

The effect of copper chelating compound, cuprizone, on adipocyte differentiation in vitro

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It has been known that the increased fat storage especially in visceral adipose tissue and decreased thermogenesis in brown and/or beige adipose tissue are closely involved in abnormal glucose tolerance, and hyperlipidemia, leading to type 2 diabetes. Recent reports have shown that serum copper concentration was increased in obese and/or diabetic patients. However, there were limited number of studies showing the role of copper in glucose and lipid metabolism. We have shown the ameliorating effects of copper chelating compound, cuprizone, on high fat diet-induced enhanced lipid storage in epididymal and inguinal white adipose tissues, reduced thermogenesis related UCP1 mRNA in brown adipose tissue, glucose intolerance, and body weight increase. However, the direct effects of cuprizone on adipocytes are unknown. Here, we investigated the effects of cuprizone on adipocyte differentiation to white- and beige-like adipocyte in vitro, by using 3T3L1 preadipocyte.

The 3T3L1 preadipocyte was cultured and differentiated to white- and beige-like adipocyte in appropriate medium. Cells were treated with cuprizone during the time course of differentiation, and the differentiation state of adipocytes was evaluated by gene expression analysis. We found that mRNA expressions of adipogenic markers were not changed by cuprizone in both white- and beige-like adipocyte. These results suggest that cuprizone might affect the functions of fat cells except for adipogenic differentiation.