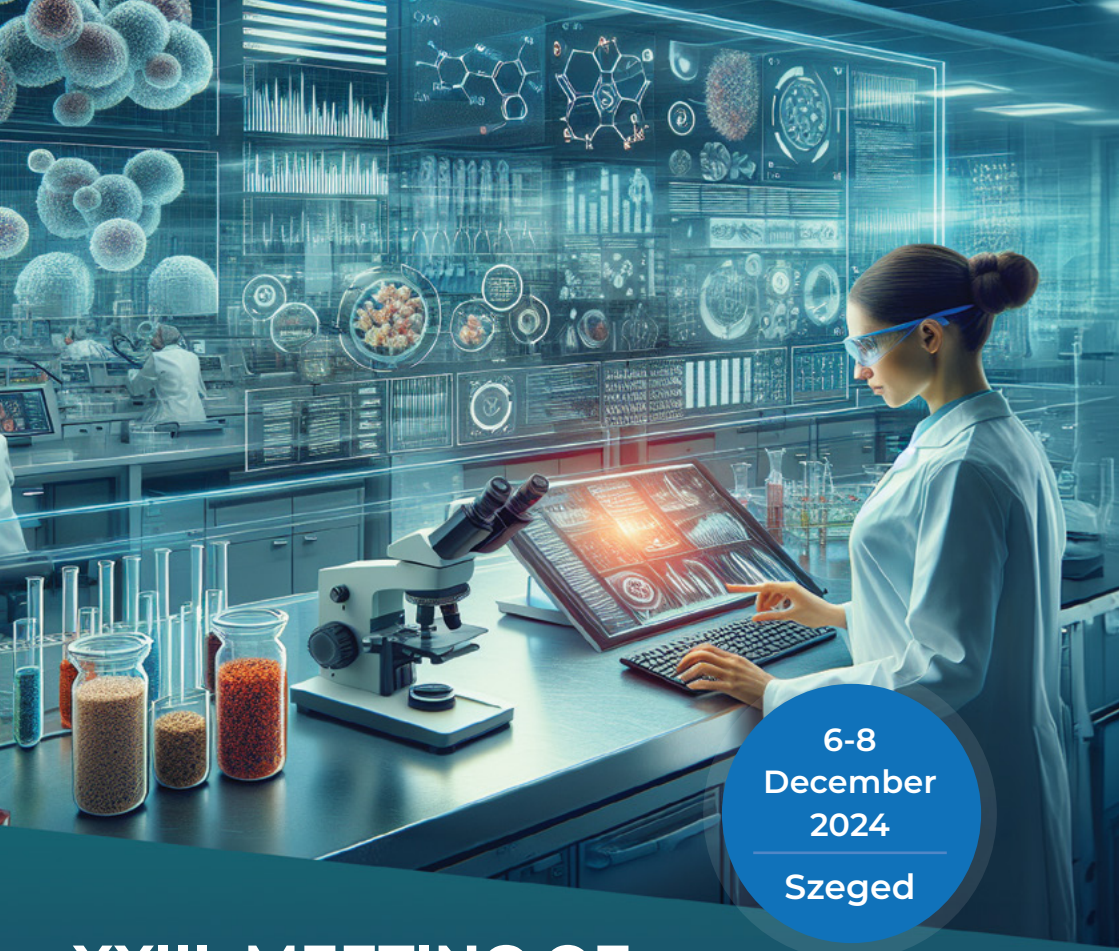

6-8 December 2024

Szeged

XXIII. MEETING OF NOBEL LAUREATES AND TALENTED STUDENTS

An event jointly organized by the National Biomedical Foundation, Academia Europaea Budapest Hub and the Hungarian Academy of Sciences

NEMZETI TUDÓSKÉPZŐ AKADÉMIA
NATIONAL ACADEMY OF SCIENTIST EDUCATION

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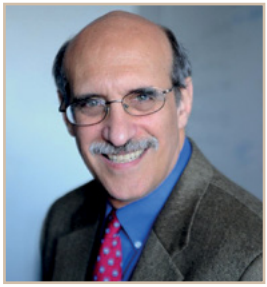
MARTIN CHALFIE



American Nobel Laureate neurobiologist and Professor at Columbia University, transformed molecular biology with his discovery. He shared the 2008 Nobel Prize in Chemistry with Osamu Shimomura and Roger Y. Tsien for his introduction of Green Fluorescent Protein (GFP) as a biological marker.

