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論文題目	A Computational Model of Cell Migration of Fish Keratocytes			

Fish keratocyte usually show a circular shape; however, they change their shape to a half-moon shape when they begin migration. Whether it is possible to acquire propulsive force by keeping a half moon shape is an interesting problem in studying the cell migration mechanism of keratocytes. The purpose of this research is to clarify the role-relationship between keratocyte morphology and motor function by physical simulation experiments considering intracellular mechanism.

Previous studies have reported that during cell migration actin molecules extend their head toward the cell membrane by actin polymerization (AP). Cells are deformed by AP at every part near the cell membrane. The actin molecules are pulled back toward the stress fiber (SF), a bundle of actin fibers spreading from side to side of the rear part of the cell. This effect is called actin retrograde flow (ARF).

In the computer simulation of this study, the cell membrane were modeled by a network of simple particles and placed on the cylindrical surface as an initial condition. Each particle of the membrane was assumed to receive elastic force from neighboring particles and receive repulsive force from actin molecules. Assuming that the polymerized actin molecule is rod-like(Length 0 in the initial state), AP was expressed by a stochastic extension of one end and depolymerization was expressed by a stochastic contraction of the opposite end. The polymerization direction of the actin molecule in the initial state was randomly determined, and the actin molecule in the initial state was arranged so as to be in the right half donut shape. ARF was expressed by moving actin molecules towards SF stochastically. The conditions were set so that when the head of actin molecule polymerized extracellularly, the position of the molecule returned to the vicinity of the cell membrane.

As a result, the actin molecule aggregated in a half-moon shape under the condition that SF was expressed by two points at the backward of the cell. Moreover, it was found that the condition that the polymerization frequency increases in the high actin molecule density area and the amount that AP and ARF move actin molecule are also important for forming a half-moon shape.