

A SYSTEMATIC REVIEW ON STEM CELL THERAPY FOR OCULAR DISEASE

Purpose: To review approaches to ocular stem cell therapy based on current progress in clinical trials and professional practice standards.

Method: A systemic literature review was conducted (Ovid MEDLINE, PubMed and EMBASE databases searched, January 1989 ? June 2017) and clinical trial registries reviewed (ClinicalTrials.gov, The World Health Organisation International Clinical Trials Registry Platform and Cochrane Central Register of Controlled Trials). Guidelines and codes of conduct from organisations including the Therapeutic Goods Administration, Royal Australian and New Zealand College of Ophthalmologists and Australian Medical Association were reviewed. Data was extracted and collated on progress in corneal and retinal stem cell therapy, the clinical trial process and ethical considerations.

Results: Forty-one clinical trials of ocular surface stem cell transplantation used to treat limbal stem cell deficiency were identified. Only fourteen studies had greater than two years follow-up, with an average success rate of 72%. Whilst clinical trial registries listed additional studies, only four Phase I/II clinical trials had been published on retinal cell transplantation with a mean success rate of 77% in 22 patients. These studies utilised induced or pluripotent human embryonic stem cell sources. Alternative approaches utilising trabecular, neural, ciliary body and iris pigment stem cells require further animal/in vivo studies prior to human trials.

Conclusion: Ocular stem cell therapy is experimental and should operate within formal clinical trial frameworks. This is the first review to encompass both corneal and retinal cell transplantation, providing a comprehensive overview that could provide the basis for a Position Statement on ocular stem cell therapy.