

SURFACE STRUCTURES MOVEMENT RELATED TO LOCOMOTION OF A. PROTEUS

S.P. Krechetov, V.V. Smolyaninov

Mechanical Engineering Research Institute, Russian Academy of Sciences;
Moscow, 117334, Russia

Actomyosin proteins interaction is known to be basic biochemical mechanism of all types cell motility. However, little is known about the role of cellular structures in mechanics of cell locomotion. By placing soot particles (5-50 μm) on the surface of *Ameba proteus* and observing their motion by light microscopy we study involvement in ameba locomotion the plasma membrane and associated structures. It was shown that particles move forward relatively the attachment surface and ectoplasm with rates, similar whole ameba. In the same time position of particles are practically steady in relation to the moving

cell contour. In relation to substrate, rates of particles, placed on the dorsal surface of ameba, are a little higher than whole ameba rate, but this difference is statistically significant. Particles to be on the lateral surface of ameba, move with rates equal or low those of ameba. Lower rate values take place in the rear part of ameba. Described particles movement show that plasma membrane and associated structures slide over the ectoplasm. In other words plasma membrane demonstrates properties of two dimension fluid distributed on the surface of ectoplasm tube. Such point of view is in agreement with idea that plasma membrane includes fluid lipid bilayer with incorporated proteins and other macromolecular components, to be capable to lateral diffusion in the plane of the membrane. So cytoskeleton reorganization during ameba locomotion can change form plasma membrane without any essential strength. Adhesion contacts with substrate prevent membrane flow on the ventral surface of ameba. It case dorsal-ventral rate gradient with increasing of rate on the dorsal ameba surface to compensate deficiency of ventral membrane flow.