Classification of annelids pdf

The Annelids belong to the elyme of Annelid, and they are a diverse group of organisms. This group contains species such as earthworms, leeches and sea worms. Then the annelids can be classified into three classes. These include: Class Polycheta Class Hirudinea Class Oligochaeta Class Oligochaeta includes freshwater and terrestrial worms like Lumbricus (earthworms). Members of Oligokhet are monotonous. They are well developed metamerism and obvious back segments. The head degenerates with sensory segments. Oligochaeta also has a spine-like appendage, and they also have a reproductive structure called clitellum. The Polychaetes class is structurally distinguished by the class of annelids and fully sea creatures. This class includes sea worms like Nereis and freshwater species. These are free moving organisms. Polychaeta have the most typical body structure and they have many fins as an appendage called parapodia. In some species that belong to this class of fin, both appendages cover the entire body, giving a fuzzy appearance and in some cases fin-like appendages re-poisonous. The species that belong to this class lack clitellum and are mostly dioecious. This Hirudinea class includes freshwater species like leeches. They have a front and back sucker. They are monotonous and asynchronous (i.e. a man can switch between a man and a woman and vice versa). Most species belonging to this class are premature. The Annelida Fillum is a very broad filum belonging to the kingdom of Animalia. The Annelids are both in the aquatic and terrestrial environment. These are two-way symmetrical invertebrates. Their segmented organism distinguishes them from any other organism. Phylum Annelida Characteristics of Annelid Characteristics of organisms present in Phylum Annelida are as follows: Annelid coelomate and tripleblast. They demonstrate the organization of organ level. Their body is segmented. They respire through their body surface. Jade are a excretion organ. They have a well-developed circulatory and digestive system. Their body contains haemoglobin, which gives them a red color. Regeneration is a very common characteristic of the Annelids. Setae help them in the movement. Most Annelids are hermaphrodites, i.e. male and female organs are present in the same body. They reproduce both sexually and asexually. The rest reproduce sexually. For example, earthworms, and leeches classification Annelid the following different classifications of Annelid: Polychaeta Oligochaeta Hirudinea Archiannelida Polychaeta Body elongated and divided into segments. They are in a marine environment. These are real kelomates, two-way symmetrical worms. They are excreted through methanefried and proton frifridi. Fertilization is external. They have nervous system. A closed blood system. These are hermaphrodites. They may possess a fin like an appendage called parapodia. The organisms belonging to this group lack clitellum and are dioecious. For example, Nereis, Sillis Oligochaeta They are mostly freshwater and terrestrial organisms. The body is segmented metamerically. The head, eyes and tentacles are no different. It's hermaphrodites, but there's cross-fertilization. Fertilization is external. There is a cocoon formation. Setae segmented. They do not possess parapodia, but clitellum is present. Organisms belonging to this class are monotonous. They do not exhibit a free larval stage and development occurs inside cocoons. For example, Feretima, Tubifex Hinuchiata is most commonly found in fresh water. Some of them are marine, terrestrial and parasitic. The body is segmented. Tentacles, parapodias and sets are not present. The beasts are monotonous. The body is dorsoventrally or cylindrically flattened. They have a front and posterior sucker on the abdominal side. Organisms lay eggs in cocoons. During the development of the body there is no larvat stage. The mouth is placed ventraly in the front of the sucker, while the anus is present dorsally in the back of the sucker. Fertilization is internal. These are hermaphrodites. For example, Hirudinaria Archiannelida They are only found in the marine environment. The body is elongated without a set and parapodia. They are unisexuals or hermaphrodites. There are tentacles on the prosthesis. For example, Dinophilus, Protodrilus In conclusion, members of Phylum Annelida have bodies that are segmented, such as leeches and earthworms. For more information about Annelida, its characteristics, and classifications, continue to visit the BYJU Biology website or download the BYJU app for further links. Related links Phylum segmented worms AnnelidaTemporal range: Early Ordovician - Recent PreЄ Є O S D P T J K K N Glycera sp. Scientific Classification Kingdom: Animalia Subkingdom: Eumetazoa Clade: ParaHoxozoa Clade: Bilateria Clade: Nephrozoa (unrated): Protostomy (non-rating): Spiralia Superphylum: Lophotrochozoa Phylum: AnnelidaLamarck, 1809 Classes and subclasses Class Polychaeta (paraphtes?) Class Clitellata (see below) Oligochaeta - earthworms, etc. Branchiobdellida Hirudinea - Leeches Sipuncula (formerly Phylum) Class Machaeridia† Annelide (Annelida, of the Latin anellus, the little ring, also known as ringworms or segmented worms, are a large filum, with more than 22,000 extant species including shaggy worms, earthworms, and species exist and adapted to different ecologies - some in marine environments as diverse as tidal zones and hydrothermal vents, others in fresh water , and others in a humid terrestrial environment. Annelids are two-sided symmetrical, triple-regional, invertebrates. They also have parapodies to move around. Most