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Topic

BRIEF CLASSIFICATION OF CHORDATA WITH CHARACTERS

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Brief Classification of Chordata with Characters

The chordates form a large heterogeneous grouping of members differing widely from one another in many respects. This creates problems in their systematic classification. Different schemes have been proposed by a number of **taxonomists** from time to time. The one followed in this text is a synthesis of the most recent ones adopted here for the sake of simplicity and proper understanding.

PHYLUM CHORDATA

(L. *chordatus*, having a cord, i.e., the notochord). **Widely diversified in size, habits and habitat. Bilaterally symmetrical, metamerically segmented, triploblastic, coelomate deuterostomes. All possess, at some stage in their life-history, supporting skeletal rod or notochord, a hollow dorsal nerve cord and paired gills or gill-slits, which may persist, change or disappear in the adults. Cambrian to Recent. Chordates. About 50,000 species.**

Phylum Chordata can be divided into two groups; *Acrania* (Protochordata) and *Craniata* (Euchordata) having contrasting characters .

Group A. Acrania (Protochordata)

(Gr. *a*, absent; *kranion*, head, or, Gr. *protos*, first; *chorde*, cord). All marine, small, primitive or lower chordates. Lacking a head, a skull or cranium, a vertebral column, jaws and brain. About 2,000 species

The Acrania is divided into three subphyla: *Hemichordata*, *Urochordata* and *Cephalochordata*, chiefly on the position of notochord.

Subphylum 1. Hemichordata

(Gr. *hemi*, half; *chorde*, cord). Body divided into 3 regions : proboscis, collar and trunk. Notochord doubtful, short, confined to proboscis and non-homologous with that of chordates.

Class 1. **Enteropneusta**. (Gr. *enteron*, gut; *pneustos*, breathed). Body large and worm-like. Gill-slits numerous. Intestine straight. Acorn or tongue worms. 3 families, 15 genera and 70 species. *Balanoglossus*, *Saccoglossus*,

Class 2. Pterobranchia. (Gr. *pteron*, feather; *branchion*, gill). Body small and compact. Gill-slits one pair or none. Intestine U-shaped. Pterobranchs includes 2 orders, 3 genera and 20 species. *Cephalodiscus*, *Rhabdopleura*.

Class 3. **Planctosphaeroidea**. Transparent, round and specialized tornaria larva, having extensively branched ciliary bands and L-shaped alimentary canal, represents this class, *Planctosphaera pelagica*. This form is regarded as the larval form of some unknown hemichordates.

Class 4. **Graptolita**. The fossil graptolites (e.g. *Dendrograptus*) were abundant in Ordovician and Silurian periods and often placed as an extinct class under Hemichordata. Their tubular chitinous skeleton and colonial habits show an affinity with *Rhabdopleura*,

Subphylum II. Urochordata or Tunicata

(Gr. *oura*, a tail; L. *chorda*, cord). Notochord and nerve cord only in tadpole-like larva. Adult sac-like, often sessile and encased in a protective tunic. Tunicates.

Class 1. **Asciacea**. Sessile tunicates with scattered muscles in tunic. Solitary, colonial or compound. Gill-clefts numerous. Ascidiaceans or sea squirts. 2 subclass, 3 orders, 12 families, 37 genera and 1,200 species. *Herdmania*, *Ciona*, *Molgula*.

Class 2. **Thaliacea**. Free-swimming or pelagic tunicates with circular muscles in tunic. Sometimes colonial. Salps or chain tunicates. 3 orders, 5 families, 9 genera and 30 species. *Salpa*, *Doliolum*, *Pyrosoma*,

Class 3. **Larvacea** or **Appendicularia**. Tiny, transparent, free-floating. Adults retain many larval features including tail. Only two -gill-slits. 2 orders, 2 families, 5 genera and 30 species. *Oikopleura*.

Subphylum III. Cephalochordata

(Gr. *kephale*, head; L. *chorda*, cord). Notochord and nerve cord present throughout life along entire length of body.

Class **Lcptocardii**. Body fish-like, segmented with distinct myotomes and numerous gill-slits.

Free-swimming and burrowing. Lancelots. One class, one family, 2 genera and 30 species. *Branchiostoma* (= *Amphioxus*), *Asymmetron*. About eight species have been recognized under the genus *Branchiostoma* and six species have been recognized from the genus *Asymmetron*.

