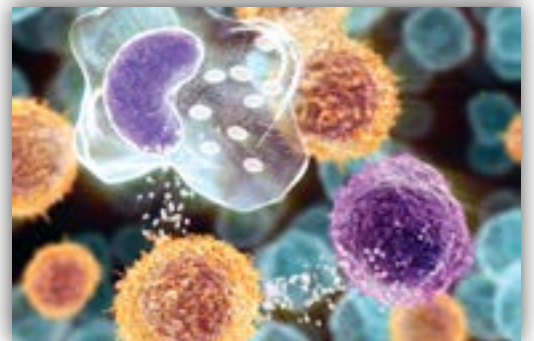


38<sup>th</sup> Annual congress on

# Microbes Infection

September 28-29, 2017 | London, UK

## Keynote Forum Day 1





## Sanjib Bhakta

University of London, UK

### Repurposing common non-steroidal anti-inflammatory drugs (NSAIDs) could potentially reverse intrinsic antimicrobial resistance in TB

**Aims:** Non-steroidal anti-inflammatory drugs (NSAIDs), successfully used against a range of human and animal illnesses, were reported to display antibiotic action against replicating, non-replicating and multi-drug-resistant clinical isolates of the tuberculosis (TB)-causing dreadful bacterial pathogen *Mycobacterium tuberculosis*. In this project, we have extended our investigation on NSAIDs anti-tubercular specific endogenous mode(s) and mechanism(s) of action.

**Results:** Interdisciplinary research methods were used to achieve the objectives of this project. The most potent NSAID so far, at sub-inhibitory concentrations, inhibited whole-cell efflux pumps activity at par with/better than potent efflux pump inhibitors such as verapamil and chlorpromazine. In addition, the NSAID inhibited mycobacterial biofilm formation significantly. Analysis of the extracellular polymeric substances of treated biofilm showed macromolecular alterations compared to the untreated controls. Furthermore, transcriptomic analysis revealed modulation of key metabolic pathways in NSAID-treated *M. tuberculosis* revealing novel endogenous targets of the drug.


**Conclusions:** NSAIDs have the potential to reverse antimicrobial resistance by inhibiting efflux pumps and biofilm formation.

**Significance:** The exponential increase of antimicrobial resistance in TB has led to an insurmountable economic and scientific challenge worldwide. Drug repurposing offers a direct route to phase III clinical trials, thereby reducing the investment of time and finances. The over-the-counter immunomodulatory drug's new antibiotic action has paved an alternative route for tackling antimicrobial resistance in TB.

### Biography

Sanjib Bhakta is a world-leading TB-expert and Academic Head of the ISMB-Mycobacteria Research Laboratory at the Institute of Structural and Molecular Biology. His continued research interest in global infectious diseases (funded by Wellcome Trust, Research Council-UK, EU and International Newton Fund) is focused on developing novel therapeutics as well as repurposing existing drugs to tackle antimicrobial resistance and persistence in TB. He has published around 100 original research articles for a number of internationally acclaimed journals viz. *J. Exp. Med.*, *J. Biol. Chem.*, *Tuberculosis*, *Biochemical Journal*, *Journal of Antimicrobial Chemotherapy*, *FEBS J. Molecular Microbiology*, *British Medical Journal*, *British Medical Bulletin*, *PLOS* and *Journal of Medicinal Chemistry*. As a UK-STEM Ambassador and BSAC-Antibiotic Action Champion, he has volunteered on the Wellcome Trust/Research Council-UK funded program "Researchers in Residence" at local schools in London and has contributed to British Museum science program "News & Views".

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## *Ebtisam Al-Ali*

*Kuwait Institute for Scientific Research, Kuwait*


### **Phylogeography and molecular characterization of Tomato yellow leaf curl virus in Kuwait**

**T**omato is one of the most important vegetables cultivated in the world, and is a critical component of nutritional security. Tomato crops in Kuwait are frequently infected with viruses, causing considerable losses, and dramatic reduction in crop production. A Begomovirus isolated from severely diseased tomatoes collected over two- tomato growing seasons in the main tomato-growing areas of Kuwait and characterised at the molecular level, the complete genomic sequence determined based on the genome structure, organization, and phylogenetic analysis, the Begomovirus found to be a strain of *Tomato yellow leaf curl virus* (TYLCV). Two isolates that characterized in this study had 97% and 95% nucleotide sequence identity, with previously characterized Kuwaiti isolate. TYLCV-KISR and the highest sequence identity (95%) was with that of TYLCV-Almeria (Spain) isolate. Phylogenetic analysis showed that the three Kuwait isolates formed a separate clade, which is suggestive of a different lineage from known TYLCV sequences, and the isolate KW 15 could be a novel variant of TYLCV.

