NUCLEIC ACID BASED ELECTROCHEMICAL BIOSENSOR

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Abstract: The analysis of nucleic acids is becoming very important research area in diagnostic testing for health, forensic and environmental science. An electrochemical DNA biosensor, recently called “nucleic acid based electrochemical biosensor” can be made by the immobilization of a single-stranded (ss) oligonucleotide called probe onto a transducer surface to recognize its complementary (target) DNA sequence via hybridization. Electrochemical DNA hybridization biosensors can be employed for determining early and precise diagnoses of infectious agents in various environments and these devices can be exploited for monitoring sequence-specific hybridization events. Short strands of oligonucleotides aptamers which are called artificial antibodies have been investigated. In this work, label-free bioelectronic detection of aptamer–thrombin interaction based on electrochemical impedance spectroscopy (EIS) technique has been done. Multiwalled carbon nanotubes (MWCNTs) have been used as modifiers of screen-printed carbon electrotransducers (SPCEs). Improved characteristics have been shown compared to the bare SPCEs. 5’ amino linked aptamer sequence has been immobilized onto the modified SPCEs. The binding of thrombin to aptamer sequence has been monitored by EIS transduction of the resistance to charge transfer (Rct) in the presence of 5mM [Fe(CN)6]3−/4−. An electrochemical genosensor for the detection of hypermethylation of the glutathione S-transferase P1 (GSTP1) gene, a specific marker of prostate cancer, has been done in our laboratory. The detected DNA hybridization has been characterized by electrochemical impedance spectroscopy with potassium ferri/ferrocyanide as a redox probe. In this talk, I will briefly introduce the above works as well as some of the other sensors we have been developing in our group.


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2:00 p.m.
Green Hall, room 0120 Host: Dr. Lan Yang

Short Bio: Prof. Ozsoz is a Professor of Analytical Chemistry at Faculty of Pharmacy, Ege University, Turkey and he is also teaching Biosensors Technology courses at Biotechnology Department, Izmir Institute of Technology. Professor Ozsoz holds a B.S. degree in Chemical Engineering from Middle East Technical University (METU), Ankara, Turkey and a Ph.D. degree in analytical chemistry from Faculty of Pharmacy, Ege University, Izmir, Turkey. He was Postdoctoral Fellow with Dr Joseph Wang at New Mexico State University, Las Cruces between 1989-1991 and 1996-1997. He is the recipient of 2008 The Scientific and Technological Research Council of Turkey (TUBITAK) science award.