Joint Event

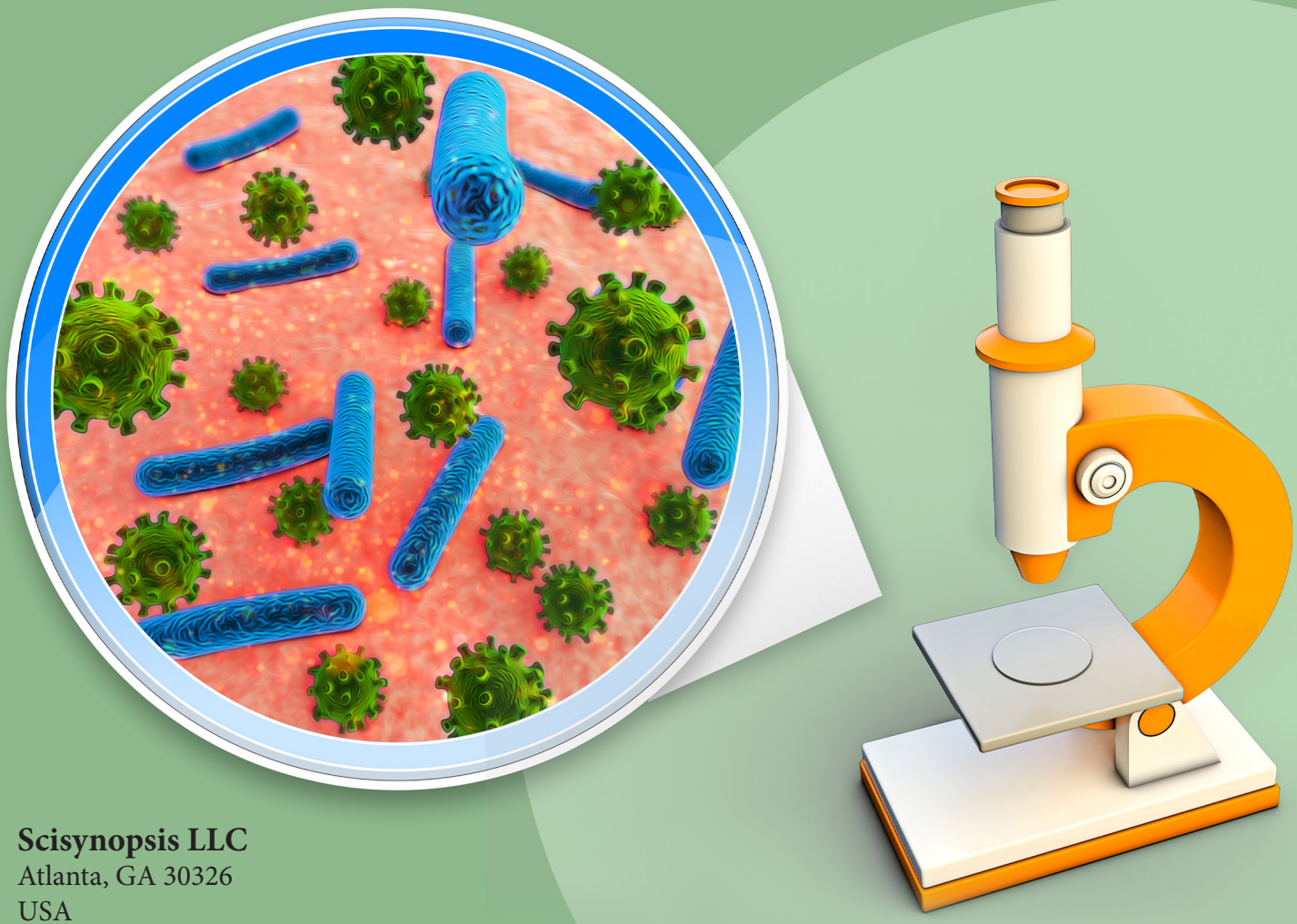
3rd International Conference on

Infectious Diseases

&

Microbiology

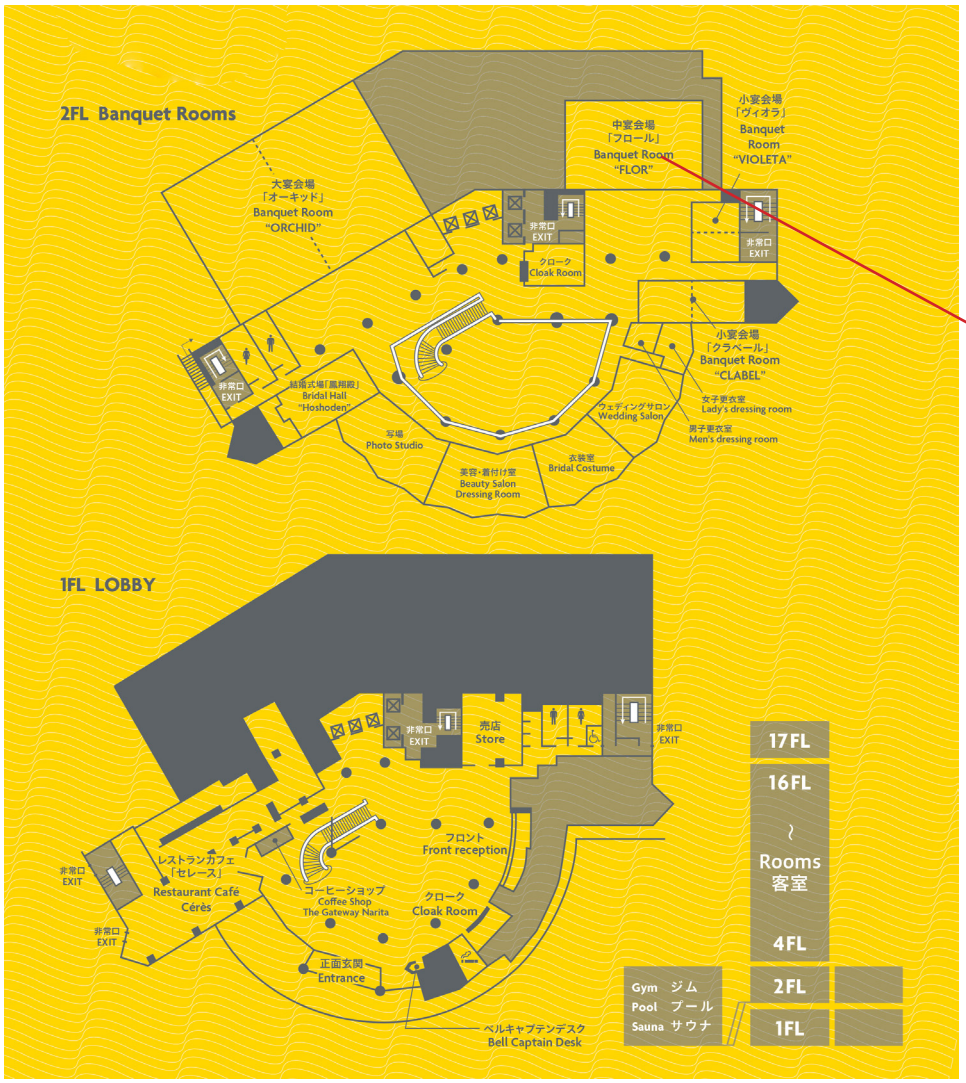
October 24-25, 2024
Tokyo, Japan



Scisynopsis LLC
Atlanta, GA 30326
USA

Contact us:
Contact: +1-770-832-7291
Whatsapp: +1-404-759-8307

Floor Map



Conference Hall

Wifi Details

SSID : *IHG One Rewards Free WIFI*
Password: *not required but log in page will be coming up, and put 1311 into the access code and submit*

Conference Programme

Conference Programme

Day 1: October 24, 2024

Meeting Hall @Flor	
08:00-08:45	**Registrations**
08:45-09:00	**Introduction**
Keynote Presentations	
09:00 - 09:40	**Heon Ju Lee, CARBio, Therapeutics, South Korea**
Title: A New Approach to Treating Incurable and Infectious Diseases: CAR-T And TCR-T Cell Therapy using Viral Vectors and Genetic Engineering Technology	
09:40 - 10:20	**Patrizia Russo, Department of Life Promotion San Raffaele University and IRCCS San Raffaele Rome, Italy**
Title: Lung Virome: The Effect of Torque Teno Virus (TTV) Infection on Clinical Outcomes, Genomic Integrity, and Mortality in COPD Patients	
Networking & Refreshments 10:20 - 10:40 @Foyer	
Oral Presentations	
Session Chair:	**Patrizia Russo, Department of Life Promotion San Raffaele University and IRCCS San Raffaele Rome, Italy**
Session Chair:	**L. Kristopher Siu, National Health Research Institutes, Taiwan**
Sessions: Corona Virus Disease | Virology | Infectious Diseases| Medical Microbiology | Plant Beneficial Microbes | Bacterial Infectious Diseases	
10:40-11:05	**Chien-Te Kent Tseng, University of Texas Medical Branch, USA**
Title: Characterization of Unique Pathological Features of COVID-Associated Coagulopathy: Studies with AC70 hACE2 Transgenic Mice Highly Permissive to SARS-CoV-2 Infection	
11.05-11.30	**Jeffrey Haltom, Children's Hospital of Philadelphia, USA**
Title: SARS-CoV-2 ORF10 Induces Mitochondrial Dysfunction	
11.30-11.55	**Nuran Sabir, Pamukkale University, Turkey**
Title: Imaging Findings and Differential Diagnosis of Septic Arthritis	

11.55 - 12.20	**Somayeh Maghsoomi Taramsari, University for Continuing Education Krems, and Medical University of Vienna, Austria**
Title: Development of Aptamer-Based Biosensors for Rapid Detection of Pseudomonas Aeruginosa with Methylene Blue Effect	
12.20 - 12.45	**Vanessa Monteil, Karolinska Institutet, Sweden**
Title: LDLR is an Important Receptor for Crimean-Congo Hemorrhagic Fever Virus	
Group photo 12.45- 13:00	
Lunch (13:00-14:00) @Restaurant Cafe Ceres	
14:00-14:25	**Swami Shraddhamayananda, Ramakrishna Mission Charitable Dispensary, India**
Title: On the Promising Role of Homeopathic Medicines in the Prevention of Post Herpetic Neuralgia	
14.25-14.50	**Paul Alexis Bourgade Su, Anahuac University, México**
Title: *In vitro* Evaluation of the Antimicrobial Effect of Toxins from the Venom of the Tarantula Poecilotheria Regalis	
14.50-15.15	**Chitra Pai, Touro University College of Osteopathic Medicine, USA**
Title: The Double Whammy: An Epidemic of Mucormycosis during the COVID-19 Pandemic: Case Reports and A Global Review	
15.15-15.40	**Shigeaki Ogibayashi, Chiba Institute of Technology, Japan**
Title: An Agent-Based Model of Infectious Diseases that Incorporate the Role of Immune Cells and Antibodies	
15.40-16.05	**Pragati Srivastava, ICAR-National Institute for Plant Biotechnology, India**
Title: Microbial Siderophores as a Sustainable Approach for Fe Acquisition in Plants as Plant Growth Promotion Trait	
Networking & Refreshments 16.05 - 16.30 @Foyer	
16.30-16.55	**Lalita Narachasima, Thammasat University, Thailand**
Title: Genotypic Characterization of MRSA from Patients during the Period 2012 to 2022 at Two Tertiary Hospitals in Thailand	

16.55-17.20	**Wipa Tangkananond, Thammasat University Research, Unit in Medicinal Chemistry, Thammasat University, Thailand**
Title: Preliminary Study of Plant Derived Japanese Encephalitis Vaccine for Swine	
17.20-17.45	**Chinedu Obiageli Ajogun, Nigerian Institute of Food Science and Technology, Nigeria**
Title: Optimization of Tiger Nut Milk, Coconut Milk and Flaxseed Powder Blends to Produce Probiotic Plant-based Yogurt and Determine the Probiotic Viability during Storage	
Day 1 Concludes followed by Certificate Felicitation	

Day 2: October 25, 2024	
Meeting Hall @ Flor	
Keynote Presentations	
10:00-10:40	**Anuruddhika Iroshani Jayarathna, Globale Stanford Campus, Sri Lanka**
Title: An Explorative Study of The Sri Lankan Intensive Care Nurses' Perceptions of Oral Care Practice of Intubated Covid-19 Patients	
10:40-11:20	**Travers Chirova, Harare Institute of Technology, Zimbabwe**
Title: Investigating the Effect of Silver Nanoparticles Produced by Green Synthesis against Streptomycin Resistant *Klebsiella pneumoniae* and Ampicillin Resistant *Escherichia. coli* Strains	
Networking & Refreshments @11:20-11:40 @Foyer	
Poster Presentations	
Poster Judge	**Anuruddhika Iroshani Jayarathna, Globale Stanford Campus, Sri Lanka**
PP001	**Sumalee Kondo, Thammasat University, Thailand**
Title: Genome analysis of ESBL-Producing *E. Coli* and *K. pneumoniae* Isolated from Patients who underwent Abdominal Surgery	
PP002	**Yen-Hung Chow, National Health Research Institutes, Taiwan**
Title: Natural Killer T Cells Play a Significant Role in Preventing Coxsackievirus A10 Infection through an Adeno-Based Vaccine Expressing Enterovirus-like Particles	
PP003	**Shu-Ling Yu, National Health Research Institutes, Taiwan**
Title: Human SCARB2 Acts as a Cellular Coreceptor for helping HFMD Pathogens Infection	
PP004	**Sanjay Kumar Biswas, Tata Memorial Hospital, India**
Title: Comparison of *in-vitro* Activity of Telavancin with Vancomycin, Linezolid, Teicoplanin and Daptomycin against *Staphylococcus aureus* Isolated from Cancer Patients	
PP005	**Hyun Gee Lee, Amorepacific, South Korea**
Title: Study on the Relationship between Environmental Microorganisms and Product Microorganisms	

