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APT-E-SENSE-Electrochemical aptasensing: From selection, simulation towards electrochemical detection: Reaching maximum residue limits and unraveling biomolecular interactions

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A highly competitive and hot topic in developing biosensors is the use of aptamers, also known as 'chemical antibodies', as bio-recognition compound. Aptamers (single strand (ss) DNA or RNA) are synthetic oligonucleic acid sequences which can bind to their targets with high affinity and specificity due to their flexibility. In addition, they are stable and can be employed in extreme conditions. Moreover, these oligonucleic acids can be easily modified by attachment of functional groups without affecting their affinity. Electrochemical sensors with immobilized aptamers as sensing elements are called electrochemical aptasensors. The high selectivity of these sensors is a result of the unique properties of the aptamers. Many strategies are suggested for the immobilization of aptamers on transducers surface but they are mostly restricted by covalent attachment or chemisorption. Despite the fact that aptamers are chemically more stable compared to proteins, they have to be protected from nucleases. For this aim, entrapment in a protective matrix is suggested to overcome this problem. Selecting an appropriate host matrix for aptamers is one of the main challenges for the immobilization of aptamers in order to improve the analytical characteristics of the aptasensors. In this presentation, the selection procedure of aptamers will be discussed next to different immobilization strategies aiming the development of aptasensing devices for environmentally important molecules such as antibiotics, PCBs. Additionally, an *in silico* method for the selection of aptamers is presented.

Biography

Karolien De Wael defended her PhD thesis titled: 'Electrochemical study of gold surfaces modified by the immobilization of transition metal ion phthalocyanines and porphyrins' (Ghent University, Belgium) in 2005. During her Postdoc study, she focused on the immobilization of redox proteins on electrodes for electrochemical detection. Since April 2011, she is tenure track Professor and Head of the research group Environmental Analysis at the University of Antwerp, Belgium. She has published more than 60 papers in reputed journals and 2 patents.

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