BIOIMAGING 2024

Satellite Symposium

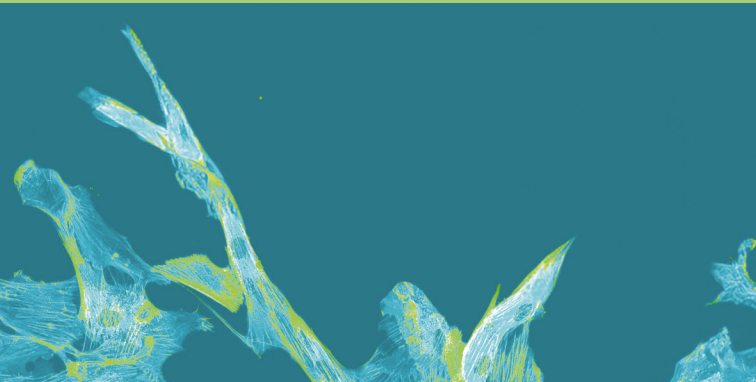
MEDİPOL UNV-SABITA ISTANBUL

SFRR EUROPE

REDOX *Seeing is Believing* ISTANBUL 2024

June 8th 2024 | Istanbul Medipol University

LEAFLET



REDOX ISTANBUL 2024 / *Satellite Symposium*

PROGRAMME

08.30 - 09.00 | **Keynote Lecture** *by Helmut Sies*
Direct Biophysical Readout for Noninvasive Redox Monitoring of Intact Cells and Organs

09.00 - 09.30 | **Featured Speaker I** *by Vsevolod Belousov*
Bioimaging and Chemogenetics in Redox Metabolism Studies

09.30 - 10.00 | **Featured Speaker II** *by Nikolaus Plesnila*
Understanding Ischemic Stroke by Dynamic In Vivo Brain Imaging

10.00 - 10.30 | **Coffee Break & Refreshments**

10.30 - 11.00 | **Featured Speaker III** *by Onnik Agbulut*
Modeling Heart Disease Using Human Cells, Bio-Inspired Cell Culture Systems and Deep Learning-Based Image Analysis to Discovery New Therapeutic Candidates

11.00 - 11.30 | **Featured Speaker IV** *by Elif Nur Fırat - Karalar*
Advanced Imaging Approaches Provide New Insight Into the Centrosome/Cilium Complex and Ciliopathies

11.30 - 12.00 | **Featured Speaker V** *by Ali Ertürk*
Decoding Diseases in 3D: AI-Powered Cell Level Imaging and Omics

12.00 - 12.30 | **Zeiss Symposium** *by Sven Terclavers*
Unlocking molecular dynamics with ZEISS LSM980 Airyscan 2

12.30 - 13.30 | **Lunch**
Istanbul Medipol University South Campus

PROGRAMME

13.30 - 18.30 | **Workshops in SABITA Excellence Center**
Relocate to Medipol North Campus - SABITA

SABITA PARALLEL SESSION I
For Workshop Participants

13.30 - 13.45 | **Welcome and Information on Workshop Modules**
13.45 - 15.15 | **Workshop Session I**
15.15 - 15.30 | **Coffee Break**
15.30 - 17.00 | **Workshop Session II**
17.00 - 18.30 | **Guided Poster Presentations**

SABITA PARALLEL SESSION II
Exclusively for Invited Speakers

13.30 - 15.30 | **Guided Poster Presentations and Networking**
15.30 - 17.00 | **Speciality Coffee Tasting** *by BaristaDoctor*
17.00 - 18.30 | **SABITA Tour**

18.30 | **Farewell at Bosphorus Banquet**
Cemile Sultan Woods

SPEAKER

PROF. DR. **HELMUT SIES**
08.30 - 09.00

"DIRECT BIOPHYSICAL READOUT FOR NONINVASIVE REDOX MONITORING OF INTACT CELLS AND ORGANS"

Current research on redox dynamics in subcellular, cellular and intercellular spaces is flourishing, due to development of sophisticated genetically encoded biosensor techniques. This presentation, in contrast, focuses on noninvasive monitoring of endogenously occurring chromophores which are constitutively present in cells and organs.

Hydrogen peroxide at the physiologically occurring nanomolar concentration is detected by spectrophotometry of Catalase Compound I in the near-infrared. This permits continuous monitoring of H2O2 generation and its removal by redox titration with hydrogen donors, yielding production rates in terms of nmol H2O2/gram tissue/min. Surface fluorescence of NAD(P)H provides information of redox transitions in metabolism, for example during hepatic urea formation from ammonia. Photoemission from electronically excited carbonyls can be followed by single-photon counting techniques. These examples illustrate the potential of direct cellular readout for analysis in redox biology.

