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Comparison of the effect of 4-hydroxycoumarin and umbelliferone on the phase transition of dipalmitoylphosphatidylcholine (DPPC) bilayers

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Abstract:
The study compares the effect of the addition of two coumarins: 4-hydroxycoumarin (4-HC) and 7-hydroxycoumarin (umbelliferone; UMB) on dipalmitoylphosphatidylcholine (DPPC) membranes. The study was based on microcalorimetric and fluorescence measurements. The examinations have shown that 4-HC changes parameters of phase transition of DPPC membranes to a greater degree than UMB. It is associated with different location of each coumarin in the lipid membrane, which is caused by different orientation of polarity of coumarin molecules. 4-HC molecules that are amphiphilic "along" incorporate inside the membrane interacting with lipid carbohydrate chains. UMB molecules amphiphilic "across" the molecule are not incorporated inside the membrane and do not interact with acyl chains.

Key words:
4-hydroxycoumarin, umbelliferone, dipalmitoylphosphatidylcholine, DSC, drug-membrane interaction