

## **Research No.(4):**

### **The Role of Mesenchymal Stem Cells with Ascorbic Acid and NAcetylcysteine on TNF- $\alpha$ , IL 1 $\beta$ , and NF- $\kappa$ $\beta$ Expressions in Acute pancreatitis in Albino Rats.**

**Dalia Abdelhafez**, Elshimaa Aboelkomsan, Abir El Sadik , Noha Lasheen,Sara Ashur, Amal Elshimy, and George N. B. Morcos

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#### **Abstract:**

**Background:** Severe acute pancreatitis (SAP) is a necrotic pancreatic inflammation associated with high mortality rate (up to 70%). Bone marrow (BM) mesenchymal stem cells (MSCs) have been investigated in pancreatic cellular regeneration, but still their effects are controversial.

**Aim of work:** examining the enrichment of the stem cells with ascorbic acid (AA) and N-acetylcysteine (NAC) and explore their combined action on the expression of the inflammatory cytokines: interleukin 1 $\beta$  (IL 1 $\beta$ ), tumor necrosis factor- $\alpha$  (TNF- $\alpha$ ), and nuclear factor- $\kappa$  $\beta$  (NF- $\kappa$  $\beta$ ). A total of twenty adult male Sprague-Dawley albino rats were divided into four groups: the control group, cerulein group (to induce acute pancreatitis), BM-MSCs group, and combined BM-MSCs with AA and NAC group. Homing and proliferation of stem cells were revealed by the appearance of PKH26-labelled BM-MSCs in the islets of Langerhans. AA and NAC combination with BM-MSCs (group IV) was demonstrated to affect the expression of the inflammatory cytokines: IL 1 $\beta$ , TNF- $\alpha$ , and NF- $\kappa$  $\beta$ . In addition, improvement of the biochemical and histological parameters is represented in increasing body weight, normal blood glucose, and insulin levels and regeneration of the islet cells.

**Results:** Immunohistochemical studies showed an increase in proliferating cell nuclear antigen (PCNA) and decrease in caspase-3 reactions, detected markedly in group IV, after the marked distortion of the classic pancreatic lobular architecture was induced by cerulein. It could be concluded that treatment with BM-MSCs combined with antioxidants could provide a promising therapy for acute pancreatitis and improve the degeneration, apoptosis, necrosis, and inflammatory processes of the islets of Langerhans. TNF- $\alpha$ , IL 1 $\beta$ , and NF- $\kappa$  $\beta$  are essential biomarkers for the evaluation of MSC regenerative effectiveness.