APIGENIN SUPPLEMENTATION PREVENTS COLONIC MOTOR DYSFUNCTIONS ASSOCIATED WITH HIGH FAT DIET-INDUCED OBESITY

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Background: Obesity is a chronic disorder characterized by low-grade systemic inflammation and several comorbidities, including alterations of gastrointestinal (GI) motility (Ho et al., 2008; Buchoucha et al., 2015). Recent reports suggested the beneficial effects of apigenin (anti-inflammatory and antioxidant natural compound) in the prevention of some comorbidities associated with obesity (Babu et al., 2013). However, its putative effect on obesity-associated colonic motor dysfunctions has not been previously investigated.

Objective: This study examined the effect of dietary supplementation with apigenin on colonic inflammatory and motor abnormalities in a mouse model of diet-induced obesity.

Methods: Wild type C57BL/6J mice were fed with standard diet (SD, 18% calories from fat) or high fat diet (HFD, 60% calories from fat). Groups of SD or HFD mice were treated with apigenin (10 mg/Kg/die). After 8 weeks of treatment , body and epididymal fat weight, as well as blood total cholesterol, triglyceride and glucose levels were evaluated. Let-7f microRNA expression (real-time PCR), malondialdehyde (MDA, colorimetric assay), IL-1β and IL-6 levels (ELISA) were also examined. Substance P (SP) and inducible nitric oxide synthase (iNOS) expressions were evaluated by immunohistochemical analysis. Nitrergic and NK1 receptor-mediated tachykininergic motor responses, elicited by electrical stimulation, were recorded in vitro from colonic longitudinal muscle strips.

Results: When compared with SD mice, HFD animals displayed an increase in body and epididymal fat weight, as well as in blood metabolic indexes. Colonic tissues from HFD mice showed also an increase in let-7f microRNA expression, MDA, IL-1β and IL-6 levels. Immunohistochemistry displayed an increase in SP and iNOS expression in the myenteric plexus of obese mice. In colonic preparations from HFD mice, electrically evoked nitrergic and tachykininergic responses were enhanced. Apigenin counteracted the increase in body and epididymal fat weight, as well as the alterations of metabolic indexes. In obese mice, apigenin decreased also let-7f microRNA expression, MDA, IL-1β and IL-6 colonic levels, as well as SP and iNOS expression along with a normalization of colonic nitrergic and tachykininergic contractions.

Conclusions: The present results indicate that diet supplementation with apigenin prevented metabolic alterations and counteracted intestinal inflammation, with a concomitant normalization of colonic dysmotility associated with obesity.

References:

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