GMBB2023 & GMID2023

February 16-18, 2023 | Miami, USA

Global Meet on Biotechnology and Bioscience &
Global Meet on Infectious Diseases

Location: ***Doubletree by Hilton Hotel Miami Airport,***
711 Nw 72nd Ave, Miami, USA

Abstract Book

PRIME MEETINGS
D.No. 45-57-6/1
3rd Floor, Akkayapalem,
Visakhapatnam, AP 530024

FOREWORD

Dear attendees of the Global Meet on Biotechnology and Bio-science,

It is with great pleasure that we welcome you to Miami, USA for this year's event. From February 16th to the 18th, experts from around the world will come together to share their knowledge and insights on the latest developments in biotechnology and bioscience.

We are excited to have you join us for this international gathering, which promises to be a forum for new ideas, meaningful discussions, and collaborations. With a diverse range of topics and presenters, we are confident that this event will be a rich and valuable experience for all attendees.

Once again, welcome to Miami and the Global Meet on Biotechnology and Bio-science. We look forward to meeting you and exploring the exciting possibilities that lie ahead.

Sincerely,
Sandra J
Prime Meetings (GMBB2023)

Dear attendees of the Global Meet on Infectious Diseases,

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Once again, welcome to Miami and the Global Meet on Infectious Diseases. We look forward to meeting you and exploring the exciting possibilities that lie ahead.

Sincerely,
Lavanya P
Prime Meetings (GMID2023)

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Biotechnology of Plant Cell Walls for Biofuel Production

Chandrashekhar P. Joshi

Professor and Chair, Department of Biological Sciences, Michigan Technological University, Houghton, MI 49931, USA

Abstract

Various problems associated with fossil fuels are real and here to stay. Depleting fossil fuel reserves and growing demand for energy have necessitated the renewed search for alternative and practical energy resources. The first-generation biofuels were produced from starch and sugars (bioethanol) and from seed oils (biodiesel). These, however, soon became negatively associated with issues such as competition with food supply, significant land-use changes, and other ethical issues. The production of second-generation biofuels from lignocellulosic materials from grasses and trees is promising but requires high-input technologies involving extensive pre-treatments and expensive cellulolytic enzymes, adding to the high costs of second-generation bioethanol. Recently, third- generation biofuels derived from microalgae have attracted the attention of plant biologists and industrialists due to their fast growth rate, high CO2 fixation ability, and high production capacity of microalgae. Now, there also exists an exciting fourth generation of biofuels on the horizon which involves genetic engineering of plants possessing traits such as high biomass yield, improved saccharification efficiency, and high CO2 fixation.

Plant biotechnology offers an effective means of developing targeted structural alterations in the lignocellulosic secondary cell walls of bioenergy plants. This presentation will provide a comprehensive yet critical assessment of past genetic modification efforts in plants that will enhance biofuels production. I will discuss our recent work with improved scarification as well as oil production from transgenic bioenergy plants.

Biography

Dr. Chandrashekhar Joshi is the Chairman of the Biological Sciences Department and Professor of Plant Molecular Genetics at Michigan Technological University for the last ten years. He is a leading plant biotechnologist who is working towards deciphering the process of biosynthesis of cell walls in bioenergy trees such as poplars. His current research interests include molecular genetics and genomics of cellulose and lignin synthesis in trees, genetic improvements of lignocellulosic products for bioenergy and paper industries, molecular basis, and biotechnology of tree growth and wood development and development of fast-growing bioenergy trees for efficient cell wall deconstruction to biofuels or paper production. He has over 40 years of research experience in plant biotechnology. He has authored over 231 journal articles, presentations, patents, book chapters, and two books on poplars and bioenergy crops. He is a recipient of a highly prestigious NSF-CAREER award; Michigan Tech's 2011 Research Award and is an inductee of Academic of Teaching Excellence at Michigan Tech. During

2010-2013, Professor Joshi visited Chonnam National University in Gwangju, South Korea as a World Class University distinguished visiting professor and participated in establishing a new Department of Bioenergy Sciences and Technology. Dr. Joshi has served on 60 graduate student committees and garnered over $10 million in funding from various national and international agencies for his research. His current research with genetic improvement of bioenergy trees has many direct applications in the areas of bioenergy production, forest and crop productivity, and plant improvement.