### **Biography**

E Al-Ali obtained her BSc in 1993 from Kuwait University, worked for Kuwait University as Research Assistant, and then joined KISR on October 5, 1993 and led six projects. She has published more than 25 papers in reputed journals and international conferences. Her field of experience is in plant virus detection, primer design, cloning and sequencing, ELISA, DNA Extraction, PCR Amplification, RCA Rolling Circle Amplification, TYLCV detection on tomatoes. She was also trained twice in the University of Wisconsin Madison under the supervision of Prof. Amy Charkowski as well as University of Washington state under supervision of Prof. Hanu Pappu.

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## Karina Gin

National University of Singapore, Singapore

### Tracking antibiotic resistance from hospitals to the environment

**Statement of Problem:** An emerging health problem is the increase of antibiotic resistant pathogens arising from indiscriminant usage of antibiotics, and the transfer of antibiotic resistant genes (ARGs) between pathogens via mobile genetic elements. Last-resort antibiotics, such as extended-spectrum  $\beta$ -lactam (ESBLs) and carbapenems used in the treatment of patients have resulted in the spread of carbapenem-resistant *Enterobacteriaceae* (CRE) extending beyond the hospital setting. Hospital wastewaters in particular are important sources of antibiotic resistant bacteria (ARB) and ARGs. Hence determining the removal efficiencies in wastewater treatment processes, and the occurrences of ARB and ARGs in the urban environment (surface waters) and sites of aquaculture activity (fish farms) provides bearing on the spread of antimicrobial resistance.

**Methodology:** Metagenomics, qPCR and culturing methods were used as an assessment of ARB and ARGs in hospital and domestic wastewaters. Gram-negative pathogens (i.e. *Escherichia coli*, *Klebsiella pneumoniae*, *Pseudomonas aeruginosa*) at high concentrations exhibited pheno- and genotypic resistance (e.g.  $bla_{KPC}$ ,  $bla_{NDM}$  genes) to ESBL and carbapenem antibiotics. To characterize the occurrence and risk of these antibiotic resistant pathogens in the urban water cycle and environmental waters, samples were tested on a routine basis using selective media supplemented with 5 different classes of antibiotics.

**Findings:** The membrane bioreactor treatment (MBR) process of a wastewater treatment plant showed complete removal of all four pathogens (influent MBR), however there were periods where *E. coli*, *K. pneumoniae* and *P. aeruginosa* were detected in MBR effluent (6-7 log removal). Of the *P. aeruginosa* isolates detected, a few exhibited phenotypic resistance to carbapenem and ESBL antibiotics. In environmental waters, higher abundance of pathogens was detected in urban surface waters followed by aquaculture sites than marine sites within the vicinity of and outfall discharging treated effluent.

**Conclusion & Significance:** A comprehensive surveillance framework was developed to track hotspots of antimicrobial resistance in the urban water cycle and the spread of ARB and ARGs in the environment.

### Biography

Karina Gin is an Associate Professor at the Civil & Environmental Engineering Department at the National University of Singapore (NUS). She received her BEng in Civil Engineering from the University of Melbourne (1988), MEng Degree from NUS (1991) and Doctor of Science (ScD) Degree jointly from the Massachusetts Institute of Technology and the Woods Hole Oceanographic Institution (1996). Her research specialisation is in water quality, especially in the development of rapid and sensitive methods of detection for emerging contaminants of concern and understanding their fate and transport in the environment. Her current research focuses on the occurrence and fate of pathogens and emerging organic contaminants in tropical surface waters and harmful algal blooms in fresh waters. She received UN Atlas Award for excellence (co-author of "The Environment in Asia Pacific Harbours"). She is a member of the WHO Expert Group on Antimicrobial Resistance in Water Safety and Hygiene and is currently holding the Dean's Chair at the Faculty of Engineering (NUS).

