Evaluation of organotypic culture method using adipose tissue slices: Effects of lithium chloride, a GSK-3β inhibitor, on the adipose differentiation from preadipocytes

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The author has established an organotypic culture method using adipose tissue slices (Cell Biol Int. 2015:39:1288-98). For further evaluation of its usefulness as a platform for adipose tissue research including cell responses against the drug treatment, lithium chloride, which is a GSK-3β inhibitor, was added to the culture medium along with the adipogenic stimulation by insulin, dexamethasone, and 3-isobutyl-1-methylxanthine and the histomorphological evaluation of adipose tissue slices was conducted.

In the histological evaluation of H-E-stained adipose tissue slices, small-sized multilocular adipocytes appeared between the unilocular-mature adipocytes and/or perivascular spaces following the adipogenic stimulation. With supplementation of lithium chloride, the cytoplasmic area of newly formed multilocular cells were smaller than those for cells found in the other condition and the number of multilocular adipocytes was remarkably decreased. The 3-D observation of adipose tissue slices using confocal microscopy revealed adipose differentiation of mesenchymal cells and the inhibiting effects of lithium chloride on the adipogenesis induced by adipogenic stimulation.

Based on the above, the organotypic culture method developed by the author was confirmed to be a useful in vitro research tool for the adipose tissue biology and the investigation of histomorphological changes observed in in vivo toxicology studies.