Testosterone Hormonotherapy Influence on Female ASC: Implications for Soft Tissue Contouring of Transgender Patients

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Objectives

The first step towards sex reassignment consists of hormonal treatment, where regular intake of steroid hormones promotes secondary sex characteristics of the opposite gender. For female to male transition, 2 years of testosterone therapy induces development of musculature, fat redistribution, body hair augmentation and voice modification. Autologous fat grafts are often used to help restructure the body. Moreover, it has been shown that longevity and quality of fat grafts may considerably be improved when cultured adipose stem cells (ASC) are supplemented. Our aim was to evaluate the impact of testosterone treatment on the differentiation capacities of female ASC cells in vitro.

Methods

After optimization of culture medium, chronic testosterone treatment was performed on primary female ASC cells obtained from abdominal surgery waisted tissue. Cells were treated with two testosterone doses (10nM and 100nM) and evaluated for proliferation, adipogenic and osteogenic differentiation (staining and qPCR). In addition, the capacity cell stemness retention traits were assessed by looking at $CD90^+$, $CD73^+$, $CD105^+$, $CD45^-$ and $CD34^-$ molecular profile by FACS.

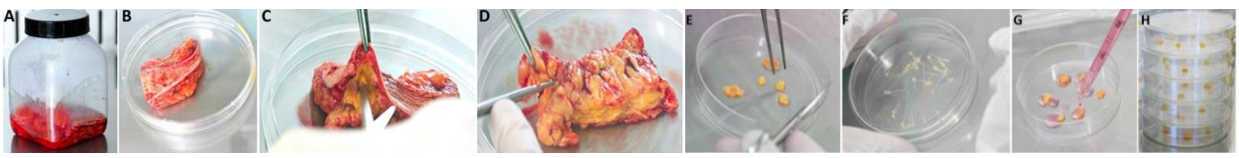

Figure 1: Cell culture procedure.

Results

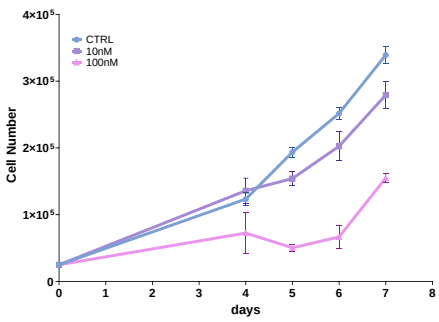

Figure 2: Cell growth after treatment with 10nM and 100nM of Testosterone.

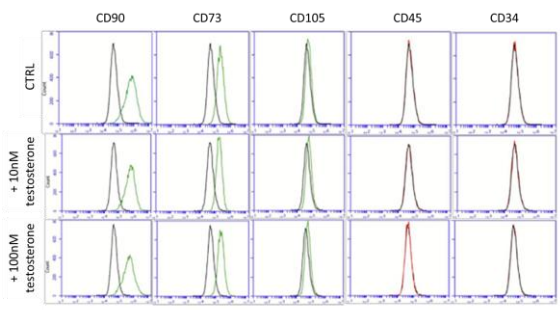

Figure 3: Maintenance of stemness of ASC after treatment with 10nM and 100nM Testosterone.

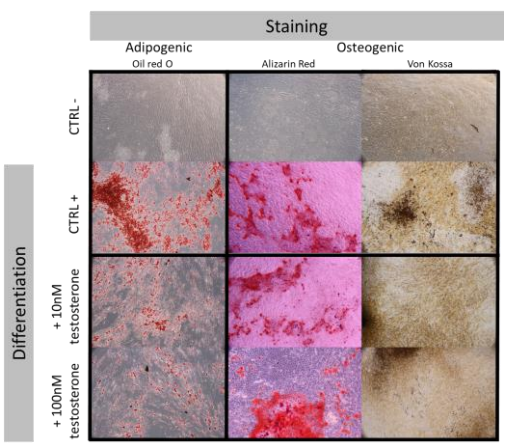

Figure 4: Adipogenic and osteogenetic differentiation after treatment with 10 or 100nM Testosterone.

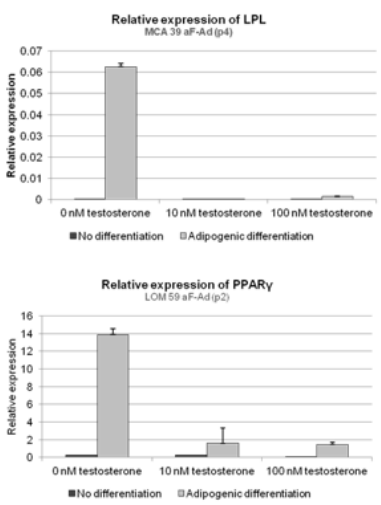

Figure 5: qPCR analysis of genes implicated in adipogenesis (LPL and PPAR γ) in ASC cells after differentiation with different doses of testosterone (10nM and 100nM)

Our results show that cell surface markers remained unaltered after acute testosterone treatment for cells at passage 1, indicating that the treatment has no impact on the stemness. However, it was observed that a chronic dose of 10nM testosterone added to the culture medium lead to a decrease in the differentiation capacities of the cells into both adipocyte and osteoblast lineages. Chronic addition of 100nM testosterone totally inhibited differentiation of the cells into osteogenic lineage and strongly impaired the adipogenic differentiation.

Conclusion

Primary ASC exposure to chronic 10nM and 100nM testosterone doses were used to design and mimic *in vivo* cell behavior of a patient. Therefore, impact of the treatment on differentiation potential may lead to assessing surgical management of patients and the use of ASC supplementation with fat grafts of testosterone treated patients.

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