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## Liposomal curcumin improves insulin resistance in type 2 diabetic rats by upregulating hepatic *GLUT-2*

Curcumin, from the rhizomes of *Curcuma longa*, is characterized by its anti-diabetic and insulin-sensitizing activities. Curcumin has poor bioavailability that has been overcome in our research by using liposomes. This study aimed to measure the hepatic expression of glucose transporter-2 (*GLUT-2*) in high fat diet (HFD) induced type 2 diabetic rats, and to investigate the roles of liposomal curcumin in improving hepatic insulin resistance and glucose intolerance. In this study, we randomly divided Sprague-Dawley male rats into 6 groups: Control, high fat diet (HFD), treated HFD with oral curcumin (0.8 g/kg/3times/week), treated HFD with oral liposomal curcumin (0.03 g/kg/3times/week), treated HFD with subcutaneous liposomal curcumin (0.03 g/kg/3times/week) and treated HFD with interperitoneal liposomal curcumin (0.03 g/kg/3times/week). Level of gene expression of *GLUT-2*, diabetic profile parameters (fasting blood glucose level, serum insulin, HOMA-IR), rat weight, total cholesterol, triglyceride, HDL-C, LDL-C, liver function, kidney function, liver malondialdehyde, glutathione and catalase activity were measured in all groups. Feeding rats HFD for 8 weeks developed features of insulin resistance and type 2 diabetes. These features presented in decreased expression of *GLUT-2* gene, increased body weight, hyperglycemia, hyperinsulinemia, hypercholesterolemia (with increased LDL-Cholesterol and decreased HDL-Cholesterol) and hypertriglyceridemia and decreased glutathione and activity of catalase. Curcumin (free and liposomal) treatment increased gene expression of *GLUT-2*, improved levels of diabetic profile parameters, lipid profile, liver and kidney function and decreased oxidative stress. Our results suggested that curcumin (especially liposomal) is a unique natural medicine against insulin resistance in type 2 diabetes mellitus in rats.

### Biography

Nihal M Elguindy has completed her PhD from Duke University, USA and continued her work in faculty of science in Alexandria University, Egypt. She has more than 10 years experience in the field of treating or preventing diseases like, liver cancer, diabetes and obesity using natural products.

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