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The roles of HDAC9c and MAPK in mesenchymal stem cell differentiation

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Human bone marrow-derived mesenchymal stem cells (MSCs) are multipotent cells and able to differentiate into distinct lineages including adipocytes and osteoblasts. The adipogenesis and osteogenesis of MSCs are mutually exclusive. Previously we have demonstrated that EZH2, a histone lysine methyltransferase, binds to the HDAC9c (also called myocyte enhancer factor-2 interacting transcriptional repressor, MITR) promoter and inhibits HDAC9c expression in adipocytes but not in osteoblasts. Expression of HDAC9c promotes MSC osteogenesis but represses MSCs adipogenesis through inactivating the transcriptional activity of PPARγ-2. In addition, knockingdown HDAC9c inhibits osteogenesis and enhances adipogenesis. To further elucidate the detailed HDAC9c-mediated signaling in MSCs adipogenesis/osteogenesis, we screened potential kinases that may be involved in the MSCs differentiation into adipocytes and osteoblasts using MAPK antibody array assays. The results show that differential expression of several potential kinases was modulated in osteoblasts compared with undifferentiated MSCs. The roles of HDAC9c and these potential kinases in modulation of osteogenesis will be further pursued (supported by NSC102-2321-B-039-002, NSC102-2325-B-039-002 and MOHW102-TD-PB-111-NSC105).

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