3rd International Conference on Infectious Diseases and Nanomedicine - 2021

December 15-18, 2021

Kathmandu, Nepal (Online)

ICIDN-2021

BOOK OF ABSTRACTS

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WELCOME

Respected Distinguished Guests, Colleagues and Friends,

It is our great pleasure to welcome you in the 3rd International Conference on Infectious Diseases and Nanomedicine (ICIDN-2021) from December 15 to 18, 2021 which is being jointly organized by Nepalese Forum for Medical Microbiology (NFMM), Nepal Polymer Institute (NPI) and CAS-TWAS Centre of Excellence for Biotechnology (CoEBio), Institute of Microbiology, Chinese Academy of Sciences (CAS) with support from the Society for Applied Microbiology (SfAM), UK via online (virtual) platform. The conference will be attended by more than 200 participants, including renowned scientists from 18 countries across the globe. The first and second editions of this triennial series of ICIDN held in Kathmandu from December 15 to 18, 2012 and 2015 were highly successful in bringing together over 200 participants from more than twenty countries. The ICIDN-2021 focuses on Molecular microbiology and epidemiology of infectious diseases and potential applications of nanotechnology for their diagnosis and treatments. Emerging infectious diseases, antimicrobial resistance, drug design, and drug delivery will form an integral part of the ICIDN-2021 endeavors. In addition, the conference will focus on the roles of microbiome in health and disease. Specific session on the ongoing coronavirus disease 2019 (COVID-19) pandemic will also be an integral part of the meeting. ICIDN-2021 will provide unique opportunity for presentation and sharing of innovations of microbiologists, immunologists, molecular biologists, epidemiologists, pathologists, chemists, pharmacists, polymer/biomedical engineers, material scientists, biotechnologists, nanotechnologists, clinicians, public health experts, and other biomedical scientists from both the academia and industries. The conference is hoped to be an important step to continue promoting interdisciplinary education and research in the field of microbiology, infectious diseases, material sciences and nanotechnology in Nepal and the region.

We extend our warm welcome to all our ICIDN-2021 delegates and wishing for fruitful discussions and networking. We sincerely thank all our well-wishers and supporters, who have contributed to the ICIDN-2021 in various ways.

Sincerely,

Rameshwar Adhikari and Santosh Thapa

On behalf of the organizing committee of ICIDN 2021

PLENARY LECTURES

Plenary Lecture 1

Next Generation Antibiotics

Nobel Laureate Ada Yonath, PhD

Nobel Prize Winner in Chemistry (2009)
The Martin S. and Helen Kimmel Professor of Structural Biology,
Director, The Helen and Milton A. Kimmelman Center for Biomolecular Structure and Assembly Structural Biology Department, Weizmann Institute of Science, Rehovot, Israel

Ribosomes are the universal cellular multicomponent particles that translate the genetic code to proteins. Owing to their high significance they are targeted by many antibiotics. Structures of complexes of bacterial and eubacterial ribosomes with the commonly used antibiotics that paralyze them, illuminated common pathways in their inhibitory-actions, synergism, differentiation and resistance. Comparisons of structures of ribosomes from multi-resistant pathogens to those of harmless bacteria illuminated unique features that may become sites for the design of novel, next generation, species-specific antibiotics, thus microbiome preserving, and degradable, thus eco-friendly.

3rd International Conference on Infectious Diseases and Nanomedicine – 2021
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Plenary Lecture 2

COVID19 vaccines: Science vs antiscience

Peter J Hotez, MD, PhD, DSc (hon), FASTMH, FAAP

Dean, National School of Tropical Medicine, Baylor Colleeg of Medicine
Professor, Pediatrics and Molecular Virology & Microbiology, Baylor College of Medicine
Co-director, Texas Children's Center for Vaccine Development
Endowed Chair of Tropical Pediatrics, Texas Children's Hospital
Houston, Texas, United States of America

Globally we are seeing a mixed picture vaccinating the U.S. and the world against COVID-19, with some progress containing the delta variant in the US but failing to control widespread transmission in Africa and Latin America. Will explore progress to date with the US vaccination program, what we can expect towards the end of 2021 into 2022, and how we advance vaccinations globally. Will discuss new options for accelerating a low-cost "people's vaccine" for COVID-19. Also, the impact of a rising and shifting antivaccine movement, which is also globalizing. Will discuss how we both address vaccine equity and a rising an aggressive globalizing antiscience empire.

KEYNOTE LECTURES

3rd International Conference on Infectious Diseases and Nanomedicine – 2021
(ICIDN – 2021)
December 15-18, 2021; Kathmandu, Nepal (Online)

Keynote Lecture 1

Haitian variant Vibrio cholerae: Pathogenicity and antibiotic resistance

Sabu Thomas, PhD

Cholera and Biofilm Research Laboratory, Rajiv Gandhi Center for Biotechnology, National Institute under the Department of Biotechnology, Government of India), Kerala, India

Vibrio cholerae, the Gram-negative comma shaped bacteria cause the disease cholera which is a grave public health concern in developing and under-developed countries. Though rehydration therapy remains the mainstay of the disease management, antibiotics are also being widely used as an adjunct in the treatment regime. This has led to an increase in the emergence of antibiotic resistant isolates. Also, there have been reports of local evolution of *V. cholerae* strains in cholera endemic regions producing novel variants with difference in pathogenicity and antibiotic resistance pattern. The organism possesses a repertoire of virulence factors including the cholera toxin, hemolysins, adhesins and secretory systems. Recent reports have indicated the emergence of variant *V. cholerae* like the El Tor variants and Haitian variants. The presentation will discuss about the difference in pathogenicity of the newly emerged Haitian variant strains and the antibiotic resistance progression to doxycycline, the commonly used antibiotic to treat cholera. Resistance profiling revealed that majority of the isolates were multidrug resistant. Minimum inhibitory concentration (MIC) creep of doxycycline antibiotic in the test isolates over the years was reported for the first time. Adaptive laboratory evolution and whole genome sequencing were carried out to identify mutations related to doxycycline resistance. The study for the first time illustrated a possible mechanism of doxycycline resistance in *V. cholerae*.

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December 15-18, 2021; Kathmandu, Nepal (Online)

Keynote Lecture 2

Electrospun micro/nanofibers for local delivery of hydrophobic drugs

Jakub Sirc, PhD and Radka Hobzova

Institute of Macromolecular Chemistry, Academy of Sciences of the Czech Republic v.v.i., Heyrovsky sq. 2, Prague, Czech Republic

Polymeric micro/nanofibrous matrices are promising carriers in various medicinal applications such as wound dressings, transdermal drug delivery devices, prevention of abdominal adhesion, bone regeneration or localized delivery of drugs in cancer therapy.

Needleless electrospinning allows preparation of nanofibers in large scale and enables their use in common medical practice. In our research we focused on the preparation of polylactide micro/nanofibers for delivery of hydrophobic compounds. The immunosuppressant cyclosporine A and chemotherapeutic agent paclitaxel were selected as representatives of widely used drugs. Regarding to their serious undesirable side effects the local application would be highly beneficial.

The incorporation and consequent release profiles of both hydrophobic drugs were modified by addition of amphiphilic polyethylene glycols of various molecular weights to electrospun mixture. The drug release kinetics were explored by HLPC under various conditions, the biocompatibility and biological activity was tested on cell lines and by chick chorioallantoic membrane assay. In vivo evaluation of paclitaxel loaded fibers on mice using a human fibrosarcoma recurrence model showed statistically significant inhibition in tumor incidence and growth after primary tumor resection compared to other treatment groups

The obtained results showed that it is possible to fabricate micro/nanofibers of a suitable morphology and release of hydrophobic drugs in wide range according to the various medicinal requirements. The prepared constructs exhibited excellent biocompatibility and release of therapeutically active doses for period of several weeks. The relationships between preparation conditions, fibers properties and drug release profiles can be applied for delivery of other pharmacologically active compounds.

3rd International Conference on Infectious Diseases and Nanomedicine – 2021
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December 15-18, 2021; Kathmandu, Nepal (Online)

Keynote Lecture 3

The human microbiome in precision medicine

Jack A. Gilbert, PhD

Department of Pediatrics and Scripps Institution of Oceanography,
University of California San Diego, La Jolla, California, United States of America

The human microbiome is quickly being recognized as a dynamic part of the human ecosystem, and research is starting to demonstrate that using ecology to understand this ecosystem has profound benefits for patient wellness. The immune system controls our interaction with the microbial world, and yet the microbial communities in our bodies are central to modulating the immune response. Changes in the human microbiome have substantial influence on atopy, neurological disorders, metabolic disorders, and a range of complex conditions and disease states. We will discuss evidence of these mechanisms of interaction and how we have started to disturb the delicate balance of the immune-microbe equilibrium, impacting the development and function of our immune systems. Applying new strategies to identify how the microbial ecosystem correlates with diseases states and treatment efficacy through Microbiome-Wide Association Studies (MWAS) is altering the trajectory of precision medicine and providing a new framework for facilitating patient care. However, to date there are still no FDA approved microbiome related therapies, pointing to concerns about over-promising of microbiome as a real treatment strategy. There is considerable concern about the need to move beyond studies that identify correlations between the microbiome and disease, toward intervention trials that will actually explore specific mechanistic relationships. It truly is time to start delivering on the promise of the microbiome.

3rd International Conference on Infectious Diseases and Nanomedicine – 2021
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Keynote Lecture 4

Tetrapods based smart materials for advanced technologies

Reza Abolhassani, Fateme Mirsafi, Horst-Günter Rubahn, Yogendra Kumar Mishra

Smart Materials, NanoSYD, Mads Clausen Institute,
University of Southern Denmark, Alsion 2, 6400, Sønderborg, Denmark
Email: mishra@mci.sdu.dk

Considering the size dependent utilization complexities of nanoscopic dimensions towards real applications, the focus of nanomaterials community is merging to three-dimensional (3D) form of materials which are built out interconnected nanostructures. This talk will briefly introduce the importance of complex shaped nanostructures towards smart 3D nanomaterials structuring. A simple flame based single step approach was developed for synthesizing zinc oxide tetrapods which demonstrated many applications in different technologies. These tetrapods have been used as building blocks to construct highly porous interconnected 3D nanonetworks in form of flexible ceramics which offer further new application avenues. Additionally, these 3D networks have been utilized as sacrificial templates to develop hollow tetrapodal 3D networks from almost any desired material, carbons, nitrides, oxides, polymers, hydrogels, etc. The sacrificial template-based strategy offers new and unique opportunities in the direction of 3D nanomaterials engineering and accordingly advanced technological applications. Some examples of 3D nanomaterials engineering will be demonstrated along with their applications. The scopes of 3D nanostructuring based smart materials in sensing, electronics, optoelectronics, energy, and biomedical engineering will be briefly highlighted in the talk.

3rd International Conference on Infectious Diseases and Nanomedicine – 2021
(ICIDN – 2021)
December 15-18, 2021; Kathmandu, Nepal (Online)

Keynote Lecture 5

SARS CoV-2 serology: Public health vs clinical uses

Muhammad Morshed, PhD
Department of Pathology and Laboratory, Medicine, University of British Columbia;
BCCDC Public Health Microbiology and Reference Laboratory,
Vancouver, British Columbia, Canada

The SARS-CoV-2 virus causes COVID-19 disease, which was first diagnosed in late December 2019 among a few people with unknown respiratory illness in Wuhan city, Hubei province, China. Presumably this virus jumped from a natural host to human, and that occurred in one of the open food markets in Wuhan city, spreading very quickly to neighboring provinces, neighboring countries, and eventually different continents. The World Health Organization declared the outbreak a Public Health Emergency of International Concern on 30 January 2020, and a pandemic on 11 March 2020. This virus killed over 5.22 million people globally as of Dec 01, 2021, and there is no sign of stopping with the latest addition of Omicron variant. However, SARS CoV-2 also forced us to invent new skills and technology not only to defeat it but also to propel ourselves forward. For instance, serological diagnostic tests in the form of Point of Care Test (POCT) format and regular EIA format become available in a couple of months instead of years.

Although molecular/ RT PCR become the test of choice for clinical diagnosis, serology has also limited uses for patient care in addition to Public Health (PH) uses. For PH, SARS-CoV-2 antibody testing is testing is essential for estimating population based seroprevalence and also to assess vaccine responses which enable evidence-based decision making for public health recommendations. For clinical care, SARS CoV-2 antibody testing help select group of population where molecular/PCR test is negative. So, it may help to increase case identification when used as an adjunct to routine molecular testing in those select cohorts. With the global availability of vaccines, there is also increasing pressure on clinical laboratories to provide antibody screening and result interpretation for vaccinated and non-vaccinated individuals those may require monoclonal antibody therapies. So, in this presentation we will review serological testing of patients' blood against SARS CoV-2 virus and highlight pros and cons of uses of serological testing in public health and its uses of clinical diagnosis.

3rd International Conference on Infectious Diseases and Nanomedicine – 2021
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December 15-18, 2021; Kathmandu, Nepal (Online)

Keynote Lecture 6

Impact of the COVID-19 pandemic on newborn care

Mohan Pammi MD, PhD, MRCPCH

Baylor College of Medicine; Texas Children's Hospital
Houston, Texas, United States of America

COVID-19 was declared a pandemic by the WHO in March 2020. As the medical community dealt with the implications of rapid spread and high mortality and morbidity of the infection, many changes focused on infection control became paramount in the neonatal intensive care unit including attendance at delivery.

We will discuss infection control measures at delivery including proper personal protective equipment and outline vertical transmission risks to the infant from a covid positive mother. A working collaboration is required with the obstetric team for a safe continuum of care. We will discuss the manifestations of neonatal covid disease that has been reported from literature and management strategies. Respiratory care is paramount, and we will discuss appropriate evidence-based respiratory care for patient benefit and to reduce horizontal transmission. We will delineate the impact of covid on the NICU workflow- virtual rounding, social distancing and universal surveillance of patients and healthcare staff in the NICU. Hospital restrictions on visitations that could place a lot of stress on parents and how we can mitigate it by video conferencing by parents to see and discuss their infant's condition with the healthcare staff.

At the end of the talk, participants will be able to (objectives): 1. Understand the risks of vertical transmission of COVID-19, 2. Recognize neonatal COVID-19 disease and 3. List changes in NICU workflow including daily rounding and parent visitations.

3rd International Conference on Infectious Diseases and Nanomedicine – 2021
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December 15-18, 2021; Kathmandu, Nepal (Online)

Keynote Lecture 7

Lymphatic filariasis: Nepalese scenario

Shiba Kumar Rai, PhD

Nepal Medical College, Attarkhel, Gokarneswor-8, Kathmandu, Nepal

Lymphatic filariasis (LF) a vector-borne parasitic disease and can be characterized by asymptomatic, acute or chronic manifestations. The chronic condition leads to lymphedema (tissue swelling) or elephantiasis (skin/tissue thickening) especially lower limbs. It is caused by *Wuchereria bancrofti*, *Brugia malayi* and *B. timori* - a thread-like worm affects 859 million people in 50 countries worldwide. However, it has shown a decreasing trend in recent years. Of the three species, in Nepal, it is caused only by *W. bancrofti* and is transmitted by female Culex mosquito called *Culex quinquefasciatus* (a night bitter mosquito). In Nepal, out of 75 districts, 61 districts are endemic of LF with an average prevalence rate of 13% (range between 1% -39% based on the survey done in between 2001 - 2012). A 25 million of people are at risk of LF in 61 districts. A national effort had been put to eliminate LF from Nepal by 2000 by mass administration of drugs namely diethyelcarbamazine and albendazole. Though, more than 100 million doses drugs have been administrated to at-risk population in last 13 years, it could not be achieved, and the deadline has been extended to 2028.

