UMCS

WYDZIAŁ BIOLOGII I BIOTECHNOLOGII

Department of Virology and Immunology

Department of Virology and Immunology

Staff
of the Department

What does the Department specialize in?

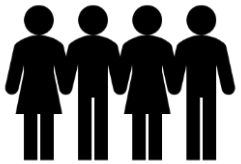
What is the subject of the research?

What diploma theses can be carried out in the Department?

Staff of the Department

Head of the Department : dr hab. Roman Paduch, prof. UMCS

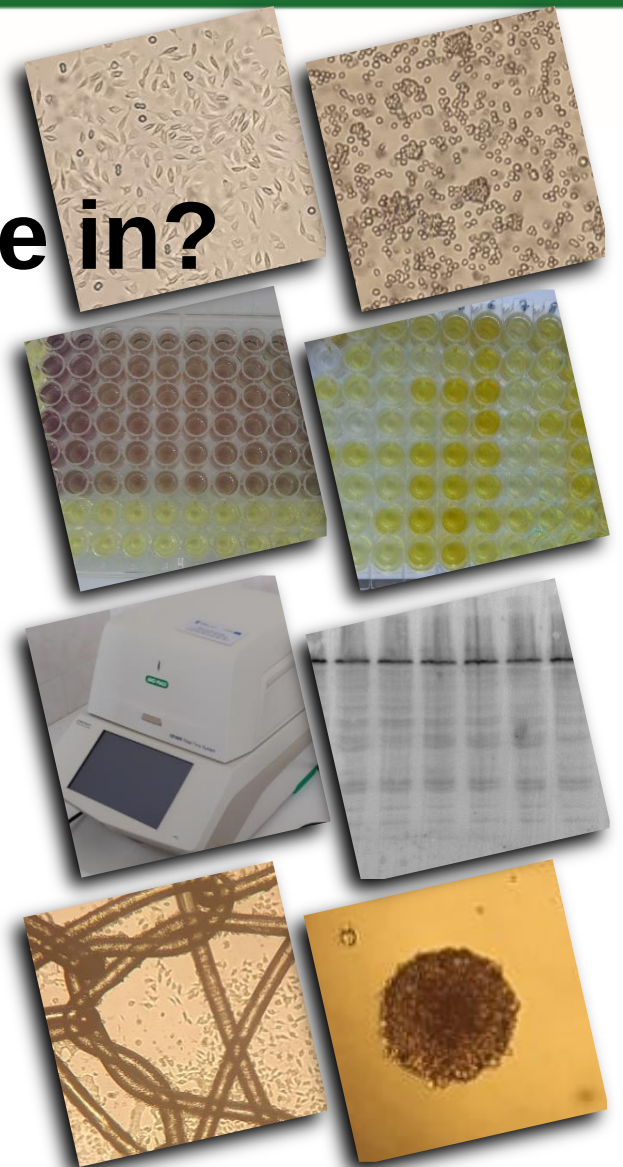
Department staff : prof. dr hab. Agnieszka Szuster-Ciesielska
dr hab. Barbara Zdzisińska, prof. UMCS
dr Katarzyna Sawa-Wejksza
dr Magdalena Mizerska-Kowalska
dr Mateusz Pięt
dr Małgorzata Pac-Sosińska
dr Michał Sułek
dr Magdalena Kopycińska
Renata Obara



Department of Virology and Immunology

What does the Department specialize in?

- Deriving cultures of normal and cancer cells from materials collected from humans and animals.
- In vitro studies of the activity of compounds of natural and synthetic origin, both at the cellular and molecular level.
- In vitro studies on the interaction of cancer cells with normal cells and the host organism, including the body's non-specific immunity.
- In vitro studies in the field of spatial cultures (3D) and tissue engineering, including human cell cultures on biomaterials for medical purposes.



