PROGRAM | DAY-1

08:30 - 09:00	WELCOME & REGISTRATION
	OPENING SESSION
09:00 - 09:10	WELCOME SPEECH by Moderator Esra Çağavi
09:10 - 09:20	OPENING TALK **Bahadır Kürşat Güntürk**
09:20 - 09:35	SABİTA'S VISION **Emrah Eroğlu**
	SCIENTIFIC SESSION - 1	NEUROSCIENCE CLUSTER **Chair: Serdar Altunay**
09:35 - 09:55	MODULATION OF EEG BRAIN OSCILLATIONS TO ENHANCE COGNITIVE FUNCTIONS **Bahar Güntekin (Neuroscience Director)**
09:55 - 10:10	HOW IS THE BODY'S HEALTH MEMORY ENCODED? **Muhammed İkbal Alp (Group Leader)**
10:10 - 10:20	INVESTIGATION OF THE PROTECTIVE EFFECTS OF POLYETHYLENEIMINE / QUERCETIN COATED GOLD NANOCONJUGATES AGAINTST APOPTOSIS AND OXIDATIVE STRESS IN DRG SENSORY NEURONS **İlyas Özçiçek (Transition Scientist)**
10:20-10:30	REGENERATION AND DEGENERATION IN THE NERVOUS SYSTEM: FROM AXOLOTL MODELS TO CANCER METASTASIS **Neşe Ayşit (Transition Scientist)**
10:30 - 11:00	COFFEE BREAK

PROGRAM | DAY-1

	SCIENTIFIC SESSION - 2 | REGENERATIVE BIOLOGY CLUSTER **Chair: Neşe Ayşit**
11:00 - 11:20	SEEING IS BELIEVING **Mehmet Şerif Aydın (REMER Director)**
11:20 - 11:35	PRECISION MEDICINE AND REGENERATIVE BIOLOGY THROUGH THE LENS OF THE MICROBIOME **Süleyman Yıldırım (Group Leader)**
11:35 - 11:50	DECODING NEURO–IMMUNE–CARDIAC CROSSTALK IN HUMAN HEART DISEASE: PATIENT DERIVED PLURIPOTENT STEM CELL IN VITRO PLATFORMS, CARDIAC ORGANOIDS AND TRANSGENIC MODELS **Esra Çağavi (Group Leader)**
11:50 - 12:05	RESEARCH TRENDS IN REPRODUCTIVE MEDICINE **Seda Karabulut (Group Leader)**
12:05 - 12:20	CELLULAR MECHANISMS ENABLING AXOLOTL LIMB REGENERATION: ROLES OF HIPPO SIGNALING, MTORC1, AND MITOCHONDRIAL REGULATION **Sven Vilain (Group Leader)**
12:20 - 12:30	CARDIAC TELOCYTES IN ARRHYTHMIA MOUSE MODEL **Behnaz Karadoğan (Transition Scientist)**
12:30 - 13:30	LUNCH BREAK
	GUIDED POSTER PRESENTATIONS BY EARLY CAREER SCIENTISTS **Moderator: Özge Şensoy**
13:30 - 13:40	DISSECTING THE ROLE OF NITRIC OXIDE IN PAIN SENSITIVE SENSORY NEURONS USING GENETICALLY ENCODED BIOSENSORS **Tuba Akgül Çağlar**

PROGRAM | DAY-1

13:40 - 13:50	ELECTROPHYSIOLOGICAL EFFECTS OF PLATINUM-BASED DRUGS ON NAV1.7 CURRENTS IN LUNG CANCER CELLS **Şerife Yerlikaya**
13:50 - 14:00	GRIL-SEQ REVEALS NOVEL SMALL RNAS REGULATING SPI1 T3SS IN SALMONELLA TYPHIMURIUM VIA HILD MRNA 3'UTR **Fatih Çakar**
14:00 - 14:10	PROTEOMIC EVALUATION OF A NEUROPROTECTIVE TREATMENT IN EXPERIMENTAL TRAUMATIC BRAIN INJURY **Hayriye Ecem Yelkenci**
14:10 - 14:20	IDENTIFICATION OF PD-L1+ B CELLS IN NON-SMALL CELL LUNG CANCER (NSCLC) AND INVESTIGATION OF MOLECULAR MECHANISMS OF THEIR EFFECT ON ANTITUMORAL RESPONSE **Oğuzhan Köse**
14:20 - 14:30	INTRINSIC AND EXTRINSIC FACTORS RESHAPE CGRP-MEDIATED EPIDERMAL NEUROIMMUNE CROSSTALK IN HUMAN AND MOUSE SKIN **Sümeyye Özyaman**
14:30 - 14:45	COFFEE BREAK
	SCIENTIFIC SESSION - 3 | BIOENGINEERING CLUSTER **Chair: Behnaz Karadoğan**
14:45 - 15:05	UNDERSTANDING AND MODULATION OF DYNAMICS OF PROTEINS BY COMPUTATIONAL METHODS **Özge Şensoy (Bioengineering Director)**
15:05 - 15:20	NANOPARTICLE-MEDIATED HISTOTRIPSY FOR NON-INVASIVE CANCER ABLATION **Yasemin Yüksel Durmaz**

PROGRAM | DAY-1

15:20 - 15:35	HUMAN–ROBOT SYMBIOSIS: PERSONALIZED ASSISTIVE & REHABILITATION ROBOTICS **Elif Hocaoğlu (Group Leader)**
15:35 - 15:50	BEYOND FLUORESCENCE: LABEL-FREE QUANTITATIVE PHASE AND REFRACTIVE-INDEX IMAGING OF CELLS **Muhammed Fatih Toy (Group Leader)**
15:50 - 16:00	RAT AS A MODEL ORGANISM FOR SENSORIMOTOR AND NEUROPROSTHETIC RESEARCH **Mehmet Kocatürk (Transition Scientist)**
16:00 - 16:10	MANIPULATING SWIMMING CELLS WITH PULSATILE FLOWS **Hakan Osman Çaldağ (Guest Scientist)**
16:10 - 16:20	CLOSING REMARKS OF THE DAY **Esra Çağavi**

PROGRAM | DAY-2

08:30 - 09:00	REGISTRATION
	CLINICAL AND TRANSLATIONAL MEDICINE CLUSTER **Chair: Seda Karabulut**
09:00 - 09:15	A RESEARCH AND CLINICAL FELLOWSHIP EXPERIENCE OF A UROLOGIST, AND FUTURE INSIGHTS AND PLANS FOR ISTANBUL MEDIPOL UNIVERSITY **Mustafa Soytaş**
09:15 - 09:30	RECENT CLINICAL AND EXPERIMENTAL RESEARCH TRENDS IN FUNCTIONAL NEUROSURGERY **Mehmet Tönge**
09:30- 09:45	FOSTERING MULTIDISCIPLINARY ACADEMIC COLLABORATIONS IN COLORECTAL RESEARCH: THE STRATEGIC VISION OF İSTANBUL MEDIPOL UNIVERSITY **Mustafa Öncel (Online)**

PROGRAM | DAY-2

09:45 - 10:05	BEYIN & BILIŞ ARAŞTIRMALARI MERKEZI (BEYKOG) **Lütfü Hanoğlu (Group Leader)**
10:05 - 10:30	COFFEE BREAK
	SCIENTIFIC SESSION-4 | DRUG DISCOVERY AND CELLULAR BIOTECHNOLOGY CLUSTER **Chair: İlyas Özçiçek**
10:30 - 10:50	THERANOSTIC NANOPLATFORMS AND COMBINATION THERAPIES FOR PRECISION ONCOLOGY: IMAGING AND ERADICATING MICRO-TUMORS **Sultan Sibel Erdem (Drug Discovery Center Director)**
10:50 - 11:05	NEXT-GENERATION TARGETED THERAPY APPROACHES FOR BRAIN CANCERS: INTEGRATING STEM CELL TECHNOLOGIES, GENETIC ENGINEERING, AND EXOSOMES **Nihal Karakaş (Group Leader)**
11:05 - 11:20	IMMUNOTHERAPY: A TRANSLATIONAL JOURNEY AT SABITA **Mazdak Hakemi (Group Leader)**
11:20 - 11:35	INTEGRATED BIOSENSING AND CHEMOGENETIC STRATEGIES TO DECODE VASCULAR STRESS SIGNALING **Emrah Eroğlu (Group Leader)**
11:35 - 11:50	NANOBIOTECHNOLOGY APPROACHES TO CONTROLLED AND TRANSLATIONAL DRUG DELIVERY **Mehmet Hikmet Üçışık (Group Leader)**
11:50 - 12:00	ACTIVATABLE MOLECULAR PROBES FOR THERANOSTIC APPLICATIONS **Toghrul Almammadov (Transition Scientist)**
12:00 - 12:10	FROM EXOSOME PACKAGING TO CYTOSOLIC FUNCTION: MAPPING THE FULL LIFECYCLE OF DELIVERED RNA **Şükriye Bilir (Transition Scientist)**

