

**EFFECT OF THE LECITHIN-TO-CHOLESTEROL RATIO ON THE SIZE AND
POLYDISPERSITY OF BLANK LIPOSOMES**

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Liposomes, nanoscale vesicles formed by phospholipid bilayers, are widely used as carriers of biologically active substances, since they are biocompatible and can accommodate both hydrophilic and hydrophobic compounds. Their efficiency is largely determined by the size and homogeneity of the vesicles, which depend on the composition of the bilayer.

Cholesterol is one of the most important structural components of liposomal membranes: it modulates the fluidity, permeability and mechanical stability of the bilayer. However, its influence on the size and homogeneity of the vesicles is not universal and depends on the lipid composition and the method of preparation, so that its optimal proportion has to be established for each lipid system.

The aim of the present work was to study the effect of the lecithin-to-cholesterol ratio on the hydrodynamic diameter and the polydispersity index of blank liposomes.

Blank liposomes were prepared from egg yolk lecithin and cholesterol by the reverse-phase evaporation method at a constant total lipid mass of 50 mg and cholesterol contents of 0, 1.25, 2.5, 5, 10 and 20% of that mass. After removal of the organic solvent under reduced pressure, the lipid phase was hydrated with 0.9% sodium chloride solution. The hydrodynamic diameter and the polydispersity index (PDI) of liposomes were determined by dynamic light scattering (Anton Paar Litesizer™ 500).

All the samples showed a monomodal size distribution, which indicates a homogeneous vesicle population over the whole range of compositions studied. At cholesterol contents of 0, 1.25, 2.5 and 5% the hydrodynamic diameter remained practically unchanged (0.198, 0.198, 0.197 and 0.201 μm , respectively), whereas at 10 and 20% the vesicles grew distinctly, to 0.212 and 0.237 μm . The polydispersity index increased over the whole range — 13.5, 16.3, 13.7, 18.2, 21.5 and 27.9%, respectively — that is, it more than doubled at the highest cholesterol content.

The results demonstrate that vesicle size remains stable at low cholesterol concentrations (0–5%), while higher cholesterol levels (10–20%) lead to a noticeable increase in vesicle diameter. Additionally, the polydispersity index rises progressively with cholesterol content, indicating increased heterogeneity in vesicle populations, particularly at the highest cholesterol concentration.