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***Lactobacillus paracasei* CNCM I-4034 enhances the intestinal immune response in obese Zucker rats**

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Obesity has reached pandemia levels and is becoming a serious health problem in industrialized countries. Intestinal microbiota is considered a main factor of body weight and fat mass, which points toward a critical role in the development of obesity and its complications. The effects of *Lactobacillus (L.) paracasei* CNCM I-4034 feeding on the immune system and glucidic metabolism in a genetic model of obesity were investigated. Obese and lean Zucker rats were used. Animals received orally either 10¹⁰ CFU of *L. paracasei* CNCM I-4034 or a placebo for 1 month. After the intervention period samples of serum, intestinal mucosa and feces were taken. Parameters related with glycidic metabolism and inflammation markers were measured in the serum. A differential gene expression (DNA array) study and a histological evaluation were carried out in the intestinal samples. Total IgA content was quantified in the faeces. No alteration compared with regular intestinal histology was observed in the mucosa or any other layer of the ileum or colon in any of the experimental groups, which suggests that the probiotic did not alter the morphology of this organ. Nor did serum glucose, insulin, leptin and adiponectin concentrations change. Expression of 45 intestinal genes was affected by feeding with the probiotic strain. Serum concentrations of CCL2, MIP-1 α , IL-2 and IL-18 increased in obese rats fed *L. paracasei* CNCM I-4034. In contrast, IL-6 concentration decreased. A greater content of total IgA was found in the feces of the rats that received the probiotic strain. Our results suggest that *L. paracasei* CNCM I-4034 stimulated the immune response in the intestine of obese rats, which could be beneficial to defeat infections.

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