PROF. DR. HELMUT SIES

Dr. Helmut Sies is known as a Redox Pioneer for his transformative contributions to the field of redox biology. His illustrious career spans decades, marked by groundbreaking research that has reshaped our understanding of oxidative stress and cellular metabolism. Dr. Sies's pioneering work includes identifying hydrogen peroxide (H2O2) as a crucial aerobic metabolite and developing innovative methods for quantifying cellular H2O2 levels. He has elucidated the roles of central redox systems, such as NAD, NADP, and the antioxidant glutathione (GSH), across various subcellular compartments. Notably, his research led to the discovery of ebselen, a selenoorganic compound with significant implications as a glutathione peroxidase mimic. With over 600 articles and 28 edited books to his name, Dr. Sies's impact on the scientific community is profound. His pioneering insights into oxidative stress and the health benefits of dietary compounds like carotenoids and flavonoids continue to inspire researchers worldwide, shaping the landscape of modern redox biology.

SPEAKER

PROF. DR. **VSEVOLOD BELOUSOV**
09.00 - 09.30

"BIOIMAGING AND CHEMOGENETICS IN REDOX METABOLISM STUDIES"

A deep understanding of the roles of redox metabolites and pathways in physiology and pathology requires molecular tools that enable both visualization of these processes and their selective modulation. Over the last two decades, a number of genetically encoded fluorescent biosensors for key redox metabolites have been developed, allowing real-time detection in living systems of varying complexity.

Recent developments in this area include the ultrasensitive probe HyPer7 and a new fluorogenic probe, HyPerFAST, which enables even more sensitive H2O2 detection across any chosen optical range, from blue to near-infrared. Complementary to imaging with biosensors, chemogenetics offers tunable substrate-dependent modulation of metabolic pathways, allowing the study of normal cell functioning and modeling dysfunctions caused by abnormal pathway activity and/or metabolite levels. We will present recent developments in this area that include insights on oxidative stress brought about by the use of D-amino acid oxidase (DAO) and intriguing details of the Warburg effect brought about by a new mitochondrial "booster," Grubraw, based on bacterial D-amino acid dehydrogenase.

PROF. DR. VSELVOLOD BELOUSOV

Dr. Vselvolod Belousov is a distinguished scientist renowned for his groundbreaking contributions to biochemistry and molecular biology. With a profound expertise in enzymology and bioinformatics, Dr. Belousov has made significant strides in elucidating the intricate mechanisms underlying cellular processes. He earned his doctoral degree in Biochemistry from the renowned Institute of Bioorganic Chemistry of the Russian Academy of Sciences (IBCh RAS), where he continues to serve as a valued member of the research community. Dr. Belousov's research focuses on the development and application of innovative methodologies for studying enzyme kinetics and molecular interactions. His work has not only expanded our understanding of fundamental biological phenomena but also holds promise for the advancement of therapeutic interventions in various disease contexts. Through his unwavering commitment to scientific inquiry and excellence, Dr. Vselvolod Belousov continues to inspire and shape the landscape of modern biochemistry.

SPEAKER

PROF. DR. **NIKOLAUS PLESNILA**
09.30 - 10.00

"UNDERSTANDING ISCHEMIC STROKE BY DYNAMIC IN VIVO BRAIN IMAGING"

Lack of microvascular perfusion after reperfusion ("No-Reflow Phenomenon") is believed to be an important mechanisms of brain damage after cerebral ischemia. Interestingly, the mechanisms causing the No-Reflow Phenomenon are still not well understood.

In the current talk the history of the No-Reflow Phenomenon will be presented and discussed together with several potential mechanisms. Data will be shown demonstrating that a highly dynamic process like the No-Reflow Phenomenon, which develops in a heterogenous spatial and temporal manner needs to be investigated with technologies able to grasp this heterogeneity. To this end, investigations using dynamic in vivofluorescence brain imaging will be presented which demonstrate how and where the No-Reflow Phenomenon occurs and how it may be treated.

PROF. DR. NIKOLAUS PLESNILA

Dr. Nikolaus Plesnila is a distinguished neuroscientist recognized for his significant contributions to understanding brain injury and neuroprotection mechanisms. With a background in medicine and neurophysiology, Dr. Plesnila earned his doctoral degree and pursued postdoctoral training, specializing in cerebral blood flow regulation and traumatic brain injury. He holds prominent positions at the Institute for Stroke and Dementia Research (ISD) in Munich, Germany. The main focus of the Plesnila Laboratory is to study cerebral microvessels in health and disease, utilizing this knowledge to develop innovative therapeutic strategies. They employ in vitro and in vivo models for various brain disorders such as ischemic and hemorrhagic stroke, brain trauma, migraine, and cerebral small vessel disease. The laboratory investigates neurovascular morphology and function using advanced techniques including AAV- and nanoparticle-based labeling, genetically encoded sensor technology, and in vivo multi-photon microscopy.

