

# WOUND HEALING AND CRITICAL CARE

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## N-acetyl-6-aminohexanoic acid formulation with cerium-containing nanoparticles promotes wound healing

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The objective of the study was to assess wound-healing efficacy of original N-acetyl-6-aminohexanoate acid formulation containing cerium nanoparticles, and explore critical molecular targets in diabetic animals. Methods: We used cerium-containing N-acetyl-6-aminohexanoate (laboratory name LHT-8-17) in a form of 10 mg / ml water-soluble spray for topical therapy of experimental wound. The substance toxicity was evaluated using human skin epidermal cell culture MTT assay. Linear wound was modelled in 18 outbred white rats with streptozotocin-induced (60 mg/kg i.p.) diabetes mellitus (DM); planar cutaneous wound was reproduced in 60 C57Bl6 mice with streptozotocin-induced (200 mg/kg i.p.) DM and 90 db/db mice with inherited DM. We mechanically assessed the firmness of the forming scar.

Skin regeneration was histologically assessed on days 5, 10, 15 and 20. Tissue TNF- $\alpha$ , IL-1 $\beta$  and IL-10 level was determined by quantitative ELISA. Oxidative stress activity was detected by Fe-induced chemiluminescence.

Ki-67 expression and CD34 cell positivity were assessed using immunohistochemistry. FGFR3 gene expression was detected by real-time PCR. LHT-8-17 anti-microbial potency was assessed in contaminated by MRSA wound tissues. Results: LHT-8-17 4 mg twice daily accelerated linear and planar wounds healing in animals with type 1 and type 2 diabetes. The formulation topical application depressed tissue TNF- $\alpha$ , IL-1 $\beta$  level, and oxidative reactions activity along with sustaining both IL-10 concentration and antioxidant capacity.

LHT-8-17 induced Ki-67 positivity of fibroblasts and prokeratinocytes, upregulated FGFR3 gene expression, and increased tissue vascularization. The formulation possessed anti-microbial property. Conclusions: the results allows to consider the formulation as advantageous pharmacological approach for topical treatment of diabetic wound.

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