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Sodium butyrate, a histone deacetylase inhibitor as a novel agent in treatment of juvenile diabetic rat: A histological and molecular study on pancreas

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Type-1 diabetes mellitus is a chronic autoimmune disorder in which genetic and epigenetic factors contributed equally to its pathogenesis. Histone deacetylase (HDAC) inhibitors such as sodium butyrate (NaB) had been reported to protect beta-cell damages and improve the glucose homeostasis by the modulation of p38/ ERK MAPK pathway. The aim of this work is to evaluate the role of NaB on ultrastructure of pancreatic beta- cells and PI3/Akt pathway. 30 juvenile male albino rats (5-6 weeks) were divided into 6 groups: Group I: Untreated control. GroupII: NaB control, received 500mg/kg/day NaB i.p. for 3 weeks. Group III: 3 days diabetic control received STZ (60mg/kg) i.p. Group IV: 3 weeks diabetic control received STZ (60mg/kg) i.p. Group V: pre-treatment with NaB for 3 weeks prior to diabetes induction. Group VI: post-treatment with NaB for 3 weeks after diabetes induction. Plasma glucose, insulin levels, glucose tolerance were evaluated. Light, electron microscopy and immunohistochemistry was performed using ki67, caspase3, insulin and acetylated histone H3. NaB treatment resulted in a significant improvement in plasma glucose level, plasma insulin level / expression and ameliorated the diabetes-induced histological alternations. Decrease in number of apoptotic cells had been demonstrated. Additionally, it inhibited the HDAC activity and increased the acetylation of histone H3 and expression of phosphorylated Akt.

Conclusion: These findings provide evidence that NaB might be useful for the treatment of juvenile diabetes.

Biography

Dalia A Elgamal has completed her PhD at the age of 33 years from Faculty of medicine, Assiut University, Egypt and postdoctoral studies from the same university. She has published 15 papers in reputed journals and has been serving as an editorial board member of repute. She is paying a major concern to basic researches that may lead to possible/definite improvement in health services and decreasing disabilities, morbidity and mortality. eg. Studying male and female infertility at cellular and molecular basis using experimental trials. In addition to stem cell isolation, differentiation as a new trend in regenerative medicine.

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