

# ABSTRACT

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Title of diploma thesis: Quantification of skin ceramides in patients after oncological treatment

Ceramides are one of the three basic lipid components present in the stratum corneum of human skin. Alterations in the ratio of individual ceramides are associated with disruption of skin barrier function. Such changes have been observed not only in skin diseases of the non-cancerous type, but also as a consequence of cancer. The main aim of the present study was to investigate the difference in the representation of skin ceramides in the stratum corneum of healthy patients and patients after cancer. Samples were collected from five groups of patients, four of which represented cancer patients with different types of treatment: tumor resection, chemotherapy, radiation or a combination of chemotherapy and radiation. The remaining fifth group consisted of control samples from volunteers without a diagnosis of cancer.

Samples were obtained by tape-stripping from an identical site on patient forearm, followed by protein determination. Cancer patient samples were compared with control samples in terms of different water loss through the skin before and after sampling. Ceramides were extracted from the samples using a mixture of organic solvents and analyzed by LC-MS/MS with the addition of internal standards. Ceramides of selected subclasses were quantified and further evaluated in terms of average acyl chain length, content of individual sphingoid bases or degree of hydroxylation.

The results show that the stratum corneum of cancer patients is more permeable to water and contains approximately half amount of proteins than the stratum corneum of control patients, but on the contrary shows increased ceramide levels. Significant increases were found for all four ceramide subclasses, but the most pronounced increases were observed for unsubstituted and  $\alpha$ -hydroxylated ceramides. The average acyl chain lengths of ceramides

or the ratio between long and ultra-long acyl chains did not show statistically significant differences.