SPEAKER

PROF. DR. **ONNIK AGBULUT**
10.30 - 11.00

"MODELING HEART DISEASE USING HUMAN CELLS, BIO-INSPIRED CELL CULTURE SYSTEMS AND DEEP LEARNING-BASED IMAGE ANALYSIS TO DISCOVERY NEW THERAPEUTIC CANDIDATES"

The advent of induced pluripotent stem cell (iPSCs) technology has revolutionized the entire field of cardiovascular research. Cardiomyocytes derived from human iPSCs are now at the basis of a growing number of platforms dedicated to high-throughput/high-content screening (HTS/HCS) and multi-OMICs analysis, aiming to better understand disease progression and identify new therapeutics. The continuous development of these platforms raises remarkably high expectations in both academia and industry, although there are still challenges to overcome such as the well-documented immaturity of iPSC-derived cardiomyocytes compared to adult cardiac myocytes or the inability of cellular models to fully recapitulate the complex physiological microenvironment of cardiac tissue, research in this field is dynamic and holds great promise. Using these technologies, we directed our focus towards genetic-driven dilated cardiomyopathy. Dilated cardiomyopathy is a progressive, debilitating disease that often significantly shortens the lifespan of those affected. To date, there exists no known treatment, pharmacological approach or surgery that will revert the disease.

Hence, novel research strategies which could lead to the development of innovative treatments are therefore strongly needed. Among the genes implicated in dilated cardiomyopathy, our attention was particularly drawn to dystrophin and desmin. Thus, human iPSC lines derived from several patients carrying different mutation of DES or DMD were generated and differentiated into cardiomyocytes to phenotype cellular, molecular and functional abnormalities using 2D and 3D cell models. Specifically, our research has demonstrated a noteworthy alteration in cellular metabolism, which is correlated with mitochondrial perturbations. This is accompanied by morphological and structural modifications, as well as functional disturbances in cardiomyocytes, highlighting the relevance of these cell models to study the pathology. Subsequently, we developed an AI-assisted high-content phenotypic screening assay that uses structural abnormalities identified in patient-derived cardiomyocytes as a readout, thereby providing a robust basis to support drug and target discovery campaigns. In summary, during this presentation, I will delineate recent advancements in generating bio-inspired 2D and 3D cell culture systems, along with associated cell-based assays. These developments aim to create a more accurate model of the disease, which is paramount for the identification of therapeutic molecules that are more reliable and effective.

PROF. DR. **ONNIK AGBULUT**

Dr. Onnik Agbulut is a distinguished cardiovascular researcher dedicated to unraveling the molecular and pathophysiological mechanisms underlying cardiovascular diseases. With a background in pharmacy and biochemistry, Dr. Agbulut earned his pharmacy degree from the University Marmara, Istanbul, Turkey in 1994, followed by a PhD in Biochemistry from the University Paris Diderot, Paris, France, in 2001, and a Habilitation to supervise research in 2007. Dr. Agbulut's research focuses on stem cells and bio-inspired biomaterials to understand and treat cardiovascular diseases. His work aims to develop novel therapeutic strategies by elucidating disease mechanisms. Through his commitment to scientific inquiry, Dr. Agbulut advances our understanding of cardiovascular health, leading to innovative treatments in the field.

SPEAKER

DR. ELIF NUR FIRAT-KARALAR
11.00 - 11.30

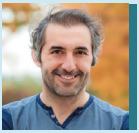
"ADVANCED IMAGING APPROACHES PROVIDE NEW INSIGHT INTO THE CENTROSOME/CILIUM COMPLEX AND CILIOPATHIES"

Centrioles are evolutionarily conserved microtubule-based organelles critical to form centrosomes and cilia, which act as microtubule-organizing, signaling and motility centers. Biogenesis and maintenance of centrioles with proper number, size and architecture are crucial for their functions during development and physiology. Consequently, their deregulation causes developmental disorders and cancer.

Functional and biochemical characterization of several proteins linked retinal degeneration, Joubert syndrome and Primary Ciliary Dyskinesia revealed new insight into disease mechanisms as well as mechanisms underlying centriole and cilium biogenesis. First, ultrastructure expansion microscopy analysis of localization and loss-of-function phenotypes of CCDC15, a new centriole protein, revealed its functions in centriole length control and integrity, resulting in defective ciliogenesis and Hedgehog signaling. Second, in vitro and cellular characterization of CCDC66, a new centriole and cilia protein, identified it as a critical regulator of cell signaling, cell division and cell migration. Moreover, these studies showed that CCDC66 mediates its functions by directly regulating microtubule polymerization and stability. Together, our findings uncovered new players and mechanisms of centriole and cilia biogenesis and thereby, provide insights into diseases linked to centriolar and ciliary defects.