PP006	**Paul Alexis Bourgade Su, Anahuac University, México**
Title: In Vitro Evaluation of the Antimicrobial Effect of Toxins from the Venom of the Tarantula *Poecilotheria regalis*	
PP007	**Ayane Fujii, Bunkyo Gakuin University Graduate School, Japan**
Title: Analysis of Quinolone Resistance Mechanisms in Quinolone-resistant Acinetobacter Baumannii	
PP008	**Mizuki Tadenuma, Bunkyo Gakuin University Graduate School, Japan**
Title: Inhibition of Virulence Factors of Multidrug-resistant *Pseudomonas aeruginosa* (MDRP) by Catechins	
PP009	**L. Kristopher Siu, National Health Research Institutes, Taiwan**
Title: Development and Evaluation of Capsular polysaccharide (CPS) Vaccine Against *Klebsiella pneumoniae* by using Serotype K2 as a Model	
PP0010	**Melika Teimouri, San Francisco State University, USA**
Title: Predicting Antibiotic Resistance in *Escherichia coli* using Machine Learning Models	
Lunch (13:00-14:00) @Restaurant Cafe Ceres	
Oral Presentations	
Session Chair:	**Anuruddhika Iroshani Jayarathna, Global Stanford Campus, Sri Lanka**
Sessions: Infectious Diseases Prevention, Control and Cure| Antimicrobial Agents | Industrial and Applied Microbiology | Vaccines and Vaccination| Antimicrobial Agents | Viral Infectious Diseases | Industrial and Applied Microbiology | Antibiotics and Resistance	
14:00-14:25	**Ella E. Gallego, West Visyayas State University Medical Center, Philippines**
Title: Risk Factors Associated with Hospital Acquired Pneumonia (HAP) Patients for Getting Intubated in a Tertiary Hospital: A Prospective Unmatched Case-Control Study	
14:25-14.50	**Sudip Kumar Das, University of Calcutta, India**
Title: Modified Green Adsorbent using Solid State Fermentation for Pb(II) Removal from its Aqueous Solution	
14:50-15.15	**George Zhang, Akeylink Biotechnology, China**

Title: Discovery and Development of Atilotrelvir (GST-HG171) for the Treatment of COVID-19	
15.15-15:40	**Suman Lata, National Institute of Malaria Research, India**
Title: Molecular Identification of Sand Flies Collected from an Endemic Focus of Cutaneous leishmaniasis in Northern India	
Video Presentations	
VP01	**Anna Saryglar, Infectious Diseases Hospital of The Republic of Tyva, Russia**
Title: Hepatitis a Control through a Routine Vaccination: Experience of the Republic of Tyva	
VP02	**Kai-Ying Low, Sunway Medical Centre, Malaysia**
Title: Age-Specific Patterns in Pulmonary Tuberculosis Epidemiology: Insights from Malaysia's Private Tertiary Healthcare Sector	
VP03	**Anna Machuzhak, National Children's Hospital "Ohmatdyt", Ukraine**
Title: Efficiency of Anti-Bacterial Therapy Based on Synergism in Septic Patients in the Conditions of the Intensive Therapy Unit	
Networking & Refreshments @ 16.10 - 16.30 @Foyer	
Day 2 Concludes followed by Panel Discussion - Awards & Closing Ceremony	

Day 1

Infectious & Microbiology 2024

Keynote Presentations

A NEW APPROACH TO TREATING INCURABLE AND INFECTIOUS DISEASES: CAR-T AND TCR-T CELL THERAPY USING VIRAL VECTORS AND GENETIC ENGINEERING TECHNOLOGY

Heon Ju Lee,Seo Jin Hwang, Eun Hee Jeong and Mi Hee Chang
CARBio Therapeutics, Republic of Korea

Abstract:

Background: About 2,000 clinical trials are underway for CAR-T gene therapy, and the United States was the first in the world to conduct clinical trials in 1990, and clinical results have been announced in earnest since 2006. The long-standing dream of curing incurable diseases is gradually being realized, starting with the cure for blood cancer using CAR-T (Chimeric Antigen Receptor-T) gene therapy. It is a cutting-edge new medicinal technology that corrects, prevents, or treats diseases by synthesizing therapeutic genes and introducing them into the human body using a virus as a carrier.

Objective: To treat incurable diseases through CAR-T gene adoptive research using lenti or adenovirus.

Methods: Experiments were conducted in accordance with SOP in the LMO laboratory. 1)Designing of CAR-Gene Constructs and Subcloning into Lentiviral Vector, 2) Generation of Genetically Modified CAR-T Cells 3) Cell Lines and Culture 4) Cytotoxicity Assays, Cytokine Release Assay 5) *In vivo* Experiments. Data were analyzed using the GraphPad Prism 10 software.

Results: We created 40 types of viral vectors, and among them, 3 types of CAR-T cells activated cytokines such as IFN-γ and TNF-α, and their killing ability against CLDN18.2 activated cancer cells was strengthened. In conclusion, we were able to further increase the anti-tumor effect through the newly developed CLDN18.2 CAR-T cells attached to PD1/CD28 CSR.

Conclusion: Gene therapy, a rapidly evolving field, is expected to become a new revolutionary method for treating infectious diseases. Let's take a look at the development trends of the mRNA COVID19 vaccine. Through this, we would like to explore the possibility that CAR-T cell immunotherapy may provide a promising option for developing treatments for infectious diseases such as HIV/AIDS and hepatitis, tuberculosis, and MRSA.

Biography

Lee has a passion for treating infectious diseases, drawing on his expertise in microbial genetics and his extensive experience in toxicology test evaluation. His open and collaborative active joint research based on the Department of Pharmacy, preclinical, and clinical is establishing new approaches and attempts through technological innovation in the field of cell immunotherapy in South Korea. He has effectively produced many results based on his many years of research, evaluation, training and administrative experience in both hospitals and educational and laboratory settings. He hopes to produce good research results in the future to eradicate malignant tumors and infectious diseases that seriously afflict humanity through further research cooperation and progress

LUNG VIROME: THE EFFECT OF TORQUE TENO VIRUS (TTV) INFECTION ON CLINICAL OUTCOMES, GENOMIC INTEGRITY, AND MORTALITY IN COPD PATIENTS

Patrizia Russo[1,2]

[1]*Department of Life Promotion San Raffaele University Rome, Italy*
[2]*IRCCS San Raffaele Rome, Italy*

Abstract:

Introduction: In recent years, there has been an increasing focus on exploring the role of the global virome in both health and disease. Consequently, investigating the human lung virome could provide new insights into respiratory illnesses. The virome, as an integral component of the microbiome, undergoes continuous changes in composition influenced by factors such as dietary habits, environmental conditions (including smoking), genetic predisposition, and other unpredictable variables. The virome significantly impacts human immune responses and contributes to inflammatory processes. Torquetenovirus (TTV) represents a recent addition to the virome, the exact role of which remains unclear; however, several studies suggest that TTV may trigger inflammasomes, which are intracellular multiprotein complexes crucial for the innate immune system's defense against various pathogens. This study explores the relationship between TTV viremia and clinical markers in a cohort of patients with severe to very severe COPD undergoing respiratory rehabilitation.

Methods: We analyzed 102 elderly COPD patients, stratified by TTV viremia levels (< or ≥ 4 log10 copies/mL). Clinical markers—including mortality, inflammatory-oxidative parameters (Lymphocyte/Monocyte, Neutrophil/Lymphocyte, and Platelet/Lymphocyte ratios), IL-6 (measured via ELISA assay), and DNA damage (assessed via comet assay)—were evaluated.

Results: Of the patients, 62.75% had TTV viremia levels > 4 log10 copies/mL. No associations were found between TTV levels and sex or obesity. However, higher TTV viremia correlated with increased DNA damage and significantly lower 5-year survival probability.

Conclusion: Patients with TTV levels ≥ 4 log10 copies/mL exhibited the lowest survival probability, though DNA damage emerged as a stronger determinant of outcomes. This study raises important questions: Is TTV a predictor of poor outcomes in COPD? Do these patients require personalized rehabilitation based on DNA damage and/or viremia? Does DNA damage drive TTV viremia, or is it the reverse?

Biography

Patrizia Russo works at San Raffaele University in Rome as an Associate Professor of Pathology and History of Medicine. She is a member of the Editorial Boards of "Current Medicinal Chemistry," "Recent Patents on Anticancer Drugs," "Molecules," and "International Journal of Molecular Sciences." She serves as a scientific evaluator for several governments, including France, Austria, Oman, Jordan and the EU.
In 2006, she was a member of the Italian Consensus Board for defining guidelines on lung cancer in Italy. Since January 2021, she has been a part of the Technical Committee of the Italian Society of Tabaccology (SITAB).

Day 1

Infectious & Microbiology 2024

Oral Presentations

CHARACTERIZATION OF UNIQUE PATHOLOGICAL FEATURES OF COVID-ASSOCIATED COAGULOPATHY: STUDIES WITH AC70 hACE2 TRANSGENIC MICE HIGHLY PERMISSIVE TO SARS-COV-2 INFECTION

Chien-Te Kent Tseng, Drelich AK, Rayavara K, Hsu J, Saenkham-Huntsinger P, Judy BM, Tat V, Thomas G Ksiazek TG and Peng B-H

University of Texas Medical Branch, USA

Abstract:

Background: COVID-associated coagulopathy seemly plays a key role in post-acute sequelae of SARS-CoV-2 infection. However, the underlying pathophysiological mechanisms are poorly understood, largely due to the lack of suitable animal models that recapitulate key clinical and pathological symptoms.

Objective: To characterize the pathological futures of COVID-associated coagulopathy in hACE2 transgenic (Tg) mice

Methods: Fully characterized AC70 line of hACE2-Tg mice with values of LD_{50} and ID_{50} of 3 and 0.5 $TCID_{50}$ of SARS-CoV-2 (WA1 strain), respectively, were challenged intranasally with 10^5 $TCID_{50}$ of SARS-CoV-2. These lethally challenged mice were subjected to various analyses for assessing a wide spectrum of host responses, especially virology, hematology, serology, coagulation-related markers, histopathology, etc.

Results: Lethal challenge of AC70 hACE2 Tg mice caused acute onset of leukopenia, lymphopenia, along with an increased neutrophil-to-lymphocyte ratio. Importantly, infected animals recapitulated key features of COVID-19-associated coagulopathy, including significantly elevated levels of D-dimer, t-PA, PAI-1, and circulating NETs, along with activated platelet/endothelium marker. Immunohistochemical staining with anti-PF4 antibody revealed profound platelet aggregates especially within blocked veins of the lungs. ANXA2 is known to interact with S100A10 to form heterotetrametric complexes, serving as coreceptors for t-PA to regulate membrane fibrinolysis. Thus, our results revealing elevated IgG type anti-ANXA2 antibody production, down-regulated de novo ANXA2/S100A10 synthesis, and reduced AnxA2/S100A10 association in infected mice support an important role of this protein in the pathogenesis of acute COVID-19.

Conclusion: We showed that acute SARS-CoV-2 infection of AC70 hACE2 Tg mice triggered a hypercoagulable state coexisting with ill-regulated fibrinolysis, accompanied by dysregulation of ANXA2 system, which might serve as druggable targets for development of antithrombotic and/or anti-fibrinolytic agents to attenuate pathogenesis of COVID-19.

Biography

Chien-Te Kent Tseng is a professor in the Departments of Microbiology and Immunology, Pathology, and Cell Biology and the Center of Biodefense and Emerging Disease at University of Texas Medical Branch. Dr. Tseng received his undergraduate training in Plant Pathology at National Chung Hsing University in Taiwan, did his M.S. and Ph.D. thesis and dissertation in the field of Immunology at Mississippi State University and University of Arkansas Medical Sciences, respectively, and did his postdoctoral training in HCV research at University of Texas Medical Brach. Over the past 20+ years, Tseng lab has primarily focused on characterization of the pathogenesis and development of effective medical countermeasures (MCMs) against zoonotic human beta-coronaviruses (b-CoVs) and other respiratory RNA viruses. Among other contributions in this fields, his lab is most well-known for their ability to establish and characterize animal models for studies of pathogenesis of SARS-CoV-1, MERS-CoV, and SARS-CoV-2, and evaluation of immunogenicity, efficacy, and safety of MCMs. His work has been recognized as evidenced by multiple grant and contract awards of various sources.