OLE PETERSEN

A Danish-born medical physiologist and research professor at Cardiff University, the founding member and former vice-president of Academia Europaea, who is a leading authority in physiology, especially calcium signaling and pancreatic disease.

SHAHROKH SHARIAT

An Iranian physician, currently serving as the head of the University Clinic for Urology at the Medical University of Vienna, acknowledged for his outstanding work in the field of urologic oncology. He leads innovative, multicenter studies aimed at advancing cancer diagnostics and treatments.

VENUES

ACCOMODATION

1 **Novotel Szeged** (1 Maros utca, 6721 Szeged)

2 **Art Hotel Szeged** (16 Somogyi utca, 6720 Szeged)

3 **Szent János Hotel** (12 Gutenberg utca, 6722 Szeged)

4 **Dóm Hotel** (6 Bajza utca, 6720 Szeged)

5 **Soleil Apartman** (7 Kelemen László utca, 6720 Szeged)

6 **Mozart Hotel** (16 Oskola utca, 6720 Szeged)

KEYNOTE LECTURE BY THE NOBEL LAUREATE AND OTHER DISTINGUISHED GUESTS, PLENARY SESSIONS, ROUND-TABLE DISCUSSIONS, PEDAGOGY SESSION

7 **University of Szeged József Attila Study and Information Centre** (10 Ady tér, 6722 Szeged)

LABORATORY PRACTICES

8 **Radnóti Miklós Experimental Grammar School in Szeged**, TERMOSZ laboratory (6-8 Tisza Lajos krt., 6720 Szeged)

9 **University of Szeged Báthory István Teacher Training Secondary and Primary School,** SzeReTeD laboratory (2 Szentháromság utca, 6722 Szeged)

10 **IH Event Center, Szeged room** (2 Felső Tisza-Part, 6721 Szeged)

Németh László Secondary and Primary School in Hódmezővásárhely (16 Németh László utca, 6800 Hódmezővásárhely)

VISITS TO THE LABORATORIES OF MENTORS

11 **Albert Szent-Györgyi Medical School, University of Szeged** (Northern Clinical Gardens)

12 **Albert Szent-Györgyi Medical School, University of Szeged** (Southern Clinical Gardens)

13 **Albert Szent-Györgyi Medical School, University of Szeged Department of Anatomy, Histology and Embryology** (38 Kossuth Lajos sgrt., 6724 Szeged)

14 **Albert Szent-Györgyi Medical School, University of Szeged Banga Ilona Health Education Center** (6 Szőkefalvi-Nagy Béla utca, 6720 Szeged)

15 **University of Szeged Faculty of Pharmacy** (6 Eötvös utca, 6720 Szeged)

16 **University of Szeged Department of Biochemistry and Molecular Biology** (52 Közép fasor, 6726 Szeged)

17 **HUN-REN Biological Research Centre, Szeged** (62 Temesvari körút, 6726 Szeged)

PRESS CONFERENCE

18 **Szeged City Hall, Lajos Lechner Hall** (10 Széchenyi tér, 6720 Szeged)

OTHER EVENTS

7 **University of Szeged József Attila Study and Information Centre** (10 Ady tér, 6722 Szeged)

keynote presentations by the Nobel Laureate and other distinguished guests; presentations by Szent-Györgyi Students; presentations by Szent-Györgyi Mentors; a closed meeting between the guests of honor and Szent-Györgyi Students; gala event; gala dinner

CONFERENCE PROGRAM

DECEMBER 6, 2024 *Friday*

10.00-11.00 — **Arrivals and hotel check-ins, Registration**
Novotel Szeged, Szent János Hotel

11.00-12.00 — **Lunch for hotel guests only**

12.00-15.00 — **Laboratory practices for Szent-Györgyi Pupils**
In Szeged and Hódmezővásárhely, in the National Education Centres of the Secondary School Education Program of the National Academy of Scientist Education. (based on a pre-assigned schedule)

15.00- — **Arrival at the University of Szeged József Attila Study and Information Centre**

