Original article

Roselle Extract Enhances Glucose Uptake of Fat Cells Isolated from High Fructose and Fat-Diet Rats.

Nutchakamol Yosaph 1, Patchareewan Pannangpetch 1*, Jarinyaporn Naowaboot 1, Bunkerd Kongyingyoes 1, Arunporn Itharat 2.

1Department of Pharmacology, Faculty of Medicine, Khon Kaen University, Thailand
2Applied Thai Traditional Medicine Centre, Faculty of Medicine, Thammasart University, Bangkok, Thailand

*E-mail address: pate_pan@kku.ac.th

Abstract

The diet high in fructose and fat can cause insulin resistance, impaired glucose tolerance and hyperinsulinemia. These metabolic changes have been implicated as contributing factors to the development of type 2 diabetes. Recently, we have found that roselle (Hibiscus sabdariffa) extract has an antihyperglycemic activity in streptozotocin-induced type 1 diabetic rats. To investigate the antidiabetic efficacy of roselle extract for type 2 diabetes, this study examined the effect of water extract of roselle calyxes (HS-WE) on glucose uptake of adipocytes isolated from high fructose and fat (HFF) diet-induced impaired glucose tolerance rats. Male Sprague-Dawley rats were induced to have impaired glucose tolerance by feeding with HFF-diet for 12 weeks. Then, the oral glucose tolerance test was performed, and the basal serum insulin level was measured. The HFF-diet rats were sacrificed and the epididymal fat pad was removed to prepare 40% fat cell suspension. The fat cell suspensions were treated with HS-WE (1-45 µg/ml) or insulin 1.5 nM. 2-deoxy-D-[U-14C]glucose was then added and used as a tracer to measure the amount of glucose uptake into fat cells. We found that the 8-12 weeks HFF-diet rats had hyperinsulinemia and impaired glucose tolerance. HS-WE at 1, 5, 15 and 45 µg/ml significantly increased glucose uptake into adipocytes as compared to basal glucose uptake by 120±3, 137±4, 148±4 and 126±3 %, respectively. In conclusion, our results indicated that the roselle extract may have glucose lowering activity by enhancing glucose uptake in HFF-diet rats.

Keywords: Hibiscus sabdariffa, Insulin resistance, Impaired glucose tolerance

Introduction

In humans, the consumption of high-calories diets and sedentary life styles are the known causes of metabolic syndrome. In animals, diet high in fructose and fat causes multiple symptoms of metabolic syndrome such as insulin resistance, impaired glucose tolerance, hyperinsulinemia and hypertriglyceridemia (1) which are implicated as contributing factors in the development of type 2 diabetes. Nowadays herbal medicines are getting accepted throughout the world for treating diabetes. Hibiscus sabdariffa Linn (roselle), locally called “Krachiap Daeng” in Thailand, belongs to the Family Malvaceae. The extract of roselle calyxes has been reported of antidysslipidemia, antiatherosclerosis and antihypertensive activities (2). Recently, we have demonstrated that roselle extract has antihyperglycemia in streptozotocin-induced type 1 diabetic rats (3). However,