



STUDY OF THE WOUND HEALING EFFECT OF NITRO-CONTAINING DERIVATIVES OF CARBOXYMETHYLINULIN

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Relevance: Wound healing is a complex process of physiological reactions aimed at restoring the integrity of the skin and tissues. Disruptions in wound healing processes can lead to chronic inflammation, infection, and the formation of difficult-to-treat defects. In this regard, special attention is paid to the development of effective and biocompatible wound healing agents with minimal side effects and promoting accelerated restoration of damaged tissues. It is known that some nitric oxide donors promote accelerated wound healing by stimulating angiogenesis through dilation of blood vessels. In addition, the use of nitric oxide donors also promotes activation of cell proliferation and enhanced collagen synthesis, which plays a key role in restoring skin structure.

Purpose of the study: Evaluation of the wound healing effect of nitro-containing inulin derivatives.

Materials and methods: The wound-healing properties of nitro-containing derivatives of sodium carboxymethylinulin (with a quantitative content of nitro groups of 1.50 mol.%) were studied on white nonlinear male rats weighing 200-220 g, in the amount of 10 heads in each group. To form a model of skin wounds, the rats received short-term anesthesia by intraperitoneal administration of sodium ethaminal at a dose of 50 mg/kg. Then depilation was carried out in the back area and after antiseptic treatment in these areas, a skin area of 2.5 cm² was excised along the underlying fascia. 12 hours after the formation of the wound, 0.5% solutions of the powders under study were administered in a volume of 100 µl per wound. On days 3, 6, 9 and 12, the area of induced wounds was recorded and the wound healing rate was calculated using the following formula: $S(\%) = (S^0 - S) / S^0 \times 100\%$, where S(%) is the wound healing rate; S⁰ is the area of the original wound; S is the area of the wound after the reproduced pathology. The simple physiological solution was used as a control.

Results: In the control group of animals, the course of regenerative processes was very slow compared to the groups of animals to whose wounds 0.5 and 1.0% solutions of nitro-containing inulin derivatives were applied. Thus, on the 3rd, 6th, 9th and 12th days, the wound area was 2.1±0.18, 1.9±0.12, 1.6±0.8 and 1.3±1.0 cm², and the calculated healing rate was 10, 23, 35 and 60%, respectively. In contrast to the control group, when a 0.5% sample solution was applied to the wounds, healing occurred faster. Thus, in the group of animals in which wounds were treated using a 0.5% solution of an inulin derivative, the wound area on the 3rd, 6th, 9th and 12th days was 1.8±0.08, 1.5±0.06, 1.1±0.05 and 0.8±0.05 cm², and the estimated healing rate was 25, 44, 61 and 78%, respectively. The phases of the reparative process, the time of cleansing from necrotic tissue, the formation of wound crusts and the onset of wound epithelialization in this experimental group of animals were faster.

Conclusions: Thus, the use of nitro-containing derivatives of carboxymethylinulin significantly accelerates the regeneration of the skin, promoting faster wound cleansing and epithelialization, which makes them promising for the creation of wound healing agents.