Synthesis and some Properties of Phosphatidylhydroxyacetone as a New Phospholipid Formed by Free-radical Fragmentation of Cardiolipin

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A number of biochemical processes in body as well as external physical and chemical condition is accompanied by the formation of reactive oxygen and nitrogen intermediates, which may afterwards cause cellular damage. Determination of the mentioned processes pathways and the role of the newly formed substances is an important biochemical subject.

Phosphatidylhydroxyacetone is the phospholipid along with phosphatidic acid found in mouse liver mitochondria subjected to oxidative stress (Yurkova, 2008).

In order to study the properties and biochemical role of phosphatidylhydroxyacetone we have been first to synthesize it from phosphatidylcholine at preparative amount by the means of microbial phospholipase D from *Streptomyces netropsis* (check the Figure 1).

Figure 1 – Scheme of phosphatidylhydroxyacetone formation

The yield comprised about 80 %. Its mobility ratio at thin-layer chromatography is near 0,65-0,70 (elution system chloroform:methanol:water 65:25:4).

Pure phosphatidylhydroxyacetone is capable to form unstable liposomes, while its mixture with phosphatidylcholine allows obtaining the stable liposomes of average diameter of 40-60 nm (measured by laser light scattering method).

We've also discovered the mentioned method allows preparing cardiolipin from phosphatidylglycerol (yield 45 %). The developed synthesis methods make it possible to study the process of cardiolipin fragmentation more deeply by exercising the biological activity of cardiolipin, phosphatidic acid and phosphatidylhydroxyacetone.