DR. ELİF NUR FIRAT-KARALAR

Dr. Elif Nur Firat-Karalar is an Associate Professor at Department of Molecular Biology and Genetics, Koc University, Istanbul, Turkey. She studied molecular biology and genetics at Bilkent University, Turkey. She then moved to US for her PhD work at the University of California, Berkeley, where she investigated the mechanisms of actin nucleation under the supervision of Matthew Welch. During her postdoctoral work in the laboratory of Tim Stearns at Stanford University, she used proteomics approaches and identified the centriole proteome and proximity interactome that revealed novel regulatory pathways for centriole biogenesis. Since 2014, she has been leading the cytoskeleton research laboratory at Koc University. Research in her lab focuses on studying the structure and function of the mammalian centrosome/cilium complex, with a particular focus on uncovering the molecular defects underlying developmental disorders. Elif is the first recipient of two ERC Starting Grants (2015, 2022) on her studies on the biology of centriolar satellites as well as other national and international grants including EMBO installation grant, Royal Society Newton Advanced Fellowship. Her research has been recognized by many awards including the EMBO Young Investigator Award, TUBITAK Incentive Award in Health Sciences and Sabri Ulker International Science Award.



SPEAKER

PROF. DR. **ALİ ERTÜRK**
11.30 - 12.00

"DECODING DISEASES IN 3D: AI-POWERED CELL LEVEL IMAGING AND OMICS"

Integration of cell-level imaging through DISCO tissue clearing, DISCO-omics, and DISCO-AI deep learning accelerates disease understanding and drug development. Visualizing complex biological systems at the single-cell level, including whole mouse bodies and centimeter-sized human tissues, is a central focus.

Combining DISCO 3D imaging data with DISCO proteomics characterizes pathologies and therapeutic effects, including toxicity and efficacy. Unbiased 3D cell-level imaging of complex biological systems leads to faster discoveries for diseases such as neurodegeneration, cancer, and metabolic disorders. DISCO methods enable exemplary applications of cell-level assessment in whole mouse body, organoids, and large monkey & human tissues, including cancer metastases, inflammation, neurodegeneration, TLS (tertiary lymphoid structures), on- and off-targeting of therapeutics, delivery vehicles such as LNPs and AAVs, CNS penetration of cells and molecules, engineered cells, and CRISPR tools.

PROF. DR. **ALİ ERTÜRK**

Dr. Ali Ertürk is a pioneering figure in biomedical research, renowned for his innovative approaches to understanding and treating complex diseases. He obtained his undergraduate degree from Bilkent University in Ankara in 2003, followed by a Ph.D. at LMU Munich, where he focused on axon regeneration in the injured spinal cord. Dr. Ertürk's career includes significant contributions at the Max-Planck-Institute of Neurobiology, Genentech in South San Francisco, and his current position leading groundbreaking research initiatives. Dr. Ertürk's research focuses on developing and implementing cutting-edge technologies to enable personalized treatment of complicated diseases. He combines biomedical research with artificial intelligence and nanotechnology, aiming to overcome major bottlenecks in research. His major fields of research include AI-based organ mapping, precision medicine in cancer treatments, and tissue engineering. Through his multidisciplinary approach and innovative methodologies, Dr. Ertürk is revolutionizing biomedical research, with the goal of accelerating discoveries and improving patient outcomes on a global scale.

SPEAKER

SVEN TERCLAVERS

12.00 - 12.30

“UNLOCKING MOLECULAR DYNAMICS WITH ZEISS LSM980 AIRYSCAN 2”

Understanding dynamic behaviour is vital to gaining insights into biological processes. Across all scales, dynamics provide crucial insight, from the movement of organisms, organs or cells, developmental changes in organisms or tissues to cell-cell interactions and intracellular molecular behaviour. Fundamentals of imaging dynamic processes match the spatial and temporal resolution. In addition, sample disturbance needs to be kept to the absolute minimum; hence, light exposure must be kept at bay using the most sensitive method, regardless of whether whole organisms or single molecules are investigated.

