



UMS+24^o

SERIES

4th - 6th April 2024

MONA
PLAZA HOTEL,
Belgrade,
Serbia

XIII CONGRESS OF MICROBIOLOGISTS OF SERBIA
with international participation

MIKROMED REGIO 5

**FROM BIOTECHNOLOGY TO HUMAN
AND PLANETARY HEALTH**



BOOK OF ABSTRACTS

ORGANIZER:



SUPPORTED BY:



Federation of European
Microbiological Societies



Republic of Serbia

MINISTRY OF SCIENCE,
TECHNOLOGICAL DEVELOPMENT AND INNOVATION

Publisher

Serbian Society for Microbiology
www.ums.rs

For publisher

Prof. dr Lazar RANIN
President of the Serbian Society for Microbiology

Editors

Dr Ivica DIMKIĆ – University of Belgrade - Faculty of Biology, Serbia
Doc. dr Dušan KEKIĆ – University of Belgrade - Faculty of Medicine, Serbia

Technical Editor & Cover design

Vojislav SIMIĆ & Stevan MIHAJLOVIĆ

ISBN 978-86-7078-178-8



SCIENTIFIC COMMITTEE CHAIRPERSON

IVICA DIMKIĆ

University of Belgrade - Faculty of Biology, Serbia

ORGANIZING COMMITTEE CHAIRPERSON

DUŠAN KEKIĆ

University of Belgrade – Faculty of Medicine, Serbia

SCIENTIFIC & ORGANIZING COMMITTEE CO-CHAIRPERSON

LAZAR RANIN

President of the Serbian Society for Microbiology

Scientific Committee

ALEXANDER OSMOLOVSKIY

Lomonosov Moscow State University, Russian Federation

ALFONSO ESPOSITO

Faculty of Medicine and Surgery, University of Enna "Kore", Italy

CECILIA FLOCCO

Leibniz-Institute DSMZ, Germany

KONSTANTINOS PAPADIMITRIOU

Laboratory of Food Quality Control and Hygiene, Department of Food Science and Human Nutrition, Agricultural University of Athens, Greece

LUÍS DANIEL RODRIGUES DE MELO

CEB – Centre of Biological Engineering, University of Minho, Portugal

MARIAGRAZIA DI LUCA

Department of Biology, Microbiology Lab, University of Pisa, Italy

IVANA GOBIN

Faculty of Medicine, University of Rijeka, Croatia

NIKOLINA UDIKOVIĆ KOLIĆ

Division for Marine and Environmental Research, Ruđer Bošković Institute, Zagreb, Croatia

SVETLANA UGARCINA PEROVIĆ

Laboratory of Computational Metagenomics, Department of Cellular, Computational and Integrative Biology – CIBIO, University of Trento, Italy

TAMAR SACHANELI

Georgian Technical University, Faculty of Agricultural and Biosystems Engineering Science, Georgia

VITTORIO VENTURI

International Centre for Genetic Engineering and Biotechnology (ICGEB), Trieste, Italy

ALEŠ LAPANJE

Department of Environmental Sciences Jozef Stefan Institute, Ljubljana, Slovenia

NEMANJA KUZMANOVIĆ

Julius Kühn-Institut – Federal Research Centre for Cultivated Plants, Germany

MIRNA MRKONJIĆ FUKA

Department of Microbiology at the Faculty of Agriculture University of Zagreb, Croatia

DJORDJE BAJIĆ

Section of Industrial Microbiology, Department of Biotechnology, Technical University Delft, Delft, The Netherlands

VASO TALESKI

FEMS Director of Events , University Goce Delcev, Shtip, North Macedonia

NATAŠA OPAVSKI

University of Belgrade – Faculty of Medicine, Serbia

JOVANA GRAHOVAC

Department of Biotechnology, University of Novi Sad, Faculty of Technology Novi Sad, Serbia

TATJANA STEVIĆ

Institute of Medicinal Plant Research „Dr. Josif Pančić“, Serbia

NEMANJA MIRKOVIĆ

University of Belgrade – Faculty of Agriculture , Serbia

NIKOLA UNKOVIĆ

University of Belgrade - Faculty of Biology, Serbia

MARINA SOKOVIĆ

University of Belgrade – Institute for Biological Research „Siniša Stanković“ - National Institute of Republic of Serbia, Serbia

GORAN VUKOTIĆ

University of Belgrade - Faculty of Biology, Serbia

ANA BANKO

University of Belgrade - Faculty of Medicine, Serbia

IVANA MORIĆ

University of Belgrade, Serbia – Institute of Molecular Genetics and Genetic Engineering (IMGGE), Serbia

JASMINA NIKODINOVIĆ-RUNIĆ

University of Belgrade, Serbia – Institute of Molecular Genetics and Genetic Engineering (IMGGE), Serbia



**BRANKICA FILIPIĆ**

University of Belgrade – Faculty of Pharmacy, Serbia

LUKA DRAGAČEVIĆ

Institute of Virology, Vaccines and Sera “Torlak”,
Belgrade, Serbia

JASMINA GLAMOČLIJA

University of Belgrade – Institute for Biological
Research „Siniša Stanković” - National Institute of
Republic of Serbia, Serbia

