

REGULATION OF BROWN ADIPOCYTE GENE EXPRESSION BY THE HISTONE

H3 LYSINE 4 DEMETHYLASE KDM1b

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ABSTRACT

Brown adipocytes function to dissipate energy as heat through adaptive thermogenesis due to the unique expression of uncoupling protein 1 (Ucp1). Understanding the molecular mechanisms underlying the brown fat thermogenic program may provide insights for the development of therapeutic approaches in the treatment of obesity. Most studies investigating the mechanisms underlying brown fat development focus on genetic mechanisms; little is known about the epigenetic mechanisms in this process. Lysine (K)-specific demethylase 1B (KDM1b) is a histone demethylase that specifically demethylates mono- and di-methylated histone H3 lysine 4 (H3K4me1/2), which plays an important role in maternal genomic imprinting during oocyte development. We found that deleting KDM1b significantly suppressed basal and the beta-adrenergic agonist isoproterenol-stimulated Ucp1 in brown adipocyte cell line BAT-1 cells. Thus, the H3K4me1/2 demethylase KDM1b may be involved in the regulation of brown adipocyte thermogenic function.