REPORTE CORTO / SHORT REPORT

EFFECT OF DIFFERENT CONCENTRATIONS OF hr-EGF ON THE HEALING OF A FULL THICKNESS-SKIN WOUND IN RATS

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SUMMARY

Recent evidence suggest that wound healing is regulated by peptide growth factors through autocrine and paracrine mechanisms. By the results presented here, improvement of the healing process whether in Epidermis or in Dermis, might be elicited by the presence of a limited range of EGF concentrations, what seems to depend upon specific cell sensitivity to EGF.

INTRODUCTION

Recent evidence suggest that wound healing is regulated by peptide growth factors through autocrine and paracrine mechanisms. Indeed the important effect of the Epidermal
Growth Factor in this complex process has been reported (1), but more information is required regarding concentrations of EGF to be used in topical formulations in order to promote a significant clinical effect (2).

MATERIALS AND METHODS

Ninety female Sprague Dawley rats with 250 g average BW were randomly distributed among 5 experimental groups of 18 animals each. Nine millimeters-diameter, full-thickness skin wounds were practiced on the external side of the right upper hind limb using a cutaneous biotome in aseptic conditions under ether anesthesia. hr-EGF was produced by the Center of Genetic Engineering and Biotechnology with more than 95% of purity. It was formulated at 10, 5 and 0.5 g of hydrophilic cream.

Experimental Groups

A: free of treatment; B: treated with Hydrophilic vehicle; C: treated with a cream containing hr-EGF at 0.5 g/g; D: treated with a cream containing hr-EGF at 5 g/g; E: treated with a cream containing hr-EGF at 10 g/g. Treatment was initiated immediately creating the ulcer, and continued daily up to the 7th. day, when the experiment was stopped.

Sample Processing

Ulcer area and the surrounding tissue were excised and fixed in 10% buffered formalin, paraffin-embedded, and sectioned at 5 m. Specimens were stained using h/e, van Giesson and PAS/Alcian Blue. A blind microscopic study was conducted by two independent and experienced pathologists.

Wound Healing Criteria

It was the morphometric assessment of Re-epithelization (ReE), Non-epithelized Area Between Edges (ABE), Percent of Epithelized Area (PEA) and Wound Contraction Level (WCL). Non-morphometric criteria were the inflammatory infiltrate and the Fibro-vascular reaction, which were classified as mild or intense.

Data were processed by the non-parametric test Mann-Whitney U, and chis quare test. Significant level was established to (p << 0.05).

RESULTS

The epithelial resurfacing was significantly stimulated in groups D and E, treated with the highest dose levels. The net values of largest epithelial outgrowth, and the largest number
of animals with re-epithelized wounds to more than a 90% were registered for both experimental groups. The calculated values of Wound Contraction, were significantly higher in groups D and E.

The conclusions drawn from the histological study on the fibrovascular and inflammatory reactions showed that, groups D and E exhibited well-organized collagen meshwork with only mild inflammation. The lowest EGF dose level assessed did not improve wound healing in any respect.

By the results presented here, improvement of the healing process whether in Epidermis or in Dermis, might be elicited by the presence of a limited range of EGF concentrations (3), what seems to depend upon specific cell sensitivity to EGF.

REFERENCES


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