What is the subject of the research?

dr hab. Roman Paduch, prof. UMCS:

- study of the anti-cancer activity of new compounds of natural and synthetic origin;
- study of direct and paracrine relationships between normal and cancer cells.

prof. dr hab. Agnieszka Szuster-Ciesielska:

- study of the anti-cancer activity of new compounds of natural and synthetic origin;
- study of the potential allergenic properties of phytopathogenic microscopic fungi.

dr hab. Barbara Zdzisińska, prof. UMCS:

- study of anticancer, antiviral and immunomodulatory activity of new compounds of natural and synthetic origin
- determination of molecular mechanisms related to the anticancer activity of the tested compounds

Department of Virology and Immunology

dr Katarzyna Sawa-Wejksza:

- study of the anti-cancer activity of new compounds of natural and synthetic origin.

dr Magdalena Mizerska-Kowalska:

- cellular and molecular studies of anticancer and immunomodulatory activity of natural and synthetic compounds in vitro
- cellular and molecular studies of osteogenic activity of natural and synthetic compounds in vitro
- biological evaluation of biocompatibility and bioactivity of biomaterials and medical and other products in contact with living organisms in vitro

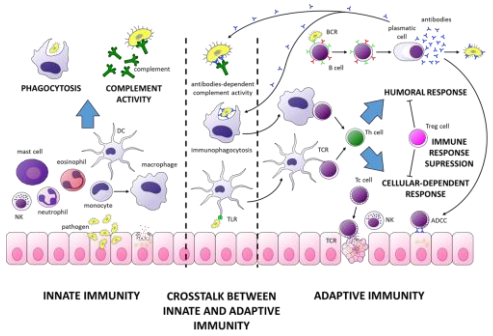
dr Mateusz Pięt:

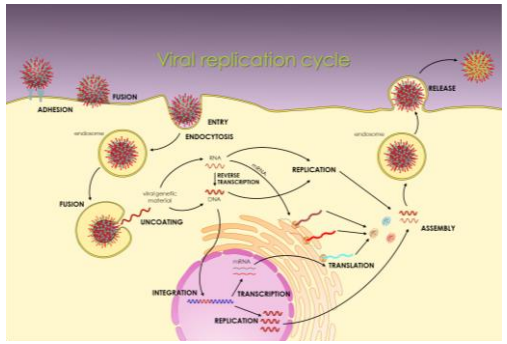
- study of the anti-cancer activity of new compounds of natural and synthetic origin;
- study of molecular mechanisms of cancer metastasis regulation;
- tissue engineering methods in the development of new and modified biomedical materials.

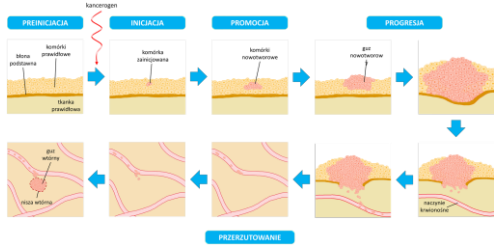
dr Michał Sułek:

- study of the anticancer properties of new, native and recombinant immune peptides and proteins (AMPs) of insect origin

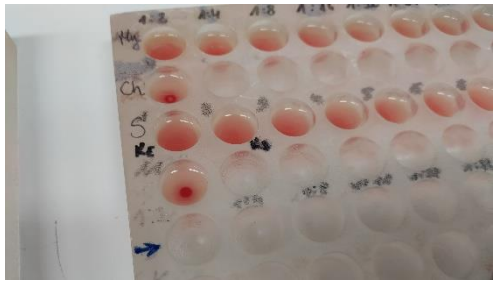
Performed experiments

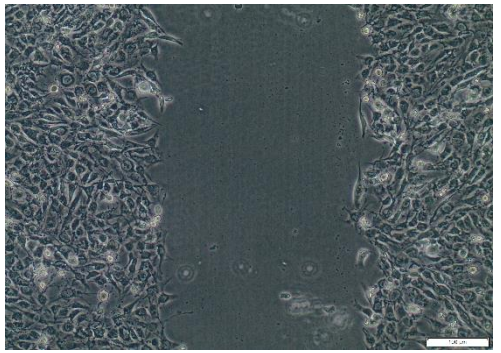


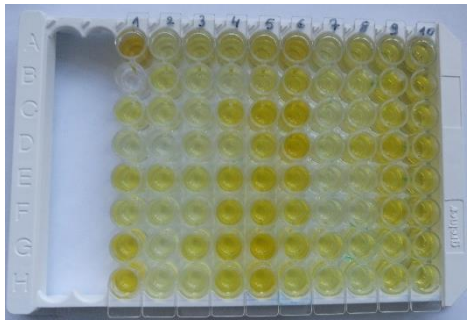




- in vitro cultivation of animal and human cells – normal cells and disease models, including cancer;
- immunological and virological research, learning about cancer biology;
- analysis of cytotoxicity of substances and cell proliferation rate using NR, LDH, MTT, BrdU methods;
- study of cell migration rates and their invasiveness using colorimetric methods and light microscopy;

