

Effect of NaCl Concentration on Formation of Highly Crystalline Phase in DMPG Bilayers

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Dimyristoylphosphatidylglycerol (DMPG) is one of the most abundant anionic phospholipids in prokaryotic cell membranes and extensively studied as a model for the negatively charged membrane. Recently we have reported that the DMPG bilayers form subgel phase in several minutes when the sample was incubated below 0 degree C under low ionic strength. It was found that the subgel phase in DMPG bilayers is metastable and transforms into a more stable phase, called highly crystalline phase, under physiological conditions (150 mM NaCl and neutral pH). The highly crystalline phase is formed following prolonged low-temperature equilibration and has higher melting temperature and enthalpy than those of the main transition [1]. We observed the morphological features of DMPG bilayers in highly crystalline phase by x-ray diffraction and examined kinetics of its formation and the dependence of the kinetics on NaCl concentration by differential scanning calorimetry.

X-ray diffraction pattern of DMPG bilayers in highly crystalline phase was similar to the powder pattern from DMPG crystals. We suggested that the DMPG bilayers in highly crystalline phase are morphologically close to DMPG in crystal state. The kinetics of highly crystalline phase formation of DMPG bilayers showed a lag time of 8 hours in the presence of 150 mM NaCl when the sample was incubated at 1 degree C. The lag time decreased as NaCl concentration increased. On the basis of those kinetic behaviors we will discuss about the process in the highly crystalline phase formation.

[1] R. M. Epand, B. Gabel, A. Sen, S. W. Hui, A. Muga and W. K. Surewicz, *Biophys. J.*, **63**, 327 (1992)