PhD in Biomedical Engineering

Research Area: Biomaterials

Title: Drug loaded intraocular lenses for the prevention of endophthalmitis

Cataracts surgery is widely practiced worldwide. It consists in the replacement of the natural lens by an intraocular lens (IOL). Endophthalmitis is a serious complication that may arise from this surgery, whose prevention relies on topical treatments. The goal of this work is to produce drug-loaded IOLs that substitute eye drops, improving drug bioavailability and the prophylactic efficacy. Ophthalmic commercial materials and different antibiotics and anti-inflammatories will be used. Several drug loading conditions will be tested and optimized to achieve a controlled drug release during a suitable period of time. The effects of different sterilization methods (conventional and new) will be evaluated. Simultaneous release of two drugs from IOLs is going to be attempted. Ex-vivo tests with animal tissues will be performed. In-vivo tests will be done for the most promising systems. This work will be carried out at Instituto Superior Técnico (CQE), Instituto Universitário Egas Moniz (CiiEM), University of Florida and Wenzhou Medical University.

Keywords: intraocular lenses, drug delivery, endophthalmitis, sterilization

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