Phase Behavior of Diheptadecanoyl-Phosphatidylcholine Bilayers in the Presence of KCl

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The multi-lamellar vesicles of diacyl-phosphatidylcholines with 17 carbons per acyl chain (diheptadecanoyl-phosphatidylcholine) exhibit an additional peak in their thermogram at the temperature a few degree lower than the well-known main transition [1] (Here we denote this additional transition as main* transition). The main* transition enthalpy is enhanced in the presence of solutes such as KCl. It was suggested that the appearance of the main* transition may be related to the coexistence of two domains because the transition enthalpy varies in great extent depending on the preparation processes [2]. However, the mechanism of coexistence and the structural difference between the two domains remain to be known. Here we tried to make clear the manner of coexistence in the multi-lamellar vesicles of diheptadecanoyl-phosphatidylcholine by calorimetry, electron microscopy and x-ray diffraction.

In the calorimetric study we found that the main* transition temperature remained almost constant on addition of KCl into a diheptadecanoyl-phosphatidylcholine suspension while the pretransition and main transition temperatures increased as the KCl concentration was increased. In the presence of 5M KCl the pretransition temperature became higher than the main* transition temperature. Thus the effects of KCl on the two domains are different suggesting that the structure of head moiety may play an important role in the formation of these domains. Moreover electron microscopic observation revealed that the two domains coexisted laterally and randomly in a single bilayer.

[1] K.Jorgensen, *Biochim. Biophys. Acta*, **1240**, 111 (1995).
[2] W.R.Perkins et al., *Biochim. Biophys. Acta,* **1327**, 41 (1997).