

## **Sector 6: Biological Threats – Session I**

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## **52. Infodemic in COVID-19 pandemic**

**Prof. Dr. Krunoslav Capak, MD, PhD**

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### **Abstract**

The term "infodemic" refers to an overwhelming amount of information and disinformation about a particular issue, which hinders the search for solutions. The public discourse about it intensified when Dr. Tedros Ghebreyesus, the Director-General of the World Health Organization (WHO), stated that the world was not only battling an epidemic during the COVID-19 crisis but also an infodemic. The media was flooded with both genuine

information and misinformation, setting this epidemic apart from previous virus outbreaks. Previously, especially on internet platforms and other social media, there were circulating "information" suggesting the virus was a biological weapon accidentally released from a lab, or that it emerged from consuming raw bats. Other myths posited that consuming garlic could treat the disease or that bleach could effectively kill the virus. However, even the United Nations warned that there has been an unprecedented spread of global panic, prejudices, and intolerance, particularly on social media platforms. Besides combating the coronavirus outbreak, the WHO, in collaboration with popular social media platforms like Twitter, Facebook, TikTok, and Tencent, engaged in countering misinformation.

Vaccine skeptics, or "anti-vaxxers", became an even greater threat than the coronavirus itself. According to them, the coronavirus either did not exist at all or, if it did, it was not as dangerous as portrayed. They propagated theories that the virus was created using 5G technology, with the ultimate aim of mandating global vaccination. They believed that vaccines would implant malicious microchips in individuals. Bill Gates was painted as the mastermind behind this, intending to control the population, including executing a controlled depopulation. According to this narrative, the shadowy global elites would reshape the world according to their desires, with the rest of us becoming their subservient slaves. If we proved unuseful, they would simply eliminate us. Such a narrative is factually incorrect. Nonetheless, it garnered significant attention among social media users. Media outlets capitalized on this, providing a platform for purveyors of false news (fake news). It was found that such news retains attention eight times longer than positive news, leading to greater advertising revenue.

In response to these challenges, the healthcare system can effectively counteract them only by enhancing the health literacy of citizens. This involves providing a higher level of information on all health-related topics and policies. It's incumbent upon us in the system to modify our communication approach with the public, using clear language and modern communication techniques to provide timely and accurate information, resisting the spread of toxic propaganda.

#### **Biography - Assoc. Prof. Krunoslav Capak**



##### **MD, PhD, Primarius Specialist epidemiology**

Subspecialist in environmental health  
Croatian Institute of Public Health Rockefellerova 7, HR-10000 Zagreb

Krunoslav Capak, born in 1962, director of the Croatian Institute of Public Health. Associate professor at the Department of Environmental Health, School of Medicine, University of Mostar. Teaches at Medical School in Rijeka and Zagreb, and the Faculty of Law in Split. President of the Croatian Society for Health Ecology and member of the Society of Epidemiology at the Croatian Medical Association. From 2010 to 2013 he was a member of the Standing Committee of the Regional Council on behalf of the WHO European Regional Office, and from 2011 to 2013 he was chair of the European Environment and Health Task Force and member of the European Environment and Health Ministerial Board. In 2016 he was elected a member of the Academy of Medical Sciences. He has been awarded the Homeland War Memorial Medal 1990-1991, the medal of Danica Hrvatska Order, and the medal of the Hrvatski trolist order. During pandemic of COVID-19 he was member of National Headquarters.

## **47. Croatian experience in health crisis management**

**Dr. Pavle Jeličić**, MD, PhD, Nataša Janev Holcer, PhD, Krunoslav Capak, MD, PhD

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### **Abstract**

The Republic of Croatia has seen a number of crisis situations over the past 10 years that, from an epidemiological perspective, may have endangered people's lives.

The Homeland War broke out in Croatia at the start of the 1990s, followed by a devastating flood in eastern Slavonia in 2014, the passage of migrants through Croatia from September 2014 to December 2015, two extremely destructive earthquakes in the northwest of Croatia in 2020, and the coronavirus pandemic that reached our nation.

