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A novel macroporous scaffold with potential applications in tissue engineering

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Spheritech Ltd have developed a novel biopolymer which has found many applications amongst them is the formation of macroporous biodegradable 3D constructs developed specifically to support 3D cell culture (Proliferate®). The porosity of the biopolymer is controlled in such a manner as to accommodate cell and nutrient penetration within. A unique feature of Proliferate® is that it is composed of two naturally occurring components; the poly-amino acid, poly-ε-lysine and a di-carboxylic acid such as dodecanedioic acid or brassylic acid. Poly-ε-lysine is an edible, non-toxic material currently used as an emulsifier and preservative in foodstuffs whilst dodecanedioic and brassylic acids are processed from plant oils. Due to the monomer composition of the biopolymer it will upon decomposition break down into natural components making it a potential candidate for tissue regeneration and transplantation. Proliferate® is already proven as cytocompatible with many cell types including HEK293T cells, kidney stem cells (mKSC H6), Schwann cells, olfactory ensheathing cells, astrocytes, corneal epithelial cells (HCE-T), conjunctival cells (HCjE-Gi) and keratinocytes (HaCaT). It is also in the process of being developed as a wound dressing material. A less cross-linked variant of the same polymer produces a hydrogel which is being developed as a corneal bandage. It is also being investigated for its potential to transplant corneal endothelial cells to the posterior of the cornea and aid in the regeneration of this region.

Biography

Andrew Gallagher is currently doing his PhD at the University of Liverpool in collaboration with Spheritech Ltd. His work is primarily focused on developing a corneal bandage lens capable of delivering drugs and antimicrobials to the cornea in order to aid wound healing. He is currently involved in another project focused on the development of a macroporous external wound dressing material.

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