

Thesis: Method for study of oxidative stress in oncology patients using flow injection analysis with electrochemical detection

ABSTRACT

An oxidative damage of an organism and its mechanisms belong to the main goals of interest in the area of biochemistry. The substances causing such type of damage, where oxygen radicals are mentioned mostly, affect an organism on the level of the most important biomolecules such as DNA. Due to this fact the transformation of nucleic bases in DNA chain to its analogues occurs and thus the functionality of genetic code may be changed leading to pathological processes. The aim of this thesis is to show the suitability of electrochemical methods for sensitive detection of products of oxidation of nucleic acids as a marker of oxidative damage. Using methods as ELISA, flow injection system and magnetic particles, the sensor for detection of 8-OHdG as a marker of oxidation of nucleic acids at oncological patients was designed and successfully applied. By using of developed method the samples of urine of fourteen patients suffering from prostate cancer were analyzed. We were able to divide the patients into three levels based on determined concentration of 8-OHdG. Whole method is not even sufficiently sensitive but it is suitable for purposes of application into the microfluidic device so-called „Lab on a chip“. The assay and its technical background thus provide promising potential for diagnostics purposes in the field of personalized medicine.