Green Tea Extract Restores Obesity-Related Dysfunction of White Adipose Tissue by Remodeling its Metabolism – AMPK-dependent mechanism
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Abstract
Purpose: Beneficial effects of green tea polyphenols against obesity have been reported. However, until this moment the molecular mechanisms of how green tea can modulate obesity and regulates fat metabolism, particularly in adipose tissue, remain poorly understood. The aim of this study was to evaluate the role of green tea extract in the adipose tissue of obese animals and its effect on weight gain, metabolism and function (de novo lipogenesis and lipolysis) and the involvement of AMP-activated protein kinase (AMPK) activation.
Methods and Results: Here, we show that obese-induced rats with cafeteria diet (8 weeks) that were treated with a green tea extract (500 mg/kg of body weight) for 12 weeks, showed a significant reduction in indicators of obesity such as hyperlipidemia, fat synthesis, body weight and fat depots through activation of AMPK as compared with control standard diet. AMPK was induced in adipose tissue of animals that were treated with green tea and restored insulin sensitivity, increased mRNA expression of GLUT4, reducing the concentrations of plasma and liver lipid content, also stimulating fatty acid oxidation in the adipose tissue. Importantly, AMPK represses de novo lipogenesis in adipose tissue, but also reverted lipid droplets in the liver and the development of insulin resistance in diet-induced obese rats.
Conclusion: Our study identified that metabolic changes caused by green tea intake, induced AMPK-activity which, in turn, modulates the expression of genes involved in metabolism, particularly in adipose tissue, thus offering a therapeutic strategy to combat insulin resistance, dyslipidemia and obesity in rats.

Keywords: Obesity, Green Tea, Metabolism, Gene Expression, Polyphenols.