2185th Conference

Nosocomial infections & Decontamination 2018

2nd International Congress on

NOSOCOMIAL AND HEALTHCARE ASSOCIATED INFECTIONS

&

International Conference on

DECONTAMINATION, STERILIZATION AND INFECTION CONTROL

October 15-16, 2018 | Las Vegas, USA

Keynote Forum

Day 1

Sami Rtimi, J Infect Dis Ther 2018, Volume 6
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Sami Rtimi

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Uniform films on 2D/3D surfaces/gadgets leading to quasi-instantaneous bacterial inactivation: A new route to reduce healthcare acquired infections

During the last few decades, the increase of infections by toxic pathogens/biofilms leading to hospital-acquired infections (HAI) has motivated work in the area [1-2]. More advanced antibacterial films presenting uniform distribution, high adhesion to flexible non-thermal resistant substrates, mechanical resistance and faster bacterial/biofilm inactivation under light or in the dark are needed due to health concerns [1]. TiO_2 films have been used under light>387 nm generating highly oxidative radicals as bactericide films for many years [2]. However, its restricted absorption of solar/visible light and slow bacterial inactivation kinetics has motivated workers to dope TiO_2 with Cu or Ag to shift the absorption of the films to the visible region. This doping also precludes recombination of the photo-generated charges. Stable, adhesive uniform films of TiO_2 inactivated bacteria within 40 min [2]. But TiO_2/Cu (Cu≥ 0.1%) films led to bacterial inactivation < 10 min under actinic light (4mW/cm2) [3-4]. Next, the sputtered Cu for 5-10s (0.01% by weight/ppb levels) on TiO_2-ZrO_2 layers on polyester [5] accelerated the kinetics by a factor of 3 with respect to films where the Cu was absent. The Cu intra-gap states seem to: a) accelerate the indirect transitions in the TiO_2/ZrO_2 during the interfacial charge transfer (IFCT), b) preclude recombination of the photo-generated charges, and c) induce Cu-redox reactions during the inactivation time. Since today's focus of interest is to increase the visible absorption of antibacterial surfaces, further work addressed the preparation of FeOx-TiO_2 on polyethylene (PE) flexible films. The FeOx-TiO_2 hetero-junctions obtained presented random distribution for both oxides and led to electron injection from the FeOx under visible light to TiO_2 lower lying trapping states inactivating bacteria within 60 min compared to 210 min for TiO_2 films by themselves [6]. The most recent work in this area focuses on metal/bimetal films driving bacterial inactivation. Hybrid Cu-Ag (50%/50%) nanoparticle metal-oxide amalgamated films able to generate highly oxidative radicals have been investigated leading to a quasi-instantaneous bacterial inactivation under low-intensity actinic light and in the dark [7]. The release of Cu/Ag-ions during bacterial inactivation was below the cytotoxicity levels permitted by the sanitary regulations. Cu and Ag are partially covered with their oxides when exposed to air and the composite Cu-Ag-polyurethane (PU) therefore contains amalgamated CuO-Ag_2O. The future development of 2D-films/3D-gadgets needs to consider their biocompatibility. In addition to the application of the metal/oxide for surgical/cutting tools, some industries recently started technologies to develop tools in the dental surgery and in spine/orthopedic implants. The substrates used are in the majority heat-resistant. In this case, the novel 2D or 3D antibacterial films shown herein can be used without further heating, which enables their use for non-heat resistant substrates.

Biography

Sami Rtimi is a Biologist with a strong background in material's chemistry and catalysis. He was awarded a Ph.D. in Chemistry and Chemical Engineering from Swiss Federal Institute of Technology-EPFL (Thin films for healthcare acquired infections (HCAIs) prevention: materials preparation, testing and characterization, EPFL, Switzerland) and a Doctorate in Biological Sciences from the University of Carthage. He is investigating smart materials for nosocomial infections reduction and biomedical applications. He is an expert in coupling nanostructured materials for targeted bio-response at the solid-air and the solid-liquid-interfaces.

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Melissa Stefko

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Prevention of contamination in pharmaceutical industry

Contamination of pharmaceutical products can cause catastrophic consequences in the pharmaceutical industry; from patient safety and patient access to drug shortages through business viability and sustainability. In the manufacturing of sterile pharmaceutical products, contamination prevention is a critical component for complying with state and federal regulations as well as protecting the safety of the public. In the wake of the meningitis outbreak of 2012, FDA and other regulatory agencies have heightened their approach and expectations on monitoring products for contamination. Although bioburden levels may be able to be controlled with suitable cleaning methods, preventing the occurrence is the best approach when assessing the risk of contamination for a facility and/or drug product. Cleanroom suites play a critical role in the creation of sterile pharmaceutical drug products. Although many methods of decontamination and sterilization have proven successful, prevention of the contamination is key to maintaining optimal microbial levels in an aseptic environment. This talk will discuss the top potential sources of contamination and how to effectively prevent them from contaminating product, the cleanroom suites and the significant impact an outbreak may have on the organization as a whole. Additionally, this talk with also evaluate the top potential sources of contamination in detail based on risk and the specific role they play in the pathway to contamination. Discussion topics include facility design, cleanroom behavior, gowning and cleaning requirements, etc.