The Crisis Headquarters of the Ministry of Health, operating under the National Headquarters for Protection and Rescue, is responsible for managing the health-related aspects of crisis situations.

This includes organizing the initial response of health services, providing medical aid for the recovery of injured communities, and undertaking initiatives for a rapid return to normal for individuals and communities in affected areas. The Deputy Minister of Health serves as the Crisis Headquarters' Chief in order to connect and coordinate actions at all levels of the healthcare system during a crisis.

The Croatian Institute of Public Health (CIPH) creates a public health strategy after the Minister of Health declares a risk of communicable disease epidemic. These measures include monitoring the supply of safe drinking water, maintaining sanitary conditions, preparing and distributing food, and engaging in activities to control infectious diseases in the most affected areas, such as disinfection, pest and rodent control. In all previous crisis situations, the Ministry of Health's Crisis Headquarter was able to ensure all health conditions for citizens' safe returns to their homes because of coordinated efforts and measures.

**Keywords:** crisis response, crisis management, health effects, sanitation, disinfection

### Biography - Dr. Pavle Jeličić



Pavle Jeličić was born in 1978. He graduated in 2004 at the Medical School, University of Zagreb. In 2010, he completed his specialization in epidemiology and in 2014 his specialization in environmental health after which he works as a specialist in epidemiology and environmental health.

Since 2016 he acts as a head of the environmental health division at Croatian Institute of Public Health. He completed the postgraduate study "Leadership and Management in Healthcare Service" at the Medical school, University of Zagreb in 2014 and obtained the title of Master in Healthcare Management. In 2023 he ended successfully his post-graduate doctoral studies in

Biomedicine and healthcare at the Faculty of Medicine of the University of Zagreb and obtained the title of Doctor of Philosophy.

Since 2019, he is holding the position of first vice-president of the Croatian Society for Environmental Health at the Croatian Medical Association.

He is member of several interdisciplinary working bodies within several ministries in matters of One Health, Vector Borne diseases, Vector Control, Disaster Risk Assessment, Climate Change, Terror Threats etc.

He has published several scientific and professional papers and participated in conferences in the country and abroad. He speaks English and German.

## 24. Emerging biological threats disrupt both society and military operations

### Dr. Stef Stienstra

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### Abstract

Amongst all CBRN threats the bio-threat is the most invisible and neglected multi source threat. Originally the biological threats were from nature only, but the bio-threat emerges with travelling, climate change and human (criminal) activities.

Officially the BWTC (Biological Weapon & Toxin Convention) prohibits the use of biological agents in warfare, but it has a long history, starting with arrows impregnated with toxins. Both natural- and man-made biological threats are emerging. Both the monitoring of potential threats as the legislation about what to consider as illegal use of biological organisms or toxins as weapons are running behind.

In addition to the illicit use of biological substances, the hoaxes around possible biological attacks are increasing. As biological threats are invisible, the use of it in PSYOPS with fake news and behavioral influence, is a rising threat, which has a dangerous disruptive effect on the society as well. Not necessary directed against the population, but also towards cattle, agriculture, food industry and environment. To get better insight it is required to develop a bio-watch program to be able to monitor with high reliability potential biological threats. With innovative equipment and new analytical techniques this is feasible, but monitoring the trigger (base) level is still a challenge like the detection of unknown pathogens. The combination of gene analysis together with several spectrometric pre-screening techniques and lab-on-a-chip technologies enable to construct a bio-surveillance system, which protects society against disruptive biological incidents, natural or man-made, which we never can exclude in the world.

