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Vitis vinifera (grape) seed extract and resveratrol alleviate bisphenol-A-induced metabolic syndrome: biochemical and molecular evidences

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Abstract

The underlying mechanisms of bisphenol-A (BPA) induced metabolic syndrome and the protective role of grape seed extract (GSE) and resveratrol were investigated. Rats were treated with BPA (۰ and ۳۰ mg/kg/day, gavage) plus resveratrol (۲۰, ۵۰ and ۱۰۰ mg/kg/day, ip) or GSE (۳, ۶, ۱۲ mg/kg/day, ip) or vitamin E (۲۰۰ IU/kg/every other day, ip). After ۲-month, mean systolic blood pressure (MSBP), serum lipid profile, glycaemia and fat index were examined. By ELISA, the serum concentrations of insulin, leptin, adiponectin and paraoxonase^۱, and by real time-PCR as well as western blotting, key liver elements in cholesterol hemostasis (ldlr, cyp^{۷a}^۱, abcg^۵ and ^۸) and insulin signaling (p-Akt/Akt and p-PI^۳K/PI^۳K) were measured.

BPA increased MSBP, total cholesterol and LDL-C, and reduced paraoxonase^۱, and the hepatic expression of both abcg^۵ and abcg^۸. It increased the body fat index, leptin, adiponectin, insulin and glycaemia level and decreased the hepatic protein expression of p-Akt/Akt and p-PI^۳K/PI^۳k. GSE, resveratrol or vitamin E co-administration along with BPA restored the detrimental effects of BPA in some levels.

Herein, predisposing effects of BPA induced metabolic syndrome were restored by GSE and resveratrol, linked to antioxidant properties and regulation of insulin signaling and abcg^۸ expression.

Key words: Bisphenol-A; Dyslipidemia; Grape; Hypertension; Metabolic syndrome; Resveratrol