

Quadrant II – Transcript and Related Materials

Programme: Bachelor of Science (First Year)

Subject: Zoology

Paper Code: ZOC 101

Paper Title: Diversity of Non-Chordates and Cell Biology

Unit: VI - Phylum Annelida

Module Name: General characters of phylum Annelida

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Notes:

PHYLUM ANNELIDA

Introduction: The annelids were included with other worms in the group VERMES by early zoologists but were separated by Cuvier in 1798 from the unsegmented worms.

The term Annelida was used for the first time by Lamarck in 1809 for the higher segmented worms. Annelida (L., annellus: little ring or F., anneler: to arrange in rings).

Annelida are in general, elongated, bilaterally symmetrical, triploblastic, metamerically segmented and coelomate worms with a thin flexible cuticle, dermo-muscular body wall with chitinous setae embedded in it, usually a closed blood vascular system, segmentally arranged nephridia. Paired appendages when present are not jointed.

Salient features of Annelida:

There are certain features that make their appearance for the first time in Annelida such as 1) metameric segmentation 2) cephalization 3) True coelomic cavity 4) Nephridia for excretion 5) Closed blood vascular system.

General Characters of Annelida:

Habitat: Annelids are mostly aquatic, marine as well as fresh water, some terrestrial, found in moist soil, generally burrowing or living in tubes.

Habits: They may be sedentary or free living. Commensal and parasitic forms are also seen.

Body structure: Body is soft, triploblastic, bilaterally symmetrical, elongate and vermiform. Cephalization is seen in some forms.

Metamerism: Body is metamerically segmented, externally by transverse grooves and internally by septa into a number of divisions. The first segment is called peristomium. An outgrowth,

known as prostomium, arises from the peristomium. Each division is termed as metamere, somite or segment which are arranged in a linear series one after another.

Grade of organization: Annelids have reached the organ system grade of organization.

Setae and parapodia: Except in leeches, segmentally arranged un-jointed chitinous setae/chaetae are often present which serve for locomotion. They may be arranged either in two pairs on either side of the body segment (lumbricine arrangement) or may be placed in a ring in each segment (perichaetine arrangement). In some annelids un-jointed, segmentally arranged locomotory structures termed parapodia are present.

Body wall: It is dermo-muscular and highly contractile. It consists of a thin, moist, non-cellular cuticle followed by a single layered epidermis and circular and longitudinal muscles.

Coelom (Body Cavity): A true coelomic cavity is present in annelids. From evolutionary point of view, annelids are perhaps, the first animals to have a true coelomic cavity. In most annelids coelom is divided by septa into compartments. The coelom is filled with coelomic fluid which contains cells.

Digestive system: Annelids have a complete digestive system in the form of a straight tube leading from a ventral mouth at the anterior end to a terminal anus at the posterior end of the body. Digestion is entirely extracellular.

Respiration: Exchange of gases in most annelids occurs through the general body surface (cutaneous respiration). In some forms, respiration through gills (branchial respiration) is also seen.

Blood vascular system: it is well developed and of a closed type made of definite blood vessels. They are the first animals to have a closed vascular system. Blood is red in colour due to the presence of haemoglobin or erythrocrurin pigments which are dissolved in the plasma. Free amoeboid cells are seen in blood but red blood cells are absent.

Excretory system: it consists of metamerically arranged coiled tubular structures termed as nephridia which open at one end into the coelomic cavity through the nephrostome and to the exterior through the nephridiopore. Nephridia help in excretion and osmoregulation. Ammonia is the chief excretory product in annelids.

Nervous system: It comprises of a nerve ring, a double ventral nerve cord and nerves. The nerve ring is made up of paired cerebral ganglia connected by a pair of circumpharyngeal connectives around the pharynx to a pair of subpharyngeal ganglia. The double nerve cord emerges out from the subpharyngeal ganglia. In each body segment, the nerve cord forms a swelling termed segmental ganglion. Nerves emerging out from the nerve ring innervate the head region while the nerves emerging from each segmental ganglion supply the organs of the segment.

Sense organs: Tactile receptors (sensitive to touch), gustatoreceptors (receptors of taste) and photoreceptors (sensitive to light) are usually found. Some forms have statocysts (balancing organs).

Reproduction: Both monoecious (hermaphroditic/ bisexual) and dioecious(unisexual) forms are seen. Gonads develop from the coelomic epithelium. Gametes pass out of the body either through the nephridia or through coelomoducts. In monoecious forms, development is direct while in dioecious forms development is indirect with a larval stage termed as trochophore larva. In some forms asexual reproduction is also seen.