MILICA MARKOVIĆ

University of Belgrade - Faculty of Agriculture, Serbia

BRANKA VASILJEVIĆ

FEMS General Secretary, Serbia

DRAGANA MITIĆ ĆULAFIĆ

University of Belgrade - Faculty of Biology, Serbia

SANJA JEREMIĆ

University of Belgrade, Serbia – Institute of
Molecular Genetics and Genetic Engineering
(IMGGE), Serbia

ALEKSANDRA ŠMITRAN

University of Banja Luka – Faculty of Medicine,
Bosnia and Herzegovina

HUGO ALEXANDRE MENDES DE OLIVEIRA

University of Minho - Campus of Gualtar, Portugal

PAUL COS

University of Antwerp, Belgium

ALEKSANDRA KNEŽEVIĆ

University of Belgrade - Faculty of Medicine, Serbia

INA GAJIĆ

University of Belgrade - Faculty of Medicine, Serbia

BRANKO JOVČIĆ

University of Belgrade - Faculty of Biology, Serbia

SRĐAN MILETIĆ

Institute of Chemistry, Technology and Metallurgy,
Serbia

NEDJELJKO KARABASIL

University of Belgrade - Faculty of Veterinary
Medicine, Serbia

MILICA LJALJEVIĆ GRBIĆ

University of Belgrade - Faculty of Biology, Serbia

DEJAN BASKIĆ

University of Kragujevac – Faculty of Medicine, Serbia

STOIMIR KOLAREVIĆ

University of Belgrade – Institute for Biological
Research „Siniša Stanković” - National Institute of
Republic of Serbia, Serbia

GORDANA SUBAKOV SIMIĆ

University of Belgrade – Faculty of Biology, Serbia

MARINA T. MILENKOVIĆ

University of Belgrade - Faculty of Pharmacy,
Serbia

LJILJANA PAVLOVIĆ

Institute of Public Health of Serbia Dr Milan
Jovanovic Batut, Belgrade, Serbia

MIRJANA RAJILIĆ-STOJANOVIĆ

University of Belgrade – Faculty of Technology and
Metallurgy, Serbia

SNEŽANA JOVANOVIĆ

University Clinical center of Serbia – Departement
for Microbiology, Belgrade, Serbia

MAJA RUPNIK

University of Maribor – NLZOH, Maribor, Slovenia

MATJAŽ HLADNIK

University Primorska – The Faculty of Mathematics,
Natural Sciences and Information Technologies,
Koper, Slovenia

BRANISLAVA KOCIĆ

Public health department in Niš, Serbia

Organizing Committee

TAMARA JANAKIEV

University of Belgrade – Faculty of Biology, Serbia

KATARINA KRUŠČIĆ

University of Belgrade – Faculty of Biology, Serbia

NENAD ANTIĆ

University of Pristina – Faculty of Sciences and
Mathematics, Serbia

MARKO JANKOVIĆ

University of Belgrade – Faculty of Medicine, Serbia

MILOŠ JOVIĆEVIĆ

University of Belgrade – Faculty of Medicine, Serbia

JOVANA KABIĆ

University of Belgrade – Faculty of Medicine, Serbia

ANA TOMIĆ

University of Belgrade – Faculty of Medicine, Serbia

Content

Message from the scientific organizers.	6
General information.	8
Congress programme.	9
Industrial and food microbial biotechnology	18
Environmental microbiology and biotechnology	54
Microbial genetics, metagenomics, and metaproteomics	97
Alternative approaches in antimicrobial control	119
Active immunization as the key element in infection prevention and control	152
Multi-drug and pan-drug resistance / health microbiology and biotechnology	171
Panel session - infections in patients on immunomodulation and immunosuppressive therapies	194
Panel session - intrahospital and emerging infections	199



Message from the organizing committee

Dear colleagues and friends,

The objective of the event was to present the latest developments in microbiology that contributed to a better understanding of the role of microorganisms in nature and to bring together microbiologists from Serbia and the region with professionals from all over Europe, including microbiologists of various disciplines, bioinformaticians, geneticists, molecular biologists, biochemists, epidemiologists, pediatricians, infectious disease physicians, and all other scientists with common interests.

This regional meeting addressed all prevailing microbiological issues and offered solutions to overcome them by world-class experts in the field. The resistance of microorganisms to antimicrobial drugs is causing major problems in veterinary and human medicine, necessitating the improvement of vaccines and the discovery of new drugs, but also alternative treatment models. Growing antimicrobial resistance, especially biofilm-related, requires alternative measures to biocontrol the spread of the microorganisms in various environments. These sessions discussed possible alternatives to common antimicrobials, ranging from bacteriophage applications, new natural compounds biotechnology or nanotechnology, as well as biological control for the inactivation of pathogenic and/or resistant phenotypes of microorganisms.

In addition, food manufacturers and retailers have been trying for decades to reduce the material damage and risks to human health posed by biofilms in food processing facilities. The environment is already too polluted by many human missteps, so any help from microorganisms to remove or process waste materials can be a big help. We are getting better and better at using microorganisms in technological processes, firstly in the medical field, but also in agriculture, industry and the energy sectors.

