

The Effect of Bone Marrow-Derived Mesenchymal Stem Cells and Their Conditioned Media Topically Delivered in Fibrin Glue on Chronic Wound Healing in Rats.

Authors: Mehanna R.A., Nabil I., Attia N., Bary A.A., Razek K.A., Ahmed T.A.E., Elsayed F.

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Abstract:

Bone marrow-derived mesenchymal stem cells (BM-MSCs) represent a modern approach for management of chronic skin injuries. In this work, we describe BM-MSCs application versus their conditioned media (CM) when delivered topically admixed with fibrin glue to enhance the healing of chronic excisional wounds in rats. Fifty-two adult male rats were classified into four groups after induction of large-sized full-thickness skin wound: control group (CG), fibrin only group (FG), fibrin + MSCs group (FG + SCs), and fibrin + CM group (FG + CM). Healing wounds were evaluated functionally and microscopically. Eight days after injury, number of CD68+ macrophages infiltrating granulation tissue was considerably higher in the latter two groups. Although - later - none of the groups depicted a substantially different healing rate, the quality of regenerated skin was significantly boosted by the application of either BM-MSCs or their CM both (1) structurally as demonstrated by the obviously increased mean area percent of collagen fibers in Masson's trichrome-stained skin biopsies and (2) functionally as supported by the interestingly improved epidermal barrier as well as dermal tensile strength. Thus, we conclude that topically applied BM-MSCs and their CM - via fibrin vehicle - could effectively improve the quality of healed skin in chronic excisional wounds in rats, albeit without true acceleration of wound closure.

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