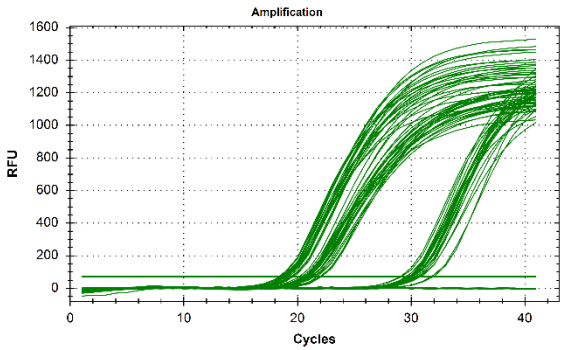


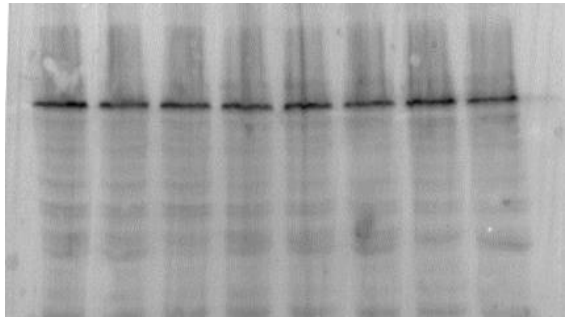


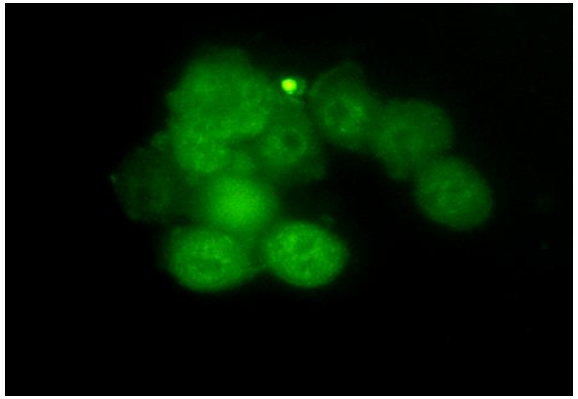


Performed experiments

- analysis of molecular pathways in cells at the protein level by immunofluorescence, Western Blotting, ELISA, flow cytometry;
- testing gene expression and protein level using the RT-qPCR method;
- analysis of the functional state and physiology of cells using flow cytometry.

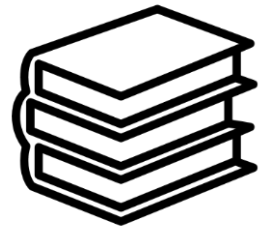






Supervisors of diploma theses carried out in the Department of Virology and Immunology

- dr hab. Roman Paduch, prof. UMCS (bachelor's and master's theses)
- prof. dr hab. Agnieszka Szuster-Ciesielska (bachelor's and master's theses)
- dr hab. Barbara Zdzisińska, prof. UMCS (bachelor's and master's theses)
- dr Katarzyna Sawa-Wejksza (bachelor's theses)
- dr Magdalena Mizerska-Kowalska (bachelor's and master’s theses)
- dr Mateusz Pięt (bachelor's theses)
- dr Małgorzata Pac-Sosińska (bachelor's theses)
- dr Michał Sułek (bachelor's theses)



Department of Virology and Immunology

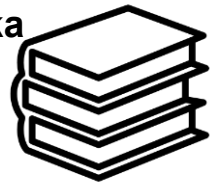
What diploma theses can be carried out in the Department?

