

# Preventive effect of NADH on STZ induced diabetes model

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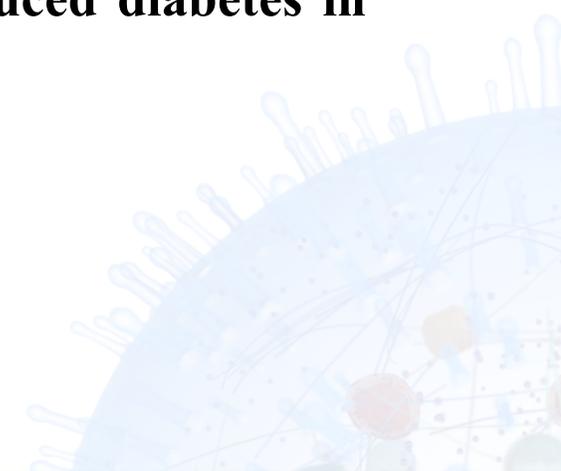
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# Introduction

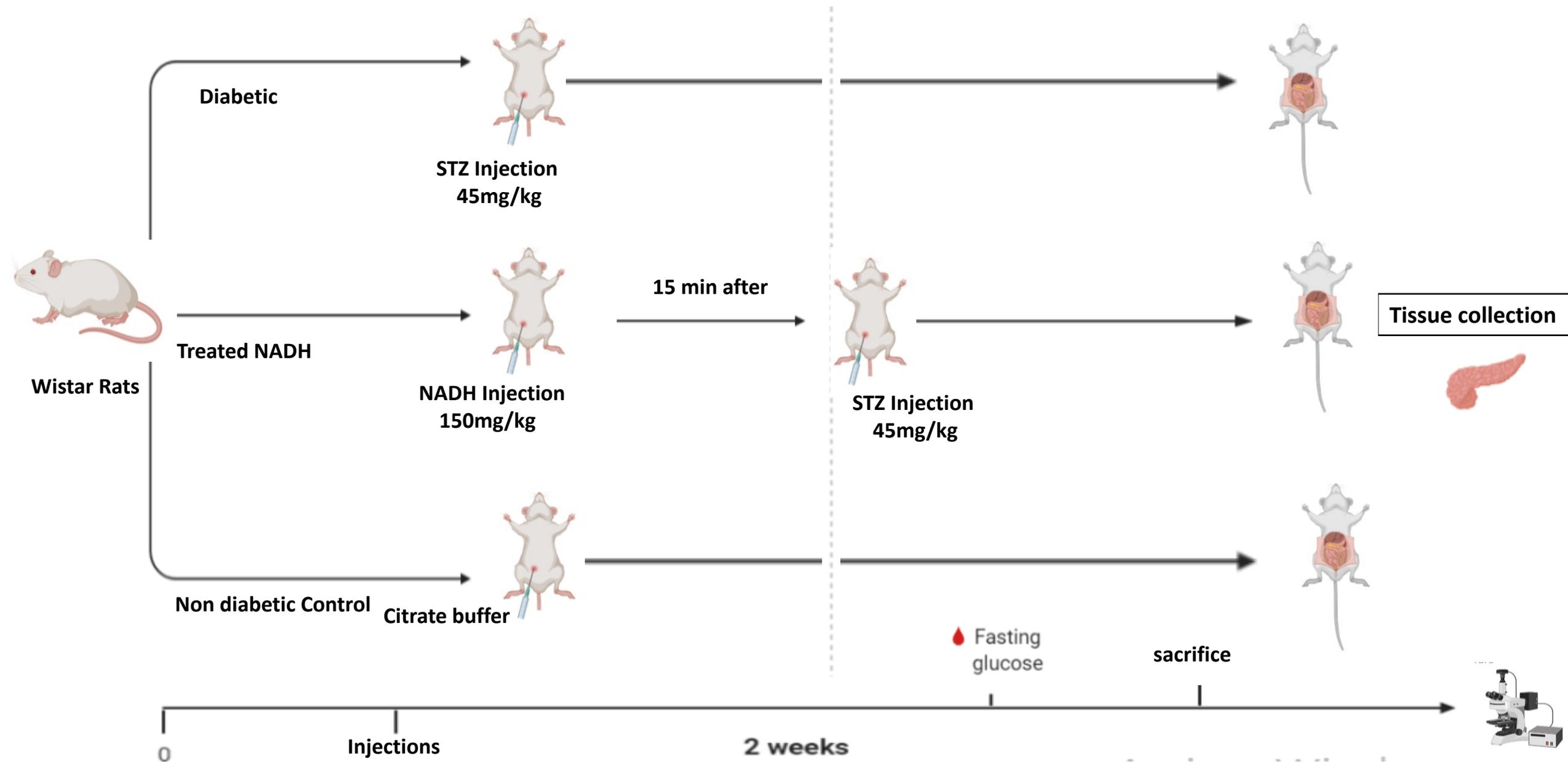
- Diabetes has become a serious public health problem that greatly affects patients' quality of life and longevity.
- Diabetes mellitus is a chronic metabolic disease characterized by a persistent hyperglycemia due to a decrease in insulin efficiency.
- The subsequent glycotoxic environment, triggers in the pancreatic microenvironment an oxidative stress with reactive oxygen species generation, which up regulation is ineluctably linked to DNA damage.
- Following the nuclear damage, will ensure a DNA repair process through PARP-1 activation using mainly NAD<sup>+</sup> as substrate. Depending on the damage severity, the PARP1 hyper activation will deplete NAD<sup>+</sup> cellular store affecting drastically energy production (ATP), leading to pancreatic beta cells dysfunction and their ultimate death.

