Comparison between Stromal Vascular Fraction and Adipose Derived Stem Cells in a Mouse Lymphedema Model

Background: Lymphedema is one of the most common complications following breast cancer. Axillary lymph node dissection and radiotherapy are two well-known risk factors resulting in either removal or damage to the lymph nodes. As stem cells are known for their regenerative capabilities they could theoretically repair/restore the damaged lymph vessels leading to a decrease in lymphedema.

Methods: We evaluated the treatment of SVF and ASC on a mouse lymphedema model. Forty-five mice were allocated into three groups containing 15 mice each. The SVF group was injected with 100 µl containing 1*10^6 SVF, the ASC group with 100 µl ml containing 1*10^6 ASC and the NS with 100 µl ml of NS. Volumes of the mice were assessed weekly by µCT hindlimb volumetry for a total of eight weeks. Lymph vessel morphometry was assessed by cross-sections of both hindlimbs stained for Lyve-1. Lymphatic function was assessed by lymphatic clearance.

Results: The volume change between the groups was non-significant throughout all eight weeks. The immunohistochemistry showed a statistically significant difference between the hindlimbs in ASC vs. NS group P=0.032, 95% CI [-2121, -103].

Conclusion: The volume of the hindlimbs showed that treatment with SVF or ASC yielded very similar results compared to the control group when assessed after eight weeks. In week two the biggest difference between ASC and NS was seen but the difference diminished during the eight weeks. The secondary outcomes showed that the lymph vessel lumen decreased when treated with ASC compared to the control group. Lymphoscintigraphy yielded non-significant results.