ACTIN: A KEY PLAYER FOR LOCOMOTION

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Edgar and Pickett/Heaps (1984) proposed a mechanism for pennate diatom gliding, involving polysaccharide/proteoglycans fibers, which attach to the substratum while they remain connected through the plasmamembrane via myosin bridges with one of the two prominent actin cables that run parallel to the raphe. Force is generated by the actin/myosin system, i.e., as myosin molecules move along the actin cable, the entire cell becomes displaced against the mucilage threads as long as they remain firmly attached to the substratum. The molecular details of the mechanism, however, are not well understood, though it has been proven, that the actin cytoskeleton is an essential component for gliding. It is known from diverse organisms, that actin is required for the establishment and maintenance of cell polarity and morphology. For instance, it is required for intracellular trafficking, endocytosis, as well as cytokinesis. Despite its importance, up to date very little is known about the actin cytoskeleton in Diatoms. We are using the large freshwater diatom *Craticula cuspidata* to visualize the intracellular processes while the cells are engaged in gliding. We have established an immunofluorescence protocol for this non-model organism, which allows us to visualize the actin- as well as the microtubule cytoskeleton of *C. cuspidata*. To analyze the internal structure of the endomembrane system and cell organelles, vital staining procedures with fluorescent dyes have been sucessfully established, the resulting images complement electron microscopic observations. We identified and sequenced two different actin genes from *C. cuspidata* and analyzed their primary structure in comparison with actin sequences known from other diatoms.