PROGRAM | DAY-2

12:10 - 12:20	MICROFLUIDIC 3D TUMOR SPHEROID MODELS USING METABOLIC BIOSENSORS TO EVALUATE COMBINATIONAL CANCER THERAPY **Laleh Rafiee (Transition Scientist)**
12:20 - 13:00	LUNCH BREAK
	GUIDED POSTER PRESENTATIONS BY EARLY CAREER SCIENTISTS **Moderator: Özge Şensoy**
13:00 - 13:10	INVESTIGATION OF FORMATION DYNAMICS AND ACTIVITY DEPENDENT REMODELLING OF PERINEURONAL NETS IN VITRO **Safiye Serdengeçti**
13:10 - 13:20	IDENTIFICATION OF MULTIPLE SCLEROSIS SPECIFIC BIOMARKERS **Burcu Kurt Vatandaşlar**
13:20 - 13:30	GLUTATHIONE RESCUES NEURONS IN PARKINSON'S MODEL FROM FERROPTOSIS BY INHIBITING THE TRPM2 ION CHANNEL **Elif Güzel**
13:30 - 13:40	DEVELOPMENT OF A GEL-FREE 3D CULTURE SYSTEM FOR GENERATING SPHEROIDS FROM AXOLOTL BLASTEMA CELLS **Zeynep Aladağ Türk**
13:40 - 13:50	REGENERATIONAL DIFFERENCES OF DORSAL ROOT GANGLION NEURONS FOR AXOLOTL AND MOUSE **Ayşe Server Sezer**
13:50 - 14:00	TRANSLATIONAL INVESTIGATION OF MOLECULAR MECHANISMS IN NEUROLOGICAL DISEASES: BIOINFORMATICS, IN VIVO AND CLINICAL APPROACHES **Ebrar Altınalan**

PROGRAM | DAY-2

14:00 - 14:10	OXYGEN TENSION IS ASSOCIATED WITH DISTINCT ORTHONAIROVIRUS REPLICATION AND REDOX-STRESS RESPONSES IN HEPATOCYTES **Merve Yazıcı**
14:10-14:30	COFFEE BREAK
	SCIENTIFIC SESSION-5: MULTIOMICS DESIGN AND ANALYSIS STUDIO CLUSTER **Chair: Nihal Karakaş**
14:30 - 14:50	TRACING THE DIET-SPECIFIC HEAVY METALS IN HUMAN NAIL SAMPLES **Mehmet Koçak (MODAS Director)**
14:50 - 15:05	SMALL RNA PROFILING IN HUMAN CEREBRAL MICROVASCULAR ENDOTHELIAL CELLS UNDER PHYSIOXIA AND HYPEROXIA **Kıvanç Kök (Group Leader)**
15:05 - 15:15	FINDING OUT BIOMARKERS WITH MULTI-OMIC APPROACHES FOR NEURODEGENERATIVE AND NEUROCOGNITIVE DISORDERS **Mehmet Ozansoy (Transition Scientist)**
15:15 - 15:25	SYSTEMATIC REVIEWS & META-ANALYSIS, THE GOLD STANDARD OF EVIDENCE SYNTHESIS: UNDERSTANDING THE IMPORTANCE THROUGH A REAL-WORLD EXAMPLE **Sundus Tariq (Transition Scientist)**
15:25- 16:00	AWARD CEREMONY **Hosting Moderator: Esra Çağavi**
16:00 - 16:10	CLOSING REMARKS BY VICE PRESIDENT YASEMIN YÜKSEL DURMAZ

DAY-1 | 09:35 - 09:55

BAHAR GÜNTEKİN
NEUROSCIENCE DIRECTOR

SCIENTIFIC SESSION - 1 | NEUROSCIENCE CLUSTER

MODULATION OF EEG BRAIN OSCILLATIONS TO ENHANCE COGNITIVE FUNCTIONS

DAY-1 | 09:55 - 10:10

MUHAMMED İKBAL ALP
GROUP LEADER

SCIENTIFIC SESSION - 1 | NEUROSCIENCE CLUSTER

HOW IS THE BODY'S HEALTH MEMORY ENCODED?

DAY-1 | 10:10 - 10:20

İLYAS ÖZÇİÇEK
TRANSITION SCIENTIST

SCIENTIFIC SESSION - 1 | NEUROSCIENCE CLUSTER

INVESTIGATION OF THE PROTECTIVE EFFECTS OF POLYETHYLENEIMINE / QUERCETIN COATED GOLD NANOCONJUGATES AGAINTST APOPTOIS AND OXIDATIVE STRESS IN DRG SENSORY NEURONS

Oxidative stress is central to the pathology of various neurological disorders. Although Quercetin (Q), a natural bioflavonoid, possesses strong antioxidant capabilities, its clinical application is hindered by some limitations. This study aimed to engineer polyethyleneimine (PEI)/Q-modified AuNPs in two distinct sizes (AuNP20 and AuNP50) and evaluate their neuroprotective potential against oxidative stress in DRG neurons isolated from mice.

A cellular oxidative stress model was induced on the neurons using H2O2. The synthesis of AuNPs with different sizes and surface chemistries was successful, as evidenced by size increases corresponding to surface coatings. Crucially, Quercetin retained its antioxidant and anti-apoptotic bioactivity after conjugation. Furthermore, the incorporation of PEI significantly enhanced the stability and biocompatibility of the nanoparticles.

Our findings indicate that AuNP-Q-PEI nanoconjugates offer a promising nanotherapeutic platform for managing neurodegenerative diseases. The PEI coating not only improves therapeutic outcomes but also provides a versatile surface for potential future functionalization.

Keywords: *Apoptosis, DRG sensory neurons, Gold nanoparticle, Oxidative stress, Quercetin*

DAY-1 | 10:20-10:30

NEŞE AYŞİT
TRANSITION SCIENTIST

SCIENTIFIC SESSION - 1 | NEUROSCIENCE CLUSTER

REGENERATION AND DEGENERATION IN THE NERVOUS SYSTEM: FROM AXOLOTL MODELS TO CANCER METASTASIS

My work focuses on the repair mechanisms and disease processes of the nervous system. In this context, the tissue regeneration capacity of the Axolotl model is investigated to develop new therapeutic pathways for central and peripheral nerve regeneration in humans. Simultaneously, axonal degeneration processes and neuroprotection are studied in neurological disease models. Another key focus is the investigation of the critical roles of the nervous system in cancer metastasis and the impact of neural signaling pathways on tumor progression. To modulate these biological processes and guide nerve growth, advanced technological approaches based on bio-conductive scaffolds and gold nanoparticles are being developed.

DAY-1 | 11:00 - 11:20

MEHMET ŞERİF AYDIN
REMER DIRECTOR

SCIENTIFIC SESSION - 2 | REGENERATIVE BIOLOGY CLUSTER

SEEING IS BELIEVING

DAY-1 | 11:20 - 11:35

SÜLEYMAN YILDIRIM
GROUP LEADER

SCIENTIFIC SESSION - 2 | REGENERATIVE BIOLOGY CLUSTER

PRECISION MEDICINE AND REGENERATIVE BIOLOGY THROUGH THE LENS OF THE MICROBIOME

This research program applies precision medicine principles to understand how microbiome dynamics shape complex neurological and regenerative phenotypes. In neurodegenerative and infection-associated cognitive disorders, we integrate multi-omic profiling, neuroimaging, and machine learning to stratify disease heterogeneity and identify modifiable pathways. Prior work in Alzheimer's and Parkinson's disease showed that gut, oral, and skin microbiome signatures, when integrated with neuropsychometric and imaging measures, can stratify patients into cognitive subtypes. Ongoing translational studies elsewhere using non-human primates extend this framework to post-acute sequelae of viral infection, revealing microbiome-linked systemic inflammation, network-level brain dysfunction, and early tau-associated pathology.

In parallel, we investigate fundamental links between microbiome ecology and tissue regeneration using the axolotl (Ambystoma mexicanum), a premier vertebrate model of scar-free regeneration. Longitudinal profiling of regenerating limb tissues demonstrates stage-specific restructuring of bacterial and fungal communities, including transient blooms of taxa associated with blastema proliferation and shifts in predicted metabolic functions during regeneration. Experimental induction of metamorphosis further shows that microbiome remodeling coincides with reduced regenerative capacity, implicating microbial–host interactions as modulators of regenerative potential.

Together, these lines of research highlight the microbiome as a unifying, mechanistically relevant factor influencing both neurodegeneration and regeneration, bridging translational medicine with basic science.

DAY-1 | 11:35 - 11:50

ESRA ÇAĞAVİ
GROUP LEADER

SCIENTIFIC SESSION - 2 | REGENERATIVE BIOLOGY CLUSTER

DECODING NEURO–IMMUNE–CARDIAC CROSSTALK IN HUMAN HEART DİSEASE: PATIENT DERIVED PLURIPOTENT STEM CELL IN VITRO PLATFORMS, CARDIAC ORGANOIDS AND TRANSGENIC MODELS

Over the past decade, our research has been driven by a central question: how do cell-autonomous and non–cell-autonomous mechanisms converge to regulate human cardiac function in health and disease? By combining patient-derived induced pluripotent stem cell (hiPSC) models, 3D orgnoids, , multicellular coculture systems, microfluidics, advanced electrophysiology, and whole-organ innervation mapping, we have established an integrated platform to interrogate cardiac physiology from a true systems perspective. Using hiPSC-derived cardiomyocytes, we demonstrated that genetically driven disorders—including SCN5A-linked tachyarrhythmias and C9ORF72-associated amyotrophic lateral sclerosis and—manifest robust, clinically relevant phenotypes at the cellular and functional levels. As a game changer, ALS pathologies ranging from TDP-43 pathology, oxidative stress and arrhythmogenic contractile behavior was shown in human patient-derived cardiomyocytes for the first time in the literature.

Beyond cardiomyocytes, our work reveals that cardiac macrophages and sensory neurons are active regulators of myocardial electrophysiology. Human macrophage–cardiomyocyte coculture models uncover direct membrane-mediated chronotropic and anti-arrhythmic effects, even rescuing inherited arrhythmia phenotypes, while whole-heart mapping of sensory afferents identifies innervation patterns and maladaptive remodeling following ischemic injury. Together, these studies define a unifying research trajectory: decoding neuro–immune–cardiac crosstalk using human-relevant, multiscale models. This approach opens new avenues for mechanism-based therapies, precision drug screening, and regenerative strategies targeting cardiac dysfunction across neurodegenerative, genetic, and ischemic diseases.

