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

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Summary of 2017 results
Title of the presentation: MicroRNAs as possible sensitive markers for early detection 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 for 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 markers of structural and functional damage of myocardial tissue (hsTnT a NT-proBNP) are analyzed in plasma of patients. In addition, the profile of selected circulating micro RNAs in plasma is monitored with aim to find the new markers of early subclinical cardiotoxicity. We selected some particular miRNAs which can be specific for myocardial damage (miR-208a, miR-208b, miR-367, miR-135). For their detection we designed a specific stem-loop primer for reverse transcription and specific forward primer for qPCR assessment. In next experiment we applied doxorubicin to one group of mice, imatimib to second and we had one group of controls (applied a physiological saline solution). In next step we detected levels of Troponin in plasma and in mouse heart tissue. The results showed significant cardiotoxicity of doxorubicin and possible cardiotoxicity of imatimib. The part of extracted plasma was sent to National Medical Institute to screening analysis of miRNAs (miRNA-arrays). In dependence on this results we will select specific miRNAs and their expression will be set by real-time PCR. In addition, the expression of miR-135, miR-367, miR-208b and we hope some of new detected miRNAs will be set in heart tissue of mice treated by doxorubicin and imatimib. The results will be compared with controls.
In the same time defined groups of patients are ranking among to our study. The results from this part of our project are expected next year.

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