

Metamerism in Annelida

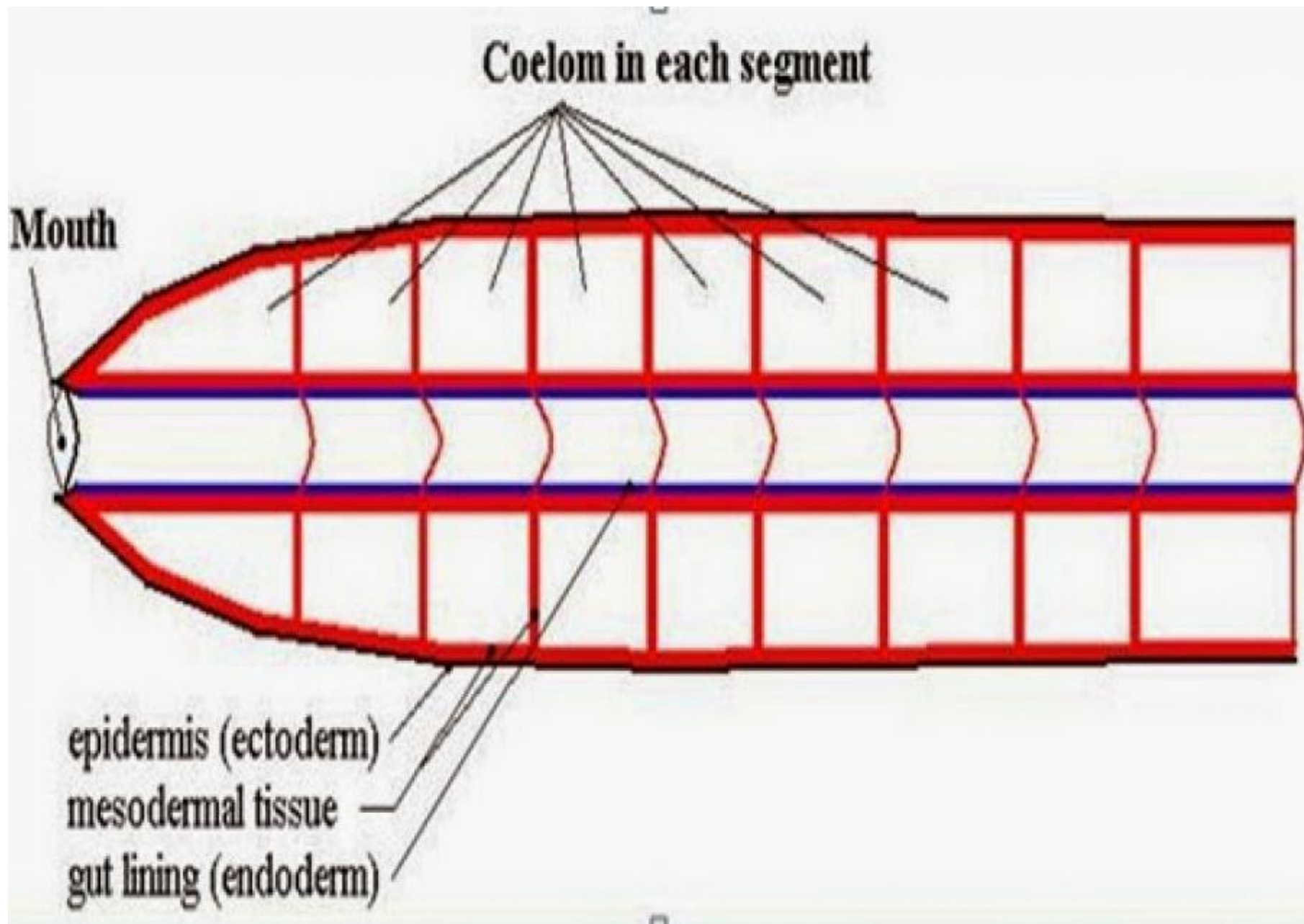
- Metameric segmentation or metamerism is an architectural body plan in some animals in which the similar body segments and organ systems are serially repeated one after another.
- The similar body segments are called metameres or somites.
- The animals shows such features called **metamerically segmented**.
- Structurally each meta-mer or somite is constructed on the basis of some fundamental plan and usually possesses a part of almost all the body systems.

