Abstract

A number of studies provide strong evidence that KLK5 is one of the most important serine proteases in the epidermis and is involved in processes such as desquamation, processing of antimicrobial peptides or induction of inflammatory reaction. The role of KLK5 has been deduced from *in vitro* experiments and thus its functions should be verified *in vivo*.

This work aimed to develop a specific tissue targeting strategy to study the role of murine kallikreins in the epidermal compartment *in vivo* and to generate a transgenic model overexpressing mKlk5 in the mouse epidermis.

Using the modified promoter of human involucrin, transgenic mice expressing the fluorescent marker, tdTomato, were generated in the first step. This transgenic reporter mouse showed specific targeting pattern of the reporter in the upper epidermal layers and, thus, the modified involucrin promoter could be employed for targeting further gene of interest in the differentiated epidermal compartment.

In the second step transgenic mouse lines expressing murine kallikrein 5 were successfully generated. Among them two lines exhibited approximately 6-9 fold overexpression at the mRNA and protein levels, however it appeared that the immature protease was not activated under normal healthy conditions. Therefore two models of epidermal diseases were performed to disbalance the epidermal barrier, activate the protease and reveal its impact on the targeted compartment. Nevertheless, the transgenic mice did not show any differences in comparison to the wild-type mice in the model of irritant dermatitis and wound healing.

Altogether, we have successfully generated two transgenic mice and developed a targeting strategy for upper layers of epidermis although to target an active protease into these layers will necessitate additional technical modifications.

Key words: kallikrein, transgenic mouse, skin, epidermis, involucrin promoter