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SARS-COV-2 ORF10 INDUCES MITOCHONDRIAL DYSFUNCTION

Jeffrey Haltom[1-4], Nidia S. Trovao[3,4], Joseph W Guarnieri[2,4], Vincent Pan[3], Urminder Singh[1,4], Sergey Tsoy[5], Collin A. O'Leary[1,6], Yaron Bram[5], Gabrielle A Widjaja[2], Zimu Cen[2], Robert Meller[7], Stephen B Baylin[8,9], Walter N. Moss[1], Basil J. Nikolau[1], Francisco J Enguita[10], Douglas C Wallace[2,4,11], Afshin Beheshti[4,12,13], Robert E. Schwartz[5,6,14] and Eve Syrkin Wurtele[1,4]

[1]*Iowa State University, USA*
[2]*The Children's Hospital of Philadelphia, USA*
[3] *Institutes of Health, USA*
[4]*COVID-19 International Research Team, USA*
[5]*Weill Cornell Medicine, USA*
[6]*Cornell College, USA*
[7]*Morehouse School of Medicine, USA*
[8]*Sidney Kimmel Comprehensive Cancer Center, USA*
[9]*Van Andel Research Institute, USA*
[10]*Universidade de Lisboa, Portugal*
[11]*University of Pennsylvania, USA*
[12]*Broad Institute of MIT and Harvard, Cambridge, USA*
[13]*Blue Marble Space Institute of Science, USA*
[14]*Cornell University, Ithaca, NY, USA*

Abstract:

Expression of SARS-CoV-2 ORF10 has been shown to induce mitophagy, leading to the degradation of mitochondrial antiviral signaling (MAVS) and weakening the innate immune response. However, the broader effect of ORF10 expression on the host transcriptome has not been investigated. We analyzed the relative expression levels of host genes in A549 and 293T cells expressing either ORF10 or GFP. In A549 cells, ORF10 expression decreases the expression of 12S-MT-RNR2, 16S-MT-RNR1, and nine genes essential for the electron transport chain, including complex I subunits (MT-ND1, MT-ND4, MT-ND4L, MT-ND5), complex III subunit (MT-CYB), complex IV subunits (MT-CO1, MT-CO2, MT-CO3), and complex V subunit (MT-ATP6). In 293T cells, ORF10 expression significantly reduces the expression of nuclear-encoded mitochondrial ribosomal proteins (MRPL4, MRPL41) and complex I subunits (NDUFB7, NDUFS7). These changes in mitochondrial transcripts disrupt mitochondrial function by decreasing oxidative phosphorylation and mitochondrial membrane potential, leading to increased production of mitochondrial reactive oxygen species. Although ORF10 likely does not directly inhibit the transcription of mtDNA or nDNA genes, given the opposite transcriptional responses observed in the two cell types, it must interfere with a common feature of mitochondrial function to produce these strong transcriptional effects. A study of ORF10 protein interactions revealed binding to TIMM8B, THTPA, PPT1, MAP7D1, and the CUL2 complex. These interactions would directly or indirectly

inhibit mitochondrial function and, through HIF-1α, shift metabolism toward glycolysis to enhance SARS-CoV-2 biogenesis. We also computationally predicted the 3D structure of ORF10, finding that it forms an amphiphilic α-helix with positively charged arginines on one face and hydrophobic amino acids on the other, a typical structure for a mitochondrial import sequence. A less pathogenic ORF10 mutation alters the positioning of these critical arginines. Our research indicates that SARS-CoV-2 infection targets mitochondria and induces mitochondrial suppression in many organs, potentially causing the long-lasting systemic impacts that are associated with post-acute sequelae of COVID-19 (PASC)3. Notably, ORF10 shows prolonged elevation in specific tissues, which could contribute to PASC. Overall, the data suggest that ORF10 induces mitochondrial dysfunction by targeting mitochondrial proteins involved in the TCA cycle and oxidative phosphorylation, ultimately triggering mitophagy and MAVS degradation to dampen the immune response. Consistent with this, we observed a downward trend in the expression of innate immune genes in ORF10-expressing A549 and 293T cells.

IMAGING FINDINGS AND DIFFERENTIAL DIAGNOSIS OF SEPTIC ARTHRITIS

Nuran Sabir
Pamukkale University, Turkey

Abstract:

Septic arthritis is a medical emergency associated with high rates of morbidity and mortality, especially when the diagnosis is delayed or the treatment is suboptimal. The large joints of the hip and the knee are most commonly affected but any joint can be involved. The differential diagnosis of an acutely painful joint is broad and includes crystalline and inflammatory arthritides, trauma, neoplasm, and infection (1). Patients with septic arthritis classically present with fever, chills, and a warm, erythematous, swollen, and painful joint. However, variation in patient presentation necessitates a high clinical suspicion for septic arthritis. Many risk factors like bacteremia, old age, Rheumatoid arthritis, immuncompromised state predispose patients to septic arthritis. Coexisting primary rheumatologic disorders have been reported in as many as 50% of patients with bacterial arthritis (2). Imaging plays a vital role in diagnosis, assessment of the extent of involvement, guiding diagnostic and therapeutic interventions, treatment planning, and follow-up of musculoskeletal infections. Imaging can aid evaluation of osseous structures and surrounding soft tissues. Radiographic findings are usually normal in early septic arthritis or may reveal periarticular osteopenia. More advanced infections may depict soft tissue swelling, obliteration, and displacement of fat planes, and if present, findings of bone and joint infections (3). Positive CT findings include joint capsule and bursal distensions and periarticular soft tissue collections. CT and MRI can aid in assessment of difficult-to-access joints such as sacroiliac joint; furthermore, CT can aid in joint fluid aspiration. MRI can reveal a joint effusion or deep soft-tissue infection as well. Nonspecific bony erosions, marrow edema, and articular cartilage destruction can be seen with septic arthritis. Because of its sensitivity to soft tissue and bone marrow pathology, has high accuracy in diagnosing infection, including septic arthritis, osteomyelitis, pyomyositis, and discitis, and could be considered as the initial imaging study (4). Ultrasound can help detect joint effusion by detecting elevation of the joint capsule with anechoic or complex fluid effusion, as well as the presence of synovial thickening and hyperemia (5).

In conclusion infection can affect musculoskeletal system and different tissue planes with various depth and extent of involvement. Imaging appearances are variable depending on the degree of infiltration of the infectious process into different tissues and bony structures and bone marrow. Knowing the radiological findings can help in the early accurate diagnosis and choosing the appropriate treatment that lead to a significant decrease in the morbidity and mortality.

Biography

Dr. Sabir, is a member of European Society of Radiology (ESR), European Society of Musculoskeletal Radiology (ESSR), International skeletal Society (ISS), Turkish Society of Radiology and Turkish Society of Magnetic Resonance (TSMR). In ESSR, also is a member of both tumor and metabolism subcommunities. She is the author of 47 scientific papers published in the peer-reviewed journals and more than 100 presentations at the international and Turkish congresses. Her scientific papers have more than 1300 citations. Dr. Sabir has invited many times as a lecturer to many international conferences like ESSR; ISS and Balkan congress of radiology (BCR) and too many different national conferences and meetings. In June, 2018, she presented (The Development of the MSK Radiology in Turkey) in the national MSK Societies meeting held in ESSR congress in Amsterdam. She is also a reviewer in may journals like European radiology, European spine Journal (ESJO), diagnostic and interventional radiology (DIR) and Eurorad.

DEVELOPMENT OF APTAMER-BASED BIOSENSORS FOR RAPID DETECTION OF *PSEUDOMONAS AERUGINOSA* WITH METHYLENE BLUE EFFECT

Somayeh Maghsoomi Taramsari[1,2]
[1]*University for Continuing Education Krems, Austria*
[2]*Medical University of Vienna, Austria*

Abstract:

Pseudomonas aeruginosa is a rod-shaped gram-negative bacterium, which is a critical threat to hospitalized patients with compromised immune systems or underlying health conditions. Therefore, it is crucial to rapidly diagnose P. aeruginosa. The standard culture and biochemical techniques commonly employed in hospitals are characterized by being time-consuming, labour-intensive, and depending on the expertise of professionals. Biosensors have become alternative tools for rapid and accurate detection of pathogen bacteria. By employing a specific aptamer for recognition of P. aeruginosa, in this study, we aim to develop an electrochemical apta-biosensor for rapid and sensitive detection of this bacterium in less than one day. The utilization of aptamer-based biosensors for environmental monitoring has gained significant attention, primarily due to the unique advantages offered by aptamers. Aptamers can selectively bind to a diverse range of target molecules, spanning from small molecules to bacteria. The successful development of the sensor was confirmed through SEM observation and cyclic voltammetry (CV) measurements. The created apta-biosensor operated by detecting the conformation change of the specific aptamer for *P. aeuruginosa* upon binding with the target bacterium, resulting in the decrease of the current peak measured by square wave voltammetry (SWV). Additionally, to enhance the sensitivity of the biosensor, we investigated the use of methylene blue (MB) as an amplification agent. The MB significantly enhances the signal response of the apta-biosensor, leading to improved detection sensitivity. The modified apta-biosensor with MB detects *P. aeruginosa* with the limit of detection (LOD) value of 8 CFU/ml.

Biography

My name is Somayeh Maghsoomi, and I am deeply immersed in the world of microbiology as a Ph.D. student at the Medical University of Vienna, collaborating with Donau University Krems. During my master's studies, I honed my skills and became a professional in the microbiology field. These skills, combined with my dedication and passion for research, have prepared me well for my Ph.D. project. My research is concentrated on the intricacies of infection biology, with a specific focus on developing rapid detection methods for *Pseudomonas aeruginosa*. In my first year of PhD, I've already produced promising results, laying the groundwork for future studies involving patient samples in medical contexts. My fervent pursuit of advancing diagnostic techniques underscores my commitment to improving healthcare outcomes.

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LDLR IS AN IMPORTANT RECEPTOR FOR CRIMEAN-CONGO HEMORRHAGIC FEVER VIRUS

Vanessa M Monteil[11], Shane C Wright[1], Matheus Dyczynski[2,3], Max J Kellner[4], Sofia Appelberg[5], Sebastian W Platzer[4], Ahmed Ibrahim[6], Hyesoo Kwon[7], Ioannis Pittarokoilis[1], Mattia Mirandola[8], Georg Michlits[3], Stephanie Devignot[1], Elizabeth Elder[7], Samir Abdurahman[5], Sándor Bereczky[5], Binnur Bagci[9], Sonia Youhanna[1], Teodor Aastrup[6], Volker M Lauschke[1,10,11], Cristiano Salata[8], Nazif Elaldi[12], Friedemann Weber[13], Nuria Monserrat[14,15,16], David W Hawman[17], Heinz Feldmann[17], Moritz Horn[2,3], Joseph M Penninger[4,18-20] and Ali Mirazimi[1,5,7]

[1]Karolinska Institute and Karolinska University, Sweden
[2]Acus Laboratories GmbH, Germany
[3]JLP Health GmbH, Austria
[4]Institute of Molecular Biotechnology of the Austrian Academy of Science, Austria
[5]Public Health Agency of Sweden, Sweden
[6]Attana AB, Sweden
[7]National Veterinary Institute, Sweden
[8]University of Padova, Italy
[9]Sivas Cumhuriyet University, Turkey
[10]University Tübingen, Germany
[11]Dr. Margarete Fischer-Bosch Institute of Clinical Pharmacology, Germany
[12]Cumhuriyet University, Turkey
[13]Justus-Liebig University, Germany
[14]University of Barcelona, Spain
[15]The Barcelona Institute of Science and Technology (BIST), Spain
[16]Catalan Institution for Research and Advanced Studies (ICREA), Spain
[17]Rocky Mountain Laboratories, USA
[18]University of British Columbia, Canada
[19]Medical University of Vienna, Austria
[20]Helmholtz Centre for Infection Research, Germany

Abstract:

Climate changes and population densities have accelerated transmission of deadly viruses into humans, including highly lethal hemorrhagic fever viruses like Crimean-Congo hemorrhagic fever virus (CCHFV). We report that the Low-Density Lipoprotein Receptor (LDLR) is an important receptor for CCHFV cell entry. Making use of an unbiased forward genetic screen in haploid cells, we identified then confirmed that LDLR plays a vital role in CCHFV infection using both laboratory strain and a clinical isolate. The interaction between CCHFV and LDLR is highly specific, and other members of the LDLR protein family fail to bind to nor neutralize the virus. Biosensor experiments in living cells as well as affinity study demonstrate that LDLR binds the surface glycoproteins Gc/Gn from CCHFV and that this interaction results in receptor/virus trafficking to endosomes.

Importantly, mice lacking LDLR exhibit a delay in CCHFV-induced disease. Furthermore, we identified the presence of Apolipoprotein E (ApoE) on CCHFV particles. Our findings highlight the essential role of LDLR in CCHFV infection, irrespective of ApoE presence, when the virus is produced in tick cells. This discovery holds profound implications for the development of novel therapies, including the design of targeted antivirals to combat this ever more widespread and highly lethal hemorrhagic disease.

Biography

Monteil is a researcher at Karolinska Institutet in Sweden. After a PhD at the French Armed Forces Biomedical Research Institute (IRBA) focusing on Dengue virus, she experienced field work during the 2014-2016 Ebola virus epidemic in West Africa. During this period, she managed a diagnostic laboratory in Guinea and worked in close collaboration with the American CDC, the French and Guinean Red Cross, the World Health Organization as well as the local authorities. Since 2016, she is studying the pathogenesis of hemorrhagic fever viruses (EBOV, MARV, LASV, CCHFV) and SARS-CoV-2 at Karolinska Institutet and at the Public Health Agency of Sweden. Her work has been recognized by several publications in high impact journals.

ON THE PROMISING ROLE OF HOMEOPATHIC MEDICINES IN THE PREVENTION OF POST HERPETIC NEURALGIA

Swami Shraddhamayananda
Ramakrishna Mission Charitable Dispensary, India

Abstract:

Herpes Zoster (HZ) is a viral disease resulting from the reactivation of Vericella Zoster Virus (VZV), which remains latent in the nerve ganglion after primary infection. The commonest complication of HZ is Post herpetic neuralgia (PHN). When the body immunity goes down then the latent VZV become active in the sensory ganglia and causes inflammatory neural damage, which subsequently leads to the incidence of PHN, and acute neuralgic pain. Both the central and peripheral nervous system are affected. The intensity of suffering of this disease is less in children than in adults. PHN occurs frequently in elderly persons and is a serious problem to them with sleepless nights (insomnia) that may persists several years. There is no general consensus on the definition of PHN, but in the latest studies it is defined as pain persisting more than 3 months after the rash has healed.

