



PUBLIC HEALTH INSTITUTE NIŠ
ИНСТИТУТ ЗА ЈАВНО ЗДРАВЉЕ НИШ
FACULTY OF MEDICINE NIŠ
МЕДИЦИНСКИ ФАКУЛТЕТ НИШ
SERBIAN MEDICAL SOCIETY OF NIŠ
СРПСКО ЛЕКАРСКО ДРУШТВО ПОДРУЖНИЦА НИШ

50. DAYS OF PREVENTIVE MEDICINE
50. ДАНИ ПРЕВЕНТИВНЕ МЕДИЦИНЕ

INTERNATIONAL CONGRESS
МЕЂУНАРОДНИ КОНГРЕС

BOOK OF ABSTRACTS
ЗБОРНИК РЕЗИМЕА

НИШ, 2016.

Editor in Chief
Уредник
Prof. dr Maja Nikolić

Technical Editor
Технички уредник
dipl. ing. Stefan Bogdanović

Publisher
Издавач
Public Health Institute Niš - Институт за јавно здравље Ниш
Faculty of Medicine Niš, University of Niš - Медицински факултет у Нишу, Универзитет
у Нишу
Serbian Medical Society of Niš - Српско лекарско друштво подружница Ниш

For publisher
За издавача
Asst. Prof. dr Miodrag Stojanović

Under the patronage of
Под покровитељством

**Ministry of Education, Science and Technological Development of the Republic of
Serbia.**
Министарства просвете, науке и технолошког развоја Републике Србије

Ministry of Health of the Republic of Serbia
Министарства здравља Републике Србије

All abstracts are published in the book of abstracts in the form in which they were submitted by the
authors, who are responsible for their content.

Сви сажеци су публиковани у зборнику резимеа у облику у коме су достављени од стране
аутора, који су одговорни за њихов садржај.

The content of this publication is available online at www.izjz-nis.org.rs
Садржај ове публикације је доступан на интернет адреси www.izjz-nis.org.rs

**The continuing education program number A-1-387/16 was accredited by the decision
of the Health Council of the Republic of Serbia No. 153-02-509/2016-01 from
03. 03. 2016.**

Програм континуиране едукације је под бројем А-1-387/16 акредитован одлуком
Здравственог савета Републике Србије број: 153-02-509/2016-01 од 03. 03. 2016. године.

ISBN 978-86-915991-5-7

HONORARY COMMITTEE – ПОЧАСНИ ОДБОР

Ass. dr Zlambor Lončar, Minister of Health of the Republic of Serbia
Mladen Šarčević, Minister of Education, Science and Technological Development of the Republic of Serbia
Dr Vesna Knjeginjić, Assistant Minister for Public health and Health care programs of the Ministry of Health of the Republic of Serbia
Dr Zoran Panajotović, Assistant Minister for Inspection Affairs of the Ministry of Health of the Republic of Serbia
Prof. dr Berislav Vekić, State Secretary of the Ministry of Health of the Republic of Serbia
Nikola Pandrc, Chief of Cabinet of the Minister of Health of the Republic of Serbia
Prof. dr Dragan Antić, Rector of the University of Niš
Prof. dr Dobriša Stanković Đorđević, Dean of the Faculty of Medicine University of Niš
Asst. Prof. dr Dragan Ilić, Director of the Institute of Public Health of Serbia
Academician Prof. dr Milorad Mitković
Dr Aleksandar Cvetković, Chief of Nisava Administrative District
Prof. dr Dragan Veselinović, President of the City branch of the Serbian Medical Society Niš
Darko Bulatović, Mayor of the City of Niš
Mr sc. Rade Rajković, President of the Assembly of the City of Niš
Prof. dr Zorka Perošević

SCIENTIFIC COMMITTEE – НАУЧНИ ОДБОР

Chairlady - Председница
Prof. dr Dušica Stojanović, Serbia

Members - Чланови

Prof. dr Dobriša Stanković Đorđević, Serbia
Asst. Prof. dr Miodrag Stojanović, Serbia
Prof. dr Elisabete Weiderpass Vainio, Sweden
Prof. dr Dragan Bogdanović, Serbia
Prof. dr Carmen-Michaela Cretu, Romania
Prof. dr Gianfranco Damiani, Italy
Prof. dr Marina Dinić, Serbia
Prof. dr Olgica Đurković Đaković, Serbia
Prof. dr Ronit Endevelt, Israel
Prof. dr Angel Galabov, Bulgaria
Prof. dr Eleni Jelastopulu, Greece
Prof. dr Joseph Kachal, Israel
Prof. dr Biljana Kocić, Serbia
Prof. dr Branislava Kocić, Serbia