15.00-16.00 — **Coffee Break**
1st floor Foyer, Exhibiton space, ground floor

16.00-16.45 — **Preparatory Presentation for Szent-Györgyi Pupils**
Congress Hall
Chairs: László Dux, Szilvia Juhász

Sándor Bán: *The significance of fluorescence in biological research*

16.45-17.00 — **Presentation by team members of the iGEM international synthetic biology competition**
Congress Hall
Chairs: László Dux, Szilvia Juhász

iGEM Team: *Possible ways of decreasing histamine concentration in the skin*

17.00-18.30 — **Presentations by Szent-Györgyi Students**
Congress Hall
Chairs: László Dux, Szilvia Juhász

Laura Mundrucz: *TRP Channels in the Central Nervous System.*

Csongor Váróczy: *The Role of Parp Enzymes in the Formation of the Tumor-Associated Macrophage Phenotype*

Zsanna Gecse: *Embryonic Origin of The Mucosal Glial Cells in the Large Intestine: An Embryosurgery Method*

Kata Kóta: *Examination of the Brain Regions that Innervate the Paraventricular Thalamic Nucleus Using Viruses in Mice*

Dorina Kovács: *Better Together – In Vitro Efficacy of Beta-Lactam Antibiotic and Inhibitor Combinations*

Ákos Kovács: *Mutations, Cancer and PCR*

19.00-21.00 — **Dinner (for hotel guests only)**

Novotel Szeged, Art Hotel Szeged, Szent János Hotel

CONFERENCE PROGRAM

DECEMBER 7, 2024 *Saturday*

07.00-08.00 — **Breakfast (for hotel guests only)**

08.30-11.00 — **Visits to the laboratories of Szent-Györgyi Mentors**

Institutions of the University of Szeged and the HUN-REN Biological Research Centre (based on a pre-assigned schedule)

09.45-10.45 — **Honorary guests visit Radnóti Miklós Experimental Grammar School in Szeged**

Classroom observation of a laboratory practice

10.00- — **Arrival at the University of Szeged József Attila Study and Information Centre, Conference registration**

11.00-12.00 — **A closed meeting between the guests of honor and the Szent-Györgyi Students**

Grand lecture hall

11.30-13.30 — **Lunch**

Atrium hall

13.30-15.30 — **Plenary session I**

Congress Hall

Chairs: András Varró, Péter Hegyi

13.30-14.00 – Opening *Welcome speach by Balázs Hankó, Minister of Culture and Innovation and the heads of the NASE's partner institutions*

14.00-14.20 – Péter Hegyi: *Introduction of the National Academy of Scientist Education Program*

14.20-14.30 – Zoltán Rakonczay: *Introduction of The University Program of the National Academy of Scientist Education*

14.30-14.40 – "Szent-Györgyi Student of Excellence 2024" – an award ceremony followed by a presentation by the awardee
Inez Bosnyák: *Investigation of oxygen deficiency in the retina*

14.40-15.30 – Ole Petersen: *How Regulations of Ion Channels Became Essential for Understanding the Physiology and Pathophysiology of Epithelial Transport*

15.30-16.15 — Coffee Break

1st and 2nd floor Foyer, Grand Hall, Exhibiton space, ground floor

16.15-18.20 — Plenary session II

Congress Hall

Chairs: András Varró, Péter Hegyi

16.15-17.00 – Shahrokh Shariat: *13 Tips for a Fulfilling and Successful Academic Career in Health Sciences*

17.00-18.20 – Martin Chalfie: *The Continuing Need for Useless Knowledge*

19.00-20.00 — Gala Event

Atrium Hall

20.00-22.30 — Gala dinner

Atrium Hall

CONFERENCE PROGRAM

DECEMBER 8, 2024 *Sunday*

07.30-08.30 — **Breakfast (for hotel guests only)**

08.30- — **Arrival at the University of Szeged József Attila Study and Information Centre**

09.00-10.00 — **Round table discussions I**

With the participation of Szent-Györgyi Pupils and Szent-Györgyi Students (based on a pre-assigned schedule)

Basement, Auditorium I-II.