Keynote Lecture 8

Biosecurity as last line of defense and the potential impact of resistance to disinfectants in a post antibiotic era

S.M. Mc Carlie, B. Belter, G. Staats, B. van der Walt, W. Swart,
C van Heerden, C.E. Boucher, Robert R. Bragg, PhD

Department of Microbial, Biochemical and Food Biotechnology,
University of the Free State, Bloemfontein, South Africa

Antibiotic resistance has become a serious problem in many settings including animal agriculture and human health. The world is rapidly heading to a post antibiotic era where common bacterial infections will become impossible to treat. There is already a ban on the use of antibiotics in animal production in many countries. It has been estimated that by the year 2050, some 10 million people per year could be dying from antibiotic resistant bacterial infections and on the frontline of this are nosocomial infections which have demonstrated a sharp increase in numbers over the last few years. Various efforts are underway to address this crisis, ranging from searching for novel antibiotics, improvement in bacterial vaccines and bacteriophages therapy and even the use of bacteriophage enzymes. Although these have some potential, there are some problems with all of these options. The most promising disease control option is good biosecurity and the correct use of disinfectants.

Biosecurity and disinfection procedures are in place in many settings, but the relatively new threat of disinfectant resistance is putting this disease control option under stress as well. The widespread use of disinfectants to combat COVID-19 could have an unforeseen consequence of increasing the levels of resistance to disinfectants. There is growing evidence to suggest a link between resistance to antibiotics and disinfectants. The bacterium uses many of the same mechanisms for resistance to both. The various efflux pumps are the best studied. Bacteria also have the ability to metabolize some of the disinfectants.

The focus of our research group is looking for novel mechanisms of resistance to disinfectants and the highly resistance strain of Serratia which we have isolated in our laboratory is the current focus of much of our research efforts and some of these results will be presented by others in this conference.

INVITED LECTURES

Invited Lecture 1

Burden of fungal infections in Nepal

Niranjan Nayak, MBBS, MD

Department of Microbiology, Manipal College of Medical Sciences, Pokhara, Nepal

Fungal infections in Nepal have long been underestimated as there has been limited attempts to explore the epidemiology of various types of fungal infections prevalent in the country. Allergic, invasive and superficial fungal infections are on the rise. One survey in the past determined that 1.94% of the Nepalese population suffered from severe fungal infections annually, the most serious infections being among HIV/AIDS and other immunocompromised patients. Since this survey was conducted way back in 2016, we tried to explore the prevalence of both superficial and deep fungal infections in a sector of population of western Nepal. It was found that invasive infections like Trichosporonosis were common not only among immunocompromised adults but also among the immunocompetent pediatric populations. Estimation of invasive corneal disease among adults revealed that 29.7% of adults suffered from infectious keratitis of fungal origin with development of corneal opacity in substantial number of patients. In addition, emerging fungal diseases due to *Magnusiomyces capitatus* were encountered in immunocompetent subjects. Superficial and cutaneous fungal infections such as pityriasis versicolor, tinea capitis, tinea corporis, and onychomycosis were also on the rise. Invasive candidiasis with fluconazole resistant candida species harboring virulence markers like biofilm production, phosphatase and esterase production were also reported.

3rd International Conference on Infectious Diseases and Nanomedicine – 2021
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December 15-18, 2021; Kathmandu, Nepal (Online)

Invited Lecture 2

Design of Biomimetic Polycations Containing Nonproteinogenic α-Amino Acids

Nino Zavradashvili[1], Giuli Otinashvili[1], Temur Kantaria[1], Nino Kupatadze[1], David Tugushi,[1] Ashot Saghyan[2], Anna Mkrtchyan[2], Artavazd Poghosyan[2] and Ramaz Katsarava[1]

[1]*Institute of Chemistry and Molecular Engineering, Agricultural University of Georgia, Tbilisi, Georgia*
[2]*Institute of Pharmacy, Yerevan State University, Yerevan, Republic of Armenia*

The importance of cationic polymers (CPs) is universally recognized because they exhibit unique biological properties. Biodegradable CPs which can be cleared from the body following executing their function, look especially valuable. One of the most convenient approaches for constructing biodegradable CPs is the incorporation of hydrolysable ester bonds into the polymeric backbones. This could be achieved e.g. by the application of diamine-diester monomers made of cationic amino acid arginine (R) and diols-bis-(arginine)-alkylene diesters. In general, the polymers made of diamine-diester monomers we call as biomimetic polymers. Promising co-building blocks for constructing biologically active biomimetic CPs are non-proteinogenic amino acids (NPAAs), including those ones containing unsaturated bonds in the lateral chains, that revealed a wide range of biological activities. The goal of the present study is to combine two classes of biologically active building blocks (i.e. arginine and NPAAs) for constructing new CPs with an expanded range of potential biological activity. Such kind of biomimetic CPs are of interest for fabricating biologically active nanoparticles. Besides, the new unsaturated polymers are promising precursors of cross-linked cationic hydrogels for numerous biomedical applications including stimuli-responsive drug delivery systems.

3rd International Conference on Infectious Diseases and Nanomedicine – 2021 (ICIDN – 2021)
December 15-18, 2021; Kathmandu, Nepal (Online)

Invited Lecture 3

Bifidobacteria and commensal gut microbes shape neurotransmitters levels in the gut and brain during postnatal development

Thomas D. Horvath[1], Berkley Luk[1], Sigmund J. Haidacher[1], Kathleen M. Hoch[1], Jennifer K. Spinler[1], Numan Oezguen[1], Anthony M. Haag[1], Melinda A. Engevik[2]
[1]Baylor College of Medicine and the Texas Children's Hospital Microbiome Center, Houston, Texas, United States of America
[2]Department of Regenerative Medicine, Medical University of South Carolina, Charleston, South Carolina, United States of America

Intestinal microbes significantly influence host health in early life. Healthy breast-fed infants are dominated by Bifidobacteria and colonization coincides with neurodevelopment. The central hypothesis of this research is that early bifidobacteria-host communication impacts neurotransmitter composition and the gut-brain-axis. Pregnant germ-free dams were colonized with Bifidobacteria (*B. longum* subsp. *infantis*, B. *breve*, *B. bifidum*, and *B. dentium*), or a fecal microbiota transplant from age matched mice (CONV). Dams treated with sterile PBS (GF) served as controls for comparison. At postnatal days P4, P10, and P20, tissue and stool were examined from gnotobiotic offspring by 16S rRNA sequencing and LC-MS/MS. At 6-7 weeks of age, mice underwent a behavioral test battery.

In early postnatal development (P4 and P10), few neurotransmitters were observed in the gut, but with increased microbial load (P20), we observed increased intestinal neurotransmitters in BIF and CONV treated mice compared to GF controls. Interestingly, we observed unique patterns in the GABA/Gln/Glu cycle, tyrosine and tryptophan pathways in the brain over time. We found substantial neurotransmitter levels in the CONV mice compared to GF mice, particularly at P20. Correlating with these findings, we observed exhibited an upregulation of synapse-promoting genes in several brain regions in CONV and BIF mice. Results from the behavioral tests suggest that GF mice have decreased short-term recognition memory, sociability, anxiety-like behaviors, and motor performance. Postnatal conventionalization rescued these behavioral abnormalities and bifidobacterial colonization selectively recapitulated the results observed in conventionalized mice. Significantly, bifidobacteria rescued the recognition memory deficit in germ-free mice.

We propose that bifidobacteria are key species of the intestinal microbiome which during neurodevelopment promote network refinement and functional organization of neural circuitry, and later in life modulate and maintain healthy brain function.

3rd International Conference on Infectious Diseases and Nanomedicine – 2021 (ICIDN – 2021)
December 15-18, 2021; Kathmandu, Nepal (Online)

Invited Lecture 4

Phenyllactic acid is associated with multiple sclerosis

Numan Oezguen[1,2], Thomas D. Horvath[1,2], Vuslat Yılmaz[4], Sigmund J. Haidacher[1,2], Kathleen M. Hoch[1,2], Recai Türkoğlu[4], Murat Kürtüncü[4], Melinda A. Engevik[3], Anthony M. Haag[1,2], Erdem Tüzün[4]

[1]*Department of Pathology & Immunology, Baylor College of Medicine, Houston, TX, USA*
[2]*Department of Pathology, Texas Children's Hospital, Houston, TX, USA*
[3]*Department of Regenerative Medicine & Cell Biology, Medical University of South Carolina, Charleston, SC, USA*
[4]*Department of Neuroscience, Aziz Sancar Institute of Experimental Medicine, Istanbul University, Istanbul, Turkey*

We are constantly in contact with microbes via our tissue interfaces such as the skin, oral cavity, the respiratory system, and especially the gastrointestinal (GI) tract. The GI tract harbors many commensals and some potentially pathogenic microbes. Because of these constant contacts, our immune system is constantly active, especially at the gut interface to defend us against these microbes. Involvement of the dysbiotic gut microbiome in numerous diseases is well established. In general, the microbiome exerts its effects on the host via secreted chemical signals that can include metabolites, hormones, peptides, and proteins. Others and we have previously reported about the link between the microbiome and multiple sclerosis (MS). Now, we have identified phenyllactic acid (PLA) as one such metabolite that may have a role in MS disease. PLA is commonly assumed to be produced by the gut microbiome and by the host in its D- and L-PLA chiral forms, respectively. Here we present results of chiral resolved mass spectrometry-based quantitative measurement of D- and L-PLA. We applied this method to measure PLA in samples from bacterial-conditioned growth medium supernatants and human blood sera samples from healthy controls (HC) and MS patients. Using our targeted chiral metabolomics method, we have confirmed that gut commensal bacteria do produce the D-PLA isomer as expected. Surprisingly, several of the microbes studied - Bacteroides vulgatus for example – was able to produce high levels of the L-PLA isomer. Our human sera-based measurements indicated that PLA is associated with MS, although it does not seem to be the causative initial triggering agent of the disease. PLA is lower in benign patient sera compared to HC. Further, patient who do not respond to Fingolimod treatment have higher PLA in their sera. Additionally, we identified significant positive correlations between PLA and effector T- and B-cells in MS patients.

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Invited Lecture 5

Metabolomics-based approaches to assess the therapeutic potential of commensal gut microbes

Thomas D. Horvath[1], Numan Oezguen[1], Sigmund J. Haidacher[1], Kathleen M. Hoch[1], Jennifer K. Spinler[1], Melinda A. Engevik[2], and Anthony M. Haag[1]
[1]*Baylor College of Medicine and the Texas Children's Hospital Microbiome Center, Houston, Texas, United States of America*
[2]*Department of Regenerative Medicine, Medical University of South Carolina, Charleston, South Carolina, United States of America*

LC-MS/MS-based metabolomics methods can be used to assess the therapeutic potential of commensal gut microbes. Microbes can influence the host through the biosynthesis and secretion of neurotransmitters into the intestinal milieu. Accumulating evidence suggests that the manipulation of neurotransmitter concentrations by bacteria within the GI tract may have an impact on host physiology. Here we highlight the LC-MS/MS-based metabolomics approaches and microbe-metabolite bipartite network models that our team uses to surveil the production of these beneficial metabolites by bacteria.

Prevotella copri, Lactococcus lactis, Enterococcus faecalis, Blautia producta, Clostridium symbiosum, Bacteroides fragilis, Escherichia coli Nissile, and *Streptococcus thermophilus* are human gut commensals identified by the Human Microbiome Project (HMP). Microbial cultures were prepared in a chemically-defined bacterial growth medium (ZMB1) at an OD600nm of 0.1, were grown anaerobically for 18 hrs, and were processed to sterile supernatants. Non-biased and targeted metabolomics analyses were performed on the supernatant samples using an OrbiTrap Fusion MS and a 6500 QTrap MS, respectively.

SCFAs are known to signal to host enteroendocrine cells (EECs) and modulate host neurotransmitter production. Non-biased metabolomic analysis of the representative gut microbes showed interesting featural characteristics in metabolic pathways associated with glycolysis and gluconeogenesis, amino acid, nitrogen, SCFA, and lipid metabolism. Targeted metabolomic analysis of supernatants from each microbe screened revealed that *P. copri* produced the greatest concentrations of acetic, butyric, and branched-chain SCFAs, while *B. fragilis* and *B. producta* produced the greatest concentrations of propionic and valeric acid, respectively. In terms of microbial neurotransmitters, *E. faecalis* produced dopamine and generated high concentrations of tyramine. *P. copri* and *L. lactis* generated significant levels of tryptamine and indoleacetic acid. Interestingly, no bacteria synthesized norepinephrine or epinephrine. Collectively, these findings reveal unique features of gut microbes and these profiles could be used in the future to selectively modify the gut.

3rd International Conference on Infectious Diseases and Nanomedicine – 2021
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Invited Lecture 6

Nanotechnology in molecular diagnosis and therapeutics

Muhammad Yasir Zahoor, PhD

Institute of Biochemistry & Biotechnology, University of Veterinary & Animal Sciences, Lahore Pakistan

Nanotechnology has gained an uplift in biotechnology in past few years but it still has a a great research potential in molecular diagnostics and therapeutics. DNA and nanoparticles binding based technologies could have a promising research interest in medicine in coming future. The DNA based nano-biotechnology can play a role in many disciplines of the subject matter. It is being used for the early diagnosis of the molecular biomarkers specially in infectious diseases and cancers. But it could be used more accurately for diagnosis of infectious diseases as well as mutations involved in genetic diseases. The nano diagnostic platforms have the ability to achieve reliable and rapid conclusions with simple and portable devices just by using different samples from patient like blood, sputum, or urine.

Nano-biotechnology provides an intelligent route for the manipulating the DNA for programmable functional unit. Genetic manipulation and editing the nucleic acid through nanoparticle would lead to adduce the gene therapy. The nanoparticles can react more accuracy to conjugate with RNA molecules to catalyze translation and controlling microRNAs based gene expression. Here few case studies and strategies are being focused associated with the application of the nanoparticle-DNA binding technologies for molecular detection and therapies. The subsequent emergence of genomics and proteomics together with nanotechnologies should continue to uncover new and useful molecular targets.