The importance of a 'one health' bio-surveillance system in public health and pandemic defence

Cdr(ret) Dr StefStiesntra

SME CBRN Royal Dutch Armed Forces, The Netherlands

Abstract

Health defense is global as 'One Health' indicates. Within the biological threats, the major threat are the emerging zoonotic diseases. As we travel more and with increasing dense population in the world, the spread of infectious diseases goes faster and over larger areas. The recent outbreak of SARS-CoV-2 is a an example of an emerging pathogen, which has spread all over the world. And there will be in the future more nasty viruses, which could create a lot of fear and economic damage.

It is of utmost importance to do research on the new emerging contagious diseases and to keep biosafety and biosecurity well organized in the laboratories where this research is done. To train the biothreat awareness and biological management is very important, especially in laboratories doing 'gain of function' research.

Tools to monitor, detect and identify the threat of new emerging zoonotic diseases is getting more important together with diagnostic tools for the diagnosis of the victims of new pandemic causing pathogens.

Classical microbiological identification techniques are too slow or unspecific for prompt reaction on an outbreak of an new emerging disease, which is at that moment unknown. To detect 'pathogenicity islands' in a virus or bacterium is more important in this phase than to identify the organism. The zoonotic micro-organism most probably is mutated naturally or in a laboratory and therefore not identifiable with existing 'classical' techniques.

New gene-extraction techniques and new analysers, which give a kind of fingerprint of the threat, are developed and these new techniques will be important to monitor the safety of the environmen.

Biography

Works internationally for several medical and biotech companies as scientific advisory board member and was titl this year an active reserve-officer of the Royal Dutch Navy in his rank as Commander (OF4). For the Dutch Armed Forces he is CBRNe specialist with focus on (micro)biological and chemical threats and medical- and environmental functional specialist within the 1st CMI (Civil Military Interaction) Battalion of the Dutch Armed Forces. For Expertise France he has managed from 2014 to 2019 an EU CBRN CoE public health project in West Africa. He is visiting professor at the University of Rome Tor Vergata giving lectures for the CBRN Master study. For the EU he is advisor on (CBRN) resilience in relation to preparedness in public health requirements. In this role he advises the Resembid program of the EU, performed by Expertise France.

In his civilian position he is at this moment developing with MT-Derm in Berlin (Germany) a novel interdermal vaccination technology as well as a new therapy for cutaneous leishmaniasis for which he has won a Canadian 'Grand Challenge' grant. With Hemanua in Dublin (Ireland) he has developed an innovative blood separation unit, which is also suitable to produce convalescent plasma for Ebola Virus Disease therapy.
He has finished both his studies in Medicine and in Biochemistry in The Netherlands with a doctorate and has extensive practical experience in cell biology, immuno-haematology, infectious diseases, biodefense and transfusion medicine. His natural business acumen and negotiation competence helps to initiate new successful businesses, often generated from unexpected combinations of technologies.

Engineering at the Nano Scale: A Strategy for Developing High Performance Functional Materials from Biopolymers

Sabu Thomas

Vice Chancellor, Mahatma Gandhi University, Priyadarshini Hills P. O Kottayam, Kerala, India -686 560

Abstract

Green chemistry started for the search of benign methods for the development of nanoparticles from nature and their use in the field of antibacterial, antioxidant, and antitumor applications. Bio wastes are eco-friendly starting materials to produce typical nanoparticles with well-defined chemical composition, size, and morphology. Cellulose, starch, chitin and chitosan are the most abundant biopolymers around the world. Cellulose nanoparticles (fibers, crystals and whiskers) can be extracted from agrowaste resources. Chitin is the second most abundant biopolymer after cellulose, it is a characteristic component of the cell walls of fungi, the exoskeletons of arthropods and nanoparticles of chitin (fibers, whiskers) can be extracted from shrimp and crab shells. Starch nano particles can be extracted from tapioca and potato wastes. These nanoparticles can be converted into smart and functional biomaterials by functionalization through chemical modifications due to presence of large amount of hydroxyl group on the surface. The preparation of these nanoparticles includes both series of chemical as well as mechanical treatments; crushing, grinding, alkali, bleaching and acid treatments. Since large quantities of bio wastes are produced annually, further utilization of cellulose, starch and chitins as functionalized materials is very much desired. The cellulose, starch and chitin nano particles are currently obtained as aqueous suspensions which are used as reinforcing additives for high performance environment-friendly biodegradable polymer materials. These nanocomposites are being used as biomedical composites for drug/gene delivery, nano scaffolds in tissue engineering and cosmetic orthodontics. The reinforcing effect of these nanoparticles results from the formation of a percolating network based on hydrogen bonding forces. The incorporation of these nano particles in several bio-based polymers have been discussed. The role of nano particle dispersion, distribution, interfacial adhesion and orientation on the properties of the ecofriendly bio nanocomposites has been carefully evaluated .