Our knowledge of how microbial diversity is distributed in natural environments and how microbes influence ecosystems is constantly evolving as public databases are established and new techniques based on massive sequencing are developed. The microbiomes found in anthropogenic environments and on human-made materials are generally much less complex than those found in natural environments. Despite this simplicity, it is very difficult to link cause and effect when it comes to determining the role of individual microorganisms. Improved genome engineering tools in model organisms allow for a comprehensive remodeling of metabolic and regulatory networks.

At the same time, a growing number of non-model organisms can be modified with different traits so that they can be further used in different applications and environments. This expanded range of engineering capabilities and modified species brings their application in the real world closer and has the potential to make a real contribution to sustainability and addressing global health challenges.

Microorganisms are the key drivers of ecosystem functions, and microbial diversity plays a central role in maintaining the stability and sustainability of ecosystems. These sessions were examined some of the principles that shape and maintain this biodiversity and explore the factors that shape microbiomes and contribute to the success of specific members of communities in different habitats.



Presentations were focused on omics techniques such as metagenomics, metatranscriptomics, proteomics and metabolomics, which are used to better understand why the health of humans, animals and plants depends on microbial interactions. In this way, the complex microbiomes and the interactions between the microbiota and a variety of host organisms from different domains of life were explored.

We strongly believe that the Congress was an excellent place to exchange and combine scientific ideas among experts and participants, with great opportunities to start new international collaborations and joint scientific projects. We have received an overwhelming response to our call, with numerous talented applicants, more than 350 participants from more than 20 countries (Austria, Belgium, Bosnia and Herzegovina, Croatia, France, Georgia, Germany, Greece, Hungary, India, Iraq, Italy, Montenegro, Namibia, North Macedonia, Portugal, Russian Federation, Serbia, Slovenia, Netherlands and United States) applying for the limited number of available grant awards (we have accepted 29 participants). In addition to presentations by invited speakers, the programme also included poster presentations by young researchers and PhD students. We were honoured to welcome 62 lecturers, 15 offered talks and 8 panelists and presenting cases. We have organized oral presentations in 15 parallel sessions, complemented by two panel discussions and a workshop entitled "NGS in Microbiology". We would like to thank all participants for their scientific commitment, especially for the more than 170 abstracts submitted, which contributed significantly to the success of the Congress. The Congress is accredited by the Health Council of the Republic of Serbia under the registration number A-1-185/24.

We hope you enjoyed the Congress programme and found it stimulating and informative. We also hope that you enjoyed the beauty of Belgrade and the Serbian hospitality. We sincerely wish you health, love and happiness and look forward to the new meetings.

Sincerely,



Ivica Dimkić
University of Belgrade
Faculty of Biology, Serbia

A handwritten signature in blue ink, appearing to read "Ivica Dimkić".

Scientific
Committee
Chairperson



Dušan Kekić
University of Belgrade
Faculty of Medicine, Serbia

A handwritten signature in blue ink, appearing to read "Dušan Kekić".

Organizing
Committee
Chairperson



Lazar Ranin
President of the Serbian Society
for Microbiology
Chairperson

A handwritten signature in blue ink, appearing to read "Lazar Ranin".

Scientific & Organizing
Committee
Co-Chairperson



General information

CONGRESS VENUE

The meeting was held at the Hall „Donji Dorćol“ and Hall „SCHONDA 4“, Mona PLAZA hotel, located at Cara Uroša 62-64, Belgrade, Serbia; Hall „Beogradska panorama“ and Hall „Club“, situated Hotel Palace, Topličin Venac 23, Belgrade, Serbia and Institute of Molecular Genetics and Genetic Engineering, Vojvode Stepe 444a, Belgrade, Serbia.

REGISTRATION OF PARTICIPANTS

Registration desk was open on Thursday, April 4 from 08:00 in front of Hall „Donji Dorćol“, Mona PLAZA hotel, as well as on Friday, April 5 and Saturday, April 6 at the same place. Daily updates on the workshop sessions and social events were available at the registration desk and through the specially designed application for this Congress (<https://play.google.com/store/apps/details?id=com.Mikrobiolozi>). All participants and accompanying persons were kindly requested to wear their accreditation badges during the scientific sessions and workshop social events.

LANGUAGE

The official language of the congress was English.

SOCIAL EVENTS

A group photo was taken in front of Mona PLAZA hotel on Thursday, April 4th, at 11:50. The poster viewing session took place at Hall ‘Club’ of Hotel Palace, ground floor, located at Topličin Venac 23, Belgrade, on Friday from 17:45 to 19:15.”

INFORMATION FOR PRESENTERS

Oral presentations were held at the Hall “Donji Dorćol” and Hall “SCHONDA 4” , First floor of the hotel Mona PLAZA, Cara Uroša 62-64, Belgrade, from April 4th to 6th.



