Abstract Book

XXVII BIOTECHNOLOGY SUMMER SCHOOL

16–20 September 2024,
Kościerzyna, Poland

IMMUNE-MEDIATED DISEASES AND APPROACHES TO IMMUNOTHERAPY

ABSTRACT BOOK

Book design and typesetting by Maksymilian Biniakiewicz.

Proofreading by Zuzanna Hirsz, Michał Prusiński and Filip Kuś.

XXVII BSS logotype design by Zuzanna Hirsz, Michał Prusiński and Filip Kuś.

Cover photograph by Mikołaj Klimczuk.

Cover design by Maksymilian Biniakiewicz.

Photographs by Angelika Michalak, Elżbieta Moroz, Maria Maja Pega, Damian Dorosz, Katarzyna Maczyszyn, Tomasz Nowicki and archival photographs by unknown photographers.

Gdańsk, 2024

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XXVII Biotechnology Summer School

Biotechnology Summer School aims to promote knowledge about the newest biotechnological achievements and build a vast scientific network between students, PhD students and young scientists together with many experienced researchers from the leading institutions in Poland and abroad. We also want to encourage young scientists to improve their skills in the area of science communication.

Targeted audience

XXVII BSS (Biotechnology Summer School) is dedicated to students and young scientists interested in experimental and life sciences. The Summer School will supplement existing knowledge with valuable practical and applied training and allow to discuss research in depth with the academics who are leading experts in their area. It will prepare and enhance appeal to potential employers and graduate schools. The international study will enable gaining a deeper understanding of another culture, make lifelong friends from a wide variety of backgrounds and benefit from globally renowned academic excellence.

Before we start

Remember to always have your ID on you. Inside your ID there is a condensed version of the BSS programme.

Please pay attention to the organizers' announcements during the whole event.

Check out a Facebook group we made for this year's event. Meet other participants and share info! You can find this group by scanning the QR code on the right or typing the following web address: https://www.facebook.com/groups/510580101418175

About Biotechnology Summer School

Biotechnology Summer Schools are organized annually since 1994. The idea of Biotechnology Summer School (BSS) came from the late Professor Anna J. Podhajska (1938-2006), who implied that students and young scientists should actively participate in obtaining knowledge and establishing contacts with scientists from all over the world, not only in formal conditions but also outside the University. That is why the participants of BSS are not only biotechnology students but also students in related biological fields from Poland and from abroad, young scientists and even advanced pupils interested in this topic. The main aim of this event is to provide students with a wide range of courses which are not available in the standard syllabus. We create a relaxed learning environment and give Polish and foreign students a chance to meet highly renowned specialists during lectures as well as in rather informal circumstances. Moreover, Biotechnology Summer Schools give Polish and foreign scientists a chance to develop cooperative relationships and create a forum for integration. Topics of BSS vary from year to year. Prof. Anna Podhajska gained many people's support over her initiative. The number of sponsors increased every year and thanks to all these companies and institutions the organization of Biotechnology Summer School has been possible. BSS was also supported by big projects like MOBI4Health, which fully financed the XX BSS or Horizon 2020 which financed XXIV BSS.

Biotechnology Summer Schools were honored with the presence of many eminent scientists such as professors: Ewa and Ernest Bartnik, Stanisław Bielecki, Charles Cantor, Klaus Halhlbrock, Waleria Hryniewicz, Robert Huber (Nobel Prize winner in Chemistry in 1988), Berndt Jastorf, Adam Jaworski, Roman Kaliszan, Władysław Kunicki Goldfinger, Andrzej Legocki, Janusz Limon, Mirosław Małuszyński, Jerzy Paszkowski, Andrzej Płucienniczak, Richard P. Sinden, Piotr Stępień, Wacław Szybalski, Dan Tawfik, Tomasz Twardowski, Jacques H. Weil, Robert Wells, Paul Williams, Brigitte Wittman - Liebold, Maciej Zenktler, Maciej Żylicz.

No less important than learning is having fun. Many entertaining activities for Summer Schools are always planned. A fancy-dress party, a bonfire with singing, field

games, sports, playing on words, and integrational workshops are part of every School. We also organize some visits to local, historical places and regional trips. We hope that this year's Biotechnology Summer School will be as successful as previous ones and will be an unforgettable experience for all participants.

Visit us on the web:

www.bss.ug.edu.pl

https://www.facebook.com/BiotechnologySummerSchool

https://www.instagram.com/bss_ifb/

BSS timeline

No	Place	Year	Topic examples
I	Wilga	1994	Miscellaneous
II	Łączyno	1995	Miscellaneous
III	Stegna	1996	Miscellaneous
IV	Stegna	1997	Miscellaneous
V	Gołuń	1998	Plant biotechnology, molecular medicine
VI	Łączyno	1999	Fundamentals for bioprocess engineering
VII	Twardy Dół	2000	Genetic modifications in plants and animals
VIII	Łączyno	2001	Ethical aspects of biotechnology
IX	Sobieszewo	2003	Bioinformatics (molecular evolution and protein structure)
X	Sobieszewo	2004	Biotechnological applications in agriculture
XI	Sobieszewo	2005	Bioprocess engineering
XII	Łapino	2006	Immunotherapy (cancer research), clinical stages
XIII	Łapino	2007	Cancer causes, diagnosis and therapy
XIV	Sobieszewo	2008	Virology, mostly involved with HCV
XV	Gdańsk	2009	Plants as a "green factory"
XVI	Sobieszewo	2010	Viral research, HCV, influenza virus
XVII	Gdańsk Górki-Zachodnie	2011	Biochemistry and biotechnology of plant lipids
XVIII	Jurata	2012	Current scientific research and its practical application
XIX	Gdańsk	2013	Molecular evolution
XX	Stegna	2014	Model organisms
XXI	Kadyny	2015	Biotech innovations
XXII	Wielimowo	2016	Biotechnologists love every bit of life
XXIII	Stężyca	2017	Iron metabolism; Biological plant protection
XXIV	Sobieszewo	2018	Responsible Research and Innovation
XXV	Ostrzyce	2019	Introduction to Translational Research
XXVI	Szarlota	2023	RNA in biology and medicine

Memories from previous editions

2015

2016

2017


Mol. Biologist
Will Science
for food!


Cas9

2018


INTERCOLLEGIATE FACULTY
OF BIOTECHNOLOGY
of University of Gdansk
and Medical University of Gdansk
STARBIOS2

2019

2023

XXVII BSS Venue

XXVII Biotechnology Summer School takes place on 16-20 September 2024 in the "SZARLOTA" Holiday Complex located in a picturesque area of Kashubia in Kościerzyna, close to the beach by the lake Osuszyno.

Comfortable hotel rooms and cottages are surrounded by the natural richness of nature. Specially prepared attractions will make integration trips unforgettable for a long time. The cuisine of Szarlota will treat you with regional specialties, as unique as Kashubia itself. Their chefs will satisfy your expectations and try to recall the flavors of childhood.

Szarlota holiday complex is a perfect hot spot for sightseeing Kashubian area. Kościerzyna is the main city of the Kashubia region with almost 800 years of history.

3 km from the city, is Wdzydze landscape park with diverse landscapes and plant-life allowing from mind calming jogging, cycling or walking.

Organizing committee

Scientific supervision

Prof. Danuta Gutowska-Owsiak

Danuta Gutowska-Owsiak graduated from the Medical University in Gdańsk, Poland, and then moved to the UK, where she undertook doctoral training at the University of Liverpool, investigating NKT cells in rheumatoid arthritis (PhD in 2010); she also undertook short research training at INSERM in Paris during that time. In 2009 she moved to Oxford where she joined the MRC Human Immunology Unit and the group of Prof. Graham Ogg at the prestigious Weatherall Institute of Molecular Medicine. There she started a line of research on formation of skin barrier and its regulation by inflammation in skin disease. In 2017 Danuta was distinguished with the "Young Investigator Award" by the British Society for Investigative Dermatology for her substantial contribution to the dermatology research.

Danuta was awarded the prestigious National Science Centre-EU Marie Skłodowska-Curie COFUND fellowship POLONEZ and "First TEAM" grants, followed by additional grant funding from the Foundation for Polish Science; she also received further Sonata BIS and Opus grans from the National Science Centre. The generous funding allowed Danuta to develop a programme of immunological and skin research at the Intercollegiate Faculty of Biotechnology UG-MUG in Gdańsk. Danuta is also involved in the EU COST action and European research consortia; in 2024 she was elected as a Co-chair of the European Epithelial Barrier Research Network (E2BRN). Recently, she was nominated to join AcademiaNet, the network of distinguished female researchers in Europe and beyond.

