Insulin-Induces Adipogenesis in Immortalized MEF Cells

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Background: As a surrogate stem cell model, mouse embryonic fibroblasts (MEFs) are often used to study adipogenesis. Past research indicates that immortalized MEF cells do not differentiate into adipose tissue without introducing pro-adipogenic transcription factors. However, a recent study has shown that high concentration of insulin does promote MEF adipogenesis. Our current project was to determine if lower concentration of insulin could also induce adipogenesis in immortalized MEF cells.

Methods: MEF cells isolated from C57/BL6 mice were immortalized and used to measure adipogenesis. 2 days post-confluency, cells were treated with (treatment) or without (control) a differentiation cocktail including dexamethasone, IBMX, troglitazone, and low (167mM) or high concentrations (835mM) of insulin. After 48 hours, cells were switched to medium containing 10% FBS medium and low or high concentrations of insulin for the remainder of the differentiation period. Adipocyte differentiation was measured by Oil Red-O staining at 8 days following the initial treatment.

Results: adipogenesis was seen in MEF cells in both low and high insulin groups but not in the control group. The concentrations of triglyceride were 19.64 mg/100ml and 24.52 mg/100ml respectively.

Conclusion: Our results collected thus far show that immortalized MEF cells can differentiate into adipocytes even with the differentiation medium containing low concentration of insulin.

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