ELECTROCHEMICAL SENSOR BASED ON MOLECULARLY IMPRINTED POLYMERS FOR LABEL-FREE DETECTION OF NEUROTROPHIC FACTOR PROTEIN

Anna Kidakova, Vitali Syritski, Jekaterina Reut, Andres Öpik

Department of Materials and Environmental Technology, Tallinn University of Technology, Ehitajate tee 5, 19086 Tallinn, Estonia
e-mail:avitarita@gmail.com

Brain-derived neurotrophic factor (BDNF) is a member of the family of protein neurotrophins that selectively affects the development, maintenance and survival of neurons, and thus, its abnormal level in the blood may be associated with a number of neurodegenerative diseases (ND) [1]. In this study, we describe a strategy for the formation of a molecularly imprinted polymer (MIP) capable of selective rebinding BDNF, but interfaced with a screen printed electrode (SPE). In order to do this, BDNF-MIP was generated directly on the gold surface of SPE by surface-initiated controlled/living radical (C/LR) photopolymerization using bis-acrylamide, 2-(diethylamino)ethyl methacrylate as functional monomers , sodium diethyldithiocarbamate as a cross-linker, andan initiator. The initiator was grafted to the SPE surface by reacting with the previously deposited 3,5-dichlorophenyl layerThe SPE was incubated in the template-monomers solution followed by exposition to UV light inducing the photopolymerization process on the gold surface. The generated polymeric thin films were immersed alternately in an alkaline and acidic solutions to remove the BDNF from the polymer matrix. The binding affinity and selectivity of the BDNF-MIP films toward the target were determined by means of electrochemical impedance spectroscopy (EIS) and differential pulse voltammetry (DPV). The electrochemical measurements demonstrated the ability of the prepared BDNF-MIP film to discriminate the target protein among the interferents.

References

1. M. Ventriglia, et al.,2013 Serum brain-derived neurotrophic factor levels in different neurological diseases. BioMed research international.: p. 901082.

Euroopa Liit
Euroopa
Regionaalarengu Fond

Eesti
tuleviku heaks