* Contact: paul.wilson@argentodiagnostics.com, info@argentodiagnostics.com

# Point-of-care instrument platform based on magnetic beads and silver nanoparticle metalloimmunoassay

Wilson, P.K.[1*], Szymanski, M.[2] & Porter, R.[1]

## Abstract

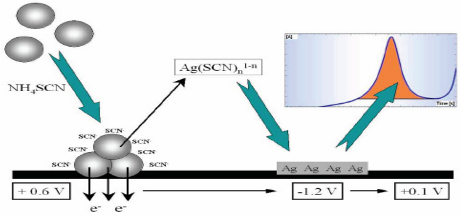
The Argento metalloimmunoassay platform produces rapid assay results at the point-of-care. The system is based on magnetic bead and silver nanoparticle conjugates, which after addition of the sample are reacted with a non-hazardous reagent, ammonium thiocyanate. This reaction creates charge on the nanoparticles which allows them to be rapidly drawn to an electrode at a fixed potential and then converted into silver ions to generate a signal by anodic stripping voltammetry.

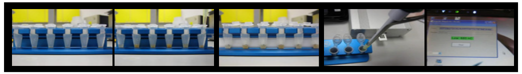
This technology is ideal for many point-of-care applications due to its speed, sensitivity, simplicity to the end user and use of non-hazardous reagents. The applications currently under development include detection of cardiac markers, influenza virus, contamination in fuel and biomarkers related to elite sport. Examples of assays from these three different target classes have been demonstrated.

## Materials and Methods

Antibodies are attached to silver nanoparticles and magnetic beads by simple conjugation procedures. Silver conjugates are optimised in a microtitre plate format, then the assays are transferred into a magnetic bead assay on the Argento platform.

Optimised conjugates can then be pre-loaded into a point of care test strip and assays run with real samples (saliva, serum, whole blood, urine, etc.) in a 1-stage or 2-stage format. The signal is then measured on the potentiostat, which can be in the form of a benchtop system or hand-held meter. The meter is Wi-Fi, Bluetooth and wireless network enabled and can present, transfer and store data as required for each application.

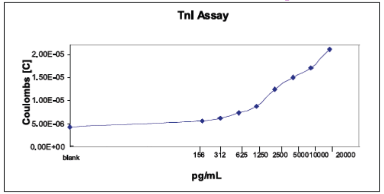


The Argento assay in action. From left to right; pre-loaded assay tubes, add sample and incubate, separate magnetic beads from sample by application of a magnet, add ammonium thiocyanate, transfer to the potentiostat for measurement and readout

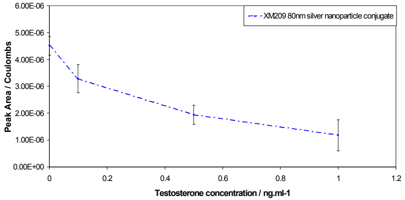
## Flexible Immunoassay Format

### Troponin – cardiac marker, sandwich assay



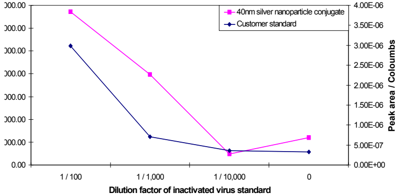

Clinically relevant point-of-care target demonstrated with Argento system

### Testosterone – Diversity in assay format, hapten




Hapten assay developed with the Argento platform, showing a wide range of targets

### Influenza A – infectious diseases, virus




Influenza A sensitivity on the Argento platform exceeds customers current product

## Conclusions

The Argento silver metalloimmunoassay platform is a next-generation point-of-care device which has now been demonstrated via example assays of three different formats. These examples include cases where the Argento platform offers a 10-fold increase in sensitivity over currently used diagnostic technologies.

Current applications of the Argento platform include cardiac markers, targets related to elite sport and infectious diseases. Any immunoassay can be transferred onto this system rapidly and doing so offers a number of advantages including increases sensitivity, rapid assay and suitability for point of case use. Data can be easily transferred from the portable or benchtop meter on to a centralised data storage system, enabling trend monitoring as well as results in real time.

1) Argento Diagnostics Ltd., Knowledge & Innovation Centre, National Physical Laboratory, Teddington, UK, TW11 0LW. 2) Biotechnology, Analytical Science, National Physical Laboratory, Teddington, UK, TW11 0LW