Parallel programs:

09.00-09.30 — **István Csabai, presentation by the professor of the Institute of Physics at the Eötvös Loránd University I**

Congress Hall

Chairs: Attila Mócsai, Zoltán Papp

István Csabai: *Artificial Intelligence and the Sciences*

09.30-10.00 — **Presentations by Szent-Györgyi Mentors I**

Congress Hall

Chairs: Attila Mócsai, Zoltán Papp

Péter Balogh: *The Birth and Decline of Our Immune System Through Time and Space*

Zsuzsa Bagoly: *The Quest to Predict Treatment Outcomes in Acute Ischemic Stroke*

10.15 – 11.15 — **Round table discussions II**

With the participation of Szent-Györgyi Pupils and Szent-Györgyi Students (based on a pre-assigned schedule)

Basement, Auditorium I-II.

Parallel programs:

10.15-10.45 — **István Csabai, presentation by the professor of the Institute of Physics at the Eötvös Loránd University II**

Congress Hall

Chairs: Zsuzsanna Helyes, Ádám Dénes

István Csabai: *Artificial Intelligence and the Sciences*

10.45-11.15 — **Presentations by Szent-Györgyi Mentors II**

Congress Hall

Chairs: Zsuzsanna Helyes, Ádám Dénes

Imola Wilhelm: *Friend or Foe? Role of the Brain Environment in Metastasis Formation*

Krisztina Káldi: *Jet lag without crossing time zones*

09.00-11.15 — **Pedagogy session for Szent-Györgyi Teachers and Senior Teachers**

Grand Lecture Hall, Seminar Room II.

10.30-11.30 — **Press conference**

Szeged City Hall, Lajos Lechner Hall

11.30-13.00 — **Lunch, departures**

Atrium hall

LECTURE ABSTRACTS

IN THE SEQUENCE OF PERFORMANCE

LAURA MUNDRUCZ

TRP Channels in the Central Nervous System

Various members of the Transient Receptor Potential (TRP) ion channels contribute to the perception of pain and temperature including the TRPV1 receptor. For this impactful discovery researcher David Julius was awarded the 2021 Nobel Prize in Medicine. The ion channels studied by us also belong to the TRP family (TRPM3, TRPM4) and play an important role, for example, in the perception of pain caused by high temperature or in the formation of the electrophysiological properties of heart musclecells. However, recent research suggests these channels to have crucial functions in the central nervous system as well: for example, TRPM3 mutations have been linked to the development of epilepsy and autistic symptoms in patients. Yet, until now relatively little data was available on the exact location and function of these channels in the brain. Thus, the main profile of our work consists of reasearch on the above-mentioned two ion channels. So far we have shown that TRPM3 is found, besides other locations, in the lateral nucleus of the amygdala and plays a major role in the encoding of fear memory and the development of amygdala related epileptic seizures. Moreover, the TRPM4 ion channel is found on the surface of the hippocampal mossy cells and modifies their electrophysiological properties, seizure susceptibility and memory disorders associated with epilepsy. In view of these results, TRP ion channels seem to play a vital role in both the physiological and pathophysiological functioning of the central nervous system, thus research in the field is of utmost importance.

CSONGOR VÁRÓCZY

The role of PARP enzymes in the formation of the tumor-associated macrophage phenotype

Macrophages are highly versatile and plastic cells of the innate immune system which play an essential role in the defense against pathogens as well as in the recognition and elimination of tumor cells. In the microenvironment of malignant cancers, macrophages are prone to exhibit an alternatively activated (M2) phenotype and produce various anti-inflammatory, angiogenic and growth factors that promote tumor expansion and metastasis formation. Therefore, understanding mechanisms that prevent the alternative (M2), and enhance the classical (M1) activation of macrophages, have outstanding oncotherapeutic relevance.

We aimed to discover how a member of the poly (ADP-ribose) polymerase enzyme family, PARP-14, influences macrophage polarization. We set up a 3-dimensional spheroid system from breast

cancer cells and macrophages to resemble the cancer microenvironment, furthermore, we isolated primary human monocytes from peripheral blood and differentiated them to M2 macrophages. The specific inhibition of the PARP-14 enzyme resulted in a significantly decreased M2 macrophage marker expression, moreover, an increase in the number of apoptotic tumor cells was also detected in spheroids.

