P.PORTO ESCOLA SUPERIOR DE SAÚDE

3 EBtM

III ENCONTRO DE
BIOTECNOLOGIA
MEDICINAL

I IBERIAN CONGRESS ON
MEDICINAL
BIOTECHNOLOGY

BOOK OF ABSTRACTS

ENCONTRO DE BIOTECNOLOGIA MEDICINAL

18 DE MAIO DE 2018

ESCOLA SUPERIOR DE SAÚDE
POLITÉCNICO DO PORTO

IBERIAN CONGRESS ON MEDICINAL BIOTECHNOLOGY

MAY 18TH, 2018

SCHOOL OF HEALTH
POLYTECHNIC OF PORTO

III ENCONTRO DE
BIOTECNOLOGIA MEDICINAL

I IBERIAN CONGRESS ON
MEDICINAL BIOTECHNOLOGY

COMISSÃO ORGANIZADORA
ORGANIZING COMMITTEE

Ana Rita Costa
Ana Rita Dias
Cristina Prudêncio
Dulce Teixeira
Joana Almeida
Mónica Vieira
Pedro Coelho
Ricardo Ferraz
Sofia Cunha

COMISSÃO CIENTÍFICA
SCIENTIFIC COMITTEE

Cristina Prudêncio
Mónica Vieira
Pedro Coelho
Ricardo Ferraz

ISBN: 978-989-20-8533-3

P29

Development of a biosensor for a biomarker CA15-3 in breast cancer by electropolymerization of pyrrole

BEATRIZ BARBOSA [1], NÁDIA FERREIRA [2], GORETI SALES[2]

1- School of Health, Polytechnic Institute of Porto (ESS), Portugal, Graduation in Medical Biotechnology
2- Biomark/CEB, School of Engineering, Polytechnic Institute of Porto (ISEP), Portugal

Introduction: Breast cancer is a disease that affects millions of people in the world and a constant search for the reduction of its incidence is necessary. If a global cure is not possible, methods must be developed to allow an early diagnosis, thereby reducing the level of disease progression. In the present study, we aim to obtain a molecularly-imprinted polymer (MIP) for the detection of a breast cancer biomarker (CA15-3). The imprinted sites are generated by the electropolymerization of pyrrole, yielding a conducting polymer.

Material and Methods: In a first stage, MIP and control (non-imprinted polymer, NIP) materials were synthesized on carbon Screen Printed Eletrodes (SPEs), and evaluated by electrochemical measurements (Cyclic Voltammetry, CV, and Electrochemical Impedance Spectroscopy, EIS). For the preparation of the imprinted material, the SPEs were first cleaned using 100 mM H_2SO_4, followed by incubation of 5 KU/mL CA15-3 (MIP), for 30 minutes, in a humid environment. The was made in the same conditions as the MIP, without the presence of the biomarker. Electropolymerization with Pyrrole monomer was made in both SPEs, and the removal of the protein was performed with 100 mM H_2SO_4. Every step of the imprinting and removal was followed by measuring CVs and EIS using an Iron redox probe. Different pyrrole concentrations (5.0, 7.5 50.0, 75.0, 80.0, 85.0, 100.0 mM) were tested by electropolymerization to determine the best condition to use during this work. In a second stage, calibrations were performed with increasing concentrations of CA15-3.

Results and Conclusions: The obtained results regarding the pyrrole concentration study showed that the optimal concentration for this work was 85 mM. With 50 and 75mM the obtained polymer was too resistant, whereas with higher concentrations the polymer was too conductive. This work is in progress now, with calibrations being made to understand the response of the sensor. These calibrations, are made with increasing concentrations of CA15-3 and it is expected that there will be a linear increase in resistance until saturation. This type of early diagnosis using MIPs aims to reduce the inconveniences associated with other detection methods, which are invasive and costly.

Key Words: Breast Cancer, MIP, Biomarkers, Pyrrole