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Chrysophanic Acid Suppresses Adipogenesis and Induces Thermogenesis by Activating AMP-Activated Protein Kinase Alpha In vivo and In vitro

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Chrysophanic acid (CA) is a member of the anthraquinone family abundant in rhubarb, a widely used herb for obesity treatment in Traditional Korean Medicine. Though several studies have indicated numerous features of CA, no study has yet reported the effect of CA on obesity. In this study, we tried to identify the anti-obesity effects of CA. By using 3T3-L1 adipocytes and primary cultured brown adipocytes as in vitro models, high-fat diet (HFD)-induced obese mice, and zebrafish as in vivo models, we determined the anti-obesity effects of CA. CA reduced weight gain in HFD-induced obese mice. They also decreased lipid accumulation and the expressions of adipogenesis factors including peroxisome proliferator-activated receptor gamma (PPAR γ) and CCAAT/enhancer-binding protein alpha (C/EBP α) in 3T3-L1 adipocytes. In addition, uncoupling protein 1 (UCP1) and peroxisome proliferator-activated receptor gamma coactivator 1-alpha (PGC1 α), the brown fat specific thermogenic genes, were up-regulated in brown adipocytes by CA treatment. Furthermore, when co-treated with Compound C, the AMP-activated protein kinase (AMPK) inhibitor, the action of CA on AMPK α was nullified in both types of adipocytes, indicating the multi-controlling effect of CA was partially via the AMPK α pathway. Given all together, these results indicate that CA can ameliorate obesity by controlling the adipogenic and thermogenic pathway at the same time. On these bases, we suggest the new potential of CA as an anti-obese pharmacotherapy.

Biography:

Hara lim is Traditional Korean Medicine Doctor. From 2015 until 2017 as an Official volunteer of KOICA (Korea International Cooperation Agency). She was dispatched to Bolivia by government of Korea for working at the public hospital Viedma and San Simon University in Cochabamba Bolivia to teach Traditional Korean Medicine. Before she was dispatched to Bolivia she work at the Soram cancer and well-being hospital in Seoul. And in 2014 Feb she got master degree of Pharmacology of Traditional Korean medicine from Kyung Hee University, Seoul, South Korea