textbooks still use traditional polychettes (almost all marine), oligochets (which include earthworms) and leeches as species. Since 1997, cladistic studies have radically changed this pattern, treating leeches as a subgroup of oligokhette and oligokhet as a subgroup of polychettes. In addition, Pogonophora, Echiura and Sipuncula, formerly regarded as a separate fila, are now regarded as subgroups of polychette. Annelids are considered members of Lophotrochozoa, a super-filum protostom that also includes molluscs, brachiopods and non-summers. The basic annelid form consists of several segments. Each segment has the same organ sets and, in most polychates, has a pair of parapodiums that many species use to move around. Septas share segments of many species but are poorly defined or absent in others, and Echiura and Sipuncula show no obvious signs of segmentation. In species with a well-developed septus, blood circulates completely in blood vessels, and vessels in segments near the front ends of these species are often built with muscles that act like hearts. The septa of these species also allows them to change the shape of individual segments, which facilitates the movement of peristalsis (ripples that pass through the body) or undulating, which improve the effectiveness of parapodia. In species with incomplete septus or not, blood circulates through the main cavity of the body without any pump, and there is a wide range of locomotive techniques - according to Rout Radhamohan some burrowing species turn their pharyngs inside out to drag themselves through the sediment. Earthworms are oligogchets that support terrestrial food chains both as prey and in some regions are important in aeration and soil enrichment. Buried marine polychrets, which can make up a third of all species in coastal environments, contribute to the development of ecosystems, allowing water and oxygen to penetrate the seabed. In addition to improving soil fertility, annelids serve people as food and bait. Scientists monitor annelids to monitor the quality of sea and fresh water. Although bloodletting is used by doctors less frequently, some species of leeches are considered endangered species because they have been over-harvested for this purpose in the last few centuries. Jaws ragworms are being studied by engineers as they offer an exceptional combination of lightness and strength. Since the annelids are soft-bodied, their fossils are rare - mostly jaws and mineralized tubes, which some species stand out for. While some of Ediacaran's later fossils may represent annelids, the oldest known fossil that is identified with certainty comes from about 518 million years ago at the beginning of the Cambrian period. of the most advanced mobile polykhet groups appeared towards the end of Carboniferous, about 299 million years ago. Paleontologists disagree on whether some of the body fossils from the middle of Ordovich, about 472-461 million years ago, are oligokhet remains, and the earliest undeniable fossils of the group appear in the tertiary period that began 66 million years ago. Classification and diversity there are more than 22,000 live annlade species, from microscopic to Australian giant earthworms Gippsland and Amynthas mekongianus (Cognetti, 1922), which can grow up to 3 meters (9.8 feet) in length. Although research since 1997 has radically changed scientists' views on the Annelid evolutionary family tree, most textbooks use traditional classification in the following subgroups: 7 (about 12,000 species). As the name suggests, they have several chetae (hair) in the segment. Polychaetes have parapodia that act as limbs, and nuchal organs that are thought to be chemotherapy sensors. Most of them are marine animals, although some species live in fresh water and even less on land. The climate of the Earthworm Clitellates (about 10,000 species). They have little or no chetae per segment, and no nuchal organs or parapodia. However, they have a unique reproductive organ, a ring-shaped clytellum (a saddle pack) around their body that produces a cocoon that stores and nourishes fertilized eggs until they hatch (11) or, in moniligastrids, yolk eggs that provide food for embryos. The clitellates are divided into: Oligochaetes (with multiple hair), which includes earthworms. Oligokhets have a sticky pad in the roof of the mouth. Most of these are burrows that feed on fully or partially decomposed organic materials. Hi sungea, whose name means leech and whose most famous members are leeches. Marine species are mostly blood-sucking parasites, mostly on fish, while most freshwater species are predators. They have suckers on both ends of their body, and use them to move as well as inchworms. Archiannelida, the smallest annelids that live in spaces between the grains of marine sediment, were considered as a separate class because of their simple body structure, but are now regarded as polychaetes. Some other animal groups have been classified differently, but are now widely regarded as an annides: Pogonophora/Siboglinidae were first discovered in 1914, and their lack of recognizable intestines makes it difficult to classify them. They were classified as separate phylum, Pogonophora, or as two fila, Pogonophora and Vestimentifera. More recently they were reclassified as family, Siboglinidae, in polykhets. Echiura has a checkered History: In the 19th century they were appointed filum Gephyrea, which is now empty as its members were assigned to other phila; Echiura were then regarded as annelids until the 1940s, when they were classified as a filum in their own right; but an analysis of molecular phylogenetics in 1997 