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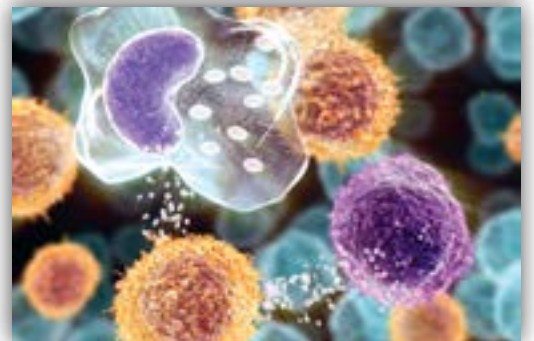
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## Keynote Forum Day 2





## Liaqat Ali Chaudhry

King Salman Military Hospital, Saudi Arabia

### Prevalence of diabetes type-2 & pulmonary tuberculosis among Filipino and treatment outcomes: a surveillance study in the Eastern Saudi Arabia

**Aim:** The aim is to study prevalence of diabetes type-2 and pulmonary tuberculosis among Filipino patients and treatment outcomes. Tuberculosis centre of Dammam medical complex(MOH) is a referral centre for the Eastern Saudi Arabia where patients from all government and private hospitals having open pulmonary tuberculosis are admitted for isolation till they are rendered non-infectious. All patients are treated for 6 months under DOTS strategy with 4 drugs (2HRZE) for 2 months as initial intensive phase and 2 drugs (HR) for 4 months as continuation phase.


**Materials & Methods:** We retrospectively reviewed clinical records of 1388 patients admitted with open pulmonary tuberculosis between Jan- 2003 and June-2010.

**Results:** Among 1388 patients, 39% (n=542) were Saudis and 61% (n=846) were non-Saudis. Among these 12.39% (n=172) were Filipinos, 153 males and 19 females respectively. Out of 1388 patients, 114 (7.17%) were found to have diabetes type-2. Among these diabetics, majority n=91 (79.82%) were Filipinos. Sputum conversion was late in diabetic patients resulting in relatively longer hospital stay compared to fellow patients having only tuberculosis.

### Biography

Liaqat Ali Chaudhry completed MBBS from King Edward Medical College university Lahore 1981. He completed his post-graduation in Diploma in Tuberculosis & Chest Diseases -Punjab University Lahore-Pakistan, MCPS from College of Physicians and Surgeons Pakistan and MRCP, FRCP from The Royal College of Physicians Dublin-Ireland. He worked as house physician, Registrar, Assistant professor at King Edward Medical College Lahore, 1982-1987. Later he joined MOH of Saudi Arabia worked as Specialist Physicians chest specialist on Feb-1988, Consultant Pulmonologist and Chief of Tuberculosis Center, Dept. of Internal Medicine & Chest diseases Dammam medical complex and Honorary Associate & Professor Dammam Medical University, Eastern Province K. Saudi Arabia – 2011 and Chairman Internal Medicine & Consultant Invasive.

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## Gwenaël Jan

Agrocampus Ouest, France

### Why buy probiotics while they are already in your fridge? The 2-in-1 effect of dairy bacteria as both immune modulators and cheese starters

**Scope:** Inflammatory bowel diseases (IBD) constitute a growing public health concern in western countries. Bacteria with anti-inflammatory properties are lacking in the dysbiosis accompanying IBD. Selected strains of probiotic bacteria with anti-inflammatory properties accordingly alleviate symptoms and enhance treatment of ulcerative colitis in clinical trials. Such properties are also found in selected strains of dairy starters such as *Propionibacterium freudenreichii*. Cheese constitutes an important source of bacteria, which can have beneficial effects, depending on the species or strain. We thus investigated the possibility to develop a fermented dairy product, combining both starter and probiotic abilities of propionic acid bacteria, designed to extend remissions in IBD patients.


**Methods & Results:** We developed a single-strain *P. freudenreichii*-fermented experimental pressed cheese using a strain previously selected for its anti-inflammatory properties.

Key immunomodulatory *P. freudenreichii* surface proteins were expressed within the cheese matrix, as evidenced by *in situ* proteomics. Consumption of this experimental fermented dairy product protected mice against TNBS-induced colitis, alleviating severity of symptoms, modulating local and systemic inflammation, as well as colonic oxidative stress and epithelial cell damages. As a control, the corresponding sterile dairy matrix failed to afford such protection.

### Biography

Gwénaël Jan focuses his research activity on the “2-in-1” properties of selected strains of dairy bacteria, both as starters for fermented dairy products, and as probiotic beneficial microbes. Following a PhD in Rennes University and Post-doc in Aberdeen Institute of Medical Sciences, he joined INRA in 1998 to study probiotic abilities of dairy propionibacteria. In close collaboration with INSERM, Pasteur Institute, Rennes University Hospital, as well as with dairy industry stakeholders, he develops a research activity spanning from food technology and molecular microbiology to preclinical and clinical investigations.

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