Danuta has a strong interest in both epidermal barrier formation and the immunity in the skin, as well as extracellular vesicles as mediators of cellular communication. Together with her team, she investigates allergic inflammation, as well as basic immunological mechanisms of T cell and dendritic call biology, including more translational angle.

Contact: danuta.gutowska-owsiak@ug.edu.pl

Prof. Marcin Okrój

Prof. Marcin Okrój completed his MSc education at the Intercollegiate Faculty of Biotechnology of the University of Gdańsk and Medical University of Gdańsk, Poland in 1999. He continued his scientific training at the same faculty till 2004 when he was awarded a PhD degree. Then he worked as a post-doctoral fellow at the Pasteur Institute in Paris and at the Lund University in Malmo, Sweden where he researched the complement system, a part of innate immunity. In 2016, he returned to Gdańsk and established his own research group focused on tumor immunology and diagnostics of the complement system dysregulation.
Contact: marcin.okroj@gumed.edu.pl

Prof. Rafał Sądej

Prof. Rafał Sądej, vice-Dean for Science at Intercollegiate Faculty of Biotechnology UG & MUG, head of the Laboratory of Molecular Enzymology and Oncology. He has been working in cancer research for nearly 20 years. He is interested in mechanisms of breast cancer progression and resistance to anticancer drugs. His group is studying the role of growth factor receptors in communication within the tumour microenvironment. This investigation involves detailed molecular and clinical analyses as well as animal model studies. He is beneficent of multiple Polish and international grants and a committee member of the European Network for Breast Development and Cancer (ENBDC labs).
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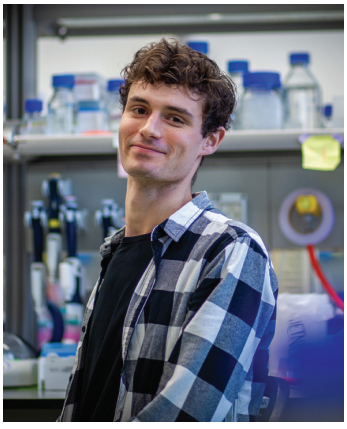
Organizing team

Michał Prusiński

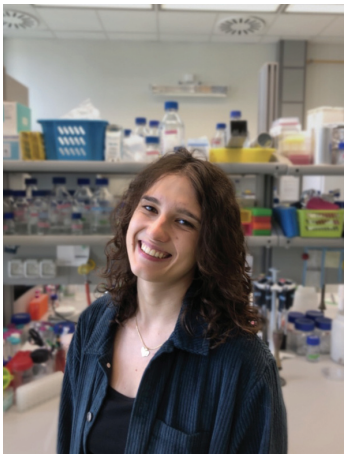
PhD student at Laboratory of Plant Protection and Biotechnology. Avid herbalist and cyclist combining hobbies with laboratory work. He is activist involved with Polish Children's Fund to show promising young people world of science by tutoring and organizing workshops.
Contact: michal.prusinski@phdstud.ug.edu.pl

Filip Kuś



I am a PhD student at the Laboratory of Protein Biochemistry, where I focus on the balance between degradation and refolding of aggregated and non-native proteins. My main research interest lies in protein quality control, especially in the context of diseases such as cancer and neurodegeneration. I like spending my free time actively, I play tennis, and I'm an enthusiast of sailing during summer, and skiing in the winter.
Contact: filip.kus@phdstud.ug.edu.pl

Zuzanna Hirsz



PhD student at the Laboratory of Molecular Biology. With a passion for science and education, she has dedicated herself to organizing this summer school to inspire and engage the next generation of biotechnologists. When not immersed in the lab, she enjoys spending time with her beloved cats and exploring the wonders of nature. She is also an avid dancer and a voracious reader, always eager to discover new stories and perspectives.
Contact: zuzanna.hirsz@phdstud.ug.edu.pl

IFB Dean's Office

Behind-the-scenes IFB staff is doing all the administrative and financial work of the event. Also they are responsible for contact with the participants and lecturers.

Patrycja Tucholska

Contact: patrycja.tucholska@ug.edu.pl

Monika Sączewska

Contact: monika.saczewska@ug.edu.pl

Intercollegiate Faculty of Biotechnology UG & MUG

The Intercollegiate Faculty of Biotechnology of the University of Gdańsk and the Medical University of Gdańsk (IFB) was established in 1993 by the decision of the Senates of the University of Gdańsk (UG) and the Medical University of Gdańsk (MUG). The initiators of the Faculty were Prof. Anna Podhajska, Prof. Wacław Szybalski and Prof. Karol Taylor. The Faculty is a unique institution in Poland created by two universities. This results in interdisciplinary research and teaching focused on biomedical and biomolecular issues and their biotechnological applications for health and quality of life. Since 1999, the IFB has been authorized to confer the degree of doctor, and since 2010, the scientific degree of habilitated doctors in the area of biological sciences – the discipline of biochemistry. Including PhD students, approximately 200 people participate in research and teaching at IFB.

IFB is a leading research and teaching institution that since 2002 has had the status of the European Centre of Excellence in Biosafety and Molecular Biomedicine and is ranked highly by the Ministry of Education and Science regarding scientific effectiveness. In 2017, in a parametric assessment, IFB was granted the highest-level

category, A+. The quality of teaching at IFB is the highest in Poland. In 2020, the Polish Accreditation Committee (PKA) awarded the Biotechnology study programme at IFB the Certificate of Educational Excellence in the category "Excellent programme - excellence in education". These are the only distinctions of that kind granted in Poland in the area of biological sciences.

Faculty members perform important functions in international societies and scientific commissions. For example, Prof. Ewa Łojkowska is President of the Polish Academy of Sciences Committee on Biotechnology, Vice-President of the ScanBalt Association, President of the Polish Jury for the L'Oréal-UNESCO for Women in Science award and a member of the International Selection Committee of the Award L'OREAL-UNESCO For Women in Science International Rising Talents. Prof. Krystyna Bieńkowska-Szewczyk was appointed to the Ministerial Advisory Group on COVID-19. Prof. Krzysztof Bielawski, as Vice-Rector for Innovation and Liaison with Business and the Community, and Prof. Jacek Bigda, as Vice-Rector of Development, are directly involved in governing the University of Gdansk and the Medical University of Gdansk, respectively. IFB staff members are also laureates of prestigious programmes and awards (ERC Starting Grant, EMBO YIP, HHMI, EUPHRESCO ERANET, InfectEra, STRATEGMED2, Polish-Norwegian Research Programme, Polish-South Africa Programme, Polish-Chinese Programme, Polish-French Polonium Programme, and Polish national programmes such as LIDER, TOP 500 Innovators, MISTRZ, START, HOMING PLUS, TEAM, and First TEAM). Publications by IFB staff have received numerous awards and distinctions for the best work conducted in Polish laboratories, granted by the Committee of Microbiology of the Polish Academy of Science, the Polish Genetic Society or the Polish Biochemical Society. In 2015, the decision was taken to establish the IFB International Scientific Advisory Board. The international board is a part of the strategy for the further development of the faculty supported by

distinguished scholars from different fields covering research topics conducted at IFB. The nominations to the IFB International Scientific Advisory Board were based on the experts' research excellence, management experience and extensive research expertise.

We have recently succeeded in increasing the quality of publications, with a consequently growing percentage of Q1 publications. The results of our research have been published in high-impact journals such as Science, Science Translational Medicine, Trends in Biotechnology, Nucleic Acids Research, Journal of Experimental Medicine, JNCI-Journal of the National Cancer Institute, Genome Research, Journal of Allergy and Clinical Immunology Current Biology, Current Biology, Industrial Crops and Products, Trends in Biochemical Sciences, Frontiers in Immunology, Journal of Virology, Plant Physiology, Journal of Molecular Biology, The EMBO Journal, FEBS Journal, and the Journal of Experimental & Clinical Cancer Research.

The Intercollegiate Faculty of Biotechnology is widely collaborating at the national and international levels. This collaboration results in publications with a large number of institutions in Poland and abroad, including prestigious foreign institutions such as the University of Oxford, University of Texas, Heidelberg University, University of Washington, University of Missouri, Università degli Studi di Roma Tor Vergata, University of Bremen, University of Wisconsin-Madison, Wellcome Sanger Institute, Lawrence

Berkeley National Laboratory, Karolinska University, Princeton University, and Cornell University.

