

**GEORGE MASON UNIVERSITY  
COLLEGE OF SCIENCE  
DEPARTMENT OF BIOLOGY SEMINAR  
Fall 2016**

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Center for Applied Proteomics and Molecular Medicine**

***“Probing the Urinary Proteome with Hydrogel Nanotechnology”***

Biomarkers help diagnose and determine treatment for many diseases. Currently a majority of biomarkers utilized are collected in an invasive manner which generates patient discomfort and the chance of nosocomial infections. Urine is a bio-fluid which can be collected non-invasively and may hold a wealth of disease biomarkers. Urine is already checked routinely for biomarkers related to kidney and liver function. One drawback to urine as source of biomarkers is that the protein concentration is dilute and many biomarkers may be overshadowed by high abundant proteins. Hydrogel nanoparticles have been developed which enable a simple and effective means to probe urine for biomarkers. Hydrogel nanoparticles are able to concentrate and protect proteins which helps increase the sensitivity of analytical techniques like immunoassays and mass spectroscopy. Copper containing hydrogel nanoparticles were developed which increase the breadth of proteins captured from urine. Nanoparticles containing reactive blue 221(RB221), reactive black 31(RB31), and reactive red 23(RR23) are able to detect over one thousand non-redundant proteins in as small a volume of urine as two milliliters. Additionally, RB31 nanoparticles are able to capture and concentrate glycosylated hemoglobin (A1C). These new nanoparticles may pave the way for non-invasive A1C monitoring for diabetic long term care. Furthermore, the utilization of bio-banked urine in combination with RB221, RB31, and RR23 nanoparticles may help find biomarkers for chronic diseases and acute non-infectious diseases.

**TUESDAY October 18, 2016**

**3:00-4:15 PM**

**Innovation Hall Room 131**