

Abstract

An Ultrasensitive Aptasensor for The Analysis of A β Oligomers in Serum [†]

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[†] Presented at the 1st International Electronic Conference on Chemical Sensors and Analytical Chemistry, 01–15 July 2021; Available online: <https://csac2021.sciforum.net/>.

Abstract: It's one of the great challenges that how to improve the sensitivity of early biomarker detection for Alzheimer's disease (AD). Therefore, an electrochemical aptasensor was prepared based on thionine (Th) - functionalized three - dimensional carbon nanomaterials (reduced graphene oxide (rGO) and multi-walled carbon nanotubes (MWCNTs) immobilized aptamer for the analysis of A β oligomers (A β O), one of the AD biomarkers. Th, the positively charged planar aromatic molecule, could form a large number of π - conjugated structures with rGO and MWCNTs, thereby bringing extra stability to the conjugated macromolecules and improve the structural stability and capacitive properties of Th-rGO-MWCNTs nanocomposites. Under the optimal conditions, DPV response decreased with the increase of A β O concentration. And the aptasensor has a good linear range of 0.0443 pM to 443.00 pM with a LOD of 0.01 pM. Meanwhile, its remarkable stability and selectivity were also discussed. It has a great potential for early diagnosis of AD.

Keywords: A β oligomers; Alzheimer's disease; Aptasensor; Th-rGO-MWCNTs nanocomposites; human serum

Published: 01 July 2021

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