

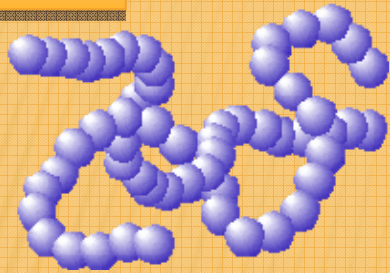
ソフトな界面の構造と物性

- 物質と生命をつなぐもの -

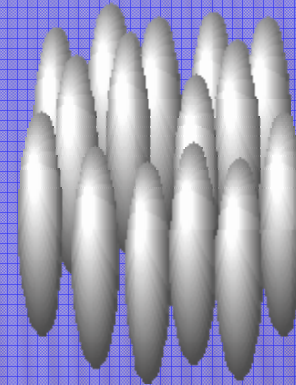
瀬戸秀紀 (物構研中性子 / 構造物性研究センター)

ソフトマター

高分子

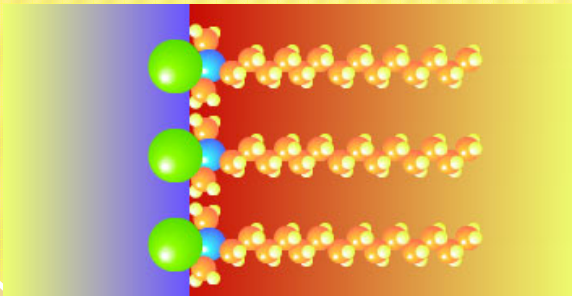