Keywords: *Cardiac multisystem interactions, Human iPSC-derived disease models, Cardiac electrophysiology and arrhythmia, organoids, transgenic mouse models,*

DAY-1 | 11:50 - 12:05

SEDA KARABULUT
GROUP LEADER

SCIENTIFIC SESSION - 2 | REGENERATIVE BIOLOGY CLUSTER

RESEARCH TRENDS IN REPRODUCTIVE MEDICINE

Reproductive medicine has witnessed remarkable advancements over the past few decades, driven by a combination of technological innovation, molecular biology insights, and evolving clinical practices. Current research trends reflect a multifaceted approach aimed at improving fertility outcomes, understanding reproductive pathophysiology, and addressing challenges related to reproductive aging, infertility, and assisted reproductive technologies (ART). Emerging studies increasingly focus on the molecular mechanisms underlying gametogenesis, gamete biology, embryo implantation, and early fetal development, providing potential targets for therapeutic intervention. In parallel, there is a growing emphasis on optimizing ART protocols, including in vitro fertilization (IVF) and intracytoplasmic sperm injection (ICSI), through improvements in culture media, cryopreservation techniques, and personalized medicine approaches. Recent investigations also highlight the role of genetic and epigenetic factors in reproductive success, alongside the influence of environmental exposures and lifestyle factors. Additionally, reproductive medicine research is expanding into the integration of artificial intelligence and machine learning for predictive analytics in fertility outcomes and embryo selection, enhancing clinical decision-making and patient-specific treatment strategies. Despite these advancements, persistent challenges remain, such as improving success rates in patients with poor ovarian reserve, recurrent implantation failure, and male-factor infertility, as well as addressing the ethical and legal considerations surrounding reproductive technologies. Overall, ongoing research in reproductive medicine aims not only to increase the efficacy and safety of fertility interventions but also to deepen our understanding of human reproductive biology, paving the way for novel therapeutic approaches and evidence-based clinical guidelines. Continued interdisciplinary collaboration and translational research are essential to advance the field and improve reproductive health outcomes worldwide.

Keywords: *Assisted reproductive technology, embryo, Infertility, oocyte, reproduction, sperm*

DAY-1 | 12:05 - 12:20

SVEN VILAIN
GROUP LEADER

SCIENTIFIC SESSION - 2 | REGENERATIVE BIOLOGY CLUSTER

CELLULAR MECHANISMS ENABLING AXOLOTL LIMB REGENERATION: ROLES OF HIPPO SIGNALING, MTORC1, AND MITOCHONDRIAL REGULATION

Axolotls possess an exceptional ability to regenerate amputated limbs, a process that relies on rapid, scar-free wound closure and timely reinnervation of the wound epithelium by regenerating neurons. These early events are essential for establishing a pro-regenerative environment that enables successful limb regrowth. Understanding the cellular mechanisms underlying these processes is critical for identifying why comparable regeneration fails in humans. In the first part of our work, we focused on Hippo signaling, a conserved pathway regulating tissue growth and repair. We investigated the role of the Hippo pathway and its downstream effectors YAP and TAZ during axolotl wound healing. Using newly generated molecular tools and a novel in vivo axolotl keratinocyte gene delivery assay, we established a platform to study how Hippo signaling contributes to rapid, scar-free wound closure.In the second part, we examined mTORC1 signaling in neuronal regeneration, a key requirement for limb regeneration. Efficient axonal outgrowth and reinnervation by dorsal root ganglion neurons must occur within a defined time window to maintain regenerative competence. We therefore wat to analyze mTORC1 activity during axonal regeneration and developed tools to modulate and monitor this pathway in vivo.

Finally, we investigated mitochondrial regulation as a component of the permissive cellular environment required for regeneration. Comparative analyses revealed distinct mitochondrial features in axolotl versus human cells, suggesting that mitochondrial adaptations support the metabolic and stress resilience necessary for sustained regeneration.

Keywords: *Axolotl limb regeneration, Hippo signaling, mTORC1, wound healing, neuronal regeneration, mitochondria*

DAY-1 | 12:20 - 12:30

BEHNAZ KARADOĞAN
TRANSITION SCIENTIST

SCIENTIFIC SESSION - 2 | REGENERATIVE BIOLOGY CLUSTER

CARDIAC TELOCYTES IN ARRHYTHMIA MOUSE MODEL

Telocytes are a distinct population of interstitial stromal cells characterized by a small cell body and extremely long, thin cytoplasmic prolongations (telopodes) that form 3D networks within tissues. In the heart, telocytes are commonly identified by their characteristic morphology together with markers such as CD34 and PDGFRα, and they are proposed to contribute to tissue architecture and interstitial homeostasis. Whether telocyte organization is altered in inherited arrhythmia, however, remains insufficiently defined.

This ongoing study investigates differences in telocyte density and morphology between an inherited arrhythmia mouse model and matched control hearts. We are performing immunolabeling on heart sections, followed by high-resolution fluorescence imaging to quantify telocyte distribution across predefined anatomical areas. Telocyte density and morphological features are being assessed within the myocardium. In parallel, we are establishing primary in vitro cultures from mouse cardiac tissue for morphological assessment of telocyte or telocyte like cells under controlled conditions. Comparative analyses between arrhythmia and control groups are underway to determine whether arrhythmic hearts exhibit region-specific changes in telocyte abundance, and to define a quantitative “telocyte signature” associated with arrhythmia-related remodeling.

Keywords: *Telocytes; arrhythmia; cardiac remodeling; fluorescence imaging*

DAY-1 | 14:45 - 15:05

ÖZGE ŞENSOY
BIOENGINEERING DIRECTOR

SCIENTIFIC SESSION - 3: BIOENGINEERING CLUSTER

UNDERSTANDING AND MODULATION OF DYNAMICS OF PROTEINS BY COMPUTATIONAL METHODS

G protein-coupled receptor (GPCR) signaling is terminated by binding of arrestin to activated and phosphorylated receptor. Nevertheless, phosphorylatable residues of the receptor might undergo mutation precluding receptor desensitization, which underlies a variety of human disorders. Here, we hypothesize that pre-activated conformation can be stabilized by small molecules, and phosphorylation-independent binding can be maintained. We discovered a compound that binds to the back loop in the unfolded state and stabilizes the pre-activated conformation. Saturation-transfer difference NMR data showed that the compound binds at the back loop of arrestin-3. Importantly, we showed that the compound increased in-cell arrestin-3 binding to basal beta2-adrenergic receptor as shown by FRET-and NanoBiT-based assays in living cells. Moreover, the binding is receptor specific as the compound did not increase binding to muscarinic M2 receptor. These experiments demonstrated the feasibility of enhancing binding of endogenous arrestin-3 to GPCRs in a receptor-specific and arrestin-subtype selective manner via small molecules.

Keywords: *molecular dynamics, arrestin, G protein coupled receptors, biased signaling, antibiotics resistance, nucleosome dynamics, posttranslational modification*

DAY-1 | 15:05 - 15:20

YASEMİN YÜKSEL DURMAZ
GROUP LEADER

SCIENTIFIC SESSION - 3: BIOENGINEERING CLUSTER

NANOPARTICLE-MEDIATED HISTOTRIPSY FOR NON-INVASIVE CANCER ABLATION

Histotripsy is a non-invasive and non-thermal mechanical tissue ablation technique that relies on acoustic cavitation generated with high-pressure, short-duration focused ultrasound pulses. Histotripsy uses already existing gas pockets in the tissue as cavitation nuclei to form bubble clouds when the peak negative pressure is raised beyond the cavitation threshold of the tissue. Although histotripsy has approved by FDA and have promising potential for many clinical applications, high negative pressure values often >25-30 MPa to produce the desired cavitation in the tissue is a major limitation that requires the additional imaging technique for precise ablation. Nanoparticle mediated histotripsy (NMH) addresses this concern using ultrasound active nanoparticles as cavitation nuclei that can significantly lower the cavitation threshold pressure (10-15 MPa).

Perfluorocarbon containing nanoparticles can undergo acoustic droplet vaporization and form gas bubbles. Their ability to selectively accumulate on the tumor through EPR effect helps the selective ablation of the tumor at lower cavitation threshold without damaging the healthy neighboring tissue. This study outlines the rational design of nanoparticles for NMH and their in vitro and in vivo feasibility for a safe and more effective therapeutic ablation.

DAY-1 | 15:20 - 15:35

ELİF HOCAOĞLU
GROUP LEADER

SCIENTIFIC SESSION - 3: BIOENGINEERING CLUSTER

HUMAN–ROBOT SYMBIOSIS: PERSONALIZED ASSISTIVE & REHABILITATION ROBOTICS

Personalized assistive and rehabilitation robotics focuses on integrated systems aligned with human motor and sensory function. Accordingly, natural prosthetic interfaces combine intuitive control with multimodal sensory feedback to enhance embodiment and performance.

Across rehabilitation and assistance contexts, systems are unified by multi-data modeling, sensing, and assist-as-needed control strategies that adapt robotic support to the user's evolving motor capacity. Rather than being tied to a specific limb or mechanical structure, these approaches emphasize compliance, safety, and adaptability to accommodate variable motor behaviors, including involuntary reflex responses and sensorimotor integration. Soft and rigid robotic architectures are selectively employed based on task demands and therapeutic goals to ensure precise and responsive human–robot interaction.