Our results have revealed that PARP-14 inhibition strongly suppresses the pro-tumorigenic alternative (M2) polarization of macrophages, which may potentially contribute to a more efficient antitumor response.

ZSANNA GECSE

Embryonic Origin of The Mucosal Glial Cells in the Large Intestine: An Embryosurgery Method

The enteric nervous system (ENS) plays a critical role in gastrointestinal function, and its disruption can lead to serious congenital neurointestinal diseases, including Hirschsprung disease. While surgical removal of the aganglionic segment is lifesaving, alternative approaches, such as neuronal stem cell transplantation, have shown promise in preclinical models as a potential treatment to replace the missing ENS.

Our overarching goal is to advance enteric stem cell therapy by studying the different populations of ENS-derived stem cells. Publications have shown that enteric glia possesses stem cell properties and holds potential as a therapeutic opportunity.

This study aimed to characterize the morphology and ontogeny of enteric glia in the lamina propria layer of the intestine of the avian embryo (which is proven to be one of the best animal model). Sections of the small and large intestines of adult chickens and the hindgut of chicken embryos were examined using double immunofluorescence staining with neural crest/glia (Sox10) and neuron markers (TUJ1). We demonstrate a complex network of intramucosal SOX10+ cells that exhibit ramified morphology typical of ENS cells. These cells are present throughout the avian gut and express the enteric glia-specific SOX10 protein. The Wnt1:tdT-EdnrB mutant mouse was also included for comparative immunolabeling. Using CAM transplantation, we confirmed that colonic mucosa SOX10+ cells do not originate from the ENCC but migrate along extrinsic fibers into the intestine and differentiate into mucosal glial cells.

In conclusion, we demonstrate that the number of mucosal SOX10+ cells is increasing towards the distal part of the colon. Embryomanipulation results show that mucosal SOX10+ cells are present in the experimental aganglionic colon, suggesting their sacral neural crest-derived extrinsic nerve origin. This data demonstrates the significant complexity of the glial networks of the intestines with distinct embryological origin between glia cells of the mucosa and ENS ganglia.

KATA KÓTA

Examination of the brain regions that innervate the paraventricular thalamic nucleus using viruses in mice

Sleep disorders and stress induced behavioural disturbances like the acute and posttraumatic stress disorders (PTSD) caused by traumatic events, pose a serious and common issue in today's society. Previous data indicate that the paraventricular thalamic nucleus (PVT), a region of the thalamus located in the inner part of the brain, plays an important role in the development of disorders associated with excessive vigilance and stress.

Our research group found that the external activation of PVT neurons increases wakefulness levels, sleeping mice wake up, while inhibiting PVT cells can prevent stress induced maladaptive behavioral changes, for example the time mice spend with freezing (a motionless state, which is an indicator of stress in rodents) significantly decreases. Based on these findings, it is crucial to understand, which brain areas are able to stimulate or inhibit PVT neurons in natural conditions, our research aimed to investigate this.

For this purpose, we used transgenic mice that express a protein called Cre recombinase selectively in either excitatory neurons or inhibitory neurons. Then we injected special viruses into the PVT, which, in the presence of the Cre protein, can express a fluorescent protein, that later we can visualize during microscopic examination of brain sections. The viruses are taken up by the nerve terminals of neurons innervating the PVT and travel along the axons to reach the cell bodies.

Using this method, we mapped the brain regions containing cells that innervate the PVT in an excitatory, inhibitory, or both excitatory and inhibitory manner to gain a better understanding of the factors influencing PVT activity.

DORINA KOVÁCS

Better Together - In Vitro Efficacy of Beta-lactam Antibiotic and Inhibitor Combinations

The excessive use of antibiotics and the high adaptability of bacteria have led to the emergence of multi-resistant bacterial strains that withstand most antibiotics used in healthcare. Our goal is to map the resistance genes present in multi-resistant bacteria in our region against combinations of beta-lactam antibiotics and beta-lactamase inhibitors (BL-BLI) currently in clinical development.

In this research, we apply functional metagenomics to identify the resistance genes responsible for these bacteria's resistance. Additionally, we use modified minimum inhibitory concentration (MIC) measurements to assess the resistance mechanisms in a diverse strain collection against 13 different BL-BLI combinations. This collection includes 125 carbapenem-resistant Acinetobacter baumannii and 102 carbapenem-resistant Klebsiella pneumoniae strains, approximately half of which are hospital infection isolates from various Eastern European countries.

