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Mesenchymal Stem Cell-Based Therapy for Retinal Degenerative Diseases: Experimental Models and Clinical Trials.

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Retinal degenerative diseases, such as age-related macular degeneration, retinitis pigmentosa, diabetic retinopathy or glaucoma, represent the main causes of a decreased quality of vision or even blindness worldwide. However, despite considerable efforts, the treatment possibilities for these disorders remain very limited. A perspective is offered by cell therapy using mesenchymal stem cells (MSCs). These cells can be obtained from the bone marrow or adipose tissue of a particular patient, expanded in vitro and used as the autologous cells. MSCs possess potent immunoregulatory properties and can inhibit a harmful inflammatory reaction in the diseased retina. By the production of numerous growth and neurotrophic factors, they support the survival and growth of retinal cells. In addition, MSCs can protect retinal cells by antiapoptotic properties and could contribute to the regeneration of the diseased retina by their ability to differentiate into various cell types, including the cells of the retina. All of these properties indicate the potential of MSCs for the therapy of diseased retinas. This view is supported by the recent results of numerous experimental studies in different preclinical models. Here we provide an overview of the therapeutic properties of MSCs, and their use in experimental models of retinal diseases and in clinical trials.

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