High-bandwidth sensing and synchronized actuation, embedded within adaptive control architectures, enable individualized progression in motor control and functional tasks. These principles define a framework for human–robot symbiosis, delivering data-informed and patient-specific support for functional recovery across clinical populations.

Keywords: *Rehabilitation robotics, wearable robotics, soft robotics, natural prosthetics design and control, multi-data model based personalized therapy*

DAY-1 | 15:35 - 15:50

MUHAMMED FATİH TOY
GROUP LEADER

SCIENTIFIC SESSION - 3: BIOENGINEERING CLUSTER

BEYOND FLUORESCENCE: LABEL-FREE QUANTITATIVE PHASE AND REFRACTIVE-INDEX IMAGING OF CELLS

Fluorescence microscopy has transformed life sciences with its specificity, yet it can perturb the systems it aims to observe, and its sensitivity is limited. In this talk, I will introduce two complementary, label-free imaging approaches that probe cells through their intrinsic optical properties: quantitative phase microscopy and refractive index tomography. Quantitative phase microscopy measures minute changes in the optical path length of light passing through cells, generating maps of cell dry mass, morphology, and dynamics over long time scales extending to days with no phototoxicity. Refractive index tomography extends this concept into 3D, reconstructing the spatial distribution of refractive index inside cells and tissues, analogous to a “CT scan with light.” I will briefly present several systems we have developed — including polarization digital holographic microscopy, total internal reflection digital holographic microscopy, and multimodal fluorescence & holotomographic imaging — and show how they enable non-invasive monitoring of cellular growth, death, and drug response, and reveal structures invisible or difficult to track with conventional bright-field or fluorescence imaging.

Keywords: *Label free microscopy, Digital holographic microscopy, quantitative phase microscopy, Holotomography, Optical diffraction tomography*

DAY-1 | 15:50 - 16:00

MEHMET KOCATÜRK
TRANSITION SCIENTIST

SCIENTIFIC SESSION - 3: BIOENGINEERING CLUSTER

RAT AS A MODEL ORGANISM FOR SENSORIMOTOR AND NEUROPROSTHETIC RESEARCH

Elucidating the neural basis of sensorimotor integration and neuroprosthetic skill learning requires model organisms that can combine experimental neuroscience with translational applications. The rat, with its well-characterized neural circuits and adaptability to behavioral paradigms, provides a robust platform for investigating visuomotor coordination, decision-making, and motivational processes. In the Neuroprosthetics and Sensorimotor Research Laboratory at Istanbul Medipol University, our research focuses on understanding the mechanisms underlying neuroprosthetic control and sensorimotor skill acquisition. To achieve this, we employ electrophysiology, voltammetry, electrical stimulation, mathematical modeling, and machine learning techniques to capture neural activity and behavioral outcomes in response to environmental sensory cues. Our studies highlight capability of rats for performance of complex limb movements and neuroprosthetic control tasks, offering useful perspectives for the development of neuroprosthetic systems. Combining insights from neuroscience and biomedical engineering, we aim to refine motor neuroprosthetic systems to better serve patients with neurological diseases.

Keywords: *Motor cortex, neuroprosthetics, animal behavior.*

DAY-1 | 16:00 - 16:10

HAKAN OSMAN ÇALDAĞ
GUEST SCIENTIST

SCIENTIFIC SESSION - 3: BIOENGINEERING CLUSTER

MANIPULATING SWIMMING CELLS WITH PULSATILE FLOWS

Controlling the spreading of microorganisms in fluids is critical to performance in many applications including bioreactors to lab-on-a-chip diagnostics. Cells with biased swimming response can disperse in non-trivial ways when combined with the shearing effects of the fluid flow. Here we investigate the transport of bottom-heavy swimming cells (such as green alga Chlamydomonas) in a pulsatile channel flow. Simulations and representative experiments show that dramatically different outcomes can be obtained simply by tuning the pulse frequency: Enhanced mixing, directional drift or physical separation of cell populations with different swimming responses are all possible. The responses stem from the interaction of orientational dynamics with the time-variant shear. Gyrotactic cells studied here migrate to the walls in a purely upwelling flow while focusing at the center in a purely downwelling flow. The pulsatile flow allows the cells to sample these mechanisms at different amounts. The results point to non-invasive, flow-based strategies to sort, concentrate or manipulate motile cells without the need for chemical labels or external fields.

Keywords: *Motor cortex, neuroprosthetics, animal behavior.*

DAY-2 | 09:00 - 09:15

MUSTAFA SOYTAŞ

CLINICAL AND TRANSLATIONAL MEDICINE CLUSTER

A RESEARCH AND CLINICAL FELLOWSHIP EXPERIENCE OF A UROLOGIST, AND FUTURE INSIGHTS AND PLANS FOR ISTANBUL MEDİPOL UNIVERSİTY

A Uro-oncology Fellowship Programme is an advanced, post-residency subspecialty training program for urologists seeking focused expertise in the diagnosis, surgical management, and multidisciplinary care of genitourinary cancers.

In this regard, IMU sent a urologist who was willing to work on urological malignancies to a urologic oncology research and clinical programme at McGill University, Canada, for about 4 years. During this scientific journey, extensive experience has been gained and planned, including biobanking, managing a cancer laboratory as a surgeon-scientist, setting up a database registry, and establishing and managing a cancer/science foundation with the help of patients and their relatives. In addition to basic science, hundreds of patients were also examined, operated on, and followed up with, and hundreds of online or in-person scientific meetings were attended. Most importantly, connecting geneticists and clinicians through a bench-to-bedside approach on a periodic basis has been a hallmark of the personalized medicine era. By and large, a broad view of science has been planned for a world-class university, IMU.
In conclusion, the IMU was honored to be represented and will gain significant advantages from this fellowship program in the next period.

DAY-2 | 09:15 - 09:30

MEHMET TÖNGE

CLINICAL AND TRANSLATIONAL MEDICINE CLUSTER

RESEARCH TRENDS IN FUNCTIONAL NEUROSURGERY

Functional neurosurgery has evolved from a target-based clinical discipline into a translational framework for human systems neuroscience, enabling chronic and causal access to deep brain circuits. Contemporary research increasingly conceptualizes movement, psychiatric, and cognitive disorders as disorders of distributed neural networks rather than focal pathologies, driving a shift toward circuit-informed and mechanism-driven neuromodulation strategies. Advances in structural and functional connectomics, tractography-guided targeting, and patient-specific network modeling have facilitated more precise modulation of large-scale brain systems beyond classical anatomical landmarks.

Parallel progress in human electrophysiology has advanced the characterization of disease-relevant neural biomarkers, including oscillatory dynamics and cross-frequency coupling, while revealing fundamental challenges related to inter-individual variability, longitudinal signal stability, and state-dependent network behavior. Adaptive and closed-loop neuromodulation frameworks integrate real-time neural sensing with responsive stimulation, allowing dynamic interaction with pathological circuit states and offering a powerful paradigm for causal testing of neuroscientific hypotheses in the human brain. Computational neuroscience and artificial intelligence further support multimodal data integration, predictive modeling, and individualized parameter optimization, advancing toward model-based neuromodulation and digital representations of brain–device interaction.

Innovation in functional neurosurgical devices is rapidly expanding the neuromodulatory landscape. Emerging technologies include bidirectional neural prostheses with chronic sensing capabilities, magnetothermal and nanoparticle-mediated stimulation approaches targeting cellular and circuit-level mechanisms, and low-intensity focused ultrasound (LIFU) enabling non-invasive, spatially selective modulation of deep brain networks. These technologies introduce new experimental degrees of freedom for probing neural causality, plasticity, and network reconfiguration, while blurring traditional boundaries between invasive and non-invasive intervention.

Safety and translational validity remain central considerations. Evidence derived from large clinical and imaging-based investigations of deep brain stimulation–related complications—including intracerebral hemorrhage, infection, targeting inaccuracy, and symptomatic peri-lead edema—demonstrates how device design, implantation strategies, and neuroanatomical precision directly influence both clinical outcomes and the integrity of neuroscientific inference. Collectively, these developments position functional neurosurgery as a technologically evolving, mechanism-oriented, and ethically grounded platform for longitudinal human neuroscience.

DAY-2 | 09:30- 09:45 (ONLINE)

MUSTAFA ÖNCEL

CLINICAL AND TRANSLATIONAL MEDICINE CLUSTER

FOSTERING MULTIDISCIPLINARY ACADEMIC COLLABORATIONS IN COLORECTAL RESEARCH: THE STRATEGIC VISION OF İSTANBUL MEDİPOL UNIVERSITY (ONLINE)

Background and Scope: The Department of General Surgery at Istanbul Medipol University serves as a high-volume referral center specializing in all subfields of colorectal surgery. Our clinical spectrum encompasses colorectal malignancies, inflammatory bowel diseases (IBD), benign colonic disorders, and proctological conditions, including hemorrhoidal disease, perianal abscesses/fistulas, and anal fissures.Our surgical approach prioritizes advanced minimally invasive techniques, with a robust emphasis on robotic and laparoscopic surgery.

The management of these complex conditions is integrated into a multidisciplinary framework, involving close cooperation with Radiation Oncology, Gastroenterology, Medical Oncology, Radiology, Nuclear Medicine, and Pathology. This collaborative environment ensures a comprehensive diagnostic and therapeutic pathway for our patients.

