Structural organization of DPPA and DPPC liposomes with ligands and permeability of incorporated Gold nanoparticles into cells

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DPPC and DPPA liposomes, prepared by conventional rotary evaporation method, have similar structural organization, though they have significant differences. The similarity is that both types of lipids create standard bilayer liposomes with strong hydrophobic forces between lipids tails and with homogeneous bonds of hydrogen and electrostatic nature between hydrophilic lipid's heads. By calorimetric method it has been shown that hydrophobic bonds break but liposomes' destruction does not occur by heating till 150°C. As for bonds between lipid heads in liposomes their cooperative destruction takes place at 41°C for DPPC and 66°C for DPPA liposomes. In the case of thermal distraction of DPPC liposomes two so-called pre transitions peaks were observed before the main transition peak, which indicates that DPPC liposomes' structure is multilamellar. DPPA liposomes have one cooperative heat absorption peak, which points to a unilamellar structure of such liposomes. Substances of hydrophobic/hydrophilic nature, incorporated into the liposomes, are placed in hydrophobic or hydrophilic parts of liposomes, which lead to change in calorimetric peak shapes and thermodynamic parameters. It has been shown that gold nanoparticles, incorporated into the DPPC liposomes are able to enter Caco-2 cells. In contrast, these nanoparticles do not enter red blood cells.

Keywords: *Gold nanoparticles; Liposomes; DPPC; DPPA; Caco-2 cell; DSC, Flow Cytometer.*