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Signaling mechanisms of a water soluble curcumin derivative in experimental Type 1 diabetes with cardiomyopathy

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Background: Curcumin exhibits anti-diabetic activities, induces heme-oxygenase-1 (HO-1) and is an inhibitor of transcriptional co-activator p300. A novel water soluble curcumin derivative (NCD) has been developed to overcome low *in vivo* bioavailability of curcumin. We evaluated the effect of the NCD on signaling mechanisms involved in cardiomyocyte hypertrophy and studied whether its action is mediated via inducible HO-1.

Materials and Methods: Rats were divided into controls, controls receiving NCD, diabetic, diabetic receiving NCD, diabetic receiving pure curcumin, diabetic receiving HO inhibitor, zinc protoporphyrin IX (ZnPP IX) and diabetic receiving NCD and ZnPP IX. NCD and curcumin were given orally. After 45 days, cardiac physiologic parameters, plasma glucose, insulin, glycated hemoglobin (GHb), HO-1 gene expression and HO activity in pancreas and cardiac tissues were assessed. Gene expression of p300, atrial natriuretic peptide (ANP) and myocyte enhancer factor 2 (MEF2A and MEF2C) were studied.

Results: NCD and curcumin decreased plasma glucose, GHb and increased insulin levels significantly in diabetic rats. This action may be partially mediated by induction of HO-1 gene. HO-1 gene expression and HO activity were significantly increased in diabetic heart and pancreas. Diabetes upregulated the expression of ANP, MEF2A, MEF2C and p300. NCD and curcumin prevented diabetes-induced upregulation of these parameters and improved left ventricular function. The effect of the NCD was better than the same dose of curcumin.

Biography

Rania Elsayed Hussein has completed her PhD at the age of 34 years from Faculty of Medicine, Cairo University. She is a lecturer of Medical Biochemistry and Molecular Biology at Faculty of Medicine, Cairo University. She is one of the active members of the unit of biochemistry and molecular biology at Kasr Alainy School of Medicine for 6 years. She has published two papers in reputed journal. She was one of the organizing committee of the department conference BIOCHEM CAIRO 2013, 2014.

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