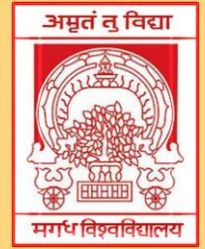




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Topic

ANCESTRY OF PHYLUM CHORDATA

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Ancestry of Phylum Chordata

The chordates include organisms having a notochord, a dorsal hollow nerve cord, pharyngeal slits or pouches and a few features like bilateral symmetry, axial organisation, triploblastic condition, segmentation, etc., that are common with the non-chordates. The question of the origin of the chordates still remains unanswered and considerable controversy exists on this issue.

The geological records established beyond doubt that the chordates originated prior to Cambrian period because the relics of some lower chordate forms have been discovered in Cambrian strata. There are various theories regarding the origin of the chordates from the non-chordate groups. Most of the theories suffer from serious defects.

Of all the theories regarding the ancestry of chordates from some non-chordates, Garstang's suggestion that the chordates have evolved from some free-swimming echinoderm larvae (possibly auricularian larvae) by means of paedomorphosis has been accepted by many workers.

The role of paedogenesis (reproduction in pre-adult stage) in evolutionary dynamics is emphasised by many workers on this line. But in recent years the ancestry of the chordates from the echinoderm source is not accepted.

Recent workers regard the differences between the vertebrates and the non-chordates (invertebrates) to be artificial in nature. Inclusion of the echinoderms, pogonophores and chordates under deuterostomia (animals where the anus develops from the blastopore and the mouth is formed anew) is accepted nowadays. The protochordates (urochordates and cephalochordates) are the members of the Phylum Chordata.

The protochordates provide connecting link between the vertebrates with other deuterostomes. The deuterostomes are highly specialised groups and it will be improper to regard them in the direct line of vertebrate descent.

The phylogenetic status of the hemichordates is a subject of great controversy. But the chordate nature of the urochordates and the cephalochordates is well-established though their relationships with the vertebrates and with each other are difficult to ascertain.

Barrington (1965) suggested that the deuterostomes have evolved from sessile/semi-sessile ancestors having bilaterally symmetrical and tripartite body and coelom. The echinoderms have departed a long way from the ancestors, while the hemichordates remained closer.

The hemichordates have developed pharyngotremy (i.e., existence of openings in the pharyngeal wall) which is associated with its ciliary mode of feeding. In course of time a group with internal food collection mechanism by elaborate and complicated pharynx gave rise to the urochordates, cephalochordates and vertebrates.