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Cilia and their movement

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We have seen that cilia are microscopic hair like extensions from the free surface of a cell. They are present in diverse forms of life - like paramecia, sponges, earthworms, snails, humans, algae, mosses, ferns, cycas etc. They are universal in occurrence and have the same [9\(2\) + 2](#) structure.

Cilia in protista (euglena, paramecium, volvox etc.) can effect locomotion in these tiny beings. If they beat faster the swimming speed of an animal increases. Changes in their beat form, can cause the animal to turn or to reverse its direction of swimming or can even completely arrest the swimming movement.

A thin layer of mucus covers cilia in human airways. The disease causing germs are trapped here. The cilia beat rapidly in a coordinated microscopic broom like manner to push particles (dust and pathogens) trapped in the mucus layer to the pharynx. We then spit out and get rid of the mucus from pharynx or swallow it to subject to strong acid in gastric juice.

If this function of cilia is not carried out properly lungs and respiratory tract often shows infections.

The walls of the ventricles (cavities) of our brain and central canal in spinal cord shows a lining of ciliated cells (Ependymal cilia). There are about 40 cilia at the tip of each cell. The cilia here are known to move the CSF (Cerebro Spinal Fluid). Improper functioning of the cilia in this region is known to lead to hydrocephalus, a disorder in which head of a baby enlarges to look like an earthen pot. Cilia beat actively i.e. at expense of energy to the cell, in organized, rhythmic waves - rigid in the power stroke, flexible in recovery. During the recovery stroke of the cilium the bend passes from base to tip. There is a group of inherited disorders such as Primary ciliary dyskinesia (PCD) and Cartagena's immotile cilium syndrome (Also known as Kartagener's syndrome). The

patients show abnormal ciliary activity often accompanied with abnormal ciliary ultrastructure - such as arms of 'A' fibrils or spokes are missing. Please see the [T.S. of cilium](#). The patients do not have the ability to sweep their respiratory passages clean and suffer from diseases of respiratory system. Male patients show immotile sperms as flagella and cilia have same basic structure and mechanism of movement.

Kartagener's syndrome patients often show a peculiar mirror image like transposition of internal organs. In this condition, called "situs inversus" the heart is transposed to the right side of the chest, and the internal abdominal organs including the gut, may also be transposed. Probably cilia are involved in choice of direction during embryonic development and their lack of motility or abnormal motility rotates the embryonic organs in the opposite direction.

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