Examination of reconstituted membrane proteins
- Do proteins prefer specific membranes?

Motivation
Cellular membrane is composed of various different lipid molecules and is non-uniform, which has recently been reported to affect on the function of the buried membrane proteins. We examine the characteristics of membrane protein by reconstituting them into different lipid membranes.

Originality
By changing lipid compositions, we succeeded in fabricating the lipid membrane containing high and low domains. We also discovered that the membrane protein has preferences in reconstituted into specific lipid membrane.

Impact
Understanding the characteristics of membrane proteins can be an implement to revealing the mechanism of biological systems. Beyond that, it can allow us to develop ultra-small devices with biological functions such as nanobio devices, including single protein sensors and implantable communication devices.

This study has been done as collaboration with University of Oxford.

Illustration of cell membrane. Lipid composition is not uniform.

A: Succeeded in fabrication of artificial non-uniform lipid bilayer containing high and low domains. (2.5x2.5 µm)
B: Height profile at white line in A.
C: Membrane proteins reconstituted into non-uniform lipid membrane. (0.5x0.5 µm) Preference of membrane protein in high domain was observed.