Biography

Sabu Thomas is currently the Vice-Chancellor of Mahatma Gandhi University, Kottayam, Kerala, India. He is a Professor at the International and Inter University Centre for Nanoscience and Nanotechnology and Full Professor of Polymer Science and Engineering at the School of Chemical Sciences of Mahatma Gandhi University, Kottayam, Kerala, India. His ground-

breaking research has covered the areas of polymer science and engineering, polymer nanocomposites, elastomers, polymer blends, interpenetrating polymer networks, polymer membranes, green composites and nanocomposites, nanomedicine and green nanotechnology. Prof. Thomas has received several national and international awards in recognition for his work, and recently received HonorisCausa (DSc) from the University of South Brittany, Lorient, France, in recognition for his contributions to polymer science and engineering. Prof. Thomas has published over 1400 peer- reviewed research papers, reviews and book chapters. He has co-edited more than 170 books. Currently he is having an H index of 122.

Neutron-Based Instruments and Gas Sensors for Biotechnology

Dr. Jay Theodore (Ted) Cremer, Jr

Chief Scientist, Adelphi Technology, Inc, Redwood City, California, USA

Abstract

Introduction to applications in biotechnology of neutron generators, based on deuterium-deuterium (DD) fusion (2.5 MeV neutrons) and deuterium-tritium (DT) fusion (14 MeV neutrons), and moderated, thermal neutrons (0.025 eV).Application of fast neutrons include Prompt Gamma Neutron Activation Analysis (PGNAA), radiographic-tomographic imaging, and 14 MeV DT-based Associated Particle Imaging (API). Applications of thermal neutron-based instrumentations include neutron diffractometers for residual stress analysis in materials, thermal neutron based refractive imaging and radiography and tomography.

Such deployable, field-based, thermal neutron instrument-based applications include neutron radiographic and tomographic imaging of plant roots in soil using grating neutron optics, measurement of sugar content in sugar cane, or imaging hydrogen-rich compounds (plastics) in manufactured parts comprised of metal and plastic, and in additive manufacturing.

Another applications of 14 MeV deuterium-tritium based neutron generators is associated particle imaging (API), which is applied to imaging soil carbon content and other element content in soil. The field-deployed, 14 MeV neutron generator is co-located with a high purity germanium gamma detector to measure gamma spectrum of inelastic neutron scatter, where the opposite directed alpha detected on a position sensitive alpha detector and the known velocity of the 14 MeV neutron provide speed and direction of the interrogation neutrons, emitted in random directions. This allows 3D imaging down to 25 cm depth with 5 to 15 cubic centimeter resolution and with 1 to 60 second measurement times. Associated particle imaging allows imaging of objects behind a wall or in soil or structures.

Other applications of neutron generators, based on deuterium-deuterium (DD) and deuterium-tritium (DT) fusion are determination of isotope composition in materials, imaging additive manufactured materials, and boron-neutron-capture-therapy (BNCT) for cancer treatment. Also, is the use of cooled thermal neutrons (cold neutrons) in small angle neutron scatter (SANS) and neutron spin echo (NSE) for analysis of structure and function of materials and biomaterials.

Also presented is a small, lightweight and highly portable instrument to provide precision detection and analysis of gases. Applications include the unaided and continuous detection and reporting of leaks of hazardous gases from buried or surface pipelines (such as hydrocarbons, methane, and toxic or explosive gases), measuring gas composition of air outdoors and indoors, gases emitted from soils and plants (such as ethylene emitted from plants grown in space station, lunar and mars bases). Also, this gas instrument can monitor gases in autonomous vehicles, ultra-sensitive detection and quantification of polycyclic aromatic hydrocarbons in shellfish, and detection of gases emitted from exhaled air, urine, mucus, or feces samples of

disease patients in hospitals.

