Inhibitory Effects of Nelumbo nucifera Extracts on Proliferation and Differentiation of 3T3-L1 Preadipocyte cell

O Rhyu Dong Young, Kim Min Suk, Min Oh Jin
Major in Medical Plant Resources, Mokpo National University, Korea

Obesity occurs from the imbalance between energy intake and energy expenditure that may lead to a pathologic growth of adipocyte and accumulation of fat in tissue. Obesity is a complex chronic disease that is suggested to cause other metabolic disorders, such as type 2 diabetes, hyperlipidemia, hypertension and arteriosclerosis. All parts of Nelumbo nucifera also have been used for various remedy purpose in Korea. Therefore, we examined the inhibitory effects of Nelumbo nucifera extracts (leaf, root, and seed) on the proliferation and differentiation of 3T3-L1 preadipocyte using MTT assay and Oil Red O staining. 3T3-L1 preadipocyte were cultured in 96-well culture plates to examine the inhibitory effects of Nelumbo nucifera extracts on proliferation, and the various concentrations (50, 250, and 500 µg/ml) of Nelumbo nucifera extracts were added for 24h, 48h, and 72h. In differentiation experiment, growth-arrested 3T3-L1 preadipocyte were stimulated with 0.5 mM 3-isobuthyl-1-methylxanthine (MIX), 5 µg/ml insulin, and 1 µM dexamethasone in DMEM media containing 10% FBS (differentiation media, DM). During the induction of differentiation, Nelumbo nucifera extracts (10, 100, and 250 µg/ml) was added to the media at 0 day, and the fat droplet of adipocyte were stained by Oil Red O at 8 day. At the results, Nelumbo nucifera extracts significantly inhibited the proliferation of 3T3-L1 preadipocyte, and the leaf and root extracts of Nelumbo nucifera showed the significant changes on fat accumulations of adipocyte. Thus these data provide the evidences that Nelumbo nucifera extract have beneficial effects on proliferation of 3T3-L1 preadipocyte and fat accumulations of adipocyte.