Title of the project: Detection of early chemotherapy-induced cardiotoxicity using adwanced echocardiography, proteins cardiomarkers and circulating mikroRNAs

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Summary of 2017 results

Title of the presentation: MicroRNAs as possible sensitive markers for early detection of heart tissue damage caused by chemotherapy

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Cardiotoxicity represents one of the undesirable effects of the treatment of cancer diseases which can negatively affect the patient's life. For that reason, early detection of cardiotoxicity has great importance for its treatment or for modification of cancer therapy. Classical methods used in cardiotoxicity detection, which is based on the evaluation of decrease of ejection fraction of left ventricle, are inconvenient because the observed changes are often irreversible. In our study, systolic and diastolic function of both ventricles are evaluated using the advanced echocardiography. Simultaneously, the levels of protein cardiomarkers (hsTnT a NT-proBNP) are analyzed in plasma of patients. In addition, the profile of selected circulating microRNAs (miRNAs) in plasma is monitored to find the new markers of early subclinical cardiotoxicity. With aim to summarized the present information about miRNAs, which specifically shows cardiac damage, we prepared a comprehensive rewiew and based on these data, some miRNAs important in carardiotoxicity were identified. Consequently, we designed a specific primers for reverse transcription and for qPCR assessment of these miRNAs. In next experiment, we applied repeatedly doxorubicin (DOX) to one group of mice, imatimib (IMB) to second and we had one group of controls (treated with physiological saline solution). After treatment, plasma and heart tissues were collected. We sent the plasma samples to National Medical Institute to overall screening analysis of miRNAs (miRNA-arrays). The results led to identification of 8 miRNAs with a significantly changed level after DOX treatment and 6 miRNAs with a markedly changed level after IMB treatment. In addition, levels of troponin T (TnT) were measured. In all mice treated with DOX and in most of the mice treated with IMB, plasmatic TnT levels were increased. In the group with IMB, huge inter-individual variability was observed. The miRNAs, which we selected as a potential markers of DOX and IMB cardiotoxicity in mice, will be used in our study with patients treated by DOX or IMB. We expect the results soon.

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