



REGIONAL CENTRE FOR BIOTECHNOLOGY

Seminar series

Real-Time Label-Free Biosensing with Nanomechanical Microcantilevers

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Wednesday, January 5, 2011

11:00 AM

Seminar Room

Cantilevers at micro/nanoscale dimensions are like tiny diving boards. When molecules bind to the diving board, the effective mass will change resulting in resonance frequency shift. Due to their extremely small dimensions they offer unprecedented opportunity as mass sensors. The major challenge has been heavy damping of the resonance frequency when these tiny diving boards are operated in liquid – the native environment of biomolecules, seriously affecting the mass sensitivity. I will describe how I have confronted this challenge. I will highlight the methods to functionalize the cantilevers with receptors. I will discuss, proof of principle experiment of latex beads binding to the cantilever; determining rheology of the liquid which could find applications in early detection of coronary heart disease or inflammation; vesicle binding and subsequent binding of pore forming bee venom protein melittin; and finally, pathogens like virus binding to membrane proteins. All the measurements are done in real-time and without any labels attached to the binding ligands. Collectively, these findings could lead these cantilevers at micro/nanoscale as early diagnostic tool in a doctor's office or more sensitive way of measuring new drugs binding to their targets in a pharmaceutical industry.