Magnetic Programmable Bead Enzyme-Linked Immunosorbent Assay (MagProBE)

AzTE Case # M13-158L

Invention Description

Innovations in proteomics have enabled the rapid discovery of potential biomarkers, such as autoantibodies, for the early detection of illnesses, including infectious diseases, autoimmune disorders and cancer. Although many biomarkers have been discovered, the high cost and time involved in validating these markers has hampered their use in clinical settings. In particular, autoantibody validation requires the assessment of selected autoantibodies amongst thousands of unrelated antibodies in sera, which is both time consuming and expensive using conventional validation tools.

Researchers at the Biodesign Institute of Arizona State University have developed a rapid, inexpensive, programmable, in situ platform for display and capture of protein antigens on magnetic bead arrays for antibody detection. This platform allows for higher reproducibility and is an inexpensive tool for biomarker validation in mid-high-throughput settings. To minimize nonspecific binding of IgG to the bead arrays, a custom blocking solution was developed that further enhances the platform. Moreover, reagents and equipment that are readily available and cost-effective are used to increase the utility of this platform.

This platform allows for multiplexed detection of various biomarkers in a fast and cost effective manner. It requires less patient sample, less time to prepare antigens, reduces variability between samples and has a lower cost per sample run than traditional bead-based ELISA assays.

Potential Applications

- Biomarker validation when used in research laboratories
- Diagnostic and prognostic tool for various diseases when used in clinical laboratories

Benefits and Advantages

- Small sample amount needed
- Higher reproducibility
- Cost-effective – lower cost per sample than traditional bead array ELISA assays
- Rapid
- Optimized buffers to deliver very high signal-to-noise signals
- Decreased epitope variability
- Smaller lab-bench foot-print
- Stable – the antibody-coupled beads have an average decrease in signal intensity of 18% for two months