Chapter 17

Web Text Box 4

Myosin in plants: cytoplasmic streaming

We describe on book page 290 how the crawling movement of an amoeba or a white blood cell is driven by the molecular motor myosin acting on actin filaments. The cells of flowering plants are surrounded by a cell wall and certainly do not crawl. Nevertheless the cells of some plants, such as the common pondweed *Elodea*, use a similar mechanism in which myosin acts on cytoplasmic actin. However in this case the object is to stir the cell contents. A belt of moving cytosol carries the chloroplasts and other organelles in a continuous, unidirectional stream around the central vacuole. As with the crawling animal cells, the cortical actin cytoskeleton makes the cytoplasm close to the edge of the cell into a highly viscous ectoplasm, while the more central cytoplasm is a fluid endoplasm. Myosin molecules attached to the organelles in the endoplasm act on cables of actin filaments in the ectoplasm and pull the organelles along.