Molecular Imprinting of Peptide Nucleic Acid (PNA) in an Electropolymerized CG-Rich Artificial Oligomer Analogue for Determination of Genetically Relevant Oligonucleotide

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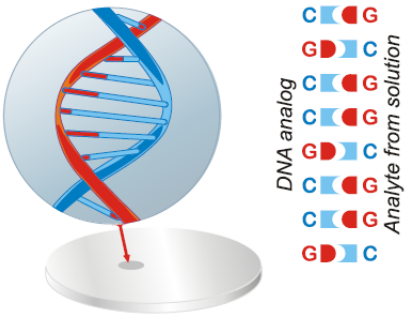

We devised and fabricated a chemosensor for selective determination of genetically relevant 5'-GCGGCGGC-3' (G-guanine, C-cytosine) oligonucleotide. Toward that, we simultaneously synthesized electrochemically and deposited on a Pt electrode a sequence-defined *octakis*(2,2'-bithien-5-yl) polymerized film of a DNA hybridizing probe.[1] For that purpose, we used both an approach of macromolecular imprinting in a polymer and a peptide nucleic acid (PNA) template of a programmable sequence. For transducing an oligonucleotide recognition event into the analytical signal, we applied electrochemical impedance spectroscopy (EIS) and surface plasmon resonance (SPR) spectroscopy under stagnant-solution and flow-injection analysis (FIA) conditions, respectively. Using EIS, we determined the target oligonucleotide with the 200-pM limit of detection. With the EIS determined apparent impact factor, IF≈4.0, the chemosensor discriminated both two-nucleotide-mismatched oligonucleotides and Dulbecco Modified Eagle Medium sample interferences.

References

1. Bartold, K., Pietrzyk-Le, A., Golebiewska, K., Lisowski, W., D'Souza, F., Kutner, W., *ACS Appl. Mater. Interfaces* **2018**, *10*, 27562-27569.