

Epigenetic Regulation of Mesenchymal Stem Cell Differentiation into Adipocyte

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Adipocytes are highly specialized cell type that maintains whole body energy homeostasis by regulating glucose and lipid metabolism. Abnormal increases of adipose tissue are closely associated with metabolic disorders such as obesity, insulin resistance, hyperlipidemia, atherosclerosis and type II diabetes. For a long time, adipocytes have been considered as an energy depot that stores and mobilizes triglyceride, a major energy fuel. Recently, adipocytes are also being recognized as an endocrine tissue with the discoveries of several adipocyte-secreted molecules including lipid metabolites and adipocytokines. Using these molecules, adipocytes are able to communicate with other tissues and organs to regulate lipid and glucose metabolism, energy balance, insulin action and reproduction.

Past research on tissue differentiation has been mainly focused on understanding the regulatory roles of specific transcription factors. On the contrary, little is known about the functional roles of coregulators such as HATs and HDACs during differentiation processes. In this study we have discovered a novel role of HDACs during adipogenesis. Our results suggest that the down-regulation of HDACs at the early stages adipogenesis is a rate-limiting step during adipogenesis. These findings add to list of the functional roles of coregulators in regulating cell differentiation and may provide a new target for discovering novel therapies for the treatment of fat-related disorders.