**Keywords:** Bio-surveillance; bio-detection; public health; communication

## Biography – Stef Stienstra



Stoffer (Stef) Stienstra Has a doctorate in both (bio)chemistry and medicine and just finished a 40-year career as officer of the Dutch Armed Forces as SME (Subject Matter Expert) CBRN in the end-rank of Cdr with the Royal Dutch Navy Reserve Special Forces. He is still lecturer at the NATO School in Oberammergau (Germany) and the Joint NATO CBRN-defense Centre of Excellence in Vyskov, Czech Republic on CBRN-related topics. Gives as visiting professor of the University of Rome Tor Vergata lectures for the University of Rome tor Vergata CBRN-MSc curriculum as well. He is also a specialist in Civil-Military Cooperation and has fulfilled several (military) deployments in Asia and Africa. He has a diploma in 'Organization of IO's, UN structures and NGO's at the Harvard University, Cambridge MA, USA and many other post-doc courses. For the MoD he completed strategic special projects, like developing 'mission safety' and was co-author of the Dutch DefenseIndustry-Strategy. In 2014 he was member of the NKS (Nuclear Knowledge Summit) team at the NSS (Nuclear Security Summit) in The Hague. He continues working with this knowledge (and network) internationally for several medical-, biotech- and high-tech companies as a scientific advisory board member. He is senior advisor on public health and biodefense for the EU-financed ReSEMBiD project executed by Expertise France and other EU and/or UN supported projects including OSCE. He has 41 peer reviewed scientific publications, over 400 publications in professional literature and is the key inventor for three different patents (related to dermatology and blood cells).

## 11. Future Biological Threats – Re-examining the role of Bacteriophages in Modern Biological Event Response

**Dr. Mzia Kutateladze, PhD**

*Director, G. Eliava Institute of Bacteriophages, Microbiology and Virology, Tbilisi, Georgia*

### Abstract

The origins of the COVID-19 pandemic remain unclear. Did the SARS-CoV-2 virus emanate from a zoonotic source in a Wuhan animal market, or did it escape from a laboratory?

Was the strain deliberately engineered as a threat agent?

Or was it released inadvertently – or deliberately – by a lone rogue actor?

Origins aside, the world must address the consequences, and plan to improve its collective response to the next pandemic. In addition to viruses, the CBRN community is facing perhaps its most dangerous threats in the evolution and spread of infectious diseases caused by multidrug resistant bacteria. The wide, uncontrolled use of antibacterials (including antibiotics) is principally responsible for a worsening situation. The search for effective alternatives for treatment is broadening and, the health community is re-examining the role that could be played by bacteriophages, or phages. Bacteriophages – viruses that specifically kill only host bacteria can be effective remedies against multi-drug resistant pathogens. Phage application and treatment has a long history in the FSU, and even received renewed interest by the Western defense community which are working in parallel with health authorities to develop phage-based approaches to fight bacterial infections. Phages can be used for animal and plant protection, as well, and thus are quite compatible with the current One-Health concept. The presentation examines coming changes in phage use in the global health environment.

**Keywords:** Bacteriophages, antibacterial agent, antimicrobial resistance

### Biography – Dr. Mzia Kutateladze



Dr. Mzia Kutateladze Dr. Mzia Kutateladze represents the world-renowned G. Eliava Institute of Bacteriophages, Microbiology and Virology, headquartered in Tbilisi, Georgia. Currently, she is the Director of the Eliava Institute, as well as the President of the Eliava Foundation, a collection of commercial spinoffs. She oversees, coordinates and manages the research directions and programs of the Institute. She is the author or co-author of more than 80 scientific papers. Her scientific background is in microbiology and molecular biology, bacteriophage research and application. Dr. Kutateladze was a manager and a leading scientist of a number of scientific research projects. She is serving as a project and papers reviewer for national and international funding agencies and scientific journals.

## 53. Cross-validation based approach to develop and evaluate an AI-supported microscopy platform to detect and classify airborne biothreat.

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### Abstract

An extensive amount of effort has been put into the development of different optical sensor solutions to detect, identify and monitor airborne biological agents. One of the reasons why there is no existing standard and interoperable bioagent monitoring solution is the lack of platforms capable of comparative data monitoring and archiving for traceable inter-method comparison. Since the resilience of disease control authorities is very intensive regarding the environmental presence of the most dangerous and unfortunately well-known member of the *Bacillus cereus* group, and it is very easy to access all the necessary components to create a virulent *Bacillus anthracis* strain, our AI supported platform is currently being finetuned for the detection of bacillus form objects sampled from the air. Our platform supports the quantitative phase imaging sensor-based data input for analysis and algorithm training. Our algorithm system can detect suspicious bacillus form objects sampled from the air with higher than 90% accuracy (precision: 88.9%; recall: 94.1 %) in the case of differential interference contrast (DIC) microscopic images and also in the case of digital holographic (DHM) microscopic images (precision: 67.7%; recall: 98.5 %). The platform contains the possibility of inter-sensor comparison, since it has been optimized and finetuned for different datatypes of quantitative phase imaging methods. The integration of the platform into CBRN related further research, decision-making and pre-standardization will be presented based on the quantitative results.

