Nanomaterials and biologically synthesized composites for biosensing applications

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Nanotechnology is increasingly used in various applications, from clinical diagnosis to food analysis and environmental monitoring. Nanomaterials can be adapted to be used for the specific detection of biomolecules using sensors and biosensors. They can be used as conductors, signal amplifiers or components of biomolecular recognition. The presentation will highlight the use of commercially available nanomaterials and composites that are fully functionalized or synthesized in our laboratory. Chemically functionalized carbon nanomaterials have been used to detect glucose [1], and carboxyl-functionalized carbon nanotubes have been successfully used to detect levothyroxine. By comparison, physically synthesized bimetallic nanoparticles loaded with reduced graphene oxide were also used to monitor levothyroxine. Enzyme-like catalytic activity has been observed on gold nanoparticles [2], usually obtained by chemical pathways. In our laboratory we obtained biologically synthesized metal nanoparticles and composites, which allow the modulation of activity and selectivity facilitating the applicability of our (bio) sensors in the analysis of real samples, to make the diagnosis at the point of care.

Keywords: Nanomaterials, Composite materials, Biosensing, Biological synthesis

Themes: Advanced nanomaterials, Gold Nanoparticles and Biosensors

References:

1. M. David et al., Sens. Actuators B Chem. 255 (2018) 3227-3234
2. M. David et al., Bioelectrochemistry 129 (2019) 124–134

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Biography

Monica Florescu, PhD, Associate Professor of Physics and Biophysics Department of Fundamental, Prophylactic, and Clinical Disciplines,"Transilvania" University of Brasov, Faculty of Medicine. She obtained in 2007 Ph.D. in Physics and in 2020 PhD in Medicine. Her current research interests include development of label-free (nano)biosensors as reliable detection tool for biologically active substances and toxins, study of biomolecular interactions with solid surfaces (metal, alloys, carbon-based) for optimization of the surfaces for biosensors and prosthetics materials, the development of bioactive nanoparticles, biocatalysts or bioanalytical systems, tuning surface properties to interact specifically with a target biomolecular system, physico-chemical characterization of biomaterials with applications for implanted materials.

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