Asst. Prof. dr Konstansa Lazarević, Serbia
Asst. Prof. dr Roberta Marković, Serbia
Prof. dr Nataša Miladinović Tasić, Serbia
Prof. dr Zoran Milošević, Serbia
Prof. dr Biljana Miljković Selimović, Serbia
Asst. Prof. dr Boban Mugoša, Montenegro
Prof. dr Maja Nikolić, Serbia
Prof. dr Suzana Otnašević, Serbia
Prof. dr Branislav Petrović, Serbia
Prof. dr Zoran Radovanović, Serbia
Asst. Prof. dr Olivera Radulović, Serbia
Asst. Prof. dr Nataša Rančić, Serbia
Prof. dr Gordana Randelović, Serbia
Prof. dr Lazar Ranin, Serbia
Prof. dr Aleksandra Stanković, Serbia
Prof. dr Holger Stark, Germany
Asst. Prof. dr Predrag Stojanović, Serbia
Prof. dr Athanasios Tsakris, Greece
Prof. dr Zoran Veličković, Serbia
Asst. Prof. dr Aleksandar Višnjic, Serbia



ORGANISING COMMITTEE - ОРГАНИЗАЦИОНИ ОДБОР

Chairlady - Председница
Prof. dr Maja Nikolić

Secretary - Секретар
Nemanja Stanković, dipl. bio. spec.

Technical secretary - Технички секретар
Stefan Bogdanović, dipl. ing.

Members - Чланови

dr sc med Tatjana Babić
Ass. dr Milena Bogdanović
Ass. mr sc med dr Zorana Deljanin
dr Ivana Jancijević
Ivana Kamenović, dipl. hem. spec.
dr Stanko Marjanović
mr sc med dr Dragan Nikolić
dr sc med Snežana Savić
dr Mihajlo Spasić

MAIN TOPICS – ГЛАВНЕ ТЕМЕ

• **Environment and health**
Животна средина и здравље

• **Nutrition and health**
Исхрана и здравље

• **Microbiology today**
Микробиологија данас

• **Current parasitosis**
Актуелне паразитозе

• **Theoretical and practical problems of communicable and non-communicable disease epidemiology**
Теоријски и практични проблеми епидемиологије заразних и незаразних болести

• **Current challenges in health care system**
Савремени изазови у систему здравствене заштите

• **Information technology and health**
Информационе технологије и здравље

• **Health promotion in the community**
Промоција здравља у локалним заједницама

• **Sexual and reproductive health of youth**
Сексуално и репродуктивно здравље младих



**50TH DAYS OF PREVENTIVE MEDICINE
BOOK OF ABSTRACTS**

27.-30. SEPTEMBER 2016.

NIŠ, SERBIA



TABLE OF CONTENTS

A. KEYNOTE PRESENTATION	7
B. SESSION: ENVIRONMENT AND HEALTH	8-52
C. SESSION: NUTRITION AND HEALTH	53-94
D. SESSION: MICROBIOLOGY TODAY (I)	95-125
E. SESSION: MICROBIOLOGY TODAY (II)	126-135
F. SESSION: CURRENT PARASITOSIS	136-152
G. SESSION: THEORETICAL AND PRACTICAL PROBLEMS OF COMMUNICABLE DISEASE EPIDEMIOLOGY	153-176
H. SESSION: THEORETICAL AND PRACTICAL PROBLEMS OF NON- COMMUNICABLE DISEASE EPIDEMIOLOGY	177-195
I. SESSION: CURRENT CHALLENGES IN HEALTH CARE SYSTEM	196-238
J. SESSION: INFORMATION TECHNOLOGY AND HEALTH	239-244
K. SESSION: HEALTH PROMOTION IN THE COMMUNITY	245-271
L. SESSION: SEXUAL AND REPRODUCTIVE HEALTH OF YOUTH	272-278

3. ALTERNATIVE APPROACHES AND PERSPECTIVES OF NANOTECHNOLOGY IN ANTIMICROBIAL RESISTANCE AND INFECTION CONTROL

Taleski Vaso, Zdravkovska M., Stojanovska Z.

