

Gas exchange systems of fish and mammals essay sample

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Different organisms occupy different environment, which requires them to adapt to those conditions to ensure their survival. In this sense, there exist vast physical forms between fish and mammals due to their opposing habitats (water and air respectively). However, the main distinguishing characteristic is the structure of their gaseous exchange system.

Fish use water as their respiratory medium. Hence they require an efficient respiratory system. This is because water has less oxygen than air. Fish require a complex respiratory system that will extract oxygen from water. The respiratory system of fish consists of evaginations of epithelium which are known as gills. The gill structure consists of two rows of filaments and lamellae, which creates a large surface area for respiration (Kent112).

There occurs a unidirectional flow of water through the gills. First, the operculum closes and the mouth opens. Water rushes into the mouth, which then closes, and the operculum opens. During this process, gaseous exchange takes place, with oxygen being absorbed into the fish body while carbon dioxide is released to the water. Counter- current system makes it efficient for the fish to take the maximum amount of oxygen from the water. This simply means that blood in the capillaries flow in the opposite direction to the direction of water in the lungs (Kent 112). This ensures that the oxygen concentration in blood is lower than that of water, hence allowing for highest saturation of oxygen in the blood. This system extracts about 80% of the available oxygen from water.

Mammals have lungs for gaseous exchange in place of gills in fish. The lungs exist as invaginations in the thoracic cavity. The gaseous exchange system

in mammals is less efficient than that of fish. Only 25% of oxygen inhaled is extracted by mammals. There is a bidirectional flow of air into and out of the lungs.

The two gaseous exchange systems serve the same purpose. However, the differences in the environment have forced the organisms to develop complex system to extract oxygen from their respective surfaces.

Work Cited

Kent, Michael. Advanced Biology. Oxford: Oxford University Press, 2000. Print