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New strategies to activate pancreatic cell therapy, therapeutic potentials of α -lipoic acid, vanadyl acetylacetonate and *Nigella sativa* in diabetic rats

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Searching for insulin replacements or insulin-mimetic upon oral administration as diabetic patients, still develop complications even with intensive insulin treatment. Rats were rendered diabetic by injection of streptozotocin (60 mg/kg body weight). After confirmation of diabetes, rats randomly allocated into 5 groups (15 rats/group): Control (normal), diabetic, the treated groups daily received oral doses of 100 mg/kg of Alpha lipoic acid, vanadyl acetylacetonate group were received 6 mg/kg of vanadyl acetylacetonate and *Nigella sativa* group were received oral doses of 500 mg/kg of *Nigella sativa* via stomach tube for 6 weeks. After 2, 4 and 6 weeks from onset of diabetes, serum and fluoride blood samples were obtained for evaluation of fasting blood glucose, lipid metabolism evaluation (total cholesterol, triglyceride, HDL and LDL), liver functions (ALT, AST, ALP activities and total bilirubin) and kidney functions (urea, uric acid, total protein and albumin). After 6 weeks, histopathological samples were taken from the liver, kidney and pancreas. Administration of alpha lipoic Acid, *Nigella sativa* and vanadyl acetylacetonate to diabetic rats resulted in a significant decrease in blood glucose, triglycerides, cholesterol, LDL, ALT, AST, ALP, total bilirubin, urea, uric acid while HDL, total protein and albumin level were markedly increased compared to untreated diabetic rats. Also histopathological findings in liver, kidney of treated group showed improvement when compared with those of diabetic group while histopathological findings of pancreas in all treated group revealed regeneration in the islands of langerhans cells while those of diabetic group showed atrophy in islands of langerhans cells, degeneration in the acini and hyalinization in the wall of congested blood vessels. The results of this study indicate that the alpha lipoic Acid, *Nigella sativa* and vanadyl acetylacetonate possess hypoglycemic, hypolipidemic, improvement effects on kidney and liver functions and protective effects on beta cells of pancreas in STZ-induced diabetic rats. The improvement action of alpha lipoic may attributed to reducing the oxidative stress in diabetes and its hypoglycemic effect through decreasing hepatic glucose output and increase glucose uptake through increasing glucose transporter (GLUT) 1 and 4 translocation, moreover it has insulin mimetic actions. The effect of vanadyl may be due to its improvement action on hepatic glucose metabolism as its insulin mimic action while the action of *Nigella* attributed to its antioxidant properties which decrease oxidative stress in diabetes and improves its complications through hypoglycemic action and hepatic insulin sensitivity and decrease gluconeogenesis. Also *Nigella* has insulin mimetic properties. The most improvement in diabetic state was seen in alpha lipoic group then vanadyl acetylacetonate group however *Nigella sativa* group significantly improve kidney functions than vanadyl acetylacetonate.

Biography

Salib AA has completed his DVM and PhD at age of 28 from Faculty of Veterinary Medicine, Department of Physiology he promoted to full Professor at age of 39 at University of Cairo Egypt. He serves as the Head of the Department of Physiology for 6 years, Senior Research Director, University of Alberta Canada. He works as Senior Research Fellow, Department of Medicine, Haematology Division, School of Medicine, Ann Arber, MI. and Research Fellow, Department of Pathology, University of Maryland, School of Medicine, Baltimore, MD. He has published more than 70 papers in reputed national, international and is serving as an Editorial Board Member of reputed journals and also has awards from NIH, USA and From QAAP, Egypt.

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