

8. SUMMARY

Title: Comparison of cultured preadipocytes and adipocytes in the reconstruction of soft tissue defects: An in-vivo study.

Aim and Hypothesis: The aim of the current study is to compare the potential of cultured adipocytes and preadipocytes to form mature fatty tissue. Therefore, we investigated the durability and permanency of the grafts via histopathological and macroscopical parameters. There exist no study yet in the literature that compares these two cells lines for tissue augmentation. We hypothesized that cultured preadipocytes promote better fatty tissue formation compared to adipocytes.

Method: Thirty-two Wistar albino rats were equally divided into 4 groups. Two grams of fatty tissue were harvested from the periepididymal region of the rats. The adipose tissue was washed out from the connective structure in vitro to obtain precursor cells of the adipocytes. At this stage, the cells were separated as preadipocytes and adipocytes. Proper media for proliferation was added into preadipocyte group. Likewise, another media was included into adipocyte suspension for differentiation. Following sufficient cell formation, the flasks were filtered out to isolate 10×10^5 cells per ml. One milliliter of preadipocyte and adipocyte suspension was injected to the right and left scapular sites respectively. The rats were sacrificed one month (group I), two months (II), three months (III) and six months (IV) after the injection. The samples obtained from injection sites were evaluated for macroscopic changes, volumetric permanency, histopathologic scores (necrosis, cyst formation, fibrosis, vascularity, the number of mast cells).

Results: Mature adipose tissue formation was achieved in all groups. Although a mild time-dependent increase in volume was observed in preadipocyte sites, there was no statistical significance ($p > 0, 05$). On contrary, adipocyte injection site of group IV was found to be decreased compared to group II ($p < 0, 05$). In addition, preadipocyte-derived adipose tissue volume of group III and IV were higher compared to the adipocyte sites of the same rats ($p < 0, 05$). Furthermore, histological score of preadipocyte-derived tissue were less than adipocyte sites ($p < 0, 05$).

Conclusion: Mature adipose tissue formation was successfully demonstrated after both adipocyte and preadipocyte injection. Given to the higher vascularity of adipose tissue, one may speculate that a more satisfactory result was acquired following preadipocyte autotransplantation. We conclude that preadipocytes may play a significant role during the healing soft tissue defects. Thus, cultured preadipocytes should be considered as a reliable source for soft tissue augmentation.

Keywords: soft tissue defect, fat graft, adipocyte, preadipocyte, cell culture

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