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Stem Cell Therapy Essay: Use of Stem Cell Therapy in Treating Stargardt's Disease and Alzheimer's Disease

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Use of Stem Cell Therapies in Treating Stargardt's Disease and Alzheimer's Disease

Medical research and technological advancement in biology has led to use of stem cells to cure challenging diseases such as Cancer, Alzheimer's, Parkinson's, and Stargardt's diseases. Stem cells are undifferentiated cells used in therapy due to their immune modulation capability, proliferation capability, low immunogenic reactivity, and differentiation and regeneration of various tissues. (Mao & Mooney, 2015). Recent advances in biology have raised hopes for treating neurological diseases such as Alzheimer's disease (AD) and Stargardt's disease (SD) by alleviating the symptoms and reversing the conditions progression. Although stem cells are gaining popularity in therapy, there is need for scientific research to analyze the effectives and safety of their application as well as suggest recommendations to overcome the challenges in stem cell research. The essay reviews the application of stem cell therapies in treating SD and AD to achieve positive patient outcomes.

Stem Cell Therapy in Treating Alzheimer's Disease (AD)

Alzheimer's disease (AD) is a neurological condition considered the most common causes of dementia. The condition usually affects nerve cells in the brain leading to confusion, loss of memory, and challenges in performing regular tasks. The nerve cells in the brain are affected by the formation of tangles and plaques, resulting in the loss cell-to-cell communication and ultimately neuronal damage (Fleifel et al. 2018). The condition is believed to be a genetic diseases but also environmental and lifestyle factors may contribute to the development of the condition. Stem cell therapy is a recent therauptic alternative researched for the treatment of Alzheimer's. Stem cell used seek to replace the damage cells in the brain with healthy stem cells. Scientists use different type of stem cells in stem cell research for treatment of Alzheimer's, including neural, embryonic, mesenchymal, and induced pluripotent stem cells.

Treatment occurs through autologous stem cell transplant. Attributed to the autologous nature of the transplant, there are minimal chances of immunological reaction or tissues reaction. The outcomes of stem cell therapy in treating Alzheimer's has been conducted on animals resulting to positive treatment outcomes. Recent clinical trials in patients with Alzheimer's using human umbilical cord-blood derived mesenchymal stem cells transplanted into the precuneus and hippocampus were safe and indicated no adverse effects. However, there is need for further research to test long term clinical efficacy of this treatment. The major challenges of stem cell therapy treatment for Alzheimer's patients is that it does not cure the genetic causes of the condition, thus it is only effective for a short term by replacing the damaged cells which could relapse in some cases (Fleifel et al. 2018). Conclusively, stem cell therapy is a promising therauptic approach to treat the incurable Alzheimer's disease.

Stem Cell Therapy in Treating Stargardt's Disease (SD)

Stargardt's disease is a degenerative condition of the retina that is associated with a group of inherited disorders that deteriorate the retina cells, specifically in the macula part of the eye. The conditions leads to vision loss which could eventually lead to blindness. Although macular degeneration in nature is associated with aging eyes in adults, Stargardt's disease is an inherited condition that can affects young adults and children. Although the condition is caused by undetermined etiology, other factors that trigger the disease development challenge the effective treatment of the disease (Tanna et al. 2017). However, stem cells therapy is a promising approach in treating Stargardt's.

Stargardt's leads to loss of photoreceptor cells in the retinal pigment epithelium (RPE). Stem cell therapy uses stem cells to regenerate healthy RPE cells. Previous clinical trials on stem cell therapy treatment injected healthy RPE cells into the eye to replace the damage cells. Human

embryonic stem cells are turned into RPE cells designed to replace and support the damaged RPE cells affected by Stargardt's disease (M'Barek, Habeler, & Monville, 2018). Experts have shown that stem cell therapy in treating macular degeneration conditions has the potential to replace the damaged cells, improve patient's vision, and have no adverse side effects. RPE cells do not require formation of neural connections to support the photoreceptors in the retina an, thus they can easily be generated in large numbers in the lab (M'Barek, Habeler, & Monville, 2018). Conclusively, there is need for further development of generating RPE cells from human embryonic stem cells to achieve efficacy in regenerative cell therapy in treating retinal and macular degenerative conditions.

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