

DESCRIPTION FOR THE GENERAL PUBLIC

Skin fulfills many essential functions for body homeostasis: it acts as a protective barrier against physical, chemical and biological factors, participates in the perception of external and internal signals, takes part in endocrine secretion and in the regulation of water, electrolyte, fat and vitamin metabolism. The three major layers that built up the skin are epidermis, dermis and hypodermis. The recent recognition of a new fat depot named dermal white adipose tissue (dWAT) that is localized within dermal part of the skin, broaden the complexity of skin reactivity. This unique and understudied population of fat cells is actively involved in the skin homeostasis including processes of hair growth, thermoregulation and wound healing. However, molecular factors specifically contributing to dWAT modulation and regulation are largely unrecognized and mandate further research.

One of the possible factors participating in dWAT homeostasis is transcription factor Foxn1. In epidermis, Foxn1 is responsible for initiation of keratinocytes terminal differentiation program. Moreover, its activity/non-activity influences dermal fibroblasts phenotype. Existing studies indicate that mice with the Foxn1 mutation ("nude" mice - lacking active Foxn1 factor) show a resistance to diet induce obesity and their skin is characterized by a lipid profile that is different from the control mice. Furthermore, using next-generation high-throughput DNA sequencing methods showed changes in expression of genes participating in regulation of adipogenesis between nude and wild type mice skin. These findings suggest not only regulatory role of Foxn1 in dWAT homeostasis, but also its contribution to the lipid profile in the skin.

The present proposal aims to contribute to the growing area of dWAT research. We address the effect of transcription factor Foxn1 activity/non-activity on dermal white adipose tissue physiology. Series of *in vitro* experiments are designated to demonstrate the possible Foxn1-mediated signaling involved in formation of dWAT. Furthermore, the project offers important insights into lipid metabolism in dWAT upon Foxn1 stimulation. Considering dWAT and Foxn1 role in skin homeostasis, it is important to identify target genes involved in modulation and regulation of dWAT. Finally, since the location and modulation of Foxn1 expression in mouse skin is analogous to its human equivalent, the results achieved on the mouse model can be a translate to human tissues.