Research and Vision: Faculty members within the department are actively engaged in extensive clinical research and scientific endeavors. This presentation aims to provide an overview of our ongoing scientific activities and academic output. Furthermore, we seek to explore potential collaborative opportunities with both clinical and basic science researchers. By bridging the gap between surgical practice and scientific innovation, we aim to establish a foundation for impactful, cross-disciplinary partnerships that can translate into improved patient outcomes.

We highly value the insights and critiques of potential collaborators and look forward to discussing future research opportunities together.

DAY-2 | 09:45 - 10:05

LÜTFÜ HANOĞLU
GROUP LEADER

CLINICAL AND TRANSLATIONAL MEDICINE CLUSTER

BEYİN & BİLİŞ ARAŞTIRMALARI MERKEZİ (BEYKOG)

Temel olarak “Bilişsel Sinirbilim” alanında faaliyet gösteren ve Medipol Üniversitesinin Unkapanı kampüsünde 2009 da ilk kuruluşundan itibaren başlayan grubumuz günümüze kadar labratuvar olanakları, insan gücü, makale üretimi, proje uygulamaları yüksek lisans ve doktora öğrencisi yetiştirme ve çalışma alanları bakımından çok ciddi bir gelişme çizgisi göstermiştir.

Bilişsel sinirbilim, günümüzde insan zihninin anlaşılmasına, etik dahil insan davranışlarının beynin işleyişiyle ilişkilendirilmesine, hızla gelişmekte olan yapay zekâ uygulamalarıyla insan zihni arasındaki etkileşimin çözümlenmesine katkı sunmaktadır.

Aynı zamanda, günümüzün en önemli sağlık sorunları arasında yer alan ve demansla seyreden nörodejeneratif hastalıkların anlaşılması, önlenmesi ve tedavi edilmesi açısından da merkezî bir rol oynamaktadır.

Söz konusu alandaki çalışma ve organizasyonların etkinliği ile hedeflenen çıktıların üretilebilmesi, yalnızca mevcut bilimsel birikimle sınırlı kalmayıp geleceğe dönük bir vizyonu da içermelidir. Bu vizyonun hem güncel araştırma eğilimlerini hem de önümüzdeki 10–20 yıl içerisinde olgunlaşması beklenen bakış açıları ve teknolojik gelişmeleri kapsaması zorunludur. Bu bağlamda grubumuz tam olarak bu ihtiyaca karşılık vermek üzere yeniden yapılanarak “Beyin ve Biliş Araştırmaları Uygulama ve Araştırma Merkezi” ni kurmuştur.

DAY-2 | 10:30 - 10:50

SULTAN SİBEL ERDEM
DRUG DISCOVERY DIRECTOR

SCIENTIFIC SESSION-4: DRUG DISCOVERY AND CELLULAR BIOTECHNOLOGY CLUSTER

THERANOSTIC NANOPLATFORMS AND COMBINATION THERAPIES FOR PRECISION ONCOLOGY: IMAGING AND ERADİCATING MICRO-TUMORS

DAY-2 | 10:50 - 11:05

NİHAL KARAKAŞ
GROUP LEADER

SCIENTIFIC SESSION-4: DRUG DISCOVERY AND CELLULAR BIOTECHNOLOGY CLUSTER

NEXT-GENERATION TARGETED THERAPY APPROACHES FOR BRAIN CANCERS: INTEGRATING STEM CELL TECHNOLOGIES, GENETIC ENGINEERING, AND EXOSOMES

Our research group focuses on developing innovative and translational therapeutic strategies, within international collaborative frameworks, for highly lethal brain tumors, particularly glioblastoma (GBM), as well as other aggressive and life-threatening diseases. By integrating advanced molecular biology, cell and gene therapy, genetic engineering, and targeted delivery technologies, we aim to enhance therapeutic precision and efficacy. A central component of our work is the development of targeted GBM therapies supported by biomarker discovery studies that identify novel molecular targets and clarify key drivers of disease progression and prognosis.

In parallel, we investigate antibody-based diagnostic and therapeutic approaches and engineer mesenchymal stem cells as tumor-homing therapeutic platforms for cell- and gene-based interventions. We also design and functionalize exosomes as biocompatible nanocarriers for targeted molecular delivery. CRISPR-based DNA and RNA editing technologies are routinely employed to modulate gene expression and validate therapeutic targets, complemented by in vivo bioimageable tumor models for real-time monitoring of therapeutic response. Although oncology is a primary focus, our platforms are broadly applicable to other life-threatening diseases, including viral pandemics.

DAY-2 | 11:05 - 11:20

MAZDAK HAKEMİ
GROUP LEADER

SCIENTIFIC SESSION-4: DRUG DISCOVERY AND CELLULAR BIOTECHNOLOGY CLUSTER

IMMUNOTHERAPY: A TRANSLATIONAL JOURNEY AT SABITA

This talk presents a translational research program bridging immune regulation in autoimmunity and cancer with targeted therapeutic strategies. At SABİTA, we plan to apply engineered human adipose-derived stem cells (hADSCs) for localized cytokine delivery in models of autoimmune encephalomyelitis and Alzheimer-type neuroinflammation, aiming for durable immune modulation and neuroprotection. In parallel, our cancer immunotherapy pipeline includes research projects on CAR-NK and T cells to target malignant cells, such as dual-antigen AND-gate CAR-NK constructs for solid tumors like glioblastoma. A central focus lies on the TIM-3/Galectin-9 axis in acute myeloid leukemia (AML), where our studies reveal its role in metabolic reprogramming via mTOR-linked glycolysis and glutaminolysis. Building on this, our TÜBİTAK 3501-funded platform utilizes Gal-9–functionalized SBA-15 nanoparticles for TIM-3-targeted, pH-sensitive Camptothecin delivery in AML. Together, these efforts embody a vision of "precision immunomodulation," where cell, gene, and nanotechnologies converge to create disease-specific, mechanism-driven therapies. The SABİTA Research Center aspires to become a leading node for translational immuno-nanomedicine by integrating immune engineering, 3D modeling, and smart delivery systems.

Keywords: *Immunotherapy, CAR-NK cells, hADSCs, Neuroinflammation, Nanomedicine*

DAY-2 | 11:20 - 11:35

EMRAH EROĞLU
GROUP LEADER

SCIENTIFIC SESSION-4: DRUG DISCOVERY AND CELLULAR BIOTECHNOLOGY CLUSTER

INTEGRATED BIOSENSING AND CHEMOGENETIC STRATEGIES TO DECODE VASCULAR STRESS SIGNALING

Understanding the molecular events that drive the transition from a healthy brain vasculature to vascular dysfunction requires tools capable of precise and real-time profiling of cellular signaling. To address this need, we develop integrated genetically encoded platforms that enable both visualization and manipulation of key signaling pathways. Among these, we have generated genetically encoded fluorescent reporters for nitric oxide, Nrf2-dependent antioxidant signaling, and hydrogen peroxide (H_2O_2), allowing quantitative, high-resolution monitoring of redox and stress-responsive processes in living systems.

In parallel, we engineer chemogenetic probes that enable controlled perturbation of the cellular environment, including intracellular acidification, H_2O_2 generation, and hydrogen sulfide production through substrate-driven enzymatic systems. These complementary approaches establish a mechanistic framework for dissecting how oxidative and reductive stress, together with pH imbalance, shape endothelial function and dysfunction.

By integrating these technologies in 2D cultures, 3D microphysiological platforms, and targeted in vivo applications, our research aims to elucidate the signaling events underlying the transition from an intact blood brain barrier to compromised vascular integrity.

DAY-2 | 11:35 - 11:50

MEHMET HİKMET ÜÇIŞIK
GROUP LEADER

SCIENTIFIC SESSION-4: DRUG DISCOVERY AND CELLULAR BIOTECHNOLOGY CLUSTER

NANOBIOTECHNOLOGY APPROACHES TO CONTROLLED AND TRANSLATIONAL DRUG DELIVERY

Integrated nanobiotechnology platforms enable the targeted and controlled delivery of bioactive compounds to diseased tissues and cellular compartments, leading to improved therapeutic outcomes across many diseases. Within this framework, our research focuses on design, fabrication, and modification of nanosystems to enhance efficiency and biological performance of bioactive compounds. These efforts collectively aim to bridge nanomedicine with biological response, thereby supporting the development of translational therapeutic strategies.

Our research encompasses the fabrication, isolation, and comprehensive characterization of nanocarriers using standardized and optimized protocols. Physicochemical analyses are employed to define key parameters, including particle size, surface properties, stability, and drug loading. Nanocarrier efficacy is systematically evaluated in cell culture–based models of cancer, neuroinflammation, and host–pathogen interactions.

In this SABITRENDS session, an overview will be given on the finalized and on-going research studies. The intrinsic features of lipid-, DNA- and exosome-based nanoparticles will be evaluated and collaboration opportunities will be pursued.

Keywords: *Nanobiotechnology; Drug delivery systems; Lipid-, DNA-, and exosome-based nanocarriers; Nanomedicine*

DAY-2 | 11:50 - 12:00

TOGHRUL ALMAMMADOV
TRANSITION SCIENTIST

SCIENTIFIC SESSION-4: DRUG DISCOVERY AND CELLULAR BIOTECHNOLOGY CLUSTER

ACTIVATABLE MOLECULAR PROBES FOR THERANOSTIC APPLICATIONS

DAY-2 | 12:00 - 12:10

ŞÜKRİYE BİLİR
TRANSITION SCIENTIST

SCIENTIFIC SESSION-4: DRUG DISCOVERY AND CELLULAR BIOTECHNOLOGY CLUSTER

FROM EXOSOME PACKAGING TO CYTOSOLIC FUNCTION: MAPPING THE FULL LIFECYCLE OF DELIVERED RNA

Extracellular vesicles, particularly exosomes, are increasingly viewed as programmable carriers for RNA therapeutics, yet the molecular rules governing RNA packaging, transfer, and functional utilization remain incompletely defined. My research targets both ends of this pipeline: (i) how RNAs are selectively packaged into exosomes in living cells and (ii) how delivered RNAs are taken up, trafficked, and rendered functional in recipient cells. A central question is quantitative: after uptake, what fraction of RNA becomes productively engaged by cellular machinery, what fraction remains nonfunctional, and what fraction is degraded—and which molecular checkpoints determine these outcomes.

