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Research Paper

Heat-killed Lactobacillus Reuteri GMNL-263 Prevents Epididymal Fat Accumulation and Cardiac Injury in High-Calorie Diet-Fed Rats

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Abstract

High-calorie diet-induced obesity leads to cardiomyocyte dysfunction and apoptosis. Impaired regulation of epididymal fat content in obese patients has been known to increase the risk of cardiac injury. In our study, a lactic acid bacteria, *Lactobacillus reuteri* GMNL-263, was evaluated for its potential to reduce body weight and body fat ratio and to prevent heart injury in rats with high-fat diet-induced obesity. Lactic acid bacteria supplementation restored the cardiac function and decreased the physiological changes in the heart of the obese rats. In addition, the Fas/Fas-associated protein pathway-induced caspase 3/e Poly polymerase mediated apoptosis in the cardiomyocytes of the obese rats was reversed in the Lr263-treated rats. These results reveal that fed with Lr-263 reduces body fat ratio, inhibits caspase 3-mediated apoptosis and restores cardiac function in obese rats through recovery of ejection fraction and fractional shortening. Our results indicated that the administration of Lr263 lactic acid bacteria can significantly down-regulate body fat and prevent cardiomyocyte injury in obese rats.

Key words: Functional food; High-calorie diet; Obesity; Cardiac dysfunction

Introduction

Obesity is a metabolic disease characterized by an excess accumulation of fat and the presence of some genetic defects such as TMEM18, SH2B1 and GNPDA2 had been shown that associated with obesity in clinical research [1]. Moreover, obesity also induces other complication disease, i.e., hyperlipidemia, inflammation, oxidative stress, myocardial apoptosis, lipid metabolic disorders and insulin resistance, and these pathological factors are associated with increased risks for the development of cardiovascular diseases (CVD) [2-6].

High-calorie intake often leads to obesity, insulin resistance, apoptosis, oxidative stress, hypertension and induced endoplasmic reticulum (ER) stress,