Gene Expression Analysis during Mammary Transdifferentiation

The paper (Morroni et al., 2004) is the basis for this project. It shows that mammary gland adipocytes are transdifferentiating into lobulo-alveolar epithelial cells during pregnancy. This process is reversed post weaning (=involution switch). Further experiments showed that upon removal of the epithelial part of the gland, adipocytes are no more able to transdifferentiate. This indicates that not pregnancy per se is the factor that induces transdifferentiation but signals from the epithelial part.

Based on these findings the epithelial part was removed from the right 4th gland in 3-weeks old CD-1 mice, leaving the mere fat pad. Microarray analysis of this gland compared to its contolateral control gland (only sham-operated) should help to elucidate which factor(s) are responsible for transdifferentiation, i.e. which factors are active in epithelial part of the gland acting on adipocytes. Histological analysis shows that the most intense period for lobulo-alveolar developement starts around day 15 of pregnany and reaches maximal levels around day 18-19. Therefore, the timepoints d15, d17 and d19 were selected for microarray experiments. Additionally, d10 and d0 (virgin mice) time points were added to have proper baseline data.

Reference List

Morroni,M., Giordano,A., Zingaretti,M.C., Boiani,R., De Matteis,R., Kahn,B.B., Nisoli,E., Tonello,C., Pisoschi,C., Luchetti,M.M., Marelli,M., and Cinti,S. (2004). Reversible transdifferentiation of secretory epithelial cells into adipocytes in the mammary gland. Proc. Natl. Acad. Sci. U. S. A *101*, 16801-16806.