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RESEARCH AREA

Tumors are still among the leading causes of death in Hungary today. Despite the improved diagnostic and therapeutic interventions in the last 2 decades, the incidence of cancer remains high in both sexes, this is especially true in the case of lung tumors in men and breast tumors in women. Therefore, there is still a need for new, non-invasive diagnostic test methods that supplement and strengthen the current diagnostic repertoire. In the last few years, a new function of platelets has become the focus of attention: their role in the development and progression of tumor processes. These platelets are called "tumor-educated platelets". At the same time, it is not exactly known how the RNA content of platelets changes significantly, or what tumor cell-derived mRNAs (transcripts) they take up, which they can transfer to other cells. The detection of these genes can be used as new potential biomarkers. Examining the RNA profile of isolated platelets through mRNA and microRNAs with high sensitivity and specificity can help to detect cancer processes at an early stage or follow therapy from even a small amount of peripheral blood samples.

TECHNIQUES AVAILABLE IN THE LAB

Before treatment, 20 mL blood sample anticoagulated with ACD is taken from newly diagnosed (at early or advanced stage) lung tumor or breast tumor patients, from which platelet-rich plasma (PRP) and then high-purity leukocyte-depleted platelet sample (LDP) separation takes place. RNA is isolated from platelets for sequencing (NGS) and confirmatory RT-qPCR measurements. We will use different algorithms and databases (e.g. Cytoscape ClueGO) for the bioinformatics evaluation of the raw data. Additional samples will be taken from the included patients at several times during the treatment ('follow-up' samples). We plan to determine the levels of different protein biomarkers using ELISA.

SELECTED PUBLICATIONS

Nagy, B., Jr, Bhavaraju, K., Getz, T., Bynagari, YS., Kim, S., Kunapuli, SP. (2009) Impaired activation of platelets lacking protein kinase C-theta isoform. **Blood 113 (11):** 2557-67.

Nagy, B., Jr, Nagy, B., Fila, L., Clarke, LA., Gönczy, F., Bede, O., Nagy, D., Újhelyi, R., Szabó, Á., Anghelyi, A., Major, M., Bene, Z., Fejes, Z., Antal-Szalmás, P., Bhattoa, HP., Balla, G., Kappelmayer, J. (2016) Amaral MD, Macek M Jr, Balogh I. Human Epididymis Protein 4: A Novel Serum Inflammatory Biomarker in Cystic Fibrosis. **Chest 150(3):** 661-72.

Szilágyi, B., Fejes, Z., Póliska, S., Pócsi, M., Czimmerer, Z., Patsalos, A., Fenyvesi, F., Rusznyák, Á., Nagy, G., Kerekes, G., Berhés, M., Szűcs, I., Kunapuli, SP., Kappelmayer, J., **Nagy. B., Jr.** (2020) Reduced miR-26b Expression in Megakaryocytes and Platelets Contributes to Elevated Level of Platelet Activation Status in Sepsis. **Int J Mol Sci 21(3):** 866.

Fejes, Z., Póliska, S., Czimmerer, Z., Káplár, M., Penyige, A., Gál, Szabó, G., Beke, Debreceni, I., Kunapuli, SP., Kappelmayer, J., **Nagy, B., Jr.** (2017) Hyperglycaemia suppresses microRNA expression in platelets to increase P2RY12 and SELP levels in type 2 diabetes mellitus. **Thromb Haemost 117(3):** 529-42.

Fejes, Z., Czimmerer, Z., Szük, T., Póliska, S., Horváth, A., Balogh, E., Jeney, V., Váradi, J., Fenyvesi, F., Balla, G., Édes, I., Balla, J., Kappelmayer, J., **Nagy. B., Jr.** (2018) Endothelial cell activation is attenuated by everolimus via transcriptional and post-transcriptional regulatory mechanisms after drug-eluting coronary stenting. **PLoS One 13(6):** e0197890.