



AB011. A collagen-alginate-based cell-encapsulation intraocular implant for retinal disease therapy

Amy Lo

Department of Ophthalmology, The University of Hong Kong, Hong Kong SAR, China

Abstract: Encapsulated-cell therapy (ECT) is an attractive approach for continuously delivering freshly synthesized therapeutics to treat sight-threatening posterior eye diseases, circumventing repeated invasive intravitreal injections and improving local drug availability clinically. Composite collagen-alginate (CAC) scaffold in ECT contains an interpenetrating network that integrates the physical and biological merits of its constituents, including biocompatibility, mild gelling properties and availability. An injectable CAC system that supported the growth of HEK293 cells with sustainable glial-derived neurotrophic factor (GDNF) delivery has been developed. Continuous GDNF delivery was detected in culture and in healthy rat eyes for at least 14 days. The gels were well tolerated with no host tissue attachment and contained living cell colonies. Most importantly, gel implantation in dystrophic Royal College of Surgeons rat eyes for 28 days retained photoreceptors while those gels containing higher initial cell number yielded better photoreceptor rescue effect. This rescue effect is clinically relevant as photoreceptor death is a common pathology in many retinal diseases. Moreover, since cells including autologous cells can be genetically engineered to secrete various therapeutic agents, CAC gel offers a flexible system design and is a potential treatment option for other chronic neurodegenerative diseases.

Keywords: Neuroprotection; neurotrophic factor; sustained drug release; RCS rat

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