These mechanistic interests directly guide my development of new engineering strategies for therapeutic RNA delivery, including improved exosomal packaging and more reliable intracellular bioavailability. To connect subcellular routes with molecular outcomes, I integrate correlative light and electron microscopy (CLEM) with RNA-seq and proteomics, enabling pathway-level mapping of internalization, trafficking, endosomal escape, and downstream RNA utilization. This systems-to-mechanism framework supports generalizable design rules and evidence-based optimization of RNA carriers, advancing more predictable, translatable RNA-based therapeutics.

Keywords: *Exosomes, RNA packaging, RNA intake mechanisms*

DAY-2 | 12:10 - 12:20

LALEH RAFIEE
TRANSITION SCIENTIST

SCIENTIFIC SESSION-4: DRUG DISCOVERY AND CELLULAR BIOTECHNOLOGY CLUSTER

MICROFLUIDIC 3D TUMOR SPHEROID MODELS USING METABOLIC BIOSENSORS TO EVALUATE COMBINATIONAL CANCER THERAPY

Physiologically relevant in vitro models are essential for understanding therapeutic responses within the tumor microenvironment (TME). Here, we present a microfluidic 3D breast cancer spheroid platform incorporating genetically encoded metabolic biosensors to investigate immune and metabolic responses to combinational FGFR and PD-1 inhibition. Tumor spheroids expressing biosensors for ATP dynamics and H_2O_2 production are treated with the FGFR inhibitor Rogaratinib and the PD-1 immune checkpoint inhibitor Pembrolizumab, enabling real-time metabolic assessment.

To model tumor–immune interactions, spheroids are co-cultured with peripheral blood mononuclear cells (PBMCs) within the microfluidic system. Treatment outcomes are evaluated by analyzing tumor viability, T cell infiltration, cytokine secretion (including TNF-α), and metabolic stress responses. The platform also enables investigation of tumor invasion behavior under controlled flow and extracellular matrix conditions.

In parallel, ongoing efforts to integrate perfusable tumor-associated microvascular networks aim to enhance physiological relevance by enabling studies of drug delivery and immune cell trafficking. Collectively, this microfluidic biosensor-based approach provides a versatile framework for studying combinational cancer therapies within a biomimetic TME.

These mechanistic interests directly guide my development of new engineering strategies for therapeutic RNA delivery, including improved exosomal packaging and more reliable intracellular bioavailability. To connect subcellular routes with molecular outcomes, I integrate correlative light and electron microscopy (CLEM) with RNA-seq and proteomics, enabling pathway-level mapping of internalization, trafficking, endosomal escape, and downstream RNA utilization. This systems-to-mechanism framework supports generalizable design rules and evidence-based optimization of RNA carriers, advancing more predictable, translatable RNA-based therapeutics.

Keywords: *Exosomes, RNA packaging, RNA intake mechanisms*

DAY-2 | 14:30 - 14:50

MEHMET KOÇAK
MODAS DIRECTOR

SCIENTIFIC SESSION-5: MULTIOMICS DESIGN AND ANALYSIS
STUDIO CLUSTER

TRACING THE DIET-SPECIFIC HEAVY METALS IN HUMAN NAIL SAMPLES

Diet is a major but under-characterized source of chronic heavy metal exposure. This study aims to quantify diet-related accumulation of toxic and essential metals by integrating Food Frequency Questionnaire (FFQ) data with biomonitoring of toenail and fingernail samples. Nails provide a stable, time-integrated matrix for assessing long-term exposure, allowing the detection of metals such as Zn, Cu, Pb, Cd, Mn, and others using high-sensitivity ICP-MS. By correlating individual dietary patterns, including consumption frequency of fish, rice, leafy vegetables, processed foods, and beverages, with metal concentrations measured in nail keratin, the study investigates how specific dietary behaviors contribute to internal metal burden. Statistical modeling will quantify dose–response relationships, identify high-risk dietary sources, and distinguish background exposure from dietary enrichment. This approach enables a mechanistic understanding of how everyday nutrition shapes toxicant accumulation, offering a scalable framework for population-level dietary exposure assessment. Findings will support risk stratification, inform dietary guidelines, and enhance public health strategies aimed at reducing diet-mediated heavy metal exposure.

Keywords: *FFQ, heavy metals, ICP-MS, human health*

DAY-2 | 14:50 - 15:05

KIVANÇ KÖK
GROUP LEADER

SCIENTIFIC SESSION-5: MULTIOMICS DESIGN AND ANALYSIS
STUDIO CLUSTER

SMALL RNA PROFILING IN HUMAN CEREBRAL MICROVASCULAR ENDOTHELIAL CELLS UNDER PHYSIOXIA AND HYPEROXIA

Although research on small noncoding RNAs is expanding, their functions under hyperoxic conditions remain poorly understood. MicroRNAs (miRNAs) are well-established regulators of gene expression, while PIWI-interacting RNAs (piRNAs) have recently gained attention for their emerging biological roles. However, both RNA classes are largely unexplored in the context of cerebrovascular biology and hyperoxia. Human cerebral microvascular endothelial cells (hCMECs) provide an amenable and versatile in vitro model for investigating brain microvascular responses. In this study, next-generation sequencing (NGS) was used to profile small RNAs in hCMECs cultured under physioxia (5 kPa) and hyperoxia (18–20 kPa). Integrated miRNA and piRNA sequencing using the Illumina MiSeq platform identified 36 miRNAs and 14 piRNAs. Comparative analysis revealed a distinct hyperoxia-associated small RNA signature, highlighting previously unrecognized regulatory responses. These findings demonstrate the value of integrated small RNA profiling and support incorporating miRNA and piRNA analyses into future multi-omics studies of cerebrovascular health.

Keywords: *Small RNA sequencing, miRNAs, piRNAs, hyperoxia, hCMECs*

DAY-2 | 15:05 - 15:15

MEHMET OZANSOY
TRANSITION SCIENTIST

SCIENTIFIC SESSION-5: MULTIOMICS DESIGN AND ANALYSIS
STUDIO CLUSTER

FINDING OUT BIOMARKERS WITH MULTI-OMIC APPROACHES FOR NEURODEGENERATIVE AND NEUROCOGNITIVE DISORDERS

At OzansoyLab, our scientific research focuses on identifying molecular and cellular biomarkers for neurodegenerative diseases such as Alzheimer's disease, Parkinson's disease, and Amyotrophic lateral sclerosis, as well as for neurocognitive conditions including disorders of consciousness and sleep disturbances. Neurodegenerative diseases are late-onset degenerative processes characterized by progressive neuronal loss and currently lack effective treatment options beyond symptomatic management. At the molecular level, neurodegeneration is accompanied by pronounced neuroinflammation. Accordingly, OzansoyLab approaches neurodegenerative diseases from a neuroinflammatory perspective, investigating molecular mechanisms driving chronic microglial activation using both cell culture models and blood samples obtained from patients. Disorders of consciousness—defined as clinical conditions in which an individual's awareness of self and environment is impaired—constitute another major research area of our group. In this context, biomarker studies are conducted using blood samples from clinically diagnosed patients. Sleep disorders represent an additional focus, with biomarker analyses performed on samples from affected individuals. Across all research areas, we employ multi-omics strategies combining metabolomic, lipidomic, and transcriptomic analyses. These datasets are integrated with clinical information using artificial intelligence–based models. Our overarching goal is to develop biomarker panels enabling more refined therapeutic strategies and facilitate the detection of late-onset diseases during their presymptomatic stages.

Keywords: *Neurodegeneration, Neuroinflammation, Neurocognitive disorders, Multiomics, Artificial Intelligence*

DAY-2 | 15:15 - 15:25

SUNDUS TARIQ
TRANSITION SCIENTIST

SCIENTIFIC SESSION-5: MULTIOMICS DESIGN AND ANALYSIS
STUDIO CLUSTER

SYSTEMATIC REVIEWS & META-ANALYSIS, THE GOLD STANDARD OF EVIDENCE SYNTHESIS: UNDERSTANDING THE IMPORTANCE THROUGH A REAL-WORLD EXAMPLE

Systematic reviews and Meta-analyses represents the gold standard of evidence synthesis, providing a demanding, transparent and reproducible approach to integrate fragmented research findings. With rapid expansions of medical literature, individual studies often yields inconsistent or underpowered results, limiting their clinical applicability. Systematic reviews addresses these challenges through predefined protocols, comprehensive literature searches explicit inclusion and exclusion criteria, and tough quality assessment, while meta-analysis statistically combines quantitative data to generate precise pooled estimates.

As a real world example, we conducted a systematic review and meta-analysis to evaluate the association between various adipokines and maternal metabolic health, fetal growth, placental function and pregnancy complications. The findings, unobtainable from individual studies alone, highlight leptin and apelin as promising biomarkers for pre-eclampsia risk stratification. Overall, this work underscores the indispensable role of systematic reviews and meta-analysis in advancing evidence based clinical practice, informing policy, and guiding future research.

