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Editorial

Orthosilicic and L-Ascorbic Acids into Topical Treatment of Burn Wound Healing

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Abstract

Burn wound healing is a complex biological process of replacing damaged tissue by living tissue. Oxidative damage is one of the mechanisms responsible for local and distant pathophysiological events after burn. So, antioxidant therapy can prove to be beneficial in minimizing burn wounds, which was examined on the basis of human skin samples. Incubation of samples in solutions of L-ascorbic acid and 7% orthosilicic acid organizes the collagen structure. Prevention of negative metabolic effects of severe burns constitutes a significant clinical problem as well as an interesting analytical issue. Studying morphological effects of the skin surface in the presence of the above compounds and assessing their therapeutic effectiveness may provide new insights into topical treatment of burns.

METHODS AND CASE PRESENTATION

Skin surface was examined using a JSM 5500LV scanning electron microscope supplied by JEOL. The samples were mounted on aluminium stubs and coated with gold (JFC 1200 Jeol).

The test group was comprised of skins (7S and 8S) extracted from two patients with burn injuries who were treated in the Dr Stanislaw Sakiel Center for Burns Treatment in SiemianowiceŚląskie; the study of human skin was conducted after obtaining the approval of the Bioethics Committee. Biopsy material was obtained as a result of necrosis resection. In the treatment of patients (the time from injury to performing resection: 5 days for the 7S women's chest sample; 5 % TBSA, 1 % III/IV; 3 days for the 8S male chest sample 33 % TBSA, 25 % III).

Scanning electron microscope (SEM) was used to diagnose and illustrate morphological effects of the skin surface. Skin samples (Figure 1) incubated in the solution of the L-ascorbic acid and 7% orthosilicic acid ($H_4SiO_4 \times nH_2O$) demonstrates the development of a structure resembling a coherent solid composite. The mechanism of modification of the surface (the polymer film or the firm composite) of the burn affected skin and the influence of the modification on the process of skin regeneration will become the subject of further research.

In general, searching for new active antioxidants, studying morphological effects of the skin surface in the presence of the above compounds and assessing their therapeutic effectiveness on the basis of SEM analytical tests may expand the knowledge on topical treatment of burns.

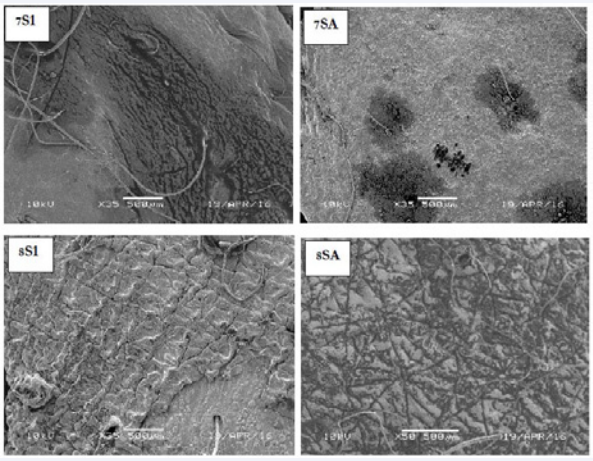

Figure 1 Scanning electron microscopic images of the surface of human burn injury skin samples (7S1 and 8S1) and images of the surfaces of human burn injury skin samples (7SA and 8SA) subsequently incubated in L-ascorbic acid solution and 7% orthosilicic acid (×35 or ×50).