UMS+24^o SERIES

04th - 06th April 2024

MONA PLAZA Hotel, Belgrade

XIII CONGRESS OF MICROBIOLOGISTS OF SERBIA
MIKROMED REGIO 5

WITH INTERNATIONAL PARTICIPATION

**FROM BIOTECHNOLOGY
TO HUMAN AND
PLANETARY HEALTH**



CONGRESS



PROGRAMME

ORGANIZER :



SUPPORTED BY :



Federation of European
Microbiological Societies



Republic of Serbia
MINISTRY OF SCIENCE,
TECHNOLOGICAL DEVELOPMENT AND INNOVATION




UMS 24 PROGRAMME

 **Thursday, April 4, 2024**

 **08:00-09:00** Registration of participants

 **Venue - Hall „DONJI DORČOL“ of the MONA PLAZA Hotel, Cara Uroša 62-64, First floor**

ORGANIZATIONAL OPENING REMARKS - **Ivica Dimkić, Dušan Kekić & Lazar Ranin**

 **08:45-09:30** **Jelena Begović** - Ministry of Science, Technological Development and Innovation
Ljubiša Stanisavljević - Dean of the Faculty of Biology of the University of Belgrade
Luciano Catani - Science Attaché at the Italian Embassy in Belgrade, Serbia
Vaso Taleski - FEMS Director of Events & Internationalization FEMS - 50 years of successful connecting people and sharing knowledge in microbiology worldwide

SESSION IA-1

MICROBIAL GENETICS, METAGENOMICS AND METAPROTEOMICS (PART 1) – MICROBIOMES AND RECENT DEVELOPMENTS & PROBIOTICS

Chaired by: **Maja Rupnik & Nataša Golić**


-  **09:30-09:55** **Maja Rupnik (Slovenia):** The role of gut microbiota on infection with multiresistant bacteria
-  **09:55-10:20** **Nataša Golić (Serbia):** The use of integrative multi-omics approach in cultivation and characterization of gut bacteria related to microbiota-gut-brain axis as a source for Next Generation Probiotics
-  **10:20-10:45** **Vladimir Milivojević (Serbia):** The importance of probiotics and modulation of microbiota in gastroenterology
-  **10:45-11:10** **Mirjana Rajilić-Stojanović (Serbia):** Modulation of human mycobiota as a tool for promoting health
-  **11:10-11:35** **Marina Atanasković-Marković (Serbia):** Dangerous relations: bacteria, antimicrobial therapies, and allergic diseases
-  **11:35-11:50** **Hristina Mitrović (Serbia, Offer. pres.):** From gut to lab: unlocking anti-inflammatory potential with GABA-producing bacteria
-  **11:50-12:10** **AbelaPharm (INDUSTRY LECTURE) - Nada Tršić-Milanović (Serbia):** From microscope to shelf: How our research becomes strength

 **Venue - Hall „SCHONDA 4“ of the MONA PLAZA Hotel, Cara Uroša 62-64, First floor**

SESSION IB-1

INDUSTRIAL AND FOOD MICROBIAL BIOTECHNOLOGY (PART 1) - MICROBIAL VALORIZATION OF WASTES AND SECONDARY MATERIALS & BIOTECHNOLOGY AND SYNTHETIC MICROBIOLOGY

Chaired by: **Vera Karličić & Alexander Osmolovskiy**

 **09:30-09:55** **Alexander Osmolovskiy (Russian Federation):** Proteinases of filamentous fungi as activators of hemostatic system proteins: key properties and application



- 🕒 09:55-10:20 **Nemanja Mirković (Serbia):** Bacteriocins: past, current knowledge and future prospects
- 🕒 10:20-10:45 **Marina Jovanović (Serbia):** Valorization of psychobiotics and agri-food by products as functional ingredients
- 🕒 10:45-11:10 **Vera Karličić (Serbia):** Ecological services of beneficial microorganisms as a paradigm of sustainable agroecosystems
- 🕒 11:10-11:25 **Vincent Léguillier (France, Offer. pres.):** Structural optimization of an I-motif aptamer for the specific detection of *Staphylococcus aureus*
- 🕒 11:25-11:40 **Marija Duvnjak (Croatia, Offer. pres.):** Aerobic stability of the alfalfa silage
- 🕒 12:10-12:30 **COFFEE BREAK**
- 🕒 12:20-12:30 **GROUP PHOTO IN FRONT OF THE MONA PLAZA HOTEL**

📍 Venue - Hall „DONJI DORČOL“ of the MONA PLAZA Hotel, Cara Uroša 62-64, First floor

SESSION IIA-1

ACTIVE IMMUNIZATION AS THE KEY ELEMENT IN INFECTION PREVENTION AND CONTROL (PART 1) - VIRAL VACCINES

Chaired by: **Maja Stanojević & Aleksandra Knežević**

- 🕒 12:30-12:55 **Maja Čupić (Serbia):** Vaccines for influenza and Covid 19 - what we need to know
- 🕒 12:55-13:20 **Aleksandra Knežević (Serbia):** HPV vaccines in the cancer prevention – recommendations and future prospective
- 🕒 13:20-13:45 **Maja Stanojević (Serbia):** Poliovirus eradication: challenges of containment
- 🕒 13:45-14:10 **Ivana Lazarević (Serbia):** Advances, challenges and novelties in HBV and HCV vaccines development
- 🕒 14:10-14:35 **Ana Banko (Serbia):** Development of new viral vaccines with a focus on the new RSV vaccine

📍 Venue - Hall „SCHONDA 4“ of the MONA PLAZA Hotel, Cara Uroša 62-64, First floor

