Lipid Model Membranes for Drug Interaction Study

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The present work shows a structural study on the process of incorporation of a hydrophobic drug, Ellipticine (ELPT), into lipid model membranes for drug targeting purpose. The ELPT is an alkaloid that showed an anti proliferation activity against several types of tumour cells and against the HIV1 virus. In the context of drug targeting, there are several important processes and parameters to be studied. For instance, the drug loading efficiency into the lipid matrix, the order into the lipid system that encapsulates the drug, the lipid-carrier critical size and stability to transport the drug and the releasing mechanisms. We used the zwitterionic lipid dipalmitoylphosphatidylcholine (DPPC) and some other phopholipids with different size of head and tail and/or different net electronic charge both on a Langmuir monolayer and deposited on a solid substrate. First results appointed toward a strong increase in drug loading efficiency into DPPC lipid systems mixed with charged lipids. However, this increasing in loading efficiency was accompanied by a disturbance in the ordering of the bilayers. To characterize these systems we used Grazing Incidence X Ray Diffraction and also specular X Ray Reflectivity technique with synchrotron radiation at Troika II beamline-ESRF, France and also a rotating anode set-up at State University of Campinas, Brazil to monitor structural changes of loaded and non-loaded lipid systems.

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