3rd International Conference on Infectious Diseases and Nanomedicine – 2021
(ICIDN – 2021)
December 15-18, 2021; Kathmandu, Nepal (Online)

Invited Lecture 7

Nanoreactors against bacterial infection and nanomimics for viral and parasite host cell entry inhibition

Adrian Najer[1,2], Michael Potter[1], Jake Baum[2], Molly M. Stevens[1]

[1]*Department of Materials, Department of Bioengineering, and Institute of Biomedical Engineering, Imperial College London, London, SW7 2AZ, UK*
[2]*Department of Life Sciences, Imperial College London, London, SW7 2AZ, UK*

Infectious diseases caused by viral, bacterial, and parasitic pathogens are a tremendous burden to public health. The current COVID-19 pandemic is only one example, with antimicrobial-resistant bacteria and parasites representing equally challenging threats to global populations. Nanomedicine offers means of creating alternatives to antimicrobials and improving efficacy of currently available treatments. To create an antibiotic-free nanomedical system that can successfully kill bacteria, we self-assembled amphiphilic Janus dendrimers into dendrimersomes, whilst co-encapsulating the two enzymes glucose oxidase and myeloperoxidase. The obtained nanoreactor successfully synthesised the highly potent antimicrobial compound hypochlorite (âˆ’OCl) through a cascade reaction involving the two enzymes and glucose as the main substrate. We then demonstrated activity of this nanoreactor against multidrug-resistant bacteria, Staphylococcus aureus and Pseudomonas aeruginosa. To achieve spatiotemporal control over nanoreactor activity we employed glucose-loaded giant liposomes to release sufficient amounts of substrate only in the presence of toxins secreted by pathogenic bacteria. Another nanomedical approach, in this case against viral and parasitic pathogens, was developed to reduce the pathogen load through inhibition of host cell entry. We designed polymer- and polymer-lipid based hybrid nanoparticles that chemically mimic heparan sulphate receptors of host cells membranes. These nanomimics were shown to potently inhibit herpes simplex virus type 2 (HSV-2) and severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) entry into epithelial cells. Activity of the nanomimics was further demonstrated against various strains and species of malaria parasites in vitro and in vivo. We envision these nanomedical strategies forming valuable basics for providing future tools to help controlling various infectious diseases caused by viruses, bacteria, and parasites.

3rd International Conference on Infectious Diseases and Nanomedicine – 2021
(ICIDN – 2021)
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Invited Lecture 8

Fighting against SARS-CoV-2 delta variant in Nepal: A tertiary care hospital experience

Sher Bahadur Pun

Clinical Research Unit, Sukraraj Tropical & Infectious Disease Hospital, Kathmandu, Nepal

Several SARS-CoV-2 variants of concern have emerged and are found to be associated with increased hospitalization and death. The delta variant (B.1.617.2), first identified in India, is considered more contagious and virulent amongst the variants and was responsible for the second wave of COVID-19 in Nepal. This presentation describes the hospital experiences responding to SARS-CoV-2 delta variant in Nepal.

3rd International Conference on Infectious Diseases and Nanomedicine – 2021
(ICIDN – 2021)
December 15-18, 2021; Kathmandu, Nepal (Online)

Invited Lecture 9

Laboratory management of COVID-19 in Mongolia

Khosbayar Tulgaa[1,2], Narangerel P[2], Boldmaa G[1], Tserendavga D[3]

[1]*Clinical Molecular Diagnostic Center, Mongolian National University of Medical Sciences. Mongolia*
[2]*Department of Clinical Laboratory, School of Medicine, Mongolian National University of Medical Sciences, Mongolia*
[3]*School of Traditional Medicine, Mongolian National University of Medical Sciences, Mongolia*
Corresponding author: khosbayar.t@mnums.edu.mn

The COVID-19 pandemic had impact laboratory system worldwide. The Mongolian government had quick response to immediate needs for laboratory diagnostics to detect and screen for COVID-19. A strategic multilevel approach to expand the country's existing capacity for PCR testing for COVID-19 was established for timely preparedness of national laboratory network for SARS-CoV-2 detection, including PCR equipment and reagent purchase and delivery, training, and the provision of technical support. The equipment increased the existing laboratory capacity of the 7 national tertiary care hospitals and medical universities, 7 urban districts of the capital city, and 19 remote aimag (province) health facilities without RT-PCR laboratory capacity. As the country's health system had to address the challenges in a short time, there were many challenges and limitations during the course of the implementation of the SARS-CoV-2 molecular detection in the country. After a year of pandemic situation, all have learned important lessons about laboratory management. The rapid capacity building of diagnostics laboratories of SARS-CoV-2 molecular detection and implementation throughout Mongolia showed the importance of a high quality, efficient and coordinated laboratory response for preparedness for future pandemics. All laboratories faced significant challenges in staffing the labs and huge COVID-19 testing workload. New work arrangements were required to fit laboratory testing needs due to COVID-19 pandemics. While the COVID-19 pandemic created significant problems for the health system, the fast planning of strategic response, a quick adaptation of the laboratories in the situation was essential for timely preparedness of the laboratory.

3rd International Conference on Infectious Diseases and Nanomedicine – 2021 (ICIDN – 2021)
December 15-18, 2021; Kathmandu, Nepal (Online)

Invited Lecture 10

Characterization of an attenuated SARS-CoV-2 related pangolin coronavirus variant with a 104-nt deletion at the 3'-terminus untranslated region

Lihua Song

College of Life Science and Technology, Beijing University of Chemical Technology, Beijing, China

SARS-CoV-2 related coronaviruses (SARS-CoV-2r) from Guangdong and Guangxi pangolins have been implicated in the emergence of SARS-CoV-2 and future pandemics. We previously reported the culture of a SARS-CoV-2r GX_P2V from Guangxi pangolins. Here we report the GX_P2V isolate rapidly adapted to Vero cells by adopting two genomic mutations –a final amino acid mutation in the nucleoprotein and a 104-nucleotide deletion in the hypervariable region (HVR) of the 3′-terminus untranslated region (3′-UTR). We further report the characterization of the GX_P2V variant in in vitro and in vivo models. In two cell cultures -Vero and BGM cells, growth of the GX_P2V variant consistently produced mild cell damages and small plaques. In two animal models -golden hamsters and BALB/c mice, the GX_P2V variant can infect but is highly attenuated. Golden hamsters intranasally, not intragastrically or rectally, infected with the variant had a short duration of productive infection. These productive infections induced neutralizing antibodies against pseudoviruses of GX_P2V and SARS-CoV-2. Altogether, our data show that the GX_P2V variant is highly attenuated in both cell cultures and animals. Attenuation of the variant is likely due to the 104-nt deletion at 3′-UTR. This study furthers our understanding of pangolin coronaviruses and provides novel insights for the design of live attenuated vaccines against SARS-CoV-2.

3rd International Conference on Infectious Diseases and Nanomedicine – 2021 (ICIDN – 2021)
December 15-18, 2021; Kathmandu, Nepal (Online)

Invited Lecture 11

Clinical and public health management of COVID-19 in sub-Saharan Africa: Challenges and opportunities from a Kenyan perspective

Paul Yonga, MBChB, MSPH, MRCP (Edin.)[1, 2, 3]

[1]*CA Medlynks Clinic and Laboratory, Nairobi, Kenya*
[2]*Fountain Projects and Research Office Clinical Research Centre (FOPRO-CRC), Fountain Health Care Hospital, Eldoret, Kenya*
[3]*Centre for Tropical Medicine and Global Health, Nuffield Department of Medicine, University of Oxford, UK, and Mahidol Oxford Tropical Medicine Research Unit, Bangkok, Thailand*

COVID-19 has posed a significant challenge to both the clinical and public health systems in Africa, and Kenya has not been spared these challenges. However, the pandemic also exposed the underbelly of neglect and lack of investment that these health care systems have faced over decades and hence brought about forced opportunities to improve health systems in Africa. Here, we will present Kenya's unique challenges during the course of the pandemic and highlight some of the opportunities that presented itself to help Kenya address the pandemic both from a clinical and public health perspective.

Invited Lecture 12

Comparing peripheral blood smears, autologous cell cultures, and reverse line blot hybridisation in screening for Anaplasma/Ehrlichia in dogs in Trinidad

Karla Georges[1], Chuckwudozi Ezeokoli[2], Godwin Isitor[1], Alex Mutani[1], Olivier Sparagano[3], Candice Sant[1]

[1]School of Veterinary Medicine, St Augustine Campus, The University of the West Indies, Eric Williams Medical Sciences Complex, Mount Hope, Trinidad, West Indies
[2]College of Veterinary Medicine, Federal University of Agriculture, Makurdi, Nigeria
[3]Department of Infectious Diseases and Public Health, Jockey Club College of Veterinary Medicine and Life Sciences, City University of Hong Kong, Kowloon Tong, Kowloon, Hong Kong SAR, China

This study compared two methods to detect cases of canine ehrlichiosis in a field setting. One method was a polymerase chain reaction for the 16S rRNA gene followed by reverse line blot hybridisation with genera and species-specific probes for *Anaplasma/Ehrlichia*. The second method was an autologous cell culture of peripheral leucocytes isolated from heparinised blood and maintained in a homologous canine serum in Dulbeccoâ€™s Modified Eagle medium without antibiotics. The cultures were examined under light microscopy for inclusion bodies after 48 h. Leucocytes were successfully propagated for 20 of the 34 samples submitted for autologous cell culture. Inclusion bodies were observed after cell culture in leucocytes of eight dogs. Two dogs were positive to the *Anaplasma*/*Ehrlichia* genera probe, and six dogs were positive to the *E. canis* probe after reverse line blot hybridisation. There was acceptable agreement between reverse line blot hybridisation and cell culture results. Both reverse line blot hybridisation and autologous cell cultures can be used to detect *E. canis* in subclinical and clinical cases of disease. A definitive diagnosis of *E. canis* is best achieved by a combination of clinical signs, positive autologous cell culture, and reverse line blot hybridisation results.

Invited Lecture 13

Health and Spirituality

Basant Pant
Annapurna Neurological Institute and Allied Sciences, Maitighar, Kathmandu, Nepal

3rd International Conference on Infectious Diseases and Nanomedicine – 2021 (ICIDN – 2021)
December 15-18, 2021; Kathmandu, Nepal (Online)

Invited Lecture 14

A country with high antibiotic use: Lessons and challenges to combat AMR

Gereltuya Dorj[1], Byambadorj Dembereldorj[2], Amarjargal Choijoo[2], Erdenechimeg Enkhee[3], Tsetsegmaa Sanjjav[4], Hege Salvesen Blix[5], Gantuya Dorj[6]

[1]*Quality Use of Medicines and Pharmacy Research Centre, Clinical and Health Sciences, University of South Australia, Adelaide SA, Australia*
[2]*Ministry of Health, Mongolia, Department of Pharmaceuticals, Medical Devices and Manufacturing, Ulaanbaatar, Mongolia*
[3]*World Health Organization, Representative Office for Mongolia, Ulaanbaatar, Mongolia*
[4]*National Drug Institute of Mongolia, Monos Group, Ulaanbaatar, Mongolia*
[5]*Norwegian Institute of Public Health, Drug Statistics, Oslo, Norway*
[6]*Mongolian National University of Medical Sciences, School of Public Health, Ulaanbaatar, Mongolia*

Mongolia has the highest antibiotic consumption in the Western Pacific Region, with an estimated 64.4 DID (2015).The county inhabits to 3.2 million people and more than 60 million livestock. In May 2017, the tripartite national action plan to combat antimicrobial resistance was approved by the Mongolian Government. With this report, we aim to share our experience and discuss about the lessons and challenges in combating AMR. Desktop and literature reviews of relevant documents were completed with key-informants providing some insightful information regarding the implementation details. A multi-disciplinary team of experts analysed the results using the methods proposed by the WHO.

The tripartite national strategy to combat AMR in Mongolia covers a total 69 activities encompassed under 6 objectives. A detailed analysis of implementation indicates approximately 60% of planned activities (n=40) were assessed as completed, whereas one-third were evaluated as half completed. More than 10% of planned activities are yet to be implemented, major reasons being related with financial and other challenges, including worldwide epidemic situation. Recent reports from imported statistics in the human sector suggest that the use of antibiotics is decreasing, being estimated at 50.7 DID 2018, and 38.7 DID in 2019. However, patient-level data suggest that the consumption remains to be high. Evidence around AMR are scarce, available data indicates that the rates of multi-drug resistant organisms have doubled recently. Overall, the implementation of the AMR strategy was mostly achieved (87.9%). The use of antimicrobials is still high in Mongolia, suggesting their overuse, however, since the Governments action towards strengthening the pharmacy practice, promoting appropriate use of antibiotics as well as antimicrobial stewardship programs, the consumption has decreased. More evidence is required to provide more specific details to scale up the implementation of national surveillance of antimicrobial consumption in Mongolia.

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ORAL PRESENTATIONS

Oral Presentation 1

sRNA23, a novel small RNA, enhances the pathogenesis of *Streptococcus suis* serotype 2

Quanming Xu, Yongyi Zhang, Wen Sun, Dewen Zhu, Hong Chen, Kul Raj Rai, Ji-Long Chen and Ye Chen

Key Laboratory of Fujian-Taiwan Animal Pathogen Biology, College of Animal Sciences (College of Bee Science), Fujian Agriculture and Forestry University, Fuzhou, China

Streptococcus suis serotype 2 (*S. suis* 2) is an important ubiquitous zoonotic pathogen. To date, regulatory factors and their implication in *S. suis* pathogenesis are not fully understood. Small non-coding RNAs (sRNAs) have been proven to function as important regulatory factors in bacterial pathogenesis and stress adaptation. Here, we identified a differentially downregulated *S. suis* 05ZYH33 sRNA after iron starvation by RNA-seq, which we named sRNA23. The presence of sRNA23 was further confirmed by RACE and Northern blot. Expression of sRNA23 was significantly altered under different environmental stresses such as nutritional starvation, osmotic pressure, oxidative stress, and lysozymal exposure. A sRNA23-deleted mutant exhibited relatively shorter streptococcal chains and weakened biofilm-forming ability. The mutation also resulted in decreased adherence of the *S. suis* 05ZYH33 to human laryngeal epidermoid carcinoma (HEp-2) cells, increased sensitivity to phagocytosis by RAW264.7 macrophages, and significantly reduced hemolytic activity. Furthermore, we observed that a sRNA23-deleted mutant had a low survival rate in pig whole blood and attenuated virulence in a mouse model. Moreover, based on RNA pull-down and electrophoretic mobility shift assay, we found that sRNA23 can directly bind to two proteins involved in adhesion and biofilm formation, namely, moonlighting protein FBA (fructose diphosphate aldolase) and *rplB* (50S ribosomal protein L2), respectively. Collectively, sRNA23 enhances *S. suis* 2 pathogenicity and the binding between sRNA23 and FBA/rplB might play an essential role in the adherence and biofilm-forming ability of *S. suis* 2.

Oral Presentation 2

Genomic islands identified in highly resistant Serratia sp. HRI: a pathway to discover new disinfectant resistance mechanisms

Samantha J Mc Carlie, Charlotte Boucher-van Jaarsveld, Robert R. Bragg

Department of Microbiology and Biochemistry, University of the Free State, Bloemfontein, South Africa

The COVID-19 pandemic has highlighted our reliance on disinfectants and hand sanitisers to prevent disease outbreaks and infection. In the fight against antimicrobial resistance very little is known about an emerging problem, microbial resistance to disinfectants. Molecular insights into the mechanisms of disinfectant resistance are severely limited, and the role of various mobile genetic elements is largely unknown. Genomic islands are a well characterised mechanism of antibiotic resistance, but it is unknown whether they play a role in disinfectant resistance. *Serratia* sp. HRI is an isolate with high disinfectant resistance capabilities. It, therefore, provides a unique opportunity to add to the knowledge of disinfectant resistance and uncover previously undescribed resistance mechanisms. Through whole-genome sequencing and bioinformatic analysis by IslandViewer4 and RAST, a total of 11 resistance islands were identified within the genome of Serratia sp. HRI. Resistance genes active against several antimicrobials were annotated in these islands, most of which are multidrug efflux pumps belonging to the MFS, ABC and DMT efflux families. Antibiotic resistance islands containing genes encoding for multidrug resistance proteins *ErmB* (macrolide and erythromycin resistance) and biclomycin were also found. A metal fitness island harbouring 13 resistance and response genes to copper, silver, lead, cadmium, zinc, and mercury was identified. In the search for disinfectant resistance islands, two genomic islands harbouring *smr* genes, notorious for conferring disinfectant resistance, were found. These resistance islands add to existing literature ad represent a novel mechanism of disinfectant resistance. Interestingly a few resistance islands were primarily composed of hypothetical proteins. These hypothetical proteins have been co-selected and maintained within these resistance islands and may play a role and confer some advantage. In a field like disinfectant resistance, where knowledge of mechanisms is minimal, the vast number of hypothetical proteins within these resistance islands are attractive targets in searching for novel mechanisms of disinfectant resistance.