# About NADH

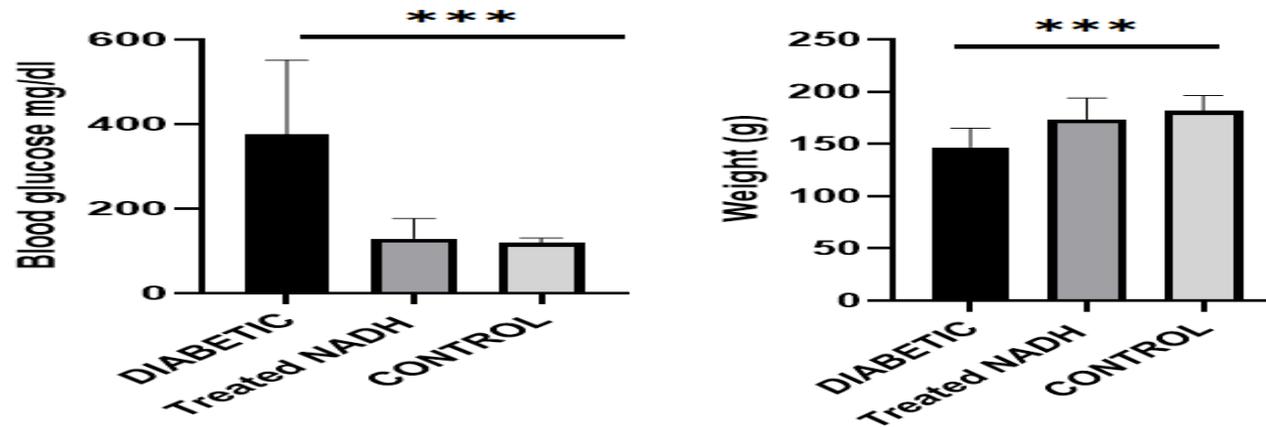
- Nicotinamide Adenine Dinucleotide, reduced form of NAD
  - NADH is present in every living cell.
  - Plays a pivotal role in many metabolic reactions as well as in energy production.
  - Used to treat some autoimmune disorders such as Parkinson and Alzheimer.
  - this molecule has already proven its efficacy in the rapid energy delivery.
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- **Aim of the study: Evaluate the preventive effect of NADH on STZ induced diabetes in Wistar rats.**



