

Synthesis of Lipid Bilayer Adhesion Polymers Containing Zwitterions (VI) -Hemagglutination by Zwitterionic Polymers-

(¹Graduate School of Science & Engineering, Saitama University, ²Advanced Institute of Innovative Technology, Saitama University, ³Strategic Research Center, Saitama University)

○Hiroki Kato¹, Takahiko Matsushita^{1, 2, 3}, Tetsuo Koyama¹, Ken Hatano^{1, 2, 3}, Koji Matsuoka^{1, 2, 3}

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The cell membrane is composed of a lipid bilayer, with phosphatidylcholine (PC) being the predominant phospholipid constituent. Recent research has reported a cell membrane adhesion molecule that interacts with the PC headgroup¹⁾. This molecule is a spherical compound with multiple choline phosphates (CP), which are in the opposite charge order to PC, and it adheres to the cell membrane through electrostatic interaction between CP and PC.

Based on the knowledge of membrane adhesion molecules reported in this research, we designed polymers using sulfobetaine (SB), which is a zwitterion like CP. CP is superior for membrane adhesion via electrostatic interaction with PC, but has issues of chemical stability and synthetic difficulty. To solve these issues, SB, which is chemically stable and easy to synthesize, was chosen.

The objective of our study is to synthesize zwitterionic polymers that adhere to lipid bilayers and functionalize the membrane surface. For this end, we have synthesized polymers with varying numbers and densities of zwitterions, with the objective of investigating their behavior towards cell membranes and liposomes, as well as the state of the membrane surface at that time.

In this study, erythrocyte aggregation assays were performed with synthesized polyacrylamide containing zwitterions to observe changes in membrane adhesion and membrane influence by zwitterionic polymers. As a result, aggregation occurred, suggesting adhesion by zwitterions.

1) X. Yu, *et al.*, *Nature Materials*, **2012**, 11, 468-476.