In this study we treated 200 HZ cases of different age and sex; with homeopathic medicines (Rhus Tox and Thuja oc.) but no one developed PHN after one to six months of follow up, and in all patients' rashes or lesions were healed within 8-12 days, which may indicate the positive role of these medicines to prevent PHN. These medicines are of very low cost, easily affordable and without any side effects. The results of this study were very encouraging indicating a definite role of homoeopathic medicine in HZ and PHN.

Biography

Swami Shraddhamayananda is a medical graduate of Calcutta University, a monk of Ramakrishna Mission, at present the Monk in Charge of the Medical Unit at Belur Math, Ramakrishna Mission, Howrah, West Bengal, India. He is also attached to the Ramakrishna Vivekananda Research Institute. Now he is engaged in the study of alternative medicines, particularly on the action of homeopathic medicines in different skin diseases. He is now running a separate clinic for this purpose, which is now attended by hundreds of patients daily. He has published 12 papers on various skin diseases in peer-reviewed journals and published one book on vitiligo from Germany, which has been translated into more than 20 different languages. He has also written a book on acne and acne scars, published in PDF form. His experience in medical practice and research is over 30 years.

IN VITRO EVALUATION OF THE ANTIMICROBIAL EFFECT OF TOXINS FROM THE VENOM OF THE TARANTULA POECILOTHERIA REGALIS.

Paul Bourgade-Su[1], Alejandro Estrada-Ugalde[1], Gabriela Guillen-Peuchert[1], Lorena Millán-Beyer[1], Gerardo Corzo-Burguete[2], Iván Arenas-Sosa[2], Samuel Cardoso-Arenas[2], Adán Peña-Barreto[1], Adrián Flores-Romero[1], Saúl Rojas-Hernández[3] and Diego Rojas-Ortega[1]

[1]Universidad Anáhuac México-Campus Norte, Centro de Investigación en Ciencias de la Salud (CICSA)
[2]Institute of Biotechnology UNAM
[3]Laboratory of Cellular and Molecular Immunology - ESM-IPN

Abstract:

Background: The use of antibiotics has a significant impact on human health. However, the emergence of resistant bacteria makes treatment difficult, which has prompted research into new drugs to control bacterial infections. Various organisms, including spiders, have the ability to produce antimicrobial peptides that play a key role in protecting against bacterial agents. However, the proteomic study of tarantula venoms is recent, due to the small amount of venom per specimen and the lack of an adequate extraction protocol.

Objective: Our study aims to evaluate in vitro the antimicrobial effect of the complete venom as well as selected fractions of P. regalis venom. For this purpose, we will determine the integrity of the proteins of the total venom of P. regalis by electrophoresis. The antimicrobial activity will be determined by plate diffusion. In addition, total venom fractionationing will be performed using RP-HPLC.

Methods: The complete venom of P. regalis was obtained by anesthetizing the specimens with concentrated isoflurane, electrically stimulating the venom-producing glands of the chelicerae for 20 seconds with 7V. The venom obtained was quantified using the A230/A280 NANODROP ONE reader. Once the venom was quantified, its complexity was analyzed using the 18% Tricine-SDS-PAGE polyacrylamide gel electrophoresis technique under reducing conditions (120V/90min). Venom fractions were separated in High Efficiency Liquid Chromatography at a concentration of 2 mg, using a reverse phase C18 column, diluting in 0-60% acetonitrile. The fractions were tracked at a wavelength of 280 nm. Each fraction was analyzed by plate diffusion in Gram-negative (E. coli ATCC 13706) and Gram-positive (S. aureus BAA-1686) bacteria on Müller-Hinton agar culture.

Results: After processing the venom by RP-HLPC, we obtained 50 fractions, of which by plate diffusion analysis, 21 fractions had antimicrobial effect against E. coli and 18 fractions had antimicrobial effect against S. aureus.

Conclusion: In this study we demonstrated for the first time Gram-positive and Gram-negative antimicrobial activity of a large percentage of the venom fractions. The fractions with antimicrobial activity will be processed to find the minimum inhibitory concentration.

Biography

Paul Alexis Bourgade Su, medical student at Universidad Anahuac Mexico. Junior Coordinator of INVESTIGA Health Sciences Research Program. Accepted in a research trainee program in South Florida University. Responsible for a research line that studies the proteomics of tarantula venoms in search of antimicrobial peptides. He's also involved in a Project on the pathophysiological explanation of the pediatric autoimmune neuropsychiatric disorder associated with streptococcal infections (PANDAS). Open to collaboration in clinical and basic sciences.

THE DOUBLE WHAMMY: AN EPIDEMIC OF MUCORMYCOSIS DURING THE COVID-19 PANDEMIC: CASE REPORTS AND A GLOBAL REVIEW

Chitra Pai[1], Sarina Utamsing[2], Dulguun Bayardorj[3], Anil Harugop[4] and Varshav Gore V[5]

[1]Professor, Touro University College of Osteopathic Medicine, California, USA,
[2]2nd year Student, Touro University College of Osteopathic Medicine, California, USA
[3]3rd year Student, Touro University College of Osteopathic Medicine, California, USA
[4]Professor, Jawaharlal Nehru Medical College and Hospital, Belgavi, India
[5]Professor, Mahatma Gandhi Mission Medical College and Hospital, Navi Mumbai, India

Abstract:

Background: During the COVID-19 pandemic, the epidemic of mucormycosis posed a double whammy as a significant global public health threat. Rhino-orbital-cerebral mucormycosis (ROCM), a highly invasive and fatal form of this opportunistic fungal disease, is known to cause high morbidity and mortality in COVID patients especially in those with Diabetes mellitus (DM), malignancy, transplantations, neutropenia etc.

Objective: To compile and analyze case reports of COVID associated mucormycosis from two different tertiary care hospitals in India and provide a systematic global review.

Methods: Data were drawn from the hospital records of COVID patients admitted with rhino cerebral mucormycosis with regards to their demographics, presence of co-morbidities, COVID status, treatment received and disease outcomes. Additionally, the electronic databases including PubMed, Google scholar and Embase were reviewed for articles published from across the world.

Results: Among the ROCM patients, four died of sepsis, five required oculoplasty, and three recovered without complications. Most had diabetes mellitus and needed surgical intervention along with Amphotericin B administration. Literature review revealed that majority of the cases of COVID-19 with ROCM were encountered in India. Most patients were elderly and had diabetes mellitus as a significant co-morbidity. Among several factors to be considered, good glycemic control, regulated use of steroids in appropriate doses, proper sanitization and handling of oxygen gas cylinders, proper decontamination of hospital environment and avoidance of overzealous use of steam inhalation and non-humidified oxygen have been proposed as important measures to control this epidemic.

Conclusion: The epidemic of mucormycosis with COVID-19 pandemic, is a significant global public health threat. The deadly fungal infection is both difficult and expensive to treat. Measures to control this epidemic include good glycemic control in DM patients; regulated use of steroids in appropriate doses; proper sanitization and handling of oxygen gas cylinders; proper decontamination of hospital environment, and the avoidance of overzealous use of steam inhalation and non-humidified oxygen.

Biography

Pai is associated with Touro University College of Osteopathic Medicine, California, as a Professor of Microbiology and the Global Health Program coordinator. Her experience spans 27 years of teaching at medical schools in India, Nepal, the Caribbean islands, and the US in addition to directing diagnostic microbiology laboratories and conducting research. Her research interests include multi-drug-resistant pathogens, tuberculosis, COVID related global health issues and medical education.

AN AGENT-BASED MODEL OF INFECTIOUS DISEASES THAT INCORPORATE THE ROLE OF IMMUNE CELLS AND ANTIBODIES

Shigeaki Ogibayashi
Chiba Institute of Technology, Japan

Abstract:

One of the essential features of agent-based modeling is that a set of indispensable factors exists for the emergence of qualitative features of the phenomenon. By analyzing why such a set of factors is indispensable, we can understand the causal mechanism of the phenomenon's emergence. This paper constructed an agent-based infection model focusing on recovery process modeling and obtained the following results. The model assumes the role of fever and antibodies as the effect of immunity increases with an increasing number of viruses, and antibodies emerge when the immunity is insufficient to keep up with virus replication. The agent movement is assumed to be random. The present model reproduced the qualitative features of the chronological pattern well regarding the numbers of newly infected, newly recovered, and total infected agents observed in the real world.

The effect of fever is indispensable for the pandemic convergence for the wide range of virus replication rates. The role of antibodies is not indispensable for the emergence of this feature, but it increases the upper limit of virus replication rate for pandemic convergence. Measuring body temperature is more effective in identifying potentially infected individuals than a PCR test because fever is a sign of infection, and it also provides information about the severity of infection status, while PCR tests only offer dichotomous information. The effectiveness of the countermeasures, such as identifying and isolating the severely infected individuals, official movement regulation, wearing masks, and providing ventilation, are all reproduced and confirmed in the model. However, the most economically effective countermeasure is that many individuals in the system recognize their current infection status by monitoring body temperature, i.e., how it is higher than their normal body temperature, thereby self-controlling their movement behavior.

Biography

Emeritus professor Shigeaki Ogibayashi graduated from the Department of Physics at Tohoku University, Sendai, Japan, in 1969 and completed a master's degree in physics in 1971.
He retired from Chiba Institute of Technology in March 2017. However, he is continuing his research in agent-based modeling of social phenomenon, not only of macroeconomic phenomenon but also of bullying phenomenon as well as the Covid-19 pandemic. The model of the covid-19 pandemic features a micro model of the infection and recovery that incorporates the number of viral particles, innate immune cells, and antibodies, whose research articles are published in the form of proceedings CSS2020 by CSSSA and one of the chapters of the book entitled "Infectious Diseases, from prevention to control," e.d. Yvette S. Brewer, published by Nova Science Publishers, Inc.

MICROBIAL SIDEROPHORES AS A SUSTAINABLE APPROACH FOR FE ACQUISITION IN PLANTS AS PLANT GROWTH PROMOTION TRAIT

Pragati Srivastava
ICAR-National Institute for Plant Biotechnology, India

Abstract:

For plants to grow and develop efficiently, iron (Fe) is a necessary nutrient. Although bioavailable form of Fe is always low that can be taken up by the plants so it indirectly impacts the human population with minimal amount of Fe in grain. However, a number of variables, such as soil pH, the amount of organic matter present, and the kind of Fe present in the soil, influence how readily available Fe is in the soil. Plant fecundity is a common issue that impacts crop quality and output. The availability of Fe in soil has been increased using traditional methods such chemical fertilisers and amendments; nevertheless, the detrimental impacts of chemical fertilisers on the environment and human health are readily apparent. As a result, methods of sustainable agriculture that depend on microorganisms' innate capacity to solubilize iron in the soil are becoming increasingly popular. Fe can be soluble in soil by a variety of microorganisms, including fungus and bacteria, through processes like reduction, chelation, and acidification. Microbial solubilizers can increase the amount of Fe available in the soil, promote plant growth, and lessen the use for fertilisers made of chemicals. Consequently, using microbial iron solubilizers can be a practical and affordable way to improve increase the amount of Fe in the soil and support sustainable farming. The potential of various microbial strains and their interactions with plants and other microbes in the soil require more investigation. The significance of iron availability for plants and soil, as well as the promise of microbial iron solubilizers as a long-term solution to solve soil iron shortage is of immense importance to meet Fe requirements in human race to overcome malnutrition.

Biography

Pragati Srivastava is currently working as DST-SERB, National Post Doctoral fellow, in ICAR-National Institute of Plant Biotechnology, IARI PUSA New Delhi. She has completed her M.Sc. and Ph.D. in Microbiology from Govind Ballabh Pant University of Agriculture and Technology, Pant Nagar, Udhamsingh Nagar Uttarakhand, India. She's skilled in Microbiology, Molecular biology and Biotechnology. Have brief knowledge of Bioinformatics tools and genetic engineering. She has received Young Women Scientist Award in International Conference on "Futuristic Agricultural technology for Natural Farming and Global Food Marketing. Her expertise is in Siderophore producing Bacteria, its isolation, optimization and Identification of its different types.

GENOTYPIC CHARACTERIZATION OF MRSA FROM PATIENTS DURING THE PERIOD 2012 TO 2022 AT TWO TERTIARY HOSPITALS IN THAILAND

Lalita Narachasima, Worawich Phornsiricharoenphant, Pimonwan Phokhaphan, Wuthiwat Ruangchai, Anucha Apisarnthanarak, Prasit Palittapongarnpim and Sumalee Kondo
Thammasat University, Thailand

Abstract:

Background: Methicillin-resistant Staphylococcus aureus (MRSA) is an important bacterial pathogen in humans. MRSA infections increased mortality and morbidity. The MRSA strains have decreased susceptibility to many antibiotics, particularly vancomycin, leading to failure of treatment. The isolates from two tertiary hospitals including Thammasat University Hospital and Songklanakarind Hospital have not been scrutinized in details at molecular level.

Objective: This study aimed to investigate genetic characteristics and antibacterial susceptibility of MRSA strains isolated from patients during the period 2012-2022 at Thammasat University Hospital and Songklanagarind Hospital during 2019-2020.