ZEISS Dynamics Profiler uncovers molecular diffusion, concentration, and flow dynamics of fluorescent proteins in your living samples in a single, easy measurement. Delicate samples can be explored without excessive light exposure or prolonged experiment time. Molecular dynamics experiments were often limited by a lack of necessary equipment or the need for highly trained personnel. Dynamics Profiler can be easily added to a ZEISS confocal by utilizing the sensitive Airyscan detector. Any proficient confocal microscopy user can go beyond traditional confocal imaging to collect molecular dynamics information about a protein of interest. The wizard-guided workflow ensures precise acquisition settings and simple data quality control. Reference images aid in sample context and measurement position documentation. Comprehensible data visualization enables intuitive access to the information obtained. Adding molecular dynamics measurements to your current live sample experiments has never been easier. Develop a more in-depth profile of the molecules in your current experiments, from cell cultures to organoids to whole organisms – even for bright and challenging samples. Examples of new dimensions uncovered by Dynamics Profiler include the transition of cellular condensates formed by liquid-liquid phase separation as measured by Asymmetric Diffusion. With Flow Analysis, measure the speed and direction of fluorescent molecules moving in a bloodstream or in microfluidic systems, such as organ-on-a-chip experiments. Raw data is saved with every measurement, enabling you to perform customized analyses immediately or when the scientific question arises later. Adding molecular dynamics measurements to your current confocal experiments is easier than you think.

SVEN TERCLAVERS

Sven Terclavers, Head of Product & Applications Specialists for the EMEA-LA region at ZEISS, started his career in Belgium as an Imaging Specialist after obtaining his degree in BioEngineering at the KULeuven/GroepT in Leuven, Belgium. Before joining ZEISS, Sven worked as Imaging Facility Manager at KULeuven/VIB in the departments of Physiology and Cardiovascular & Research.

In 2014, he moved to the United States where he first worked as a 3D Specialist supporting the South-East region, followed by a 3-year position as Embedded Specialist at the Harvard Centre for Biological Imaging in Cambridge, MA.

Upon his return to Europe in 2018 – Sven now lives in London – he took up the role as Head of PASS EMEA-LA, leading a group of international specialists, responsible for sales & application support, as well as business development in the fields of Light-, Electron-, and X-ray Microscopy.

TRAINER

DR. ESRA NUR YİĞİT
13.45 - 17.00

MODULE 1

"SINGLE CELL LASER INJURY AND SIMULTANEOUS CALCIUM AND ATP IMAGING USING HIGH RESOLUTION CONFOCAL MICROSCOPY"

Hello, my name is Dr. Esra Nur Yiğit. This workshop explores advanced techniques of laser microdissection while conducting real-time calcium and ATP imaging using genetically encoded biosensors. Participants will learn how to induce precise cellular damage such as single axotomy and monitor intracellular dynamics, fostering insights into cellular response mechanisms.

References:

Ghaffari Zaki A et al., **Genetically Encoded Biosensors Unveil Neuronal Injury Dynamics via Multichromatic ATP and Calcium Imaging.** ACS Sens. 2024 Jan 31. doi: 10.1021/acssensors.3c02111. Epub ahead of print.

Aydın MŞ et al., **Active shrinkage protects neurons following axonal transection.** iScience. 2023 Aug 25:26(10):107715. doi: 10.1016/j.isci.2023.107715.

DR. ESRA NUR YİĞİT

Esra Nur Yiğit holds a B.S. degree in Genetics and Bioengineering and minor degree in Computer Engineering. She received her M.Sc. degree in Neuroscience at Istanbul Medipol University and Ph.D. degree in Biotechnology at Gebze Technical University. Her Ph.D. thesis is based on identifying common cell death/survival pathways playing a role in the spread of pathology among different neurodegenerative diseases including Huntington's disease, Parkinson's disease and traumatic injury. She is interested in implementing advanced microscopy techniques for identifying cell to cell interactions in the process of spreading of neurodegeneration.

TRAINER

ASAL GHAFFARI ZAKI

13.45 - 17.00

MODULE 2

"REAL-TIME MANIPULATION AND OBSERVATION OF H2O2 AND PH USING CHEMOGENETIC AND IMAGING APPROACHES"

Dear fellows, this is Asal Ghaffari Zaki. This workshop delves into manipulating H2O2 and pH levels through chemogenetic approaches while employing wide-field techniques and genetically encoded biosensors for real-time visualization. Participants will learn to modulate cellular environments and track dynamic changes, enabling precise control and observation of biochemical processes.

References:

Ghaffari Zaki A et al., **Development of a Chemogenetic Approach to Manipulate Intracellular pH.** J Am Chem Soc. 2023 Jun 7;145(22):11899-11902. doi: 10.1021/jacs.3c00703. Epub 2023 May 24.

