Abstract

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Title of thesis: Study of lipid monolayer models of skin barrier diseases

Skin protects human body from external factors and maintain internal integrity of organism. Skin barrier is formed by corneocytes and lipid matrix in intercellular space of *stratum corneum*, the uppermost layer of epidermis. Lipid matrix consists of ceramides, free fatty acids and cholesterol. The composition and organisation of lipid matrix are essential for the skin barrier properties. Ceramides are synthetized from glucosylated ceramide and sphingomyelin by hydrolitic enzymes β-glucocerebrosidase and sphingomyelinase. Insufficiency or malfunction of these enzymes lead to functionless skin barrier.

The aim of this work was to prepare and study monolayer lipid models, which simulated the malfunction of sphingomyelinase in skin diseases. For valuation we used several techniques such as Langmuir monolayers, Brewster angle microscopy (at the air-liquid interface), Langmuir-Blodgett technique and atomic force microscopy.

Monolayers with 100% substitution of sphingomyelin layout the most readily with rising surface pressure and the course of their isotherm is very similar to control mixture containing ceramide. Simultaneously these lipid mixtures are arranged most tightly. The presence of both sphingomyelin and ceramide in mixtures show itself by loosening of monolayers. The ability to form compact domains is decreasing with rising substitution of sphingomyelin.

Knowledge about behavior of sphingomyelin in *stratum corneum* monolayer lipid model gained by this work could be helpful for research in future.