IFB comprises 19 teams involved in research activities. The basic and applied research areas at IFBs cover virology, molecular microbiology, medical biology and molecular diagnostics as well as molecular plant biology. These areas are the basis of biotechnology development. At the IFB, approximately 90 research projects supported by external funding are conducted simultaneously. In these projects, various microorganisms are used as models to analyse basic cell processes. The main research topics include protein aggregation and disaggregation; the role of molecular chaperones; proteolysis; DNA replication; plant, animal and human pathogens; infection mechanisms; cell response to viral infections; and pathogen diagnostics. Other projects concern the area of medical biology and molecular diagnostics. We conduct research concerning recombinant and edible vaccines, markers used in neurodegenerative disease diagnostics, and nanobiotechnology for treating burns. Cancer research, including studies on cancer biology, therapy response and resistance, prognostic and predictive biomarkers, liquid biopsy, and new immune-modulating substances and protease inhibitors in anticancer treatment, is being dynamically developed. In addition, we have grants involving immunology research focused on allergic and inflammatory reactions and structural biology research which analyses replication of mitochondrial DNA and its

impact on health problems. A third area, covered by external funding involves molecular plant research, dedicated to the diagnostics and infection mechanisms of plant diseases and identification of genes and lipid metabolic pathways in plant cells.

Since 2022, in response to changes in Constitution for Science, two scientific disciplines are led by the Faculty: biotechnology and medical sciences. Within the biotechnology, microbiology, including virology and plant research, is the main research topic, while the medical sciences focus on molecular and translational studies of cancer as well as immunology and the use of bacterial spores for medical applications.

IFB

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https://biotech.ug.edu.pl/

https://www.facebook.com/MWB.UGiGUMed

https://www.youtube.com/@IFBUGandMUG

https://www.linkedin.com/company/intercollegiate-faculty-of-biotechnology/

XXVII BSS Support

This year's edition of BSS was was kindly supported by MegaMocni, KAWA.SKA and MABIOM. This year's School is organized with the support of the STER NAWA program "Internationalization of Doctoral Schools of the University of Gdańsk".

NAWA POLISH NATIONAL AGENCY FOR ACADEMIC EXCHANGE

MegaMocni
żłobki i przedszkola

The non-public MegaMocni nurseries and kindergartens were created as a part of an initiative by the DyNaMo Creative Development Association. The main goal was to stimulate educational activities among children, youth, and adults, in order to promote

attitudes that favour comprehensive personal development through competencies building and continuous learning. We believe that these are the foundations for living a successful and happy life, and this is why we want to give the children at the Mega-Mocni nurseries and kindergartens a head-start. Since we know that the first years play a fundamental role in the development of child's personality, we aim to stimulate intellectual and emotional development at this crucial stage.

We see providing daily safety, education, and play as our prime objective. Thanks to our experience and collaboration with qualified personnel we can offer high level of education, professional care, and an optimum combination of learning and playing.

We use the innovative "Key to Learning" international programme which, through its curriculum modules, introduces the child into the surrounding world, and allows them to develop cognitive, social, emotional, and early academic skills, which later enable them to be successful at school and in other fields. The "Key to Learning" Early Years Educational Programme breaks with the dominating model based on memorising and regurgitating information. Instead, the children are taught independent thinking and quick acquisition of knowledge.

We are also aware of the importance of the physical space that surrounds the child. Its arrangement can be either soothing or stimulating; it can both increase and decrease cognitive activity. The space — same as the type of a particular task, the temper, or the time of the day — can discourage or cause certain behaviours of a child.

Having this in mind, our nurseries and kindergartens have been designed as spacious rooms, which are equipped with objects that draw attention and engage, while not overloading with stimuli, so as not to affect the capacity to focus. We adjust the space around the children to their age and developmental abilities. We support their independence, in order to boost their sense of competence.

Our modern facilities are located in some of the key districts of Gdańsk: Zaspa, Strzyża, Suchanino, Chełm, and Stogi. In response to the growing demand, we will be soon launching a new site in the Jasień district. All of our facilities are adjusted to care requirements for children with chronic diseases, such as asthma, diabetes, and food allergies. Our own kitchen, located at MegaMocni Chełm, is managed by an experienced catering company that prepares safe and tasty meals, while taking into consideration individual dietary requirements.

There were many roads we could have chosen as a child-care institution, yet we took the one that we can all share: the joy of overcoming difficulties, of reaching the objectives, and of discovering the unknown.

Feel invited to learn more about our offer at
www.przedszkolegdansk.pl and www.zlobekgdansk.pl.

Business profile

We are a supplier of innovative solutions for scientific and research centers in the field of biotechnology. As a trading company, our product portfolio includes devices and consumables used in biology, biophysics, molecular biology, biotechnology, environmental protection, molecular diagnostics, histopathology and quantum optics. We are a Polish company that has been operating for over 24 years. We represent global brands on the domestic market, such as: Leica Microsystems, Leica Biosystems, PicoQuant, Kurabo, Agena Bioscience, Anathomic Solutions, Cerus, Indica Labs.

Mission

Slogan: "We teach. We advise. We support." is the motto of our daily work. Our overriding goal is to provide substantive support to clients in making decisions that are satisfactory for them, regarding the purchase of research and development equipment that will be best suited and profiled in terms of their research.

Vision

Our future is development. Both the biotechnology market and the solutions we offer, as well as our team. We believe that thanks to the top-class equipment, professional service and substantive support of our specialists, clients receive comfort of work, repeatability of processes and credibility of results. We strive to be a reliable partner for our clients.

Strategy

We believe that the key to success are the latest biotechnological solutions and people who see the potential of modernity. Our employees have extensive knowledge and skills in the field of offered solutions. We conduct microscopy training for our current clients, as well as for students and researchers who want to deepen their knowledge in the field of microscopy, imaging and to work on the most modern equipment on the market. Our authorized Leica service supports our customers during the installation of devices, as well as during the entire life of the devices purchased from us. As part of marketing activities, we participate in many conferences, seminars and workshops, thus wanting to meet your expectations and make it easier for you to get to know the

systems and devices we offer. We are open to new markets and new interesting cooperation proposals.

The beginnings of the company through the eyes of the President

And how did it start? Imagine that although the company is only 24 years old, it all started almost 43 years ago, so in the last century. In 1980, I left the Medical Academy in Warsaw and started working for an American company. The company produced scientific, research and diagnostic equipment. The recipients of this highly specialized equipment were biologists (I am a biologist - geneticist), chemists, physicists, biophysicists and medical diagnosticians.

At that time, access to the application knowledge and technology of Western research and diagnostic centers was very limited. This was the motive for my action aimed at bringing this knowledge and technical solutions closer to Polish users. This is how selling through education began. An American company allocated the appropriate funds for this and in the mid-1980s we started educational activities. Unfortunately, all good things come to an end sometimes. This was to be the case here. The company turned off the money tap. But I decided to continue my educational activities further. Education cannot be interrupted just like that. That is why KAWA.SKA was founded 24 years ago with the mission WE TEACH. WE ADVISE. WE SUPPORT., which sets the direction of our activity to this day.

Have we been successful? I will say immodestly: Yes. We managed to survive crises, overcome difficulties and start another year of existence and activity. The success of our company would not be possible without the wonderful people around. Clients with a vision and willingness to conduct new research, employees with charisma, knowledge and willingness to work, and a family with holy patience. Many, many thanks. I wish us all success together for the next 20 years.

