Neither local nor systemic postoperative complications were observed in the study subjects during a 6-month follow-up. Concentration of SOD in the NAC group turned out to be significantly higher than in the controls, in both fresh (p=0.041) and frozen samples (p=0.004). Also SOD activity in NAC group was significantly higher, both in fresh and frozen samples (p=0.023 and p=0.003, respectively). Interestingly, no statistically significant intergroup differences were observed in terms of ROS levels. The level of NO in frozen samples from the controls was significantly higher than in NAC group (p=0.009).

The results of this study imply that addition of NAC to tumescent solution may counteract oxidative stress the cells of autologous fat graft are exposed to during the harvesting procedure. This may contribute to lesser volume of the graft that undergoes resorption over time (the study is ongoing). The lack of adverse events after the infiltration of the fat graft donor site with NAC-enriched solution suggests that this technique is safe. If addition of NAC was shown to improve the retention of the graft, this technique might become a routine adjunct method used during this type of procedures.

**The Promotion of Adipogenesis in a Rat Model of Radiation Induced Fibrosis of the Mammary Fat Pad**

**Presenter: Jessica L. Truong, MD, MSc**

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**BACKGROUND/PURPOSE:** Radiofibrosis of breast tissue ultimately compromises breast tissue reconstruction by interfering with tissue viability and healing; autologous fat transfer has recently been shown to reduce radiotherapy-related tissue injury, thought to be attributed to the presence of adipose-derived pluripotent stem cells. We have identified a novel gene HMMR/RHAMM, whose expression decreases adipogenesis and increases fibrosis. We have developed RHAMM peptide mimetics (NP-110) to block RHAMM signalling, and it is thought that the injection of such a peptide will promote adipogenesis and decrease fibrosis in mammary tissue in rats.

**METHODS:** High frequency ultrasound was used to assess volume through thickness measurements and 3D reconstruction of mammary fat pads in 20 retired breeder female rats that were non-irradiated, irradiated, treated, and not-treated with peptide NPI-110 at days 0, 7, 14, and 21. Rats were euthanized at Day 21, and mammary fat pad tissues were processed for expression of fibrotic and adipogenic markers using real-time polymerase chain reaction and immunohistochemistry.

**RESULTS:** Volume estimates of fat pad and expression of fibrotic markers such as Collagen-1, Collagen-3, and TGFβ-1, and adipogenic markers such as PPARγ, adiponectin and perilipin were ameliorated by peptide NP-110 and radiotherapy when quantified via qPCR and immunohistochemistry. NPI-110 significantly reduced skin inflammation and radiofibrosis, the latter assessed by collagen fibril deposition via picrosirius red staining, and increased mRNA expression of adipogenic markers.

**CONCLUSION:** Results from this study may aid in therapies in the human patient population which decrease the significant morbidity associated with a very challenging and common clinical problem – reconstruction in previously radiated beds in general, and breast cancer specifically.

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**Transplanted Fat Adapts to the Environment of the Recipient: A Study to Investigate the Suitability of Donor Recipient Obesity Mismatch in Face Transplantation**

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INTRODUCTION: The primary goal of face transplantation is to restore normal face structure and improve function, offering patients with severe facial deformities a better quality of life and increased social integration. Research regarding factors affecting donor suitability remains lacking. There has been no investigation of the long-term effects of transplanting an obese donor face onto a normal recipient or vice versa. The aim of this study is to determine how an obesity mismatch between donor and recipient affects transplanted facial fat graft retention and cellular properties, potentially increasing the donor pool substantially.

METHODS: 60 male mice were utilized in this study: 30 C57BL/6J wild-type (WT) and 30 diet-induced obese (DIO) mice. 175ug of fat was harvested from the perigonadal fat pads of 10 euthanized mice from each group. The 20 remaining mice in each group served as recipients. A small incision was made between the ears of each recipient mouse and a subcutaneous pocket formed. Harvested fat was implanted in this location and the incision closed. 10 DIO mice were implanted with fat from a DIO donor, 10 with fat from a WT donor. 10 WT mice were implanted with DIO fat and 10 with WT fat. Recipient mice underwent micro-CT scans at 2 days, 2, 4, 6, and 8 weeks postoperative. Scans were 3d reconstructed and fat transplant volume assessed. At 8 weeks, mice were euthanized and transplanted fat analyzed histologically.

RESULTS: Volume retention of the facial fat graft was entirely dependent on the recipient phenotype, confirmed through ANOVA analysis and Student-Newman-Keuls Test. Volume of the graft when the recipient was DIO increased with both a DIO and WT donor (25.6% and 24.4% increase respectively). When the recipient was WT, the graft volume decreased when the donor was WT (-54.0%) and DIO (-53.0%). Average cellular volume also demonstrated the same trend, with a lower volume when the recipient was WT and higher volume when the recipient was DIO, regardless of the donor phenotype.

CONCLUSION: This study demonstrates that fat transplanted to the facial region responds to the surrounding microenvironment both macroscopically and microscopically. This indicates that adipose cells respond to the metabolic environment of the recipient. Furthermore, this study demonstrates that microscopically, fat cells adapt to their recipient host environment as well through cellular volume. This study has large implications in donor suitability in face transplant, as it indicates that a donor-recipient obesity mismatch may be acceptable.

An Algorithm for Treatment of Radiation-Induced Soft Tissue Damage with Products Based on Autologous Adipose Tissue

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PURPOSE: Even though efficiency of fat grafting and adipose-derived stromal vascular fraction injection for radiation-induced soft tissue injury treatment was supported by clinical practice, there are some questions concerning using of these methods still remains unsolved. The aim of our study was to develop an algorithm for management of radiation-induced soft tissue damage with products based on autologous adipose tissue.

METHODS AND MATERIALS: Since 2010 123 patients with late soft tissue radiation damage were treated by injection of products based on autologous adipose tissue. In group 1 containing 44 patients with chronic radiation wounds (LENT-SOMA grade 4) the goal was to completely heal a sore. In group 2 including 21 patients with radiation fibrosis (LENT-SOMA grade 2,3) the treatment was directed to prevention of radiation necrosis. For the rest of 58 patients (group 3) primary goal was to correct contour deformities after previous surgery combined with radiotherapy. Radiolesions were localized in breast, head and neck, trunk, extremities and rectovaginal septum in 59, 24, 21, 11 and 18 patients respectively. Liposuction was performed with barbed cannula 2.5 mm in diameter with fourteen 1.5 mm holes. Three different products based on autologous lipoaspirate were used depending on clinical needs: centrifuged at 1250 g force for 3 minutes microfat,