Faculty of medical Sciences, University "Goce Delchev", Shtip, Macedonia

Introduction: Infection diseases caused by antibiotic resistant bacteria present major global health concern and a great challenge for science and medicine. Over 700 000 deaths worldwide (25 000 in Europe), including 214 000 neonatal sepsis deaths, are caused by resistant bacterial pathogens each year.

Currently, insufficient access and delays in access to antibiotics cause more deaths than antibiotic resistance, but more resistance-related deaths are being reported in all countries irrespective of income level.

Objectives: To present possibilities and limitations of current antimicrobial therapy against resistant Gram-positive and Gram-negative bacteria, and current, new concepts, approaches and methods as very promising to overcome this tremendous problem.

Methods: Extensive use and misuse of antimicrobials has led to increased bacterial resistance. Studies have revealed that antibiotic resistance genes existed within the microbial genome prior to the discovery of antibiotics. There is evidence that heavy metals and some pollutants, introduction of antibiotics into the environment through human waste (medication, farming), animals, agriculture and the pharmaceutical industry may select antibiotic-resistant bacteria. Current concepts in antimicrobial therapy against resistant Gram-positive bacteria imply use of vancomycin, daptomycin, ceftaroline and telavancin, while, against Gram-negative bacteria (*Multidrug-resistant*/MDR, *Extensively drug-resistant*/XDR, *Pandrug-resistant*/PDR), mostly used arecolistin, polymyxin B, carbapenems, tigecycline, fosfomycin, aminoglycosides and rifampicin. Limitation of current antimicrobial therapies are due to concerns of side effects such as: the potential of selecting and rapid spread of resistant strains, toxicity, reduction of normal microbiota and high cost.

Therefore, one of the major challenges for scientists and highest priorities of modern medicine and biotechnology has become developing of novel alternative methods. A promising approach seems to be manipulation of microbes using natural or synthetic molecules which have potential to be used in controlling microbial behavior and virulence.

Current approaches include:

- Anti-infectious Approaches Based on Biological Factors (Bacteriophages, Synthetic Biology);
- Anti-infectious Approaches Based on Physical Factors (Cold Plasmas low-temperature, Photodynamic Antimicrobial Chemotherapy);
- Chemical Virulence Modulators and Alternative Antimicrobial Compounds
 - Natural Virulence Modulators
 - Synthetic Virulence and QS Signaling Modulators
- Increasing the Efficiency of Antimicrobial Compounds Using Nanotechnology
 - Nanostructures Used in Anti-infectious Therapy
 - Zinc Oxide Nanoparticles
 - Silver Nanoparticles
 - Magnetite Nanoparticles such as Fe₃O₄
 - Synthesis of Fe₃O₄ Nanoparticles
 - Functionalized Magnetite Nanoparticles
 - Antimicrobial Nanoshuttles

o Antimicrobial Nano-modified Surfaces (Anti-adherent Nano-surfaces)

Extremely small size (1-100 nm) enables nanoparticles to enter the human body through cell membranes or cross the blood-brain barrier.

Metal nanomaterials (silver, gold, copper, titanium, zinc, magnesium, cadmium, and alumina) possess advantage of unique antimicrobial activities. Scientists offers also new complex antibacterial and antiviral Nano systems on the basis of metal oxides or intermetallic oxide compounds (such as TiO₂, ZrO₂, SnO and SiO₂). Silver ions showed strongest bactericidal effect, copper and gold weaker one. Silver ions are non-toxic to human cells in low concentrations.

In our preliminary study on antibacterial activity of several different compositions of nanoparticle coatings (titanium, iron and silver), we found antimicrobial activity of silver, double composition of titanium plus silver against *Staphylococcus aureus* and *Staphylococcus epidermidis*, but not against *E. coli*, *Pseudomonas aeruginosa*, *Listeria monocytogenes* and *Candida albicans*.