Bachelor's theses topic	Promoter
• Diagnosis and treatment of autoimmune encephalitis with anti-NMDA antibodies • Immunological basis of anaphylactic shock induction • The role of selected viruses of the *Hepadnaviridae* family in the etiology of liver cancer	**dr hab. Roman Paduch, prof. UMCS**
• SARS-CoV-2 - the virus that caused the pandemic • Apoptosis and autophagy as targets of anticancer therapy • COVID-19 vaccines • Epstein-Barr virus as an etiological factor of multiple sclerosis	**Prof. dr hab. Agnieszka Szuster-Ciesielska**
• Chimeric antigen receptor macrophages (CAR-M) - application of new technology in cancer immunotherapy • Oncolytic viruses in cancer diagnosis and treatment • Immunotherapeutic methods aimed at the CD38 molecule • CD20 molecule as a target in cancer therapy	**dr hab. Barbara Zdzisińska, prof. UMCS**

Department of Virology and Immunology

What diploma theses can be carried out in the Department?

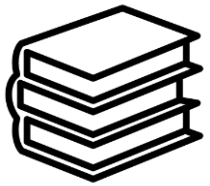
Bachelor's thesis topic	Promoter
• The impact of global epidemics on the modern incidence of autoimmune diseases. • Congenital cytomegalovirus infections • The biggest epidemics. About viruses that decimated humanity • Human parvovirus B19 – characteristics and risks	**dr Magdalena Mizerska - Kowalska**
• Immune checkpoint inhibitors for cancer therapy • Immunomodulatory effects of vitamin D • The role of regulatory T cells in the development and course of allergic diseases of the respiratory system • Application of CAR-T cell therapy in the treatment of hematological malignancies	**dr Katarzyna Sawa-Wejksza**
• Drug-conjugated antibodies in cancer therapy • Modern therapies in the treatment of small cell lung cancer • Effect of NF2 tumor suppressor gene inactivation on the development of central nervous system tumors • HER2 receptor as a target of modern therapies in the treatment of breast cancer	**dr Mateusz Pięt**
• Neurotrophic viruses and the development of neurodegenerative diseases • The gut microbiome and the modulation of the immune response – potential applications in the treatment of autoimmune diseases • Structural analysis and prediction of epitopes and antigens using immunoinformatic methods	**dr Małgorzata Pac-Sosińska**



Department of Virology and Immunology

What diploma theses can be carried out in the Department?

Master's theses topic	Promoter
• Anticancer potential of oleic acid, (-)-linalool and synthetic derivative of these compounds in human colon cancer mode • Assessment of anticancer activity of peryl butyrate in cultured human colon cancer cells • Biological activity of butyric acid, peryl alcohol and their ester in in vitro studies on human colon cancer cells • Assessment of anticancer activity of oleic acid, (-)-linalool and their ester in in vitro studies	**dr hab. Roman Paduch, prof. UMCS**
• Study of the anticancer activity of new copper (II) and L-arginine complexes • Proallergenic potential of Tranzschelia pruni-spinosae and Phragmidium rubi-idaei - in vivo studies.Proallergenic potential of Erysiphe palczewskii and Erysiphe convolvuli - in vivo studies.Potential allergenic properties of Peronospora ficariae - in vitro cytotoxic activity study	**Prof. dr hab. Agnieszka Szuster-Ciesielska**
• Anti-cancer activity of new compounds designed as protein tyrosine phosphatase PTP1B inhibitors in a human breast cancer cell model • Anti-cancer and anti-viral activity of new 4- aminosulfol-2-ene derivatives – *in vitro* studies • Anticancer activity of new thalidomide derivatives in a human breast cancer cell model • Evaluation of the anti-metastatic potential of the modified tropinone in a human osteosarcoma cell model	**dr hab. Barbara Zdzisińska, prof. UMCS**



What diploma theses can be carried out in the Department?

Master's thesis topic	Promoter
• Preliminary assessment of the biomedical potential of a composite based on nanohydroxyapatite and polylactide – in vitro studies • Preliminary assessment of the biocompatibility and bioactivity of nanohydroxyapatite modified with alpha-ketoglutarate – in vitro studies.	**dr Magdalena Mizerska - Kowalska**

Department of Virology and Immunology

Examples of Department's equipment:

Reversed Field Microscopes

Vertical airflow laminar and laminar flow incubators with CO_2 flow

Department of Virology and Immunology

Examples of Department's equipment:

FACSCalibur Flow Cytometer

Real-time PCR analysis instrument with software and workstation

Western Blot Electrophoretic Gels and Membrane Documentation System

We cordially invite you to the Department of Virology and Immunology