POSTER | DAY-1 | 13:30 - 13:40

TUBA AKGÜL ÇAĞLAR

GUIDED POSTER PRESENTATIONS BY EARLY CAREER SCIENTISTS

DISSECTING THE ROLE OF NITRIC OXIDE IN PAIN SENSITIVE SENSORY NEURONS USING GENETICALLY ENCODED BIOSENSORS

Nitric oxide (NO) plays critical roles in the nervous system such as a neurotransmitter, axonal growth and regeneration. Because of its short half-life and highly infusibility, the function of NO in pain-sensitive dorsal root ganglia (DRG) has largely been studied using indirect approaches. Thus, we aimed to investigate NO dynamics in DRG neurons using genetically encoded NO biosensor (geNOp) in this study. For this aim, DRG neurons were transduced with AAV viruses carrying geNOp and endogenous NO production induced with the application of 50 mM KCl were imaged under fluorescent microscopy. KCl stimulation elicited a robust increase in geNOp fluorescence; however, the number of neurons exhibiting detectable NO signals was limited. Immunolabeling analysis revealed that only a small subset of DRG neurons express nNOS. Our study highlights the need for alternative cellular model with DRG-like characteristics to better elucidate the contribution of NO signaling in pain sensation.

Keywords: *Apoptosis, DRG sensory neurons, Gold nanoparticle, Oxidative stress, Quercetin*

POSTER | DAY-1 | 13:40 - 13:50

ŞERİFE YERLİKAYA

GUIDED POSTER PRESENTATIONS BY EARLY CAREER SCIENTISTS

ELECTROPHYSIOLOGICAL EFFECTS OF PLATINUM-BASED DRUGS ON NAV1.7 CURRENTS IN LUNG CANCER CELLS

Various chemotherapy drugs alter voltage-gated sodium channel (VGSC) activity in neurons and cardiomyocytes. The VGSC subtype Nav1.7 is up-regulated in lung cancer cells, where it enhances invasion and metastasis. However, it is not known whether platinum based drugs like cisplatin or oxaliplatin affect Nav1.7 function in lung cancer cells. Here, we studied the electrophysiological effects of cisplatin on Nav1.7 currents in H23 cells using Sophion's automated patch clamp technique, Qube 384. Further work is required to establish whether this inhibition functionally impacts on Nav1.7-dependent invasive behaviour. Experiments were conducted using the Qube 384 automated electrophysiology platform from Sophion Bioscience. This platform utilized 384-channel patch chips, each featuring 10 parallel patch holes per channel, with a patch hole diameter of approximately 1 µm and a resistance of 2.00 ± 0.02 MΩ. Effects of 6 different concentrations of cisplatin (1, 2.5, 5, 10 20 and 30 µM) were determined by using Sophion's Qube 384 patch platform on Nav1.7 currents in H23 lung cancer cells. Peak currents were decreased in concentration response manner. Cisplatin is reducing the voltage dependence of activation and inactivation in H23 cells.

Keywords: *Lung cancer cells, metastasis, voltage-gated sodium channels*

POSTER | DAY-1 | 13:50 - 14:00

FATİH ÇAKAR

GUIDED POSTER PRESENTATIONS BY EARLY CAREER SCIENTISTS

GRIL-SEQ REVEALS NOVEL SMALL RNAS REGULATING SPI1 T3SS IN SALMONELLA TYPHIMURIUM VIA HILD MRNA 3'UTR

Salmonella enterica serovar Typhimurium invades the intestinal epithelium using the Salmonella pathogenicity island 1 (SPI1) type III secretion system (T3SS) and induces secretory diarrhea which is still considered a global risk. The regulation of the SPI1 system is controlled by three AraC-like regulators, HilD, HilC and RtsA, that form a feed-forward regulatory loop form, leading to activation of hilA, which encodes the main transcriptional regulators of the T3SS structural genes. Most of the regulatory input is mediated through the translation or stability of the hilD mRNA, or the activity of the HilD protein. The hilD mRNA has an unusual 3′ untranslated region (UTR). The hilD mRNA 3′UTR is 300 nts and can be an independent module that acts as a source of instability for the mRNA. The deletion of this region significantly increases the expression of hilD. Studies indicated that hilD 3′UTR is regulated by RNase E, the transcriptional terminator Rho, and various small regulatory RNAs (sRNAs).

We modified a useful technique to identify the sRNAs that regulates hilD mRNA via the 3′UTR. The technique, which is known as global small non-coding RNA target identification by ligation and sequencing (GRIL-seq), is performed by ligation in vivo of the hilD 3′UTR with any sRNAs that bind through base-pairing and sequencing to identify the chimeric RNAs. Using GRIL-seq, we have identified five novel sRNA that interact with the hilD 3′UTR by base-pairing, resulting in the repression of hilD expression. Moreover, the sequencing data of the chimeras revealed that the sRNA-mRNA base-pairing site finding was accurate when compared to the bioinformatic predictions. We also found that the sRNAs act together with Rho and/or RNase E to regulate hilD via the 3'UTR, as the sRNAs lose their regulation in the absence of Rho or RNase E. The use of modified GRIL-seq allows us to identify sRNAs for specific targets in different environments and also helps uncover new roles for these sRNAs.

Keywords: *Regulation of Gene Expression, Infectious Diseases, Salmonella, GRIL-seq, sRNA*

POSTER | DAY-1 | 14:00 - 14:10

HAYRİYE ECEM YELKENCİ

GUIDED POSTER PRESENTATIONS BY EARLY CAREER SCIENTISTS

PROTEOMIC EVALUATION OF A NEUROPROTECTIVE TREATMENT IN EXPERİMENTAL TRAUMATIC BRAIN INJURY

Proteomics is an omics approach that investigates protein characteristics such as abundance, localization, post-translational modifications, and interactions within cells and tissues. Due to these features, proteomics plays a crucial role in elucidating the molecular mechanisms of neurological disorders and evaluating treatment effects at the protein level. Traumatic brain injury (TBI) is one of the most common injuries with a substantial impact on public health, highlighting the need for effective therapeutic strategies and molecular-level evaluations of treatment outcomes.

In this study, the effects of low and high doses of VPN, an ethyl apovincaminate compound with antioxidant and anti-inflammatory properties, were investigated for their potential to improve cognitive and physical functions in TBI. Three experimental designs were established. First, the effect of VPN under physiological conditions was examined. Second, acute-phase TBI was induced to evaluate protein expression changes in VPN-treated animals. Third, VPN treatment was administered for 28 days following TBI to assess protein profiles during the subacute phase. Proteomic and bioinformatic analyses revealed significant alterations in proteins associated with neurological function and signaling pathways across all groups. Pathway analysis highlighted mechanisms related to neuroprotection and repair, including modulation of the RhoA–ROCK signaling pathway, suggesting that VPN may contribute to preserving neural connectivity and reducing cell death in TBI.

Keywords: *Proteomics, Traumatic brain injury, Bioinformatics*

POSTER | DAY-1 | 14:10 - 14:20

OĞUZHAN KÖSE

GUIDED POSTER PRESENTATIONS BY EARLY CAREER SCIENTISTS

IDENTIFICATION OF PD-L1+ B CELLS IN NON-SMALL CELL LUNG CANCER (NSCLC) AND INVESTIGATION OF MOLECULAR MECHANISMS OF THEIR EFFECT ON ANTITUMORAL RESPONSE

NSCLC remains the leading cause of cancer-related deaths worldwide. The tumor microenvironment in NSCLC is a complex environment composed of a variety of immune and non-immune cells that collectively shape disease progression and therapeutic response. Given PD-L1's role as a key TME regulator, we focused on PD-L1+ B cells to assess their immunosuppressive potential and clinical impact in NSCLC.

A total of 55 patients with the diagnosis of stage IB to IV NSCLC were enrolled. Samples from tumors, mediastinal lymph nodes, healthy lung tissue and peripheral blood were collected from all patients. Lymphocytes were isolated from the blood and the tumor mass. B lymphocyte PD-L1 expressions and characterizations are determined by flow cytometry. RT-qPCR was used to measure EBI3, IL-12p35 IL-10, LGALS1 and MAF mRNA expression.

The number of tumor-infiltrating (TIL) B cells (13.89%±1.45%) was significantly higher than those in healthy lung tissue (4.36%±0.63%) ($p<0.0001$). Similarly, PD-L1 and PD-1 expressions of TIL B cells (9.63%±1.81% and 8.62%±1.78%, respectively) were elevated compared to that of healthy lung tissue (3.39%±0.58% and 1.97%±0.86%, respectively) ($p=0.0018$ and $p=0.0028$, respectively). Flow cytometric analyses revealed that PD-L1+ B cells are found in the “terminally differentiated” group, which includes memory and plasma cells, compared to PD-L1- B cells and healthy lung tissue, however there is no statistical significance ($p=0.0815$ and $p=0.4171$, respectively).

All analyzed genes were up-regulated in PD-L1+ TIL B cells compared to PD-L1- cells: EBI3 (3.96-fold), IL-12p35 (10.87-fold) IL-10 (9.79-fold), LGALS1 (1.14-fold) and MAF (96.73-fold). However, only IL-10 and LGALS1 expression levels were statistically significant when compared to healthy donors ($p=0.0228$ and $p=0.0162$, respectively).

The gene expression profile of PD-L1+ B cells suggests an immunosuppressive function in anti-tumor immunity. These findings indicate that tumor-infiltrating PD-L1+ CD19+ B cells exhibit regulatory B cell characteristics. However, modus operandi of this effect remains to be unveiled.