Marian Kawczynski
President of the Management Board of KAWA.SKA

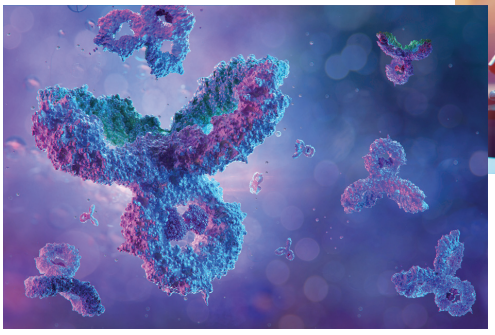
More information about the company:

https://www.facebook.com/people/Kawaska/100039796579365/?paipv=0&eav=AfbKH-22HEK7qG5V3eOsLfg4PXuqYUC2ZdbA-foueaCUcrZdoNGmK-tTn8dxjl4k10OI&_rdr

https://www.linkedin.com/company/kawa-ska/?originalSubdomain=pl

MABION
Biologics CDMO

We are a forerunner of the biotechnology sector in Central Europe, thanks to which we have gained a unique opportunity to create the foundations and standards of this industry in the heart of Europe. We started in a small laboratory in central Poland, and today we work in two fully equipped, modern centers: research and development and scientific and production. We specialize in the manufacture of sterile biotechnology products in a Good Manufacturing Practice (GMP) facility, and our goal is to integrate and commercialize scientific advances to produce a biological drug based on mammalian cell cultures. We develop, transfer and implement solutions for the development of the production process of biological products and their qualitative and quantitative analysis, also in samples taken from patients. During the SARS-COV-2 pandemic, we were noticed and appreciated by the American company Novavax, which established cooperation with us in the production of vaccine antigen. We are constantly looking for space to grow!



Speakers Introduction

Dr Calliope Dendrou

Kennedy Institute of Rheumatology
University of Oxford, Oxford, England

Calli Dendrou obtained her BSc in Biology with First Class Honours and won the Forbes Memorial Medal for Excellence in Biology at Imperial College (2005). She then went on to obtain a Wellcome Trust PhD in Infection and Immunity at the University of Cambridge (2010). Under the supervision of Profs Linda Wicker and John Todd she investigated genotype-to-phenotype correlations for GWAS variants in type 1 diabetes.

Subsequently, she joined the University of Oxford to undergo her postdoctoral training with Prof Lars Fugger at the Oxford Centre of Neuroinflammation in the Weatherall Institute of Molecular Medicine, expanding her interest in functional genetics to multiple sclerosis.

In 2017 Calli was awarded a Sir Henry Dale Fellowship to start her group at the Wellcome Centre for Human Genetics, focusing on cross-disease genomics, encompassing functional analysis of the tyrosine kinase 2 locus, application of Bayesian approaches for UK Biobank analyses, and high-throughput single-cell profiling of patient samples.

In June 2023 she moved her Cross-Inflammatory Disease Multiomics Lab to the Kennedy Institute of Rheumatology, as a KTRR Group Leader in Clinical Pathology. Her group investigates molecular circuits and cellular mechanisms across tissues and across diseases for the purpose of identifying 'hubs' that may be targeted therapeutically via drug repositioning approaches. They also interrogate the relationship between variation in cell responsiveness and transcriptional kinetics and the spectrum of immune-related diseases spanning malignancies, autoimmunity and infections to help inform risk-benefit analyses in the context of therapeutic targeting. Through these interests Calli is the Data Analysis Lead for several consortia.

Talk abstract: see page 44 (Opening lecture)

Prof. Piotr Trzonkowski, MD

Department of Medical Immunology
Medical University of Gdańsk, Gdańsk, Poland

Piotr Trzonkowski, professor of Immunology, actively involved in the clinical research with T regulatory cells and mechanisms of immunosuppression for over 20 years. His group developed and applied first-in-man protocols of the treatment with expanded T regulatory cells.

He graduated from the Medical University of Gdańsk in 1999. In 2003 he defended Ph.D. thesis on the suppressive mechanisms in human immunosenescence which included his first works on T regulatory cells. From 2004, he worked at Oxford University on the immune background of the depleting therapy with alemtuzumab in kidney transplant recipients. He was also involved there in the work on T regulatory cells biology. These studies were continued after getting back to Poland as PI in the Department of Medical Immunology, Medical University of of Gdańsk and also as a visiting professor in the Department of Surgery, University of Chicago. The trials on the clinical application of T regulatory cells supervised by prof. Trzonkowski covered graft versus host disease, type 1 diabetes, multiple sclerosis and pancreatic islets allotransplantation. In 2015, he set up a spin-off PolTREG to commercialize the therapy. His group conducts also research in novel approaches to cellular therapy in autoimmune and malignant diseases in man, synthesis of immunosuppressive small-particle drug candidates and posttransplant laboratory diagnostics in allograft recipients. In 2017, he has been awarded with the highest scientific award in Poland, the Foundation for Polish Science Prize in the life and earth sciences in 2017.

Talk abstract: see page 45 (Lecture 1)

Dr Helen Wright

Institute of Life Course and Medical Sciences
University of Liverpool, Liverpool, England

Dr Helen Wright is a Senior Lecturer at the University of Liverpool, Institute of Life Course and Medical Sciences. She has a special interest in the role of neutrophils in the pathogenesis of inflammatory diseases, with a focus on the regulation of metabolism and gene expression in inflammatory neutrophils. She graduated from the University of Central Lancashire in 2005 with a BSc (Hons) in Molecular Biology and Biochemistry and obtained her PhD at the University of Liverpool in 2009. In 2010 she was awarded an Arthritis Research UK Foundation Fellowship, during which she characterized neutrophils from RA patients before and after TNF inhibitor therapy using RNA-sequencing. As part of the Fellowship, she spent time at Cold Spring Harbor Laboratories in New York, undertaking state-of-the-art training in bioinformatics data analysis and computer programming. More recently she has been awarded major research grants from the Wellcome Trust, Pfizer and Versus Arthritis, through which she has developed protocols applying quantitative proteomics and 1H NMR metabolomics technologies to further define the activation of neutrophils in RA. Her research has provided unprecedented insight into the role of neutrophils in inflammatory diseases and ageing. She was awarded the British Society for Rheumatology Garrod Prize in 2017 and became a Fellow of the Higher Education Academy in 2018. Her award of a Versus Arthritis Career Development Fellowship has enabled her to further develop skills in advanced statistics and computational biology to enable the integration of multiple–omics datasets. In her wider University roles, she is chair of the musculoskeletal biology patient involvement panel which brings together researchers and people with musculoskeletal disease to discuss research priorities and the design of research studies with a patient focus. She is a member of the ILCaMS Fellowships Panel and actively mentors ECRs through fellowship and tenure-track applications, and she also sits on the Institute of Life Course and Medical Sciences Research Ethics Committee.

Talk abstract: see page 46, 60 (Lecture 2, Methodology session 2)

Dr Wojciech Siwek

International Centre for Cancer Vaccine Science (ICCVS),
University of Gdańsk, Gdańsk, Poland

Wojciech Siwek is an assistant professor at the International Centre for Cancer Vaccine Science (ICCVS), University of Gdańsk (PL). He holds a bachelor's and a master's degree in biotechnology from the University of Warsaw (PL) and a PhD in biochemistry from the International Institute of Molecular and Cell Biology in Warsaw (IIMCB) (PL). Later in his career, he trained at the Gulbenkian Institute (PT), University of Oxford (UK) and Massachusetts General Hospital, Harvard Medical School (USA). He specializes in biomedical research with a focus on gene regulation and epigenetics. Wojciech is fascinated by how cells remember previous environmental states and is keen to translate his research into the clinic.

Talk abstract: see page 47, 58 (Lecture 3, Workshop)

Prof. Bożena Kamińska-Kaczmarek

Laboratory of Molecular Neurobiology
Nencki Institute of Experimental Biology of the Polish Academy of Sciences, Warsaw, Poland

Prof. Bozena Kaminska-Kaczmarek is head of the Laboratory of Molecular Neurobiology at the Nencki Institute of Experimental Biology of the Polish Academy of Sciences in Warsaw, Poland. She obtained her PhD in biochemistry at the Nencki Institute in 1991 and after postdoctoral training at the Mc Gill University in Montreal, Canada, she become a full professor in 2003. From 2009 to 2023 she was the director of the Postgraduate School of Molecular Medicine at the Medical University of Warsaw. She was a visiting researcher at the Brain Research Institute at UCLA in Los Angeles, USA (2001-2002) and the Nanshan Scholar professor at the Medical University of Guangzhou, China (2019-2022). She is an elected member of the Polish Academy of Sciences (since 2016) and European Molecular Biology Organization (since2022).

She received a prestigious Foundation for Polish Science Award 2021 in life sciences and the Prime Minister Award for scientific achievements (2022); was nominated by NCN for AcademiaNet - Expert Database for Outstanding Female Scientists and Scholars.

