Modulation of Ocular Inflammation by Mesenchymal Stem Cells

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PUBLIC ABSTRACT

Ocular trauma (one of the most common forms of battlefield injury) is a significant cause of uncontrolled ocular inflammation and vision loss among active-duty military personnel. Additionally, millions of patients in America suffer each year from ocular inflammatory disorders for which there are currently limited therapeutic options that are both safe and effective. Many of these ocular injuries and inflammatory disorders are commonly treated with non-specific anti-inflammatory drugs such as corticosteroids. These non-specific treatment strategies typically target both pathogenic and regulatory cells of the immune system and are associated with side effects such as infection, cataract, and glaucoma.

Thus, there is a pressing need for new immunomodulatory (not indiscriminate immunosuppressive) strategies that not only inhibit pathogenic immune cells, but also promote critical regulatory immune cells that promote immune quiescence in ocular injury and inflammation. Mesenchymal stem cells are adult stem cells that possess an extraordinary capacity to modulate tissue inflammation and regeneration. The aim of this project is to determine the mechanisms and factors by which mesenchymal stem cells regulate the immune response in damaged/inflamed ocular tissues. This will lead to identification of novel therapeutic strategies for safer and more effective treatments for ocular injuries and inflammatory disorders.