concluded that the echiourans were annelids. Misostomida lives on crinoids and other echinodermes, mainly as parasites. In the past they were considered close relatives of trematodes of flatworms or tardigrades, but in 1998 it was suggested that they were a subgroup of polychaetes. However, another analysis conducted in 2002 showed that misostomids are more closely related to flatworms or to rotifers and acantomephals. Sipunkula was initially classified as an annelids, despite the complete absence of segmentation, bristles and other annelid characters. Filum Sipukula was later associated with Mollusk, mainly based on development and larval characters. Phylogenetic analyses based on 79 ribosome proteins showed the position of Sipunkula in Annelid. A subsequent DNA analysis of the mitochondria confirmed their close relationship with Misostomida and Annelida (including echiouranas and pogonophores). It has also been shown that rudimentary neural segmentation, similar to annelid, occurs at an early larvat stage, even if these traits are absent in adults. No feature distinguishes Annelide from other invertebrate phila, but they have a distinctive combination of features. Their bodies are long, with segments that are separated by outwardly small ring-shaped constrictions called annuls, and internal sept (sections) at the same points, although some species of septa are incomplete and in some cases absent. Most segments contain the same sets of organs, although the joint colon, circulatory system and nervous system makes them interdependent. Their bodies are covered with cuticle (external coating), which does not contain cells, but is excreted by cells on the skin at the bottom, consists of hard but flexible collagen and does not shed – on the other hand, arthropod cuticles are made of a harder α-chitin, and until the arthropods reach their full size. Most annelids have closed circulatory systems where blood makes its entire chain through blood vessels. A summary of the distinctive features of Annelid (Annelida) Recently merged into Annelidu (Annelida) Closely related to a similar species of Phil Ehiura (23) Sipuncula (Sipuncula) Nemertea (Nemertea) Arthropoda (Arthropoda) Onychophora (Anichophora) External segmentation Yes, No, not only in a few species Yes, except for ticks not a repetition of internal organs Yes no yes yes in primitive forms of Da Sept between segments In most species there is no cuticle collagen material collagen no α-hitin α-hitin Molting generally no; But some of them molt of their jaws, and leeches shed their skins No 29 no29 No 29 Yes Yes body cavity Coelom; but it is reduced or lost in many leeches and some small polychaetes 20 2 coelomata, mainly and in proboscis 2 coelomata, the main and in the tentacles of Coelom only in the trunk of the Hemocoel Hemocoel circulatory system Closed in most kinds Of Open outflow, return through the branched vein Open Open Open description of Segmentation Prostomium Peristomium O Roth Growth zone Pygidium O Anus Chart segments of the annexation having the same sets of internal organs and external chaetae (Greek χαιτη that means hair) and, in some species, appendages. The front and rear sections are not considered to be true segments because they do not contain standard organ sets and do not develop in the same way as true segments. The anterior part, called simple (Greek means front and mouth) contains the brain and sensory organs, while the posterior, called pygidium (Greek q, which means small tail) or periproct contains an anus, usually on the lower side. The first section behind the prosthesis, called peristi (Greek y - meaning around and mouth), is considered by some zoologists as not a real segment, but in some polychithes peristium has chetae and appendages, as in other segments. Segments develop along one of the growth zones right in front of the pygidium, so the youngest segment of the annelida is right in front of the growth zone, while perisomium is the oldest. This model is called body growth. Some Annelid groups, including all leeches, have a fixed maximum number of segments, while others add segments throughout their lives. The name philum comes from the Latin word annelus, meaning little ring. Body cuticles, chaetae and parapodia Annelids are made of collagen fibers, usually in layers that spiral in variable directions, so that fibers cross each other. They are secreted by a single-celled deep epidermis (the outer layer of the skin). Several marine annelids that live in tubes lack cuticles, but their tubes have a similar structure, and mucus-secreting glands in the epidermis protect their skins. Under the epidermis is a derma that consists of connective tissue, in other words, a combination of cells and noncellular materials such as collagen. Below are two layers of muscle that develop from the lining of the coelom (body cavity): circular muscles make the segment longer and thinner when they contract, while underneath them are longitudinal muscles, usually four different bands whose contractions make the segment shorter and thicker. Some annelids also have oblique internal that connect the lower body on each side. The set (hair) of the annelids come out of the epidermis to provide traction and other possibilities. The simplest of them are disjointed and form paired beams at the top and bottom of each segment. Parapodia (limbs) of annelids, which often carry more complex chetae on their tips - for example, joint, comb, or hooked. Chetae is made from moderately flexible β-chitin and is formed by follicles, each of which has chetoblast cells at the bottom and muscles that can expand or draw the