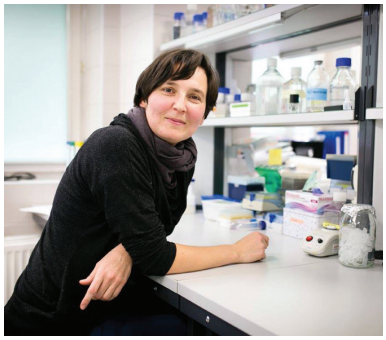
She specializes in molecular neurobiology, tumor immunology, neuro-oncology and neuroimmunology, with a focus on functions of myeloid cells in pathological processes. Prof. Kaminska's lab employs multidisciplinary approaches combining in vivo experiments in rodent models of human pathologies and in vitro experiments in primary cultures, brain slices and human-induced induced pluripotent stem cell organoids. She has pioneered single-cell omics studies of brain tumor microenvironment in experimental gliomas. In recent years, her group has been exploring transcriptional and epigenetic mechanisms in microglia in response to environmental exposures and experience.

She promoted 35 PhD students and 15 Master students. HI=49, citations= 8,748.

Talk abstract: see page 48, 50 (Lecture 4, Plenary lecture 5)

Dr Magdalena Winiarska

Department of Immunology
Medical University of Warsaw, Warsaw, Poland



Magdalena Winiarska was awarded a PhD by the Medical University of Warsaw (MUW) in 2008 and DSc in 2018. Early in her career, she was involved in the research on the antitumor activity of anti-CD20 monoclonal antibodies. These studies have led to the identification of hitherto undescribed mechanisms of regulation of CD20 expression and signalling pathways associated with the process of translation of CD20 mRNA. She was a visiting scientist to the lab of Prof. Efremov, International Centre for Genetic Engineering and Biotechnology, Italy and Cancer Laboratory led by Prof. Olive, Institut Paoli Calmettes, Aix-Marseille Université, France. She has secured funding in several grants funded by Polish (National Science Centre, National Centre for Research and Development) and European (ERC Starting Grant) institutions. She was awarded a Fellowship for Outstanding Young Researchers by the Ministry of Science and Higher Education in Poland, as well as fellowship from ASH, as a visiting student at UTHSCSA, San Antonio, USA. She was a Laureate in "Medicine" category in "Poles with Verve" poll and was also awarded by "Polityka" weekly Polish journal with the Scientific Award for young researchers. Her PhD thesis was recognized as the outstanding doctoral thesis and rewarded with the highest Scientific Award from the Prime Minister of Poland. From the Foundation for Polish Science, she obtained a stipend for outstanding young researchers and from L`Oreal & Unesco 'For Woman in Science' she was awarded a PhD fellowship. During her career, she was a mentor of more than 20 graduate students and supervisor of five PhD students. Recently, she has been extensively searching for novel antigens that could be used as potential therapeutic targets in adoptive therapy with chimeric antigen receptors-modified T cells.

Talk abstract: see page 52 (Lecture 6)

Prof. Leendert Trouw

Department of Immunology,
Leiden University Medical Center, Leiden, The Netherlands

Leendert Trouw studied Biology in Leiden and already during his PhD training, at the Department of Nephrology in the LUMC, he became fascinated by autoantibodies and complement. This research, conducted in the lab of Prof. Dr. Daha, provided the explanation as to why anti-C1q autoantibodies contributed to renal damage in patients suffering from lupus, whereas the same antibodies were not harmful for healthy individuals.

To gain more understanding of the role of complement in autoimmunity, Dr. Trouw moved to the lab of Prof. Dr. Blom, Lund University, in Malmo, Sweden. During this period Dr. Trouw focussed, now as a post-doc, especially on the role of endogenous complement inhibitors on the protection of dying and dead cells from excessive complement attack.

To further develop himself in the field of complement and autoantibodies in a more clinical setting Dr. Trouw, now as a senior post-doc, started working with Prof. Dr. Huizinga and Prof. Dr. Toes at the Department of Rheumatology in the LUMC. Next to studies on the complement activating potential of ACPA and several genetic studies Dr. Trouw and his team set up a series of experiments that led to the identification of a new autoantibody in rheumatoid arthritis, the anti-CarP antibodies. After obtaining both an NWO VENI and a VIDI grant Dr. Trouw now focussed, as associate professor, on the role of complement in autoimmunity particularly in RA and SLE and on the characterisation of the anti-CarP antibody response. After obtaining an ERC-consolidator grant he moved his lab to the Department of Immunology in the LUMC. Now as a full professor in immunology focussed on complement biology and therapy, he initiated 'Complement Center Leiden'. With his team, he is currently studying biomarkers, complement biology and targeted antibody-based complement therapeutics.

Talk abstract: see page 53, 55 (Lecture 7, Lecture 9)

Dr Bartłomiej Tomasik, MD

Department of Gynecological Oncology and Radiotherapy,
Medical University of Gdańsk, Gdańsk, Poland

In 2014, Bartłomiej graduated from the Faculty of Medicine at the Medical University of Lodz. In 2019, he defended a doctorate thesis "Identification and application of circulating microRNAs in monitoring complications of radiotherapy in patients with oropharyngeal cancer" at that University. His work has been recognized by the Polish Society of Clinical Oncology as the best PhD thesis defended in 2019. Additionally, in 2020, he graduated from the Postgraduate School of Molecular Medicine at the Medical University of Warsaw. Bartlomiej continued his clinical training with his research work, leading him to become a board-certified radiation oncologist in 2020. Later, he did a short post-doc at the Dana- Farber Cancer Institute/Harvard Medical School (Boston, MA, USA) and came back to Poland in 2021 to start working as Assistant Prof. at the Department of Oncology and Radiotherapy, Medical University of Gdańsk. Here he works as a research group coordinator focused on radiotherapy's physical and clinical aspects. In addition, Bartłomiej is on the management board of the HORIZON 2020-funded project, STOPSTORM, which is the acronym for "Standardized Treatment and Outcome Platform for Stereotactic Therapy of Re-entrant tachycardia by a Multidisciplinary consortium".

Talk abstract: see page 54 (Lecture 8)

Prof. Jan Rehwinkel

Radcliffe Department of Medicine
University of Oxford, Oxford, England

Jan is interested in the molecular mechanisms underlying host-pathogen interactions. In particular, Jan studies how cells detect virus infection. His work lies at the intersection of immunology, virology and molecular biology. After undergraduate training in biology at the University of Heidelberg, Germany, Jan joined the European Molecular Biology Laboratory (EMBL) as a PhD student. Under supervision of Elisa Izaurralde, Jan studied post-transcriptional control of messenger RNA, including the mechanisms by which microRNAs repress their targets, and obtained a PhD in 2007. This background in RNA biology led Jan to develop an interest in nucleic acids in innate immunity. As a postdoctoral fellow, he joined the group of Caetano Reis e Sousa, then at the Cancer Research UK London Research Institute (London, UK). Jan investigated how RNA viruses such as influenza A virus are recognised by innate immune sensors, particularly RIG-I. In 2012, Jan moved to the University of Oxford, UK, to establish his independent research group. His laboratory is part of the MRC Human Immunology Unit and the MRC Weatherall Institute of Molecular Medicine. Jan's research dissects nucleic acid sensing by innate receptors in the context of virus infection, autoinflammatory disease and cancer. Jan's work is funded by the MRC, Wellcome Trust, Lister Institute and European Union.

Talk abstract: see page 56, 57 (Lecture 10, Career session)

Dr Edyta Bartusik-Czubek

Manager of Analytics and Process Development Division at Mabion S.A.

She obtained her master's degree in Biotechnology at the Gdańsk University of Technology. Her research focused on the impact of the expression of the UGT1A10 isoenzyme on the cellular response induced by the triazoloacridone derivative C-1305 on the HT-29 and HCT-116 cancer cell lines.

Immediately after obtaining her master's degree, she started working at Mabion S.A. specializing in cultures of mammalian cells producing monoclonal antibodies for anticancer therapies. During over 11-year career at Mabion, she expanded her interests to further areas related to broadly understood processes of production and quantitative and qualitative analysis of biologically active molecules. She is constantly fascinated by statistics and the enormous scientific and business benefits of statistical data analysis combined with knowledge and understanding of processes.

In parallel to working at Mabion S.A. she completed her doctoral studies at the Medical University of Lodz, researching and describing the relationships between mammalian cell culture conditions and the glycosylation profile and biological activity of monoclonal therapeutic antibodies. In 2024, she defended a doctorate thesis 'Investigation of the impact of the glycosylation profile of a monoclonal antibody on its biological activity, as well as the possibility of controlled modification of the glycosylation profile by changing the values of cell culture process parameters using and example of rituximab' at that University. Currently, she manages a team of 30 scientists in the R&D department of Mabion S.A., combining scientific aspects with a business approach in her daily work.

