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Antioxidants modulate *in vitro* adipocyte function and lipolysis during obesity: Are antioxidant therapies efficient?

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Nowadays, there has been an explosion of interest in the role of specific functional foods promoting health. Antioxidants, such as vitamins and poly-phenolic compounds, are molecules capable of reducing the causes or effects of oxidative stress, caused by environmental factors, disease, infection and inflammation. Obesity with excessive adipose tissue is associated with a chronic inflammatory state and evident oxidative stress. Micronutrient deficiencies in obesity may influence several physiological functions including adipocyte dysfunction. It has been proposed that increased oxidative stress in adipose tissue is an important cause of obesity-associated diseases, and that antioxidants may be therapeutic approaches. Previous studies showed some beneficial effect of vitamin supplementation on obesity-associated metabolic complications. However, the magical supplement theory of obesity is not proved yet. In addition, little attention has been directed towards adipose tissue function and redox status in the obese state. We then explored the *in vitro* effects of vitamins C and E and polyphenols (chlorogenic acid and curcumin) on adipocyte function including lipolysis and oxidant/antioxidant status in a rat model of diet-induced obesity. Adipocytes were isolated from abdominal adipose tissue and were cultured in the presence or the absence of vitamins (C, E) or polyphenols (chlorogenic acid and curcumin). Cell proliferation, membrane fluidity, glucose consumption, Lactate Dehydrogenase (LDH) and glycerol efflux, Adenosine Triphosphate (ATP) and redox balance (catalase, superoxide dismutase, reduced glutathione, hydro-peroxides and carbonyl proteins) were investigated. The results showed altered membrane fluidity, glucose consumption, low ATP concentrations and glycerol release with a concomitant oxidative stress in adipocytes of obese rats. Adipocyte function and redox balance was improved in the presence of antioxidants. However, only curcumin enhanced lipolysis. In conclusion, antioxidants had beneficial effects on adipocyte function and redox status, with effective effect of curcumin on lipolysis. Antioxidants should be considered in therapeutic approaches for normalizing adipose function in obesity.

Biography

Hafida Merzouk is a Professor in Physiology and Nutrition, Algeria. Currently, she is the Director of PPABIONUT Laboratory where she manages several research projects on preventive nutrition and bioactive molecules, on major pathological syndromes related to nutrition: Diabetes, high blood pressure, obesity, metabolic syndrome and their prevention by functional foods. Her research is oriented towards understanding the origin of chronic diseases which resides in the dysfunction of cells, due to chronic deficiencies in vitamins, minerals and other essential cellular substances. Her integration into the SANMO Society of Nutrition allows her to provide information on the importance of adequate nutrition for general population and to promote preventive nutrition.

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