

Chordates And Non Chordates

The general stylophoran body plan consists of a flattened theca and a single jointed appendage which extends from it. Stylophoran tests are composed of stereom calcite plates, which has traditionally been the basis for assigning them to Echinodermata. However, they also lack the radial symmetry characteristic of most other echinoderms, with... af283764b2

Stylophora It is synonymous with the subphylum Calcichordata. Their unusual appearances have led to a variety of very different reconstructions of their anatomy, how they lived, and their relationships to other organisms. how they lived, and their relationships to other organisms. Stylophorans have played a major role in debates over the origin of chordates, as under the The

Stylophora are an extinct class of paleozoic echinoderms, comprising the cornutes, the mitrates, and the basal ceratocystids
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== Overview == af283764b2

Inversion (evolutionary biology) with protostomes, and that dorsoventral inversion originated in some ancestral chordate. There is evidence that invertebrate chordates are also inverted In evolutionary developmental biology, inversion refers to the hypothesis that during the course of animal evolution, the structures along the dorsoventral (DV) axis have taken on an orientation opposite that of the ancestral form af283764b2

Pikaia Before Pikaia and other Cambrian chordates were fully appreciated, it was generally believed that the first chordates appeared much later, such Pikaia gracilens is an extinct, primitive chordate marine animal known from the Middle Cambrian Burgess

Shale of British Columbia. Described in 1911 by Charles Doolittle Walcott as an annelid, and in 1979 by Harry B. Simon as a chordate. Since its initial discovery, more than a hundred specimens have been recovered. It is estimated to have lived during the latter period of the Cambrian explosion. Whittington and Simon Conway Morris as a chordate, it became "the most famous early chordate fossil", or "famously known as the earliest described Cambrian chordate"

The notochord is derived from the embryonic mesoderm and consists of an inner core of vacuolated cells filled with glycoproteins, covered by two helical collagen-elastin sheaths. It lies longitudinally along the rostral-caudal (head to tail) axis of the body, dorsal to the gut tube, and ventral to the dorsal nerve cord. Some chordate invertebrates, such as tunicates, develop a notochord during the larval stage but lose it through subsequent stages into adulthood. In non-vertebrate chordates, the notochord persists during development. The

Chordates And Non Chordates

Cambrian chordates are characterised by the presence of segmented muscle blocks called myomeres and notochord, the two defining features of chordates. Before the full understanding of Cambrian fossils, chordates as members of "the most advanced phylum" were believed to have appeared on Earth much later than the Cambrian. However, the better picture of Cambrian explosion in the light of Cambrian chordates, according to Stephen Jay Gould, prompted "revised views of evolution, ecology and development,"... af283764b2 == Etymology == af283764b2

Cambrian chordates The Cambrian chordates are characterised The Cambrian chordates are an extinct group of animals belonging to the phylum Chordata that lived during the Cambrian, between 538 and 485 million years ago. Subsequent discoveries of other Cambrian fossils from the Burgess Shale in 1991, and from the Chengjiang biota of China in 1991, which were later found to be of chordates, several Cambrian chordates are known, with some fossils considered as putative chordates. found to be of chordates,

several Cambrian chordates are known, with some fossils considered as putative chordates. The first Cambrian chordate discovered is *Pikaia gracilens*, a lancelet-like animal from the Burgess Shale in British Columbia, Canada. The discoverer, Charles Doolittle Walcott, described it as a kind of worm (annelid) in 1911, but it was later identified as a chordate af283764b2

Inversion was first noted in 1822 by the French zoologist Étienne Geoffroy Saint-Hilaire, when he dissected a crayfish (an arthropod) and compared it with the vertebrate body plan. The idea was heavily criticised, but periodically resurfaced, and is now supported by some molecular embryologists. af283764b2 Deuterostomia's sister clade is Protostomia, animals that develop mouth first and whose digestive tract development is more varied. Protostomia includes the ecdysozoans and spiralians. Together with the Xenacoelomorpha, these constitute the large clade Bilateria, i.e. animals with bilateral symmetry and three germ layers. af283764b2

Deuterostome hollow nerve cord of chordates. Deuterostomia comprises three phyla: Chordata, Echinodermata, Hemichordata, and the extinct clade Cambroernida. Both the hemichordates and the chordates have a thickening of the aorta, homologous to the chordate heart, which contracts Deuterostomes (from Ancient Greek δεύτερος (deúteros) 'second' and στόμα (stóma) 'mouth') are bilaterian animals of the superphylum Deuterostomia (), which are typically characterized by their blastopore becoming their anus during embryonic development af283764b2

== Systematics == af283764b2 The taxon name, Vetulicolia, is derived from the type genus, Vetulicola, which is a compound Latin word composed of vetulus "old" and -cola "inhabitant". It was named after Vetulicola cuneata, the first species of the group described in 1987. af283764b2

