MATURATION OF FUNCTIONAL HUMAN ADIPOCYTES

INTRODUCTION
Pre-adipocytes differentiate into adipocytes through several phases: differentiation and maturation, where they are then completely functional (lipogenesis / lipolysis).

Materials required
- HWP and 3T3-L1 grown in BIOMIMESYS® Adipose tissue
- Perilipine antibody and Phalloidin-FITC (Abcam)
- RNA extraction by TRIzol

Hydroscaffold properties
Porous and Translucent

Method
- The lipid quantification is accomplished by AdipoRed ™ normalized by the DNA quantitation kit following manufacturer’s protocol and using a Hoescht solution at 0.02 μg/ml.
- AdipoRed ™ Assay Reagent, follow manufacturer’s protocol
- Method for marking the perilipin / phalloidin: follow manufacturer’s protocol and visualize by immunofluorescence
- RNA extraction method: follow manufacturer’s protocol

RESULTS
The storage structure of maturated triglycerides can be highlighted by staining of matured adipocytes with Perilipin, also called lipid droplet-associated protein. Perilipin protein stabilizes the lipid droplet surface (1).

Figure 1: Confocal microscopy of a section of HWP cell aggregates in BIOMIMESYS® Adipose tissue at Day 21 (perilipin in green and nucleus in red) by LSCM observation of Z-stack
The adipocyte maturation can also be confirmed by the expression of a late maturation gene: GLUT-4, which is a transporter that allows glucose trafficking and its secretion from the cell.

**Figure 2: Semi-quantitative RT-PCR of adipogenesis late marker gene in 2D and 3D cultures in BIOMIMESYS® Adipose tissue**

Induction of the late gene GLUT-4 is observed during the maturation of adipocytes, as described in the literature (2). This maturation gene is highly expressed in adipocytes grown in BIOMIMESYS® Adipose tissue, attesting the advanced stage of maturation of adipocytes in 3D culture.

**CONCLUSION**

The Perilipin staining and GLUT-4 gene expression indicates a higher maturation of human adipocytes in BIOMIMESYS® Adipose tissue.

**References:**


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