

Original Article

**Influence of Bone Marrow Derived Mesenchymal Stem Cells on Expression of Glial Fibrillary Acidic Protein and Rhodopsin in Light - Induced Retinal Damage. An Immunohistochemical Study**

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**ABSTRACT**

**Introduction:** Macular degeneration, the commonest cause of loss of vision after 60 (age related macular degeneration; AMD) is one of the causes of retinal damage where the retinal pathology is similar to retinal lesion caused by white fluorescent light.

**Aim of work:** This work was designed to study the effect of intravenous injection of rat BMSCs on expression of GFAP and rhodopsin in the light-induced retinal damage, a model for AMD.

**Materials and methods:** This study was conducted on 36 male albino rats divided into two groups; the control group (IA, IB) and experimental group; the latter group was subdivided into two subgroups: IIA and IIB (12 rats each). They were further subdivided equally according to time when they were scarified into IIA1, IIA2, IIB1 and IIB2 one day and two weeks respectively. The animals of subgroups IIA and IIB were exposed to white light, and then rats of subgroup IIB were given 1 ml PKH26 labeled BMSCs suspended in PBS intravenously. Sections were immunohistochemically stained for detection of GFAP and rhodopsin. Sections from for subgroups IB, IIB1 and IIB2 were examined by fluorescence microscope. The area percent of the positive reaction in the immunohistochemically stained sections was measured and statistically analyzed.

**Results:** The retina of untreated subgroups showed vesiculation of the outer segment, interruption of the outer limiting membrane and disruption of the outer plexiform layer. There was also mislocalization of rhodopsin in the inner segment, rods' cell membrane and cytoplasm and in the outer plexiform layer. Positive GFAP immunoreactions were detected extending to the outer limiting membrane. The BMSCs-treated subgroups revealed the presence of PKH26 labeled stem cells within the retinal layers denoting their homing to site of damage. They showed nearly normal histological features of all retinal layers. The immunohistochemical study revealed normal rhodopsin distribution in the outer segment and confinement of GFAP positive reaction to the outer nuclear layer.

**Conclusion:** intravenous BMSCs could preserve the retinal structure in cases of light injury, a model for AMD. Thus, they could be used in restoration of vision in cases of AMD.

**Key Words:** Retinal damage, Amd, Bmscs, Albino rats, Pkh26, Gfap GFAP, Rhodopsin.