Oral Presentation 3

Jackfruit starch blends with polyvinylpyrrolidone: Preparation, structural characterization and biodegradable properties

Shanta Pokhrel Bhattarai, Shova Kumari Limbu

Department of Chemistry, Tri-Chandra Multiple Campus, Tribhuvan University, Kathmandu, Nepal

Starch was extracted from the seeds of ripen jackfruit (*Artocarpus heterophyllus*) cultivated in Nepal by treating with distilled water and alkali solution. The properties of extracted starch were evaluated by measuring ash content, moisture content and amylose content. A series of starch-based biodegradable blends, with PVP were prepared through solution casting method and their biodegradable properties were studied. The blend was characterized by thickness measurement, water solubility test, Fourier Transform infrared spectroscopy (FTIR), optical microscopy and biodegradability test. The thickness measurement showed the linear increase in thickness of the blend with the addition of starch. The water solubility test revealed the higher solubility of PVP in water than that of the starch. FTIR spectra of PVP/TPS blends exhibited the existence of relevant functional groups of both starch and PVP, the peaks shifting and the change in nature of the peaks after degradation. Optical microscopy revealed the non-uniform dispersion of starch particle in the PVP matrix and the appearance of holes and fractures in composite subjected to compost soil for degradation. The biodegradability study proved that the loading of starch to PVP accelerates the degradation process.

3rd International Conference on Infectious Diseases and Nanomedicine – 2021 (ICIDN – 2021)
December 15-18, 2021; Kathmandu, Nepal (Online)

Oral Presentation 4

Eudragit coated polymeric chitosan nanoparticles for oral delivery of paclitaxel in breast cancer

Muhammad Khurram Waqas, Farah Rasheed
Institute of Pharmaceutical sciences, University of veterinary and animal Sciences, Lahore, Pakistan

Breast cancer is a malignant cancer that is the second leading cause of mortality in women throughout the world. Breast cancer is becoming more common and deadly across the world. Many chemotherapeutic drugs are employed in the early stages of the disease to treat it, but their non-specific delivery limits their usage. By incorporating them into nanoparticle compositions, their efficacy can be increased. Paclitaxel is a highly effective anticancer drug. It is an anti-microtubule substance. Paclitaxel-loaded polymeric chitosan nanoparticles were successfully prepared using ionic gelation method and coated with pH responsive ES100 by solvent evaporation method. Paclitaxel was used in complex form with Î²- cyclodextrin to increase its water solubility and to be easily incorporated into nanoparticles. Different formulations were prepared using ES-100 coating and without ES-100 coating and in-vitro characterization parameters were determined which showed that formulations coated with ES-100 showed pH responsive release at pH 7.4 or above and restricted the release of drug at gastric pH which increased its oral bioavailability and ultimately drug frequency was reduced and efficacy was increased. Contents of drug in formulations and compatible behavior between the active therapeutic ingredient and polymers was confirmed by interpreting spectrums generated by FTIR. Zeta size of optimized uncoated nanoparticle formulation (F3) was found to be 281.8 Â± 98.53 nm, PDI was 0.485 while zeta potential was 38.9 Â± 4.95 mV. Likewise, zeta size of optimized coated nanoparticle formulation (F7) was found to be 425.01 Â± 99.34 nm, PDI was 0.310 and zeta potential was -24.7 Â± 3.67 mV. Increase in size of nanoparticles was due to coating with ES-100 and negative sign of zeta potential was due to anionic nature of coating polymer i.e ES-100. The % EE of optimized formulation was found to be 74 Â± 0.52 which was mainly due to PTX/SBE-Î²-CD inclusion complex. Drug release studies which were conducted in-vitro for 24 hours which revealed that drug was released in a controlled manner at a specific pH by preventing its release at gastric pH. At 1.2 and 6.8 pH, no or negligible amount of drug was released and at pH 7.4, % drug release from optimized coated nanoparticle formulation (F7) was found to be 56.14 %. Model dependent release kinetic studies were carried out using different types of models whose data was interpreted using DD solverÂ®. These models determined the mechanism and release pattern of active therapeutic ingredient from nanoparticle formulations. Zero order kinetic release was being followed by optimized nanoparticle formulation (F7) which justified that drug was released in a controlled way from nanoparticle formulations. This formulation also followed Korsmeyer & Peppas kinetic modeling as â€˜nâ€™ value was found to be 1.35 which is greater than one and indicated super case 2 non-fickian mechanism of release of drug.

Hence, present study showed that Eudragit coated polymeric chitosan nanoparticles loaded with anticancer drug paclitaxel were successfully prepared which release the drug in a controlled manner to ensure maximum oral bioavailability of drug for the treatment of breast cancer

3rd International Conference on Infectious Diseases and Nanomedicine – 2021 (ICIDN – 2021)
December 15-18, 2021; Kathmandu, Nepal (Online)

Oral Presentation 5

Polymer particles as contrast agents for photoacoustic tomography

Michal Babič[1], Monika Paúrová[1], Ivana Šeděnková[1], Jiřina Hromádková[1], Petr Matouš[2]

[1]Institute of Macromolecular Chemistry, Czech Academy of Sciences, Prague 6, Czech Republic
[2]Charles University, First Faculty of Medicine, Center for Advanced Preclinical Imaging, Prague, Czech Republic. Corresponding author: babic@imc.cas.cz

Photoacoustic (PA) imaging, a novel in vivo molecular imaging method based on a photoacoustic effect, detects an acoustic signal induced by light. This unique method enables to obtain simultaneously ultrasound anatomical information with high resolution along with a functional photoacoustic signal, which is created by transformation of a laser pulse to mechanical wave by some light absorbing chromophore. PA imaging shows great potential for various clinical procedures from diagnosis to therapy guidance, which arises from its ability to gather functional and molecular information in real-time regime with a high spatial resolution at clinically relevant depths together with the absence of ionizing beaming. The optical absorption can be mediated by two kinds of substances according to their origin: endo- and exogenous. due to a natural presence of endogenous chromophores, e.g. haemoglobin, melanin and lipids, PA is very valuable technique for imaging of blood vessels, traumatic injuries, perfusion, oxygen saturation quantification, and lipid detection in vessels. However, the application of exogenous contrast agents can greatly improve the imaging contrast and opens thus an opportunity to obtain diagnostic images originating on cellular and molecular level. To maximize the contrast effect of the exogenous agents, it is necessary to suppress the tissue contribution to the PA signal. The optical absorption of endogenous soft structures shows the minimum in the near-infrared (NIR) region from ~700 to 1100 nm, often called as an “optical window”. To take advantage offered by PA, a selection of suitable contrast agents is crucial. Therefore, the development of safe and efficient exogenous contrast agents represents a challenge for material science with an interesting application in biology and medicine.

Recently there were developed new heterogenous syntheses of polypyrrole (PPY) particles with PA contrast properties in NIR, which allow good control of size (10 nm step within the range 80-300 nm). Besides widely used linear water-soluble polymer stabilizers of the dispersion polymerizations, classical emulsifiers were also successfully employed in their synthesis, what broadens possibilities to employ less hydrophilic comonomers in the aqueous polymerization systems (aqueous conditions are unavoidable since the reaction needs to be mediated with inorganic oxidants insoluble in organic solvents). It was also found that biocompatible water-soluble polymers can serve as excellent stabilizers (especially those with MW > 1□106) that can also control particle size and morphology.

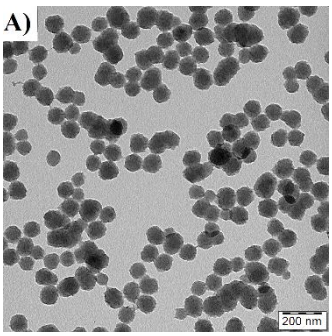

Figure: Transmission electron micrograph of polypyrrole particles prepared for photoacoustic imaging

3rd International Conference on Infectious Diseases and Nanomedicine – 2021 (ICIDN – 2021)
December 15-18, 2021; Kathmandu, Nepal (Online)

Oral Presentation 6

First-trimester cervix length measurement and vaginal microbiome analysis: a combination to improve preterm birth outcomes

Alishum Ali[1,2,3], Jeffrey A. Keelan[2], Michael Bunce[1], Morten Allentoft[1], Claus T. Christophersen[1,4]

[1]*Western Australia Human Microbiome Collaboration Centre (WAHMCC), Trace and Environmental DNA (TrEnD) Laboratory, School of Molecular Life Sciences, Curtin University, Perth, Western Australia, Australia*
[2]*School of Biomedical Sciences and Division of Obstetrics & Gynecology, The University of Western Australia, Perth, Western Australia, Australia*
[3]*Fiona Stanley Hospital, Perth, Western Australia, Australia*
[4]*School of Medical and Health Sciences, Edith Cowan University, Perth, Western Australia, Australia*

Preterm birth (PTB) is a multifaceted condition that impacts 15 million pregnancies annually. PTB remains the biggest killer of children under five years of age, and infants who survive are at higher risk of developing severe morbidities. A history of PTB and a 2nd-trimester short cervix (<25mm) are the most significant risk factors for early delivery. Unfortunately, there are currently no accurate tests for high-risk pregnancies to identify the risk of PTB other than the above two criteria. Similarly, no tests can stratify women to the best treatment available. However, recent research has shown that specific vaginal community compositions during the 1st trimester can increase PTB risk.

We conduct a retrospective longitudinal vaginal microbiome analysis on swabs from 157 Western Australian women at high risk of PTB in this work. We examined the microbiota composition before and after common preventative interventions, namely vaginal progesterone pessary, cerclage surgery and no treatment controls. Additionally, we highlight pre-intervention 1st-trimester ultra-sound cervix measurements as an essential indicator of response to preventative strategies.

Preterm birth was higher in the cerclage surgery group (48%), progesterone (28%), Both (13%), no intervention (18%). The surgical intervention increased vaginal microbiome alpha diversity while progesterone reduced it consistently. Higher diversity continued throughout gestation with women who received surgery only (n=29) but not with women who also received progesterone (n=15). Interestingly, higher diversity values, depleted Lactobacillus spp., and earlier births were seen in women who received surgery and had a >35mm 1st-trimester cervical lengths measurement, $P<0.03$ and $P<0.01$, respectively.

A subset of PTB high-risk women with “long” (>35mm) cervical lengths may not benefit from history indicated cerclage alone. Our new 1st-trimester cervix length categorisation coupled with targeted vaginal microbiome analysis early in pregnancy may help stratify PTB treatment and improve outcomes.

Oral Presentation 7

Common pitfalls in microbiome research and how to avoid them

Mehrbod Estaki

International Microbiome Centre (IMC), Wild Microbiome & Immunology Centre (WiMIC)
University of Calgary, Calgary, Alberta, Canada

With advances in high-throughput sequencing technologies, surveying microbial communities across the world is becoming more accessible and affordable, allowing researchers from a variety of fields to incorporate microbiome data into their experiments. This has transformed microbiome research into one of the fastest growing fields in biological sciences today, with exciting new discoveries everyday linking the microbiome to health and disease. Today, human microbiome research lies at the nexus of several branches of science including genomics, ecology, computer science, and human physiology. While borrowing heavily from these fields has propelled microbiome research into exciting new frontiers, it has inevitably inherited some of their flaws and limitations. In this brief talk, I'll go over the common pitfalls in microbiome research and highlight ways to avoid them. These range from experimental design, bioinformatics, and statistical analysis to replicability and reproducibility, and how to avoid overselling the microbiome.

Oral Presentation 8

Green synthesis of silver nanoparticles from *Themeda quadrivalvis*, conjugation of macrolide antibiotics against respiratory pathogens

P. Ruban, Saraswathi A. and Syed Ali M.

Department of Biotechnology, Shri Nehru Maha Vidyalaya College of Arts and Science, Coimbatore-641050, Tamilnadu, India

The present study characterized the chemical compounds of *Themeda quadrivalvis* using GCMS, synthesis of green silver nanoparticles and conjugated with macrolide antibiotics. The anti-microbial pattern analyzed with different extracts of plant compounds, AgNPs and macrolide conjugated AgNPs against respiratory pathogens. GCMS analysis has shown the presence of different chemical compounds in the chloroform extract of *Themeda quadrivalvis*. A total 51 compounds were identified, and also maximum zone of inhibition was found in chloroform extract and against *Klebsiella* sp. (18Â±4.7 mm). Green synthesis AgNPs conjugated with Macrolite antibiotics Viz., Azithromycin Erythromycin and Clarithromycin showed broad bactericidal effects against test bacteria, similarly green synthesis AgNPs also showed their antibacterial efficacy against all the respiratory pathogens. In SEM analysis, particles consisting of several smaller objects were identified of 20nm. The previous study on phytochemical and green synthesis of silver nanoparticle analysis Themeda quadrivalvis is not yet reported. Both extracts (a plant extract and green nanoparticle combined macrolide antibiotics) had broad-spectrum activity against respiratory pathogens; this baseline study gives the novel ideas to make drugs against respiratory pathogens.

Oral Presentation 9

Hepatocurative evaluation of copper nanoparticles biosynthesized using aqueous leaf extract of Moringa oleifera against carbon tetrachloride induced hepatotoxicity in mice

A. Nazir[1], M. A. Rasheed[1], M.O. Omer[1], Y. Zahoor[2]

[1]Department of Pharmacology and Toxicology, [2]Institute of Biochemistry and Biotechnology
University of Veterinary and Animal Sciences Lahore, 54000, Punjab, Pakistan
Correspondence: dr_aadil@uvas.edu.pk

Liver ailments are a major health concern having highest mortality and morbidity rates due to lack of effective preventive and curative options. The present study was designed to evaluate hepatocurative effects of copper nanoparticles against carbon tetra chloride induced hepatotoxicity in mice. Copper nanoparticles were prepared by green synthesis method using aqueous leaf extract of Moringa oleifera Lam. UV-spectroscopy, FTIR spectroscopy and (SEM) scanning electron microscope were used for characterization of nanoparticles. Hepatoprotective effects were evaluated on mice by oral treatment on forty-two mice divided in seven groups. Group 1 was given normal saline. Group 2 was intoxicated intraperitonially with carbon tetrachloride + olive oil in 1:2 (0.5 ml/kg BW) for initial two days after that they were given normal saline for ten days. Groups 3, 4 and 5 were given copper nanoparticles dose (6.2,12.5 and 25 mg/kg BW) respectively. Group 6 was given 5% aqueous leaf extract 0.1ml/kg and group 7 was given Silymarin at dose of 200mg/kg. The treatment was started orally from 3 rd day of induction of hepatotoxicity orally to 10th day. Then mice were sacrificed for blood samples and liver tissues collection. Serum biochemical indices were determined and histopathology of livers tissue was performed. The dose 6.2mg/kg BW) of copper nanoparticles was effective in revival of all biological parameters (ALT, AST, ALP and total bilirubin) to near normal in all intoxicated groups and showing highly significant result $P \leq 0.001$ depicting curing effect of nanoparticles on hepatic injury. Histopathological evaluation indicated that maximum damage was recovered to near normal in group treated with 6.2 mg/kg BW dose of nanoparticles. It may be concluded from this study that copper nanoparticles could be used as an alternative for the treatment of hepatotoxicity.

