

Abstract

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Coenzyme Q10 supplementation lowers hepatic oxidative stress and inflammation associated with diet-induced obesity in mice.

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BACKGROUND: Diabetes and obesity are metabolic disorders induced by an excessive dietary intake of fat, usually related to inflammation and oxidative stress.

AIMS: The aim of the study is to investigate the effect of the antioxidant coenzyme Q10 (CoQ10) on hepatic metabolic and inflammatory disorders associated with diet-induced obesity and glucose intolerance.

METHODS: C57bl6/j mice were fed for 8 weeks, either a control diet (CT) or a high-fat diet plus 21% fructose in the drinking water (HFF). CoQ10 supplementation was performed in this later condition (HFFQ).

RESULTS: HFF mice exhibit increased energy consumption, fat mass development, fasting glycaemia and insulinemia and impaired glucose tolerance. HFF treatment promoted the expression of genes involved in reactive oxygen species production (NADPH oxidase), inflammation (CRP, STAMP2) and metabolism (CPT1alpha) in the liver. CoQ10 supplementation decreased the global hepatic mRNA expression of inflammatory and metabolic stresses markers without changing obesity and tissue lipid peroxides compared to HFF mice. HFF diets paradoxically decreased TBARS (reflecting lipid peroxides) levels in liver, muscle and adipose tissue versus CT group, an effect related to vitamin E content of the diet.

CONCLUSION: In conclusion, HFF model promotes glucose intolerance and obesity by a mechanism independent on the level of tissue peroxides. CoQ10 tends to decrease hepatic stress gene expression, independently of any modulation of lipid peroxidation, which is classically considered as its most relevant effect.

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