液晶



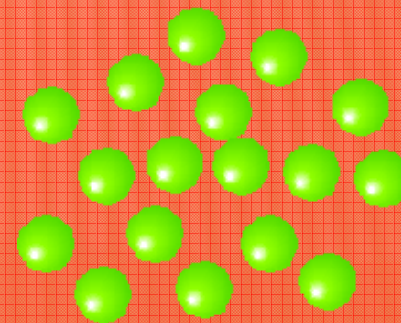
高分子液晶
液晶性高分子

両親媒性高分子



両親媒性分子

液晶コロイド

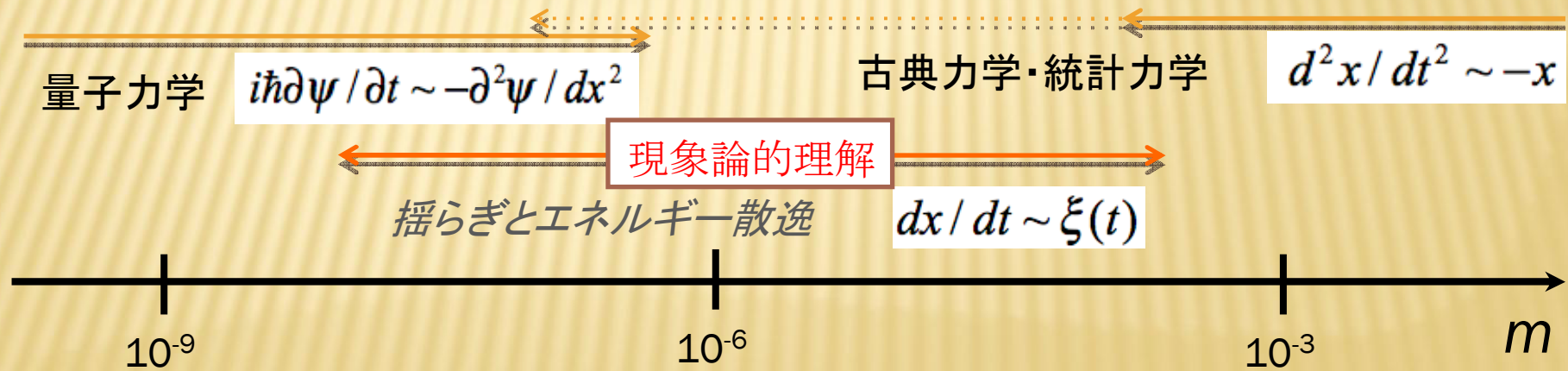
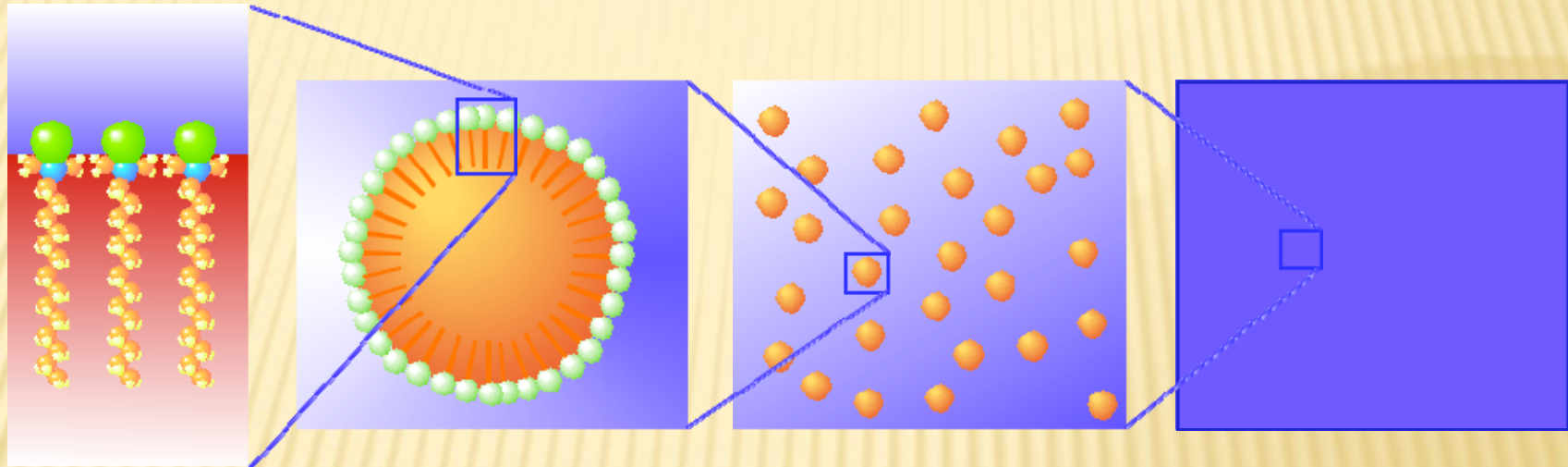