couple. chetoblasts produce chetae by forming microvilli, thin hair-like extensions that increase the area available for cheta secretions. When the cheta is completed, the microvilli go off into the chetoblast, leaving parallel tunnels that run almost the entire length of the cheta. Thus, the couple Annelide are structurally different from the sets (bristles) arthropods, which are made of a stricter α-hitin, have a single inner cavity and are installed on flexible joints in shallow pits in the cuticle. Almost all polycheths have parapodias that function as limbs, while other major groups of annelids do not have them. Parapodias are disparate pair extensions of the body wall, and their muscles are derived from the circular muscles of the body. They are often supported internally by one or more larger, thick chetae. The parapodia burrows and tubes inhabiting polykhets are often just ridges whose tips carry hooked chetae. In active scanners and swimmers parapodia is often divided into large upper and lower oars on a very short trunk, and paddles are usually fringed with het, and sometimes chiri (fused beams of cilia) and gills. The nervous system and the senses of the Brain usually forms a ring around the throat consisting of a pair of ganglia (local control centers) above and before the throat, bound by nerve cords on either side of the throat to another pair of ganglia just below and behind it. The brain of polyhetes is usually found in prostheses, while the brain of the clythellate is in peristich, and sometimes in the first segment, behind the simple. In some very mobile and active polychettes the brain is enlarged and more complex, with visible sections of the posterior brain, middle brain and brain. The rest of the central nervous system, the abdominal nerve cord, is usually a ladder-like, consisting of a pair of nerve connections that pass through the lower part of the body and have in each segment paired ganglia bound by a transverse connection. From each segmental ganglion branching system of local nerves runs into the body wall and then surrounds the body. However, in most polychettes the two main nerve cords merge, and in the tubular genus Owenia one nerve chord has no ganglia and epidermis. As in arthropods, each muscle fiber (cell) is controlled by more than one neuron, and the speed and power of fiber cuts depends on the combined effects of all its neurons. Vertebrates have another system in which one neuron controls a group of muscle fibers. Most longitudinal nerve trunks of annelids include giant axons (weekend signaling lines of nerve cells). Their large diameter reduces their resistance, allowing them to transmit signals exceptionally quickly. This allows these worms to quickly escape the danger by shrinking their bodies. Experiments have shown that cutting giant axons prevents this escape response, but does not affect normal movement. Sensors are mostly single cells that detect light, chemicals, pressure waves and contact, and are present on the head, appendages (if any) and other parts of the body. Nuchal (around the neck) organs are paired, ciliated structures found only in polychaetes, and are thought to be chemotherapy sensors. Some polycheths also have different combinations of ocelli (small eyes) that detect the direction from which the light comes, and the camera's eyes or complex eyes, which can probably image. Complex eyes have probably evolved regardless of the eyes of arthropods. Some tubular worms use ochelly, widely spread across their bodies, to detect the shadows of fish, so that they can quickly go into their tubes. Some polycheths living in tubes have satocists (tilt and balance sensors) that tell them which way down. Several polyhetic genera have fingers on the underside of the head, which are used both in feeding and as a feel, and some of them also have antennas that are structurally similar but are probably used mainly as a feel. Coelom, Movement and Circulatory System Most annelids have a pair of coelomata (body cavities) in each segment separated from other segments of the sept and from each other by vertical mesenteria. Each partition forms a sandwich with a connective cloth in the middle and mesothelius (a membrane that serves as a lining) from previous and subsequent segments on both sides. Each mesenteria is similar, except that mesothelium is the lining of each of the colomat pairs, and blood vessels and, in polychettes, the main nerve cords are built into it. Mesothelium consists of modified epitheliomcular cells; In other words, their bodies are part of the epithelium, but their bases expand to form muscle fibers in the body wall. Mesothelium can also form radial and circular muscles on the sept, as well as circular muscles around blood vessels and intestines. Parts of mesothelium, especially on the outside of the intestines, can also form chlorine cells that perform Vertebrate liver function: production and storage of glycogen and fat; Manufacturing haemoglobin; The destruction of proteins; and converting nitrogen waste into ammonia and urea for secretion. Play media peristalism moves this worm to the right Many annelide move peristales (compression and expansion waves that sweep through the body), or bend the body using parapodia to crawl or swim. In these animals, the septa allows round and longitudinal muscles to change the shape of individual segments, making each segment a separate liquid-filled balloon. However, septts are often incomplete in annelids that are semi-sessile or that do not move peristalt or parapodia movements - for example, some move by flogging body movements, some small marine species move using cilia (thin muscle hair) and some burrows turn their pharyngs (throat) inside out to penetrate the seabed. The fluid in the colomat contains colococyte cells that protect animals from parasites and infections. In some species, kelomotions may also contain respiratory pigment - red hemoglobin in some species, green chlorocurorin in others (dissolved in plasma) - and provide oxygen transportation in their segments. The respiratory pigment also dissolves in the blood plasma. Species with a well-developed septus usually also have blood vessels running all the long of their bodies above and below the intestines, the top holding the blood forward while the lower one carries it back. The capillaries in the body wall and around the intestines transmit blood between the main blood vessels and parts of the segment that need oxygen and nutrients. Both main vessels, especially the upper one, can pump blood, due to infection. In some annelidas, the advanced part of the upper blood vessels increases with the muscles to form the heart, while in front of the ends of many earthworms some of the vessels that connect the upper and lower main vessels function as hearts. Species with poorly developed or no septa usually have no blood vessels and rely on circulation in coelom to deliver nutrients and oxygen. However, leeches and their immediate family have a body structure that is very homogeneous within the group but significantly different from other annelids, including other Members of Clitellata. There is no sept, the layer of connective tissue of the body wall is so thick that it occupies most of the body, and the two colomats are widely separated and pass along the length of the body. They function as the main blood vessels, although they are side by side rather than upper and lower. However, they are lined with mesothelioma as coelomata and unlike the blood vessels of other annelids. Leeches usually use suckers on their front and rear ends to move like inchworms. The anus is located on the top surface of the pygmy. [14] In some annelids, including earthworms, all breath through the skin. However, many polychaetes and some clitellates (a group to which earthworms belong) have gills associated with most stages, often as parapodia extensions in polychaetes. the gills of tubular inhabitants and burrows are usually grouped around which end has a stronger flow of water. Feeding and secreting Lamellibrahian tubular worms have no intestines and receive nutrients from the chemo-autotrophic bacteria living inside them. Feeding structures in the mouth are very different and have little correlation with the diet of animals. Many polychaetes have a muscular throat that can be everted (poked inside out to prolong it). In these animals only a few segments are often missing septs so that when the muscles in these segments contract, a sharp increase in fluid pressure from all these segments everts the throats very quickly. Two families, Eunicidae and Phyllodocidae, have developed jaws that can be used to capture prey, bite off chunks of vegetation, or capture dead and decaying matter. On the other hand, some predatory polykhets have neither jaws nor eternal pharyng. Selective deposit feeders usually live in tubes on the seabed and use fingers to find food particles in sediments and then wipe them into the mouth. Filter feeders use crown fingers covered with lashes that wash food particles to their mouths. Do not selective feeders for soil inhalation or marine sediments through mouths, which are usually non-specialized. Some clitellates have sticky pads in the roofs of their mouths, and some of these can evert pads to capture prey. Leeches often have every possible proboscis, or muscle pharynx with two or three teeth. The intestine is usually an almost straight tube supported by mesentery (vertical septums inside segments), and ends with an anus on the underside of the pygmy. However, members of the Tubular Siboglinidae family have a swollen lining that is home to symbiotic bacteria, which can make up 15% of the total weight of worms. Bacteria convert inorganic matter - such as hydrogen sulfide and carbon dioxide from hydrothermal vents, or methane from seeps - into an organic substance that feeds itself and its hosts, while worms expand their fingers into gas streams to absorb the gases needed by bacteria. Annelidides with blood vessels use methanefridi as much as possible to remove soluble waste, while those that do not use protonefried. Both systems use a two-fold filtration process in which liquid and waste are first extracted and re-filtered to re-absorb any reusable materials when toxic and decomposed materials are discharged as urine. in that proton fridria combines both stages of filtration in one organ, while methanefridigia performs only the second filtration and rely on relying other mechanisms for the first - in annelids special filter cells in the walls of blood vessels let fluids and other small molecules into the kelome fluid, where it circulates in methanefridiment. In the annelidas, the points at which the liquid enters protonefried or methanefried are on the side of the septum, while the second-stage filter and jade (exit hole in the body wall) are in the next segment. As a result, the rear segment (up to the growth zone and the pygmy) does not have a structure that extracts its waste, as there is no next segment for their filtration and discharge, while the first segment contains an extraction structure that transmits waste to the second, but does not contain structures that refil filter and write off urine. Reproduction and Life Cycle Asexual Reproduction This sabellid tubeworm is a