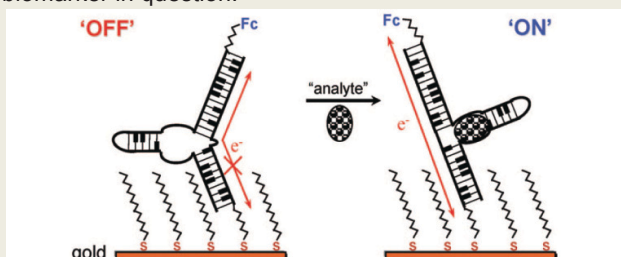


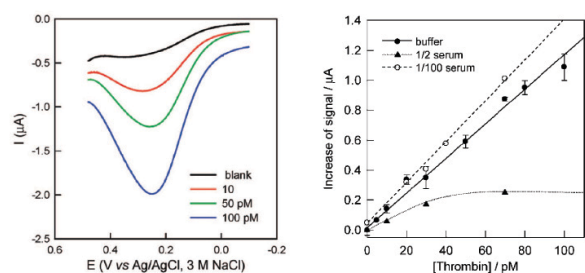
Rapid Protein and Small Molecule Detection Platform

Novel Technology

DeOxyRiboSensor (DORS) technology represents a novel class of highly sensitive molecular diagnostics tools for population-wide detection of disease-signalling biomarkers. This highly adaptable platform technology is capable of high-resolution detection of ultra-low concentrations of disease-indicating micro- and macro-molecules. This has the potential to allow effective monitoring of disease progression and development of personalized patient treatment regimes. This synthetic DNA-based electronic biosensor technology, which couples DNA-based sensing molecules with an electrochemical microchip, incorporates an analyte-specific aptamer (a nucleic acid receptor) in a disrupted double helix. Upon analyte binding, the altered aptamer conformation repairs the base-stacking of the adjacent helical path and restores its conductivity, which can be directly measured as an electrical signal that is translated via an electrochemical chip-based readout interface, providing qualitative and quantitative accounts of the biomarker in question.



We have published proof-of-concept experiments showing detection of the blood-borne protein, thrombin, at picomolar concentrations using our DORS technology¹.



The Opportunity and the Need for DORS-based Diagnostic Devices

With the successful completion of the human genome project, many scientists throughout the world have turned their attention to the development of comprehensive, knowledge-based proteomics. This has led to the identification of a number of important blood-borne disease biomarkers that, if detected and quantified at early stages of disease progression, could lead to substantial improvements in disease outcome in humans. A lack of sensitive technologies to detect proteins at very low concentrations has slowed down the adoption of in clinical practice.

In addition, the ability to detect small changes in disease biomarkers will help track disease progression and treatment effectiveness, enhancing the potential for personalized medicine, a quickly growing trend within the medical and research communities. High-resolution identification of blood-based disease biomarkers is therefore highly desirable.

Competing technologies consist primarily of more traditional, antibody-

based devices, such as those incorporating ELISA or antibody-coated surfaces. Proof of concept studies indicate significant potential advantages to our DORS technology.

Advantages of DORS Diagnostic Devices

High sensitivity and specificity – DORS has shown picomolar levels of detection and may confer the ability to sense minute changes in biomarker levels using small volumes of sample. Due to its aptamer-based design, DORS has also shown exceptional specificity in the presence of common serum proteins, minimizing non-specific effects of contaminating substances.

User friendly, portable device – With our chip-based DORS technology, label-free measurement and independence from solution turbidity analysis and ELISA tests are made possible. This may eliminate the need for complex laboratory manipulations, thereby enhancing efficiency and productivity in the lab and providing point-of-care healthcare professionals with a portable, easy-to-use diagnostic device.

Lower cost – Due to the use of an aptamer-based electrochemical sensor, DORS technology could facilitate the production of less expensive devices for more widespread and extensive use in research laboratories, as well as provide the potential for future expansion into point-of-care applications and the emerging medical home-testing market.

DORS is ideal for the construction of inexpensive, yet highly sensitive and user friendly point-of-care diagnostic devices that will meet the growing demand for personalized molecular diagnostics, which is quickly proving to be an important step in the advancement of a number of disease treatments, including many types of cancer. DORS therefore offers the potential for a major advance in point-of-care molecular diagnostics.

Current Development Plans, IP and Proposal

A multidisciplinary team at Simon Fraser University is presently constructing a portable device that fully prototypes the capabilities of this technology. Detection of proprietary blood-borne proteins for non-small cell lung cancer is currently in progress.

PCTs for this technology have been filed in the US, Canada and Europe (app. nos. 10/507387, 2516091, 03743776.1, respectively). A CIP has been filed in the US (app. no. 12/102669). Simon Fraser University is currently seeking development and licensing opportunities. For more information, contact:

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1. Huang YC, Ge B, Sen D, Yu HZ. J Am. Chem. Soc. 2008, 130: 8023-29.

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