SESSION IIB-1

ENVIRONMENTAL MICROBIOLOGY AND BIOTECHNOLOGY (PART 1) - HOST-MICROBE INTERACTIONS & TOWARDS A MORE SUSTAINABLE AGRICULTURE AND SOIL MICROBIAL LEGACY

Chaired by: **Ines Mandić Mulec & Ivica Dimkić**

- 🕒 12:30-12:55 **Ines Mandić Mulec (Slovenia):** Social strategies by beneficial bacterium *Bacillus subtilis*
- 🕒 12:55-13:20 **Vittorio Venturi (Italy):** Inter-species bacterial signaling in the plant microbiome
- 🕒 13:20-13:45 **Stéphane Compant (Austria):** Harnessing fungal-bacterial interactions to improve plant growth and health
- 🕒 13:45-14:10 **Ioannis Kampouris (Germany):** A consortium of plant-beneficial microorganisms mitigates drought effects on maize by aiding the recruitment of focal soil microorganisms in rhizosphere
- 🕒 14:10-14:25 **Dmitrii Deev (Slovenia, Offer. pres.):** Enhancing bioremediation efficiency: novel isolation techniques for microbial consortia in recalcitrant PAH-contaminated soils
- 🕒 14:25-14:40 **Ivana Galić (Serbia, Offer. pres.):** Soil microbiome diversity in maize-winter wheat crop rotation

🕒 14:40-15:30 LUNCH BREAK

📍 Venue - Hall „DONJI DORČOL“ of the MONA PLAZA Hotel, Cara Uroša 62-64, First floor

15:30-15:50 EuroMedicina (INDUSTRY LECTURE) - Aleksa Jovanović (Serbia): EXS2600 MALDI TOF - new possibilities

SESSION IIIA-1

ENVIRONMENTAL MICROBIOLOGY AND BIOTECHNOLOGY (PART 2) - TOWARDS A MORE SUSTAINABLE AGRICULTURE AND SOIL MICROBIAL LEGACY & PHYTOPATHOLOGY

Chaired by: Jovana Grahovac & Aleš Lapanje

- 🕒 15:50-16:15 **Aleš Lapanje (Slovenia):** Harnessing spatial microbiome dynamics for cutting-edge environmental biotechnology
- 🕒 16:15-16:40 **Đorđe Bajić (The Netherlands):** Using fitness landscapes to engineer optimal function in microbial communities
- 🕒 16:40-17:05 **Matjaž Hladnik (Slovenia):** Comparative analysis of phyllosphere microbiota in olive leaf spot disease
- 🕒 17:05-17:30 **Jovana Grahovac (Serbia):** Microbial biomass production and application within biorefinery concept
- 🕒 17:30-17:45 **Marko Vincenković (Croatia, Offer. pres.):** Preparation, characterization and application of copper microparticles in controlling of phytopathogenic fungi

📍 Venue - Hall „SCHONDA 4“ of the MONA PLAZA Hotel, Cara Uroša 62-64, First floor

SESSION IIIB-1

PANEL SESSION - INFECTIONS IN PATIENTS ON IMMUNOMODULATION AND IMUNOSUPRESIVE THERAPIES

Moderator: Dušan Kekić

- 🕒 15:50-17:45 **PANELISTS:**
 Gordana Petrović (Serbia)
 Tamara Knežević (Serbia)
 Borko Gobeljić (Serbia)
 Aleksandra Plavšić (Serbia)
 Ana Banko (Serbia)
- PRESENTING CASES:**
Tijana Đerić (Serbia): Occurrence of pneumonia in a patient on biological therapy due to TRAPS
Olga Odanović (Serbia): Infections in patients with inflammatory Bowel disease on biologic therapy: Challenges in management
Ljubica Matic (Serbia): Biological therapy and infections in hematopoietic stem cell transplantation
Uroš Karić (Serbia): A series of rare infectious complications in an immunosuppressed patient with SLE

🕒 17:45-18:10 COFFEE BREAK



 Venue - Hall „DONJI DORĆOL“ of the MONA PLAZA Hotel, Cara Uroša 62-64, First floor

SESSION IVA-1

INDUSTRIAL AND FOOD MICROBIAL BIOTECHNOLOGY (PART 2) - FOOD MICROBIOLOGY

Chaired by: **Mirna Mrkonjić Fuka & Konstantinos Papadimitriou**




-  18:10-18:35 **Tamar Sachaneli (Georgia):** Microbial diversity of Georgian artisanal cheese production
-  18:35-19:00 **Konstantinos Papadimitriou (Greece):** Multi-omics approaches to characterize the microbiome of certain greek artisanal fermented foods and wines
-  19:00-19:25 **Mirna Mrkonjić Fuka (Croatia):** Fermented food ecosystems - a treasure chest of untapped microbial potential
-  19:25-19:40 **Marija Todorovska Ivkovikj (North Macedonia, Offer. pres.):** Isolation and characterization of yeasts from Macedonian vineyards for production of Macedonian unique wine

