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2005 Program

*Small Business Technology
Transfer (1-year project)*

Project Title: Rapid Detection of Acute Myocardial Infarction

Project Summary: Smoking is a major contributor to human loss world wide. Nearly 40% of people who dies from smoking die from heart and blood vessel disease. Tobacco use is accountable for a large proportion of heart attacks among younger cigarette smokers. This proposal is a joint collaboration between Florida State University and Nanomagnetics and Biotech Inc (a small business based in Tallahassee Florida) to develop a rapid testing device to identify at the point of care the levels of cardiac markers. Cardiac markers are used as one of the primary indicators to the existence and the severity of the heart attack.

The proposed device will be built on the technology that is being patented by Florida State University and has been licensed to Nanomagnetics and Biotech Inc. In this technology magnetic nanoparticles are synthesized then coated with suitable surfactant to functionalize them to capture the cardiac proteins in the blood serum. With the use of a magnet these magnetic particles (after capturing the cardiac marker from the blood serum) will be isolated from the blood serum. An additional labeled protein that is also specific to the cardiac marker will be attached to form a sandwich complex. The second label is used to measure for the concentration of the cardiac protein in the blood sample.

At Florida State the second labels that have been tested include enzymes and flour cent labels. Using this technology the time needed to perform the tests was reduced to few minutes.

It has been recognized that a specialized personnel may be needed to perform such tests with the technology developed. In here we propose to utilize a commercial glucometer to perform the test for heart attack. The developed technology will be utilized with a change in the second label. Instead of an enzyme or a florescent we propose to use a glucose molecule. This new introduction of the new label will make the utilization of rapid detectors available to every clinic and to the first responders. In addition to its speed this technology will be relatively inexpensive in comparing to all products available in the market. It has to be noted that this platform technology that is proposed here can be used with minimum change to detect for infectious diseases, stroke markers and arrange of different applications.