement.

Metamerism encountered for the first time in Annelids.