Erdogan YC et al.,**Complexities of the chemogenetic toolkit: Differential mDAAO activation by d-amino substrates and subcellular targeting.** Free Radic Biol Med. 2021 Dec;177:132-142. doi: 10.1016/j.freeradbiomed.2021.10.023. Epub 2021 Oct 20.

ASAL GHAFFARI ZAKI

Asal Ghaffari Zaki has received her bachelor degree from Sabanci University in Turkey. For her master's studies she joined Dr. Eroğlu's lab to persue her interest in development of genetically encoded biosensors and chemogenetic tools. She received her master's degree from Sabanci University department of Molecular biology and Bioengineering in Summer of 2023 and plans to continue her research in the lab of Dr. Eroğlu.

TRAINER

DR. MEHMET ŞERİF AYDIN
13.45 - 17.00

MODULE 3

"3D-LIGHT-SHEET IMAGING OF BRAIN TISSUES AND TISSUE CLEARING TECHNIQUES"

Hi, I am Dr. Mehmet Şerif Aydın. This workshop focuses on employing 3D-light-sheet imaging to visualize brain tissues, coupled with tissue clearing techniques to enhance imaging depth and clarity. Participants will explore cutting-edge methods for studying neural architecture in three dimensions, facilitating comprehensive analysis of brain structure and function.

References:

Pan, C., Cai, R., **Quacquarelli, F. et al. Shrinkage-mediated imaging of entire organs and organisms using uDISCO**. Nat Methods 13, 859–867 (2016). https://doi.org/10.1038/nmeth.3964

Ueda HR et al, **Tissue clearing and its applications in neuroscience.** Nat Rev Neurosci. 2020 Feb:21(2):61-79. doi: 10.1038/s41583-019-0250-1.

Aydin, M. S. et al., **Transfer and Integration of Breast Milk Stem Cells to the Brain of Suckling Pups**. Sci Rep 8, 14289 (2018)

DR. MEHMET ŞERİF AYDIN

Dr. Mehmet Şerif AYDIN completed his Bachelor's degree in Biology at Istanbul University Faculty of Science in 2008. He obtained his Master's and Ph.D degrees in Histology and Embryology from Institute of Health Sciences in Marmara University (2010) and Selçuk University (2016), respectively. Since then, he is the Head of Advanced Imaging Laboratory at Regenerative and Restorative Medicine Research Center (REMER) within Research Institute for Health Sciences and Technologies (SABITA) in Istanbul Medipol University. His primary research interest is investigating the migration and differentiation of breast milk stem cells, as well as delving into the field of neurodegeneration using in vivo microscopy techniques and applying tissue clearing techniques for imaging. In 2022, he became the Director of REMER in Istanbul Medipol University.

TRAINER

DR. THERESA BALBER
13.45 - 17.00

MODULE 4

"STEREO FLUORESCENCE IMAGING OF VESSELS IN OVO"

Dear all, this is Dr. Theresa Balber. This workshop introduces stereo fluorescence imaging techniques for visualizing vascular structures in ovo (in the chicken egg) utilizing fluorescent dyes. Participants will learn the injection and visualization techniques.

References:
Balber T et al. **Experimental Nuclear Medicine Meets Tumor Biology.** Pharmaceuticals (Basel). 2022 Feb 14;15(2):227. doi: 10.3390/ph15020227.

DR. THERESA BALBER

Theresa Balber studied pharmacy and received her doctorate from the Faculty of Life Sciences at the University of Vienna, Austria. She completed her doctoral studies at the Department of Biomedical Imaging and Image-guided Therapy (Division of Nuclear Medicine, Medical University of Vienna), where she developed a radiolabeled tracer for imaging the adenosine-3 receptor (using positron emission tomography) and was involved in the discovery of MCHR1 in brown adipose tissue. After graduation, she accepted a postdoctoral position at the Ludwig Boltzmann Institute Applied Diagnostics, where she was responsible for the in vitro and in vivo characterization of new radiotracers for imaging and therapy (theranostics). She established protocols for the imaging of fertilized chicken eggs as an alternative tumor model and is very experienced in the production and quality control of radiopharmaceuticals. She teaches medical radiochemistry and pharmaceutical technology. She is also a board member of the Austrian Pharmaceutical Society (ÖPhG) and a member of the management committee of the COST Action CA22118 "Radionuclide Diagnostics for Personalised Medicine (RATIONALE)". Dr. Theresa Balber has recently joined Emrah Eroglu's group as a visiting scientist. She is receiving a 12-month scholarship from the Scientific and Technological Research Council of Turkey (Tübitak). Her current research focuses on the effects of oxidative stress on tumor vasculature and angiogenesis.

