# ABSTRACT

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**Title of thesis**: Optimization of the skin barrier model with isolated ceramides of human *Stratum corneum*

*Stratum corneum* (SC), the uppermost layer of the skin, regulates transcutaneous water loss and protects against outer conditions and harmful substances. It consists of cornified cells - corneocytes and extracellular lipid matrix, which is responsible for the barrier functions. Corneocytes are covered with covalently bound lipids creating the corneocyte lipid envelope (CLE). CLE is considered to interconnect the extracellular lipids with corneocytes and to have a templating effect. We aimed to optimize a skin lipid model simulating also the presence of CLE.

The lipidic part of the model was prepared from an equimolar mixture of isolated human skin ceramides (hCer), cholesterol and free fatty acids (FFA, either protonated or deuterated) with 5 weight % of cholesteryl sulfate. hCer were extracted from the isolated human SC and purified by the column chromatography. The composition of hCer was determined by the high-performance thin-layer chromatography. The reverse-phase and normal phase silica gel particles served as the CLE model and the negative control, respectively. X-ray diffraction revealed the periodic structure of models and showed two lamellar phases with short and long repeat distances and separated cholesterol. The long repeat distance changed in dependence on the type and amount of silica gel. The thermotropic behavior of samples with protonated or deuterated FFA was revealed by Fourier-transform infrared spectroscopy.