The project was supported by Horizon 2020 program: HoloZcan (GA: 101021723). (<https://datasenselabs.net/>  
<https://datasenselabs.net/horizon2020/>)

**Keywords:** artificial intelligence, object detection, air sampling, bio-detection, bacterial classification.

### Biography – Dr. János Pálhalmi



Dr. János Pálhalmi is a cell-biologist, neuroscientist, metrologist, specializing in bioinformatics and computational sciences. He holds a PhD degree in health sciences as well. Inventor of the term 'BioSignal Metrology' (patent ID: P1900302), with the aim to improve the standards of quality assurance in the field of industrial level bio-medical research and development. He is scientific coordinator, work package leader and participant in several EU projects in the field of sensor integration, AI software development, testing, validation, and use case specific fine tuning.

Dr. János Pálhalmi is invited speaker and consultant in different Medical CBRN and NATO supported projects and conferences, and participates in miniaturized biosensor and implemented algorithm development workflows to improve anomaly detection and health monitoring systems.

## 15. Development of amperometric and impedimetric based biosensors for the detection of *Bacillus anthracis* spores

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### Abstract

Due to importance of *Bacillus anthracis* in biological warfare agents, the fast and sensitive detection of its spores is crucial in all ways. Several biosensor methods are currently being developed to detect *B. anthracis* spores. Especially electrochemical immunosensors take the most significant part of this area. In our study, a newly developed amperometric immunosensor was designed to detect *B. anthracis* spores with a combination of magnetic beads and multiplex screenprinted electrodes. In this method, changes in current intensity resulting from oxidation and reduction in the working electrode are measured directly to the spore concentrations. In



addition, signals from amperogram curves were used to draw standard graphics in inactive and live spore concentrations. Besides, another highly sensitive impedimetric immunosensor was developed. For amperometric immunosensor, a standard curve was formed in the method by testing the number of live spores between  $2 \times 10^2$  -  $2 \times 10^4$  spores/ml concentrations. Current changes were taken under an applied potential and, LOD and LOQ values were found to be 92 and 272 spores/ml, respectively. For impedimetric immunosensor, the measurement range was found to be  $1 \times 10^2$  -  $1 \times 10^4$  spore/ml. LOD and LOQ values were 55 and 154 spores/ml, respectively. It was shown as  $CV\% = 2.59$ . No cross-reactions were seen for *Bacillus subtilis*, *Bacillus cereus* and *Bacillus thuringiensis* spores. As a result, it is shown that the designed CBRN agent Anthrax immunosensor has high sensitivity and selectivity with fast results. Furthermore, the immunosensor can also be miniaturized to detect live spores in the field with high accuracy.

**Keywords:** *Bacillus anthracis*, Amperometry, Impedance, Immunosensor

### Biography – Dr. Mesut Ortatatli



He was born in Konya-Turkiye on 24 February, 1970. In 1994, he had MD degree after graduation from Gulhane Military Medical Faculty, Ankara. He worked as a general practitioner in Antalya between 1995-1997. He became Specialist MD in Infectious Diseases and Clinical Microbiology in 2002.

Thereafter, he became PhD degree in Medical CBRN Defense in 2006. He worked as Specialist MD in Infectious Diseases and Clinical Microbiology in Antalya between 2007 and 2009. Since 2009 he has been working as Assistant Professor at department of CBRN

defense in University of Health Sciences, Ankara Turkey.

His research interests are broadened recently beyond microbiologic diagnostic techniques applications to molecular biology and biosensor related projects for detection of biological and chemical warfare agents. He is married and has two sons.

