NovaUCD

Technology Transfer Opportunity

Biomedical Microarray Sensor

OPPORTUNITY:
Biomedical microarray sensor for identification of macromolecules and their structural properties using Surface Plasmon Resonance (SPR).

Description of Technology:
The SPR sensor is designed as a microarray for applications in biomedical diagnostics and macromolecular binding studies. An array of microspots modified to capture specific molecules for analysis is deposited on a wavelength-tunable metal-coated grating. The sensor is based on the principle of surface plasmon resonance, where light of a specific wavelength is converted into an electron density at the surface of a metal (a surface plasmon).

Detection of light reflected from the surface of the metal is proportional to changes in the density of the plasmon, which are influenced by the surface properties of the metal and the immediate surrounding environment (analyte molecules). Existing SPR systems use detectors at a fixed wavelength for each sample analysis, thus limiting the scope of analysis on biological systems and making microarray applications impracticable. The uniqueness of this novel detector is in the variable grating system used, which allows rapid scanning of the surface of a microarray of detection spots, tunable for the optimum resonance wavelength of the molecules of interest.

Value Proposition:
Alternative analytical methods currently use label molecules, mass spectroscopy and quartz-microbalances. However, labeling methods can alter the molecules of interest, MS destroys the sample and the weak molecular interactions of the quartz-microbalance provide poor specificity.

The greatly enhanced sensitivity of this novel device over existing SPR detectors, lies in the ability to tune the wavelength of the incident light and the spacing of the grating, to the optimum values required for detection of particular molecules or materials captured on the grating surface and analysis of their structural properties and interaction kinetics. The commercial attractiveness of this sensor for SPR applications is its simplicity of use in microarray formats, low cost, high molecular discrimination and non-destructive testing.

Market:
A recent review in ChemBioChem predicts that SPR imaging will become one of the most prominent techniques for analysing molecular interactions without employing labeling techniques. This market is currently dominated by Biacore AB, Nanofilm Technologie GmbH, Eco Chemie BV, GenOptics SA, Reichert Inc. and Texas Instruments (Spreeta Biosensor).

Applications of the technology are in protein, DNA and drug analysis, disease detection and studies of molecular interactions and kinetics. The overall market for DNA and Protein microarrays is about $1 billion with analysts projecting that the market may grow to $40 billion by 2010.

Inventor:
Dr Dominic Zerulla, UCD School of Physics.

Status:
The Biomedical Microarray Sensor is the basis of a patent application filed on 8th September 2006. Development work is ongoing to optimise working prototypes for characterization of macromolecules and their interactions with substrates.

Opportunity Sought:
Collaboration with an industry partner to develop applications for use in SPR instruments. This collaboration could be the creation of a new start-up business or a licensing structure with an existing business in the relevant technology sector.

Contact:
Dr François Pichot, Project Manager, Technology Transfer, NovaUCD, Belfield Innovation Park, UCD, Belfield, Dublin 4.

t: +353 1 716 3725
e: francois.pichot@ucd.ie
w: www.ucd.ie/nova