

JOINT EVENT

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Spirulina maxima* inhibits adipogenesis in 3T3-L1 cells and high fat diet induced obese mice*Boo Yong Lee and Young Jin Seo**
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Obesity is a major health problem across the world that causes the risk of type 2 diabetes and obesity-related pathologies. Obesity occurs by an imbalance between energy intake and energy expenditure. *Spirulina maxima* is a microalga rich in other essential nutrients and contains phenolic acids. Recently, many studies have been demonstrated that *Spirulina maxima* has anti-oxidant and anti-cancer properties. However, it has not been shown whether *Spirulina maxima* has anti-obesity effects. The aim of this study is to evaluate the anti-obesity effect of *Spirulina maxima* 70% ethanol extract (SM70EE) *in vitro* and *in vivo*. Our results showed that SM70EE repressed the lipid accumulation compared with MDI-induced differentiation, using Oil Red O staining. SM70EE decreased expression of adipogenic genes such as C/EBP α , PPAR γ , and aP2 in 3T3-L1 adipocytes. Additionally, treatment of SM70EE reduced lipogenesis related genes such as LPAAT β , LPAAT θ , and Lipin1 by using Western Blot analysis. Moreover, SM70EE induced brown adipocyte marker proteins such as PRDM16, PGC1 α , and UCP1 in 3T3-L1 cells. In HFD-induced obese mice, SM70EE treatment significantly depressed weight gain as well as the weight of the white adipose tissue (WAT). These results indicated that the intake of SM70EE suppressed expression of adipogenesis related genes such as C/EBP α , PPAR γ , and aP2 in mouse WAT. Our study revealed that SM70EE improved obesity through inhibition of adipogenesis and induction of thermogenesis in 3T3-L1 cells and high fat diet induced obese mice.

Recent Publications

1. Choi J et al. (2016) Gelidium elegans extract ameliorates type 2 diabetes mellitus through negative regulation of MAPK signaling pathway by PI3K/AKT activation. Journal of the Korean Society of Food Science and Nutrition. 10(1).pii:E51.
2. Seo Y J (2017) Anti-adipogenesis mechanism of pterostilbene through the activation of heme oxygenase-1 in 3T3-L1 cells. Phytomedicine. 33:7-13.
3. Koh E J et al. (2017) Modulation of HO-1 by ferulic acid attenuates adipocyte differentiation in 3t3-l1 cells. Molecules. 22(5).pii:E745.
4. Choi J et al. (2017) Gelidium elegans regulates the AMPK-PRDM16-UCP-1 pathway and has a synergistic effect with orlistat on obesity-associated features in mice fed a high-fat diet. Nutrients. 9(4).pii:E342.
5. Koh E J et al. (2017) Ginsenoside Rg1 suppresses early stage of adipocyte development via activation of C/EBP homologous protein-10 in 3T3-L1 and attenuates fat accumulation in high fat diet-induced obese zebrafish. Journal of Ginseng Research. 41(1):23-30.

Biography

Boo Yong Lee is currently a Faculty Member in the Department of Food Science and Biotechnology, College of Life Science of CHA University, Republic of South Korea. He has his expertise in evaluation and passion in improving the health and wellbeing. His open and contextual evaluation model based on responsive constructivists creates new pathways for improving food and nutrigenomics. He has built this model after years of experience in research, evaluation, teaching and administrating in education institutions.

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