Without inhibitors, resistance was observed in 60-90% of the isolates for individual antibiotics. In contrast, combination therapies showed a significant reduction in resistant strains. The BL-BLI combinations still in development generally demonstrated higher effectiveness than the "older" drugs already on the market. Statistical analyses identify which resistance genes are responsible for the resistance phenotypes.

A key goal of our project is to evaluate the effectiveness of BL-BLI combinations in clinical development to understand the types of resistance future antibiotics may face.

ÁKOS KOVÁCS

Mutations, cancer and PCR

Mutations are changes in the DNA sequence. They are often referred to as the engines of evolution. So mutations are useful, aren't they? On the level of the individual they are usually harmful or at least have no beneficial effects. Both inherited and newly acquired mutations can cause a lot of diseases. Probably the most significant is cancer. In cancer cells mutations accumulate that affect proteins playing key roles in the cell cycle control and cell survival. As a result of this micro-level "evolution", cancer cells are formed with an accelerated division rate, without the ability to undergo programmed cell death. Thanks to our growing knowledge of the genetic background of cancer (e.g. what types of mutations are present in a certain type of cancer), these characteristic mutations can also be used for diagnostic purposes. More and more often detecting a typical mutation not only helps in diagnosis, but plays a role in selecting the optimal therapy, supporting the survival of the patient. Our research group has been working on a method over the past few years that can detect two common mutations associated with bladder cancer from urine samples. To do this, we have utilized the magical tools of biochemistry, the most important and universal of which is PCR (polymerase chain reaction). What exactly is PCR? How can it detect COVID? How can it help find a murderer? How can it identify cancer related mutations? You will get the answers if you listen carefully to the lecture.

INEZ BOSNYÁK

Investigation of oxygen deficiency in the retina

Eye diseases caused by oxygen deficiency can easily lead to visual impairment. The prevalence of these conditions is increasing, so identifying new therapeutic targets and treatment options is a focus of interest for researchers. In addition, the pathomechanisms of these diseases are not fully understood.

Our aim was to develop an optimal mouse model with permanent unilateral (UCCAO) or temporary bilateral (BCCAO) common carotid artery occlusion and to investigate the consequences of hypoxia in a time-dependent manner. After the surgeries, changes in the thickness of the different retinal layers were monitored using optical coherence tomography, a painless imaging technique. The extent of damage was analyzed separately in the central and peripheral regions. Molecular biology methods were also used to investigate the consequences of oxygen deprivation at the cellular level. During the experimental period, the total retinal thickness decreased, and significant changes were observed in several layers, but the severity of damage did not differ between central and peripheral regions. In contrast, a more significant decrease in ganglion cell number was observed in the peripheral regions of the retina, a result confirmed by other immunohistochemical studies.

Our results suggest that the 20 min BCCAO is a good model to investigate the consequences of ischemia and reperfusion in the retina in a time-dependent manner, while the UCCAO causes more severe damage in a short time, so it can be used for testing new drugs. The damage probably starts in the periphery and is more severe there, but this difference has not yet been detected by imaging, which is also used in clinical practice.

ISTVÁN CSABAI

Artificial Intelligence and the Sciences

The exponential development of science and the technology built upon it continues at an unbroken pace in the 21st century, making increasingly greater computational capacities and datasets available. Despite this well-known trend, even researchers working in the field were surprised by the phase transition like emergence of artificial intelligence, which in many respects can be compared to human capabilities. Artificial intelligence methods have rapidly spread across many areas of everyday life as well as in the sciences, including physics. In this presentation, I will also try to illustrate the reverse direction: how exploratory science has contributed to technological advancement and what are the physical principles on which artificial intelligence algorithms are based.

PÉTER BALOGH

The birth and decline of our immune system through time and space.