budding Polychaetes can reproduce asexually, by dividing into two or more parts or giving hope from a new person while the parent remains a full organism. Some oligokhets, such as Aulophorus furcatus, seem to reproduce completely asexually, while others breed asexually in summer and sexually in autumn. Asexual reproduction in olygochets is always divided into two or more parts, not budding. However, leeches have never been seen reproducing asexual. Most polychette and oligokhette also use similar mechanisms for regeneration after damage. Two polychette genus, Chaetopterus and Dodecaceria, can regenerate from one segment, while others can regenerate even if their heads are removed. The Anneliids are the most complex animals that can regenerate after such serious damage. On the other hand, leeches cannot regenerate. Sexual reproduction Apical tuft (cilia) Prototroch (lashes) Metatroch stomach (resli) Mesoderm Anus / // Restia Trochophore larva (lashes) It is believed that the annelids were originally animals with two separate floors that released eggs and sperm into the water through their nephridia. Fertilized eggs turn into trochophor larvae that live like plankton. Later they descend to the seabed and transmorphosis in miniature adults: the part of the trochophore between the apical beam and the protothroch becomes a prosthesis (head); a small area around the anus of the trochophor becomes a pygmy (tail-piece); The narrow band just before it becomes a growth zone that produces new segments. and the rest of the trochophor becomes perisomy (a segment that contains the mouth). However, the life cycles of most living polychettes, which are almost all marine animals, are unknown, and only about 25% of the 300 species whose life cycle is known to follow this model. About 14% use similar external fertilization, but produce a rich yolk which reduce the time that the larva should spend among among the or eggs from which miniature adults appear, not larvae. The rest take care of fertilized eggs until they hatch - some of them produce jelly-covered egg mass, which they tend to some, attaching eggs to their bodies and several species, keeping eggs in their bodies until they hatch. These species use different methods to transmit sperm; for example, some females collect sperm released into the water, while others have a penis that injects sperm into the female. There is no guarantee that this is a representative sample of reproductive models of polychettes, and it simply reflects the modern knowledge of scientists. Some polykhets reproduce only once in their lives, while others reproduce almost continuously or during several breeding seasons. While most polychnets remain of the same sex all their lives, a significant proportion of species are full of hermaphrodites or change gender during their lifetime. Most polycheths have been studied for lack of permanent gonads, and it is unclear how they produce eggs and sperm. In several species, the back of the body separates and becomes a separate person who lives long enough to swim in a suitable environment, usually near the surface, and spawn. Most mature clytellates (a group that includes earthworms and leeches) are full of hermaphrodites, although in some leeches young adults function as males and become females in adulthood. Everyone has well-developed gonadas, and everyone copulates. Earthworms store the sperm of their partners in sperm (sperm), and then the cello produces a cocoon, which collects the egg from the ovaries, and then sperm from sperm. Fertilization and development of earthworm eggs occurs in a cocoon. Eggs of leeches are fertilized in the ovaries, and then transferred to the cocoon. In all climatic cocoons also either produces yolks when eggs are fertilized or nutrients until they develop. All clitellates hatch like miniature adults, not larvae. The ecological significance of Charles Darwin's book Formation of vegetable mould through the action of worms (1881) presented the first scientific analysis of the contribution of earthworms to soil fertility. Some burrows while others live completely on the surface, usually in the damp litter of leaves. Nors weaken the soil so that oxygen and water can penetrate it, and how surface and burying worms help produce soil by mixing organic and minerals, by accelerating the decomposition of organic matter and thus making it more quickly available to other organisms, as well as by concentrating minerals and converting them into forms that plants can use more easily. Earthworms are also an important prey for birds the size of robins storks, as well as for mammals ranging from shingeighties and badgers, and in some cases the conservation of earthworms may be to conserve endangered birds. Ground annelids can be invasive in some situations. For example, in the lingible areas of North America, almost all of the local earthworms are believed to have been killed by glaciers, and the worms that are currently found in these areas have all been from other areas, mainly from Europe and, more recently, from Asia. Northern hardwood forests have a particularly negative impact on invasive worms as a result of leaf loss, soil fertility, changes in soil chemistry and loss of ecological diversity. Amynthas agrestis is of particular concern and at least one state (Wisconsin) has listed it as a prohibited species. Earthworms migrate only a limited distance annually on their own, and the spread of invasive worms is rapidly increasing from anglers and from worms or their cocoons to dirt on car tires or shoes. Marine annelids can be more than a third of bottom animal species around coral reefs and in tidal