

Biophysical Characterization of 11-oxa-nanodecylphosphocholine (NPC):
interaction study of liposome.

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The 11-oxa-nanodecylphosphocholine(NPC) is a representative of the Alkylphosphocholines(APCs), a class that induces apoptosis in tumour cells. It has been proposed that due to APCs lipophilic character, interaction with cell membrane and possibly lipid-rafts is one possible mechanism of action, but exact mode of action still unknown. We studied biochemical/biophysical properties of the NPC and carried out a characterization of the interaction of NPC with liposomes constituted by dipalmitoylphosphatidylcholine(DPPC). The Critical Micellar Concentration(CMC) for NPC, determined by surface tension measurements was 200 μ M. Dynamic light scattering showed that DPPC-liposome size wasn't affected by incubation with 25 μ M of NPC for up to 2 hours. However, in the presence of 250 μ M NPC, an increase in liposome size from 150 to 600nm was observed after 1 hour of incubation. Differential calorimetric scanning (DSC) measurements for DPPC-liposomes revealed a critical transition temperature(T_c) of 41.5°C, enthalpy(ΔH) and entropy(ΔS) variation of 7.3Kcal.mol⁻¹ and 0.02Kcal.K⁻¹.mol⁻¹, respectively. The presence of NPC at 25 μ M decreased the T_c , ΔH and ΔS values (39.3°C 4.7Kcal.mol⁻¹, 0.013Kcal.K⁻¹.mol⁻¹), and at 250 μ M destabilized the liposome (36.3°C 0.46Kcal.mol⁻¹, 0.0015Kcal.K⁻¹.mol⁻¹). Kinetics measurements of 5(6)-carboxyfluorescein(CF) revealed that the rate and the extent of CF release is NPC concentration dependent and above CMC, release is instantaneous. For liposomes systems constituted by PC, the CF release was 58%; by PC:PG it was 39%, being significantly reduced to 17% by PC:Cholesterol. Soon, NPC should be able to interact with membrane even at concentrations below CMC. The physical properties of NPC and its interaction with DPPC are being used to develop drug delivery systems.

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