 Venue - Hall „SCHONDA 4“ of the MONA PLAZA Hotel, Cara Uroša 62-64, First floor

SESSION IVB-1

ACTIVE IMMUNIZATION AS THE KEY ELEMENT IN INFECTION PREVENTION AND CONTROL (PART 2) - VIRAL VACCINES

Chaired by: **Danijela Miljanović & Ivana Lukić**

-  18:10-18:35 **Danijela Miljanović (Serbia):** MMR vaccine and seroprevalence of measles, mumps and rubella IgG antibodies among young medical students in Serbia
-  18:35-19:00 **Ivana Lukić (Serbia):** mRNA vaccine manufacturing – challenges in plasmid DNA cloning vector design
-  19:00-19:15 **Marko Janković (Serbia, Offer. pres.):** Human cytomegalovirus oncoprotection across diverse populations, tumour histologies, and age groups: the relevance for prospective vaccinal therapy

 **Friday, April 5, 2024**



 08:00-09:00 **Registration of participants**

 Venue - Hall „DONJI DORĆOL“ of the MONA PLAZA Hotel, Cara Uroša 62-64, First floor

SESSION IA-2

MULTI DRUG AND PAN DRUG RESISTANCE & HEALTH MICROBIOLOGY AND BIOTECHNOLOGY (PART 1)

Chaired by: **Ina Gajić & Paul Cos**

-  09:00-09:25 **Paul Cos (Belgium):** Challenges and lessons learned from antimicrobial research projects
-  09:25-09:50 **Ina Gajić (Serbia):** Genomic epidemiology of carbapenem-resistant *Pseudomonas aeruginosa*



- 🕒 09:50-10:15 **Katarina Novović (Serbia):** *Acinetobacter baumannii* resistant to last line antibiotics: an emerging threat in Western Balkan
- 🕒 10:15-10:40 **Dušan Milivojević (Serbia):** From soil to lab: Exploring toxicology with *Caenorhabditis elegans*
- 🕒 10:40-10:55 **Miloš Jovičević (Serbia, Offer. pres.):** High-level resistance of carbapenem-resistant *Klebsiella pneumoniae* to novel β -lactam- β -lactamase inhibitor combinations in clinical settings in Serbia
- 🕒 10:55-11:20 **Jose Alexander (USA) - online:** Understanding antimicrobial resistance for testing and treatment strategies
- 🕒 11:20-11:40 **bioMérieux (INDUSTRY LECTURE) - Snežana Jovanović (Serbia):** Syndromic PCR or how to solve diagnostic Rubik's cube easily

📍 Venue - Hall „SCHONDA 4“ of the MONA PLAZA Hotel, Cara Uroša 62-64, First floor

SESSION IB-2

MICROBIAL GENETICS, METAGENOMICS AND METAPROTEOMICS (PART 2) - MICROBIOMES AND RECENT DEVELOPMENTS & MICROBIAL GENOMES AND THEIR EVOLUTION

Chaired by: Livia Leoni & Gergely Maróti

- 🕒 09:00-09:25 **Livia Leoni (Italy):** Role of stringent response in *Pseudomonas aeruginosa* virulence
- 🕒 09:25-09:50 **Gergely Maróti (Hungary):** Genome level investigation of inter-kingdom microbial interactions
- 🕒 09:50-10:15 **Elena Perrin (Italy):** Insights into the evolution of multipartite genomes in *Proteobacteria*
- 🕒 10:15-10:40 **Svetlana Ugarčina Perović (Italy) - online:** Challenges in metagenomic annotation of antibiotic resistome
- 🕒 10:40-10:55 **Marko Panić (Serbia, Offer. pres.):** Exploring *E. coli*-based expression of genetically inactivated tetanus toxin for vaccine development
- 🕒 10:55-11:10 **Allwin Mabes Raj (Slovenia, Offer. pres.):** Mer B (organomercurial-lyase) mediated quartz crystal microbalance (QCM) based methylmercury detection

🕒 11:40-11:55 **COFFEE BREAK**

📍 Venue - Hall „DONJI DORČOL“ of the MONA PLAZA Hotel, Cara Uroša 62-64, First floor

SESSION IIA-2

ACTIVE IMMUNIZATION AS THE KEY ELEMENT IN INFECTION PREVENTION AND CONTROL (PART 3) - BACTERIAL VACCINES

Chaired by: Tamara Kastrin & Nataša Opavski

- 🕒 11:55-12:20 **Tamara Kastrin (Slovenia):** The importance of vaccination and national surveillance of invasive bacterial diseases and whooping cough in Slovenia
- 🕒 12:20-12:45 **Nataša Opavski (Serbia):** Do we need higher valency pneumococcal conjugate vaccines in Serbia?
- 🕒 12:45-13:10 **Marko Veljković (Serbia):** Vaccination against pertussis in Serbia: past, current challenges and future perspectives
- 🕒 13:10-13:35 **Nevena Jovičić (Serbia):** Complications of pneumococcal pneumonia in children
- 🕒 13:35-14:00 **Aleksandar Sovtić (Serbia):** Respiratory infections in children – over the horizon

 Venue - Hall „SCHONDA 4“ of the MONA PLAZA Hotel, Cara Uroša 62-64, First floor

SESSION IIB-2


ENVIRONMENTAL MICROBIOLOGY AND BIOTECHNOLOGY (PART 3) - BIODETERIORATION OF MATERIALS: EXTREME ENVIRONMENTS & ANTIMICROBIAL RESISTANCE: A ONE HEALTH CHALLENGE

