Gözde Aydogdu Tıg et al., J Anal Bioanal Tech 2015, 6:4
http://dx.doi.org/10.4172/2155-9872.S1.022

OMICS International
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6th International Conference and Exhibition on
Analytical & Bioanalytical Techniques
September 01-03, 2015 Valencia, Spain

DNA-functionalized electrochemical biosensor based on poly-(pyridine dicarboxylic acid) coated glassy carbon electrode for the study of anticancer drug gemcitabine

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In this study, a simple methodology was used to develop a new electrochemical DNA biosensor based on poly-(pyridine dicarboxlic acid) (PPDC) modified glassy carbon electrode (GCE). This modified electrode was used for the electrochemical monitoring of interaction between the dsDNA and gemcitabine (GEM) for the first time. The decrease in the guanine and adenine oxidation peak currents after the interaction with GEM was used as an indicator signal for the selective determination of GEM using differential pulse voltammetry. Under the optimum conditions, the guanine oxidation peak currents were linearly proportional to the concentrations of GEM in the range of 1-30 mgL-1, limit of detection and limit of quantification were found to be 0.276 mgL-1 and 0.922, respectively. The reproducibility, repeatability, stability and applicability of the analysis to pharmaceutical dosage forms in human serum samples were also examined. UV-Vis measurements combined with DPV were also carried out to propose the most possible mechanism for monitoring the interection of gemcitabine and dsDNA. The novel sensor developed here could serve as a sensitive, accurate and precise method for the determination of GEM–dsDNA interactions.

Biography

Gözde Aydoğdu Tığ has completed her MSc degree in Biochemistry from Ankara University. She is a PhD student. She studied with Professor Giovanna Marrazza in the Dipartimento di Chimica, University of Florence, for three months. She is a Research Assistant in Department of Chemistry, Ankara University.

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