

The Role of Bone Marrow Stem Cells Transplantation in the Repair of Damaged Inner Ear in Albino Rats

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Abstract : Introduction: Sensorineural hearing loss (SNHL) is largely caused by the degeneration of the cochlea. Therapeutic options for SNHL are limited to hearing aids and cochlear implants. The cell transplantation approach to the regeneration of hair cells has gained considerable attention because stem cells are believed to accumulate in the damaged sites and have the potential for the repair of damaged tissues. The aim of the work: was to assess the use of bone marrow transplantation in repair of damaged inner ear hair cells in rats after the damage had been inflicted by Amikacin injection. Material and Methods: Thirty albino rats were used in this study. They were divided into three groups. Each group ten rats. Group I: used as control. Group II: Were given Amikacin- intratympanic injection till complete loss of hearing function. This could be assessed by Distortion product Otoacoustic Emission (DPOAEs) and / or auditory brain stem evoked potential (ABR). GroupIII: were given intra-peritoneal injection of bone marrow stem cell after complete loss of hearing caused by Amikacin. Clinical assessment was done using DPOAEs and / or auditory brain stem evoked potential (ABR), before and after bone marrow injection. Histological assessment of the inner ear was done by light and electron microscope. Also, Detection of stem cells in the inner ear by immunohistochemistry. Results: Histological examination of the specimens showed promising improvement in the structure of cochlea that may be responsible for the improvement of hearing function in rats detected by DPOAEs and / or ABR. Conclusion: Bone marrow stem cells transplantation might be useful for the treatment of SNHL.

Keywords : amikacin, hair cells, sensorineural hearing loss, stem cells

Conference Title : ICMMA 2015 : International Conference on Microscopic and Macroscopic Anatomy

Conference Location : Barcelona, Spain

Conference Dates : August 17-18, 2015