Keywords: *CGRP sensory innervation; photoaging; Langerhans cells; cutaneous immunity; whole-mount staining*

POSTER | DAY-1 | 14:20 - 14:30

SÜMEYYE ÖZYAMAN

GUIDED POSTER PRESENTATIONS BY EARLY CAREER SCIENTISTS

INTRINSIC AND EXTRINSIC FACTORS RESHAPE CGRP-MEDIATED EPIDERMAL NEUROIMMUNE CROSSTALK IN HUMAN AND MOUSE SKIN

POSTER | DAY-2 | 13:00 - 13:10

SAFİYE SERDENGEÇTİ

GUIDED POSTER PRESENTATIONS BY EARLY CAREER SCIENTISTS

INVESTIGATION OF FORMATION DYNAMICS AND ACTIVITY DEPENDENT REMODELLING OF PERINEURONAL NETS IN VITRO

Perineuronal nets (PNN) are lattice like extracellular matrix that coat mainly GABAergic parvalbumin interneurons (PV-IN) in CNS. Throughout development, PNN structures take shape and stabilise neuronal circuits in majorly experience related fashion. PNN+ PV-INs have a great role in maturation of neural circuits, E/I balance and forming brain oscillations. Despite these seemingly restrictive characteristics, PNNs are not rigid structures yet quite dynamically shaped in activity dependent manner with matrix metalloproteinases (MMPs). However, formation and activity-dependent dynamics of PNNs has not been well understood. In this study, we aimed to observe real time effects of increased neuronal activity on PNN degrading MMPs and dynamics of PNN structures through live imaging in primary neuron cultures in DIV28-30. Using WFA and MMPSense 645 probe incorporated with calcium imaging, cultures were imaged in confocal microscope to observe spontaneous activity in normal conditions for baseline. After PTX treatment, all ROIs were imaged every hour for 24 hours acquiring z-stack for measuring MMP activity and PNN signal intensity, and time series were acquired for measuring changes in network activity via Ca+2 imaging. These results show developmental maturation of PNNs can be mimicked in vitro, and through manipulations of neural activity this method can serve as a useful platform to observe and understand activity dependent dynamics of MMPs shaping PNNs.

Keywords: *perineuronal nets, matrix metalloproteinases, interneurons*

POSTER | DAY-2 | 13:10 - 13:20

BURCU KURT VATANDAŞLAR

GUIDED POSTER PRESENTATIONS BY EARLY CAREER SCIENTISTS

IDENTIFICATION OF MULTIPLE SCLEROSIS SPECIFIC BIOMARKERS

Background/Aim: In the central nervous system (CNS), oligodendrocytes form the myelin sheath by wrapping axons with their plasma membrane, enabling rapid electrical signal propagation and providing trophic support for neuronal survival. Demyelination disrupts these functions, leading to impaired signal transmission and progressive neuronal loss. Multiple sclerosis (MS) is a chronic inflammatory neurodegenerative disease characterized by immune-mediated demyelination and oligodendrocyte dysfunction. Beyond focal myelin damage, accumulating evidence indicates that impaired oligodendrocyte homeostasis and disrupted immune–glial communication critically contribute to disease progression. However, the molecular mediators linking peripheral immune activation to oligodendrocyte pathology remain incompletely defined. To address this gap, we applied an interactome-based strategy integrating transcriptomic and proteomic datasets to identify key proteins involved in oligodendrocyte–immune cell interactions in MS. Based on this approach, ten candidate proteins potentially involved in MS pathogenesis were identified. The main aim of this study was to examine the expression of these candidates in immune cells and to identify MS-specific biomarkers.

Materials and Methods: Expression profiles of the ten candidate proteins were validated in peripheral blood mononuclear cells (PBMCs) obtained from MS patients and age-matched healthy controls using flow cytometry. Functional relevance was further assessed by evaluating the effects of conditioned media derived from patient-derived M1 macrophages on oligodendrocyte lineage cells in vitro.

Results: Among the candidates, HSPA5 emerged as a key molecule showing stage-dependent expression changes in MS. HSPA5 expression was significantly dysregulated in MS patients. Conditioned media from M1 macrophages with altered HSPA5 expression significantly reduced mature oligodendrocyte numbers, while oligodendrocyte precursor cell populations remained largely unaffected.

Conclusion: These findings identify HSPA5 as a potential biomarker reflecting immune–glial interactions in MS and suggest a functional link between immune stress responses and oligodendrocyte vulnerability under inflammatory conditions.

Keywords: *HSPA5, Biomarker, Oligodendrocytes, Multiple Sclerosis*

POSTER | DAY-2 | 13:20 - 13:30

ELİF GÜZEL

GUIDED POSTER PRESENTATIONS BY EARLY CAREER SCIENTISTS

GLUTATHIONE RESCUES NEURONS IN PARKINSON'S MODEL FROM FERROPTOSIS BY INHIBITING THE TRPM2 ION CHANNEL

The pathophysiology of Parkinson's disease is driven by excessive oxidative stress and ferroptosis, a regulated iron-dependent cell death mechanism. This study was undertaken to elucidate the function of the TRPM2 channel in mediating the ferroptosis induced by the parkinsonism-mimicking agent, MPP in SH-SY5Y cells.

Exposure to MPP resulted in a significant upregulation of TRPM2 channel current density and a pathological intracellular overload of free ions, specifically cytosolic calcium, iron, and zinc. This ion imbalance exacerbated mitochondrial dysfunction, leading to elevated reactive oxygen species and lipid peroxidation, while concurrently depleting GSH and glutathione peroxidase.

These pathological processes were significantly mitigated through the administration of exogenous GSH, TRPM2 blocker ACA, or the anti-ferroptotic agent Ferrostatin-1. These findings support that TRPM2 activation constitutes a critical signaling nexus linking parkinsonism-induced oxidative neurodegeneration to ferroptosis. Consequently, modulating the TRPM2 signaling pathway via GSH represents a promising therapeutic paradigm for mitigating neuronal damage in Parkinson's disease.

Keywords: *Ferroptosis, oxidative stress, Parkinson's disease, TRPM2 channel*

POSTER | DAY-2 | 13:30 - 13:40

ZEYNEP ALADAĞ TÜRK

GUIDED POSTER PRESENTATIONS BY EARLY CAREER SCIENTISTS

DEVELOPMENT OF A GEL-FREE 3D CULTURE SYSTEM FOR GENERATING SPHEROIDS FROM AXOLOTL BLASTEMA CELLS

POSTER | DAY-2 | 13:40 - 13:50

AYŞE SERVER SEZER

GUIDED POSTER PRESENTATIONS BY EARLY CAREER SCIENTISTS

REGENERATIONAL DIFFERENCES OF DORSAL ROOT GANGLION NEURONS FOR AXOLOTL AND MOUSE

POSTER | DAY-2 | 13:50 - 14:00

EBRAR ALTINALAN

GUIDED POSTER PRESENTATIONS BY EARLY CAREER SCIENTISTS

TRANSLATIONAL INVESTIGATION OF MOLECULAR MECHANISMS IN NEUROLOGICAL DISEASES: BIOINFORMATICS, IN VİVO AND CLINICAL APPROACHES

Vestibular schwannoma (VS) is a benign Schwann cell–derived tumor that frequently causes progressive hearing loss and vestibulocochlear dysfunction, substantially impacting quality of life. The molecular mechanisms underlying VS pathobiology remain poorly defined, and reliable biomarkers or targeted therapies are lacking. This study aimed to delineate the molecular landscape of VS through a transcriptome-wide meta-analysis.

We performed a genome-wide random-effects meta-analysis of four independent Affymetrix microarray datasets from the GEO database. Differential expression analyses were conducted with and without covariate adjustment. Gene Ontology enrichment and DrugBank-based drug–gene interaction analyses were subsequently applied to characterize biological pathways and assess translational potential.

This transcriptome-wide meta-analysis suggests a comprehensive and multifaceted molecular framework for VS, encompassing Schwann cell lineage programs, immune activation, sensory-related transcriptional changes, and proliferative signaling. The study highlights novel disease-associated genes and pathways, identifies potential therapeutic targets, and provides a foundation for future functional and translational studies in VS.

POSTER | DAY-2 | 14:00 - 14:10

MERVE KALKAN YAZICI

GUIDED POSTER PRESENTATIONS BY EARLY CAREER SCIENTISTS

OXYGEN TENSION IS ASSOCIATED WITH DISTINCT ORTHONAIROVIRUS REPLICATION AND REDOX-STRESS RESPONSES IN HEPATOCYTES

Background: Oxygen tension strongly influences metabolism, mitochondrial function, and antiviral responses, yet most cell culture studies are performed under atmospheric oxygen (~21 kPa), far above physiological tissue levels (3–8 kPa). The liver, a major target of Crimean-Congo hemorrhagic fever virus (CCHFV), operates under low oxygen, but how oxygen shapes orthonairovirus infection remains unclear. Hazara virus (HAZV) provides a safe BSL-2 surrogate.

Aim: To assess how physiological (5 kPa) versus atmospheric (21 kPa) oxygen impacts viral replication and cellular stress.

Methods: Huh-7 cells adapted to each oxygen condition were infected with HAZV (MOI 1). Viral titers, nucleoprotein levels, mitochondrial ROS (Hyper7.2), NRF2 signaling (ARE-miniGFP reporter), and mitochondrial membrane potential (TMRM) were quantified.

Results: Physioxia significantly suppressed viral replication but caused faster mitochondrial depolarization. ROS accumulation was lower at 5 kPa, while NRF2 signaling declined later under physioxia.

Conclusion: Physiological oxygen levels markedly alter HAZV infection dynamics and mitochondrial stress responses, underscoring oxygen as a critical experimental variable.