Kirsty Spalding Research Presentation

Human adipose tissue in health and pathology (Spalding Laboratory)

Obesity is increasing in an epidemic manner in most countries and constitutes a public health problem by enhancing the risk for diseases such as diabetes, fatty liver disease and atherosclerosis. Despite this, much remains to be discovered about the basic physiology of fat cells (adipocytes) and how they respond to changes in the fat mass. Adipocytes are specialised cells that either store lipid for times of energy need (white adipocytes) or burn lipid in the process of non-shivering thermogenesis (brown adipocytes). They are believed to be terminally differentiated cells, arising from the differentiation of resident pre-adipocyte progenitor cells.

The Spalding lab investigates many of the basic function of *human* fat cells, including the turnover and regulation of mature and progenitor fat cells, the life cycle of an adipocyte and how they respond to obesity and hyperinsulinemia, adipose tissue senescence and how this associates with metabolic disease and the distribution of 'brown-like' cells (brite fat) in human fat depots and the browning of white fat cells (which are currently of great interest as a novel treatment for obesity, where one burns lipid instead of storing it). We also investigate the turnover of different cell types in the human kidney and how this relates to kidney pathology. We have developed novel technologies to investigate cell turnover and heterogeneity, including radiocarbon dating (Spalding et al., Cell, 2005; Spalding et al., Nature 2008; Arner et al., Nature 2011; Spalding et al., Nat. Comm. 2017), flow cytometry (Hagberg et al., Cell Reports 2018) and single cell transcriptomics (unpublished).