Vetulicolia The taxon name, Vetulicolia, is derived from the Vetulicolia is a group of bilaterian marine animals encompassing

several extinct species from the Cambrian, and possibly Ediacaran, periods. As of 2023, the majority of scientists favor placing Vetulicolians in the stem group of the Chordata, but some continue to favor a more crownward placement as a sister group to the Tunicata. suggests that vetulicolians may be paraphyletic and form a basal evolutionary grade of stem chordates. It was initially erected as a monophyletic clade with the rank of phylum in 2001, with subsequent work supporting its monophyly. However, more recent research suggests that vetulicolians may be paraphyletic and form a basal evolutionary grade of stem chordates af283764b2

== Difference from embryogenesis of lower chordates ==
af283764b2 The exact phylogenetic position is unclear, though recent studies suggest that it is likely a stem-chordate...
af283764b2 The body structure resembles that of the lancelet and it swam perhaps much like an eel. A notochord and myomeres (segmented blocks of skeletal muscles) span the entire length of the body, and are considered the defining signatures of chordate

characters. Its primitive nature is indicated by the body covering, a cuticle, which is characteristic of invertebrates and some protochordates. A reinterpretation in 2024 found evidence of the gut canal, dorsal nerve cord and myomeres, and suggested that the taxon was previously interpreted upside down. The notochord provides a directional reference to the surrounding tissue as a midline structure during embryonic development, acts...

Notochord In non-vertebrate chordates, the notochord persists during development. The notochord is derived from the embryonic mesoderm and consists of The notochord is an elastic, rod-like structure found in chordates. In vertebrates the notochord is an embryonic structure that disintegrates, as the vertebrae develop, to become the nucleus pulposus in the intervertebral discs of the vertebral column

Chordate Chordates are divided into three subphyla: Vertebrata

Chordates And Non Chordates

(fish, amphibians, reptiles, birds and mammals), which A chordate (KOR-dayt) is a bilaterian animal belonging to the phylum Chordata (kor-DAY-tə). distinguish chordates from all other animals. All chordates possess, at some point during their larval or adult stages, five distinctive physical characteristics (synapomorphies) that distinguish them from other taxa: a notochord, a hollow dorsal nerve cord, an endostyle or thyroid, pharyngeal slits, and a post-anal tail af283764b2

Chordates are divided into three subphyla: Vertebrata (fish, amphibians, reptiles, birds and mammals), which possess a skull and whose notochords are replaced by a cartilaginous/bony axial endoskeleton (spine); Tunicata or Urochordata (sea squirts, salps, and larvaceans), which only retain the synapomorphies during their larval stage; and Cephalochordata (lancelets), which resemble jawless fish but have... af283764b2 == Description == af283764b2 Stylophorans have played a major role in debates over the origin of chordates, as under the calcichordate hypothesis they were

interpreted as being stem-group chordates. However, multiple lines of evidence argue against the calcichordate hypothesis, and stylophorans are now widely agreed to belong to the echinoderm total group. Debate remains over whether they are stem-group echinoderms which predate the origin of radial symmetry, or highly modified descendants of radially symmetric echinoderms.

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Mammalian embryogenesis implantation, and forms the chorion with its chorionic villi, and later the placenta and umbilical cord, is also a difference from lower chordates. The difference Mammalian embryogenesis is the process of cell division and cellular differentiation during early prenatal development which leads to the development of a mammalian embryo af283764b2

== History == af283764b2 In addition to the morphological characteristics used to define chordates, analysis of genome sequences has identified two conserved signature indels (CSIs) in

their proteins: cyclophilin-like protein and inner mitochondrial membrane protease ATP23, which are exclusively shared by all vertebrates, tunicates and cephalochordates. These CSIs provide molecular means to reliably distinguish chordates from all other animals. af283764b2 As early as 1822, the French zoologist Étienne Geoffroy Saint-Hilaire noted that the organization of dorsal and ventral structures in arthropods is opposite that of mammals. Five decades later, in light of Darwin's theory of "descent with modification", German zoologist Anton Dohrn proposed that these groups arose from a common ancestor which possessed a body plan similar to that of modern annelids with a ventral nerve cord and dorsal heart. Whereas this arrangement is retained in arthropods and other protostomes, in chordate deuterostomes, the nerve cord is located dorsally and the heart ventrally. The inversion hypothesis was met with scornful criticism... af283764b2 In deuterostomes, the developing embryo's first opening (the blastopore) becomes the anus and cloaca, while the mouth is formed at a different site later on. This was initially the group's

distinguishing characteristic, but deuterostomy has since been discovered among protostomes as well. The deuterostomes are also known as enterocoelomates, because their coelom develops through pouching of the gut, enterocoely. af283764b2

Gap junction protein proteins of non-chordates (or innexins) were discovered later, and the proteins of chordates even later. They are divided into two broad categories: pannexins and connexins. Pannexins are typically between 300 and 600 amino In biology, gap junction proteins are proteins that form gap junctions, which connect two neighboring cells af283764b2

The notochord is important for signaling the dorso-ventral patterning of cells coming from the mesodermal progenitors. This helps form the precursors needed for certain organs and the embryo to develop. In summary, the notochord plays essential roles in embryonic development. af283764b2

Chordates And Non Chordates

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Chordates And Non Chordates

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