Traditionally immunologists overwhelmingly focus on the leukocyte-driven functionality of the immune system as the major task force for providing protection, without much consideration of the emergence of tissue environment that accommodate the leukocytes themselves. Importantly, adaptive immune responses guided by antigen receptor-bearing T and B cells need special anatomical sites for allowing intricate interactions to occur, which tissues are under developmental control for their formation. These tissues are collectively referred to as secondary lymphoid organs and include the spleen (a solitary organ receiving blood-borne antigens), lymph nodes (a set of tissues in a chain collecting antigens from the lymphatic circulation) and various mucosal lymphoid formations along the gut, receiving luminal antigens locally from the internal surfaces through epithelial cells. Typically, these tissues are formed before birth in a sterile environment, thus predating their actual need – however, the organism retains its capacity to form similar tissues throughout life, often associated with chronic diseases, whereas in aging individuals these tissues lose their capacity for mounting immune responses, thus compromising the efficiency of the immune system. The aim of my presentation is to provide an overview for comparing the developmental characteristics and distinguishing features of these different lymphoid tissues, and highlight the importance of tissue developmental aspects of immunological activity beyond providing protection, and its decline in the elderly.

ZSUZSA BAGOLY

The Quest to Predict Treatment Outcomes in Acute Ischemic Stroke

Approximately 80% of stroke cases are ischemic, meaning that the underlying cause of stroke is the blockage of a cerebral artery by a blood clot (thrombus). Rapid dissolution of the thrombus by a pharmacological drug (thrombolysis) or by mechanical removal of the clot (thrombectomy) is essential for improving outcomes, but these interventions are not a remedy for all. Thrombolysis is only effective in about 30-40% of patients, moreover, in about 6-8% of cases a potentially fatal side-effect, intracranial bleeding will occur. Such complications cannot be foreseen at the initiation of therapy and their occurrence remains unexplained. We hypothesized that certain elements of blood coagulation may be associated with treatment failure and we aimed to see whether testing these elements could help predict therapy outcomes. To test this hypothesis, we established a biobank containing blood samples and clinical data from more than 500 acute stroke patients. We compared

specific blood coagulation parameters from the blood samples of patients with treatment outcomes. We found that clot size and the levels of certain coagulation parameters could predict therapeutic success, providing valuable information for physicians. Part of our work included the development of improved methods and rapid tests that will hopefully allow for more effective prediction of treatment success and enable personalized stroke therapy in the near future. Interestingly, acute alcohol intake showed a beneficial effect on outcomes, and was associated with faster clot dissolution in our tested patient cohort, raising the possibility of potential therapeutic benefit of ethanol during thrombolysis treatment. (Funding: MTA Lendület Hemostasis and Stroke Research Group)

IMOLA WILHELM

Friend or foe? Role of the brain environment in metastasis formation

Brain metastases are commonly formed by lung cancer, breast cancer, melanoma, and several other tumor types. For these cells to establish metastatic tumors in the brain, they must first cross the walls of cerebral capillaries, which form the blood-brain barrier (BBB). The BBB is a specialized feature of the endothelial cells lining cerebral vessels, restricting the passage of cells and molecules into the brain, thus providing protection. However, while the BBB limits the entry of most therapeutics, certain tumor cell types have developed mechanisms to bypass it.

Additionally, brain-metastatic cells must overcome the hostile neural environment shaped by vascular and glial cells. Surprisingly, surviving malignant cells may also benefit from the protective and even supportive roles provided by the BBB and other cerebral cells, making the brain a “sanctuary site” that is less accessible to anti-tumor therapies.

