

# Fluidity of Liposome Membranes Doped with Metalloporphyrins: An ESR Study

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Changes in membrane fluidity of porphyrin-doped liposomes have been investigated to assess the kinetics of the fluidization process. Metal complexes of *tert*-butylphenyl *meso*-substituted porphyrin, containing ions of Mg, Mn, Fe, Co, Ni and Cu, were used as dopants. Liposomes were obtained by sonication of hen egg yolk lecithin (EYL). Electron paramagnetic resonance (ESR) was applied using two spin probes, TEMPO (2,2,6,6-tetramethylpiperidine-1-oxyl) and 16-DOXYL-stearic acid [2-ethyl-2-(15-methoxy-15-oxopentadecyl)-4,4-dimethyl-3-oxazolidinyloxyl], localized at different sites within the membrane to determine the spectroscopic parameters: partition ( $F$ ) and rotation correlation time ( $\tau$ ), related to the membrane's fluidity. It was found, that porphyrins considerably fluidize the membranes, and the dynamics of this process depends on the kind of the compound used and the membrane's area surveyed by the probes. The Cu complex proved to be the most effective one within the surface layer, whereas the Mn complex most strongly fluidized the deeper parts of the lipid double-layer. Variations in fluidity observed after the porphyrins had been introduced into the liposome were found to stabilize inside the double-layer and within the surface layer after ca. 25 and 50 h, most probably due to hydration of the hydrophilic part of the membrane.

*Key words:* EYL Liposomes, ESR, Metalloporphyrins