Membrane dynamics during locomotion of *Amoeba proteus*

Atsushi TANIGUCHI, Yukinori NISHIGAMI, Teruo SHIMMEN and Seiji SONOBE
(Graduate Sch. Life Science, Univ. Hyogo)

SUMMARY

In order to explain membrane dynamics during amoeboid movement, the tank track model and the retrograde lipid flow (RLF) model have been proposed. The former suggests that the cell membrane furthest from the substrate advances to the dorsal surface at the posterior region, and returns to the ventral surface at the anterior region. Alternatively, the RLF model suggests that membrane vesicles sequestered by endocytosis at the posterior region move to the anterior region through the cytoplasm, and fuse with the membrane at the tip of the pseudopod by exocytosis. No clear conclusion has been reached yet. To solve this problem, we analyzed membrane dynamics during locomotion of *Amoeba proteus*. To visualize membrane movement, amoebae were marked with either Alexa488-ConA or charcoal particles. Neither marker migrated at either the anterior or posterior region, and that on the dorsal surface moved in the direction of cytoplasmic flow. Neither tank track nor RLF models can explain this observation. In addition, the gel region of the cytoplasm remained stationary relative to the substrate during locomotion. This suggests that displacement between the gel region and the membrane might occur. During observation following Alexa488-ConA staining, the total fluorescence intensity did not change. However, Alexa488-ConA was sequestered intracellularly after prolonged incubation. This suggests that the filamentous sugar coat on the plasma membrane may stay constant during locomotion, and be recycled slowly by endocytosis and exocytosis.