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3ʀᴅ World Chemistry Conference &

World Congress on

Biotherapeutics and Bioanalytical Techniques

September 11-12, 2017   Dallas, USA

An additional diagnostics to predict the type of neoplasm by smell of blood

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Statement of the Problem: The one of the modern direction of clinical diagnostics is the assessment of the health of the organism, separate organs and systems by certain gases and vapors of substances which are distributed between gas phase and biological media (blood, plasma, fat, lungs and muscles). The main substances connected with neoplasm are different amines, sulfides and the increased content of alcohols, ketones in biological samples. However, the researches about rapid assessment of neoplasm presence in an organism at routine analysis are still few. The purpose of this study is to assess the possibility of determination of neoplasm presence in organism and its type (benign or malignant) on the example of patient with gynecological disorders by the responses of sensors array at sorption of equilibrium gas phase (EGP) over blood samples.

Methodology & Experimental Orientation: The clinical investigations were performed on the base of Gynecology Department of Non-state health care facility Road Clinical Hospital at the station Voronezh-1 of JSC, Russian Railways (group of prof. Bityukova V V). The investigations of EGP over blood samples were implemented on the gas analyzer MAG-8 (Russia) with piezoelectric sensors.

Findings: The differences in qualitative and quantitative composition of EGP over blood samples have been found out depending on the type of pathology (myoma, endometriosis, uterine cancer). The mathematical model based on output data processing of sensors array using partial least squares (PLS) has been constructed to increase specificity of proposed approach.

Conclusion & Significance: Applying the sensors array for analysis of EGP over blood samples using the processing of output sensors data by PLS model allows you to obtain the first diagnostic information about presence and type of neoplasm in an organism with high sensitivity (81%) and specificity (87%), also to suppose the necessity of surgical intervention.

Biography

Anastasiia Shuba has defended her Doctoral thesis in 2013, devoted to the investigation of living system including bioassays, food products, using the arrays of selective and non-selective piezoelectric sensors. Her research is based on approach to obtain information about samples with increasing specification using different output signals of sensors array. The proposed approach has been tested on the many types of samples (cervical mucus, feces, blood, exhaled breath, various food products) and has a good agreement with the results of investigation of samples by traditional clinical methods.

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Notes:

Chem Sci J, an open access journal
ISSN: 2150-3494

Chemistry-Biotherapeutics 2017
September 11-12, 2017

Volume 8, Issue 3 (Suppl)

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