



Category: Miscellaneous

Plant extract AE11 acts as a potent modulator of adipocyte development and function

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Abstract

Use of herbal formulation to modulate adipocyte development and function has been argued as a potent strategy to tackle alarmingly increasing problem of obesity and associated disease like type 2 diabetes and other cardiovascular problems. However, till date no single formulation exists with good efficacy and little side effects. In this study we are investigating the effect of AE11 (6% v/v, nontoxic to 3T3-L1), a plant extract prepared using cold maceration of shade dried leaves of a common flowering plant of Lakhimpur district of Assam, on 3T3-L1 pre-adipocyte differentiation and function. AE11 very efficiently decreased lipid accumulation in differentiating 3T3-L1 cells. To understand the mechanism of such inhibition, we performed gene expression analysis using semi-quantitative PCR for adipogenic master regulator PPAR γ 1 and PPAR γ 2. A marked reduction in expression of both of the genes were observed in AE11 treated differentiating 3T3-L1 cells. Western blot analysis confirmed reduction of the two factors at protein level as well. Not surprisingly PPAR γ downstream GLUT4, PLN1, FABP4, FAS and LPL mRNA content was also reduced in treated groups. Interestingly mRNA content of the transcription factor GATA2, which is a negative regulator of PPAR γ expression and is normally downregulated during adipogenesis, found to be very high in the AE11 treated cells. This raised a possibility of GATA2 mediated downregulation of PPAR γ in AE11 treated groups. GATA3 mRNA content was however not different in treated and untreated groups. mRNA of CCAAT enhancer binding protein α (CEBP α) which is a positive regulator of PPAR γ expression was decreased by AE11 exposure to 3T3-L1 cells during differentiation. AE11 targeted the expression of another positive regulator of PPAR γ expression, SREBP1c. SREBP1c mRNA content was decreased upon AE11 treatment in differentiating 3T3-L1 cells. These preliminary results suggest AE11 is an effective modulator of adipocyte development and function by targeting positive and negative regulators of PPAR γ gene expression. The authors thank Department of Biotechnology (DBT) for providing fellowship and funds to carry out the work.

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