ABSTRACT

Charles University

Faculty of Pharmacy in Hradec Králové

Department of pharmeceutical technology

Candidate: Oksana Yanok

Supervisor: Pharm.Dr. Andrej Kováčik, Ph.D.

Title of Diploma Thesis: The effects of glucosyl sphingosine on barrier function of skin and complex skin model.

The skin barrier, which provides protection from water loss and harmful environmental influences is located in the *stratum corneum*. The dominant group of lipids within the *stratum corneum* are ceramides (Cer), which also have the most important role in ensuring the barrier properties of the skin. The enzymes sphingomyelin deacylase and glucosylceramide deacylase hydrolyze the amide bond of Cer precursors, which leads to highly polar metabolites, called lysolipids. The increased activity of these enzymes is considered to be one of the major factors leading to the development of a number of skin diseases characterized by a skin barrier disorder (for example atopic dermatitis). In this study we prepared model membranes mimicking a healthy skin barrier as an equimolar mixtures of human Cer, cholesterol, free fatty acids with the addition of 5 % cholesterol sulfate. We also prepared models in which the amount of Cer was gradually reduced and replaced by the hydrophilic lysolipid glucosylsphingosine. The permeability was measured for two (physically-chemically different) model permeants, and X-ray diffraction was performed to determine membrane microstructure. The results showed that the loss of Cer and/or the presence of glucosylsphingosine results in an increase in membrane water loss and increase in membrane permeability for model permeants. A long periodic lamellar phase, which is most important in the barrier function, was not found in membranes that did not contain Cer,. Our results confirm the adverse effect of glucosylsphingosine on the barrier function of *stratum corneum* models.