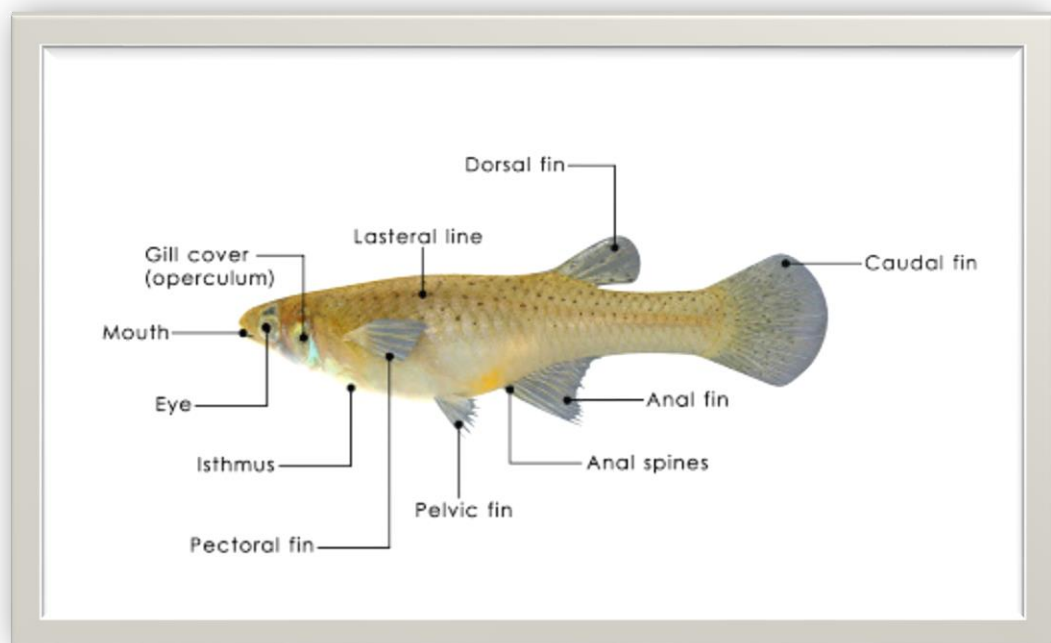


External Fish Anatomy

Fish are animals that are cold-blooded and have fins and a backbone. Most fish have scales and breathe with gills. Approximately 22,000 species of fish began evolving 480 million years ago.