3rd International Conference on Infectious Diseases and Nanomedicine – 2021
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Oral Presentation 10

Bhasmas as nanomedicines in Ayurveda: Physiochemical, structural, morphological, antibacterial and cytotoxic properties

Jyoti Giri[1,2], Purshottam Mandal[1], Gopinand Shah[3], Rajesh Paudel[3], Rameshwar Adhikari[2,3,4], Motee Lal Sharma[3], Girija Mani Aryal[3,4]

[1]Tri-Chandra Multiple Campus (TC), Tribhuvan University, Ghantaghar, Kathmandu, Nepal
[2]Nepal Polymer Institute (NPI), Kathmndu, Nepal
[3]Central Department of Chemistry (CDC), Tribhuvan University, Kirtipur, Nepal
[4]Research Center for Applied Science and Technology (RECAST), Tribhuvan University, Kirtipur, Nepal. Corresponding author: girijys@yahoo.com

Bhasmas are considered as ayurvedic nanomedicines practiced from ancient days. They are mainly organo-metallic compounds made up of different minerals such as Calcium, iron, Copper, gold, silver and Zinc etc. The refined form has significant therapeutic effect in living organisms. In this work Tamra (TB), Yashad (YB), and Lauha Bhasma (LB) are synthesized in laboratory following ancient technology mentioned in textbook '*Rasa Tarangini'* using modern tools. The various steps of synthesis included purification, heating and roasting, levigation and incineration. These *Bhasmas* are reported as good remedy for diseases such as heart, eye, anemia, jaundice, diabetes and skin diseases.

These synthesized *Bhasmas* were characterized by ancient techniques such as organoleptic character, physiochemical analysis and classical tests as well as by modern analytical technique viz. X-ray diffraction (XRD), Fourier Transform Infrared Spectroscopy (FTIR) and Energy Dispersive X-ray (EDX) and Scanning Electron Microscopy (SEM). The results obtained by modern analytical technique XRD shows CuS as major crystalline phase present in TB, ZnO in YB and ferric oxide (Fe2O3) in LB. These synthesized Bhasmas are proven to be more antimicrobial in comparison to commercial Bhasma and show effective against all the bacterial strain studied including major foodborne pathogens like *Escherichia coli*, *Staphylococcus aureus, Bacillus subtilis, Klebsiella pneumoniae* etc.

Oral Presentation 11

EDGE COVID-19: A web platform to generate submission-ready genomes from SARS-CoV-2 sequencing efforts

Chien-Chi Lo, Migun Shakya, Karen Davenport, Mark Flynn, Adán Myers y Gutiérrez, Bin Hu, Po-E Li, Elais Player Jackson, Yan Xu, Patrick S. G. Chain

Los Alamos National Laboratory, Carlsbad, New Mexico, USA

Genomics has become an essential technology for surveilling emerging infectious disease outbreaks. A wide range of strategies and techniques for pathogen genome enrichment and sequencing are being used by laboratories worldwide, together with different, and sometimes ad hoc, analytical procedures for generating genome sequences. A standardized analytical process for consensus genome sequence determination, particularly for outbreaks such as the ongoing COVID-19 pandemic, is critical to provide a solid genomic basis for epidemiological analyses and well-informed decision making. We have developed a bioinformatic workflow to standardize the analysis of SARS-CoV-2 sequencing data generated with either the Illumina or Oxford Nanopore platforms. Using an intuitive web-based interface, this workflow automates SARS-CoV-2 reference-based genome assembly, variant calling, lineage determination, and provides the ability to submit the consensus sequence and necessary metadata to GenBank, GISAID, and INSDC raw data repositories.

Availability: https://edge-covid19.edgebioinformatics.org, and https://github.com/LANL-Bioinformatics/EDGE/tree/SARS-CoV2

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Oral Presentation 12

SARS-CoV-2, The spike protein and the rise of variants

Bernadette Belter, Charlotte E. Boucher, Robert R. Bragg

Department of Microbiology and Biochemistry, Faculty of Natural and Agricultural Sciences, University of the Free State, Bloemfontein, South Africa

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is the third beta-coronavirus to cause global health concerns and has resulted in the Covid-19 pandemic. Since the pandemic, the virus has undergone mutations, both synonymous and nonsynonymous; many may have gone largely unnoticed as it lacked a significant impact on virulence, transmissibility, severity and effectiveness therapeutics, giving rise to variants of concern. Many new variants have been termed variants of concern/interest (VOC/I) because of the greater risk they pose due to possible enhanced transmissibility or severity, immune escape, diagnostic or treatment failure, and reduced vaccine efficacy.

Mutations on the spike protein, in particular, may affect both affinity for the SARS-CoV-2 cell receptor ACE2 and antibody binding. These VOC/Is often share similar mutation sets and of significance are those in the spike gene used for viral infection and immune response. Three main VOCs share the N501Y mutation: Alpha (B.1.1.7), first identified in the United Kingdom, Gamma (P.1), originating from Brazil, and Beta (B.1.351), first described in South Africa. This mutation likely increases transmissibility by increasing affinity for the ACE2 receptor. The Beta and Gamma variants also display the E484K mutation, which decreases binding of neutralizing antibodies, leading to partial immune escape, allowing for and favouring reinfections, and reducing the in vitro efficacy of some antibody therapies or vaccines. Those mutations may also have phenotypical consequences of increased disease severity.

Furthermore, the accumulation of mutations poses a diagnostic risk, as seen for some assays targeting the spike gene. With ongoing surveillance, many new VOC/Is have been identified. Of more recent concerns are the Delta (B.1.617.2) variant, first documented in India and the Mu (B.1.621) variant. The emergence of the E484K mutation independently in different parts of the globe may reflect the adaptation of SARS-CoV-2 to humans against a background of increasing immunity.

These VOC/Is are increasing globally and pose challenges to any herd immunity approach to managing the pandemic. While vaccination is ongoing, vaccine updates may be prudent. The virus continues to adapt to transmission in humans, and further divergence from the initial Wuhan sequences is expected.

Oral Presentation 13

Wastewater based epidemiology: A tool for surveillance of infectious diseases

Dev Raj Joshi

Central Department of Microbiology, Tribhuvan University, Kathmandu, Nepal

Infectious diseases are major cause of morbidity and mortality in developing countries. Detection of various pathogens in wastewater systems not only provide information on transmission dynamics but also a powerful indicator of disease burden in the community. Wastewater-based epidemiology (WBE) is a valuable population level approach for monitoring pathogens and has been consolidated as a tool to provide real-time information on circulating pathogens. WBE has gained global attention during on-going pandemic of COVID-19, as the concentration of SARS-CoV-2 in wastewater was found proportional to the number of COVID-19 patients in the catchments. In this presentation, the detection of SARS-CoV-2 genome signals in wastewater and the correlation with clinical cases in Kathmandu Valley has been discussed. Despite multiple challenges in implementing WBE in Nepal, the wastewater surveillance of pathogens would be useful in developing early warnings of outbreaks of infectious diseases and suggest public health interventions to minimize the burden.

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Oral Presentation 14

From molecules to dengue clinical management- filling gap through research and collaboration

Shyam P. Dumre[1,2]

[1]*Central Department of Microbiology, Tribhuvan University, Kathmandu, Nepal*
[2]*Department of Immunogenetics, Institute of Tropical Medicine (NEKKEN), Nagasaki University, Nagasaki, Japan*

Global issues including emerging and re-emerging infectious diseases like dengue affect more than a single country or region, and developing countries are worst hit. These issues cannot be resolved without international collaboration to meet the local and global needs. Dengue is among the important infectious diseases of global concern, and the world is facing larger and larger outbreaks very year. Despite considerable achievement in dengue management, there is huge number of unnecessary hospitalizations of dengue cases worldwide due to the lack of definitive predictor(s) of severe dengue (SD). Therefore, identification and implication of SD predictors have crucial impacts in dengue management, and it largely benefits the developing countries. The primary objective was to develop a SD prediction model while the secondary objective was to strengthen research capacity of developing country to address the global health issues. Employing the developed and developing country collaborative approach, a prospective cohort study was initiated in Vietnam involving hospitals, ministry of health and research institute. With the use of cutting-edge science in Japan, several promising candidate markers of SD have been discovered and verified in Japan. These SD predictors (TGFBIp, cfDNA, IgE, etc.) are currently under clinical validation in larger cohorts, while additional biomarkers are under verification. Furthermore, a clinic friendly simple multiplex kit is also being developed to quantify these markers at a time in dengue patients. Additionally, this approach has resulted into sustainable capacity strengthening in developing country through infrastructures (laboratory set-up), academic training (developing PhD graduates) and technology transfer. Taken together, this approach remained very productive in terms of specific research outcomes (product development) to address the global issues in dengue as well as research capacity strengthening in a developing country - filling two needs with one deed.

Oral Presentation 15

Plasmid mediated antimicrobial resistance

Boudine van der Walt and Robert R. Bragg

Department of Microbiology and Biochemistry, University of the Free State, Bloemfontein, South Africa

The widespread unrestricted use of antibiotics is currently leading the world into a post-antibiotic era, increasing the need for proper biosecurity in the form of disinfectants. Improper application of disinfectants, however, has led to the emergence of resistance to disinfectants; compromising the prevention of diseases that may require the use of potentially ineffective antibiotics. Bacteria adapt to antimicrobial compounds either through genetic mutation or through the acquisition of mobile genetic elements like plasmids. Resistance determinants originating from mutation may be mobilised to plasmids, and therefore circulate through bacterial populations. Mobile genetic elements travel through either intracellular- (inside a cell) or extracellular (from one cell to another) mechanisms, allowing plasmids to spread resistance determinants. Plasmids encode specialised mechanisms that support their maintenance, including restriction/anti-restriction mechanisms, addiction systems and enhanced virulence. Plasmids may also act as suicide vectors, transferring resistance determinants to a host chromosome, without necessarily being maintained itself. Plasmid-encoded resistance mechanisms include inactivation and degradation of the compound, efflux pumps, cell surface alterations and decreased compound uptake. Mobile genetic elements allow the formation of clusters of resistance genes- facilitating co-resistance and cross resistance between antibiotics and disinfectants, allowing acquisition of resistance to both compounds simultaneously. The ongoing SARS-CoV-2 pandemic further highlights the need for proper biosecurity as disinfectants are prevalently used and may positively select for resistant bacteria when applied improperly.

Oral Presentation 16

Efficacy testing of antimicrobial and sporicidal curtains

Clarissa van Heerden, Samantha Mc Carlie, Gunther Johann Staats and Robert R. Bragg

Department of Microbial, Biochemical and Food Biotechnology, University of the Free State, Bloemfontein, South Africa

The misuse of antimicrobials has led to the selection of resistant pathogens, especially in hospital-settings. As treatment options for these resistant pathogens are becoming limited, focus can be shifted to methods that prevent the spread and establishment of pathogens. Current biosecurity measures implemented in hospitals are crucial. However, several studies have shown that these measures are prone to human error, and therefore, novel methods in disease control must be considered. One such method is privacy curtains possessing antimicrobial and sporicidal properties. This study aimed to evaluate the efficacy of these curtains against a variety of bacterial and yeast strains. In order to obtain quantifiable results bacterial and yeast counts were done. The conventional spread plate method was compared to a drop plate method that would ultimately require the use of less resources. Statistically there was no significant difference between the two methods, and therefore the drop plate method was adjusted for evaluating the efficacy of the curtain and ultimately used to determine percentage inactivation. This analysis showed that the curtain had exceptional antimicrobial activity against *Escherichia coli*, *Staphylococcus aureus*, *Serratia marcescens*, *Mycolicibacterium smegmatis*, and *Candida* species. A highly disinfectant resistant isolate, *Serratia sp*. HRI, was also included in the study, however the curtain was unable to eradicate this organism. This emphasizes the problem we are facing because of antimicrobial resistance. Privacy curtains possessing antimicrobial properties can be implemented as a novel method in disease control within hospital-settings.

POSTER PRESENTATIONS

Poster Presentation 1

Efflux pump mediated disinfectant resistance in bacteria

Gunther Johann Staats, Charlotte E. Boucher-Van Jaarsveld and Robert R. Bragg
Department of Microbiology and Biochemistry, University of the Free State, Bloemfontein, South Africa

The increased prevalence of multidrug and antibiotic resistant bacteria may lead to a post-antibiotic era. Currently, one of the best alternatives to combat multidrug resistant populations is disinfectant usage and biosecurity. The increased usage of disinfectants, antiseptics and hand-sanitisers during the COVID-19 pandemic will likely increase the prevalence of disinfectant resistant strains. Efflux pumps have been described as the most common mechanism of resistance, both for antibiotics and disinfectants alike. This work focuses on determining the role that efflux pumps play in a resistant Serratia sp. HRI isolate compared to the susceptible Serratia marcescens subsp. marcescens ATCC 13880 type strain. The efflux transporter profiles of the two strains were generated by analysis of whole genome sequences using the TransAAP tool. A total of 37 and 33 multidrug resistant transporters were identified in the susceptible and resistant strains, respectively. There were only 2 disinfectant specific efflux pumps identified per isolate, showing that cumulatively the susceptible strain has more efflux pumps than the resistant strain. This suggests that the efflux pumps in the resistant isolate are overexpressed or have greater substrate specificity. Minimum inhibitory concentration (MIC) analyses were conducted with didecyldimethylammonium chloride (DDAC) on both strains in the presence and absence of efflux pump inhibitors (EPIs) to determine extent of efflux pump activity. The MIC results showed that a 20 -30 fold difference exists between the two strains. The addition of EPIs resulted in between 20 - 250 fold reductions in MIC values. Indicating that efflux pumps actively function in conferring resistance to DDAC in the strains. In a field where very little is known, this work adds to the knowledge of antimicrobial resistance and is essential to safeguard current disinfectants, antiseptics and sanitisers.