Talk abstract: see page 59 (Methodology session 1)

Dr Jarosław Korczyński

KAWA.SKA

From a young age, I have been fascinated by biology and the natural world. I followed my interests during my education process and finally graduated biology with honors at Jagiellonian University in Krakow, Poland. There, for the first time, I have become familiar with the fascinating world of microscopy experiments. My enthusiasm for biology led me to pursue PhD studies at the Nencki Institute of Experimental Biology in Warsaw, Poland. There, I investigated the signaling pathways that regulate actin cytoskeleton dynamics in glioma C6 cells and astrocytes, utilizing both biochemical and confocal microscopy techniques. During my PhD, I gained expertise in various fluorescence microscopy techniques, including super-resolution, 3D visualization, F-techniques, calcium measurement, and live cell imaging. Currently, I have been working as an Advanced Workflow Specialist for 10 years at KAWA.SKA, a leading distributor of Leica microscopy equipment in Poland.

Talk abstract: see page 61 (Methodology session 3)

Abstracts

Opening Lecture: A longitudinal single-cell profiling across immune-mediated disease provides treatment strategy insights

Dr Calliope Dendrou

Kennedy Institute of Rheumatology
University of Oxford, Oxford, England

Precision medicine in immune-mediated inflammatory diseases (IMIDs) requires an understanding of how cellular networks change following therapy. We describe a therapeutic atlas for Crohn's disease (CD) and ulcerative colitis (UC) following anti-tumour necrosis factor (TNF) therapy. We generated ~1 million single-cell transcriptomes, organised into 109 cell states, from 216 gut biopsies from 38 patients and three controls, revealing disease- and therapy-specific differences. A systems-biology analysis identified distinct spatially-resolved cellular microenvironments: granuloma signatures in CD and interferon (IFN)-response signatures localising to T-cell aggregates and epithelial damage in CD and UC. Longitudinal comparisons demonstrated that disease progression in non-responders associated with myeloid and stromal cell perturbations in CD and increased multi-cellular IFN signalling in UC. IFN signalling was also observed in rheumatoid arthritis (RA) synovium with a lymphoid pathotype. Our therapeutic atlas informs drug positioning across IMIDs, and suggests a rationale for the use of janus kinase (JAK) inhibition following anti-TNF resistance.

NOTES

Lecture 1: From bench to bedside - T regulatory cells in the clinic

Prof. Piotr Trzonkowski, MD

Department of Medical Immunology
Medical University of Gdańsk, Gdańsk, Poland

T regulatory cells (Tregs) are considered a viable option in immunosuppressive treatment in the clinic. First promising clinical experiments and trials with clinical-grade Tregs cultured as advanced therapy medicinal product (ATMP) are completed already. In our centre, the drug has been tested in graft versus host disease, type 1 diabetes and multiple sclerosis. We will present the path from preclinical studies to the results of clinical trials and the regulatory path towards the marketing authorisation of this cellular drug. In vivo results will be supported with in vitro and animal models showing activity of Tregs in auto- and allogeneic settings.

NOTES

Lecture 2: Role of neutrophils in auto-immune disease

Dr Helen Wright

Institute of Life Course and Medical Sciences
University of Liverpool, Liverpool, England

Neutrophils are innate immune cells important in host defence from microorganisms. However, during immune-mediated inflammatory diseases neutrophils can also become activated causing damage to host tissues by releasing reactive oxygen species (ROS) and proteases (neutrophil elastase, collagenase, MMP8). Neutrophils also drive the development of auto-immunity through exposure of neoepitopes to the adaptive immune system on neutrophil extracellular traps (NETs) leading to the development of auto-antibodies to citrullinated peptides and nuclear proteins such as histones. This lecture will provide an overview on the role of neutrophils in host defence and their contribution to inflammation in auto-immune inflammatory disease, drawing on examples from our own research in rheumatoid arthritis and systemic lupus erythematosus and other key publications in the field. We will conclude by discussing the latest emerging therapeutic strategies targeting neutrophil pathways, offering new hope for managing these challenging conditions.

NOTES

Lecture 3: Mechanisms of Interferon-Gamma Transcriptional Memory

Dr Wojciech Siwek

International Centre for Cancer Vaccine Science (ICCVS),
University of Gdańsk, Gdańsk, Poland

Epigenetics is a process that describes a heritable phenotype resulting from changes in the cell without alterations in the DNA sequence. It is fundamental for multicellular life as it maintains gene expression during growth and in adulthood. Transcription factor feedback loops can sustain active gene expression but are not always required. This suggests that other processes are involved in preserving active transcription. Strikingly, such mechanisms are largely unknown. This knowledge gap comes from the fact that uncoupling transcription from maintenance of active states is difficult to achieve experimentally. Due to this reason the field of epigenetics is almost exclusively focused on studying the mechanisms responsible for sustained gene silencing. To uncouple transcription form maintenance, and gain access to novel epigenetic mechanisms, I am exploring a phenomenon present in innate immunity: interferon-gamma (IFNγ) transcriptional memory. During this process, cells primed with IFNγ will show increased rates of gene expression after restimulation many days later. In this talk, I will present key discoveries from my previous work and describe our current attempts to understand this phenomenon, as well as future research plans.

NOTES

Lecture 4: How to improve tumor immunotherapy?

Prof. Bożena Kamińska-Kaczmarek

Laboratory of Molecular Neurobiology
Nencki Institute of Experimental Biology of the Polish Academy of Sciences, Warsaw, Poland

Although immunotherapy has achieved good results in various cancer types, a large proportion of patients do not benefits. In case of therapy with checkpoint inhibitors, only 20-30% of the patients respond well. There is a growing understanding that accumulation and reprogramming of myeloid cells creates a "cold" immunosuppressive tumor microenvironment (TME) which results a poor infiltration and exhaustion of effector T cells. Hypoxia and metabolic reprogramming are further critical factors that impact immunotherapy response. The detailed studies of TME with single-cell techniques, spatial transcriptomics and proteomics unraveled identities of immune cells instrumental for creating TME and cell-cell communication networks. The reduced infiltration and/or impaired activation of effector immune cells due to the immunosuppressive TME contribute to the immunotherapy failure. Reprogramming specific compartments of TME, such as immunosuppressive myeloid and lymphoid cell subsets, may overcome resistance mechanisms and enhance antitumor immunity. Targeting nonimmune components of the TME by normalizing the vasculature, represents another strategy to overcoming resistance to immune checkpoint inhibitors and other immunotherapies. Many FDA approved drugs that can limit infiltration of leukocytes have been tested in neuroinflammatory disorders and several therapeutics show a high anti-tumor efficacy in cancers. The application of pharmacological compounds and antibodies targeting activated, tumor supportive cells in TME will be discussed. Antibodies targeting the immune checkpoints (CTLA-4, PD-1) need pre-existing, active immune TME to establish clinical outcomes. While interference with myeloid cell functions in TME may not be sufficient to significantly improve cancer patient survival, restoring proper functions of myeloid cells may improve the effectiveness of the checkpoint blockade. The combination of a vaccine with checkpoint inhibitors may increase the number of patients who respond well up to 60-70%. The ongoing studies exploring combination of standard therapies (radio- and chemotherapy) with various compounds or antibodies targeting distinct cells in TME, their metabolic reprograming or targeting with bi-specific antibodies or localized intratumoral administration will be discussed.

Particular interest is targeting more than one target/ population with bi-specific antibodies or localized intratumoral administration that overcomes BBB obstacles and helps to reduce systemic, undesirable effects. Some of those studies await to be performed in GBM models and patients. Antibodies targeting the immune checkpoint proteins (CTLA-4, PD-1) need pre-existing, active immune TME to establish durable clinical outcomes and many patients do not respond to these therapies. It is widely accepted that a "cold" GBM TME restricts the effectiveness of the immune checkpoint inhibitors.

A growing number of studies shows that blocking specific cells or cell type specific targets when combined with the immune checkpoint blockade, improves survival and therapy outcomes in pre-clinical models.

Clinical trials with immune checkpoint inhibitors (ICI) have benefited many cancer patients but failed in a number of tumors, including glioblastoma (GBM), the most common and aggressive primary brain tumor in adults. The main obstacle for ICI efficacy in malignant tumors is the continuously evolving tumor microenvironment (TME), in which antitumor immunity is inhibited or evade by tumor-secreted factors.