Chaired by: **Cecilia Flocco & Nikola Unković**

-  11:55-12:20 **Cecilia Flocco (Germany):** New perspectives for microbiology and biotechnology in cultural heritage research
-  12:20-12:45 **Nikola Unković (Serbia):** Research into the application of bacterial-based bioformulations in the conservation of fungal-deteriorated works of art in Serbia
-  12:45-13:10 **Nikolina Udiković Kolić (Croatia):** Environmental spread of antibiotic resistance – the role of industrial, agricultural and municipal waste
-  13:10-13:35 **Stoimir Kolarević (Serbia):** Impact of untreated wastewaters on the microbiological water quality of the Danube river and its tributaries in Serbia
-  13:35-14:00 **Dragana Predojević (Serbia):** Phytoplankton in small water bodies

 14:00-15:00 LUNCH BREAK






 Venue - Hall „DONJI DORČOL“ of the MONA PLAZA Hotel, Cara Uroša 62-64, First floor

-  15:00-15:20 **Pfizer (INDUSTRY LECTURE) - Ivana Ćirković (Serbia):** Together in the fight against AMR, from immunization and diagnostics to targeted therapy

SESSION IIIA-2

ALTERNATIVE APPROACHES IN ANTIMICROBIAL CONTROL (PART 1) - BACTERIOPHAGES APPLICATIONS

Chaired by: **Mariagrazia Di Luca & Goran Vukotić**


-  15:20-15:45 **Mariagrazia Di Luca (Italy):** Unveiling the Janus-Face of Bacteriophages: A dual perspective on antibacterial therapy
-  15:45-16:10 **Hugo A. M. de Oliveira (Portugal):** Novel bacteriophage-based depolymerase strategies to control *A. baumannii*
-  16:10-16:35 **Goran Vukotić (Serbia):** Bacteriophages of multidrug-resistant nosocomial pathogens – Belgrade experience
-  16:35-17:00 **Luís D. R. de Melo (Portugal):** Phage-host interaction with cells in different metabolic states: *A. S. epidermidis* case
-  17:00-17:15 **Sonja Gostimirović (Serbia, Offer. pres.):** Non-tailed icosahedral phages as antibacterial agents

 Venue - Hall „SCHONDA 4“ of the MONA PLAZA Hotel, Cara Uroša 62-64, First floor

SESSION IIIB-2

PANEL SESSION - INTRAHOSPITAL AND EMERGING INFECTIONS

Moderator: **Dušan Kekić**

-  15:20-17:15 **PANELISTS:**
Miodrag Milenović (Serbia)
Novica Nikolić (Serbia)
Jelena Jordović (Serbia)

PRESENTING CASES:

Marija Rajković (Serbia): Fulminant necrotizing fasciitis: A fatal outcome. Case series

Elena Đukić (Serbia): Unraveling the mystery: A case of septic shock with unknown origin

Ana Mirković (Serbia): A case report of *Staphylococcus aureus* prosthetic valve endocarditis in patient with Randu – Osler – Weber syndrome

Martina Jug (Serbia): Aspergillosis - diagnostic and therapeutic challenges

🕒 17:45-19:15 **POSTER VIEWING SESSION - HALL CLUB OF THE HOTEL PALACE, GROUND FLOOR, TOPLIČIN VENAC 23, BELGRADE**

📅 **Saturday, April 6, 2024**

🕒 08:30-09:30 **Registration of participants**

📍 **Venue - Hall „DONJI DORČOL“ of the MONA PLAZA Hotel, Cara Uroša 62-64, First floor**

SESSION IA-3

MICROBIAL GENETICS, METAGENOMICS AND METAPROTEOMICS (PART 3) - MICROBIOMES AND RECENT DEVELOPMENTS & MICROBIAL GENOMES AND THEIR EVOLUTION

Chaired by: **Tamara Janakiev & Alfonso Esposito**

- 🕒 09:30-09:55 **Nađa Nikolić (Serbia):** Microbiomes in oral carcinomas
- 🕒 09:55-10:20 **Alfonso Esposito (Italy):** Next-Generation Sequencing and Bioinformatics: How does microbiology benefit from cutting edge technologies?
- 🕒 10:20-10:45 **Tamara Janakiev (Serbia):** Plant microbiomes: from diversity to healthy crops
- 🕒 10:45-11:00 **Maurizio Zotti (Italy, Offer. pres.):** Microbiome associated with mycelial activity of three species of *Basidiomycetes*: Fairy rings in the gardens of the Royal Palace of Caserta (Italy)
- 🕒 11:00-11:15 **Daria Tsibulskaia (Serbia, Offer. pres.):** Description of a new potential aggregation factor from the *Streptococcus thermophilus* genome
- 🕒 11:15-11:40 **Jose Alexander (USA) - online:** Implementation of a rapid, cost-effective, and clinically focused NGS solution

📍 **Venue - Hall „SCHONDA 4“ of the MONA PLAZA Hotel, Cara Uroša 62-64, First floor**

