ABSTRACT OF THE THESIS OF

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Major: Human Morphology

Title: BURN WOUND HEALING IN BOTOX TREATED RATS: ROLE OF MYOFIBROBLASTS AND MAST CELLS

Introduction: Wound healing is a complex biological process. Many factors and a variety of cell types interact in a well orchestrated fashion to restore the injured tissue. Wound contraction contributes to approximation of wound edges and re-establishment of the continuity of the wounded area. Myofibroblasts, which are characterized by the presence of α-smooth muscle actin (α-SMA) as part of their contractile apparatus, play a significant role in wound contraction.

Purpose: We proposed to study the effect of botulinum toxin type-A (BTX-A) on the inflammatory process in burn wounds, specifically its effect on mast cells and on the expression of α-SMA gene.

Methods: Burn wounds were performed on 45 rats divided into two groups. In the first group (Control group), wounds were treated with saline. While in the second group (experimental group), wounds were injected with BTX-A. Biopsies were taken on days 0, 3, 8, 14, 28. They were processed for light microscopy and real-time PCR to study the expression of α-SMA and count the mast cells.

Results: The inflammatory reaction was delayed and less extensive in the BTX-A treated group. This was shown as a decrease in the number of mast cells in the dermis and in the degree of their degranulation. Moreover, BTX-A resulted in a shutdown of α-SMA gene expression in the first 3 days. However, in days 8, 14, and 28 its expression raised to catch up with that of the control group.

Conclusion: BTX-A enhanced the healing process in burn wounds by decreasing the severity of inflammatory response. In addition, it has the potential to affect the contraction of the wound as shown by its effect on α-SMA gene expression. Therefore, BTX-A is a potential novel treatment to address the scarring of wounds in general and for burn wounds in particular.

Keywords: Wound healing, Myofibroblasts, α-SMA, mast cells.