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## Nanotech News

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### Microwaves + Nanoparticles = Ultrafast, Ultrasensitive Assays

Using a relatively new technique that relies on silver nanoparticles to amplify a diagnostic fluorescent signal and low power microwaves to accelerate binding of a diagnostically important molecule with the protein used to detect it, researchers at the University of Maryland Biotechnology Institute have created a new type of assay that could speed the detection of cancer at its earliest stages. This work, conducted by Kadir Aslan, Ph.D., and Chris Geddes, Ph.D., is reported in the journal *Analytical Chemistry*.

The new assay technology relies on two physical processes. Metal-enhanced fluorescence is a recently observed phenomenon that boosts the intensity of a fluorescent signal through the interaction of a weakly fluorescent probe with metal nanoparticles. Low power microwave radiation has been gaining use as a means of accelerating a variety of chemical reactions. Combining the two into a single, easy to use format resulted in an assay system that was 90 times faster than a conventional protein binding system with a 10-fold boost in sensitivity.

Constructing the assay system involves coating a glass slide with a thin film of silver nanoparticles, and then adding the sample to be assayed. Proteins in the sample will stick to the silver layer. Next, a fluorescently labeled detection reagent – a molecule designed to bind to the specific protein of interest – is added and the slide is then heated with microwaves for 20 seconds. The slide is then washed to remove unreacted detection reagent and then surveyed for any fluorescent signal using a standard spectrophotometer.

This work is detailed in a paper titled, “Microwave-accelerated metal-enhanced fluorescence: platform technology for ultrafast and ultrabright assays.” An abstract is available through PubMed. View abstract.