University of Missouri-St. Louis

Technology / Business Opportunity

Diagnostic Technology

The University of Missouri-St. Louis seeks a partner to license or further develop a

Simplified Immunoassay for Detection of Protein Biomarkers

Immunoassays are among the most valuable analytical methods for clinical diagnosis and biochemical studies involving specific antigen-antibody interactions, such as the detection of protein biomarkers. Currently, sandwich ELISA tests are most commonly used to evaluate the presence of antibody or antigen in a sample.

Researchers at UM-St. Louis have developed a simplified immunoassay that uses visible spectroscopy to detect protein biomarkers using appropriate immobilized antibodies on a porous surface. This discovery includes a novel cassette and methodology consisting of fewer steps and requiring less time to perform than sandwich ELISA tests. One antibody serves for both the capture and detection, reducing testing time and cost.

Current & Future Development

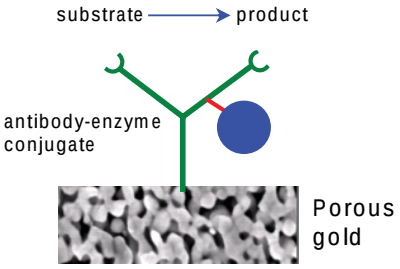
The simplified immunoassy has been demonstrated with free prostate specific antigen (fPSA). The method should be applicable to any protein biomarker that can be detected by antibody binding (IgG). Researchers are currently testing the immunoassy with other sample biomarkers. They are also exploring additional opportunities including electrochemical detection, which would open up the possibilities of 1) an electrode array able to detect different antigens in one sample and 2) detection of biomarkers in whole blood. A device with such functionalities would allow for a powerful point-of-care diagnostic tool.

Benefits

- Fewer steps, shorter testing time and less expensive than current sandwich ELISA tests, features attractive to both researchers and health care providers.
- The material support used is adaptable to a range of geometries and surface chemistries, expanding possible research applications.
- With additional development, electrochemical detection may open up the possibility of a powerful diagnostic tool able to detect different antigens in one sample, detect antigens in whole blood, and be used at point of care.

Potential Applications

- The approach can be applied to detection of protein biomarkers by appropriate immobilized antibodies in both research and diagnostic health care.
- Screening for free prostate specific antigen (fPSA), a biomarker for prostate cancer, has been demonstrated.
- Diagnostic tool in medicine and plant pathology.
- Quality control check in various industries (e.g., detection of food allergens; analytical and bioanalytical chemistry; immunology)



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The Inventors

Keith Stine, Ph.D.
Associate Professor of Chemistry
University of Missouri-St. Louis

Dr. Keith J. Stine received his B.S. degree in chemistry from Fairleigh Dickinson University, where he also received a B.A. degree in Mathematics and Computer Science. He received his Ph.D. in physical chemistry at Massachusetts Institute of Technology, and then worked as a postdoctoral associate at University of California–Los Angeles studying the surface chemistry of monolayers. A faculty member at UM-St. Louis since 1990, Stine has published widely in areas of surface chemistry, model membrane systems and self-assembled monolayers. Stine is a member of the UM-St. Louis Center for Nanoscience.

Alexei Demchenko, Ph.D.
Associate Professor of Chemistry
University of Missouri-St. Louis

Dr. Alexei V. Demchenko received his B.S./M.S. in Chemical Engineering from the Mendeleev University of Chemical Technology of Russia. He received his Ph.D. from the Russian Academy of Sciences, Moscow, for his work on the development of thiocyanate methodology for stereospecific glycosylation, and then spent two years as a post-doctoral research fellow at the University of Birmingham (UK) and three years at the Complex Carbohydrate Research Center, University of Georgia as a research associate, where his research was focusing on the synthesis of complex oligosaccharides for immunological studies and exploration of chemical O-sialylation. An UMSL faculty member since 2001, Demchenko has co-authored over 75 articles, reviews, chapters, and edited two books. Professor Demchenko's current research interests are in the area of synthetic carbohydrate chemistry.

Olga Shulga, Ph.D.
Research Chemist
Crosslink, Inc.

Dr. Olga Shulga received her B.S. and M.S. (Kiev State University, Kiev, Ukraine) and Ph.D. (University Toledo) degrees in analytical chemistry. After graduation from the University of Toledo, she did her postdoctoral fellowships at the University of Montana, where she worked to develop a new electrochemical sensor for detection of chemical warfare agents, and at the University of Missouri–St. Louis where she worked to develop this new immunoassay for detection of cancer biomarkers. Shulga has a number of publications in the area of electrochemical sensors and biosensors. After her postdoctoral fellowship at UM-St. Louis, Shulga joined Crosslink, Inc., as a research chemist.

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CONTACT

To discuss this opportunity, contact:

Tamara Wilgers

Director of Technology Transfer
University of Missouri-St. Louis
314-516-6884
wilgerst@umsl.edu

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