## 1. Terrorism and the Pandemic: Weaponizing of COVID-19

### Dr. Katalin Petho-Kiss

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#### Abstract

The global pandemic has offered extraordinary opportunities for extremists and terrorists to mobilize themselves and revive as more powerful actors in the security landscape. But could these threat groups actually capitalize on the coronavirus crisis and advance their malevolent agendas? To answer these questions, it should be assessed whether Islamist terrorists as well as far-right entities have been able to exploit novel vulnerabilities COVID-19 has established. It may be yet too early to identify the pandemic's medium and long-term effects on terrorism, there is, however, a significant number of information available to draw implications on detected changes in terrorists' operational circumstances.

The largest COVID-19-related terrorism database provides the basis for the research. The analysis is built upon a quantitative and qualitative comparison between the nature of both the jihadist and the far-right-related threat in 2018 and 2020. The ultimate goal is to provide a true picture of novel trends since the outbreak. This established snapshot view could serve as the basis for amendments to be made in countering terrorism strategies both in the conflict and in the non-conflict zones. With this in mind, implications on future counter policy actions have been put forward.

### Biography - Katalin Petho-Kiss



Katalin Petho-Kiss is a Senior Fellow at the Global Peace Institute and a Senior Analyst at the Counter Terrorism Information and Criminal Analysis Centre in Hungary. She is the former deputy head of the Central European CBRNE Training Centre in Budapest. Responsible for counter terrorism and violent extremism, she covered explosives and CBRN at the law desk of the Hungarian Europol National Unit. She holds a Juris Doctorate Degree and as a recipient of an Endeavour Scholarship, she graduated from the Master of Research Program in Policing, Intelligence and Counter Terrorism at Macquarie University, Australia. While in Sydney, she assessed CBRN terrorism risks and compared Australian and EU terrorism legislation. Her research was published in Perspectives on Terrorism and in the Journal of Applied Security Research.

## 2. An evaluation of the medical measures taken against COVID-19 in Turkey

Dr. Levent Kenar<sup>1</sup>, M. Ortatli<sup>1</sup>

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### Abstract

The new type of coronavirus pandemics, which started with pneumonia cases of unknown etiology in the city of Wuhan, China at the end of 2019, has been officially seen in our country for the first time on March 11, 2020. Since then, many precautions have been taken to prevent the disease in our country and to prevent the transmission of the infection. Health system was managed from a single center. In addition, state institutions quickly started to implement the decisions taken by the scientific committee. As of 13rd May 2023, the number of COVID-19 cases in Türkiye had reached more than 17 million with 102174 deaths, as reported by the Ministry of Health. During the pandemics, public and private hospitals spent a great effort to reduce the effects of COVID-19 under the management of the Ministry of Health, in addition, epidemiological studies and clinical filtration investigations were started simultaneously in the society. The MoH started to implement a program under the COVID-19 Vaccine National Implementation Strategy as the first vaccination with the Sinovac which started on 13 January 2021. Turkovac, an inactivated vaccine, was approved by MoH as "Emergency Use Approval" after November 2021. The recommendations and decisions of the scientific committee established by the MoH were carried out by the relevant institutions of the State without the need for military support. In this presentation, the details of the measures taken by the Turkish MoH will be discussed from the health perspective.

**Keywords:** COVID-19; Turkey; Pandemics

### Biography – Levent Kenar



Prof. Dr. Kenar has been working for more than 20 years in the CBRN Department in Ankara, Turkey and is currently the Professor of CBRN in this department. He has completed PhD program about CBRN defense. He has been assigned in various international organisations/ meetings and have represented Turkey in CBRN- NATO related groups like CBRN Working Group, CBRN Defense Working Group, NBC Initiatives in NATO Assessment Team. He was also certified as the inspector of UNMOVIC organized by the UN. He worked as a visiting scholar in the University of Minnesota, USA between Sept 2010-Sept 2011. He has papers published in peer-reviewed international journals, oral and poster presentations in international scientific meetings. He has been tasked in various assignments in developing CBRN strategy, plans and training at some related organizations like MoD, MoH, Ministry of Foreign Affairs, AFAD (Disaster and Emergency Management Authority). As the Chief of the CBRN Department, he has supervised and trained about 20 instructors and provided CBRN training for about 2500 national staff students until August 2022. He has also participated in higher level Decision Making Process in support of CBRN response in Turkey. From that perspective, he has been involved in planning and executing CBRN meetings, panels and symposia. On the other hand, he's also been organizing, attending, and speaking in congresses, seminars, conferences or workshops along with the supervising project or study groups. He has also been designing CBRN courses and updating the curriculum requirements for various degrees.