コロイド

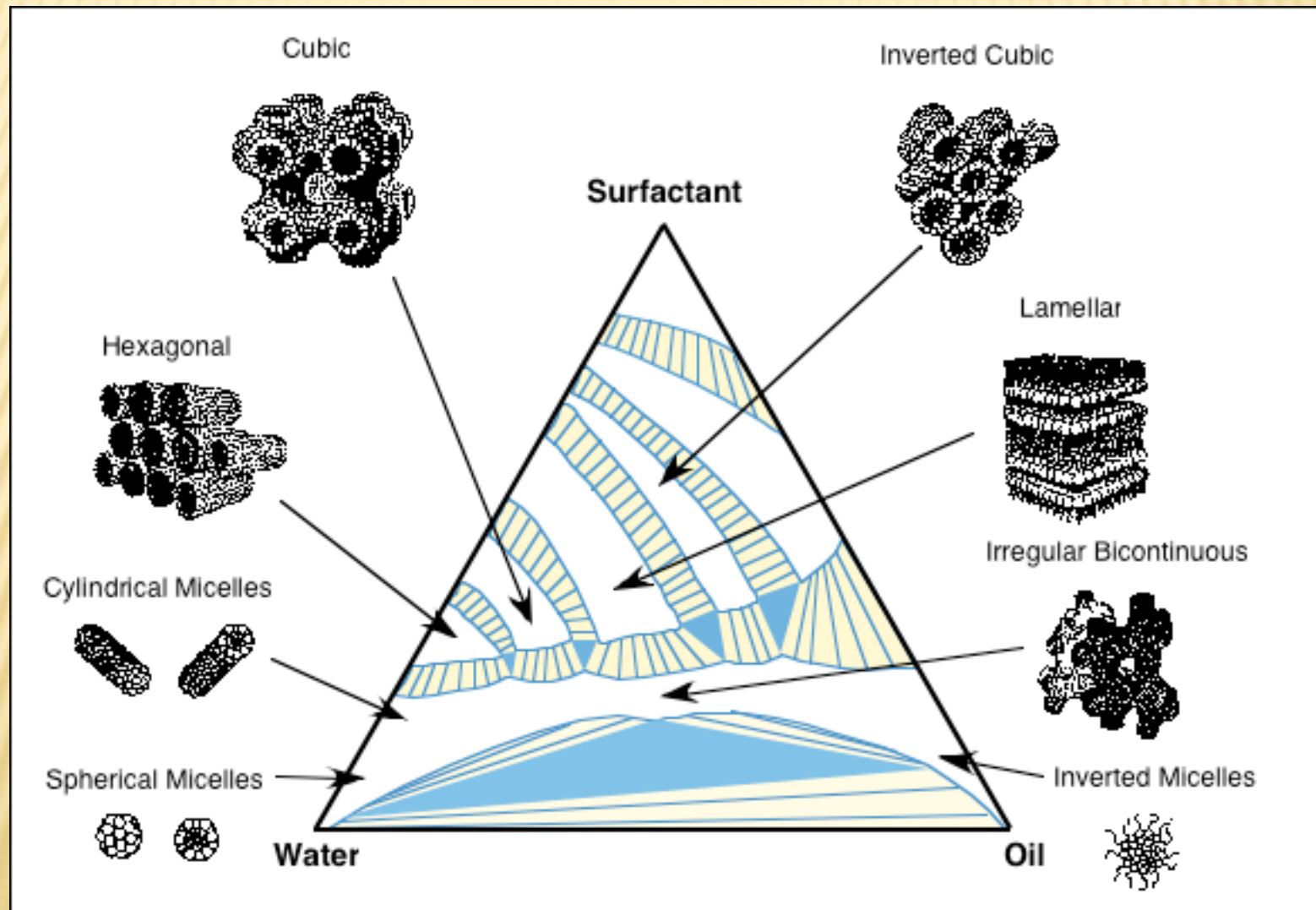
リオトロピック液晶

エマルション

ソフトマターの階層的構造



ソフトマターにおける界面

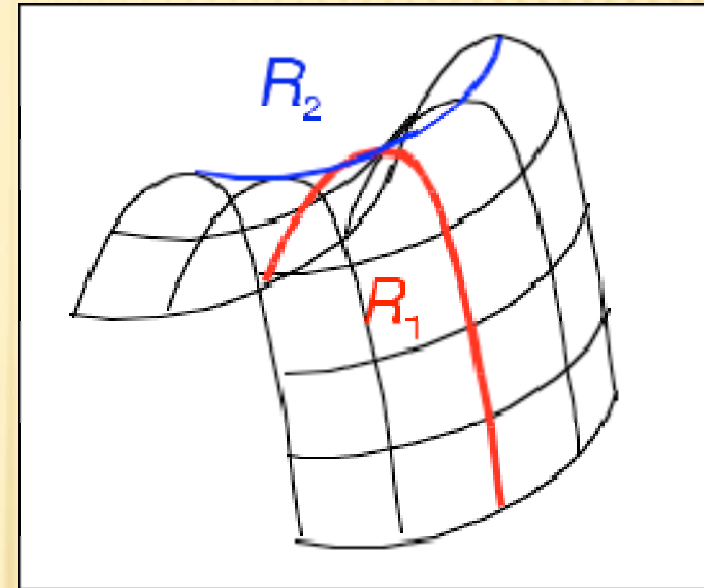


界面弹性模型

W. Helfrich, Z. Naturforsch. C28 (1973) 693

mean curvature $H = \frac{1}{2} \left(\frac{1}{R_1} + \frac{1}{R_2} \right)$

Gaussian curvature $K = \frac{1}{R_1 R_2}$



bending modulus

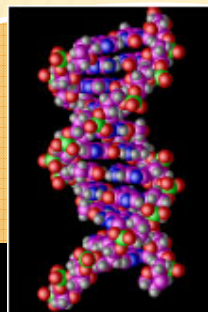
saddle-splay modulus

$$E_{bend} = \int \left[\kappa \left(H - \frac{1}{R_s} \right)^2 + \bar{\kappa} K \right] dS$$

