INTERRELATIONSHIPS BETWEEN THE PHASE DIAGRAMS OF THE TWO-COMPONENT PHOSPHOLIPID BILAYERS

Istvan P. Sugar\textsuperscript{a} and Gianluigi Monticelli\textsuperscript{b}

\textsuperscript{a} Department of Biochemistry, University of Virginia, Charlottesville, VA 22908 USA and Institute of Biophysics, Semmelweis Medical University, Budapest, Hungary. \textsuperscript{b} Istituto di Fisiologia generale e chimica biologica, Università degli Studi, Milano Italy

Basic relationships between the phase diagrams, previously considered to be independent from each other, are described. Phase diagrams of two-component phosphatidylcholine/phosphatidylcholine (PC/PC), phosphatidylethanolamine/phosphatidylethanolamine (PE/PE) and PC/PE lipid bilayer membranes are systematically investigated by means of the Landau theory. Gradually changing the chain length of one of the components a characteristic peritectic-miscible-azeotropic-semiazeotropic-eutectic (P-M-A-S-E) series of phase diagrams was found in the PC/PE system and peritectic-miscible-one component-miscible-peritectic (P-M-O-M-P) in the PC/PC, PE/PE systems.

These serial catastrophic changes of the phase diagrams could be explained by means of the fusion and birth of the mixed phase regions in the phase diagram. Finally constructing the superdiagrams we could get all of the possible series of the phase diagrams in a wide class of the two-component mixtures. Moreover one can predict the type of the phase diagram when the components contain equal length saturated hydrocarbon chains.

\textit{Abstr. II Int. Conf. Biothermodyn., Graz 1985, Comm. M22.}