ANTIOBESITY EFFECTS OF GARCINOL AND PTEROSTILBENE ON INHIBITION OF ADIPOGENESIS IN 3T3-L1 ADIPOCYTES

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Obesity has become a global health problem due to its association with life-style-related diseases. Therefore, developments of potential natural compounds with slight or no side effects are very important for antiobesity agents. The aim of this work was to study the effects of garcinol (a polypropynylated benzophenone derivative from *Garcinia indica*) and pterostilbene (a naturally occurring compound similar to resveratrol) on cell proliferation and adipogenesis in 3T3-L1 cells. The results showed that garcinol and pterostilbene decreased the cell population growth and caused cell cycle arrested at G2/M phase in 3T3-L1 preadipocytes. During adipocytes differentiation, both garcinol and pterostilbene had inhibitory effects on fat droplet formation and triacylglycerol accumulation. The data indicated that garcinol and pterostilbene could inhibit the glycerol-3-phosphate dehydrogenase activity by 97.8 and 61.5%, respectively, as compared to the control. Both garcinol and pterostilbene significantly attenuated the protein expressions of PPARγ and C/EBPα during 3T3-L1 adipocytes differentiation. Moreover, garcinol and pterostilbene caused an inhibition of lipid accumulation in 3T3-L1 adipocytes differentiation. Garcinol and pterostilbene also significantly up-regulated the gene expression of adiponectin as well as down-regulated the gene expressions of leptin, resistin, and fatty acid synthase (FAS) in 3T3-L1 adipocytes differentiation. In 3T3-L1 adipocytes, garcinol significantly down-regulated the protein expressions of PPARγ and FAS as well as up-regulated the protein expressions of adipose triglyceride lipase and adiponectin. Garcinol also significantly up-regulated the gene expression of adiponectin and down-regulated the gene expressions of leptin and FAS. These results suggest that garcinol and pterostilbene have anti-adipogenic effect on preadipocytes and adipocytes.