

Microcalorimetric Studies on the Physical Stability of

PEG-Liposome

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Abstract

Liposomes were prepared from mixtures of egg-PC, cholesterol and distearoyl-phosphatidyl-ethanolamine covalently attached poly-ethylene glycol (PEG) with a molecular weight of 2000 (DSPE-PEG(2000)). In this work we examine how PEG(2000)-grafted lipids affect the surface properties of the egg phosphatidylcholine (egg-PC) liposomal bilayer membrane through zeta potential and interaction potential measurements using microcalorimetry. Experimental results demonstrate that the absolute value of the zeta potential of PEG(2000)-grafted PC liposomes decreased from -19 to -8 mV when increasing DSPE-PEG(2000) from 0 to 7 mol fraction, and the repulsive interaction potential of PEG(2000)-grafted PC liposomes decreased compared with those liposomes without PEG-grafting. However, the phenomenon of fusion between the liposomes incorporated with PEG-grafted PC was reduced. In brief, this result of fusion is contrary to the expectation of the interaction potential measurement; therefore, we believe that the steric hindrance of the grafted PEG(2000) molecules on the liposomal surface contribute to a major imposition on the approach between liposomal surface and the formation of inverted micelles which are suggested as the necessary steps of liposome fusion. (C) 2002 Elsevier Science B.V. All rights reserved. [References: 33]