Biography

Melissa Stefko is an experienced pharmaceutical and biotechnology professional with a background in Quality Assurance and Quality Control in aseptic sterile processing. Prior to joining Wells Pharmacy Network, She served as Head of Quality with a start-up 503B outsourcing pharmacy and gained a strong CGMP understanding through previous positions within pharmaceutical manufacturers. She is an active member of the American Society for Quality as a Certified Quality Auditor and is a member of Institute of Environmental Sciences and Technology, American Society for Microbiology, Parenteral Drug Association, and IACP. She holds Masters in Business Administration, Masters of Science in Biotechnology, and Regulatory Affairs Certificate.

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Day 2

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Mahboob Qureshi

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Concomitant *Pneumocystis* and cytomegalovirus infections in immunocompromised patients: An under-explored but emerging infectious disease challenge

Immunocompromised individuals including AIDS patients, solid organ and bone-marrow-transplant recipients, and patients receiving cytotoxic chemotherapies often suffer from *Pneumocystis jirovecii* (PJ) and/or Cytomegalovirus (CMV) infections. Nosocomial Pneumocystis pneumonia (PCP) is not uncommon in transplant units and is particularly observed among the kidney transplant recipients, one of the most commonly transplanted solid organs. PCP is rather commonly encountered in the AIDS (Acquired Immunodeficiency Syndrome) patients; whereas, CMV infections are most frequently encountered among the bone marrow transplant recipients; albeit at a lesser frequency among the solid organ transplant (SOT) recipients. CMV infection in immunocompromised individuals involves reactivation of the latent infections. Of note, most of us have this virus in a latent form, a characteristic feature of all herpes virus. On the other hand, PJ is ubiquitous in the environment and easy to acquire. Even though almost all of us become seropositive for PJ by 2-3 years of age; the immunity is dependent on competent cell-mediated immunity at the time of infection. In recent years, PCP has been encountered as a relatively common cause of pneumonia among SOT recipients as solitary infection as well as a comorbidity with CMV infections. These patients often have been reported to suffer from underlying lung diseases and/or concomitant infections with tuberculosis, *Streptococcus pneumoniae*, Hepatitis C and CMV. It is worth mentioning that CMV has been identified as a clear risk factor for developing PCP among the SOT recipients. Even though an emerging challenge in the infectious disease world, concomitant infections with PJ and CMV is an underexplored topic. With enforcement of prophylaxis, the incidence of PCP has been reduced significantly in the AIDS patients; but not among transplant recipients. On the other hand, the incidence of CMV pneumonia among transplant recipients and CMV retinitis among the AIDS patients are still common due to ineffective guidelines for prophylaxis. Patients suffering from concomitant PCP and CMV pneumonia often have a poor clinical outcome, which warrants a clear insight of the pathogenesis of this dual infection. We have studied the dynamics of concomitant PJ and CMV infections and examined how the co-existence of this dual infection effects the disease process and clearance of each organism. Understanding the complex phenomenon of host immune responses to the co-infection will elucidate the underlying components responsible for hindering the clearance of one or both infections; which will help developing novel clinical approaches for managing these severely ill patients with immunocompromised conditions.

Biography

Mahboob Quershi is presently the Associate Dean for Research and Professor of Microbiology and Immunology Toruo University Nevada, USA.

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Carolyn Twomey

Irrisep Corporation, USA

Does surgical irrigation impact Surgical Site Infection?

Today, in the United States, it has been estimated that there are approximately 300,000 surgical site infections (SSI) every year on average. Established and published SSI rates historically range from 2%–5% of patients undergoing inpatient surgery, and up to 20% of those undergoing intra-abdominal surgery. At the same time, healthcare and where it is delivered is rapidly changing. When we look at surgery today, the shift from traditional inpatient or hospital-based surgery has shifted to the outpatient setting at a remarkable pace. No longer is outpatient surgery just for less complex procedures and low comorbidity patients. Today it is for the spine, total joint replacement procedures, and other complex procedures for which a resulting SSI has the significant patient and financial impacts. Antibiotic resistance is outpacing the development of new antibiotics. Keeping up with ongoing changes in the science is challenging. Dealing with changing definitions is almost impossible. Staying abreast of guidelines, federal, and state reporting requirements are daunting. Keeping up with the latest research; while trying to manage your own practice and publish your own data is difficult. This session is designed to address a practice often disregarded in regard to SSI and the recent science to consider.

Biography

Carolyn L Twomey is the Global Vice-President, Clinical and Research, for IrriMax Corporation. She is an established healthcare executive leader with extensive experience in clinical operations, research, and regulatory domestically and internationally. She held a faculty appointment at the Virginia Commonwealth University, Medical College of Virginia, Department of Surgery. She was nominated by her physician peers to the Surgical Infection Society, the American College of Surgeons, and the American Association of Hip and Knee Surgeons (AAHKS). She speaks globally on surgical infections and antibiotic resistance. She serves on the Medical Advisory Board for Aerobiotix.

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