NOTES

Plenary lecture 5: Dissecting tumor immune microenvironment with single-cell and spatial transcriptomics

Prof. Bożena Kamińska-Kaczmarek

Laboratory of Molecular Neurobiology
Nencki Institute of Experimental Biology of the Polish Academy of Sciences, Warsaw, Poland

The tumor microenvironment (TME) is a heterogeneous and continuously evolving. Besides malignant cells there are numerous immune cells, astrocytes and other stromal cells, blood vessels and extracellular matrix. Tumour-secreted factors reprogram resident and infiltrating myeloid cells, and create the immunosuppressive TME blocking antitumor immunity. The advancements of single-cell techniques provide powerful means to systemically scrutinize the tumour and its TME at a single-cell resolution, shedding light on the pathogenic mechanisms and dysfunctions of tumour immunity. More advanced techniques allowed to simultaneously characterize transcriptomes and acquire spatial information, revealing the phenotypes and functionalities of disease-specific cell populations at specific tumour sites. Applications of single-cell RNA (scRNAseq), scRNA and protein sequencing (CITEseq), CyTOF and Visium spatial transcriptomics allow to identify the functional diversity and localization of immune cells in human and experimental tumors. Spatial transcriptomics technologies allow the acquisition of gene expression information from intact tissue sections in the original physiological contex. Despite some drawbacks such as relatively low resolution and comparatively insufficient sequencing depth, current spatial transcriptomics techniques accelerate a capacity to investigate the architecture of normal tissue and tumor. The integrative studies of experimental malignant tumors reveal dynamics of antitumor immune responses, critical players and interconnections between cells in TME. For example in brain tumors infiltrating monocytes are proinflammatory and express interferon signature, and their transformation into protumour, immunosuppressive macrophages in the TME. This transition is coupled with a phenotypic switch from the IFN-related to antigen-presentation and tumour-supportive gene expression. Natural killer cells do not mature and are not functional in the tumor core but show some activity at the periphery. Computational analyses allow to extract a detailed information regarding ligand-receptor interactions between tumor, myeloid cells and lymphocytes, and point to certain factors responsible for tumor-induced reprogramming of immune cells. In animal models specific oncogenic drivers induce the cellular and functional diversity of immune subpopulations in TME and distinct gliomas grow with various dynamics and tissue penetration. Human tumours with various genetic alterations have distinct TME immune composition and antitumor responses that translates into different survival, and responses to therapy. Recurrent tumors have distinct immune landscape than

primary ones. Spatial immune cell distribution helps to define cell functionalities and provides additional clues as to the mechanisms of tumorigenesis.

NOTES

Lecture 6: Searching for mechanisms of resistance to immunotherapies

Dr Magdalena Winiarska

Department of Immunology
Medical University of Warsaw, Warsaw, Poland

Cancer immunotherapy, a treatment that uses the power of the body's own immune system to eliminate cancer, comes in a variety of forms that constitute key treatment options for cancer patients, including those with various hematological malignancies. However, many reports indicate that a significant percentage of patients experience resistance following various immunotherapies. Cancer cells escape from immune attacks by developing various mechanisms, which will be shortly discussed during the lecture. I will also present our results from the tumor cell line models resistant to CD19-targeting CAR-T therapy. Moreover, our discovery of so far unknown metabolic changes that can support the survival of tumor cells and their escape from the immune surveillance will be discussed.

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Lecture 7: Complement activation by post-translationally modified proteins and ways to intervene

Prof. Leendert Trouw

Department of Immunology
Leiden University Medical Center, Leiden, The Netherlands

The complement system is a well-known element of our innate defense against infections. Yet complement activation, when activated in the wrong context will strongly contribute to tissue damage in several important human diseases. Understanding the triggers of complement activation may allow even more proximal interventions into these pathological processes. In rheumatoid arthritis, autoantibodies targeting post-translationally modified (PTM) proteins are known to occur and associate with disease development and severity. We have studied next to ACPA also several other anti-PTM responses and discovered next to anti-CarP antibodies several other reactivities. It may be no surprise that immune complexes comprising these antibodies will activate complement. Interestingly our search into the triggers for the production of such anti-PTM antibodies revealed that also several of the antigens, so the PTM-proteins themselves strongly activate complement. In the presentation an overview will be presented on the anti-PTM responses in rheumatic diseases, the capacity of PTM proteins to trigger complement activation and targeted local intervention strategies.

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Lecture 8: Radiotherapy meets immunotherapy: translating discoveries into real-world solutions

Dr Bartłomiej Tomasik, MD

Department of Gynecological Oncology and Radiotherapy,
Medical University of Gdańsk, Gdańsk, Poland

Immunotherapy has revolutionized oncology, demonstrating an improvement in overall survival across a broad range of cancers. However, its benefit in the overall population is still relatively low and most patients do not respond to immunotherapy or develop resistance to therapy after some time. Radiotherapy is a well-established cancer treatment method that employs high doses of ionizing radiation. It is used at some point in a vast majority of patients with cancer. In many clinical scenarios, immunotherapy and radiotherapy are combined, either concurrently or sequentially. Hence, understanding and harnessing their interaction becomes crucial in order to improve treatment outcomes. Interestingly, there are reports supporting both pro-inflammatory and immunosuppressive effects of radiotherapy. In this talk, I will discuss the studies investigating interplay between radiotherapy and immunotherapy. I will focus on the novel methods and approaches that could be used to assess this relationship and show how to integrate data obtained from different modalities, such as single-cell sequencing and image analysis. Finally, I will explore key points from an oncologist's perspective and discuss how to translate these findings into clinical practice.

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Lecture 9: Overview of complement and role in SLE

Prof. Leendert Trouw

Department of Immunology
Leiden University Medical Center, Leiden, The Netherlands

While the complement system is a well known element of our innate defense against infections it does also contribute strongly to tissue damage in several important human diseases and it plays essential roles in the prevention of autoimmunity. In this lecture an overview of the current understanding of complement will be given. One disease in which the different elements of complement activation come together is the autoimmune disease Systemic Lupus Erythematosus. Using examples from this disease we will discuss the role of complement in tissue pathology as well as the role of complement in the prevention of autoimmunity. Finally we will touch upon possible ways of intervening in the complement system and the delicate balance between activation and inhibition.

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Closing lecture 10: Nucleic Acid Sensing by Innate Immune Receptors; A journey from MDA5 to cGAS

Prof. Jan Rehwinkel

Radcliffe Department of Medicine
University of Oxford, Oxford, England

The innate immune response is critical for host defence against viruses. Cell-intrinsic mechanisms detect virus presence and restrict virus replication. Nucleic acids are often a molecular signature of infection and are recognised by receptors including Toll-like receptors, RIG-I-like receptors and cytosolic DNA sensors. These receptors signal for the induction of innate response genes such as those encoding type I interferons. These then induce the expression of restriction factors, host proteins that limit virus replication.

Our work focuses on cytosolic nucleic acid sensors, in particular RIG-I, MDA5 and cGAS. We use in vitro and in vivo models of virus infections and are interested in rare genetic diseases linked to chronic anti-viral innate immune responses. In this presentation, I will discuss our recent work on MDA5 and cGAS.

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Career session: **Career path in academia**

Prof. Jan Rehwinkel

Radcliffe Department of Medicine
University of Oxford, Oxford, England

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Workshop: Epigenetics in scale, is our future determined by genes?

Dr Wojciech Siwek

International Centre for Cancer Vaccine Science (ICCVS)
University of Gdańsk, Gdańsk, Poland

During the workshop we will discuss what differs epigenetics from genetics. We will explore epigenetic phenomena at various levels of biological organization: organisms, cells, and molecules. Additionally, we will talk about correlations and how much we can trust them.

There will be an opportunity to participate in a contest:

Epigenetic Puzzle: take on the challenge, solve the puzzle, win a genomic test, and learn about your ancestry.

NOTES

Methodology session 1: Targeted immunotherapy - how can the process of obtaining a monoclonal antibody affect its effectiveness?

Dr Edyta Bartusik-Czubek

Manager of Analytics and Process Development Division at Mabion S.A.

One of the most common solutions used in targeted immunotherapy are monoclonal antibodies. Antibodies consist of two identical antigen-binding regions (Fab) and a single conserved region known as Fc (fragment crystallizable region). While the former is responsible for blocking specific protein interactions, the latter can modulate the immune response of patients by engaging specific immune cells or stimulating the production of specific signals that can either enhance or suppress the immune response.