# Materials and Methods



# Results



FigI: Effect 150mg/kg of NADH on blood glucose and weight

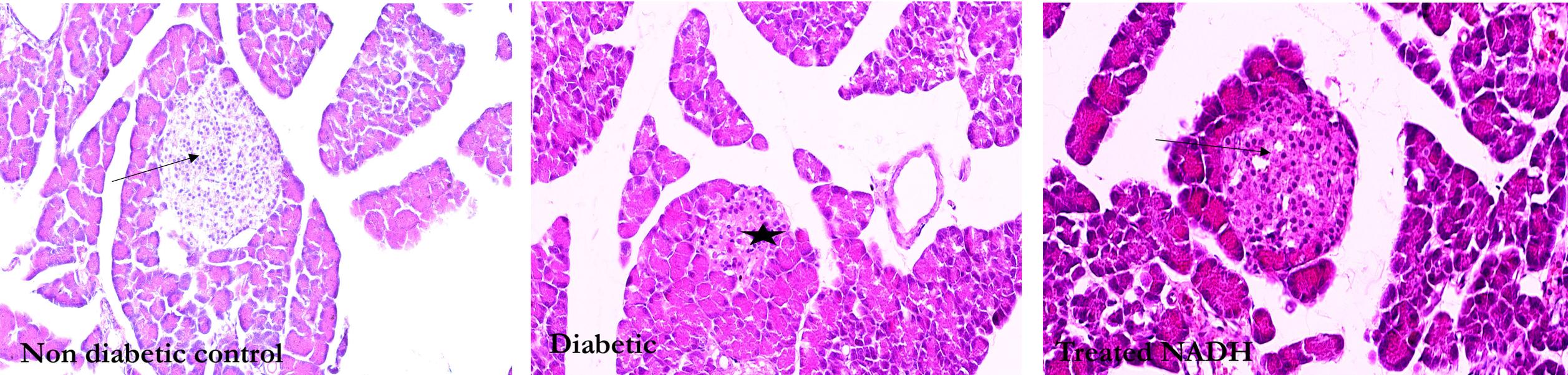
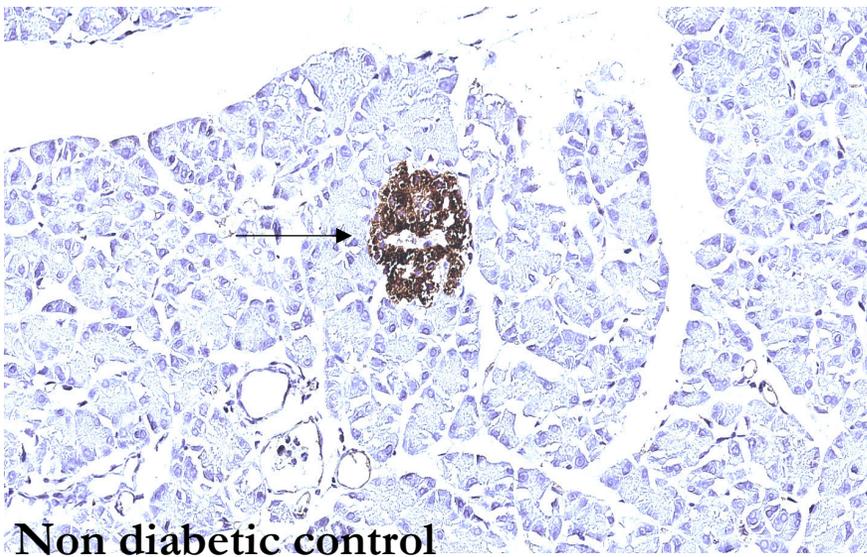
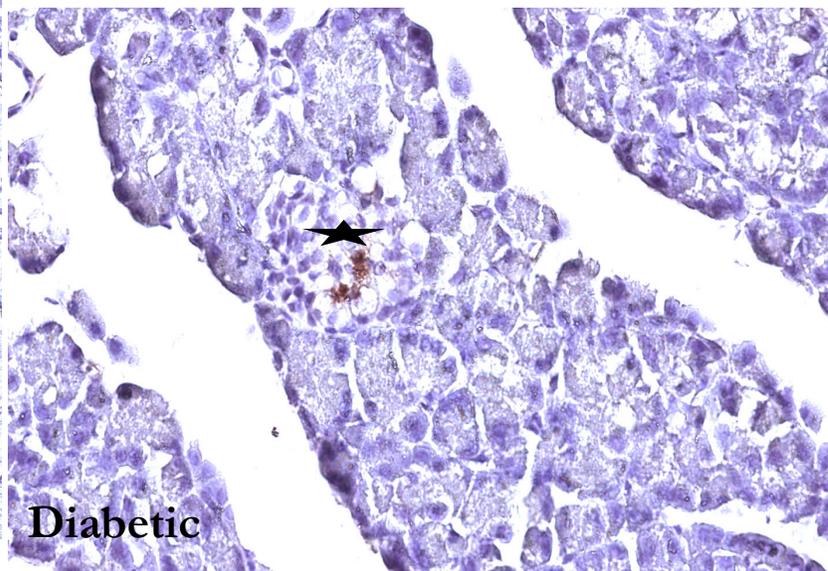