Methods: Antibacterial susceptibility test was performed by disk diffusion method and broth dilution method. One-point population was carried out to examine hVISA strains. Genotypic analysis was analyzed by whole genome sequence data.

Results: Most isolates from Thammasat University Hospital during 2012-2022 were resistant to erythromycin, clindamycin and azithromycin. Only one out of 48 isolates from Songklanagarind Hospital was resistant to all tested antimicrobial agents. All isolates (n=169) were susceptible to vancomycin (MIC = 0.25-2 µg/ml). 32 out of 101 isolates (2012-2015) from Thammasat University Hospital and 6 out of 48 isolates from Songklanagarind Hospital were vancomycin MIC creep (1.5-2 µg/ml). The MRSA with vancomycin reduced susceptibility were hVISA detected from Thammasat University Hospital (31.25%) and Songklanagarind Hospital (16.67%). The vancomycin MIC creep and hVISA strains were significant predictor of treatment failure. During the period 2019-2022, most of the strains from Thammasat University Hospital belonged to ST22 (30.8%) while ST239 (25.7%), the most common found in Thailand, was mostly found from Songklanagarind Hospital. SCCmec Type IIa (2012-2015) and IVa (2019-2022) strains were mostly detected from the strains from Thammasat University Hospital at 40.6% and 61.5%, respectively. SCCmec Type IV (22.9%) was also found in Songklanagarind Hospital. This indicated that these strains were CA-MRSA which caused infections in patients at the two tertiary hospitals during the period 2019-2022.

Conclusion: The results would provide an insightful detail information for surveillance and control of MRSA strains. Medical personnel would be alert for effective prevention of the spread from infected patients to other patients in hospital

Biography

Lalita Narachasima has current research study on Methicillin-resistant S. aureus in the aspects of genetic diversity, mutation of genes associated with reduced susceptibility and resistant strains of MRSA and epidemiology of MRSA in tertiary hospitals. The detailed information of MRSA characterization study will be useful for tracking sources of infections, implementing preventive control measures, and providing effective treatment of the infections.

OPTIMIZATION OF TIGERNUT MILK, COCONUT MILK AND FLAX-SEED POWDER BLENDS TO PRODUCE PROBIOTIC PLANT-BASED YOGURT AND DETERMINE THE PROBIOTIC VIABILITY DURING STORAGE

Chinedu Ajogun
Nigerian Institute of Food Science and Technology, Nigeria

Abstract:

The study optimized the formulation of a probiotic plant-based yogurt blend combining tiger nut milk, coconut milk, and flaxseed powder. Response surface methodology was employed to evaluate the effects of ingredient ratios and fermentation conditions on yogurt's physicochemical properties and probiotic viability. The optimal blends consisted of 62.9% tiger nut milk,34.1% coconut milk, and 3% of Flaxseed powder, fermented at 38°C for 8 hours. The resulting yogurt demonstrated desirable texture, pH, and acidity levels. Probiotic strains Lactobacillus sp and streptococcus sp exhibited high viability after 21 days of refrigerated storage. The developed yogurt showed significant potential as a nutritious, dairy-free alternative, rich in fiber, protein, and healthy fats. This research contributes to the development of sustainable, probiotic-rich plant-based yogurt, supporting gut health and consumer demand for vegan products.

Biography

Chinedu Ajogun, is a food scientist and Product development specialist. Highly motivated food scientist with expertise in food chemistry, microbiology, and product development. Proven track record of creating innovative, safe, and good food products. She has a patent on coconut wine which was one of the products produced during her PhD study. She is a member of The Nigerian Institute of Food Science and Technology (NIFST). Certified Food Scientist of Nigeria (CFSN). She is also a certified Lead Auditor ISO 22000:2018 Food Safety Management System. She obtained her B.Sc. in Food Science and Technology from University of Maiduguri Nigeria, M.Sc. in Food Microbiology University of Port-Harcourt Nigeria and PhD in Food Science and Technology Rivers State University Nigeria. She has published several papers which has been cited in various research sites. Her research interest is in food quality control and auditing, microbiology and food safety, food chemistry, food sustainability and affordability.

Day 2

Infectious & Microbiology 2024

Keynote Presentation

AN EXPLORATIVE STUDY OF THE SRI LANKAN INTENSIVE CARE NURSES' PERCEPTIONS OF ORAL CARE PRACTICE OF INTUBATED COVID-19 PATIENTS

DGAI Jayarathna1 and AMS D Pathiranage
Stanford Campus, Sri Lanka

Abstract:

Background: The COVID-19 pandemic has affected countries all over the world, wreaking havoc on the global health-care system. Nurses played a unique role and were directly exposed to COVID-infected patients during patient care. As front-line fighters in both developed and developing countries, intensive care nurses gained both positive and negative experiences while providing oral care to COVID-19 intubated patients

Objective: The aim of this study is to explore the Sri Lankan intensive care nurses' perceptions of the practice of oral care for intubated COVID-19 patients.

Methods: The qualitative research approach was used. A phenomenological design was conducted because nurses' perceptions were studied, and purposive sampling was conducted, including on 20 nursing officers who worked more than six months in the intensive care unit at the Infectious Disease Hospital (IDH), Base Hospital Homagama, and Base Hospital Theldeniya. Interviews were conducted using a semi-structured interview guide as the data collection tool. Interviews were conducted in the Sinhala language within 30 to 40 minutes. During the interview, an audio recorder was used

Results: When exploring nurses' perceptions of oral care practice in COVID-19 intubated patients in ICUs, three major themes and nine subthemes were identified: Oral health care in intensive care practice, barriers and enablers to oral health care, and emotional and psychological perceptions about oral care practice were related to nurses' perceptions as major themes. Positive and negative attitudes toward oral care, oral care methods used for intubated COVID-19 patients, limited information about oral care practice for COVID-19 patients, insufficient support for oral care practice, technical barriers, emotional and psychological attitudes toward oral care practice, fear of the disease process, fear of the oral care procedure, and concern about family were identified as sub themes

Conclusion: Intubated COVID-19 patients have a greater impact on the care delivered by the nurses, improving the quality of nursing care practice and minimizing ventilator associated pneumonia in Sri Lanka. These findings suggest that focusing on novel knowledge and skills, new techniques, psychological, social, and spiritual aspects correspond to the holistic care of intensive care patients.

Biography

Miss D.G.A.I. Jayarathna has her expertise in evaluation and passion in improving the health and wellbeing. Her research experiences based on responsive constructivists creates new pathways for improving healthcare. She has invented new device for long term catheter users to improve their quality of life after years of experience in research, evaluation, teaching and administration both in hospital and education institutions. Further she worked as critical care nurse for 13 years attached to the Ministry of Health Sri Lanka, this foundation Knowledge and experiences is based on her to think out of box. This approach is responsive to all stakeholders and has a different way of focusing.

INVESTIGATING THE EFFECT OF SILVER NANOPARTICLES PRODUCED BY GREEN SYNTHESIS AGAINST STREPTOMYCIN RESISTANT KLEBSIELLA PNEUMONIAE AND AMPICILLIN RESISTANT *ESCHERICHIA. COLI* STRAINS

Travers Chirova
Harare Institute of Technology, Zimbabwe

Abstract:

Antibiotic resistance is one of the most serious public health issues of our day, linked to high mortality rates and the potential to kill even more people in the future. The aim of this research was to assess how silver nanoparticles (AgNPs) made through green synthesis would perform against streptomycin-resistant Klebsiella pneumoniae and ampicillin-resistant Escherichia coli bacteria. Nano-sized metals have been proposed as a potential remedy for antimicrobial resistance in bacteria. In this study, plant extracts (Zingiber officinale, Magnifera indica, Allium sativum and Aloe vera) were used to successfully reduce silver ions from silver nitrate (AgNO3) to nano-sized particles. UV spectrophotometry was used to validate the presence of AgNPs and to assess the impact of variables such as pH, incubation period, extract volume, and $AgNO_3$ concentration. The disk diffusion method, MIC, MBC were used to assess the antibacterial efficacy of green synthesized AgNPs against Gram-negative multidrug resistant microorganisms (MDR). The study also looked at the synergistic effect of produced AgNPs with antibiotics (ampicillin and streptomycin), and the results were examined using the ANOVA test. Obtained results showed that the synthesized nanoparticles were more effective towards E. coli than *K. pneumoniae* as *E. coli* overall showed greater zones of inhibition signifying greater susceptibility. Ginger extract AgNPs had the largest clear zone of inhibition in both *K. pneumoniae* and *E. coli* MDR strains (4.25 mm and 3.1 mm respectively) indicating that it has the highest antibacterial activity and has great potential in treating infectious diseases caused by MDR bacteria. Aloe vera nanoparticles showed very low antibacterial activity (1.6 mm average zone). In the MBC assay ginger AgNPs proved to be a suitable treatment as growth of bacteria only occurred up to the plate with 12.5 mg/ml of AgNPs therefore low doses would be required for desired function of the antimicrobial. One way ANOVA test resulted in the p value which was greater than 0.05 thus it was concluded that there is no significant difference between the means of the 5 groups of antimicrobials which were investigated. Nanoparticles can thus fill up the huge gap of being an alternative in the development of an antimicrobial against MDR bacteria to reduce infections.

Biography

Travers Chirova is a Lecturer in the Biotechnology department at the Harare Institute of Technology in Harare, Zimbabwe. His research has spread over a number of areas with most recent focusing on investigating for new antimicrobial compounds from both natural (plant) and synthetic materials, factoring in the assessment of these antimicrobial entities against antibiotic resistant strains of microbials. The passion being in ensuring improved health and management of infectious microbial agents to both humans and animals He has also researched on fermentation biotechnology areas with specific mention to citric acid production and its purification, only to mention a few. He has published several papers and a book chapter

He earned degrees in Biotechnology (Btech Honors) from Chinhoyi University of Technology and a Master of Technology Honors Degree in Biotechnology from ITM University, Gwalior India. He has been Lecturing in University for over 7 years and has supervised many Bsc projects. He has published several papers and 1 book chapter. He has been part of delegates under the ministry of health and child welfare working on bio fortification policy documents and also part of members looking into antimicrobial resistance development and possible solutions to the problem. Also a member of the entre for Science & Technology of Non-Aligned and Other Developing Countries (NAM S&T Centre). Has peer reviewed papers for blind reviews for a number of journals.

Day 2

Infectious & Microbiology 2024

Poster Presentations

GENOME ANALYSIS OF ESBL-PRODUCING E. COLI AND K. PNEUMONIAE ISOLATED FROM PATIENTS WHO UNDERWENT ABDOMINAL SURGERY

Sumalee Kondo, Worawich Phornsiricharoenphant, Lalita Na-rachasima, Wuthiwat Ruangchai, Pimonwan Phokhaphan, Anucha Apisarnthanarak and Prasit Palittapongarnpim

Faculty of Medicine, Thammasat University, Thailand

Abstract:

Background: Extended-spectrum β-lactamase-producing Enterobacterales (ESBL-PE) caused serious global health concern for transmission of multidrug resistant organisms, particularly Escherichia coli and Klebsiella pneumoniae. Hospital-acquired infections including surgical site infections caused by ESBL-PE, are associated with considerable morbidity and mortality.

Objective: To examine resistance genes, virulence genes and relatedness among the strains isolated recovered from rectal swabs of patients who underwent abdominal surgery.

Methods: A total of 31 out of 104 patients, who underwent abdominal surgery, carried ESBL producing E. coli and K. pneumoniae isolated from fecal flora. Forty-six isolates were recovered from 17 patients who yielded ESBL-PE organisms on pre- and post-surgical screening, except for one patient where ESBL-KP and KPR phenotypes were found only in the post-operation specimen. The 46 selected isolates were carried out for whole genome sequence analysis.

Results: Phylogenetic trees demonstrated the relatedness among the strains. Six different clusters were demonstrated among the ESBL-producing E. coli (EPE) and resistant E. coli (EPR) strains from the tree. The strains carried plasmid encoding extended-spectrum β-lactamase, antimicrobial resistance genes and virulence factors. Most isolates were multidrug resistant and potentially cause high risk of infections during abdominal surgery.

Conclusion: It is crucial to screen for ESBL producers to advocate for monitoring and prevention of transmission of prolonged fecal ESBL carriages at high risk to breakout a consequential threat of treatment.

Biography

Sumalee Kondo has current research topics focus on antibiotic resistance of bacteria, including Methicillin-resistant S. aureus and Extended-spectrum β-lactamase - producing Enterobacterales (ESBL-PE). The research on screening for ESBL-PE and other resistant bacteria has been urged to be a significant concern on surveillance and prevention of infections in patients who are at high risk in hospital, particularly site-specific infections from ESBL carriages.