TRAINER

ŞEYMA KABLAN ÇİMEN
13.45 - 17.00

MODULE 5

"PRACTICAL APPLICATIONS OF HIGH-CONTENT REAL-TIME CELL METABOLIC ANALYSIS WITH SEAHORSE ANALYZER: TECHNIQUES AND INSIGHTS"

Dear participants, this is Şeyma Kablan Çimen. This workshop offers hands-on training in high-content Seahorse technology, focusing on real-time cell metabolic analysis. Participants will learn to utilize Seahorse technology for comprehensive assessment of cellular bioenergetics, gaining insights into metabolic pathways and their modulation in health and disease.

References:

Little AC et al., **High-content fluorescence imaging with the metabolic flux assay reveals insights into mitochondrial properties and functions.** Commun Biol. 2020 May 29;3(1):271. doi: 10.1038/s42003-020-0988-z.

Yozgat Y et al., **Hexokinase 1b is a novel target for Non–small-cell lung cancer.** Biorxiv. 2022 June 30; doi: https://doi.org/10.1101/2022.06.27.497447

ŞEYMA KABLAN ÇİMEN

Şeyma Kablan Çimen graduated from Istanbul Medipol University Department of Nutrition and Dietetics with a first degree in 2018 and she completed her master's degree in the same area in 2019. Since 2018, she has been working at SABITA (Health Sciences and Technology Research Institute) as a researcher and she has still been continuing her education at Istanbul Medipol University, Institute of Health Sciences, Nutrition and Dietetics Ph.D. program. Her research has focused on cellular bioenergetics and she is primarily responsible for the maintenance and operation of the Seahorse XF Analyzer in SABITA. She is also interested in cellular metabolism in cancer and takes part in different cancer research projects.

TRAINER

DR. **SVEN VILAIN**
13.45 - 17.00

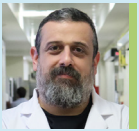
MODULE 6

"AN INTRODUCTION TO AXOLOTL LIMB REGENERATION"

Bonjour, this is Dr. Sven Vilain. In this workshop we will introduce axolotl as a model organism to study regeneration. We will show axolotl salamanders with and without regenerating limbs and discuss some principles of axolotl limb regeneration. Hence, the workshop will provide a presentation of axolotl regeneration studies.

DR. SVEN VILAIN

After obtaining his master's degree in bio-engineering - cell and gene biotechnology at the VUB (Free University in Brussels, Belgium), he pursued a PhD at the KU Leuven, Belgium under the supervision of Prof. Bassem Hassan. During his PhD, he used the fruit fly Drosophila melanogaster as a model organism to study the role of the proneural gene atonal during neurogenesis. To facilitate this study, he developed novel gene targeting approaches.
He continued his scientific career as a Postdoc in the lab of Prof. Patrik Verstreken, where he sought to gain an understanding of the aetiology of Parkinson's disease. For this purpose, he used Drosophila as a model organism and studied the function of various genes involved in hereditary forms of this disease. Together with his colleagues, he found that mutations in these genes cause defects in presynaptic terminals via different biological pathways. He is currently Assistant Professor at Istanbul Medipol University, Turkey where he uses the axolotl salamander to unravel the mechanisms of regeneration.



TRAINER

EMRE VATANDAŞLAR
13.45 - 17.00

MODULE 7
"HYPER QUANTIFICATION EMPLOYING FACS"

Dear Friends, I am Emre Vatandaşlar. This workshop provides training on selecting and sorting stable cells using FACS based-methodology and quantifying HyPer7.2 signals through Flow Cytometry (FC) analysis. Participants will learn to optimize protocols for detection and quantifying intracellular hydrogen peroxide levels using HyPer7.2 with FlowJo analysis software, as a high throughput screening method.

References:
Secilmis M, et al. **A Co-Culture-Based Multiparametric Imaging Technique to Dissect Local H2O2 Signals with Targeted HyPer7.** Biosensors (Basel). 2021 Sep 14;11(9):338. doi: 10.3390/bios11090338.

Altun HY et al. **Visualizing H2O2 and NO in endothelial cells: strategies and pitfalls.** Biorxiv https://www.biorxiv.org/content/10.1101/2023.02.15.528776v1

EMRE VATANDAŞLAR

Holds a B.Sc degree in Biology from Istanbul University. During undergraduate studies he spent two years on Taxonomy and Physiology of Marine Molluscs as an assistanship at Hydrobiology Section.

After undergraduate studies he took part for one year at Yale University, Departmant of Obstetrics, Gynecology and Reproductive Sciences as an Postgraduate Fellow.

He concluded his Master Degree in Neuroscience at Istanbul Medipol University. He is currently working as a Flow Cytometry/FACS Laboratory Manager at SABITA (Research Institute for Health Sciences and Technologies) and doing his Ph.D in Histology and Embryology at Istanbul Medipol University.

