

Impedimetric detection of Activated Protein C by carbon nanofibers based composite modified electrode

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Abstract

Carbon nanofibers, which are an advanced form of carbon nanomaterials, possess comparable conductivity and stability to carbon nanotubes. Due to their distinctive chemical and physical properties, carbon nanofibers have found extensive application as electrode material and immobilization substrate [1]. APC is the key enzyme of the protein C pathway and is a serine protease derived from the inactive precursor protein C (PC). Following the discovery of an association between decreased endogenous protein C and APC levels and worsening disease progression in sepsis, recombinant human APC (rhAPC) has been developed for use in the treatment of these patients. [2,3].

In this study [4], the selective and sensitive impedimetric detection of human activated protein C (APC) was performed using graphite electrode modified with the composite of carbon nanofibers (CNF) and ionic liquid (IL). Electrochemical behaviour of CNF-IL modified electrode was firstly investigated. Under the optimized experimental conditions, the detection of interaction between APC and an APC-specific DNA aptamer was performed by using electrochemical impedance spectroscopy (EIS) technique. Additionally, electrochemical detection of interaction process was explored in the absence /presence of antidote pair. The selectivity of our assay to APC contrast to other proteins was also tested.

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