

ABSTRACT

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We are protected against the harmful influence of the external environment by a skin barrier, which is located in the stratum corneum. The skin barrier also prevents excessive water loss through the skin. Ceramides have the most important role in the barrier function of the skin. The healthy skin's ceramides are synthesized of glucosylceramide and sphingomyelin via enzymes sphingomyelinase and glucocerebrosidase. If there is a lack of ceramide in the stratum corneum, which means, if these mechanisms work insufficiently, it gives rise to atopic dermatitis. In the stratum corneum of a patient who suffers from atopic dermatitis are glucosylceramide and sphingomyelin hydrolyzed by glucosylceramide/sphingomyeline deacylase which leads to free fatty acids and lysolipids (glucosylsphingosine and sphingosinephosphorylcholine) generation. In this work, we prepared model membranes which simulate a composition of lipids of the stratum corneum of a patient with atopic dermatitis, in which ceramides are replaced by lysolipids partially (25 % - 75 %) or completely. Model membranes were prepared as an equimolar mixtures of lysolipids, ceramide, mixtures of free fatty acids (C16 – C24) and cholesterol with the addition of cholesterol sulphate on polycarbonate filters. Effect of lysolipids on permeability prepared membranes was studied by model permeants theophylline and indomethacin by using Franz diffusion cells. Then we measured a loss of water through the

membranes and electrical impedance. The amount of permeants which passed through the membranes was determined by HPLC. Results showed that the presence of sphingosinephosphorylcholine causes increase in loss of water from the membrane and increased permeability of membranes for both model permeants. This most happened when we replaced 25 % of ceramide by sphingosinephosphorylcholine. Increased permeability of the membranes was also found at glucosylsphingosine, and it happened mostly in the case of replacing 25 % of ceramide by glucosylsphingosine. This study demonstrated that the presence of both lysolipids is responsible for the increased permeability of the stratum corneum of atopic dermatitis, and it is also responsible for increased loss of water from the epidermis.