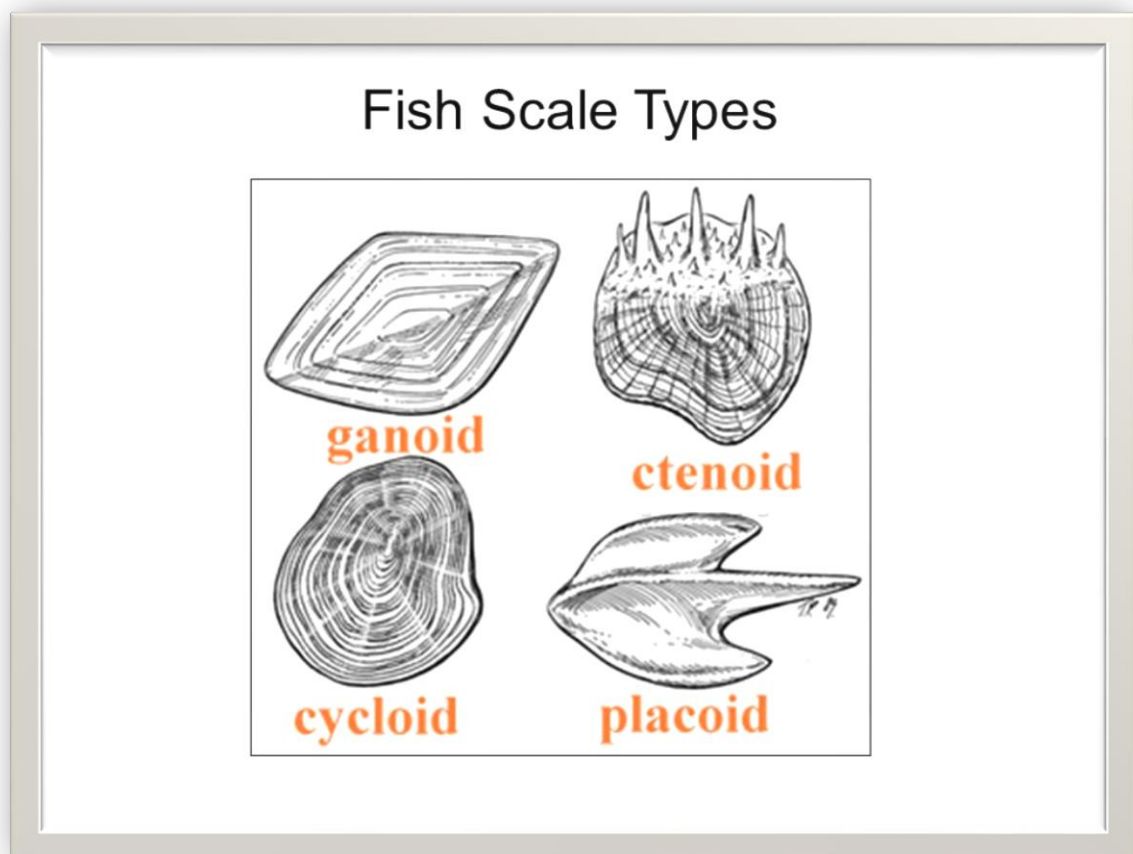
Fins

Fins are appendages used by the fish to maintain position, move, steer and stop. They are either single fins along the centerline of the fish, such as the dorsal (back) fins, caudal (tail) fin and anal fin, or paired fins, which include the pectoral (chest) and pelvic (hip) fins. The dorsal and anal fins primarily help fish to not roll over onto their sides. The caudal fin is the main fin to push and to move the fish forward. The paired fins assist with steering, stopping and hovering



Scales

Scales found in most bony fish. Gar have ganoid scales, catfish have no scales while other have ctenoid or cycloid scales. Most fish also have a very important mucus layer covering the body that helps prevent infection. Anglers should be careful not to rub this “slime” off when handling a fish that is to be released.



Gills

The gills are the breathing apparatus of fish and are highly vascularized, which gives them their bright red color. An operculum (gill cover) is a flexible bony plate that protects the sensitive gills. Water is “inhaled” through the mouth, passes over the gills and is “exhaled” from beneath the operculum.

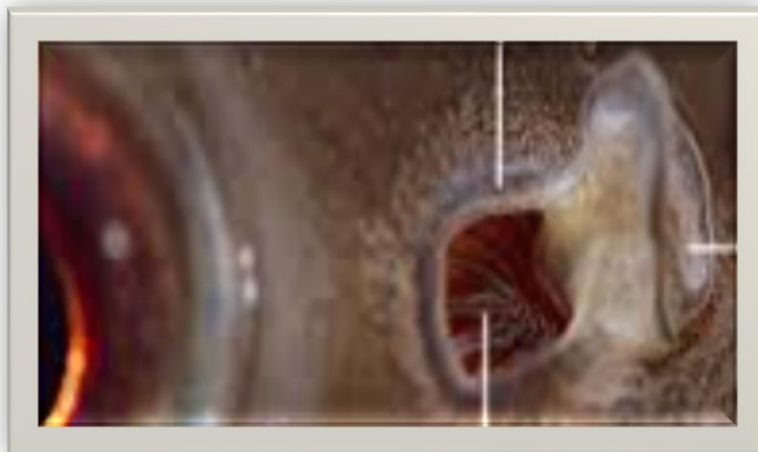


Eyes

Fish can detect color. Fish eyes are more round than in mammals because of the refractive index of water and focus is achieved by moving the lens in and out, not distorting it as in mammals.

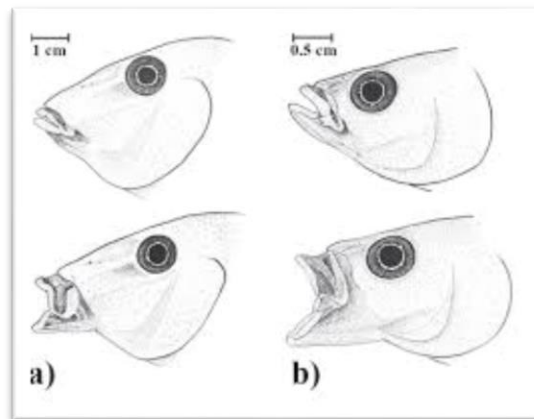
Nares

Paired nostrils, or nares, in fish are used to detect odors in water and can be quite sensitive. Eels and catfish have particularly well developed senses of smell.



Mouth

The mouth's shape is a good clue to what fish eat. The larger it is, the bigger the prey it can consume. Fish have a sense of taste and may sample items to taste them before swallowing if they are not obvious prey items. Most freshwater are omnivorous. Some are primarily piscivorous, which means eating mostly other fish. The imported grass carp is one of the few large fish that are primarily herbivorous. Fish may or may not have teeth, depending on the species.



