GREEN TEA EXTRACT CHANGES THE PROFILE OF INFLAMMATORY CYTOKINE RELEASE FROM LYMPHOCYTES OF OBESE AND LEAN RATS AND PROTECTS AGAINST OXIDATIVE DAMAGE

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Introduction: Obesity is associated with a chronic low-grade inflammation state, present both systemically and within the white adipose tissue (WAT). Furthermore, obesity is characterized by increased levels of some circulating hormones and nutrients, such as leptin, glucose and free fatty acids, among other metabolic changes.

Objectives: This study aimed to investigate whether green tea extract (GT) modulates some functional parameters of lymphocytes from obese rats.

Materials and Methods: Male Wistar rats were treated with GT by gavage (12 weeks/5 days/week; 500 mg/kg of body weight) and obesity was induced by cafeteria diet (8 weeks). Lymphocytes were obtained from mesenteric lymph nodes for analyses.

Results: In response to the cafeteria diet, activity of the metabolic enzyme hexokinase was increased, together with ROS production, which was accompanied by increases in MnSOD, CuZnSOD and GR enzyme activities. Proliferation capacity of cells at baseline was increased due obesity, whereas IL-10 production was decreased. Obese rats treated with GT showed decreased cell proliferation under ConA stimulation, hexokinase and G6PDH activity, ROS production and MnSOD, CuZnSOD, GPx and GR enzymes remained increased, accompanied by an increase in Nrf2 mRNA level. Regarding cytokine release, decreases in pro-inflammatory IL-2, IL-6, IL-1\(\beta\), TNF–\(\alpha\) were accompanied by a decrease in the mRNA level of TRL4 and restoration of IL-10 production in obese rats treated with GT. GT treatment of lean rats showed similar results to that of obese rats, thereby indicating that the effects of GT are independent of diet. Foxp3 and IRF4 mRNA levels were increased by GT.

Conclusions: Cafeteria diet modulated lymphocyte function, mainly by increasing ROS production and decreasing anti-inflammatory IL-10, which could contribute to the inflammatory state in obesity. GT was efficient at reducing ROS production, improving the redox status and reducing pro-inflammatory cytokine production by lymphocytes, suggesting that GT treatment may be driving lymphocytes to a more anti-inflammatory than pro-inflammatory microenvironment.

Keywords: Obesity; Oxidative stress; Polyphenols.