Currently developed methods of cancer diagnostics, although they have contributed to the overall survival of cancer patients in recent years, have not increased the survival time of patients diagnosed late, this time has remained unchanged for 40 years. The chance of survival increases in the case of early detected tumors. The development of innovative procedures for early diagnosis and precise removal of cancer is therefore crucial to avoid recurrence. This has particular significance for infiltrating lesions, when infiltrating structures with normal structure will make it difficult to completely remove cancer cells. Currently used medical imaging techniques, neurosurgical microscopy, fluorescence navigated microscopy, and NMR are not able to detect the full extent of neoplastic infiltration. Introducing into the clinical practice diagnostic based on Raman imaging and spectroscopy contributes to create a new quality in oncological diagnostics, including the most difficult to overcome infiltrating tumors. Diagnosis of neoplastic lesions by Raman spectroscopy and imaging is based on determination of intensity ratios of bands attributed to Raman markers. Research carried out in the Laboratory of Laser Molecular Spectroscopy with the use of human tissues collected from several hundred cancer patients showed clearly that the developed procedure of optical biopsy and virtual histopathology is: fast (the result obtained in seconds/minutes, in real time - during the examination), objective (the result of the study is based on the bands recorded in the Raman spectrum and is independent of the interpretation and professional experience of medical personnel), a sensitive and highly specific (both parameters above 90%). The procedure is possible without adding any additional substances to the patient's body or staining the tissue (no need to use contrast). The technique also allows in one measurement to estimate the histological grade of the tumor (G1, G2, G3, G4), and the identification of neoplastic lesions occurs with the precision of a fraction of a micrometer. Optical biopsy and virtual histopathology are a qualitative breakthrough for patients enabling oncologists to obtain a precise, objective test result in seconds / minutes. World literature reports in recent years clearly indicate that a special role in understanding the mechanisms of reprogramming lipid metabolism, epigenetic changes and loss of polarity of epithelial cells in malignant tissue is attributable to molecular spectroscopy, among which dominant importance is gaining Raman spectroscopy and Raman imaging techniques. For many years it was thought that cancer is primarily a genetic disease in which changes in the sequence of specific genes, oncogenes and suppressor genes, cause disease. A recent TCGA report reported that over 30,000 mutations in breast cancer tissue have been identified (Cancer Genome Atlas Network, 2012). These results suggest that research based solely on genomics only cannot longer be continued. In recent years it has become evident that neoplastic changes also depend on metabolic and epigenetic factors, such as methylation of DNA and histones, acetylation, phosphorylation, which modify the transcriptional and posttranslational potential of the cell. Currently, more and more scientific reports have initiated a discussion on the benefits of metabolic regulation of cancer. The Warburg effect, a discovery made about 90 years ago, refers to the "universality" of characteristics characteristic of tumors. The main goal of the project is to develop innovative methods for monitoring 'omic' modifications (proteomics, lipidomics, and epigenetics) based on the oncology platform: Raman-IR-fluorescence-SNOM-AFM imaging, which will ensure ultrasensitive, fast, minimally invasive, objective method of monitoring cancer development. This approach will allow to study neoplastic changes with spectacular spatial and spectral resolution. As a result, the project will contribute to understanding the mechanisms of metabolic reprogramming in cancer cells, polarization disorganization and epigenetic changes that occur in epithelial cancer cells and in the matrix environment. Understanding the disruption of polarity of epithelial cells, epigenetic changes and metabolic changes will improve the methods of detecting tumor markers - it will allow Raman methods to be used for screening and early detection of tumors, and will accelerate progress in the field of immunotherapy and targeted pharmacological treatment.