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Preparation of ionic polymer bead-supported lipid system using naturally occuring phospholipids

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【Objective】We have reported an ionic polymer bead-supported lipid system of which the formation of bilayer membrane on the surface of beads is promoted by the electrostatic interaction of anionic lipids with cationic beads. In this study, this system was extended to naturally occurring phospholipids, and an attempt was made to reconstitute biological membranes onto beads.

【Methods】Naturally occurring phospholipids were treated by a probe-type sonicator in 0.05 M Tris buffer(pH 8.5), and then shaken with SA11A(a quaternary ammonium-type polymer bead, 0.35-0.55 mm in diameter) at 55°C for 30 min. Rat red blood cell(RBC) unsealed ghosts were suspended in 0.01 M Tris-HCl buffer(pH 7.4) and then sonicated in an ice bath. SA11A was shaken with the RBC ghosts at 25°C for 30 min. The amounts of phosphorus and protein bound to the beads were measured by colorimetry subsequent to wet digestion and Lowry method, respectively.

【Results and discussion】With naturally occurring phospholipids, the amount of phosphorus bound was 44 μg/mL-bead. While the amounts of phosphorus and protein in the SA11A-ghost complex were 49.7 and 157 μg/mL-bead, respectively. When a membrane probe, octadecyl rhodamine, was added to the RBC ghosts in the preparation of the SA11A-ghost complex, fluorescence microscopy revealed that the ghost membranes were located along the outline of the beads. These results suggest that our system can be extended to naturally occurring phospholipids and biological membrane samples.