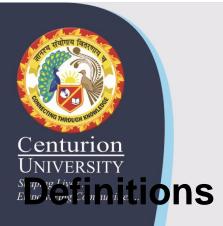


Osmoregulation

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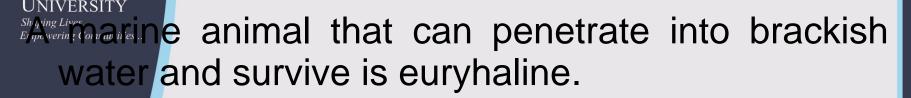
Osmoregulation

Most marine invertebrates have body fluids with the same osmotic pressure as the sea water; they are isosmotic or isosmotic.

One way is to change the osmotic concentration of its body fluids to conform with that of the medium, thus remaining isosmotic with the medium; such an animal is an osmo-conformer. concentration is spite of external concentration changes; such an animal is called an osmoregulator.

Fresh-water animals have body fluids that are osmotically more concentrated than the medium; these animals are *hyperosmotic*.

Some aquatic animals can tolerate wide variations in the concentration of the water in which they live; they are called euryhaline animals.



An extremely euryhaline animal may even be able to tolerate shorter or longer periods in fresh water.

There is no sharp separation between euryhaline and stenohaline animals.



Osmoregulation

maintenance of water and salt balance of the body tissues in fishes, whether they live in fresh, marine or brackish waters.

Osmoregulatory problem in freshwater fishes

reptiles and mammals that live in freshwater are osmoregulators.

Their body fluids (1/3rd of the concentration of seawater) have a greater concentration than their surrounding environment (hyperosmotic).

Skin has low permeability to water and salt ions, hence very little water is allowed to enter the body or salt to diffuse out through it.

University Sin pine Lives... Generation of the continous inflow of water through gills, freshwater fishes produce a large amount of dilute urine.

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Osmoregulatory problem in marine fishes

Comparison to freshwater fishes because their internal salt content is less than that of the surrounding water.

Marine teleosts are hypoosmotic (body fluids 1/3 of that seawater) and live in a medium ing high concentration of salts.

marine fish has an internal osmotic concentration lower than that of the surrounding seawater, so it tends to lose water and gain salt.



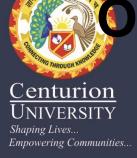
single of the gills.

Marine fishes are faced with the problem of continuous loss of water and gain salts.

As marine fish drinks seawater and Na and Cl ions are actively absorbed through the gut.

Many species are reported to drink water >25% of their body weight/day, of which 80% is absorbed.

water by the special cells in the gills, oral membrane and inner surface of the operculum.



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The chondrichthyes maintain osmotic concentration of blood nearly at the same level as that of seawater (isoosmotic) and are not in danger of dehydration and do not drink seawater

This is achieved by retaining nitrogen containing compounds, mainly urea and trimethylamine oxide (TMAO) in the blood, which is slightly hyperosmotic to seawater. so that it is retained in the blood in large quantity to raise the osmotic concentration of blood to a slightly higher level than seawater.

The osmotic balance in these fishes is maintained by retention of high level of urea in the blood.

Whereas, freshwater sharks have a lowered concentration of urea in the blood.

elasmobranchs which helps in osmoregulation by excreting NaCl.

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Migratory fish are hyperosmotic to their environment during some periods and hypeosmotic at other times.

To complete their life cycle, amphihaline fishes show remarkable adaptation in being able to migrate from the sea to freshwater bodies or vice versa.

They have to survive in 2 different environments for the sake of their progeny.

becoming reproductively mature starts migrating to breed in riverine or land locked freshwater.

The young born in freshwater migrate into seawater and live there until they are in turn mature and ready to spawn in freshwater.

These fish eg. Salmon and hilsa are known as amphihaline potemotocous.

spends several years in these surroundings and undergoes important morphological, biochemical and physiological modifications before undertaking downstream migration to marine feeding grounds.