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Effect of polystyrene surfaces and altered polylactic acid surface chemistries on fibrinogen orientation and endothelialization and its application for coronary stents

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Coronary Artery Disease (CAD) is a leading cause of death which accounted for around 370,000 deaths in 2016. CAD is caused by a build-up of cholesterol in an artery, blocking oxygen from going to the heart. Current treatments for CAD include placing a drug-eluting stent in the artery in order to promote blood flow to the heart. However, this treatment results in-stent thrombosis, the fatal clotting of blood, in around 1% of all CAD patients. In this study, we investigate the use of biodegradable polymers to prevent fibrinogen proliferation on *in vivo* surfaces, and the effect of soluble fibrinogen on fiber characteristics. Hydrophilic polylactic acid surfaces (UV induced) resulted in less fiber occupancy and smaller fibers, and endothelial cells attachment was successful on hydrophilic PLA surfaces. These results show promise in UV treatment for coronary stents and a suitable biodegradable polymer. Further research on fibrinogen orientation and fiber characteristics was done on polystyrene surfaces for *in vitro* study. We found that a higher concentration of soluble fibrinogen, an essential protein in blood coagulation, resulted in dense fibers on polystyrene (PS) surfaces. This study reveals crucial information for the future development of coronary stents and the treatment of a leading heart complication, coronary artery disease.

Biography

Nupur Dave is a rising high school senior at Dulles High School in Sugar Land, Texas. She has analyzed and developed this research project at Stony Brook University under the mentorship of Dr Miriam Rafailovich. She has a long founded interest in Biomedical Engineering and wishes to major in some fields of Engineering in the future.

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