

# Study Material for SEM 2

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## CC2-2 (UNIT 2)

### METAMERISM IN ANNELIDA

#### **Introduction :**

The annelita as the name implies are segmented worms and the segments in many cases are externally recognized as ring like constriction. Dephite segmentation in encountered in annelids.

The body is composed of numerous distinct longitudinal segments arranged in a linear series, which is known as METAMERE.

**Definition :** Segmentation or metamerism is an architectural body plan in which an organism is built by a series of segments or metameres.

#### • **General composition of segment or metamere**

- (i) Segmentation or metamerism is body pattern in annelida.
- (ii) A segment generally contains –
  - (a) A pair of nerve ganglia
  - (b) A pair of appendages
  - (c) A pair of coelomic sacs.
- (iii) In all respect the segments forming an individual are identical in structure and the individual informed by rhythmic repetition of segments which are similar both externally and internally.
- (iv) This repetition in often disturbed by simplification, by coalescence of segments.
- (v) In annelid, there are pair of sacs – the right and left *coelomic vesicles* lying between each segment of the gut and the corresponding segment of the body wall.
- (vi) Each segment of annelid has a dorsal mesentery, ventral mesentery and a septum.
- (vii) The septum which is a screen between two successive segments is formed by meeting of two peritonal sheet the cavities of coelom lined by peritoneum) at the boundary between the segments.

- (viii) In rare exceptions, the septa and mesenteries form complete series of transverse or longitudinal partitions throughout the entire length of the body.

### **PATTERN OF SEGMENTATION**

- ⊙ The body of annelids consists of a number of segments and the number remains constant in a given species except in certain cases of asexual reproduction.
- ⊙ New segments are not added to the body after maturity is reached, that means after the embryonic stage all the segments become of the same age.
- ⊙ The segmental structures are interdependent and integrated.

### **Evolution and significance of Metamerism**

The terms metamerism or metameric segmentation are used only when organs of mesodermal origin are so arranged.

Pseudometamerism refers to superficial segmentation.

The main theories concerning the origin of metamerism revolve around the questions as to whether it is the repetition of organs or mesodermal segmentation that is of primary importance, and whether there is a connection between the evolution of metamerism and of the coelom.

### **Pseudometamerism theory** →

This theory proposes that the serial repetition of organs or pseudosegmentation. Metamerism was an accidental consequence of the serial arrangement in acoelomate animals.

### **Cyclomerism theory** →

This theory is the corollary of the enterocoelus theory of mesoderm and coelom formation and implies the development of metameric segmentation from fundamentally radial organization.

### **Corm theory** →

This theory postulates that metameric segmentation resulted from incomplete separation following a sexual reproduction.

### **Embryological theory** →

It suggest that mechanical stresses in the mesoderm during elongation of the embryo or larva resulted in mesoderm fragmentation, manifested in the adult as a meristic repetition of all mesodermal derivatives.

### **Locomotary theory →**

This theory postulates that undulatory, serpentine swimming movements completed the process of segmentation begun by the pie cement repetition of organ system.

### **Significance →**

- Metamerism help in swimming , burrow formation movement, bending of annelita.
- Metamerism helps in finding and feeding of foot particles.
- Metamerism helps in finding and feeding of food particles.

## **SEGMENTATION IN DIFFERENT GROUP OF ANNELIDA**

### **Polychaeta**

These annelids have a well marked internal & external segmentation each body segment bearing a pair of appendages on parapodia.

#### (i) **Sarantia**

Polychaetes with numerous out usually similar segments except for the head and anal segments.

#### (ii) **Sedentaria**

Body generally divided into two or more distinct regions with segments and parapodia dissimilar

### **Oligochaeta**

These annelidas have a well –marked external & internal segmentation, usually segmentally arranged throughout the greater part of the body, but not on parapodia setae present in each segment.

### **Hirudinea**

These annelids, in which the body consists of a limited and definite number of segments and is marked externally by secondary ring and annuli.

The anterior end of the body is suctorial, and several of the hindmost segments are fused to form a powerful posterior sucker.

### **Difference b/w segmentation in tapeworm & annelida**

	<b>Annelida</b>		<b>Tape worm</b>
(i)	New segments are not added to the body after maturity is reached	(i)	New segments are added to the body, after reached maturation
(ii)	External & internal segmentation present in body.	(ii)	External or superficial segmentation present

### **Role of metamerism**

- i) Neural ganglia and their periphery branches due to metamerism help the annelidsto get aware about the environment.
- ii) Due to metamerism arrangement of nephridia help the animals in removing the nitrogenous waste in the better way.
- iii) Due to metamerism gonads help the annelid in better reproduction and thereby better survival.
- iv) Setae, parapodia functioning properly.