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W214 Effects of allulose, a sugar substitute on adipocyte differentiation

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Several anti-obesity functional foods have been developed to alleviate obesity, which is a serious problem in modern society. Allulose, a natural substance, is getting attention as an alternative to sugar. [1] To evaluate the anti-obesity functionality of allulose, it is necessary to evaluate adipogenic factors quantitatively and comprehensively using 3T3-L1 cell line which allows to save time and cost to perform experiments.

Recent studies have investigated the anti-obesity effects by measuring adipocyte formation and a size increase during a differentiation process of white adipose tissue (WAT). [2] The differentiation process of adipocytes is carried out through the complex interrelationships of several transcription factors (TFs). For example, when a cAMP response element-binding protein (CREB) activity is increased via cAMP in the adipogenesis process, CCAAT-enhancer-binding proteins (C/EBP) is stimulated. In addition, insulin stimulation increases the activity of sterol regulatory element-binding protein 1c (SREBP-1c) and induces adipogenesis.

In our study, during 14 days of adipocyte differentiation, the number and size of adipocytes were reduced when substituting allulose for glucose. In addition, we are investigating the interaction and dynamics of key transcription factors (TFs). [3] The activity changes of CREB, C/EBP, and SREBP-1c are measured to analyze effects of allulose on adipocyte differentiation. We expect that these results will provide a systematic and quantitative understanding for the anti-obesity functionality of allulose.

Keywords : obesity, allulose, adipocyte, transcription factor

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