SESSION IB-3

HEALTH MICROBIOLOGY AND BIOTECHNOLOGY & ALTERNATIVE APPROACHES IN ANTIMICROBIAL CONTROL (PART 2)

Chaired by: **Lidija Đokić & Jon Salmanton-García**

- 🕒 09:30-09:55 **Marina Šantić (Croatia):** *Legionella pneumophila* - journey from the environment to human macrophages



- 🕒 09:55-10:20 **Jon Salmanton-García (Germany):** Overview on the current situation on epidemiology and management of IFI and future perspectives
- 🕒 10:20-10:45 **Ivana Čolović Čalovski (Serbia):** Diagnosis of intestinal helminth infections: strengths and limitations
- 🕒 10:45-11:10 **Eleonora Dubljanin (Serbia):** Biomarker guided antifungal therapy: a current state of laboratory mycology and antifungal management
- 🕒 11:10-11:35 **Lidija Đokić (Serbia):** New approaches in the treatment of chronic bacterial infections

🕒 11:40-12:10 **COFFEE BREAK**

📍 **Venue - Hall „DONJI DORČOL“ of the MONA PLAZA Hotel, Cara Uroša 62-64, First floor**

SESSION IIA-3

ALTERNATIVE APPROACHES IN ANTIMICROBIAL CONTROL (PART 3) - BIOTECHNOLOGICAL APPROACH OF USING NATURAL PRODUCTS & NANOTECHNOLOGY IN MICROBIOLOGY

Chaired by: **Marina Soković & Ivana Gobin**

- 🕒 12:10-12:35 **Marina Soković (Serbia):** Microfungi as a target and source of valuable compounds
- 🕒 12:35-13:00 **Ivana Gobin (Croatia):** Biofilms in premise plumbing systems - current challenges and potential solutions
- 🕒 13:00-13:25 **Marina T. Milenković (Serbia):** Herbal products as an alternative to antibiotics: application possibilities and limitations
- 🕒 13:25-13:50 **Tatjana Stević (Serbia):** Biocontrol activity of plant products against plant pathogens
- 🕒 13:50-14:05 **Miroslav Dinić (Serbia, Offer. pres.):** Host-microbiota interplay regulates epithelial barrier function and wound healing

📍 **Venue - Hall „SCHONDA 4“ of the MONA PLAZA Hotel, Cara Uroša 62-64, First floor**

SESSION IIB-3

WORKSHOP “NEXT GENERATION SEQUENCING (NGS) IN MICROBIOLOGY “

Moderators: **Valentina Đorđević & Ivana Morić**

- 🕒 12:10-12:35 **Valentina Đorđević (Serbia):** Center for Genome Sequencing and Bioinformatics
- 🕒 12:35-13:00 **Ivana Morić (Serbia):** Introduction to NGS technologies
- 🕒 13:00-13:25 **Mirjana Novković (Serbia):** Genome sequence diversity of SARS-CoV-2 in Serbia during pandemic
- 🕒 13:25-13:55 **Nada Stanković & Ivana Galić (Serbia):** Metagenomic studies

🕒 14:15-14:30 **ORGANIZATIONAL CLOSING REMARKS**

IL105

NEW APPROACHES IN THE TREATMENT OF CHRONIC BACTERIAL INFECTIONS

Lidija Đokić¹, Miloš Rokić¹ and Lidija Senerović¹

¹ Institute of Molecular Genetics and Genetic Engineering, University of Belgrade
Contact: lidijadjokic@imgge.bg.ac.rs

The rapid emergence and spread of multi-drug-resistant pathogens present a global healthcare challenge. One common cause of resistance and/or tolerance to antibiotics is biofilms, a complex communities of bacteria embedded in a self-produced matrix. Biofilm formation and maturation are regulated by quorum sensing, a cell density-dependent communication system that relies on the synthesis, diffusion, and detection of small signaling molecules - autoinducers (AIs). Quorum quenching (QQ) enzymes that cut AIs emerged as a promising strategy for persistent bacterial infections. However, a significant drawback for the use of QQ enzymes as therapeutics is their poor stability and efficacy in vivo. Since one of the major health issues linked to biofilm development is persistent wound infections, our goal was to improve enzyme properties by immobilizing it on a natural biopolymer to make it suitable for use as a wound dressing. The best candidate for

immobilization was YtnP lactonase from *Bacillus paralicheniformis* ZP1, as in concentrations higher than 25 µg/mL it improved the survival of *Pseudomonas aeruginosa* PAO1-infected zebrafish, rescuing 80% of embryos. When combined with tobramycin or gentamicin, the survival rate of zebrafish embryos increased to 100%. Purified YtnP lactonase at a concentration of 1 mg was immobilized on 10 mg of polymer disks by crosslinking with glutaraldehyde. Specific modifications of the polymer were also made to eliminate the use of glutaraldehyde, which is a skin irritant. In in vivo experiments on a murine chronic wound model, immobilized enzyme inhibited biofilm development, cleared already formed biofilms, and overall improved wound healing. These results provide a foundation for the development of advanced wound dressings that will prevent infection development in wounds and enable proper therapy for infected chronic wounds.

KEYWORDS: biofilm; chronic wounds; *Pseudomonas aeruginosa* PAO1; YtnP lactonase; immobilization

