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Bio-functionalized Nanotube Membranes For DNA Separation

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The studies of translocation and transport of ions, biopolymers, and other genetics materials is very important in medical and scientific communities. The transport of biopolymers such as RNA, DNA, and polypeptides across membrane occurs in many biological systems. Examples include the transport of RNA molecules and transcription factors through nuclear pores, injection of DNA from a virus head into the host cell, and the uptake of oligonucleotides by specific membrane proteins. Another example is the transport of ions through protein ion channels across cell membranes, which converts the concentration of transported analytes through a channel into change in channel conductance. Nature's highly selective biosensor are based on molecular-recognition of one species of interest in the presence of others. In this presentation, I will discuss the fabrication of a new DNA biosensor. I will also talk about the transport behavior of DNA molecules through nanotubes. These sensors based on monodisperse ensemble of gold nanotubes. Single stranded oligonucleotides were immobilized onto the inner walls of nanotubes. These bio/nano-membranes selectively transport complementary DNA across the membrane with selectivity greater than 5 was observed. With these membranes, single nucleotide polymorphism detection is also demonstrated.