TRAINER

DR. ŞÜKRIYE BİLİR
13.45 - 17.00

MODULE 8

"CORRELATIVE LIGHT AND ELECTRON MICROSCOPY WITH ELEMENTAL MAPPING USING EDX"

Kon'nichiwa, I am Dr. Şükriye Bilir. This workshop introduces techniques for combining light and electron microscopy, along with Energy Dispersive X-ray Spectroscopy (EDX) for elemental mapping. Participants will learn to integrate optical and electron microscopy images, correlating cellular structures with elemental composition, advancing their understanding of biological and material sciences.

References:

Aydın MŞ et al. **Live cell imaging and CLEM reveals effects of Mutant Huntingtin Aggregation Process.** https://www.biorxiv.org/content/10.1101/2023.02.15.528776v1 Preprint

Pirozzi NM, Hoogenboom JP, Giepmans BNG. **ColorEM: analytical electron microscopy for element-guided identification and imaging of the building blocks of life.** Histochem Cell Biol. 2018 Nov;150(5):509-520. doi: 10.1007/s00418-018-1707-4. Epub 2018 Aug 17. PMID: 30120552; PMCID: PMC6182685.

DR. ŞÜKRİYE BİLİR

Dr. Şükriye Bilir took her B.Sc. degree from Istanbul Technical University, Molecular Biology and Genetics department. Followingly, she achieved her M.Sc. and Ph.D. degrees from Osaka University in Japan. Her Ph.D. thesis was about the nuclear pore complex formation mechanisms during cell division under the supervision of Prof. Hiraoka and Prof. Haraguchi. During her postgraduate education, she developed a deep interest towards advanced high-resolution microscopy techniques. Her current research interests include revealing new RNA-protein interactions through high-resolution microscopy. She is interested in RNA metabolism especially on neurodegenerative and neuro-muscular diseases. Her lifetime aim is to be able to develop novel and simple techniques for the visualization of RNA molecules on living organisms which will help to understand the RNA metabolisms more thoroughly.

TRAINER

DR. **SERDAR ALTUNAY**
13.45 - 17.00

MODULE 9

"REAL-TIME IMAGING OF CEREBRAL BLOOD FLOW IN VIVO"

Hello this is Dr. Serdar Altunay. This workshop will focus on how real-time cerebral blood flow imaging is performed using a laser speckle imaging system over the skull of a live animal. It will also discuss how to analyse the data obtained from the imaging.

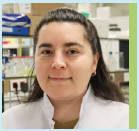
References:
Kilic U, et al. **Inflammatory Cytokines are in Action: Brain Plasticity and Recovery after Brain Ischemia Due to Delayed Melatonin Administration.** J Stroke Cerebrovasc Dis. 2021 Dec;30(12):106105.

DR. SERDAR ALTUNAY

He holds a B.Sc degree in Biology from Istanbul University.

He got his M.Sc degree in Medical Physiology from Istanbul Medipol University, SABİTA. His M.Sc studies were related to investigation of stroke (MCAO) and animal behavior.

He is currently a PhD student of Neuroscience in Istanbul Medipol University, SABİTA and channeled his interest to virus production and circadian rhythm in stroke.



TRAINER

ARİFE AHSEN KAPLAN
13.45 - 17.00

MODULE 10

“LASER-CAPTURE MICRODISSECTION/ CATAPULT SYSTEM AND OPTICAL TWEEZERS”

Merhaba I am Arife Ahsen Kaplan. This workshop focuses on the Palm Microbeam Laser Microdissection system. Participants will learn how laser microdissection microscopy enables the single cell laser ablation and collecting single cell with pressure catapulting.

References:

Aydın MŞ, Bay S, Yiğit EN, Özgül C, Oğuz EK, Konuk EY, Ayşit N, Cengiz N, Erdoğan E, Him A, Koçak M, Eroglu E, Öztürk G. **Active shrinkage protects neurons following axonal transection.** iScience. 2023 Aug 25;26(10):107715. doi: 10.1016/j.isci.2023.107715.

ARIFE AHSEN KAPLAN

Arife Ahsen Kaplan graduated from Department of Genetics and Bioengineering, Faculty of Engineering, Yeditepe University in 2014.

Following, she received her master degree (MSc) in 2017 from the Department of Histology and Embryology, Faculty of Medicine, Ondokuz Mayıs University, Turkey. She has worked as a research assistant at the İstanbul Medipol University, School of Medicine from 2021. She received PhD degree in 2023 from the Department of Histology and Embryology, İstanbul Medipol University, Turkey.