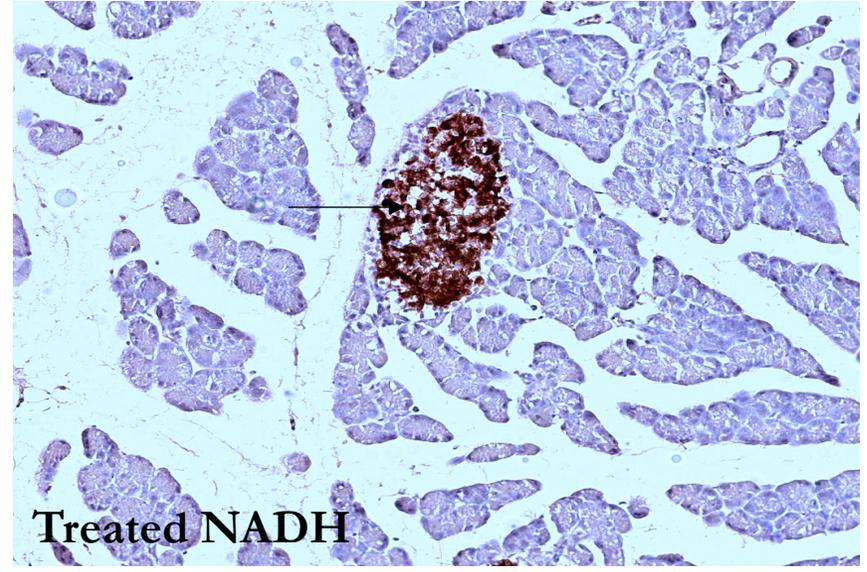
Fig II: Histopathological observation of pancreas in control and treated groups of rats. (stained H&E , 40×). Section from pancreas of the control group showing normal islet with granulated cytoplasm. Section from pancreas of the diabetic rats apparent reduction in the size and number of islets. Section from pancreas of a group treated with 150mg/kg of NADH before STZ injection revealed a normal structure of islet with granulated beta cells



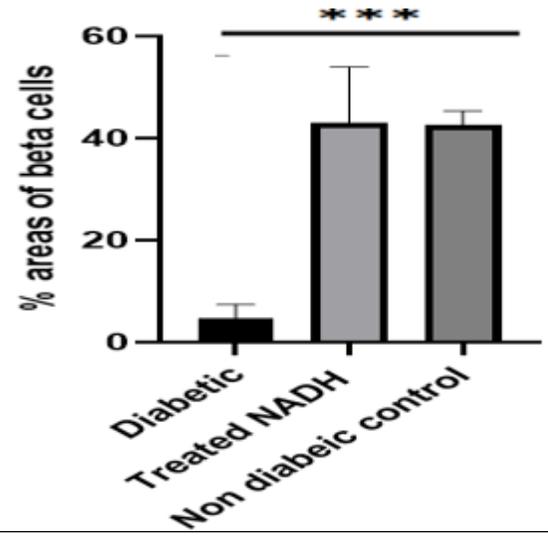
Non diabetic control



Diabetic



Treated NADH



**Fig III:** Effect of NADH on  $\beta$ -cells areas on the percentage of Insulin -positive cells of diabetic rats. a) Pancreas sections from diabetic rats, were stained with antibodies against glucagon (brown) showing marked reduction in the immunohistochemical expression of insulin in beta-cells. In control rats, insulin positive cells are found in the central core of the islets. Section from pancreas of a group treated with 150mg/kg of NADH before STZ injection showing an evident increase in insulin expressing beta-cells with normal density, compared with diabetic group

# Concluding Remarks

- **Protective effect of NADH**

- According to our results, the effect of NADH injected 15 min before STZ injection in rats was revealing
- the NADH significantly improve the glycemia reaching normoglycemic status.
- the evidence of a hypoglycemic properties has been definitely established
- Our data confirm with certitude that NADH prevent and/or reverse diabetes by preventing beta cells from damage and death generated through STZ injection
- This can be explained by the high efficiency of NADH energy source which is capable to restore the NAD<sup>+</sup> cytoplasmic and reducing the subsequent glyctoxic environment .