Séminaire

Mardi 30 mai 2023 à 10h30

Amphithéâtre Henri Benoît

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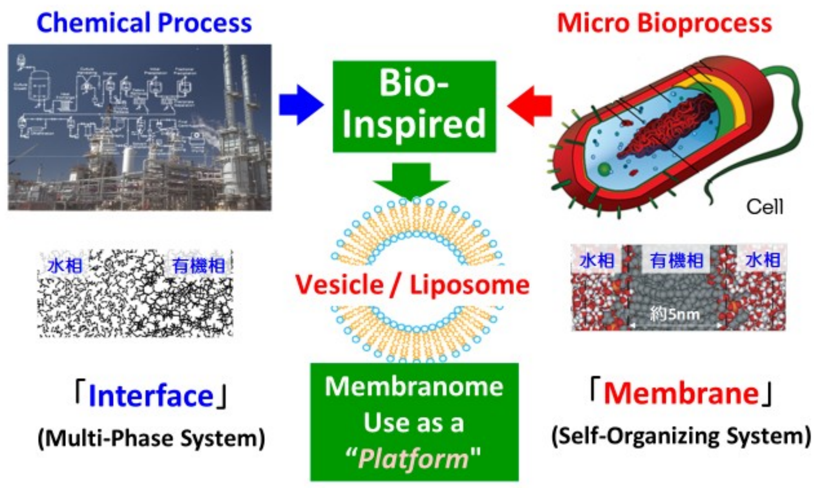
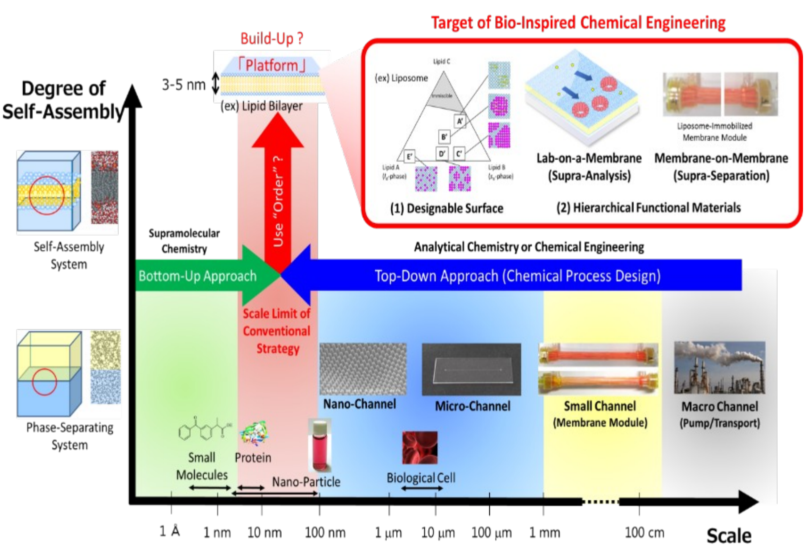
"*Bio-Inspired*" Chemical Engineering Utilizing Self-Organizing System



A "*Biomembrane*" is a highly-organized self-assembly of biomolecules (i.e. lipid, protein etc.) and a key interface for the survival of biological cell. The "*Membranome*" can be defined as the properties of vesicle (or liposome), which arise from the bilayer molecular assembly of amphiphiles, focusing on "*emergent properties*" which are not present in the individual components, and is gradually recognized as an important research methodology to investigate the potential functions of vesicles (or liposome) and to apply them for the bioprocess design. "*Self-Organizing System*", such as liposome or vesicle, possesses several benefits in the recognition of (bio)molecules, where it can recognize them with



(i) electrostatic, (ii) hydrophobic interaction, and (iii) stabilization effect of hydrogen bonds at its surface. A key of next chemical engineering is the use of "*Self-Organizing System*", where "enthalpy-driven" nature of chemical process would be converted to "entropy-driven" one. We call this strategy as "*Bio-Inspired Chemical Engineering*". I would like to introduce the basic and applied aspect of the self-organizing system: (1) Phase Equilibrium and Physicochemical Properties of Self-Organizing System, (2) Functions of Self-Organizing System (i.e. Chiral Recognition Function etc.), and (3) Its Application to the Development of the Chemical Process Devices (i.e. Membrane Module for Optical Resolution etc.).

Les personnes souhaitant rencontrer H. Umakoshi sont priées de prendre contact avec Fabrice Thalmann.

[Publications] *Langmuir*, **24(3)**, 350-354 (2008) / *Langmuir*, **24(9)**, 4451-4455 (2008) / *Langmuir*, **24(19)**, 10537-10542 (2008) / *Langmuir*, **25(9)**, 4835–4840 (2009) / *J. Appl. Electrochem.*, **39(10)**, 2035-2042 (2009) / *Colloid Surface B*, **88**, 221-230 (2011) / *Nucleic Acid Res.*, **39**, 8891-8900 (2011) / *Biochem. Biophys. Res. Comm.*, **426(2)**, 165-171 (2012) / *AIChE J.*, **57(12)**, 3625–3632 (2012) / *Langmuir*, **29(6)**, 1899–1907 (2013) / *Langmuir*, **29 (15)**, 4830–4838 (2013) / *Chem. Comm.*, **50**, 10177-10197 (2014) / *Anal. Chem.*, **87**, 4772-4780 (2015) / *Lab on a Chip*, **15**, 373-377(2015) / *J. Phys. Chem. B*, **119**, 9772-9779 (2015) / *ACS AMI*, **7**, 21065–21072 (2015) / *Langmuir*, **31**, 12968–12974 (2015) / *Langmuir*, **32**, 3630–3636 (2016) / *J. Phys. Chem. B*, **120**, 2790–2795 (2016) / *Biomacromolecules*, **18 (4)**, 1180-1188 (2017) / *Langmuir*, **34 (5)**, 2081-2088 (2018) / *J. Chem. Eng. Japan*, **52 (3)**, 311-316 (2019) / *Biophys. J.*, **116**, 874-883 (2019) / *Langmuir.*, **36 (12)**, 3242-3250 (2020) / *J. Phys. Chem. B*, **124 (44)**, 9862-9869 (2020)./ *Langmuir*, **37 (14)**, 4284–4293 (2021) / *Langmuir*, **37 (22)**, 6811–6818 (2021) / *Langmuir*, **37 (38)**, 11195-11202 (2021) / *J. Phys. Chem. B*, **125** (**23**), 6192-6200 (2021) / *ACS Applied Nano Materials*, **5** (**7**), 9958-9969 (2022) / *ACS Applied Polymer Materials*, **4(10)**, 7081-7089 (2022) / *Langmuir*, **38(48)**, 14768-14778 (2022) / *ACS Omega*, **8(1)**, 829-834 (2023) .