

Physical chemistry of phospholipids and fats

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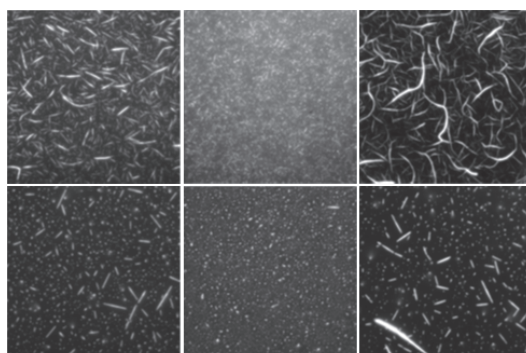
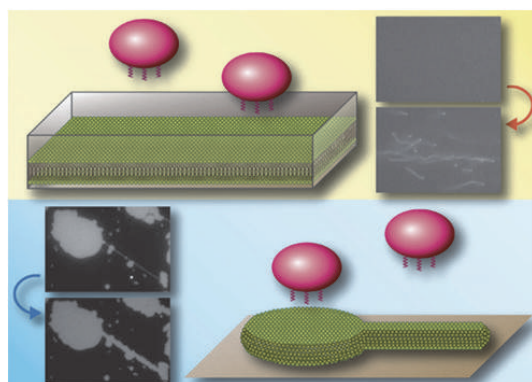
Background

- Supported bilayers are useful biomimetic models for understanding the interaction of amphiphilic molecules with biological membranes.
- The interaction between phospholipids and fats occurring in biological systems is not well understood.

Aim

- We investigated the processes of amphiphile insertion in phospholipid bilayers using glass-supported bilayers.
- We investigated the behaviors of phospholipid molecules in triacylglycerols that are major components of biological fats.

Advanced Research Topics



When the amphiphiles are bound to bilayers with restricted areas, lipid fibrils extend (upper). When the amphiphiles are inserted in bilayers with tunable areas, bilayer area expansion occurs (below). The area increase is dependent on the bilayer patch shape.

Phospholipid molecules form reverse micelles in triacylglycerols. We identified the parameter that determines the structures of the reverse micelles using fluorescence microscopy.

Publications

- C. Kataoka-Hamai, Y. Kaizuka, T. Taguchi, *Langmuir* 2016, 32, 1250.
- C. Kataoka-Hamai, T. Yamazaki, *Langmuir* 2015, 31, 1312.
- C. Kataoka-Hamai, M. Higuchi, *J. Phys. Chem. B* 2014, 118, 10934.

Summary

- The amphiphile insertion in supported bilayers is dependent on the restricted/unrestricted bilayer areas and the bilayer edge tension.
- Phospholipids form various reverse micelles in triacylglycerols.

Research outcome

- Biosensors