Dermal white adipose tissue (dWAT) is an adipose compartment within dermis which is primarily composed of adipocytes defined as intradermal adipocytes. Studies published in the last decade revealed that intradermal adipocytes are involved in various physiological and pathological processes in the skin e.g., thermoregulation, hair cycle and immune response in skin infections. Furthermore, dWAT has been recognized as an important factor in skin wound healing. Currently it is known that injury modulates expression of genes related to adipogenesis and lipid metabolism (lipogenesis and lipolysis processes). However, the data related to regulatory pathways of dWAT lipid metabolism in intact and post wounded skin is still limited. This issue is particularly interesting in the context of recent literature reports demonstrating that fatty acids released from adipocytes in the process of lipolysis contribute to activation of the immune cells to promote skin repair. So far, lipid turnover in the skin was mainly addressed in regard to epidermal permeability barrier. Due to recently recognized importance of dWAT in skin physiology, the analysis of lipid composition in dermal layer is necessary for uncovering modifications in the skin lipidome resulting from dWAT plasticity.

Age and diet are factors widely considered as important modulators of skin structure and function. While aging and obesogenic environment modulates thickness of fibroblasts rich dermis and dWAT, several modifications in the transcriptomic characteristics of dermal fibroblasts (DFs) and intradermal adipocytes has been observed. Existing data indicate that combination of age and diet has a profound effect on skin wound healing. Despite the fact, that increased evidence point out dWAT as a crucial contributor in proper course of skin repair, the effects of single factors: age or diet and their cumulative interactions on intradermal adipocytes lipid metabolism in post wounded skin has not yet been addressed.

The proposed project will be the first to address the activation of lipid metabolism and secretory capacity of intradermal adipocytes in relation to age and diet. While, proposed *in vivo* studies will address the cumulative effect of age (young vs old) and diet (low fat vs high fat) on skin lipid turnover in intact and post wounded skin, *in vitro* experiments will unravel the molecular regulation of dWAT lipid metabolism. Considering increasing number of elderly and obese individuals, the ability to recognize the mechanism of intradermal adipocytes modulation/ regulation during skin wound healing can directly benefit in the prevention and care of acute and chronic wounds (e.g., pressure ulcers) associated with aging and obesity.