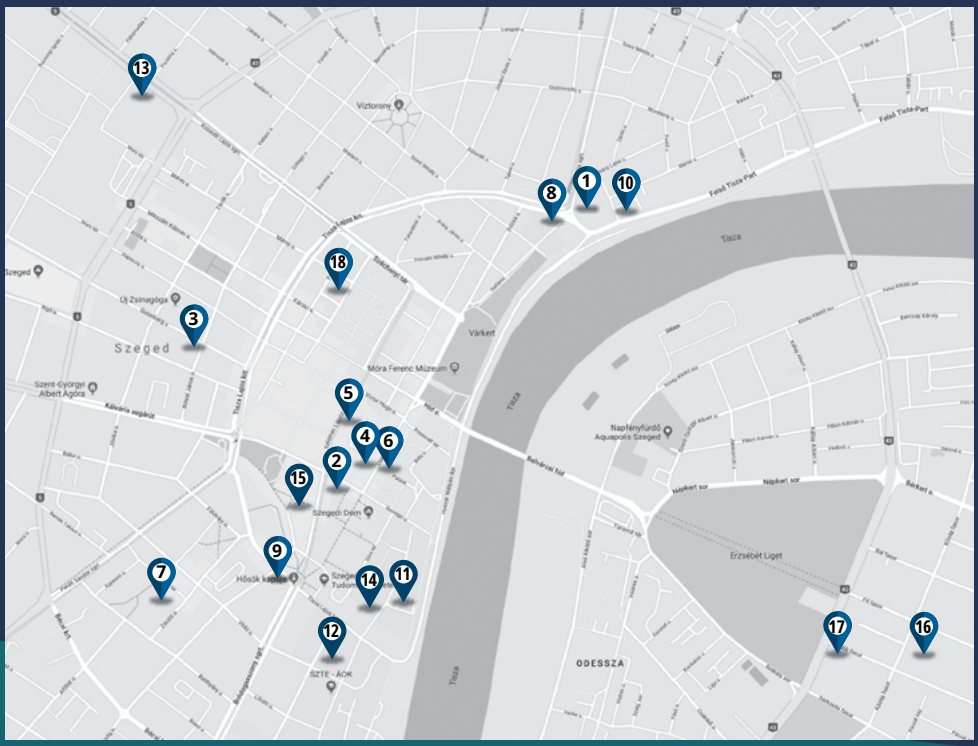
To identify novel therapeutic targets in this life-threatening disease, we focused on the tumor-supportive mechanisms active in the brain. We discovered that pericytes—perivascular cells—secrete large amounts of insulin-like growth factor 2 (IGF2), which promotes the proliferation of breast cancer cells. Furthermore, these metastatic tumor cells activated astrocytes, one of the most abundant cell types in the brain. In response, astrocytes secreted IL-1β, a potent inflammatory cytokine that enhanced the proliferation of metastatic cells.

Most importantly, we were able to block both of these mechanisms using small molecule inhibitors capable of crossing the BBB. Taken together, our findings highlight pericytes and the IGF axis, as well as astrocytes and the IL-1β activation pathway, as promising novel therapeutic targets for the treatment of brain metastatic disease.

KRISZTINA KÁLDI

Jet lag without crossing time zones

Our body continuously measures time within a 24-hour range, a function known as the circadian clock. The daily, clock-regulated rhythm of biological processes is referred to as the circadian rhythm. It is a fundamental physiological function that allows our body to adapt to daily fluctuations of environmental factors, such as light conditions or temperature. Due to endogenous timekeeping, our cells and tissues can prepare in advance for environmental changes, resulting in more efficient functioning. Genetic mutations the molecular clock, jet lag, and shift work lead to disruptions in circadian timekeeping. In such cases, synchronization between our internal clock and environmental changes is lost, which is a risk factor for the development of diabetes, hypertension and other cardiovascular diseases, certain cancers, as well as psychiatric disorders. However, the most common rhythm disorder is social jetlag (SJL), which results from the shift in sleep timing between workdays and free days. We have shown that SJL negatively impacts the academic performance of medical students. Another study of our lab suggests that SJL deteriorates subjective sleep quality and simultaneously has an adverse effect on heart rate regulation during sleep. In my presentation, in addition to discussing the physiological and molecular mechanisms of circadian timekeeping, I will present our findings on the consequences of social jetlag.



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6. Mozart Hotel
7. University of Szeged József Attila Study and Information Centre
8. Szegedi Radnóti Miklós Kísérleti Gimnázium
9. University of Szeged Báthory István Teacher Training Secondary and Primary School
10. IH Event Center
11. Albert Szent-Györgyi Medical School, University of Szeged
12. Albert Szent-Györgyi Medical School, University of Szeged
13. Albert Szent-Györgyi Medical School, University of Szeged Department of Anatomy, Histology and Embryology
14. Albert Szent-Györgyi Medical School, University of Szeged Banga Ilona Health Education Center
15. University of Szeged Faculty of Pharmacy
16. University of Szeged Department of Biochemistry and Molecular Biology
17. HUN-REN Biological Research Centre, Szeged
18. Szeged City Hall

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