

Fall 2007 SEMINAR SERIES

F21C Bioprocessing & Biosensing Center

• DIVISION OF FOOD SYSTEMS & BIOENGINEERING •

PRESENTER: **Dr. David B. Henthorn, Assistant Professor**
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TITLE: **Protein responsive synthetic materials for use in diagnostic arrays and analytical devices**

ABSTRACT:

Synthetic materials with the ability to recognize and bind proteins – enzymes, antibodies, cell adhesion molecules, etc. – would find use in numerous applications ranging from bioanalytical assays to substrates for tissue engineering. Use of these materials would be further bolstered if the production techniques were amenable to various microfabrication methods. Recently we have demonstrated the production of wholly synthetic polymeric materials capable of binding specific protein molecules using common photopolymerizable monomers. A templating “mask” is first formed by immobilizing the desired protein target on a suitable substrate. This mask is then used to imprint the surface of a polymeric material during formation, creating recognition sites for the specific protein. After mask removal, the recognitive materials are tested with a variety of protein species to determine binding. In this work, a monoclonal IgG was chosen as the model protein for study due to the unique conserved/variable structure of immunoglobulins. This novel surface imprinting technique allowed us to form materials which act as synthetic antigen mimics, with the target IgG molecule showing a 400% preference for the imprinted materials over control (non-imprinted) materials. Competing IgG molecules show no additional affinity for these materials when compared to control materials. Reusability of the protein mask was studied and only minor degradation noted. As the surface imprinting technique was designed to be compatible with traditional photolithographic techniques, integration of these materials into immunological arrays and in microfluidic biosensors is currently underway.

BIOGRAPHY:

Dr. Henthorn completed his BS and PhD degrees in Chemical Engineering at Purdue University in 1999 and 2004 under the supervision of Professor Nicholas Peppas. For his PhD, he studied the formation of crosslinked polymer networks for use in biomedical applications. Upon graduation, Dr. Henthorn took a position as an Assistant Professor in Chemical and Biological Engineering at the University of Missouri Rolla. His research interests focus on formation of novel materials for diagnostic and therapeutic devices.

DATE • TIME • LOCATION:

Tuesday, October 23, 4:00 pm
Ag Eng Bldg 105 • Refreshments