<u>Title</u>: Lipid organization in biomembranes

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<u>Course Objective</u>: Current advance of lipid research changed our concept of lipids from building blocks of the membrane to the central platform of various biological events. The aim of this course is to introduce students to the current view of lipid organization in biomembranes and to the recent techniques of imaging lipids and lipid domains.

<u>Learning Goals</u>: during this course, the students will:
1. learn current view of lipid organization in biomembranes
2. learn different techniques including up-to-date ones to study organization in biomembranes
3. get prepared for further learning of lipid biophysics/cell biology.

<u>Class Plan</u>:
Day 1: Introduction; provide current view of lipid organization in biomembranes by revisiting milestone papers.
Day 2: Recent techniques of imaging lipids and lipid domains.
Day 3: Discussions & conclusions

<u>References</u>:
Hullin-Matsuda F, Taguchi T, Greimel P, Kobayashi T. (2014) Lipid compartmentalization in the endosome system. *Sem Cell Dev Biol* 31, 48-56.
Kishimoto T, Ishitsuka R, Kobayashi T. (2016) Detectors for evaluating the cellular landscape of sphingomyelin- and cholesterol-rich membrane domains. *Biochim. Biophys Acta* 1861, 812-829.
Sezgin, E., Levental, I., Mayor, S., and Eggeling, C. (2017) The mystery of membrane organization: composition, regulation and physiological relevance of lipid rafts. *Nat Rev Mol Cell Biol* 18, 361–374.
Steck TL, Lange Y. (2018) Transverse distribution of plasma membrane bilayer cholesterol: Picking sides. *Traffic* 19, 750-760.
Kobayashi T, Menon AK (2018) Transbilayer lipid asymmetry. *Curr Biol* 28, R386-R391.

<u>Grading Policy</u>: The marking will be done as follows: 50% class participation; 50% final report.