NATURAL KILLER T CELLS PLAY A SIGNIFICANT ROLE IN PREVENTING COXSACKIEVIRUS A10 INFECTION THROUGH AN ADENO-BASED VACCINE EXPRESSING ENTEROVIRUS-LIKE PARTICLES

Yen-Hung Chow[1] and Shu-Ling Yu[2]
[1]Graduate Institute of Biomedical Sciences, China Medical University, Taiwan
[2]Institute of Infectious Disease and Vaccinology, National Health Research Institutes, Taiwan

Abstract:

Enterovirus A71 (EV-A71) and coxsackievirus A (CVA) were the primary causative agents of hand, foot, and mouth disease (HFMD), the heightened occurrence of HFMD outbreaks associated with CVA10 worldwide has questioned this perspective. Due to the absence of an effective vaccine or antiviral treatment, HFMD caused by CVA10 has emerged as a significant global public health issue. We study a potent-valent vaccine based on adenovector expressing enterovirus A71 (EV-A71) viral like particle (AdVLP) which elicits a multivalence against not only EV71 but also other coxsackieviruses such as A10. In young-aged human scavenger receptor class B, member 2 –transgenic ((hSCARB2-Tg) mice received two-dose of vaccine following challenge with CVA10, AdVLP immunization significantly reduced muscle, spinal cord, and brain's viral amounts and protected animal from disease occurrence. In contrast, massive CVA10 accumulated in these tissues that resulted in severe diseases and death in the control vector-received mice. Passive immunization of Tg mice with AdVLP-immunized serum after challenge with CVA10 confirmed that the antibodies present in the serum, while lacking neutralizing capabilities, demonstrated viral-binding activity and complement-dependent responses. These components were found to effectively protect against CVA10 infection in AdVLP-immunized serum. We also assess the efficacy of the formalin-inactivated CVA10 (FI-CVA10) vaccine against CVA10 infection, the FI-CVA10-immunized serum was shown to raise neutralizing antibodies and was subsequently tested in a passive immunization study to demonstrate its potency in preventing CVA10 infection. Notably, the results of passive immunization with AdVLP-immunized splenic lymphocytes versus invariant natural killer T (iNKT) cell-depleted lymphocytes in Tg mice before CVA10 challenge revealed a significant difference. Tg mice that passively received iNKT-depleted lymphocytes were nearly all deceased by day 8 post-challenge, whereas those receiving AdVLP-immunized lymphocytes exhibited a 100% survival rate. Conversely, Tg mice that passively received FI-CVA10-immunized splenic lymphocytes did not show resistance to CVA10 challenge, indicating that neutralizing antibodies rather than cellular immunity played a key role in protecting against CVA10 infection. In conclusion, AdVLP vaccine demonstrates multivalent efficacy against both EV71 and CV. AdVLP induces iNKT cells as well as antibody-mediated cellular responses, which serve as major protective mechanisms against CVA10 infection. The neutralizing antibodies induced by the traditional FI-CVA10 vaccine also plays a significant role in controlling CVA10 infection.

What will audience learn from your presentation?

Enterovirus A71 (EV-A71) and coxsackievirus A (CVA) were the primary causative agents of hand, foot, and mouth disease (HFMD)

A potent-valent vaccine based on adenovector expressing enterovirus A71 (EV-A71) viral like particle (AdVLP) which elicits a multivalence against not only EV71 but also other coxsackieviruses such as A10.

HUMAN SCARB2 ACTS AS A CELLULAR CORECEPTOR FOR HELPING HFMD PATHOGENS INFECTION

Shu-Ling Yu[1] and Yen-Hung Chow[2]
[1]*Institute of Infectious Disease and Vaccinology, National Health Research Institutes, Taiwan*
[2]*Graduate Institute of Biomedical Sciences, China Medical University, Taiwan*

Abstract:

Hand, Foot, and Mouth Disease (HFMD) and acute flaccid myelitis (AFM) are severe childhood infectious diseases. HFMD is caused by various pathogens, with Coxsackievirus A10 (CVA10) being one of them. However, it rarely causes severe neurological symptoms in children. The lack of a reliable animal model is a challenge in studying the manifestations of human diseases caused by CVA10, and current clinical treatments are limited to symptom relief.

Recent study indicates that CVA10 does not use common enterovirus 17 (EV71) CVA16 receptor like human SCARB2 (hSCARB2, scavenger receptor class B, member 2), but uses other receptor such as kremen1 for infection. We tried to discovery CVA10 infection mechanism and found that CVA10 could infect and replicate in the mouse cells which expressing human SCARB2 (NIH3T3-SCARB2) but not in parental NIH3T3 cells. Knock-downing of endogenous human SCARB2 or KREMEN1 by its specific siRNA was able to inhibit CVA10 infection in human RD cells. Immunoprecipitation result confirmed that hSCARB2 could physically interact with VP1 of CVA10 and KREMEN1. We previously generated a novel EV71-infectious model with hSCARB2-transgenic mice expressing the discovered receptor hSCARB2.We performed the viral challenge study in young-aged hSCARB2- transgenic mice and in wildtype mice parallelly. It resulted in severe hind limb paralysis syndromes accompanied with high mortality rate in hSCARB2- transgenic but not in wildtype mice. CVA10 viral loads were evident in the transgenic mice's tissues from muscle, spinal cord, and brainstem. Transgenic mice pre-immunized with the formalin-inactivated CVA10 vaccine was able to resist the subsequent lethal challenge with CVA10 and reduce the severity of disease.

The novelty in this study is a pioneer to report that hSCARB2 served as a co-receptor to help CVA10 cell infection. In addition, hSCARB2-transgenic mice are a useful model for assessing anti-CVA10 medications and for studying the pathogenesis induced by CVA10. Furthermore, we have utilized this mouse in tests for the AFM animal model and found that it can accurately replicate the pathological features of Enterovirus D68 (EVD68) virus-induced acute flaccid myelitis and other HFMD-pathogens including CVAs in human. We have applied this mouse to the development of a broad-spectrum hand, foot, and mouth disease (HFMD) vaccine and successfully demonstrated the protective efficacy of the broad-spectrum HFMD vaccine Ad-VLP, preventing fatal doses of EV71, CVA16, and CVA10 challenges in this mouse. In the future, we will complete the exploration of the immune mechanisms of this vaccine and the development of other hand, foot, and mouth disease-related virus infection models.

Biography

Shu-Ling Yu possesses specialized knowledge in virology and immunology related to animal experiments, along with a passion for improving health and preventing infections. She has dedicated many years to exploring HFMD and AFM animal models, as well as the broad-spectrum vaccine immune mechanisms. Leveraging her extensive research experience, she has established this model. Reinterpreting the function of the receptor hSCARB2 in virus infections opens a new avenue for research in the field of infection pathways.

COMPARISION OF IN-VTRO ACTIVITY OF TELAVANCIN WITH VANCOMYCIN, LINEZOLID, TEICOPLANIN AND DAPTOMYCIN AGAINST STAPHYLOCOCCUS AUREUS ISOLATED FROM CANCER PATIENTS

Sanjay Biswas, Gaurav Salunke and Pradnya Samant
Tata Memorial Hospital, India

Abstract:

Introduction: Infections occur frequently in cancer patients, especially in those with hematologic malignancies and profound neutropenia, but also in patients with solid tumours and with adequate neutrophil counts. Gram-positive organisms are the predominant bacterial pathogens in this setting. Staphylococcus species (coagulase-negative staphylococci (CoNS), *Staphylococcus aureus* (*S. aureus*), both methicillin-susceptible and methicillin-resistant strains) are isolated most often. Bloodstream infections (including catheter-related infections) are probably the most frequent Gram-positive infections. Other common sites of infection include the skin and skin structures or surgical site infections, bones and joints, the respiratory tract and the intestinal tract.

Vancomycin has been the agent of choice for the treatment of documented Gram-positive infections in most cancer care centres. Agents such as linezolid and daptomycin are considered alternatives to vancomycin, but clinical data for these agents in cancer patients are scant. Telavancin, a novel, dual action lipoglycopeptide, is reported to be rapidly bactericidal against Gram-positive cocci. This agent might be a potential alternative to vancomycin in neutropenic cancer patients. We compared it's in vitro activity to vancomycin, linezolid, teicoplanin and daptomycin against recent clinical isolates obtained from cancer patients.

Materials & Methods: A total of 59 isolates of *Staphylococcus aureus* (n=25), including MRSA (n=34), were included in this retrospective study. All the samples were processed as per routine microbiological methods.

Results: Of the 59 samples, 47 were wound swabs, 6 were pus samples and 2 each of BAL and pleural fluids and 1 each of sputum and tissue. 34 of the 59 isolates were methicillin resistant *S. aureus* and 25 were Sauers. Televancin had the lowest MIC's followed by teicoplanin, vancomycin, daptomycin and Linezolid.

Conclusion: Gram-positive organisms remains one of the predominant bacterial pathogens in our cancer patients. Gram-positive coverage is considered necessary in cancer patients, the agent used needs to have activity not just against the Staphylococcus and Streptococcus but against a much wider spectrum of Gram-positive pathogens. In settings where organisms with vancomycin MIC of >= 1 µg/mL are prevalent, telavancin is considered a potential alternative in the case of serious MRSA infections that are difficult to treat by standard antibiotics. However, the efficacy of telavancin should be weighed against safety during clinical use in the treatment of any infection. The potential benefits of telavancin versus vancomycin must be balanced with possible increased risks for decline in renal function and trends for increased mortality in patients with pre-existing renal impairment.

Biography

Sanjay Biswas has been working as a clinical microbiologist for last 25 years in a tertiary care cancer centre. His main interest is antibiotic resistance and new antibiotic drugs evaluation. He also has keen interest in molecular microbiology.

STUDY ON THE RELATIONSHIP BETWEEN ENVIRONMENTAL MICROORGANISMS AND PRODUCT MICROORGANISMS

Hyun Gee Lee
Amorepacific, South Korea

Abstract:

There are many microorganisms around us. Microorganisms exist in the air, soil, water, dust, and people, and they also exist in cosmetics manufacturing plants. The goal of this study is to confirm the influence of these environmental microorganisms on the contamination that occurs during cosmetics manufacturing. Microbiological samples were collected from floating bacteria, fallen bacteria, attached bacteria, purified water, and contaminated products in the manufacturing facility, and bacterial identification was performed (bacterial identification was performed using Vitek MS and genetic analysis). The number of detected bacteria in the floating bacteria was higher overall, and various bacteria could be confirmed. However, the characteristics of the detected bacteria in the dropped bacteria and the floating bacteria were confirmed to be different. If the area is subdivided and classified, the characteristics of the bacteria found are different depending on the environmental characteristics of the area. It seems that purified water and surface bacteria directly affect product contamination. It was possible to find a link between environmental bacteria and product contamination, where the floating bacteria and dropped bacteria affect the manufacturing tank, and the attached bacteria in the tank and the purified water used in manufacturing directly affect product contamination.

Biography

Hyun Gee Lee has expertise in assessment and a passion for improving product contamination. He has created a new perspective through environmental research to study product contamination. He has derived this result based on his years of research and assessment experience in cosmetics companies.

ANALYSIS OF QUINOLONE RESISTANCE MECHANISMS IN QUINOLONE-RESISTANT ACINETOBACTER BAUMANNII

Ayane Fujii, Nobuhiko Furuya, Yoko Mano and Ryo Takahashi
Bunkyo Gakuin University Graduate School, Japan

Abstract:

Background: Recently, the emergence of multidrug-resistant *Acinetobacter* (MDRA), which is resistant to β-lactams, aminoglycosides, and fluoroquinolones, has become a problem. The causes include enzymatic drug inactivation, reduced drug affinity due to genetic mutations, efflux pumps, and other drug resistance mechanisms. Ciprofloxacin (CPFX) resistance was more pronounced when efflux pumps were involved than with other drugs. However, quinolone resistance mechanisms other than efflux pumps have been suggested in some strains.

Objective: We investigated mutations in DNA gyrase (GyrA)- and DNA topoisomerase IV (ParC)-encoding genes, and quinolone resistance-determining region (QRDR) of the plasmid-mediated quinolone resistance (PMQR) gene.

Methods: A total of 21 *A. baumannii* strains isolated in Japan were used. After identification by *recA* gene, drug susceptibility was tested using the micro liquid dilution method according to the Clinical and Laboratory Standards Institute (CLSI). QRDR (*gyrA, parC*) and PMQR (*qnrA, aac*(6')*-Ib-cr*) genes were determined by PCR. *gyrA* and *parC* mutations were analyzed using restriction fragment length polymorphism PCR (RFLP-PCR) along with nucleotide sequence analysis.

Results: A total of 21 and 20 strains were CPFX- and LVFX-resistant, respectively. Ser83→Leu and Ser80→Leu mutations in *gyrA* and *parC*, respectively, were found in all strains, but none of them carried the *PMQR* gene.

Conclusion: *qnrA* and *aac* (6')*-Ib-cr* were not implicated in quinolone resistance in the *A. baumannii* strains used in this study. RFLP-PCR and sequencing analyses revealed Ser83→Leu mutations in *gyrA* and Ser80→Leu mutations in *parC* in all strains. This may reduce the affinity of quinolone antimicrobials to *A. baumannii* and contribute to resistance.

This study provides a basis for future studies on the mechanisms of resistance of A. baumannii to fluoroquinolones.

Biography

She was born in Tokyo, Japan, in 2001 and graduated from the Department of Laboratory Medicine, Faculty of Health and Medical Technology, Bunkyo Gakuin University, in March 2024. In April 2024, she entered a Master's program at the same university. She is a member of the Microbiology Laboratory. Her research uses restriction fragment length polymorphism PCR (RFLP-PCR), drug susceptibility testing, PCR, and sequencing to analyze quinolone resistance mechanisms in quinolone-resistant Acinetobacter baumannii from her undergraduate days to the present. She will complete her Master's degree by 2026. She looks forward to attending this conference for the first time.