Occurrence of Metamerism:

- **Metamerism is first seen in annelids in animal kingdom.**
- Each segment usually contains appendages, muscles, nerves, blood vessels, excretory organs and a pair of coelomic sacs which are repeated in almost all segments.
- It is also seen in kinorhynchs, arthropods and most chordates.

- Metamerism first observed in Annelida in the animal kingdom.
- The most successful animals of animal kingdom like arthropoda and chordate will also show metameric segmentation.
- In annelids the metameric segmentation is both external and internal. The body is divided into a number of segments which contain all body organs repeatedly but the alimentary canal is long and straight tube extending through all the segments.
- In arthropods the segmentation is external.
- In chordates the segmentation is internal.

- Characteristic Features of Metamerism:
- 1. Metamerism is always Very small to the intermediate (trunk) segments except the anterior acron (head) and a posterior pygidium or telson.
- 2. Each metamere represents a mirror image of the other.
- 3. Segmental structures are interdependent on each other.
- 4. They are integrated into a single functional unit.
- 5. All the segments of body work in coordination.



Types of Metamerism:

- The metamerism in different groups is divided into the following types:
- **1. True Metamerism:**
- The true metamerism is one in which the segmentation of the body develops by the segmentation of the mesoderm. It occurs in annelids, arthropods and in most chordates.
- The body of annelids consists of a number of segments and the number remains constant in a particular species except in certain cases of asexual reproduction.
- New segments are not added to the body after maturation.

- That means after the embryonic stage all the segments become the same age.
- Moreover, the segmental structures are inter dependent and integrated so that the individuality of the body is preserved. New segments arise at the posterior end in front of the pygidium.
- Hence, newer segments occur at the posterior end and older segments remain just behind the head.

- **2.Homonomous Metamerism:**

- If the segments or somites of the animal are all alike, the' segmentation is called homonomous metamerism. It is seen in annelids. Each metamere contains segmental blood -vessels, nerves, nephridia and coelomoducts.
- This is a primitive type of segmentation and is not found in any exist ing animal because a few anterior segments are specialised to form the head which is called cephalization.
- A well-defined and well-organised head is lacking in annelids.
- However, formation of a 'head' is suggested in polychaetes by anteriorly placed struc tures and their association with parapodial cirri.

- **3.Heteronomous Metamerism:**

- In arthropods and chordates the segments of the body are dissimilar in different body regions and restricted only to certain organs. This type of metamerism is called heteronomous metamerism.

- **4. External Metamerism:**

- In arthropods, the metamerism is external. Internally the segments are not marked by partitions.

- **5. Internal Metamerism:**

- In vertebrates there is internal metamerism, seen in the embryos and confined to the muscular,
• skeletal (vertebrae and ribs) and nervous system.

- **6. External and internal Metamerism:**

- In Annelids, the metamerism is clearly visible both externally and internally.
- Externally it is marked by the constriction on the skin of the body and internally it is marked by the partitions (septa).

- **7. Complete Metamerism:**

- When the segmentation is seen practically in all systems, the metamerism is called complete

- metamerism. It is seen in annelids.

- **8. Incomplete Metamerism:**

- When the segmentation is not seen in all the organs, the metamerism is called incomplete metamerism. It is seen in arthropods and chordates.

- **Pseudo-metamerism or Strobilization:**
- In contrast to true metamerism, pseudo-metamerism or strobilization is seen in tapeworms (Platyhelminthes) where segmentation of the body takes place by the segmentation of the ectoderm.
- The body consists of a number of segments or proglottids which varies in different individuals of the same species.
- New segments are added to the body throughout life.

- **Significance of Metamerism:**

- 1. It helps in locomotion, not only in burrowing but in all other types of locomotion.
- 2. Metamerism offers division of labour.