zones. Burrowing increases the penetration of water and oxygen into the seaflobal sediment, which stimulates the growth of populations of aerobic bacteria and small animals along with their burrows. Although blood-sucking leeches do little direct harm to their victims, some transmit flagellates that can be very dangerous for their owners. Some small tubular oligokhets transmit mixosporic parasites that cause vortex diseases in fish. Interaction with people of terrestrial worms make a significant contribution to soil fertility. The rear end of the Palolo worm, a marine polychette that tunnels through corals, is detached to spawn on the surface, and the people of Samoa view these spawning modules as a delicacy. Anglers sometimes believe that worms are a more effective bait than artificial flies, and worms can be kept for several days in a tin lined with wet moss. Ragworms are commercially important as bait and as food sources for aquaculture, and there have been suggestions of treating them to reduce the over-fishing of their natural populations. The forerunner of some marine polychettes on molluscs causes serious damage to fisheries and aquaculture. Scientists study aquatic annides to monitor oxygen content, salinity and pollution levels in fresh and seawater. Accounts of the use of leeches for medically questionable blood donation practices came from China around 30 AD, India around 200 AD, Ancient Rome around 50 AD, and then across Europe. In the 19th century, demand for leeches was so high that stocks in some areas were depleted, while others imposed export restrictions or bans, and Hirudo Medicine was regarded as an endangered species of both IUCN and CITES. More recently leeches have been used to assist in microsurgery and their saliva anti-inflammatory compounds and several anticoagulants, one of which also prevents the spread of tumors. The jaws of worms are strong, but much lighter than the hard parts of many other organisms that are biominralized by calcium salts. These benefits have caught the attention of engineers. Studies have shown that the jaws of ragworms are made of unusual proteins that strongly bind to zinc. Evolutionary History See also: List of families Annelid Fossil records Burgessochaeta setigera Since annelidas are soft-bodied, their fossils are rare. Polykhete's fossil records mostly consist of jaws that some species had, and mineralized tubes that some secreted. Some Ediakaran fossils, such as Dickinsonia, are in some ways similar to polychettes, but the similarities are too vague for these fossils to be classified with certainty. The small shelly fossil Cloudina, 549 to 542 million years ago, was classified by some authors as annelid, but others as cnidarian (i.e. in the filum to which sea jellyfish and anemones belong). Until 2008, the earliest fossils widely adopted as annelids were the Polyhetes of Canada and Burgess, both from Canada's Burgess Shale, formed about 505 million years ago at the beginning of Cambrian. Myoscolex, found in Australia and slightly older than Burgess's slate, may have been an annexe. However, it does not have some typical annelida features and has features that are not normally found in the annelida, and some of which are associated with other phila. Then Simon Conway Morris and John Peel reported on Phragmochaeta from Sirius Passet, about 518 million years old, and concluded that it was the oldest Annelide known to date. There has been an active debate about whether the Burgess Shale fossil Wiwaxia was a mollusc or annelide. Polykhets are diversified in the early ordinica, about 488-474 million years ago. It was only after the early Ordovician that the first annelids were found, so the crown group did not always seem until that date and probably appeared a little later. By the end of Carboniferus, about 299 million years ago, fossils of most modern mobile polychette groups appeared. Many fossil tubes look like those made by modern sesyami polykhets, but the first tubes clearly produced by polychettes date back to the Jurassic period, less than 199 million years ago. In 2012, a 508-million-year-old species of annelids was found near a shale ridge in British Columbia, Kutenaycolex, which changed hypotheses about how the annelide head evolved. It appears that the bristles on the head segment are akin to those along his body, as if the head is simply designed as a specialized version of the previously shared segment. The earliest strong evidence of oligokhets occurs in the tertiary period, which began at 65 years ago, and it has been suggested that these animals are animals around the same time as flowering plants in the early Cretaceous period, from 130 to 90 million years ago. The fossil of the footprints, consisting of a tangled burrow partially filled with small fecal pellets, may be evidence that the earthworms were present in the early Triassic period from 251 to 245 million years ago. The body fossils found in the middle of Ordovich, from 472 to 461 million years ago, were pre-classified as oligos, but these identities are uncertain and some have been challenged. The family tree of the traditional annelids were divided into two main groups, polychettes and clitellates. In turn, the clitellates were divided into oligoghates, which include earthworms, and gyrudinomorphs, the most famous members of which are leeches. For years there has been no clear location of approximately 80 polychaete families in higher-level groups. In 1997, Greg Rouse and Christian Fochald took the first heuristic step in terms of bringing the polykhet system to an acceptable level of rigor based on anatomical structures, and divided the