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Research Article

A New FRET-Based Sensitive DNA Sensor for Medical Diagnostics using PNA Probe and Water-Soluble Blue Light Emitting Polymer

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Abstract

A reliable, fast, and low-cost biosensor for medical diagnostics using DNA sequence detection has been developed and tested for the detection of the bacterium "*Bacillus anthracis*." In this sensor, Poly [9,9-di (6,6'-N, N' trimethylammonium) hexylfluorenyl-2, 7-diyl)-alt-co- (1,4-phenylene)] dibromide salt (PFP) has been taken as cationic conjugated polymer (CCP) and PNA attached with fluorescein dye (PNAC*) as a probe. The basic principle of this sensor is that when a PNAC* probe is hybridized with a single strand DNA (ssDNA) having complementary sequence, Forster resonance energy transfer (FRET) may take place from PFP to the PNAC*/DNA complex. If the FRET is efficient, the photoluminescence from the PFP will be highly quenched and that from PNAC* will be enhanced. On the other hand, if the DNA sequence is noncomplementary to PNA, FRET will not occur.