

## Session I - Skin, Bone, Muscle

### 1.1 Treating skin wounds in Veterinary Medicine: conventional versus innovative therapies

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The loss of skin integrity may induce important dysfunctions and, in large wounds, it is difficult to obtain the *restitutio ad integrum*. The aim of this study was to verify the efficacy of conventional and innovative topical treatments on skin regeneration. To achieve this goal different types of investigations were performed. Six lesions were surgically created on the back of six healthy adult sheep; every single wound was destined to different conventional (acemannan gel, manuka honey, hyaluronic acid) or innovative treatments such as allogeneic mesenchymal stem cells and plasma gas. The sixth wound was the placebo. Biopsies were collected at time T0, T15 and T40 days. Lesions were clinically evaluated. Histological examinations considered re-epithelization and epidermal thickness. Immunohistochemistry for the evaluation of inflammation, vascularization, and cell proliferation was performed using CD3, CD20, MHCII, von Willebrand factor and KI67 antibodies. Real time-PCR investigated transcripts such as VEGF, TGF-beta 1, Vimentin, Collagen 1 $\alpha$ 1 and hair Keratin. Clinically, the lesions treated with MSCs healed more rapidly with respect to the placebo. From the second week onwards, all wounds did not show presence of fluid and exhibited a dry and clean secondary layer. MSCs treatment reached the optimal healing since the new tissue presented a mature organization and skin annexes. To sum up, MSCs isolated from peripheral blood can be used *in vivo* to regenerate wound healing suggesting their involvement not only to improve the healing of primary intention but also for the stimulation of secondary intention.

### 1.2 Effects of Epidermal Growth Factor on horse skin from different anatomical locations

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Healing can be impaired in horses depending on the anatomical location of the wound. Wounds on the limb may develop exuberant granulation tissue that does not re-epithelialize, evolving in aberrant scarring, known as “proud flesh”. This preliminary *ex vivo* study investigates the effects of Epidermal Growth Factor (EGF) on epidermal thickness and re-epithelialisation of cultured horse skin. Skin strips were obtained from a euthanized horse exempt of dermatological lesions. From the mentioned strips, six-mm full-thickness punch biopsies were obtained from body and limb skin and cultured in a serum free medium, then treated for 6 days (D): 10ng/mL or 20 ng/mL Epidermal Growth Factor (EGF) either alone or with 10 $\mu$ g/mL Dexamethasone (DMS). Culture medium and treatments were replaced every other day. Epidermal thickness and the length of neoformed peripheral epidermis ( $\mu$ m) were measured at D3, D5 and D7. The higher dose of EGF modified epidermal thickness in skin from both locations at D5: a statistically significant increase was observed for body skin while a decrease was observed for limb skin. Analogously, a significant increase of the neoformed peripheral epidermis (epithelial tongue) was observed at D5 for body skin; although a decrease was seen in limb skin, it failed to reach statistical significance. Statistically significant changes were not observed at both D3 or D7. Our findings confirm the differences between body and limb skin morpho-physiology reported in horses. Moreover, while body skin responded to EGF as hypothesised, limb skin showed an unexpected response.