NOVEL BIODEGRADABLE PLGA FILMS AS ANTIFIBROTIC DRUG CARRIERS.

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Subconjunctival fibrosis is a major complication associated with many eye surgeries. Excessive post operative fibrosis at the wound site significantly reduces surgical success after glaucoma surgery. The hypothesis is that thin polymer film coatings on a glaucoma drainage device (Ahmed valve) could act as a biodegradable drug carrier for the release of anti-fibrotic agents that would modulate fibrosis. The biodegradable and FDA-approved polymer, poly(lactic-co-glycolic acid) (PLGA) was used as a drug carrier and Mitomycin C as the anti-fibrotic drug. Our objective is to tune the drug delivery rate from this film to suit therapeutic requirements.

Different formulation techniques have been employed to obtain the release range from a sharp initial burst of the drug to an initial slow delivery followed by an accelerated delivery as the film degrades. Initial experiments have demonstrated that the drug release could be controlled via the method of formulation. The spin coating technique has been employed to produce a thin film. From the scanning electron microscopy, the film morphology and its thickness (around 20 microns) was observed. An in vitro cell culture system (COS-1 cells) was used to test the efficacy of these polymers films to inhibit cell proliferation. COS cells were incubated for 5-7 days in the presence of PLGA films containing varying amounts of Mitomycin C. These experiments have shown dose-dependent toxicity effects on the cells. Our future studies will focus on delaying drug release and incorporating the drug loaded PLGA films into glaucoma drainage devices for animal studies.

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