

51f Optimization of Parameters for Sustained Local Drug Delivery of Statins for the Prevention of Vascular Intimal Hyperplasia

Anusha Vishwanathan, Stephanie T. Lopina, Steven P. Schmidt, Michelle Evancho-Chapman, Deenu G. Kanjickal, and Aadithya Krishnan

Restenosis is the most common basis of failure for interventional cardiac procedures like the coronary artery bypass graft surgery (CABG) and percutaneous transluminal coronary angioplasty (PTCA). The structural changes underlying it are the accumulation of new tissue within the artery wall – intimal hyperplasia which is the proliferation of vascular smooth muscle cells in the intima. A previous study has been done by Kanjickal et al in which a novel targeted drug delivery system named as the “PolyRing” has been devised in which the drug (Cyclosporin A) is encapsulated within the PLGA microspheres which in turn is entrenched in the PEG block as a polymeric vascular wrap whose rings matched the diameter of the blood vessels. The same concept is used for the drug statin, which is a hydroxymethylglutaryl coenzyme A (HMG-CoA) reductase inhibitor. The advantages of this device are that it does not need additional support and there are possibilities of multiple ring placements. Statins have been already in the market as lipid lowering agents and have shown marked anti-proliferative and anti-inflammatory properties.

Our work is concentrated on the optimization of certain parameters for the Simvastatin loaded microspheres in the PolyRing device. We would be discussing the synthesis of microspheres loaded with statin drug, which according to preliminary results is good, the highest drug loading efficiency in the PLGA microspheres, the efficacy of the incorporation of the statin loaded microspheres in the PEG hydrogel block polymer. The release kinetics of both unsterilized and hydrogen peroxide sterilized device and the cytotoxicity of the Simvastatin drug will be analyzed to determine the characteristics of the PEG hydrogel block polymer loaded with statin microspheres.