Biodegradable intrascleral implants for sustained ocular drug delivery

Published date: April 5, 2016

Technology description

Delivery of medications to the eye has been the most challenging task to pharmaceutical scientists, especially in treating sight threatening diseases such as, age-related macular degeneration (AMD), diabetic retinopathy (DR), diabetic macular edema (DME), uveitis, and cytomegalovirus retinitis. This is due to the unique structure of the eye, which restricts the entry of drug molecules at the required site of action, located at the back of the eye called "posterior segment of the eye". Conventional eye drops, ointments & oral drug delivery are easily administered; however, drug absorption through these routes is limited due to multiple barriers of the eye against the entry of xenobiotics (including drug molecules). Currently, intravitreal (IV) injection (direct injection into the centre of the eye) by using hypodermic needle is an effective and direct approach to deliver medications to treat posterior segment eye diseases. However, due to the chronic nature of the posterior eye diseases patients require frequent IV injections. This mode of administration is invasive, uncomfortable to patients, high drug dosage related toxicities, higher costs, require frequent hospital visits, needs experienced personnel to administer (e. g. retina specialist/ophthalmologist surgeon) and it is associated with severe side effects, such as vitreous hemorrhage, retinal detachment, endophthalmitis and cataract. Therefore, we intended to evaluate novel sustained-release implants that can be delivered within the sclera (white portion of the eye), in a minimally invasive manner, to provide continuous drug delivery for long-term and thereby enhancing the treatment of posterior segment eye diseases. The implants are free flowing polymeric gels, before injection, but forms an implant upon injection into the sclera of the eye to sustain the drug delivery over long-term. The free flowing gel formulation can be precisely delivered to desired depths within the scleral tissue of the eye, to form the implant, by using a prototype microneedle-based device. Through a series of objectives, we will demonstrate the advantages of this novel minimally invasive sustained-release intrascleral implants over existing ocular drug delivery strategies. Ultimately, this study will create a novel platform of delivering a range of therapeutic molecules (i.e., small molecules, peptides/proteins, and gene delivery), from minimally invasive implants, to treat a host of sight threatening eye diseases.

This therapeutic delivery system will be first of its kind to have this unique combination technology and, given the track record the School of Pharmacy has in commercialisation of University IP, it is envisaged that the commercial interest in a minimally invasive intrascleral drug delivery implants will be in high demand by the Pharmaceutical industries. Importantly, one of the leading segments of the

Pharma industry is the ophthalmic market with expected global revenue of $18.7 billion by 2012. Consequently, with the novel technology described here will offer greatly enhanced clinical benefits to the patients and the healthcare industries, as well as reducing treatment costs. Additionally, this technology could also cosmaceutical applications thereby increasing its commercial value.

Institution

The Queen's University of Belfast

Inventors

David Jones
Academic
Raghu Thakur
Academic
Chirag Gujral
Research

联系我们

叶先生

电 话：021-65679356

手 机：13414935137

邮 箱：yeyingsheng@zf-ym.com