TREATMENT OF BURNS BY TISSUE-ENGINEERING

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Actuality: Burns remain a prevalent and burdensome critical care problem. In Republic of Moldova frequency of thermal trauma is 52,5 in adults and 78,2 in children cases per 100,000 population, with a significant decrease in recent years; the general mortality decreased too, 6,3-8,4% in adults and 2,5-1,4% in children [1,2]. The priorities of specialized facilities focus on stabilizing the patient, preventing infection, and optimizing functional recovery [3]. Skin grafts remain the gold standard for wound closure, but unfortunately, it is not usually possible to cover the entire burns with autologous grafts, and another alternative cover is needed as tissue-engineered skin replacement: cultured autologous/allogeneic keratinocyte grafts, cultured autologous/allogeneic fibroblast grafts, autologous/allogeneic composites, acellular collagen matrices etc.

Materials and methods: In the present study, we developed procedures for establishing confluent layers of cultured human fibroblasts and keratinocytes. The main stages of cells cultivation are: obtaining of skin biopsy, donors' serologic control, preparing culture flasks, separation of epidermis and dermis, proper cultivation, cells bacteriological control and application. The cells' growth and proliferation were evaluated by culture examination in phase-contrast microscope.

Discussion results: The study showed that by cultivation of isolated skin dermal cells in an adequate nutritive medium in a month can be obtained a confluent layer of fibroblasts and keratinocytes. The final cells' concentration in culture was $5,0*10^4$ cells/cm^2.

Conclusion: The role of keratinocyte-fibroblast interactions in the wound-healing process is very important. There is ample evidence that keratinocytes stimulate fibroblasts to synthesize growth factors, which in turn will stimulate keratinocyte proliferation in a double paracrine manner that ensure finally good functional and esthetic results [4]. That is why tissue engineering is so interesting and has a great potential in burn treatment, improve the quality of life and outcome of burn surgery [5].

While cellular therapy has immense potential, many parts of the supply chair require development: technology to rapidly grow optimal number of cells with desired potency, optimal harvest site selection based on desired therapeutic indication, and the storage and transport of the cells to the clinical site for application.

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