

# THE EFFECT OF BONE MARROW DERIVED MESENCHYMAL STEM CELLS ON THE ULTRASTRUCTURE OF SUBMANDIBULAR SALIVARY GLAND OF INDUCED HYPOTHYROIDISM IN RATS (ELECTRON MICROSCOPIC STUDY)

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## Abstract

Background: Hypothyroidism is a clinical disorder that results from insufficient production of thyroid hormones leading to a total decrease of metabolic demands of the body and causing serious abnormalities. Hypothyroidism is known to affect salivary glands causing deleterious changes including apoptosis and numerous cytoplasmic vacuolation. Mesenchymal stem cells (MSCs) have high capability of self-renewal. Thus, have enormous therapeutic potential for tissue repair. Objective: The study aimed to assess the influence of bone marrow derived mesenchymal stem cells (BM-MSCs) on the histological ultrastructure of submandibular salivary gland of carbimazole-induced hypothyroidism in rats. Method: Twenty one adult male albino rats were divided into three groups (seven rats each). Group I: Is considered as control group. Group II: (Carbimazole induced hypothyroidism group): animals were given a single daily oral dose of carbimazole (5mg/250g/day) dissolved in 3 ml of distilled water delivered by intragastric tube for five weeks, to induce hypothyroidism. Group III: (BM-MSCs treated group): hypothyroidism was induced similar to group II. Then rats were injected at the lateral tail vein with  $1 \times 10^7$  BM-MSCs cells in 0.2ml phosphate buffer saline immediately following induction of hypothyroidism. All rats were euthanized after 8 weeks (5 weeks of hypothyroidism induction + 3 weeks of stem cells injection). Submandibular salivary glands were prepared for transmission electron microscopic examination (TEM). Results: Ultrastructural results of group II revealed massive degenerative changes within the acinar and ductal cells' nuclei and organelles, together with disruption of their intercellular junctions. Marked improvement of parenchymal cells' architecture was detected with BM-MSCs administration in group III. Conclusion: BM-MSCs have the potentiality to repair salivary glands damage following induction of hypothyroidism.

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