**Detection of DNA Hybridization at Electrode Surfaces Using Electrochemical Approaches**

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A great deal of interest has recently been focused on use of microarrays, microchips and microfluidic devices in various analytical schemes, especially for detecting biological targets. An important analytical target for these devices is DNA. In several of the more common analytical formats that use such devices, small oligomers of DNA (e.g. 15- to 25-mers) are detected by virtue of their binding to complementary strands that previously had been immobilized at various locations on the device. To accomplish this detection electrochemically, one requires a simple way of detecting the hybridization of the target DNA strand to the immobilized complementary strand.

This presentation describes an electrochemical method for detecting the hybridization of single strands of DNA with complementary strands of surface-immobilized DNA. The detection strategy involves use of a redox-active compound that has some selectivity for binding to duplex DNA. In its simplest manifestation, this binding can be measured directly by electrochemical methods, allowing a means of assaying the amount of DNA duplex present on the surface. An alternative approach would involve use of this compound to electrochemically mediate the reduction of a different redox compound present in solution. This modification of the approach allows for amplified detection. It also requires that the solution-phase redox compound be effectively blocked from direct access to the electrode, so that it can be reduced only *via* the mediation pathway. The presentation will focus on the design and synthesis of a novel redox compound that selectively binds to duplex DNA and the demonstration of its use to detect DNA hybridization at Au electrodes either by direct electrochemical detection or through mediation to a solution-phase redox compound.