INHIBITION OF VIRULENCE FACTORS OF MULTIDRUG-RESISTANT *PSEUDOMONAS AERUGINOSA* (MDRP) BY CATECHINS

Mizuki Tadenuma, Ryo Suzuki, Nobuhiko Furuya, Yoko Mano and Ryo Takahashi
Bunkyo Gakuin University, Japan

Abstract:

Background: *Pseudomonas aeruginosa* is widely distributed in the natural environment and causes opportunistic infections in susceptible individuals. In recent years, multidrug-resistant *Pseudomonas aeruginosa* (MDRP) has emerged as a pathogen that is resistant to many antimicrobial agents in the population, thus making treatment more difficult. Biofilm formation is one of the important virulence factors of this bacterium. Catechins contained in green tea have been reported to have various beneficial effects such as antibacterial and antiviral effects. In addition, catechins do not have side effects as those reported for other antimicrobial agents. However, till date, only a few studies have demonstrated the effectiveness of catechins in inhibiting biofilm formation.

Objective: To examine the inhibitory effects of catechins on biofilm formation.

Methods: Eleven strains of *Pseudomonas aeruginosa* were used, including the standard strain, *Pseudomonas aeruginosa* PAO1, and 10 strains of MDRP. The amount of biofilm formed and anti-biofilm activity were measured by the microplate adsorption adhesion assay (MPA).

Results: Biofilm-forming ability was classified as high, low, or no biofilm formation. The results showed that all the strains, including PAO1, exhibited high biofilm-forming ability. In the anti-biofilm activity assay, catechins inhibited biofilm formation in 8 (73%) out of the 11 strains, including PAO1. Additionally, the biofilm inhibitory effect was confirmed in the presence and absence of catechins, and a maximum biofilm inhibition rate of 25 % was observed.

Conclusion: In the present study, catechins were found to inhibit biofilm formation by *Pseudomonas aeruginosa*. Catechins inhibit cell wall synthesis and have few adverse effects. Therefore, we believe that catechins can be used as a therapeutic agent for in-hospital patients. In the future, we would like to increase the number of target strains of *Pseudomonas aeruginosa* to investigate the effect of catechins on inhibition of biofilm formation.

Biography

Mizuki Tadenuma has obtained her bachelor's degree from the microbiology laboratory at Bunkyō Gakuin University in 2024. In the same year, she enrolled in the university's graduate master's program. Her passion is to investigate suppression of pathogenic factors in drug-resistant bacteria through the use of polyphenols. Her interest in this field was sparked during her high school years, wherein she carried out experiments using catechins found in green tea. Currently, she is advancing her research in this area. She plans to explore antibacterial and antiviral properties of catechins that can be harnessed for the treatment of infectious diseases, which is a global concern. Her hobbies include watching K-pop, sports(football), and eating banana.

DEVELOPMENT AND EVALUATION OF CAPSULAR POLYSACCHARIDE (CPS) VACCINE AGAINST *KLEBSIELLA PNEUMONIAE* BY USING SERO-TYPE K2 AS A MODEL

L Kristopher Siu, Jung-Chung Lin, Jia-Je Li, Eshter Yip-Mei Liu and Feng-Yee Chang
National Institute of Infectious Diseases and Vaccinology, National Health Research Institutes, Taiwan

Abstract:

Background: This study aimed to develop and evaluate a CPS vaccine against *Klebsiella pneumoniae* (Kp), focusing on the hypervirulent K2 serotype.

Methods: We first validated the increase in titers of anti-K2 antibodies in mouse sera after injection of inactivated K2 whole-cell antigen. Subsequently, immunized mice were challenged with a highly virulent K2 strain to assess vaccine-induced protection. Further investigations included serum bactericidal assays and neutrophil phagocytosis assays using purified polyclonal antibodies to elucidate the underlying mechanisms of vaccine-mediated protection. Animal experiments were conducted to validate the protective efficacy of the antibodies.

Results: The titers of anti-K2 antibodies in mouse sera increased over time following immunization. Multiple immunizations led to a gradual elevation in antibody titers, indicating the generation of a specific antibody response. By the fifth booster immunization, antibody titers reached a high level. Immunized mice showed improved survival rates compared to non-immunized mice when challenged with a highly virulent K2 strain. In vitro experiments demonstrated enhanced complement-mediated bacterial killing and increased neutrophil phagocytosis of bacteria mediated by the polyclonal antibodies. Encouragingly, animal studies revealed a significant extension of survival in mice infected with K2 Kp.

Conclusion: The developed vaccine demonstrated protective efficacy against K2 Kp, likely mediated through increased antibody expression and enhanced serum bactericidal activity and neutrophil phagocytosis.

Biography

L. Kristopher Siu did his PhD studies at the University of Hong Kong and graduated in 1996. Subsequently, he pursued a postdoctoral fellowship at the Chinese University of Hong Kong. In 1998, he became an Assistant Investigator at the National Health Research Institutes, where his focus centered on bacterial infectious diseases, particularly those caused by Gram-negative bacteria. By 2005, he became a Full Investigator. His recent research endeavors have been concentrated on Klebsiella pneumoniae, spanning various aspects including epidemiology, virulence factors, antimicrobial resistance, rapid diagnostics, and novel therapeutic interventions. Within their research group, they have identified capsular polysaccharides (CPS) as one of the major virulence factors associated with K. pneumoniae infections. Sero-epidemiological studies have been conducted locally. Notably, certain serotypes have demonstrated a higher prevalence in causing infections. Furthermore, they have developed a rapid antigen detection test specifically tailored for the invasive types of K. pneumoniae, which has now been implemented in clinical settings. Presently, their focus lies in the development of a vaccine targeting the most prevalent serotypes encountered in infected patients. Utilizing CPS, they aim to generate antibodies capable of effectively combating the invasive strains of K. pneumoniae. They firmly believe that passive immunization or monoclonal antibody therapy could serve as alternative strategies for addressing K. pneumoniae infections, particularly those involving multidrug-resistant strains. Through their ongoing research efforts, they are dedicated to advancing our understanding of K. pneumoniae pathogenesis and developing innovative approaches to combat this formidable pathogen.

PREDICTING ANTIBIOTIC RESISTANCE IN *ESCHERICHIA COLI* USING MACHINE LEARNING MODELS

Melika Teimouri
San Francisco State University, USA

Abstract:

Background: Antibiotic resistance in *Escherichia coli* (*E. coli*) presents a significant public health challenge. Swift and accurate identification of drug-resistant *E. coli* strains is crucial for optimizing patient treatment, reducing drug administration time, and curbing the spread of resistance. Machine learning can potentially expedite antibiotic resistance identification, leading to more efficient patient care.

Aim: This study aims to predict antibiotic resistance in *E. coli* through genomic analysis, identifying the most effective machine-learning technique. Leveraging a recent one-year dataset from a US hospital allows meticulous evaluation and selection of the optimal approach.

Approach: Genomic data from *E. coli* isolates underwent annotation and pan-genome analysis to identify relevant genetic features. Complementary antibiotic susceptibility and epidemiology metadata were integrated, with datasets cleaned and merged using Python programming. Two machine learning algorithms, Random Forest (RF) and Extreme Gradient Boosted Tree (XGBT), were trained on the merged dataset to predict antibiotic resistance. Model performance was evaluated using metrics such as accuracy, precision, and recall ensuring robustness.

Results: The study focused on predicting resistance across Penicillin (Ampicillin), Tetracycline, and Fluoroquinolones (Ciprofloxacin). Both RF and XGBT models exhibited strong performance, with XGBT showing slightly higher accuracy and precision across various antibiotics.

Conclusion: By identifying key features influencing bacterial resistance, this study contributes to informed medical decision-making. Future directions include expanding scope, optimizing accuracy, exploring deep neural networks, and experimenting with other machine learning models. This research underscores machine learning's potential in accurately predicting antibiotic resistance in *E. coli*, with implications for patient care and resistance mitigation.

Biography

I am Melika Teimouri, a graduate student in the Cell and Molecular Biology master's program at San Francisco State University (SFSU), under the mentorship of Dr. Pleuni Pennings, Associate Professor at SFSU. My research focuses on understanding and combating drug resistance in microbial populations, particularly in pathogens like Escherichia coli. With a background in cell and molecular biology, I am committed to utilizing innovative approaches to address the pressing challenges of antimicrobial resistance. Currently, as a Graduate Researcher at the Code Lab, SFSU, I am dedicated to leveraging genomics and machine learning techniques to predict antibiotic resistance in Escherichia coli, aiming to contribute to the global effort in combating antimicrobial resistance. In March 2024, I presented my research on predicting antibiotic resistance in E. coli using machine learning models at The Allied Genetics Conference (TAGC) in Washington DC Metro, DC. This experience provided me with the opportunity to share my findings with a diverse audience of genetics and genomics professionals, fostering valuable discussions and receiving insightful feedback.

Day 2

Infectious & Microbiology 2024

Oral Presentations

RISK FACTORS ASSOCIATED WITH HOSPITAL ACQUIRED PNEUMONIA (HAP) PATIENTS FOR GETTING INTUBATED IN A TERTIARY HOSPITAL: A PROSPECTIVE UNMATCHED CASE-CONTROL STUDY

Ella E Gallego, Stephanie O Palacios, Marie Grace Dawn Tindog-Isidro, Tomasito R Sy and Patricio P Palmes

West Visayas State University Medical Center, Philippines.

Abstract:

Introduction: Hospital-acquired pneumonia (HAP) increases morbidity, mortality, and healthcare costs, thus additional epidemiologic studies are necessary to better understand the problem's scope and develop interventions. Considering that HAP is an exogenous infection with nosocomial pathogens acquired from the hospital environment, evaluating hospital environment-related risk factors would be necessary. However, studies on hospital environment-associated risk factors for HAP are limited. In this analytic study, the association of risk factors and outcome of Hospital Acquired Pneumonias were determined.

Objective: This study evaluates different risk factors associated with Hospital-Acquired Pneumonia (HAP) resulting to intubation in a tertiary hospital in Iloilo City.

Methods: A prospective unmatched case-control study was conducted between August and October 2023 with 176 participants. Demographic and clinical characteristics were collected, with the presence of intubation as a clinical outcome. Odd's ratios and Poisson regression were used as statistical method.

Results: Participants have a mean age of 53.76 years old. Being male increases the likelihood of developing HAP. Diabetes Mellitus, Hypertension, Dyslipidemia, Transaminitis, Malnourishment and Anemia are also significantly associated with increased risk of HAP. Length of hospital stay, presence of nasogastric tube, previous ICU admission, previous antibiotic use and antacid therapy indicates higher risk for HAP. The use of corticosteroids decreased risk of intubation by 99%. Previous exposure to mechanical ventilators are 53 times more likely to be re-intubated. Exposure to antacid therapy increased the risk of intubation by 9 times. Three microorganisms were observed to increase the risk of getting intubated: A.baumanii, E. cloacae, and Proteus spp.

Conclusion: The factors associated with HAP identified may be used to improve surveillance and allow early diagnosis, treatment and prognosis. Optimal therapy may help prevent clinical outcomes such as intubation.

Biography

Gallego studied BS Nursing at West Visayas State University and graduated as Cum Laude in 2015. She then finished her medical degree in 2020 at same Institution. After her post graduate internship and passing the licensure exam, she is now on her 3rd year medical residency training in Internal Medicine.

MODIFIED GREEN ADSORBENT USING SOLID STATE FERMENTATION FOR PB(II) REMOVAL FROM ITS AQUEOUS SOLUTION

Sudip Kumar Das
University of Calcutta, India

Abstract:

The present study opens a new door to modify any green adsorbents via an utterly biological process called solid-state fermentation. The different kinds of enzymatic activity during fermentation change the raw green adsorbent's surface texture and functional groups. This report also compares the adsorption capacity of Pb(II) ions from aqueous solution onto green adsorbent, Groundnut shell (GS) and modified green adsorbent, Fermented Groundnut shell (FGS). The fabrication of a modified groundnut (Arachis hypogaea) shell via solid-state fermentation (SSF) using an isolated Aspergillus strain was conducted to improve the adsorption capacity. During the 30-day solid-state fermentation (SSF) process, we collected samples six times on different days. The adsorptive capacity and enzyme activity varied among the six samples. After analyzing the results, we decided to focus on the sample collected on the 20th day due to its higher adsorptive capacity than the others. It has been proven that only a premium dose of enzymatic activity can increase the adsorptive capacity, not lower or even vigorous enzymatic activity. FTIR study confirmed changes in the functional groups during and before adsorption onto both adsorbents. BET analysis showed that FGS has a larger surface area than GS. SEM analysis revealed that both adsorbents have a rough surface suitable for adsorption. During SSF treatment on GS, released enzymes like laccase and amylase may have played an essential role in changing texture, surface area, functional group, and adsorption capacity. Finally, it was found that FGS has superior Pb(II) removal efficiency compared to GS, with a maximum adsorption capacity of 36.82 mg/g. This study introduces a new method to modify natural cellulosic adsorbents without using any chemical substances, providing an advantage over traditional modification techniques.