Poster Presentation 2

Comparative analysis of antibacterial activity of green synthesized Zirconia nanoparticles with Cefotaxime

Nelson Rai[1], Sambridhi Shah[1], Rajendra Joshi[1], Rajesh Pandit[1,2]*
*[1]Department of Chemistry, Tri-Chandra Multiple Campus, Tribhuvan University, Kathmandu, Nepal [2]Nepal Polymer Institute, Kathmandu, Nepal *Correspondence: rajesh.pandit@trc.tu.edu.np*

The boundless possibilities of nanotechnology for the treatment, diagnosis, monitoring and control of biological systems has aspired the entire field of medicine. In this work, the comparative antibacterial study of zirconia (Zirconium dioxide) nanoparticles obtained from green synthesis route using the Citrus Sinensis peels extract was carried out with an antibiotic Cefotaxime (CTX) against gram-negative bacteria, i.e., *Escherichia coli* and *Klebsiella pneumoniae*, and gram-positive bacteria, i.e., *Staphylococcus aureus.* The synthesized NPs were characterized by X-ray diffraction (XRD) and Fourier Transform Infrared (FTIR) spectroscopic technique which confirmed the formation of zirconia in nanometric size with an average particle size of 15.94 nm. The results showed that zirconia NPs were susceptible against both gram-negative bacteria while it remains ineffective towards the gram-positive bacteria. In addition to that, the zirconia NPs acted as an excellent enhancer in increasing the bactericidal properties of CTX against both gram-negative bacteria *E. coli* and *K. pneumoniae*. However, zirconia neither exhibited antibacterial activity nor enhanced the bactericidal effect of Cefotaxime against gram-positive bacteria *S. aureus.*

Poster Presentation 3

A review on prevention and control strategies of Theileriosis

Sabir Hussain[1], Abrar Hussain[2], Umair Aziz[1], Baolin Song[1], Jehan Zeb[1], David George[3], Jun Li[1] , Olivier Sparagano[1]

[1]Department of Infectious Diseases and Public Health, Jockey Club College of Veterinary Medicine and Life Sciences, City University of Hong Kong, Kowloon, Hong Kong SAR, China [2]University of Veterinary and Animal Sciences, Lahore, Pakistan [3]School of Natural and Environmental Sciences, Newcastle University, United Kingdom

Theileriosis, a vector-borne disease of ruminants caused by *Theileria* spp. has huge economic importance worldwide. It is one of the major tick-borne diseases that cause huge economic loss in tropical and sub-tropical regions. Thus, strategies for prevention and control of theileriosis are important to minimize these losses. The present study systemically evaluated the prevention and control strategies for theileriosis. Three databases (i.e., Google Scholar, Web of Science and PubMed) were used to search for published studies available online in English language by using relevant keywords. Our search found a total of 127 articles, of which 73 articles were selected for the study after removing duplicates and articles that were not focused on prevention and control strategies of theileriosis. We found that control strategies for theileriosis varies according to geographical areas, animal production system and livestock density. But the three major control strategies, namely vaccination, upgrading barns by roughcasting and smoothing their wall surfaces, applying acaricides, were found effective almost everywhere. We found gaps in theileriosis research, including a lack of studies regarding eco-friendly control strategies and vector control which demands proper implementation of control strategies for theileriosis in endemic areas to minimize future economic threats.

Poster Presentation 4

Computational characterization of didanosine and it's binding with DNA nucleotide

Bidit Lamsal[1,2], Tika Ram Bhandari[2,3], Rameshwar Adhikari[1,2], Narayan Prasad Adhikari[3]*

[1]Central Department of Chemistry, Tribhuvan University, Kirtipur, Nepal
[2]Research Centre for Applied Science and Technology, Tribhuvan University, Kirtipur, Nepal
[3]Central Department of Physics, Tribhuvan University, Kirtipur, Nepal
**Correspondence: npadhikari@gmail.com*

Didanosine or 2',3'-dideoxyinosine (ddI) is a reverse transcriptase inhibiting antiviral drug administered to patients with HIV infection. ddI works by competing with adenosine nucleotide during DNA synthesis and terminating the DNA chain. The structure of ddI is probed using density functional theory (DFT) with B3LYP/6-31++G(d,p) level of approximation. Vibrational and natural bonding orbital analysis was done. In addition, NMR chemical shifts using GIAO method and UV transitions using time dependent DFT at the same approximation was performed. Simulated NMR shows good agreement with experimental data. Binding energy of phosphorylated dideoxyadenosine, the final active product of ddI with DNA nucleotides is compared with that of phosphorylated deoxyadenosine.

Poster Presentation 5

Preparation and characterization of composite hydrogel films comprising chitosan and cattle horn keratin for enhanced wound healing

Anusha Upadhyay[1], Akshay Sai Chalise[1], Babin Khanal[1], Bishmita Tamang[1], Prashant Bishesh Khanal[1], Swastika Shrestha[1], Rameshwar Adhikari[2,3*], Mishal Pokharel[1]

*[1]College of Biomedical Engineering and Applied Sciences, Hadigaun, Kathmandu, Nepal [2]Research Center for Applied Science and Technology (RECAST), Tribhuvan University, Kirtipur, Nepal [3]Nepal Polymer Institute, Kathmandu, Nepal *Correspondence: nepalpolymer@yahoo.com*

The difference in systemic and local factors, delays wound healing process in humans which lead to adverse effects such as chronic consequences, resulting in ulcers. The proper measures, both internal and external, should be thus undertaken to facilitate and enhance the healing process effectively. Considering the fibroblast recruitment property of keratin and antibacterial property of chitosan, a composite hydrogel film of these two components can be used for wound dressing. In this work, the keratin, biomass was extracted from waste horns of cattle, and chitosan was prepared by deacetylation of commercial chitin in combination with gellan gum to prepare composites, film by physical mixing. The FTIR spectroscopy and SDS-PAGE were performed for keratin extracted. The prepared film was observed for its swelling, permeability, contamination tests, along with MTT assay. The SDS-PAGE of extracted keratin is at the same place as for human keratin. The film is impermeable and has swelling capacity which facilitates in wound healing by retaining moisture and absorption of excess exudates. The film did not show bacterial colony growth on its surface confirming its ability to resist infections. Similarly, the MTT assay showed cell proliferation as well in the prepared composite film.

Poster Presentation 6

Development of decellularized fish skin scaffold doped using biosynthesized silver nanoparticles for accelerated burn wound healing

Astha Paudel[1], Anisha Sharma[1], Baruna Thapa[1], Neha Khanal[1], Nisha Shastri[1], Sourav Rai[1], Rameshwar Adhikari[2,3]*, Surya Prasad Adhikari[1]

*[1]College of Biomedical Engineering and Applied Sciences, Hadigaun, Kathmandu, Nepal [2]Research Center for Applied Science and Technology (RECAST), Tribhuvan University, Kirtipur, Nepal [3]Nepal Polymer Institute, Kathmandu, Nepal *Correspondence: nepalpolymer@yahoo.com*

Burn wound management is a complex study as the situation becomes traumatizing due to pain and infection which even results into the death of patients. This work is inspired by natural biomaterials, decellularized fish skin scaffold doped with biosynthesized silver nanoparticles (Nps) to reduce the frequency of wound dressing and microbial infections. Silver nanoparticles (Ag-Np) were prepared by hydrothermal method using aloe vera plant solution as reducing and stabilizing agent which were doped on the decellularized Tilapia fish skin. The antibacterial activity of the obtained Nps against *P. aeruginosa*, *S. aureus* showed minimum inhibitory concentration (MIC) from 50 µg/mL. The DPPH assay for antioxidant activity of the prepared Nps was found to have IC50 value ranging 362µg/mL which is lesser than the chemically prepared Nps. The cell viability of the prepared scaffold was determined by MTT assay. The % of cell viability was found to be increased with the increase in the concentration of Ag-Np from 50 to 200 µg/mL. From this study, it was concluded that the Tilapia fish skin provided a biocompatible ambiance for cell proliferation and migration while the biosynthesized Ag-Np maintained the antimicrobial and antioxidant atmosphere to promote the burn wound healing.

Poster Presentation 7

Synthesis, characterization and biological study of Lauha Bhasma

Rajesh Paudel[1], Jyoti Giri[2,3]*, Rameshwar Adhikari[1,3,4], Motee Lal Sharma[1]

[1]Central Department of Chemistry, Tribhuvan University, Kirtipur, Nepal [2]Tri-Chandra Multiple Campus, Tribhuvan University, Ghantaghar, Kathmandu, Nepal [3]Nepal Polymer Institute, Kathmandu, Nepal [4]Research Center for Applied Science and Technology, Tribhuvan University, Kirtipur, Nepal

**Correspondence: girijys@yahoo.com*

Bhasma are the ayurveda prepared from metallic and herbal ingredients and are also referred to as herbo-metallic preparations. Lauha Bhasma (LB) is the iron-based herbo-metallic preparations used for treating various ailments caused by iron deficiency. In this work LB was prepared by modern techniques in following different steps (such as samanya sodhana, vishesha sodhana, bhanupaka, sthalipaka and putapaka) and studied for its physicochemical parameters, structure, morphology and antibacterial properties. The LB prepared was characterized by using X-ray diffraction (XRD), Fourier Transform Infrared Spectroscopy (FTIR), and Energy Dispersive X-ray (EDX). Prepared LB was also compared with market samples. The prepared sample has negligible moisture content (0.42 %), 17.3 % total ash value and 7.6 % acid insoluble ash value. The average crystalline size is 57.23 nm in a dimension. EDX graph indicates 75.43 % of Fe as a major element. FTIR spectra suggest the presence of different organic moieties which enhances the therapeutic action due to which LB shows significant antibacterial properties.

Poster Presentation 8

Synthesis, characterization and study biological properties of Yashad Bhasma

Gopinand Lal Karna[1], Jyoti Giri[2,3]*, Rameshwar Adhikari[1,3,4], Motee Lal Sharma[1]

[1]Central Department of Chemistry, Tribhuvan University, Kirtipur, Nepal
[2]Tri-Chandra Multiple Campus, Tribhuvan University, Ghantaghar, Kathmandu, Nepal
[3]Nepal Polymer Institute, Kathmandu, Nepal
[4]Research Center for Applied Science and Technology, Tribhuvan University, Kirtipur, Nepal
**Correspondence: girijys@yahoo.com*

Ayurved deals with bhasma of different minerals such as Calcium, iron, Copper, gold, silver and Zinc etc. Yashad bhasma (YB) is herbo-organometallic product of Zinc (Zn) which is used for treatment of different chronic ailments related to Zn deficiency such as diabetes, eye diseases, skin diseases etc. This study revealed the synthesis of YB by following ayurvedic textbook 'Rasa-Tarangini' and by non-conventional method. The various steps of synthesis include purification, heating and roasting, levigation incineration. The synthesized bhasma was characterized by ancient technique like organoleptic tests, physiochemical analysis, and classical tests as well as by modern analytical techniques viz. X-ray diffraction (XRD), Fourier Transform Infrared Spectroscopy (FTIR) and Energy Dispersive X-ray (EDX). The XRD shows ZnO as major crystalline phase present in YB and FTIR spectra revealed organic groups are attached with Zn in synthesized YB. The YB synthesized is antimicrobial and non-cytotoxic on analysis.

Poster Presentation 9

Characterization of *Streptococcus agalactiae* isolates in pregnant women

Kusum Shrestha[1,2]*, Anil Kumar Sah[3], Neetu Singh[4], Rameshwar Adhikari[2], Pramila Parajuli[1]

[1]*Department of Microbiology, St. Xavier's College, Maitighar, Kathmandu, Nepal*
[2]*Research Center for Applied Science and Technology (RECAST), Tribhuvan University, Kathmandu, Nepal*
[3]*Annapurna Neurological Institute and Allied Sciences, Annapurna Research Center, Maitighar, Kathmandu, Nepal* [4]*Manmohan Memorial Medical College and Teaching Hospital, Kathmandu, Nepal *Correspondence: kusumshrestha41@gmail.com*

Early detection of perinatal rectovaginal carriage of Group B Streptococci (GBS) is important in the prevention of newborn infections. It can also cause infectious disease among immunocompromised individuals. The aim of this study was to investigate the prevalence of GBS molecular capsular serotype and genotype distribution of pregnant women in Kathmandu city and to determine the susceptibility pattern of the GBS isolates against different antimicrobial agents. A hospital based cross-sectional study was conducted and the prevalence of GBS was determined by culture method in HiCrome Strep B Selective Agar Base and then by PCR, the serotypes were evaluated by multiplex PCR analysis; bacterial susceptibility to antibiotics was determined by the disk diffusion method. Among 125 samples studied, 24 isolates were found positive. Further using the multiplex PCR, 13 samples were found to contain typeable and 11 non-typeable GBS. The most prevalent Serotype was found to be III followed by serotype II, Ia and Ib. Serotypes IV, V, VI, VII, and VIII were not found. All the isolates were found to be sensitive to Linezolid and Ceftriaxone while resistant to Tetracycline and Ertapenem. There was significant association found between GBS and gestational period whereas no association was determined for other risk factors such as age, weight, and education of the patients.

Poster Presentation 10

Repurposing of drugs against mutated strain of Eurasian Avian like H1N1 Influenza virus, G4 virus

Sangita Ghimire[1], Sandhya Sahukhal[1], Ayush Shrestha[1], Sarmila Adhikari[1], Pramod Aryal[2]
[1]Department of Biotechnology, SANN International College, Purbanchal University, Kathmandu, Nepal
[2]Central Department of Biotechnology, Tribhuvan University, Kirtipur, Nepal

There is a stringent need of efficient solution for various viral epidemic and pandemic outbreaks that could most probably occur due to the emergence of highly mutated, pathogenic subtypes of viruses. It has been revealed that the genotype 4 of Eurasian avian like H1N1 influenza virus (EA H1N1 G4 influenza strain) has been circulating in the swine population as a dominant genotype exhibiting even swine to human transmission, thus, surging the chances of causing next potential human pandemic in the future. The Computer Aided Drug Discovery (CADD) has been employed as a tool to develop new drugs /repurpose the existing ones against such potential outbreaks. In this research, the in-silico computational methods had been used for the prediction of lead compounds against the selected target protein of EA H1N1 variant. The Haemagglutinin (HA) had been identified as a target protein and molecular docking was performed against the FDA ligand library for repurposing purposes. Moreover, the probable mutation in the target protein HA that could occur in the future was predicted using quantum approach and efficacy of the top drugs identified against HA were analyzed in the mutated variant of HA protein. A total of 3 compounds Enalapril, Enalaprilat and Ivabradine had been identified as a potential inhibitor of HA. It has also been analyzed that all these three top drugs identified for the HA protein were effective for the mutated HA variant as well if those predicted mutations occur in the future. Thus, the drugs Enalapril, Enalaprilat and Ivabradine could be used as HA inhibitors to restrict the viral entry into the host and could be explored further for human trials and symptom management.

