

Public Abstract

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Department:Biological Engineering

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Title:DEVELOPMENT OF A FLUORESCENCE RESONANCE ENERGY TRANSFER OPTICAL NANOSCALE BIOSENSOR BASED ON A LIQUID-CORE WAVEGUIDE PLATFORM

Biosensors belong to a relatively new class of diagnostic methods that are proving feasible for detection of various analytes. These sensors utilize biological species in order to function, which allows them to detect specific analytes with a high degree of accuracy. Many different techniques within this class of sensors remain unrealized, and those that have been developed suffer from many misgivings. One of the most important of these misgivings is the requirement of the biosensor to be bound to a substrate, which effectively limits the use of the sensor and often decreases its effectiveness. In order to counteract this deficiency, a biosensor that is not confined to a substrate, but instead utilizes a complex composed of biological molecules to function properly, has been developed. The biosensor utilizes optical fluorescence techniques, and also effectively combines biological elements with nanotechnology to create a highly capable means of analyte detection. Results of this study indicate that the proposed biosensor is an efficient and accurate technique for detection of Porcine Reproductive and Respiratory Syndrome virus, as well as human cardiac Troponin I, which acts as an indicator of heart muscle damage, in particular, heart attack. Once properly developed, this biosensor method could prove to be important for an array diagnostic and preventative applications.