Action of an extract from the seeds of Fraxinus excelsior L. on metabolic disorders in hypertensive and obese animal models

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ABSTRACT

Nuzhenide and GI3, the principal secoiridoids of an extract obtained from the seeds of Fraxinus excelsior L. (FXE) are believed to be the active compounds responsible for the previously reported hypoglycemic effects of this extract. In this study, the effects of FXE were studied in two animal models which are representative of metabolic disorders: spontaneously hypertensive rats (SHR) and obese Zucker rats. SHR were acutely treated (oral gavage) with different doses of FXE. In addition, SHR and Zucker rats were chronically fed (20 or 5 weeks, respectively) with standard chow supplemented with FXE. Acute treatment with FXE (200 mg/kg body weight) decreased systolic blood pressure as did captopril (50 mg/kg body weight). Chronic treatment with FXE at 100 mg/kg body weight/day, a dose equivalent to that showing hypoglycemic activity in humans, resulted in a significant decreased in glycemia (-16.3%), triglyceridemia (-33.4%) and body weight (-8.1%) in Zucker rats as well as a significant decrease in SBP in SHR (-6.7%), with a concomitant improvement in endothelial function and nitric oxide bioavailability in both strains. The broad-ranging effects of FXE may be due to a unique compositional profile that could be useful to prevent metabolic syndrome, characterized by obesity, insulin resistance, glucose intolerance, hypertriglyceridemia and elevated blood pressure.