

Motor activity of paramecium

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Abstract

A systemic study of the mechanisms of motor activity of paramecium was carried out. The movements of paramecium responding to various influences were photographed. The analysis of the data revealed the time dependences of the rate of movement, rate of rotation, and the radius and the pitch of the helix trajectory. Mathematical models of the membrane and a unit that transforms the calcium signal to programs of regulating the effectors were constructed. A system of equations for constructing the trajectory of movement was proposed. It is concluded that the biomolecular system that involves calmodulin, calmodulin-dependent ionic channels, adenylate cyclase, guanylate cyclase, phosphodiesterases, Ca²⁺-calmodulin, cAMP, cGMP-dependent protein kinases, and phosphoprotein phosphatases is capable of regulating motor reactions necessary for complex maneuvering of paramecium under various conditions.

Keywords

Biomolecular system, Calcium signal, Motor activity, Time dependences