Monoclonal antibodies can be tailored to recognize specific epitopes and therefore they characterized by high specificity, selectivity and low toxicity.

The "gold standard" on the market is obtaining monoclonal antibodies from the biotechnological processes based on the mammalian cell lines. However, it is important to be aware that during manufacturing process various types of mAb's isoforms are obtained. The crucial stage of the manufacturing process of the monoclonal antibodies is cell culture. During this stage, different process conditions can influence the quantity and quality of the obtained pool of mAbs.

And quality characteristics are critical to the drug's effectiveness and safety. Following that, it is important to understand how changes in cell culture can influence the quality profile of the monoclonal antibody.

With my R&D team at Mabion S.A. we've analyzed influence of the cell culture process conditions on quality (and therefore biological activity) of monoclonal antibodies with the use of example of rituximab. Results of our studies allows us not only to better understand interactions between process parameters and quality of obtained product but also identify process parameters that can be used as 'modulators' of quality of the mAb.

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Methodology session 2: Metabolomics for health research

Dr Helen Wright

Institute of Life Course and Medical Sciences
University of Liverpool, Liverpool, England

Metabolomics describes the comprehensive analysis of small molecules in biological systems and captures a dynamic snapshot of the metabolic status and perturbations induced by diseases, drugs, or the environment. In this session we will explore the transformative impact of metabolomics on modern healthcare, offering insights into how this field of study can decode complex biological processes and facilitate enhanced disease diagnosis, prognosis and therapeutic strategies. This will include an introduction to the principles of metabolomics and an overview of the technologies used for metabolic profiling such as mass spectrometry and nuclear magnetic resonance spectroscopy. The talk will highlight some of our own studies using metabolomics to understand disease mechanisms and identify novel biomarkers for diseases such as rheumatoid arthritis and frailty. The case studies will illustrate how metabolomics has been pivotal in uncovering previously unrecognized metabolic changes that can serve as early indicators of disease, thus opening new avenues for preventive medicine. The challenges and future prospects of metabolomics in health research will be addressed, emphasizing its potential in personalised medicine and public health.

NOTES

Methodology session 3: To See Life - Breakthrough Innovations and Interdisciplinary Applications in Microscopy

Dr Jarosław Korczyński

KAWA.SKA

The light microscope has been an essential tool in biological research for over 200 years. Although the fundamental principles of optics have remained largely unchanged, numerous inventions and improvements have transformed current microscopes. Modern microscopes not only enable super-resolution imaging of specimen morphology but also allow for the observation of processes occurring in the samples. This holistic view enhances our understanding of organisms functioning at organ as well as sub-cellular levels. This presentation will showcase the latest achievements in light microscopy and highlight their integration with other scientific fields, such as genetics, molecular biology, and physiology.

NOTES

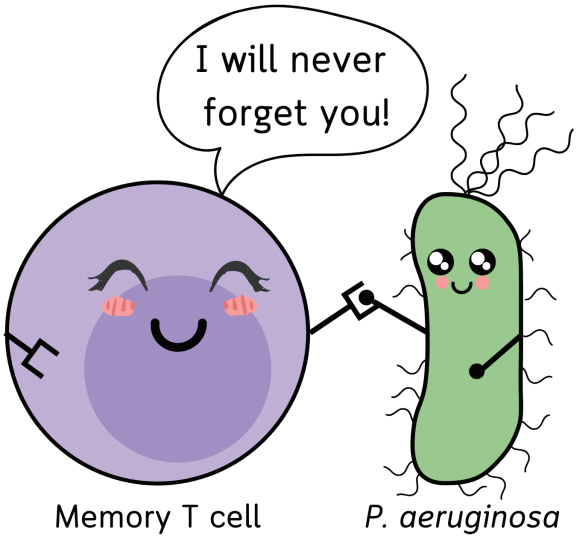
XXVII BSS Programme

Monday, 16th September			
15:00	17:00	Departure from Gdańsk - Arrival at the Hotel Szarlota	
18:00	19:00	Welcome word + **Opening Lecture**: A longitudinal single-cell profiling across immune-mediated disease provides treatment strategy insights	**Calliope Dendrou** (Kennedy Institute of Rheumatology, University of Oxford, Oxford, England)
19:00	20:00	Dinner	
20:00		Integration - field game	
Tuesday, 17th September			
8:00	9:00	Breakfast	
9:30	10:30	**L1**: From bench to bedside - T regulatory cells in the clinic	**Piotr Trzonkowski** (Department of Medical Immunology, Medical University of Gdańsk, Gdańsk, Poland)
10:30	11:30	**L2**: Role of neutrophils in auto-immune disease	**Helen Wright** (Institute of Life Course and Medical Sciences, University of Liverpool, Liverpool, England)
11:30	12:00	Coffee break	
12:00	13:00	**L3**: Mechanisms of Interferon-Gamma Transcriptional Memory	**Wojciech Siwek** (International Centre for Cancer Vaccine Science (ICCVS), University of Gdańsk, Gdańsk, Poland)
13:30	14:30	Lunch	
15:00	16:00	**L4**: How to improve tumor immunotherapy?	**Bożena Kamińska-Kaczmarek** (Laboratory of Molecular Neurobiology, Nencki Institute of Experimental Biology of the Polish Academy of Sciences, Warsaw, Poland)
16:00	17:00	**Career session**: Career path in academia	**Jan Rehwinkel** (Radcliffe Department of Medicine, University of Oxford, Oxford, England)
17:00	17:45	**Methodology session 1**: Targeted immunotherapy - how can the process of obtaining a monoclonal antibody affect its effectiveness?	**Edyta Bartusik-Czubek** (Manager of Analytics and Process Development Division at Mabion S.A.)
19:00		Dinner barbecue	

Wednesday, 18th September			
8:00	9:00	Breakfast	
9:30	10:30	**L5 Plenary lecture**: Dissecting tumor immune microenvironment with single-cell and spatial transcriptomics	**Bożena Kamińska-Kaczmarek** (Laboratory of Molecular Neurobiology, Nencki Institute of Experimental Biology of the Polish Academy of Sciences, Warsaw, Poland)
10:30	11:30	**L6**: Searching for mechanisms of resistance to immunotherapies	**Magdalena Winiarska** (Department of Immunology, Medical University of Warsaw, Warsaw, Poland)
11:30	12:00	Coffee break	
12:00	13:00	**W**: Epigenetics in scale, is our future determined by genes?	**Wojciech Siwek** (International Centre for Cancer Vaccine Science (ICCVS), University of Gdańsk, Gdańsk, Poland)
13:30	14:30	Lunch	
15:00	16:00	**L7**: Complement activation by post-translationally modified proteins and ways to intervene	**Leendert Trouw** (Department of Immunology, Leiden University Medical Center, Leiden, The Netherlands)
16:00	17:00	**Methodology session 2**: Metabolomics for health research	**Helen Wright** (Institute of Life Course and Medical Sciences, University of Liverpool, Liverpool, England)
17:00	17:45	**Methodology session 3**: To See Life – Breakthrough Innovations and Interdisciplinary Applications in Microscopy	**Jarosław Korczyński** (KAWA.SKA)
19:00	19:30	Dinner	
Thursday, 19th September			
8:00	9:00	Breakfast	
Kayaking			
13:30	14:30	Lunch	
15:00	16:00	**L8**: Radiotherapy meets immunotherapy: translating discoveries into real-world solutions	**Barłomiej Tomasik** (Department of Gynecological Oncology and Radiotherapy, Medical University of Gdańsk, Gdańsk, Poland)
16:00	17:00	**L9**: Overview of complement and role in SLE	**Leendert Trouw** (Department of Immunology, Leiden University Medical Center, Leiden, The Netherlands)
17:00	18:00	**L10 Closing lecture**: Nucleic Acid Sensing by Innate Immune Receptors; A journey from MDA5 to cGAS	**Jan Rehwinkel** (Radcliffe Department of Medicine, University of Oxford, Oxford, England)
19:00	19:30	Dinner	
20:00		Fancy dress party - theme "Immunology" / attendance certificate and prizes ceremony	

Friday, 20th September		
8:00	9:00	Breakfast
9:00	9:45	Checking out
11:00		Departure

Glossary:
L = lecture
W = workshop
Please remember to sign your name on a list for workshops participation order.


I will never forget you!
Memory T cell
P. aeruginosa