ALLOGENEIC MESENCHYMAL STROMAL CELLS (MSCs) CONTRIBUTE TO WOUND HEALING AND MODULATE T CELLS SUBSETS IN BURN MODEL

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INTRODUCTION

Skin burns are hard to treat, since they lead to an impairment of the immune system and other organs. Tissue damaged by burns triggers a cascade of events and produces both local effects and general responses in the whole body. A recent therapeutic alternative to treat burns is the use of mesenchymal stromal cells (MSC). MSCs are good candidates to regenerative therapy since these cells differentiate in many cell types besides possessing immunomodulatory properties **(Figure 01)**.

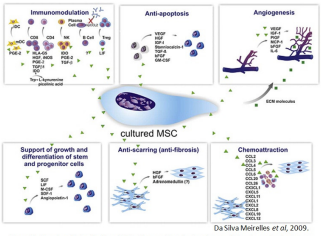

Figure 01: Paracrine effects of cultured MSCs. The secretion of a broad range of bioactive molecules is now believed to be the main mechanism by which MSCs achieve their therapeutic effect and it can be divided into six main categories: immunomodulation, anti-apoptosis, angiogenesis, support of the growth and differentiation of local stem and progenitor cells, anti-scarring and chemoattraction.

AIM

→Evaluate the therapeutic potential of MSCs in the treatment of deep burning in rats.
→Evaluate the immunomodulatory potential of MSCs in burn model in rats.

MATERIAL AND METHODS

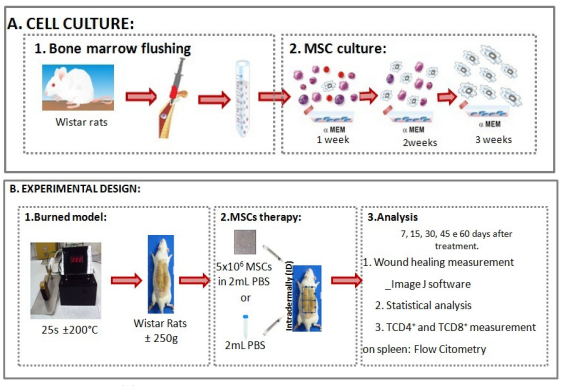

Figure 02: Experimental design

RESULTS

From the 60th day after the thermal injury **(Figure 03 A-H)**, an improvement in the healing process was observed in MSC-ID group (92.25 ± 2.92; n=4) in comparison to the PSB-ID (72.50 ± 1.87 n=6) p= 0.003 **(Figure 03 G)**.

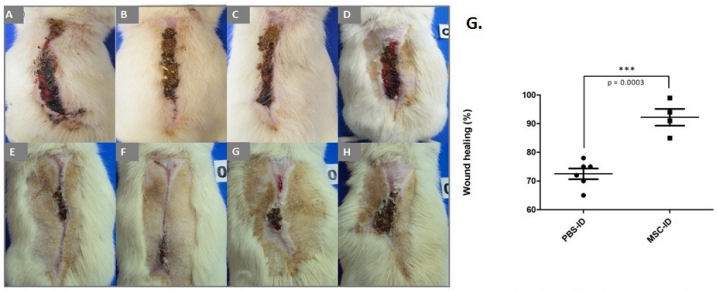

Figure 03. Representative burning aspect on animals from both PSB-ID (A-D) and MSC-ID group (E-H) 60 days after the treatment and Wound healing percentage in both PBS-ID and MSC-ID groups 60 days post burning. **A-D,** PBS-ID group burning (n= 6 rats). **E-H,** MSC-ID group burning (n= 4 rats). **G,** Wound healing percentage in both PBS-ID and MSC-ID groups 60 days post burning. Measurement provided by Image J software.

Evaluating the systemic immune response by analyzing the percentages of TCD4⁺ **(Figure 04)** cells and TCD8⁺ **(Figure 05)** on animals' spleen, we found that 7, 15 and 30 days post-burn (PB) MSC-ID group had a lower percentage of both cell types.

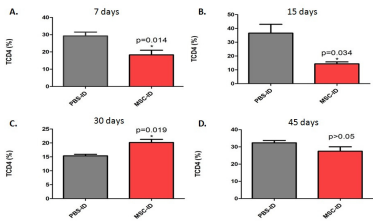

Figure 04: Percentages of TCD4⁺ cells on the spleen of both PBS-ID and MSC-ID groups in different post burning times. **A.** Percentages of TCD4⁺ cells on the spleen 7 days post burning. **B.** Percentages of TCD4⁺ cells on the spleen 15 days post burning. **C.** Percentages of TCD4⁺ cells on the spleen 30 days post burning. **D.** Percentages of TCD4⁺ cells on the spleen 45 days post burning.

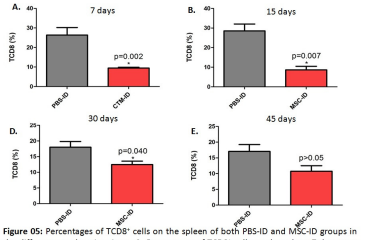

Figure 05: Percentages of TCD8⁺ cells on the spleen of both PBS-ID and MSC-ID groups in the different post burning times. **A.** Percentages of TCD8⁺ cells on the spleen 7 days post burning. **B.** Percentages of TCD8⁺ cells on the spleen 15 days post burning. **C.** Percentages of TCD8⁺ cells on the spleen 30 days post burning. **D.** Percentages of TCD8⁺ cells on the spleen 45 days post burning.

CONCLUSION

These preliminary results showed the efficiency of ID administration of MSCs in deep burns, improving wound healing and modulating immune cells as well.

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