polychettes into: Scolecida, less than 1,000 species of burrows that look more like earthworms. Palpata, the vast majority of polychettes, is divided into: Canalipalpata, which differ in that long grooved fingers, which they use for feeding, and most of which live in tubes. Aciculate, the most active polycheths, which have parapodia, reinforced by internal spikes (aciculs). Annelide some Scolecida and Aciculata some Canalipalpata Sipuncula, formerly separate phylum Clitellata some Oligochaeta Hirudinea (leeches) some Oligochaeta some Oligochaeta Aeolosomatidae , some Scolecida and Canalipalpata some Scolecida Echiura, Previously separate phylum some Scolecida previously phylum Pogonophora some Canalipalpata some Scolecida, Canalipalpata and Aciculata Annelid groups and fila included in Annelide (2007; simplified). The main changes in traditional classifications. Also in 1997, Damnite McHugh, using molecular phylogenetics to compare similarities and differences in one gene, presented a completely different point of view in which: clitellates were an offshoot of one branch of the genealogical tree polyheth; Pogonophores and Echiourans, which for several decades were considered as separate fila, were placed on other branches of the polychette tree. Subsequent analyses of molecular phylogenetics on a similar scale presented similar conclusions. In 2007, Torsten Hit and his colleagues compared three genes in 81 taxa, of which nine were in other words, not considered closely related to the annelida, but included to give an idea of where organisms are currently found on the great tree of life. The study used analysis of 11 genes (including the original 3) in ten dacts. This analysis agreed that the clitellates, pogonophores and echiourans were located on different branches of the polyhette genus. It also concluded that the classification of polykhet on Scoledid, Canalipalpat and Aticulata was useless, as members of these alleged groups were scattered throughout the family tree as a result of the 81 dachshunds. It also placed sipunculans, generally regarded at the time as a separate phylum, on another branch of the polychaete branch branch, and concluded that leeches were a subgroup of oligochaetes rather than their sister-group among clitellates. Rouse has taken analyses based on molecular phylogenetics, and their main findings are now a scientific consensus, although the details of the annelid genus remain uncertain. In addition to rewriting the classification of the Annelids and three previously independent philaes, the analysis of molecular phylogenetics undermines the emphasis that decades of previous writings have emphasized the importance of segmentation in the classification of invertebrates. The polykhets, which were found in these analyses to be the parent group, have fully segmented bodies, while the ehuran polycheth and pounculans are not segmented, and the pogonophores are segmented only in the back of the body. It now seems that segmentation may appear and disappear much more easily during evolution than previously thought. The 2007 study also noted that a ladder similar to the nervous system associated with segmentation is less universal than previously thought, in both annelid and arthropods. The Philogenetic Tree of the renewed cladogram of the Annelides filum. Annelid Paleoannelid Owenoid Magelonides Chaetopteriformia Apistobranchida Psammodrilida Chaetopterida Amphinomorpha Lobatocerebrida Amfinomida Zipukul Pleistoannelida Errantia Mishostomida Protodriliformia Polygordiida Idylida Aida Orbinid Siboglinida Chirratouliformia Spioniformia Sabellad Spiellid Ophionid Kapielled Echiurida Maldanomorpha Terebellid Clytellatomorph Kepodadrilida Parerodrilidae Aeolosomatide Dorsofaringey (Aquela and Nemettodermatide) Deuterozotomy (Echinoderms, Chords, etc.) Protostomy Ecdisosomea (Arthropods, Nematodes, Priapulids, etc.) Lophotrochozoa Bryozoa Annelida Sipuncula Mollusca Phoronida and Brachiopoda Nemertea Dicyemida Myzostomida Platyzoa Other Platyzoa GastrotrichaHaHelminthes Philogenetic Tree show Annelida Phylum's relationship with other Bila (Analysis produced in 2004, Before Sipuncula was merged in Annelid in 2007, the Annelidas were members of protostoms, one of the two main superphiles of bilaterian animals - another deuterostamia that includes vertebrates. The genes that drive segmentation in arthropods don't seem to do the same in anneligues. that the ancestors of protostomy or bilaterian was segmented and that segmentation disappeared in many descendants of the phila. The anneliids are now thought to be grouped with molluscs, brachiopods and several other filaps that have lofophores (fan-like feeding structures) and/or trochophor larvae as members of Lophotrochozoa. Bryozoa may be the most basal phylum (the one that first became distinctive) in Lophotrochozoa, and the relationship between other members is not yet known. Arthropods are now regarded as members of Ecdysozoa (animals that shed), along with some phila that are unsegmented. The Lofotrohozo hypothesis is also supported by the fact that many fillets in this group, including annides, molluscs, non-British and flatworms, follow a similar pattern in the development of a fertilized egg. When their cells divide after the 4-cell stage, the descendants of these four cells form a spiral pattern. In these phila fates of embryo cells, in other words, the roles that their descendants will play in an adult animal are the same and can be predicted from the earliest stage. Therefore, this development model is often referred to as spiral defining cleavage.

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