Poster Presentation 11

Removal of Arsenic (III) from aqueous solution by hydroxyapatite/chitosan (HAp/CS) nanocomposites as adsorbents

Sambridhi Shah[1], Rajendra Joshi[1], Rajesh Pandit[1,2]*, Rameshwar Adhikari[2,3]
*[1]Tri-Chandra Multiple Campus, Tribhuvan University, Ghantaghar, Kathmandu, Nepal [2]Nepal Polymer Institute, Kathmandu, Nepal [3]Research Centre for Applied Science and Technology (RECAST), Tribhuvan University, Kirtipur, Kathmandu Nepal *Correspondence: panditrajesh02@gmail.com*

Hydroxyapatite (HAp) is the major inorganic component of hard tissue obtained from bone and chitosan (CS) is a biopolymer which is widely used for the adsorption purpose. In this research work, the HAp and CS were synthesized using chicken bone and pila shells respectively in nanometric range. Later on, the HAp/CS nanocomposites were synthesized in various ratios by co-precipitation method. The synthesized HAp, CS and their nanocomposites were characterized using XRD, and FTIR techniques. Furthermore, the adsorption behavior of nano-HAp and their nanocomposites with CS of various compositions was studied for the removal of As(III) ions from aqueous solution. The batch adsorption technique was employed to investigate the efficiency of adsorbents for the removal of As(III) ions particularly focusing at the investigation of effect on several adsorption parameters (such as pH, initial concentration, and contact time). As(III) ions removal efficiency of the HAp/CS nanocomposites was found to increase with HAp content and maximum at HAp/CS weight ratio of 60/40 that could be attributed to the non-woven type of structure which might have been formed by binding of hydroxyl group of HAp and, amine and hydroxyl group of CS. The adsorption of the As(III) ions onto both HAp and HAp/CS nanocomposites was found to follow Langmuir isotherm with pseudo second-order kinetics.
Keywords: adsorbents, chitosan, hydroxyapatite, nanocomposite

Poster Presentation 12

Nasal colonization of methicillin-resistant Staphylococcus aureus among school children in Kathmandu, Nepal

Narayan Sharma Basyal[1], Jayanti Parajuli[2], Upendra Thapa Shrestha[1], Shyam Prakash Dumre[1]
[1]*Central Department of Microbiology, Tribhuvan University, Kathmandu, Nepal*
[2]*Wuhan University of Technology, Wuhan, China*

Staphylococcus aureus is the common cause of community-acquired and hospital-acquired infections. Methicillin-resistant *S. aureus* (MRSA) has been a major threat to many countries throughout the world including Nepal. Vancomycin has been the antibiotic of choice for MRSA infections. Recently, infections due to isolates with high but susceptible vancomycin minimum inhibitory concentrations (MIC) have been associated with additional treatment failures and patient mortality. The objective of this study was to determine the MIC of vancomycin against MRSA isolated from nasal swab from school children. A total of 164 nasal swabs were collected from school children of a government school in Kathmandu, Nepal. Samples were processed in the laboratory by standard microbiological techniques including biochemical tests. MRSA was screened using cefoxitin disk diffusion method followed by determination of MIC for vancomycin. Among the samples collected, 15.9% (n=26) showed growth of S. aureus alone. Of the positive isolates, 46.2% (n=12) were found to be MRSA. Vancomycin MIC against MRSA revealed that all the MRSA isolates were susceptible to vancomycin with the MIC value ranged from 0.25 to 1.5 µg/ml. Use of antibiotics before six months and recent admission to hospital were identified as risk factors for nasal colonization of S. aureus and MRSA. To conclude, very high colonization rate of MRSA (46%) among school children is a serious concern in Nepal although none of the nasal S. aureus isolates were found to be vancomycin resistant.

Poster Presentation 13

Burden of HIV and syphilis among women attending antenatal care in North-eastern Nigeria

Emmanuel Pembi[1], Stephen John[2], Shyam Prakash Dumre[3] Ahmadu Baba Usman[4], Shusaku Mizukami[5], Nguyen Tien Huy[5], Luis E. Cuevas[5], Kenji Hirayama[5]

[1]Adamawa state Ministry of Health, Nigeria [2]Adamawa State Agency for the Control of HIV/AIDS, Yola, Nigeria [3]Central Department of Microbiology, Tribhuvan University, Kathmandu, Nepal
[4]Department of Pediatrics, Federal Medical Centre, Yola, Adamawa State, Nigeria [5]School of Tropical Medicine and Global Health, Nagasaki University, Sakamoto, Nagasaki, Japan
[6]Department of Clinical Sciences, Liverpool School of Tropical Medicine, UK

Major efforts are being made to prevent mother-to-child-transmission (PMTCT) of HIV and syphilis, as one-third of HIV and half of syphilis untreated mothers transmit the infection to their offspring. We evaluated the State-wide PMTCT service of women attending ante-natal care (ANC) to assess the proportion of women tested for HIV/syphilis, receiving appropriate therapy and the HIV partner concordance from 2012 to 2016 in Adamawa State, Nigeria. A total of 208,682 pregnant women registered for ANC in 317 health facilities. Of these, 14,843 (7.1%) were screened for syphilis and 133 (0.1%) were syphilis positive. All infected women were reported as treated. 1,782 (0.9%) of 208,682 women knew they were HIV-infected on registration and 206,900/208,682 were tested for HIV, identifying a further 2,790 (1.3%) HIV infections. The proportion of HIV-infected mothers decreased over the five-year period. 3,474 (76%) of the 4572 HIV-infected mothers received antiretrovirals (ARVs). Only 1,188 (0.6%) couples consented to be tested together. Of these, 694 (58.4%) couples were uninfected, 296 (24.9%) had one infected partner and in 198 (16.7%) both partners were infected. Few women knew their HIV status at the time of ANC attendance and very few were screened for syphilis. All women accepted to be tested for HIV, but very few accepted to be tested as a couple. One quarter of couples tested were discordant and one quarter of HIV-infected women did not receive ARVs. Interventions are needed to increase syphilis screening, the uptake of ARVs for PMTCT and sensitization of male partners.

Poster Presentation 14

Preparation and characterization of 3D printed biodegradable nanocomposite comprising poly (butylene adipate-co-terephthalate) and hydroxyapatite bioceramics

Arun Acharya[1], Ramesh Puri[2], Komal Prasad Malla[1], Kamal Prasad Sharma [3], Jyoti Giri[4,5], Rameshwar Adhikari[* 1,2,5]

[1]Central Department of Chemistry, Tribhuvan University, Kirtipur, Kathmandu, Nepal
[2]Research Centre for Applied Science and Technology, Tribhuvan University, Kirtipur, Kathmandu, Nepal
[3]Meijo University, Nagoya, Japan [4]Tri-Chandra Multiple Campus, Tribhuvan University, Ghantagar, Kathmandu, Nepal [5]Nepal Polymer Institute, Kathmandu, Nepal
**Correspondence: nepalpolymer@yahoo.com*

The nanocrystalline hydroxyapatite (nano-HAp) bioceramics are used for preparing implants materials in medical fields. In this work, nano-Hap was prepared from biowaste, the bone of buffalo and characterized by different methods such as Fourier Transform Infrared (FTIR), X-ray diffraction (XRD) and Scanning Electron Microscopy (SEM). The XRD result shows the crystal size of HAp ranging from 9.75 to 40.89 nm on increasing the incineration temperature during processing, from 600 °C to 1100 °C. The SEM micrographs indicate the agglomeration with small rod-like crystals, which are in the dimension ranging from 1.75 to 2.72 µm. The nano-HAp prepared was mixed with a biodegradable aromatic aliphatic polymer poly (butylene adipate co terephathalate) (PBAT) in different proportion via solvent casting followed by melt mixing method and finally to 3-D printing to a button shape. The water adsorption, biodegradability and anti-microbial properties of the 3D printed specimens were investigated. It was found to have higher toughness than the pure polymer, due to interaction of carbonyl groups of PBAT with -OH groups of the nano-HAp. Similarly, the water absorption percentage of nanocomposites also increased. The specimens prepared in this work has good potential application in biomedical field, for instance in bone growth support.

ICIDN 2021 - CONFERENCE TIMETABLE (based on Kathmandu time)

DAY I. WEDNESDAY, DECEMBER 15, 2021

8:00 - 8:05 AM		**Arrival of participants (login to Zoom)**
8:05 - 8:10 AM		**Welcome Note** *Rameshwar Adhikari and Santosh Thapa*
8:10 - 8:20 AM		**Opening Address** *Guest of honor Prof. Nanda Bahadur Singh,* *Vice-Chancellor, Mid-Western University, Surkhet, Nepal*
		Plenary Lecture *Moderators: Rameshwar Adhikari and Santosh Thapa*
8:20 - 9:05 AM	PL1	**Next generation antibiotics** ***Nobel Laureate Ada E. Yonath*** *Weizmann Institute of Science, Rehovot, Israel*
9:05 - 9:15 AM		**Health break**
		Keynote Lecture *Moderator: Santosh Thapa*
9:15 - 9:45 AM	KL1	**Haitian variant *Vibrio cholerae*: Pathogenicity and antimicrobial resistance** *Sabu Thomas* *Rajiv Gandhi Centre for Biotechnology, Trivandrum, Kerala, India*
		Symposium: Molecular Microbiology and Epidemiology of Infectious Diseases (I) *Moderators: Santosh Thapa and Kamal Rai*
9:45 - 10:05 AM	IL1	**Burden of fungal infections in Nepal** *Niranjan Nayak* *Manipal College of Medical Sciences, Pokhara, Nepal*
10:05 - 10:20 AM	OP1	**sRNA23, a novel small RNA, enhances the pathogenesis of *Streptococcus suis* serotype 2** *Quanming Xu, Yongyi Zhang, Wen Sun, Dewen Zhu, Hong Chen, Kul Raj Rai, Ji-Long Chen and Ye Chen* *Fujian Agriculture and Forestry University, Fuzhou, China*
10:20 - 10:35 AM	OP2	**Genomic islands identified in highly resistant *Serratia* sp. HRI: a pathway to discover new disinfectant resistance mechanisms** *Samantha J Mc Carlie, Charlotte Boucher-van Jaarsveld and Robert R. Bragg* *University of the Free State, Bloemfontein, South Africa*
10:35 - 10:40 AM		**Closing of the Morning Session/Announcements**
5:00 - 5:10 PM		**Arrival of participants (login to Zoom)**
		Keynote Lecture *Moderator: Rameshwar Adhikari*
5:10 - 5:40 PM	KL2	**Electrospun micro/nanofibers for local delivery of hydrophobic drugs** *Jakub Sirc and Radka Hobzova* *Institute of Macromolecular Chemistry, Czech Academy of Sciences,* *Prague, Czech Republic*
		Symposium: Drug Design, Drug Delivery and Nanomaterials *Moderators: Jyoti Giri and Shankar Khatiwada*
5:40 - 6:00 PM	IL2	**Design of biomimetic polycations containing nonproteinogenic α-Amino acids** *Nino Zavradashvili, Giuli Otinashvili, Temur Kantaria, Nino Kupatadze, David Tugushi, Ashot Saghyan, Anna Mkrtchyan, Artavazd Poghosyan and Ramaz Katsarava* *Agricultural University of Georgia, Tbilisi, Georgia*
6:00 - 6:10 PM		**Health break**
6:10 - 6:25 PM	OP3	**Jackfruit starch blends with polyvinylpyrrolidone: Preparation, structural characterization and biodegradable properties** *Shanta Pokhrel Bhattarai and Shova Kumari Limbu* *Tri-Chandra Multiple Campus, Tribhuvan University, Kathmandu, Nepal*
6:25 - 6:40 PM	OP4	**Eudragit coated polymeric chitosan nanoparticles for oral delivery of paclitaxel in breast cancer** *Muhammad Khurram Waqas and Farah Rasheed* *University of veterinary and animal Sciences, Lahore, Pakistan*
6:40 - 6:55 PM	OP5	**Polymer particles as contrast agents for photoacoustic tomography** *Michal Babič , Monika Paúrová , Ivana Šeděnková, Jiřina Hromádková and Petr Matouš* *Institute of Macromolecular Chemistry, Czech Academy of Sciences,* *Prague, Czech Republic*
6:55 - 7:00 PM		**Day I Closing/Announcements**

PL=Plenary Lecture, KL= Keynote Lecture, IL=Invited Lecture, OP= Oral Presentation

ICIDN 2021 - CONFERENCE TIMETABLE (based on Kathmandu time)

DAY II. THURSDAY, DECEMBER 16, 2021

8:00 - 8:10 AM		**Arrival of participants (login to Zoom)**
		Symposium: Microbiome in Health and Disease *Moderator: Santosh Thapa*
8:10 - 8:30 AM	IL3	**Bifidobacteria and commensal gut microbes shape neurotransmitters levels in the gut and brain during postnatal development** *Thomas D. Horvath, Berkley Luk, Sigmund J. Haidacher, Kathleen M. Hoch, Jennifer K. Spinler, Numan Oezguen, Anthony M. Haag and Melinda A. Engevik* *Medical University of South Carolina, Charleston, South Carolina, USA*
8:30 - 8:50 AM	IL4	**Phenyllactic acid is associated with multiple sclerosis** *Numan Oezguen, Thomas D. Horvath, Vuslat Yılmaz, Sigmund J. Haidacher, Kathleen M.Hoch, Recai Türkoğlu, Murat Kürtüncü, Melinda A. Engevik, Anthony M. Haag, Erdem Tüzün* *Baylor College of Medicine/Texas Children's Hospital Microbiome Center, Houston, Texas, USA*
8:50 - 9:05 AM	OP6	**First-trimester cervix length measurement and vaginal microbiome analysis: a combination to improve preterm birth outcomes** *Alishum Ali, Jeffrey A. Keelan, Michael Bunce, Morten Allentoft, Claus T. Christophersen* *Curtin University, Bentley & The University of Western Australia, Perth, Australia*
9:05 - 9:15 AM		**Health break**
9:15 - 9:30 AM	OP7	**Common pitfalls in microbiome research and how to avoid them** *Mehrbod Estaki* *International Microbiome Centre, University of Calgary, Alberta, Canada*
9:30 - 9:50 AM	IL5	**Metabolomics-based approaches to assess the therapeutic potential of commensal gut microbes** *Thomas D. Horvath, Numan Oezguen, Sigmund J. Haidacher, Kathleen M. Hoch, Jennifer K. Spinler, Melinda A. Engevik, and Anthony M. Haag* *Baylor College of Medicine/Texas Children's Hospital Microbiome Center, Houston, Texas, USA*
		Keynote Lecture *Moderator: Santosh Thapa*
9:50 - 10:20 AM	KL3	**The human microbiome in precision medicine** *Jack A. Gilbert* *University of California San Diego, La Jolla, California, USA*
10:20 - 10:30 AM		**Announcements/Closing of the Morning Session**
5:00 - 5:10 PM		**Arrival of participants (login to Zoom)**
		Keynote Lecture *Moderator: Rameshwar Adhikari*
5:10 - 5:40 PM	KL4	**Tetrapods based smart materials for advanced technologies** *Yogendra Kumar Mishra* *University of Southern Denmark, Spnderborg, Syddanmark, Denmark*
		Symposium: Application of Nanotechnology to Infectious Disease Diagnosis and Treatment *Moderators: Sharmila Pradhan and Rajesh Pandit*
5:40 - 6:00 PM	IL6	**Nanotechnology for molecular diagnostic and therapy** *M. Yasir Zahoor* *University of Veterinary & Animal Sciences, Lahore, Pakistan*
6:00 - 6:10 PM		**Health break**
6:10 - 6:25 PM	OP8	**Green synthesis of silver nanoparticles from themeda quadrivalvis, conjugation of macrolide antibiotics against respiratory pathogens** *P. Ruban, Saraswathi A. and Syed Ali M.* *Shri Nehru Maha Vidyalaya College of Arts and Science, Coimbatore, India*
6:25 - 6:40 PM	OP9	**Hepatocurative evaluation of copper nanoparticles biosynthesized using aqueous leaf extract of *Moringa oleifera* against carbon tetrachloride induced hepatotoxicity in mice** *A. Nazir, M. A. Rasheed, M.O. Omer, Y. Zahoor* *University of Veterinary and Animal Sciences, Lahore, Pakistan*
6:40 - 6:55 PM	OP10	**Bhasmas as nanomedicines in Ayurveda: Physiochemical, structural, morphological, antibacterial and cytotoxic Properties** *Jyoti Giri, Purshottam Mandal, Gopinand Shah, Rajesh Paudel, Rameshwar Adhikari, Motee Lal Sharma, Girija Mani Aryal* *Tri-Chandra Multiple Campus, Tribhuvan University, Kathmandu, Nepal*
6:55 - 7:15 PM	IL7	**Nanoreactors against bacterial infection and nanomimics for viral and parasite host cell entry inhibition** *Adrian Najer, Michael Potter, Jake Baum, and Molly M. Stevens* *Imperial College London, London, United Kingdom*
7:15- 7:20 PM		**Day II Closing/Announcements**