Group B. Craniate (Euchordata)

Aquatic or terrestrial, usually large-sized, higher chordates or vertebrates with distinct head, a vertebral column, jaws and brain protected by a skull or cranium. The Craniata includes a single subphylum, the *Vertebrata*.

Subphylum IV. Vertebrata

(L. *vertebratus*, backbone). Notochord supplemented or replaced by a vertebral column or backbone composed of overlapping vertebrae. Body divisible into head, neck, trunk and tail. Usually dioecious. Vertebrates. Largest chordate subphylum including about 46,500 species.

The subphylum Vertebrata is divided into two divisions : *Agnatha* and *Gnathostomata*.

Division I. Agnatha

(Gr. *a*, not; *gnathos*, jaw). Jawless primitive fish-like vertebrates without true jaws and paired limbs.

Class 1. **Ostracodermi**. (Gr. *ostrakon*, shell; *derma*, skin). Several extinct orders of ancient primitive heavily armoured, Palaeozoic, world's first vertebrates, collectively called the ostracoderms. *Cephalaspis*, *Drepanaspis*.

Class 2. **Cyclostomata**. (Gr. *cyklos*, circular; *stoma*, mouth). Body eel-shaped, without scales, jaws and lateral fins. Mouth rounded and suctorial. Gills 5-16 pairs. Parasites and scavengers. 45 species. Lampreys (*Petromyzon*) and hagfishes (*Myxine*).

Division II. Gnathostomata

(Gr. *gnathos*, jaw; *stoma*, mouth). Jawed vertebrates having true jaws and paired limbs. For convenience, some taxonomists further divide Gnathostomata into two superclasses. All the fishes and fish-like aquatic gnathostomes are placed in the superclass *Pisces*, whereas all the four-footed terrestrial gnathostomes in the superclass *Tetrapoda*.

Superclass J. Pisces

(L. *piscis*, fish). Fishes or fish-like aquatic forms with paired as well as median fins, gills and scaly skin.

Class 1. **Placodermi**. Several extinct orders of primitive earliest jawed fishes of Palaeozoic with bony head shield movably articulated with trunk shield. Placoderms. *Climatius*, *Dinichthys*.

Class 2. **Chondrichthyes**. (Gr. *chondros*, cartilage; *ichthys*, fish). Mostly marine. Cartilaginous endoskeleton. Skin with placoid scales. Gill-slits not covered by operculum. Pelvic claspers in male. Cartilaginous fishes. Approximately 600 species. *Scoliodon* (dogfish), *Chimaera* (ratfish).

Class 3. **Osteichthyes**. (Gr. *osteon*, bone; *ichthys*, fish). Freshwater and marine. Endoskeleton mostly bony. Skin having various types of scales (cycloid, ctenoid) other than placoid. Gill-slits covered by operculum. Males without claspers. Bony fishes. 20,000 species. *Labeo* (rohu), *Protopterus* (lungfish), *Hippocampus* (sea horse).

Superclass 2. Tetrapoda

(Gr. *tetra*, four, *podos*, foot). Land vertebrates with two pairs of pentadactyle limbs, cornified skin and lungs.

Class 1. **Amphibia**. (Gr. *amphi*, both; *bios*, life). Larval stage usually aquatic and breathes by gills. Adult typically terrestrial and respire by lungs. Skin moist, glandular and with no external scales. Heart 3-chambered. Amphibians. Approximately 2,500 species. *Rana* (frog), *Bufo* (toad), *Ambystoma* (salamander).

Class 2. **Reptilia**. (L. *reptilis*, creeping). Terrestrial tetrapods. Skin dry, covered by ectodermal horny scales or bony plates. Heart incompletely 4-chambered. Cold-blooded. Respiration by lungs. 7,000 species. *Hemidactylus* (wall lizard), *Ummastix* (spiny-tailed lizard), *Naja* (cobra), *Sphenodon*, *Crocodylus* (crocodile).

Class 3. **Aves**. (L. *avis*, bird). Typically flying vertebrates covered with feathers. Forelimbs modified into wings. No teeth in beak. Heart 4-chambered. Warm blooded. Birds. About 9,000 species. *Struthio* (African ostrich), *Columba* (pigeon), *Gallus* (fowl).

Class **4. Mammalia**. (L. *mamma*, breast). Body covered by hair. Skin glandular. Female with mammary glands which secrete milk for suckling the young. Heart 4-chambered. Warm blooded, air breathing vertebrates. 4,500 species. *Echidna* (spiny anteater), *Macropus* (Kangaroo), *Rats* (rat), *Homo* (man).