The Global antimicrobial resistance crisis alerted WHO to prepare and adopt Global Action Plan (GAP) on Antimicrobial Resistance (2015) which outlines five strategic objectives:

1. to improve awareness and understanding of antimicrobial resistance through effective communication, education and training;
2. to strengthen the knowledge and evidence base through surveillance and research;
3. to reduce the incidence of infection through effective sanitation, hygiene and infection prevention measures;
4. to optimize the use of antimicrobial medicines in human and animal health;
5. to develop the economic case for sustainable investment that takes account of the needs of all countries and to increase investment in new medicines, diagnostic tools, vaccines and other interventions.

The strategic goal of GAP, as a need for an effective "one health" approach is to ensure successful treatment and prevention of infectious diseases with effective and safe medicines accessible to all who need them.

In 2016, EASAC (European Academies Science Advisory Council) and FEAM (Federation of European Academies of Medicine) issued the final report of the Independent Review on Antimicrobial Resistance including recommendations similar to GAP, also suggesting:

- establishment of a Global Innovation Fund for early stage and non-commercial research;
- better incentives to promote investment for new drugs and improvement of existing drugs;
- building of a global coalition for action, via G20 and the United Nations;
- intensify the surveillance activities (antimicrobial resistance and antibiotic use).

Seven new EU research projects on AMR, aim to develop novel antibiotics, vaccines or alternative treatments for drug-resistant microbial infections. Other projects set out to identify better methods to use currently available antibiotics or to study antibiotic resistance within the food chain.

Three projects, funded by the EU Seventh Framework Program (FP7) and the Nano sciences, Nanotechnologies, Materials and New Production Technologies (NMP) Program are working to develop novel nanotechnology-based AMR approaches as follows:

- PneuMoNP: Nano therapeutics to treat pneumonia infections
- FORMAMP: Innovative Nano formulation of antimicrobial peptide: to treat bacterial infections diseases
- NAREB: Nano therapeutics for antibiotic resistant emerging bacterial pathogens

Conclusion: After 70 years use of antibiotics, concerns of reentering the "preantibiotics" era has become very real because of the rapid spread of antimicrobial resistance and little to no

progress in the development of new antibiotics. Alternative approaches, based on natural or synthetic molecules able to modulate virulence and cell-to-cell communication, become one of the highest priorities of modern medicine and biotechnology. Current technological progress allowed the development of nanosized molecular particles, composed of different components which showed a great antimicrobial effect while at the same time safe for the human use. WHO Global Action Plan on antimicrobial resistance, recommendations of professional organizations and scientific projects in progress emphasize priority needs of joint action to combat antibiotic resistance with greatest goal to control infections, improve health and save lives.

Key words: alternative, antimicrobials, nanoparticles, nanotechnology, resistance.

References:

1. Azam A, Ahmed AS, Oves M, Khan SM, Habib SS, Memic A. Antimicrobial activity of metal oxide nanoparticles against Gram-positive and Gram-negative bacteria: a comparative study. *International Journal of Nanomedicine*. 2012;7:6003-6009.
2. EASAC and FEAM. Joint Statement from the Presidents. July 2016.
3. Holban AM, Grunzescu AM. *Novel Molecular Approaches in Targeting Microbial Virulence for Handling Infections*, De Gruyter Open Ltd, Warsaw/Berlin, GmbH, Berlin/Munich/Boston, 2015.
4. Juan L, Zhimin Z, Anchun M et al. Deposition of silver nanoparticles on titanium surface for antibacterial effect. *International Journal of Nanomedicine*, 2010;5, 261-267.
5. O'Neill J. *Tackling drug-resistant infections globally: final report and recommendations*. London: H M Government/Wellcome Trust, 2016.
6. Santos CL, Albuquerque AJR, Sampaio FC, Keyson D. *Nanomaterials with Antimicrobial Properties: Applications in Health Sciences*. Microbial pathogens and strategies for combating them: science, technology and education © FORMATEX 2013.
7. Troitzch D, Borutzky U, Jungmann U. Detection of antimicrobial efficacy in silver-coated medical devices. *Hyg Med*, 2009, 34 (3).
8. WHO. *Global action plan on antimicrobial resistance*. Geneva: World Health Organization, 2015.
9. Woolhouse M, Ward M, van Bunnik B, Farrar J. Antimicrobial resistance in humans, livestock and the wider environment. *Philos Trans R Soc Lond B Biol Sci* 2015; 370.