ICIDN 2021 - CONFERENCE TIMETABLE (based on Kathmandu time)

DAY III. FRIDAY, DECEMBER 17, 2021

8:00 - 8:10 AM		**Arrival of participants (login to Zoom)**
		Symposium: SARS-CoV2 and COVID-19 Pandemic (I) *Moderators: Rameshwar Adhikari and Santosh Thapa*
8:10 - 8:30 AM	IL8	**Fighting against SARS-CoV-2 delta variant in Nepal: A tertiary Care Hospital Experience** *Sher bahadur Pun* *Sukraraj Tropical and Infectious Disease Hospital, Teku, Kathmandu, Nepal*
8:30 - 8:50 AM	IL9	**Laboratory management of COVID-19 in Mongolia** *Khosbayar Tulgaa* *Mongolian National University of Medical Sciences, Ulaanbaatar, Mongolia*
8:50 - 9:05 AM	OP11	**EDGE COVID-19: A web platform to generate submission-ready genomes from SARS-CoV-2 sequencing efforts** *Chien-Chi Lo, Migun Shakya, Karen Davenport, Mark Flynn, Adán Myers y Gutiérrez, Bin Hu, Po-E Li, Elais Player Jackson, Yan Xu, and Patrick S. G. Chain* *Los Alamos National Laboratory, Carlsbad, New Mexico, USA*
9:05 - 9:15 AM		**Health break**
		Keynote Lecture *Moderator: Santosh Thapa*
9:15 - 9:45 AM	KL5	**SARS CoV-2 serology: Public health vs clinical uses** *Muhammad G. Morshed* *University of British Columbia, Vancouver, BC, Canada*
9:45 - 9:50 AM		**Announcements/ Closing of the Morning Session**
10:00 AM -12:00 PM		**POSTER SESSION**
6:00 - 6:10 PM		**Arrival of participants (login to Zoom)**
		Symposium: SARS-CoV2 and COVID-19 Pandemic (II) *Moderator: Santosh Thapa*
6:10 - 6:25 PM	OP12	**SARS-CoV-2, The spike protein and the rise of variants** *Bernadette Belter, Charlotte E. Boucher, Robert R. Bragg* *University of the Free State, Bloemfontein, South Africa*
6:25 - 6:45 PM	IL10	**Characterization of an attenuated SARS-CoV-2 related pangolin coronavirus variant with a 104-nt deletion at the 3'-terminus untranslated region** *Lihua Song* *Beijing University of Chemical Technology, Beijing, China*
6:45 - 7:05 PM	IL11	**Clinical and public health management of COVID-19 in sub-Saharan Africa: Challenges and opportunities from a Kenyan perspective** *Paul Yonga* *CA Medlynks Clinic and Laboratory at Nairobi; Fountain Health Care Hospital at Eldoret, Kenya*
7:05 - 7:10 PM		**Health break**
		Keynote Lecture *Moderator: Santosh Thapa*
7:10 - 7:40 PM	KL6	**Impact of COVID19 pandemic on newborn care** *Mohan Pammi* *Baylor College of Medicine/Texas Children's Hospital, Houston, Texas, USA*
7:40 - 7:45 PM		**Break (Preparation for Plenary talk)**
		Plenary Lecture *Moderator: Santosh Thapa*
7:45 - 8:30 PM	PL2	**COVID19 vaccines: Science vs antiscience** *Peter J. Hotez* *Baylor College of Medicine/Texas Children's Hospital, Houston, Texas, USA*
8:30 - 8:45 PM		**Q &A with Prof. Peter Hotez** **Vote of thanks to Prof. Hotez**
8:45 - 9:00 PM		**Day III Closing/Announcements**

ICIDN 2021 - CONFERENCE TIMETABLE (based on Kathmandu time)

DAY IV. SATURDAY, DECEMBER 18, 2021

8:00 - 8:10 AM		**Arrival of participants (login to Zoom)**
		Keynote Lecture *Moderator: Rameshwar Adhikari*
8:10 - 8:40 AM	KL7	**Lymphatic filariasis: Nepalese scenario** *Shiba K Rai* *Nepal Medical College, Attarkhel, Kathmandu, Nepal*
		Symposium: Molecular Microbiology and Epidemiology of Infectious Diseases (II) *Moderators: Krishna Raut and Shanta Pokhrel Bhattarai*
8:40 - 9:00 AM	IL12	**Comparing peripheral blood smears, autologous cell cultures, and reverse line blot hybridisation in screening for Anaplasma/Ehrlichia in dogs in Trinidad** *Karla Georges, Chuckwudozi Ezeokoli, Godwin Isitor, Alex Mutani, Olivier Sparagano and Candice Sant* *City University of Hong Kong, Hong Kong SAR, China*
9:00 - 9:10 AM		**Health break**
9:10 - 9:30 AM	IL13	**Mental Health and Spirituality** *Basanta Pant* *Annapurna Neurological Institute and Allied Sciences, Maitighar, Kathmandu, Nepal*
9:30 - 9:45 AM	OP13	**Wastewater based epidemiology: A tool for Surveillance of infectious diseases** *Dev Raj Joshi* *Central Department of Microbiology, Tribhuvan University, Kathmandu, Nepal*
9:45 - 10:00 AM	OP14	**From molecules to dengue clinical management- filling gap through research and collaboration** *Shyam Prakash Dumre* *Central Department of Microbiology, Tribhuvan University, Kathmandu, Nepal*
10:00 - 10:05 AM		**Closing of the Morning Session/Announcements**
5:00 - 5:10 PM		**Arrival of participants (login to Zoom)**
		Keynote Lecture *Moderator: Santosh Thapa*
5:10 - 5:40 PM	KL8	**Biosecurity as last line of defense and the potential impact of resistance to disinfectants in a post antibiotic era** *Robert R. Bragg* *University of the Free State, Bloemfontein, South Africa*
		Symposium: Antimicrobials, Vaccines and Alternatives *Moderators: Santosh Thapa and Tista Prasain*
5:40 - 6:00 PM	IL14	**A country with high antibiotic use-Lessons and challenges to combat AMR** *Gereltuya Dorj* *University of South Australia, Adelaide SA, Australia & Mongolian National University of Medical Sciences, Ulaanbaatar, Mongolia*
6:00 - 6:10 PM		**Health break**
6:10 - 6:25 PM	OP15	**Plasmid mediated antimicrobial resistance** *Boudine van der Walt and Robert R. Bragg* *University of the Free State, Bloemfontein, South Africa*
6:25 - 6:40 PM	OP16	**Efficacy testing of antimicrobial and sporicidal curtains** *Clarissa van Heerden, Samantha Mc Carlie, Gunther Johann Staats and Robert R. Bragg* *University of the Free State, Bloemfontein, South Africa*
6:40 - 6:45 PM		**Day IV Closing**
		Closing Ceremony of ICIDN-2021
6:45 - 7:00 PM		**Remarks by guests and organizers**
7:00 - 7:05 PM		**Vote of Thanks** *Santosh Thapa*
7:05 - 7:15 PM		**Closing/Farewell Remarks** **Announcement of ICIDN-2023** *Rameshwar Adhikari*

POSTERS

1.	**Efflux pump mediated disinfectant resistance in bacteria** Gunther Johann Staats, Charlotte E. Boucher-Van Jaarsveld and Robert R. Bragg *Department of Microbiology and Biochemistry, University of the Free State, Bloemfontein, South Africa*
2.	**Comparative analysis of antibacterial activity of green synthesized Zirconia nanoparticles with Cefotaxime** Nelson Rai[1], Sambridhi Shah[1], Rajendra Joshi[1], Rajesh Pandit[1,2] *[1]Department of Chemistry, Tri-Chandra Multiple Campus, Tribhuvan University, Kathmandu, Nepal* *[2]Nepal Polymer Institute, Kathmandu, Nepal*
3.	**A review on prevention and control strategies of Theileriosis** Sabir Hussain[1], Abrar Hussain[2], Umair Aziz[1], Baolin Song[1], Jehan Zeb[1], David George[3], Jun Li[1], Olivier Sparagano[1] *[1]Department of Infectious Diseases and Public Health, Jockey Club College of Veterinary Medicine and Life Sciences, City University of Hong Kong, Kowloon, Hong Kong SAR, China* *[2]University of Veterinary and Animal Sciences, Lahore, Pakistan* *[3]School of Natural and Environmental Sciences, Newcastle University, United Kingdom*
4.	**Computational characterization of didanosine and it's binding with DNA nucleotide** Bidit Lamsal[1,2], Tika Ram Bhandari[2,3], Rameshwar Adhikari[1,2], Narayan Prasad Adhikari[3] *[1]Central Department of Chemistry, Tribhuvan University, Kirtipur, Nepal* *[2]Research Centre for Applied Science and Technology, Tribhuvan University, Kirtipur, Nepal* *[3]Central Department of Physics, Tribhuvan University, Kirtipur, Nepal*
5.	**Preparation and characterization of composite hydrogel films comprising chitosan and cattle horn keratin for enhanced wound healing** Anusha Upadhyay[1], Akshay Sai Chalise[1], Babin Khanal[1], Bishmita Tamang[1], Prashant Bishesh Khanal[1], Swastika Shrestha[1], Rameshwar Adhikari[2,3], Mishal Pokharel[1] *[1]College of Biomedical Engineering and Applied Sciences, Hadigaun, Kathmandu, Nepal* *[2]Research Center for Applied Science and Technology (RECAST), Tribhuvan University, Kirtipur, Nepal* *[3]Nepal Polymer Institute, Kathmandu, Nepal*
6.	**Development of decellularized fish skin scaffold doped using biosynthesized silver nanoparticles for accelerated burn wound healing** Astha Paudel[1], Anisha Sharma[1], Baruna Thapa[1], Neha Khanal[1], Nisha Shastri[1], Sourav Rai[1], Rameshwar Adhikari[2,3], Surya Prasad Adhikari[1] *[1]College of Biomedical Engineering and Applied Sciences, Hadigaun, Kathmandu, Nepal* *[2]Research Center for Applied Science and Technology (RECAST), Tribhuvan University, Kirtipur, Nepal* *[3]Nepal Polymer Institute, Kathmandu, Nepal*
7.	**Synthesis, characterization and biological study of Lauha Bhasma** Rajesh Paudel[1], Jyoti Giri[2,3], Rameshwar Adhikari[1,3,4], Motee Lal Sharma[1] *[1]Central Department of Chemistry, Tribhuvan University, Kirtipur, Nepal [2]Tri-Chandra Multiple Campus, Tribhuvan University, Ghantaghar, Kathmandu, Nepal [3]Nepal Polymer Institute, Kathmandu, Nepal* *[4]Research Center for Applied Science and Technology, Tribhuvan University, Kirtipur, Nepal*
8.	**Synthesis, characterization and study biological properties of Yashad Bhasma** Gopinand Lal Karna[1], Jyoti Giri[2,3]*, Rameshwar Adhikari[1,3,4], Motee Lal Sharma[1] *[1]Central Department of Chemistry, Tribhuvan University, Kirtipur, Nepal* *[2]Tri-Chandra Multiple Campus, Tribhuvan University, Ghantaghar, Kathmandu, Nepal* *[3]Nepal Polymer Institute, Kathmandu, Nepal* *[4]Research Center for Applied Science and Technology, Tribhuvan University, Kirtipur, Nepal*
9.	**Characterization of *Streptococcus agalactiae* isolates in pregnant women** Kusum Shrestha[1,2], Anil Kumar Sah[3], Neetu Singh[4], Rameshwar Adhikari[2], Pramila Parajuli[1] *[1]Department of Microbiology, St. Xavier's College, Maitighar, Kathmandu, Nepal* *[2]Research Center for Applied Science and Technology (RECAST), Tribhuvan University, Kathmandu, Nepal* *[3]Annapurna Neurological Institute and Allied Sciences, Annapurna Research Center, Maitighar, Kathmandu, Nepal [4]Manmohan Memorial Medical College and Teaching Hospital, Kathmandu, Nepal*
10.	**Repurposing of drugs against mutated strain of Eurasian Avian like H1N1 Influenza virus, G4 virus** Sangita Ghimire[1], Sandhya Sahukhal[1], Ayush Shrestha[1], Sarmila Adhikari[1], Pramod Aryal[2] *[1]Department of Biotechnology, SANN International College, Purbanchal University, Kathmandu, Nepal* *[2]Central Department of Biotechnology, Tribhuvan University, Kirtipur, Nepal*

11.	**Removal of Arsenic (III) from aqueous solution by hydroxyapatite/chitosan (HAp/CS) nanocomposites as adsorbents** Sambridhi Shah[1], Rajendra Joshi[1], Rajesh Pandit[1,2], Rameshwar Adhikari[2,3] *[1]Tri-Chandra Multiple Campus, Tribhuvan University, Ghantaghar, Kathmandu, Nepal* *[2]Nepal Polymer Institute, Kathmandu, Nepal [3]Research Centre for Applied Science and Technology (RECAST), Tribhuvan University, Kirtipur, Kathmandu Nepal*
12.	**Nasal colonization of methicillin-resistant *Staphylococcus aureus* among school children in Kathmandu, Nepal** Narayan Sharma Basyal[1], Jayanti Parajuli[2], Upendra Thapa Shrestha[1], Shyam Prakash Dumre[1] *[1]Central Department of Microbiology, Tribhuvan University, Kathmandu, Nepal* *[2]Wuhan University of Technology, Wuhan, China*
13.	**Burden of HIV and syphilis among women attending antenatal care in North-eastern Nigeria** Emmanuel Pembi[1], Stephen John[2], Shyam Prakash Dumre[3] Ahmadu Baba Usman[4], Shusaku Mizukami[5], Nguyen Tien Huy[5], Luis E. Cuevas[5], Kenji Hirayama[5] *[1]Adamawa state Ministry of Health, Nigeria* *[2]Adamawa State Agency for the Control of HIV/AIDS, Yola, Nigeria* *[3]Central Department of Microbiology, Tribhuvan University, Kathmandu, Nepal* *[4]Department of Pediatrics, Federal Medical Centre, Yola, Adamawa State, Nigeria* *[5]School of Tropical Medicine and Global Health, Nagasaki University, Sakamoto, Nagasaki, Japan* *[6]Department of Clinical Sciences, Liverpool School of Tropical Medicine, UK*
14.	**Preparation and characterization of 3D printed biodegradable nanocomposite comprising poly (butylene adipate-*co*-terephthalate) and hydroxyapatite bioceramics** Arun Acharya[1], Ramesh Puri[2], Komal Prasad Malla[1], Kamal Prasad Sharma [3], Jyoti Giri[4,5], Rameshwar Adhikari[* 1,2,5] *[1]Central Department of Chemistry, Tribhuvan University, Kirtipur, Kathmandu, Nepal* *[2] Research Centre for Applied Science and Technology, Tribhuvan University, Kirtipur, Kathmandu, Nepal* *[3]Meijo University, Nagoya, Japan* *[4]Tri-Chandra Multiple Campus, Tribhuvan University, Ghantagar, Kathmandu, Nepal* *[5]Nepal Polymer Institute, Kathmandu, Nepal*