

DEPARTMENT OF REGENERATIVE MEDICINE

The Department is responsible for overseeing the preparation and storage of hematopoietic stem cells for transplantation purposes in patients suffering from lymphoma. The group conducts basic research on stem cells and cancer cells, with a particular focus on the interactions between cancer cells, tissue stroma cells, and immune cells as well as the role of mesenchymal stem cells on tissue regeneration processes. They optimize the application of nanobiomaterials in combination with stem and progenitor cells for use in bioimplants.

The department employs bioprinting technologies for cancer and in vitro tissue models, using extrusion-based and/or lumen X bioprinting methods. They also participate in the design of advanced therapy medicinal products (ATMPs) and prepare these products for clinical trial purposes. Lastly, they conduct 2D and 3D in vitro research, with a specific emphasis on exploring the effects of hypoxia on cancer growth and its interactions with immune system cells or drugs.

The department offers cancer and normal tissue model bioprinting and testing their response to drugs and immune system cells (including CAR-T). The department can provide human and animal mesenchymal stem cells for research (non-clinical) purposes.



DEPARTMENT OF EPIDEMIOLOGY AND PRIMARY PREVENTION OF CANCER

The department is engaged in scientific research on the epidemiology and prophylaxis of malignant tumors, both in Poland and worldwide. Specifically, they are investigating disease risk factors within the domain of descriptive and analytical epidemiology, focusing on several types of cancer, including thoracic, pancreatic, gallbladder, stomach, lung, and breast cancer. To accomplish these objectives, they collaborate with scientific institutes both in Poland and internationally. Furthermore, the department prepares and implements scientific research grants aimed at studying lifestyle and chronic disease risk factors, with a particular emphasis on neoplastic diseases. They are an active participant in health promotion and education, including the dissemination and promotion of the recommendations of the European Code Against Cancer.

The department conducts educational activities, such as lectures, seminars and workshops on cancer prevention, health promotion, cancer epidemiology, development of educational and popular science materials (including articles). It offers analyses and reports on cancer epidemiology, cancer modeling and risk assessment as well as cancer primary prophylaxis. It provides professional consultations, health program expert consultations, reports, analyses, health event professional support (e.g. media campaigns, radio and TV programs).

INDEPENDENT LABORATORY OF CANCER BIOMARKERS AND CYTOKINES

The laboratory is engaged in scientific research on soluble biomarkers and their clinical significance. They identify specific parameters that could prove significant in assessing treatment response or identifying cancer patient groups with a higher risk of adverse events associated with a given therapy method. The laboratory is responsible for exploring new prognostic and predictive biomarkers in body fluids of cancer patients, as well as soluble biomarkers associated with cancer treatment toxicity. Additionally, the unit analyzes known prognostic and predictive factors in the context of new cancer treatment methods. They monitor immunological response using biomarkers and proinflammatory cytokines during immunotherapy and adoptive therapy. They also study the inflammatory response in preclinical trials and non-commercial clinical trials

The laboratory offers serum archive, maintenance of research databases and testing of biomarkers as a part of research projects; Inhibin B concentration marking in patients with granulosa cell tumor; FIT as a part of colorectal cancer screening; marking of cytokine and biomarkers, which have not been standardized for immunochemical assays – for NIO-PIB and third parties.



BASIC RESEARCH UNITS AT MSCI WARSAW

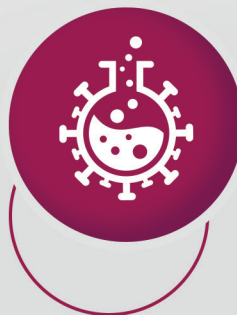


DEPARTMENT OF EXPERIMENTAL IMMUNOTHERAPY

The department is researching the pathogenesis mechanisms in selected human tumors and their potential application in the treatment of intracranial tumors, vulvar cancer, and breast cancer. They determine the profile of molecular defects in tumors and circulating tumor cells and assess the role of such defects in neoplastic transformation using experimental methods. They also identify molecular defects that can be applied in oncology. Basic research in the department focuses on defining the function of the HAX-1 cell protein and its role in carcinogenesis.

