

The Extent of Proliferation, Apoptosis and Angiogenesis at the Site of Injury Determine the Course of Healing Either as Scar Free or as Scarred One in the Appendages of Lizard

Authors : Isha Ranadive, Sonam Patel, Suresh Balakrishnan

Abstract : It has been observed that in lizards wound can be healed by either a scar free mechanism or by scarring. The animal model used to study both these healing processes was Northern House Gecko. In lizard, the tail when amputated heals by scar free mechanism which allows it to regenerate, the same is not seen when the limb is amputated. Proliferation, apoptosis, and angiogenesis are the main events which succeed an injury. We observed that proliferation of the cells beneath the wound epidermis was much higher in case of wound healing in tail. This could be because after the wound gets covered by the epithelium, it enters in to a cross-talk with the underlying mesenchyme to recruit a pool of blastemal cells which proliferate and later differentiate to form the lost part through epimorphic regeneration. This was substantiated by mRNA expression levels of various FGFs which facilitate the cross-talk and also by PCNA which is a marker for proliferation. Western blot result reaffirms the same notion. However, in case of the limb, the rate of apoptosis was more than proliferation as there are a lot of debris that needs to be removed. We came to this conclusion as we observed that p53 the apoptotic gene was highly upregulated in case of the scarred tissue. Further, we confirmed this result by checking the anti-apoptotic gene bcl2 and found it to be significantly down-regulated. As we noticed heightened proliferation in the case of scar-free wound healing in tail, angiogenesis was targeted for the study. This is because, when the cells are proliferating they require constant supply of blood and hence neo-vascularization is inevitable. It was observed that the marker of angiogenesis, VEGF, was expressed more during wound healing as compared to the resting stage of tail. Moreover, a high up-regulation was seen in KDR, a receptor of VEGF. Thus, this study reveals how proliferation, apoptosis, and angiogenesis play a key role in the scar-free as well as scarred wound healing.

Keywords : epimorphic regeneration, injury, northern house gecko, wound healing

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