DISCOVERY AND DEVELOPMENT OF ATILOTRELVIR (GST-HG171) FOR THE TREATMENT OF COVID-19

George Zhang
Akeylink Biotechnology Co., Ltd., China

Abstract:

The coronavirus 3C-like (3CL) protease has become a validated therapeutic target for developing new COVID-19 therapeutics with the clinical success of Paxlovid (nirmatrelvir/ritonavir) in treating high-risk COVID-19 patients. Although symptoms associated with the recent Omicron infections are generally less severe than the preceding strains, the risk of disease progressing to hospitalization and deaths remains, especially in elderly population with chronic diseases. In addition, the risk of long-term consequence (i.e., long COVID) caused by continuously emerging variants is unpredictable. Therefore, broad-spectrum, and more effective and safer antiviral drugs targeting the intrinsic and more conserved viral replication cycle are still in urgent need for treating COVID-19 patients across all risk levels. Here we report the discovery and development of Atilotrelvir (GST-HG171), a potent, broad-spectrum, orally bioavailable small-molecule 3CL protease inhibitor that has demonstrated greater potency and efficacy compared to Nirmatrelvir in pre-clinical studies in vitro and in vivo. Further, GST-HG171 exhibits more favorable pharmacokinetic characteristics and has demonstrated an excellent safety profile in both pre-clinical and phase 1 clinical studies. Finally, in a pivotal phase 2/3 study, we evaluated efficacy and safety of Atilotrelvir (GST-HG171) plus Ritonavir in mild to moderate COVID-19 patients (n = 1246) infected with emerging Omicron XBB and non-XBB variants. Subjects received GST-HG171 plus Ritonavir showed both shortened median time to sustained recovery of clinical symptoms compared to placebo ($P = 0.031$), and negative conversion of SARS-CoV-2 nucleic acid vs. placebo ($P < 0.0001$) with the LS mean difference in viral load change from baseline reaching the largest at day 5 of 1.75 log10 copies/mL ($P < 0.0001$). Consistent results were observed in SARS-CoV-2 XBB (45.7% of mITT population) and non-XBB variants (54.3% of mITT population) subgroups. Incidence of adverse events was similar in Atilotrelvir (GST-HG171) plus Ritonavir and placebo groups. Based on the results of the pivotal study, Atilotrelvir (GST-HG171) plus Ritonavir was conditionally approved by the Chinese National Medical Products Administration (NMPA) for treating adult patients with mild to moderate COVID-19 in November, 2023.

Biography

Zhang received his Ph.D. in Biology from the University of Goettingen, Germany, and completed his postdoctoral training at Southwestern Medical Center (UTSW) in Dallas, Texas, and Memorial Sloan-Kettering Cancer Center (MSK) in New York, USA. He is a seasoned pharmaceutical executive with over 25 years of experience leading more than 10 drug discovery and development programs at Wyeth/Pfizer, P&G Pharmaceuticals, and Allergan/AbbVie. Under his leadership, he has taken 8 candidate compounds to clinical development and contributed to 6 NDA submissions and approvals in several countries, including the most recent NDA approval of a novel best-in-class 3CL protease inhibitor for COVID-19 treatment in 2023 in China.

MOLECULAR IDENTIFICATION OF SAND FLIES COLLECTED FROM AN ENDEMIC FOCUS OF CUTANEOUS LEISHMANIASIS IN NORTHERN INDIA

Suman Lata, Gaurav Kumar and Ramesh C Dhiman

ICMR-National Institute of Malaria Research, India

Abstract:

Background: Himachal Pradesh state in Northern India is the most endemic region for cutaneous leishmaniasis transmission in India. The present study was carried out with an aim to distinguish and identify the sand fly species found in the endemic focus of CL in HP.

Methods: Collections of sand flies were made from endemic villages of cutaneous leishmaniasis in Shimla, Kullu and Kinnaur districts of HP India during 2017-2019. The sand flies were identified morphologically. In addition, genus specific identification was carried by Polymerase Chain Reaction (PCR) of fifty-two sand flies. The PCR amplified products were sequenced for confirmation of sand-fly species. The sequences obtained were submitted to NCBI GenBank under accession no. MT126505 to MT126510 and compared for similarities to the NCBI database.

Results: The morphological identification revealed *Phlebotomus (adlerius) longiductus* (Parrot). The sequences obtained were compared for similarities to NCBI database and showed 99-100% similarity with *Phlebotomus longiductus* (Parrot). The phylogenetic tree analysis showed that, the isolates were geographically closest to the sand flies from Bhutan and China.

Conclusion: The study revealed that the *P. longuductus* (Parrot) is the predominant species found in the CL endemic area in HP. The study confirms the identity of *P. longiductus* (Parrot) through molecular tools as well as morphologically. As, *P. longiductus* (Parrot) has been reported to transmit *L. donovani*, therefore, it is important to distinguish these cryptic species as India is in elimination phase of leishmaniasis.

Biography

Suman Lata is currently working as a Research Associate at the National Institute of Malaria Research, Delhi. Suman Latha completed her MTech in Biotechnology and is now pursuing her Ph.D. She has over ten years of experience in the field of Malaria, Leishmania & Covid-19.

Day 2

Infectious & Microbiology 2024

Video Presentations

HEPATITIS A CONTROL THROUGH A ROUTINE VACCINATION: EXPERIENCE OF THE REPUBLIC OF TYVA

Anna Saryglar
Infectious Diseases Hospital of The Republic of Tyva, Russia

Abstract:

The presentation is devoted to the 12-year experience of Hepatitis A control through a routine vaccination implemented by the Infectious Diseases Hospital of the Republic of Tyva in Russia. In the Republic of Tyva a universal single-dose HAV vaccination has been implemented for children aged 3 years and older since 2012. The aim of this prospective non-interventional observational single-centre study was to determine the immunological and epidemiological effectiveness of single-dose vaccination against Hepatitis A 9 to 11 years after its implementation. The HAV vaccination program resulted in zero rates of Hepatitis A incidence in the Republic of Tyva since 2016. Our data demonstrated the immunological and epidemiological effectiveness of paediatric single-dose HAV vaccination in Tyva. The seroprotect ion rate was as high as 99.4% nine years after the single-dose vaccination in childhood, but significantly decreased in the cohort tested eleven years after immunization. The drop in HAV seroprotection rates observed between nine and eleven years after the single-dose vaccination was accompanied by a significant decrease in the anti-HAV geometric mean values. These data indicate that serum anti-HAV antibodies induced by a single-dose immunization vanish over time, with significantly lower levels at eleven years after vaccination than at nine years. However, the limited monitoring of HAV RNA in sewage and environmental samples demonstrated the ongoing circulation of both the regional epidemic strain of HAV genotype IA and another genotype IA strain imported recently from other parts of the Russian Federation, probably due to subclinical infections in non-vaccinated children under 3 years old. The data indicates the effectiveness of the single-dose HAV vaccination strategy. However, it suggests the necessity of expanding the vaccination program to include children starting from 12 months old to achieve maximum effectiveness. The HAV single-dose mass immunization in average-endemnicity regions will help cut down short-term costs in the health sector and use most rationally local budgets to ensure health protection for some years ahead, while the complete booster-dose immunization course will secure a decades-long immunity in the immunized.

3rd International Conference on Infectious Diseases
&
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EFFICIENCY OF ANTI-BACTERIAL THERAPY BASED ON SYNERGISM IN SEPTIC PATIENTS IN THE CONDITIONS OF THE INTENSIVE THERAPY UNIT

Machuzhak A, Karpenko N, Holovnya O and Kuchmenko O

National Children's Hospital "Ohmatdyt", Ukraine

Abstract:

At the moment, the problem of resistance to antibiotics (AB) and the emergence of bacterial strains with multiple resistance, which are common in hospitals, is relevant. The aim was to investigate the effectiveness of using the synergistic effect of AB in a randomized sample of patients with sepsis caused by multi-resistant flora in the intensive care unit of the Okhmatdit Hospital. The sample included 5 patients aged from 1 month to 4 years, patients with a surgical and somatic profile, in critical condition with a confirmed septic process caused by multiresistant flora - before and against the appointment of antibacterial therapy based on synergistic action.

Patient 1. According to the results of bacteriological examination of sputum - *K. pneumonia* MBL. Leukocytes (L) 21.8·109/l, C-reactive protein (CRP) 98.7 mg/l (normal < 6 mg/l), procalcitonin (PCT) 0.106 ng/ml (normal 0.020–0.046 ng/ml). Kolistin is prescribed. Considering the serious condition of the patient and the possible worsening of the condition, in order to make a decision to strengthen antibacterial therapy, the synergistic effect of ABs was revealed by the method of cross-testing: tigecycline+colistin, fosfomycin+colistin, imipenem+fosfomycin, aztreonam+ceftazidime/avibactam. Colistin monotherapy shows positive dynamics. L 13.3·109/l, CRP 6.4 ng/ml. Patient 2. According to the results of bacteriological examination of sputum - K. pneumonia MBL. L 8.45·109/l, CRP 21 mg/l, PCT 0.148 ng/ml. Meronem+ciprofloxacin was prescribed. The method of cross-testing revealed the synergistic effect of AB: imipenem+colistin, imipenem+tigecycline, tigecycline+colistin, fosfomycin+colistin. A synergistic effect was revealed by the ratio method: aztreonam+ceftazidime/avibactam. Taking into account the rapid deterioration of the condition, the following was prescribed: aztreonam+ceftazidime/avibactam. L 13.3·109/l, CRP 42.11 mg/l, PCT 0.17 ng/ml. The patient's condition worsened, another scheme of antibacterial therapy was used. Patient 3. According to the results of bacteriological examination of material from the wound - A. baumanii, P. aureginosa. L 8.5·109/l, CRP 251.8 mg/l, PCT 89.19 ng/ml, interleukin 6 (IL6) 848 pg/ml (normal < 7.0). The quantitative method revealed the synergistic effect of AB: meropenem+tigecycline. Appointed: meropenem + tigecycline. L 16.1·109/l, CRP 138.7 mg/l, PCT 0.43 ng/ml, IL6 69.08 pg/ml. Patient 4. According to the results of bacteriological examination of sputum - K. pneumonia. L 12.2·109/l, CRP 182.2 mg/l, PCT 15.3 ng/ml. The synergistic effect of AB: colistin+tigecycline was revealed by the method of cross-testing. Assigned: colistin + tigecycline. L 8.5·109/l, CRP 7.58 mg/l, PCT 0.5 ng/ml. Patient 5. According to the results of the bacteriological examination of bronchoalveolar lavage - K. pneumonia. L 13.2·109/l, CRP 13.2 mg/l. By the method of cross-testing, the synergistic effect of AB: colistin+-tigecycline was revealed. Assigned: colistin + tigecycline. L 10.4·109/l, CRP is negative. K. pneumonia strains are the predominant multiresistant flora in the intensive care unit.

According to the principles of prescribing antibacterial therapy: empirical therapy first; viewing in 24–48 hours. According to the results of the tank. Crops and the patient's condition; in case of deterioration of the patient's

condition, in case of infection with multiresistant flora, it is necessary to have a backup option of antibacterial therapy, according to the synergistic effect. The method of synergistic action is promising and can prevent an increase in mortality. The obtained results definitely require the continuation of the study of the effectiveness of antibacterial therapy based on synergism.

AGE-SPECIFIC PATTERNS IN PULMONARY TUBERCULOSIS EPIDEMIOLOGY: INSIGHTS FROM MALAYSIA'S PRIVATE TERTIARY HEALTHCARE SECTOR

Kai-Ying Low, Lian-Huat Tan, Oi-Fong Yew, Masita Arip, Jamuna and Nurul-Atiqa Mohd Yuseri

Laboratory, Sunway Medical Centre, Malaysia

Abstract:

Background: Pulmonary tuberculosis (PTB) presents a significant global clinical challenge, necessitating accurate diagnosis through culture-based methods.

Objective: This study aims to examine the epidemiology of PTB in Malaysia's private tertiary healthcare sector and explore associated trends.

Methods: Data from 2019 to 2023 were gathered from Sunway Medical Centre's laboratory information system, including mycobacterium culture and susceptibility testing requests from various medical centers within the Sunway Health Group. Both solid (Lowenstein Jenson agar) and liquid (BD BBLTM MGITTM) media were utilised with up to 8 weeks of incubation. Descriptive statistical analysis, including crosstabulation, was conducted using IBM SPSS Statistics 26.

Results: During the study period, 7 213 culture requests were received, yielding 815 strains of Mycobacterium tuberculosis complex. Among these, 638 originated from pulmonary samples like sputum, bronchioloalveolar lavage, and lung biopsy, with 8.9% from foreigners. The frequency of PTB detection exhibited a declining trend over the years: 10.94% (2019), 7.96% (2020), 10.96% (2021), 8.10% (2022), and 7.14% (2023). Analysis by age groups showed a peak in the 20 - 39 age category (44.20%), followed by 40 - 59 (28.53%), 60 - 79 (18.81%), ≤ 19 (6.43%), and ≥ 80 (2.04%). First-line drug resistance rates varied, peaking in 2021 and showing a decreasing trend in 2023 for ethambutol (2.70% to 0.81%), isoniazid (6.08% to 3.25%), rifampicin (4.73% to 1.63%), and streptomycin (4.05% to 2.44%) resistance.

Conclusion: The decline in PTB detection frequency and resistance rates may partly result from preventive measures adopted during the COVID-19 pandemic, such as widespread mask usage and improved hygiene practices. While these interventions likely contributed to reducing PTB transmission, further research is needed to understand their overall impact. Nevertheless, despite this decline, the burden of PTB remains significant, particularly among younger age groups. This highlights the need to investigate various contributing factors such as lifestyle behaviors, socioeconomic status, and healthcare access.

Biography

With extensive experience in medical laboratory sciences and a four-year tenure on the antimicrobial stewardship committee, Kai-Ying is a dedicated and skilled professional specializing in bacteriology and mycobacteriology. Besides ensuring precise diagnostic results, she actively contributes to enhancing antimicrobial stewardship practices. Collaborating with healthcare teams, Kai-Ying drives towards optimizing antimicrobial use, preventing resistance, and improving patient safety. She conducts antimicrobial surveillance studies and raises awareness among healthcare workers and the public. Kai- Ying's dedication to staying updated in her field allows her to contribute effectively to medical science advancement and deliver reliable laboratory services. Her passion for precision and excellence drives her commitment to enhancing patient care and healthcare outcomes through antimicrobial stewardship efforts.

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