The department uses molecular biology tools to analyze patients' biological materials, primarily based on PCR reactions and DNA sequencing, as well as tissue sample staining and microscopic observations, and in vitro cell culture experiments. They introduce genetic mutations and modify specific protein expression in stable cell line cells and perform related fluorescence microscopy and cell phenotype change testing.

The department offers to conduct research and development projects in the field of immunoncology, the service of nanoantibodies production to a given target, cell sorting, as well as the recombinant protein expression and purification in *E. coli*, yeast *Pichia pastoris* and human cell lines.



DEPARTMENT OF MOLECULAR AND TRANSLATIONAL ONCOLOGY



The department is researching the pathogenesis mechanisms in selected human tumors and their potential application in the treatment of intracranial tumors, vulvar cancer, and breast cancer. They determine the profile of molecular defects in tumors and circulating tumor cells and assess the role of such defects in neoplastic transformation using experimental methods. They also identify molecular defects that can be applied in oncology. Basic research in the department focuses on defining the function of the HAX-1 cell protein and its role in carcinogenesis.

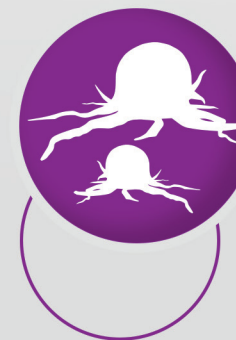
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The department also offers Sanger sequencing.

DEPARTMENT OF CANCER BIOLOGY

The department's research focuses on detecting microRNA as cancer biomarkers in aggressive non-Hodgkin's lymphoma in B cells and plasma of patients with lung cancer. Additionally they perform molecular analysis of the tumor microenvironment, integrated transcriptomic analysis (mRNA and microRNA), as well as DNA methylation in cervical cancer and surrounding tissues. The group also analyzes the phenotypic plasticity of cancer cells to identify new therapy methods, specifically analyzing changes in the cancer cell phenotype caused by compounds targeting tumor-initiating cells. Furthermore, the department analyzes the ovarian tumor microenvironment based on molecular and immunological characteristics of borderline ovarian and ovarian tumors to understand their reaction to treatment and malignant transformation of borderline ovarian tumors. This includes genotype analysis, DNA methylation, protein-coding gene expression, and long non-coding RNA (lncRNA) analysis. The department also studies the clinical significance and function of transcripts in ovarian tumors, as well as the functions and clinical significance of lncRNA CRNDEP, a micropeptide discovered by department personnel who also published the sequence of the first full CRNDE transcripts in GeneBank. Finally, the department has developed an innovative cancer microenvironment model using 3D bioprinting technology.

The department offers tissue and line cell culture (according to GLP) in 2D and 3D in hypoxia and normoxia conditions as well as preclinical in vitro research on cytotoxicity of chemical compounds, drugs and biomaterials in accordance with ISO-10993-5-2009; apoptosis and cell cycle; cancer cell drug resistance; microscopic imaging and biological material characteristics: NGS, flow cytometry; cell sorting, cell and tissue banking in liquid nitrogen.



DEPARTMENT OF GENETICS



The department conducts research on the role of the microbiome in neoplastic diseases and its modulating function in response to oncological treatment. The group investigates cancer and normal cell metabolism, as well as the mechanisms linking metabolic pathways with gene expression regulation, in addition to identifying diagnostic and predictive biomarkers. One of the aspects of its scientific research is the development and patients derived xenografts (PDX) for preclinical studies conducted internally and by external parties.

The department offers preclinical studies using cancer cell lines and PDX models grown in immunodeficient mice, breeding of NU/J, NSG, NSG-SGM3 mice and quantitative measurement of short-chain fatty acids and amino acids in biological material using GC-MS method.