

Chemistry Department - REQUIMTE

Biosensor for the early diagnostic of prostate cancer



Laboratório de Farmacologia
e Biocompatibilidade Celular
Pharmacology & Biocompatibility



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- Since 2010: PhD student Doctoral Program in Sustainable Chemistry; JPNoronha / Goreti Sales / João Rodrigues
- 2008-2009: Master in Energy Optimization in Industry
- 2000-2005: Degree in Chemical Engineering

Skills & Expertise

Nanotechnology; Biosensors; Chemistry;

Objectives

The main goal is to develop low cost biosensing devices for screening several prostate biomarkers in the routine clinical control of men. These sensors are developed to screen PSA, SAR, ANN and/or MSMB.

For this purpose, newly synthesized highly stable plastic antibodies playing as sensing materials are coupled to small-sized devices. The interaction between the biomarker and the sensing-material produces electrical signals generating quantitative or semi-quantitative data. These devices allow inexpensive and portable detection in point-of-care testing.

Methodology

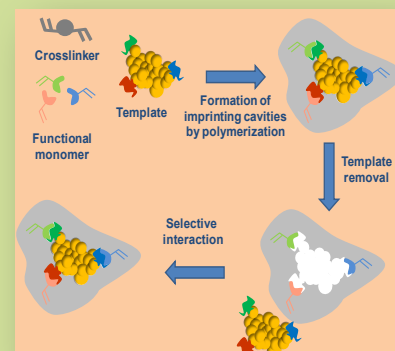
The device includes an array of electrodes, each one specific for only one kind of biomarker. Therefore, single sensing units are constructed first for each biomarker and possibly combined after in one multi-sensorial platform. For this purpose, several tasks are performed for each biomarker:

- Synthesis of new sensing materials based on molecularly imprinted polymers (plastic antibodies) of suitable selectivity and/or specificity;
- Application of the sensing materials over conductive supports and analytical characterization of the sensing devices: potentiometry and voltammetry.
- Application of the sensing units to cultured human prostate cell lines and real samples and validation of the analytical results, conventional biochemical and biophysical methods, such as Elisa, MALDI-TOF mass spectrometry and RT-PCR.

Expected Results

Application of sensors developed to analyze the presence of selected biomarkers in real samples, such as blood and/or urine of patients with CaP, using healthy donors as control group.

Molecularly Imprinted Polymers

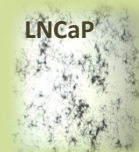


Conductive supports

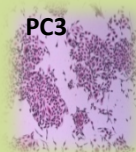


Prostate cell lines

LNCaP



PC3



PNT2

