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Possible protective effect of Procainamide as an epigenetic modifying agent in experimentally induced type-2 diabetes mellitus in rats

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Diabetes mellitus occurs due to insulin deficiency and/or impaired insulin action. Epigenetic mechanisms were shown to be involved in endocrine cell differentiation and islets function. Procainamide an antiarrhythmic drug has been recently classified as an epigenetic drug targeting DNA methylation. The present study was designed to evaluate the effect of procainamide as a demethylating agent on streptozotocin-induced type-2 DM in rats. Fifty (50) adult male albino rats were divided into five groups: Group-1: Normal control, Group-2: Diabetic untreated, Group-3: Procainamide-treated diabetics, Group-4: Metformin-treated diabetics and Group-5: Combined procainamide and metformin-treated diabetics for 4 weeks. Fasting blood glucose level, serum insulin and Tumor Necrosis Factor alpha (TNF-α) levels and DNA Methyltransferase Enzyme (DNMT) activity in pancreatic tissues were assessed. Results revealed that combined administration of procainamide and metformin produced a statistically significant reduction of fasting blood glucose levels as compared to untreated diabetic rats and diabetic treated by either procainamide or metformin alone. Procainamide resulted in a statistically significant rise of serum insulin levels. TNF-α levels were statistically elevated in diabetic untreated rats and those treated with metformin only while procainamide led to its statistical decrease. Also, procainamide produced a statistically significant reduction in the activity of DNMT in pancreatic tissues. Thus our work could provide a proof of concept that procainamide could be used as a possible therapeutic potential in type-2 diabetics as an epigenetic demethylating agent to increase insulin levels and it is better to be used in combination with oral hypoglycemic agent to decrease insulin resistance.

Biography

Wessam Fahmy El-Hadidy has completed her PhD from Faculty of Medicine, Alexandria University and Postdoctoral studies from Medical Research Institute, Alexandria University. She is an Assistant Professor of Pharmacology, Treasurer of the Egyptian Association of Advancement of Basic Medical Sciences (EAMBS), Member of the Scientific Committee at Medical Research Institute, Alexandria University. She has published more than 11 papers in reputed journals and has been serving as an Editorial Board Member of Journal of MRI.

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