Collaborations and public funding:

Introduction: Cytoplasmic extracts of unfertilized salmon roe have been shown to initiate reprogramming of differentiated cells and increase expression of a.o. Nanog and Oct4 (Collas et al., Cloning and stem cells. 2007). The extracts also stimulate skin cells to produce several extracellular matrix components, including collagens, elastin and hyaluronic acid, that are crucial for wound healing, increase cell motility as well as expression of integrins (manuscript in preparation). Based on these preclinical data, this study was designed to assess the efficacy of two different salmon roe extract (LEX® and VERNEX™) on wound healing in a double-blind ex vivo human wound healing model.

Methods: Two types of wounds, excisional and burn, were made in donor skin from a patient who had undergone abdominal reduction surgery. The excisional wounds (n = 36) were inflicted using a sterile biopsy punch (3 mm diameter) through epidermis to mid-dermis (Fig. 1). Burn wounds (n = 36) were inflicted using an aluminum device (0.5 mm wide) in contact with the skin for 1 second at a skin interface temperature of 150 °C (Fig. 2). The wounded skin explants were excised with a 6 mm biopsy punch and incubated (37 °C, 10% CO2/air) in medium containing 2% or 10% fetal bovine serum (FBS) in the presence or absence of the two different salmon roe extracts. Media with or without salmon roe extract were replaced every second day. All groups were run in triplicates. After 5 and 10 days of incubation, skin explants were fixed in formalin, paraffin-embedded and tissue sections were stained with hematoxylin-eosin. Re-epithelialization was assessed by quantitative light microscopy by blinded investigator.

Discussion and conclusions: The exposure of human skin explants to salmon roe indicate that the extracts rapidly promote wound healing of second-degree burns. The salmon roe extracts accelerated re-epithelialization both in 2% FBS, mimicking suboptimal conditions of hard-to-heal wound, as well as under the normal wound healing conditions represented by 10% FBS. The salmon roe extracts did, however, not accelerate the healing process of incised wounds.

This is the first study of a marine roe extract accelerating wound healing in a human ex-vivo skin model, and should be of significant clinical importance for re-epithelialization.