## 67. Reducing Biological Risk in the Built Environment: Biodefense Research Capability and Testbed Development

Bryon Marsh

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### Abstract

In 2021, a U.S. congressional request was made through the conference report (FY 2021 Conference JES Report (BILLS-116RCP68-JES-DIVISION-F Built Environment)) that the Department of Homeland Security Science and Technology Directorate (DHS S&T) invest up to \$6M towards developing a national testing capacity to assess vulnerabilities and mitigate biological risks in building systems; namely air, water, and wastewater. Idaho National Laboratory (INL), Montana State University (MSU), and Northwestern University (NU) created a Built Environment

Surveillance Testbed for Biological Hazards (BEST Bio) Project Team to assist DHS S&T in assessing stakeholder requirements. The team also developed an associated business case model for operational facilities needed for integrated testing and evaluation of biological pathogen detection and surveillance technologies for the built environment. This capability was designed to monitor the movement of a pathogen exposure—from point-of-release, to building water / air distribution systems, to detection of the bioagent, response, and decontamination. The BEST Bio Project Team hosted a national virtual summit in June 2023 to engage stakeholders on national needs and priorities for biothreat detection and surveillance in the built environment. The BEST Bio Test and Evaluation Capability Gap Assessment Report summarizes the Team's findings based on analysis of extensive stakeholder input obtained during and after the workshop related to use case needs for biodefense research in the built environment.

### Biography - Bryon Marsh



Bryon Marsh, MPH, MHS Bryon Marsh is a CBRN project and business relationship manager at the Idaho National Laboratory (INL), and has over 20 years of experience in CBRN response and research. Bryon is a retired U.S. Army 72D Environmental Science and Engineering Officer. His military assignments included 3/75th Ranger Regiment, 3/325th Airborne Combat Team, 121st Long Range Surveillance Detachment, and the 4th Weapons of Mass Destruction – Civil Support Team (CST). While assigned to the 4th CST, he managed and operated a mobile ISO/IEC 17205 certified analytical laboratory for WMD incident response. Bryon's professional interest is implementing research into practice. Post 9/11 Bryon worked extensively within the U.S. government interagency process to develop a national biothreat response framework. Bryon holds a Master of Public Health from Emory University, and a Master of Homeland Security from the Naval Post Graduate School.

## 57. New bacteriophage lysins, LysJ and LysF, effective in killing anthrax bacteria in vitro

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### Abstract

Endolysins (lysins) are lytic proteins encoded by bacteriophages, i.e. bacterial viruses. They are directly responsible for damaging the bacterial cell wall and releasing phage progeny from the infected bacterium. Endolysins, like phages, have a potential therapeutic value (as an alternative or supplement to antibiotic therapy) in the treatment of infections caused by *Bacillus anthracis*, an etiological agent of anthrax. Also, they could be used to identify and detect this pathogen. The sequences of endolysins encoded by two new anthrax phages, J5a and F16Ba, differ from the best-known *B. anthracis*-infecting phage lysin, PlyG from Gamma phage, by the presence of a signal peptide at the N-terminus and by the length. The genes encoding the lysins of the phages J5a and F16Ba were thus cloned and expressed in *E. coli*. The activity of the purified lysins, LysJ and LysF, was evaluated against strains of *B. anthracis* and other bacterial species of the genus *Bacillus* using the plate method and by assessing the optical density (OD) reduction of bacterial cultures. Dropping different concentrations of both lysins on the cell layers of the tested bacteria showed their specificity towards the anthrax bacilli. In the OD reduction assay, LysJ and LysF proved their lytic activity against live cells of all tested *B. anthracis* strains (incl. virulent strains) but also other *Bacillus* species. LysJ showed better antimicrobial activity in all performed experiments and could constitute a potential candidate for further studies in terms of future applications in treating human or animal infections.