spontaneous curvature

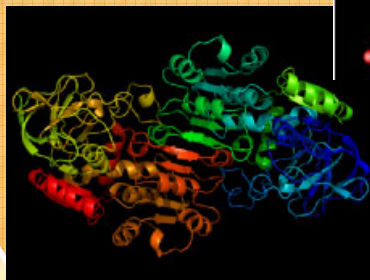
生物=ソフトマター複合体

高分子

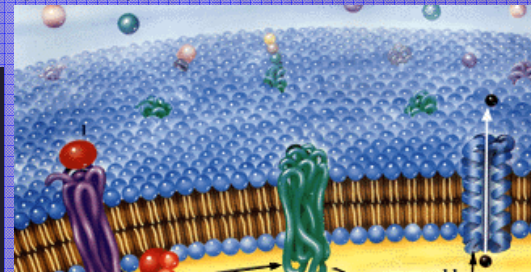


DNA

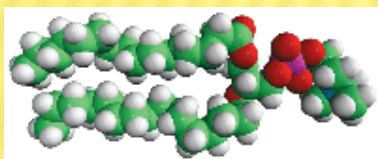
蛋白質



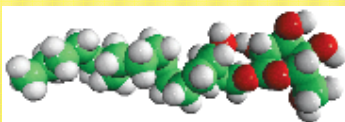
細胞膜



液晶



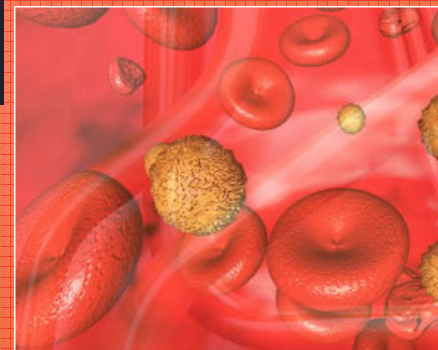
リン脂質



糖脂質

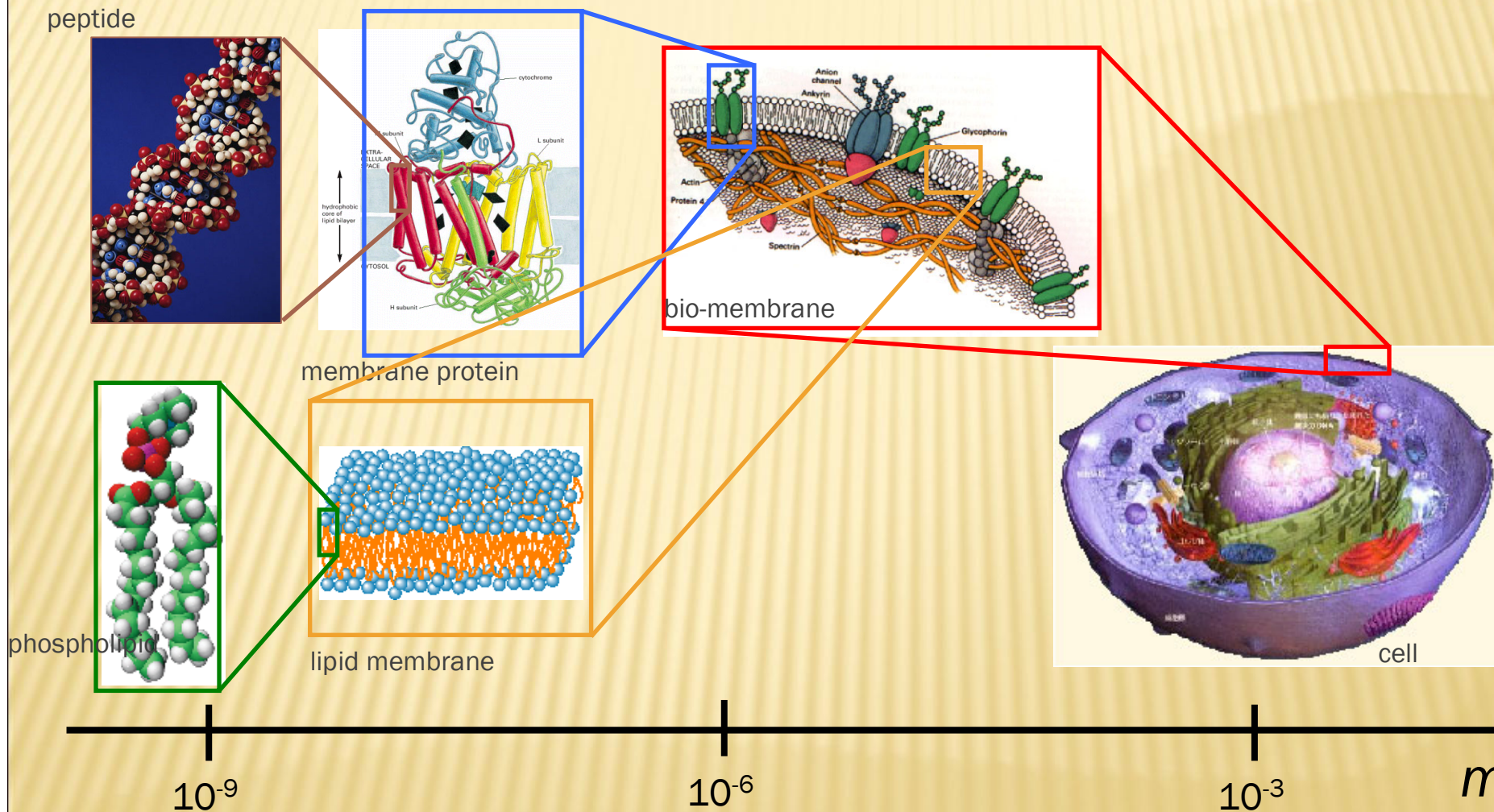
両親媒性分子

血液



コロイド

生物の階層的構造



物質と生命現象のINTERFACE