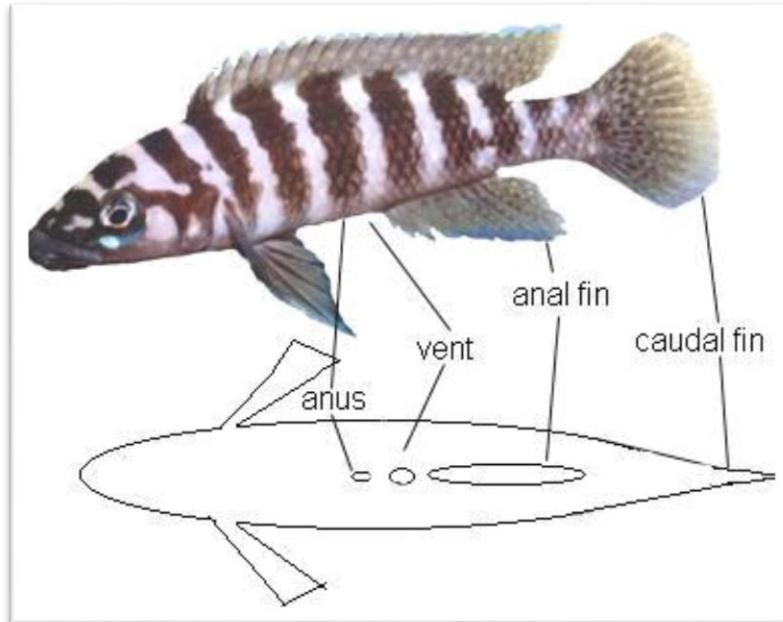
Lateral Line

The lateral line is a sensory organ consisting of fluid filled sacs with hair-like sensory apparatus that are open to the water through a series of pores, creating a line along the side of the fish. The lateral line primarily senses water currents pressure and movement in the water.



Vent

The vent is the external opening to digestive urinary and reproductive tracts. In most fish it is immediately in front of the anal fin.



Internal Fish Anatomy

Spine

The primary structural framework, upon which the fish's body is built, connects to the skull at the front of the fish and to the tail at the rear. The spine is made up of numerous vertebrae, which are hollow and house and protect the delicate spinal cord.



Spinal cord

Connects the brain to the rest of the body and relays sensory information from the body to the brain, as well as instructions from the brain to the rest of the body.

Brain

This is the control center of the fish, where both automatic functions, such as respiration, and higher behaviors occur. All sensory information is processed here.

Swim (Or Air) Bladder

This hollow, gas-filled balance organ allows a fish to conserve energy by maintaining neutral buoyancy (suspending) in water. Fish caught from very deep water sometimes need to have air released from their swim bladder before they can be released and return to deep water, because of the difference in atmospheric pressure at the water's surface.



Kidney

This filters liquid waste materials from the blood, and these wastes are then passed out of the body. The kidney is also extremely important in regulating water and salt concentrations within the fish's body, allowing certain fish species to exist in freshwater or saltwater, and in some cases both.



Stomach And Intestines

These break down food and absorb nutrients. Fish such as bass that are piscivorous have fairly short intestines because such food is easy to chemically break down and digest. Fish such as tilapia that are herbivorous require longer intestines because plant matter is usually tough and fibrous and more difficult to break down into usable components.

Liver

This important organ has a number of functions. It assists in digestion by secreting enzymes that break down fats, and it also serves as a storage area for fats and carbohydrates. The liver also is important in the destruction of old blood cells and in maintaining proper blood chemistry, as well as playing a role in nitrogen (waste) excretion.



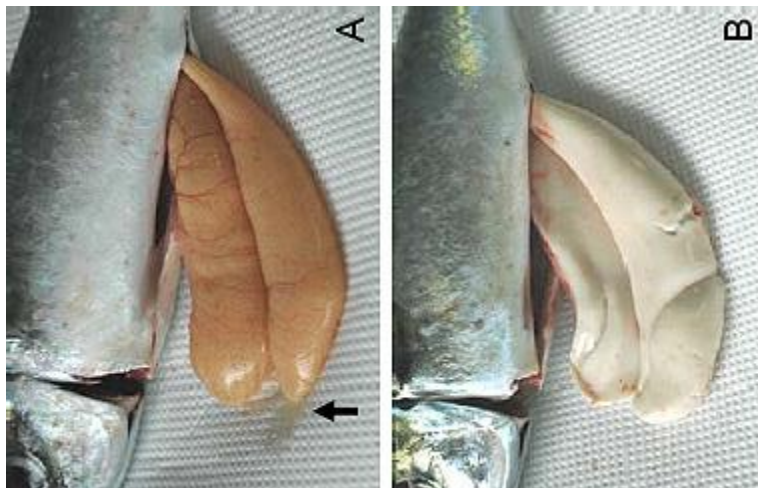
Heart

This circulates blood throughout the body. Oxygen and digested nutrients are delivered to the cells of various organs through the blood.



Gonads (Reproductive Organs)

The gonads are the organs that produce sex cells. Male fishes usually have paired testes that produce sperm. Females usually have paired ovaries that produce eggs. The method by which the eggs and sperm meet varies widely among fishes. Many species are broadcast spawners, shedding their eggs and sperm into the water to fertilize external to the body. Others such as sharks and rays have internal fertilization where the sperm are released into the body of the female.



Muscles

Provide movement and locomotion. This is the part of the fish that is usually eaten, and composes the fillet of the fish

