Adrenal tumors are a heterogeneous group of neoplasms characterized by diverse biology and clinical course. They are characterized by various oncological risks and can cause various cardio-metabolic disorders and cardiovascular complications. 75% of adrenal tumors are non-functioning adrenal incidentalomas (NFAI). Clinically relevant adrenal tumors include adrenocortical carcinoma (ACC), pheochromocytomas (PHEO), primary aldosteronism (PA), mild autonomous cortisol secretions (MACS), autonomous cortisol secretions (CS, Cushing Syndrome), androgen-secreting autonomic adenomas (AAS) and others. Malignancy is diagnosed in 5-8% of patients with adrenal tumors, with the risk being higher in young patients. Uncertainty about the management of small incidental adrenal tumors remains a challenge in actual clinical practice. The diagnosis of these diseases is not easy and often requires the performance of complex and costly diagnostic procedures and, unfortunately, in many cases does not give 100% certainty about the diagnosis or the nature of the neoplastic process (benign, malignant, hormonally active). A major problem is that hormonally active adrenal tumors or potentially malignant adrenal lesions in the adrenal glands are rare or very rare. As a result, conducting research is a major challenge. One of the current research directions in this group of tumors is biochemical research in metabolomics and proteomics supported by bioinformatics techniques based on artificial intelligence (AI).

The scientific goal of the project is to investigate the usefulness of new diagnostic tools, including selected metabolic panels of various compounds, and selected granin family proteins and peptides as new biomarkers in the differential diagnosis of adrenal neoplasms. The following compounds will be studied: plasma amino acid profile, urine organic acid profile, plasma acylcarnitine profile and plasma fatty acid profile. The granin family consists of nine proteins and peptides: chromogranin A (CgA), chromogranin B (CgB), secretogranins (secretogranin II and secretogranin III) and related proteins (7B2, NESP55, proSAAS and VGF). They are produced by various neuronal, neuroendocrine and endocrine cells (e.g., the diffuse endocrine system). Most of these proteins are precursors of biologically active peptides that modulate pain pathways, inflammatory responses, metabolic disorders and blood pressure, among other things. The project will enroll 150 patients with various adrenal tumors (PHEO, PA, ACC, MACS, CS, NFAI).