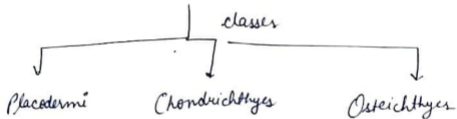


Phylum - Chordata (Euchordata)
Group - Craniata
Division - Gnathostomata
Subphylum - Vertebrata
Super class - Pisces

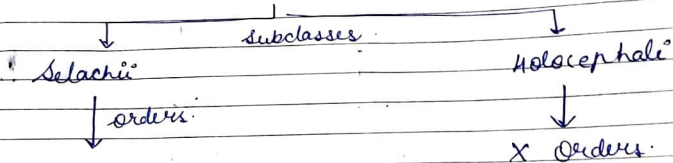


Class 1 → Placodermi

→ (1st Jawed Vertebrates)

→ Extinct

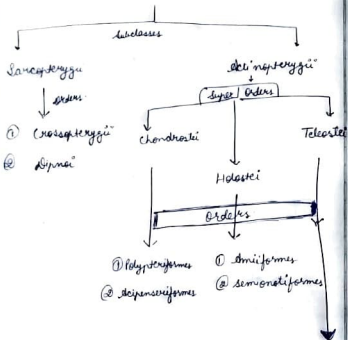
Class 2. → Chondrichthyes



① Squaliformes

② Rajiformes

Class - 3 Osteichthyes



- 1 Clupeiformes 2 Scopheliformes 3 Cypriniformes
- 4 Anguilliformes 5 Belontiiformes
- 6 Syngnathiformes 7 Channiformes

- 8 Gymnarchiformes 9 Mastacembeliformes
- 10 Poaceiformes 11 Scorpaeniformes
- 12 Pleuronectiformes 13 Discocystidi
- 14 Lethiiformes 15 Tetraodoniformes

Class 4. Chondrichthyes

The Cartilaginous Fishes

GENERAL CHARACTERS

1. Mostly marine and predaceous.
2. Body fusiform or spindle shaped.
3. Fins both median and paired, all supported by fin rays. Pelvic fins bear claspers in male. Tail heterocercal.
4. Skin tough containing minute placoid scales and mucous glands.
5. Endoskeleton entirely cartilaginous, without true bones (Gr. chondrus, cartilage + ichthys, fish). Notochord persistent. Vertebrae complete and separate. Pectoral and pelvic girdles present.
6. Mouth ventral. Jaws present. Teeth are modified placoid scales. Stomach J-shaped. Intestine with spiral valve.
7. Respiration by 5 to 7 pairs of gills. Gill-slits separate and uncovered. Operculum absent. No air bladder and lungs.
8. Heart 2-chambered (1 auricle and 1 ventricle). Sinus venosus and conus arteriosus present. Both renal and hepatic portal systems present. Temperature variable (poikilothermous).
9. Kidneys opisthonephric. Excretion ureotelic. Cloaca present.
10. Brain with large olfactory lobes and cerebellum. Cranial nerves 10 pairs.
11. Olfactory sacs do not open into pharynx. Membranous labyrinth with 3 semicircular canals. Lateral line system present.
12. Sexes separate. Gonads paired. Gonoducts open into cloaca. Fertilization internal.



Oviparous or ovoviviparous. Eggs large, yolky. Cleavage meroblastic. Development direct, without metamorphosis.

CLASSIFICATION

The class *Chondrichthyes* (Gr., *chondros*, cartilage + *ichthys*, fish), also called *Elasmobranchii* (Gr., *elasma*, plate + *branchia*, gills), including the sharks, rays, skates and chimaeras, comprises more than 1000 living species of cartilaginous fishes. The classification followed here is based after that of **Romer**.

Subclass I. Selachii

(Gr., *selachos*, a shark)

1. Multiple gill slits on either side protected by individual skin flaps.
2. A spiracle behind each eye.
3. Cloaca present.

Order 1. Squaliformes or Pleurotremata (Gr., *pleuro*, side + *trema*, opening)

1. Body typically spindle-shaped.
2. Gill-slits lateral, 5 to 7 pairs. Spiracles small.
3. Pectoral fins moderate, constricted at base.
4. Tail heterocercal.

Examples : True sharks. About 250 living species. Dogfishes (*Scoliodon*, *Chiloscyllium*, *Mustelus*, *Carcharinus*), spiny dogfish (*Squalus*), seven gilled shark (*Heptanchus*), zebra shark (*Stegostoma*), hammer-headed (*Sphyrna*), whale shark (*Rhineodon*).

Order 2. Rajiformes or Hypotremata (Gr., *hypo*, below + *trema*, opening)

1. Body depressed, flattened dorso-ventrally.
2. Gill-slits ventral, 5 pairs.
3. Pectoral fins enlarged, fused to sides of head and body.
4. Spiracles large, highly functional.

Examples : Skates and rays. About 300 species. Skate (*Raja*), stingray (*Trygon*)

Class Chondrichthyes : The Cartilaginous Fishes

electric ray (*Torpedo*), eagle ray (*Myliobatis*), guitar fish (*Rhinobatus*), sawfish (*Pristis*).

Subclass II. Holocephali

(Gr., **holos**, entire + **kephale**, head)

1. Single gill opening on either side covered by a fleshy operculum.
2. No spiracles, cloaca and scales.
3. Jaws with tooth plates.
4. Single nasal opening.
5. Lateral line system with open groove.

Examples : Rat fishes or chimaeras. About 25 species. *Hydrolagus* (= *Chimaera*).