The studies have been conducted within a project "Comparative analysis of endolysins encoded by bacteriophages lytic against *Bacillus anthracis*" 2016/23/N/NZ7/01992, funded by a National Science Centre.

**Keywords:** anthrax; bacteriophages; endolysins; lytic activity

### Biography - Aleksandra Nakonieczna



I am a biotechnologist working as a Research Assistant in the Bacteriophage Laboratory in Biological Threats Identification and Countermeasure Center of MIHE, Puławy, Poland. I have been working in this lab for the past 12 years. I'm experienced in the isolation and



characterization of phages (bacterial viruses) and their lytic enzymes (endolysins), focusing especially on phages infecting *Bacillus anthracis* as a biowarfare agent.

I have worked with various pathogens, including virulent anthrax strains in the BSL-3 laboratory, and I'm familiar with a range of molecular biology techniques. During my career, I have been involved in national and international research projects within the microbiology or diagnostics field, for instance: "Isolation, selection, and characteristics of bacteriophages lytic against enterohemorrhagic *Escherichia coli* strains (EHEC)", "Anthrax Environmental Decontamination Network", "New diagnostic technologies on the modern battlefield - nanobiodetectors for the detection of *Bacillus anthracis*".

I had two abroad internships within Marie Curie Actions program. Recently I defended my Ph.D. on new anthrax phages that I have isolated and their endolysins, based on the grant I led ("Comparative analysis of endolysins encoded by bacteriophages lytic against *Bacillus anthracis*").

## **70. Determination of Immune Status by Detection of Mucosal Immune Antibodies in Saliva**

**David Trudil\***

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### **Abstract**

The portal of entry for all respiratory viruses is the mucosal lining of the nasopharynx. The IgA2 antibody (ab) is the most effective and abundant mucosal antibody available to inhibit and neutralize any viral infection. This IgA2 ab, therefore, may be a target for determining initial viral infection for asymptomatic as well as symptomatic individuals and, with IgG, indicating immune status. Saliva of unexposed, vaccinated and unvaccinated individuals were collected throughout 2020 and 2021 with different saliva collection devices for Covid-19. ELISA and LFI assays were developed for: anti-Human IgA and IgG antibodies directed against the RBD, Nucleocapsid (N), and both RBD/N. The ELISA result and LFI test line indicated a significant increase over the two weeks following the second dose of a vaccine, with a subsequent gradual decline after 6 months. This assay detected the presence of Anti- IgA and IgG in infected individuals and tracked levels of IgG and IgA during the months post vaccination as well as infection/immune status in unvaccinated individuals. Correlation with a neutralization assay was observed. The study indicates a saliva POC assay may be applicable as a tool to screen for asymptomatic individuals and to track immune status.

### **Biography – David Trudil**



David P Trudil – D. Trudil, a former US Army Chemical Officer, has been involved with detection and control of infectious agents including state of the art materials, monoclonal antibodies, luminescence, bacteriophage and phage lytic enzymes for over 40 years. David is the Executive Director of New Horizons Diagnostics currently managing various technology and business functions and projects. These have focused on both rapid diagnostics as well as therapeutics. As PI for a DTRA Project for the Development of a Rapid Mucosal Immune Status Assay targeting SARS-CoV-2, included the development of a novel microarray system as well as standard ELISA and Lateral Flow Immunoassay technologies. He is also PI for another DTRA project, currently under development with submission to the FDA under 510k for a rapid, field-based Plague assay. Field Clinical Trials were conducted in Madagascar with pathogenic analytical testing in US DoD BSL-3 laboratories. Other past projects managed by him include 8 separate Biological Based projects within the Former Soviet Union (FSU) under a Department of Energy Program. These include detection & diagnostics as well as therapeutics. In addition to projects in the FSU, he has managed projects focused on infectious disease, Gastric Cancer, therapeutics and immune response in the Middle East, Georgia, China, Indonesia, Philippines, Singapore, Europe, Latin America and other countries.