Improved Heparin Therapeutics: Biocompatible Composites & Redesigning the Biological Activities of Heparin on Microarray Chips

By

Tae-Joon Park

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Examining Committee:

Robert J. Linhardt, Thesis Advisor

Jonathan S. Dordick, Member

Steven M. Cramer, Member

Linda S. Schadler, Member

Rensselaer Polytechnic Institute
Troy, New York

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ABSTRACT

Public concerns about the general improvement of health care have led to the application of combinatorial methods for new drugs, biomaterials and diagnostic system development. The emergence of combinatorial methods for new compound synthesis and drug discovery has resulted in a dramatic increase in the number of drug candidates for *in vitro* and ultimately *in vivo* testing. Implantable medical devices, developed using combinatorial methods, further open up opportunities to reduce side effects. The current thesis focuses on high throughput synthesis and analysis using high-speed robotic spotting of heparin glycosaminoglycan (GAG) and blood or biocompatible materials such as carbon nanotubes (CNTs), activated carbon and nanocomposites. Multidisplicinary research on blood-compatible, heparinized materials, employing high-throughput microarrays will also be used to understand heparin-protein interactions. The goals of this thesis include the preparation of blood compatible CNTs, biocompatible activated carbon composites, high-throughput micro-scale screening of heparin-protein interactions and enzymatic solid-phase synthesis of GAGs on microarrays.