ELASMOBRANCHS : OVERVIEW

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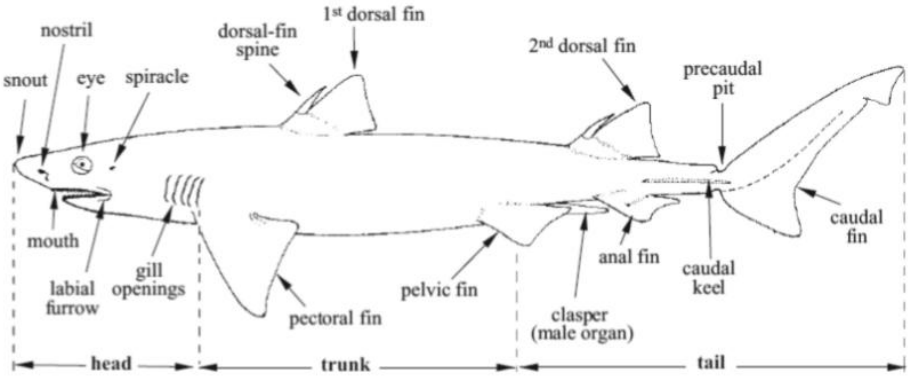
The term Elasmobranchs or chondrichthyans refers to the group of marine organisms with a skeleton made of cartilage. They include sharks, skates, rays and chimaeras. These organisms are characterised by and differ from their sister group of bony fishes in the characteristics like cartilaginous skeleton, absence of swim bladders and presence of five to seven pairs of naked gill slits that are not covered by an operculum. The chondrichthyans which are placed in Class Elasmobranchii are grouped into two main subdivisions Holocephalii (Chimaeras or ratfishes and elephant fishes) with three families and approximately 37 species inhabiting deep cool waters; and the Elasmobranchii, which is a large, diverse group (sharks, skates and rays) with representatives in all types of environments, from fresh waters to the bottom of marine trenches and from polar regions to warm tropical waters with over 950 different species. Chimaeras are big eyed, stomachless, deep-sea creatures that possess an upper jaw which is fused to its cranium (unlike in sharks). The great majority of the commercially important species of chondrichthyans are elasmobranchs. The latter are named for their plated gills which communicate to the exterior by 5–7 openings. In total, there are about 869+ extant species of elasmobranchs, with about 400+ of those being sharks and the rest skates and rays. Taxonomy is also perhaps infamously known for its constant, yet essential, revisions of the relationships and identity of different organisms. Classification of elasmobranchs certainly does not evade this process, and species are sometimes lumped in with other species, or renamed, or assigned to different families and other taxonomic groupings. It is certain, however, that such revisions will clarify our view of the taxonomy and phylogeny (evolutionary relationships) of elasmobranchs, leading to a better understanding of how these creatures evolved.



Characteristics of Elasmobranchs

- Skeleton is made of cartilage rather than bone
- Five to seven gill openings on each side
- Rigid dorsal fins (and spines if present)
- Spiracles to aid in breathing
- Placoid scales (dermal denticles)
- The upper jaw of elasmobranchs is not fused to their skull.
- Elasmobranchs have several rows of teeth which are continually replaced.
- They don't have swim bladders, but instead their large livers are full of oil to provide buoyancy.
- Elasmobranchs reproduce sexually with internal fertilization and either bear live young or lay eggs.

Types of Elasmobranchs

There are over 1,000 species in Class Elasmobranchii, including the southern stingray, whale shark, basking shark, and the shortfin mako shark.

The classification of elasmobranchs has undergone revision again and again. Recent molecular studies have found that skates and rays are different enough from all of the sharks that they should be in their own group under elasmobranchs.

Differences between sharks and skates or rays are that sharks swim by moving their tail fin from side to side, while a skate or ray may swim by flapping their large pectoral fins like wings. Rays are adapted for feeding on the ocean floor.

Sharks are well-known and feared for their ability to kill by biting and tearing. Sawfishes, now endangered, have a long snout with protruding teeth that looks like

a chainsaw blade, used for slashing and impaling fish and probling in mud. Electric rays can generate an electric current to stun their prey and for defense.

The Evolution of Elasmobranchs

The first sharks were seen during the early Devonian period, about 400 million years ago. They diversified during the Carboniferous period but many types went extinct during the big Permian-Triassic extinction. The surviving elasmobranchs then adapted to fill the niches available. During the Jurassic period, skates and rays appeared. Most of the current orders of elasmobranchs trace back to the Cretaceous or earlier.

The classification of elasmobranchs has undergone revision again and again. Recent molecular studies have found that skates and rays in the Batoidea subdivision are different enough from the other types of elasmobranchs that they should be in their own group separate from the sharks.