Keywords
Neutron fast, epithermal, thermal, and cold neutron sources and neutron instrumentation, Gas chromatography, MEMS, soil gas, probing, chemical sensor, integrated detector

Biography

Dr. Cremer (B.S. MIT, 1976, PhD. Electrical Engineering, U. of Maryland, 1984), chief scientist of Adelphi Technology, has a diverse experimental and theoretical background in applied physics, which includes x-ray/neutron sources, detectors, optics, bioelectric phenomena (artificial skin S.B thesis at MIT), and postdoctoral traineeship in biophysics on cellular electrofusion and electrically mediated gene transfer at University of California at San Francisco, 1984-1986.
Dr. Cremer has published 43 peer-reviewed publications, 4 books on neutron and x-ray optics with Academic Press (Elsevier), and 4 issued US patents.
Presently, Dr. Cremer is funded with grants for research and development of instruments for neutron spin echo, neutron radiography, neutron diffractometry, neutron small angle scattering, and gas sensors.

Bioactive hybrid nanomaterials

Kokkarachedu Varaprasad

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Abstract

The nanotechnology-based engineered materials have dramatically expanded the range of tools used for infection control, which can serve as a new medicine1. Herein, to improve the bioactivity of hybrid nanomaterials with minimum toxicity, we designed nanomaterials from natural biomolecules (such as biopolymers and curcumin) and metal nanoparticles. The biomolecules play a key role in improving the bioactivity (antimicrobial activity) of the metal oxide nanoparticles and reducing the toxicity (control the reactive oxygen species and reduce the inflammation)2. The antimicrobial activity of the bioactive hybrid nanomaterials was examined against human pathogens bacteria via the well-diffusion method. The cytotoxic activity of the nanomaterials was studied against human breast cancer and fibroblast cell lines. In addition, the antioxidant property was evaluated by the radical scavenging method. The resulting prototype will be useful for clinical applications. We greatly acknowledge the support from the Fondecyt Regular 1211118, ANID and FIT, Universidad San Sebastián, Chile.

Keywords

Hybrid nanomaterials; Biomolecules; Antimicrobial; Curcumin; Biopolymers

Biography

Dr Varaprasad Kokkarachedu is working as an Associate Professor at the University of San Sebastian, in the Faculty of Engineering, Architecture and Design, at the Conception campus, Chile. He received PhD in biocidal temperature-sensitive hydrogels from the Department of Polymer Science and Technology, Inda. He worked as an Investigator in the Advanced Polymer Research Center (CIPA) and was the recipient of 3 International Postdoctoral Fellowships at Creighton University USA, Tshwane University of Technology SA, and Universidad de Concepción, Chile. He developed the modern bioactivity of hybrid nanomaterials and biomaterials during this period. He has published over 121 articles, including 2 patents, 2 books, and 24 book chapters, has 36 h-index and more than 5300 citations, and is the recipient of 10 research grants (2 projects ranked as 1 and 4th). He edited special issues for various Journals and was a member of several Societies. He guided several students in the nano-bio materials field. Once again, His name has been listed in the Top 2% of scientists in the world under biomaterials, nanoscience, and nanotechnology by a recent survey conducted by Stanford University to recognize (2021) the scientists based on the citations and h index via researcher professional career. Technologies". His primary objective is to translate primary nano and polymer technology research results for the next generation of biomedical applications.

A multifunctional peptide for targeted imaging and chemotherapy for various cancers

Chin-Tarng Lin

Department of Pathology, National Taiwan University Hospital, Taipei, Taiwan

Abstract

The L-peptide plays a role as a universal ligand binding specifically to nasopharyngeal carcinoma (NPC) and other cancers but not normal cells. It was used to link iron oxide nanoparticles, and injected intravenously to SCID mice bearing NPC and breast cancer xenografts for MR analysis, and showed significant change of MR signal intensity in the xenograft regions. Using this conjugate as a ligand to localize the L-peptide targeted protein in the cancer surgical specimens, a clear reaction product was identified in the tumor cells of both cancer types. If the L-peptide-linked-liposomal doxorubicin was used to treat the SCID mice bearing other NPC or breast cancer xenograft, a high efficacy of chemotherapy with minimal adverse effect was observed. In conclusion, the L-peptide has a considerable potential for clinical usage for targeted imaging, peptide histochemical localization of targeted protein, and targeted chemotherapy for different cancer types.

Keywords

nasopharyngeal carcinoma (NPC), iron oxide nanoparticles, MRI analysis, peptide-linked-liposomal chemotherapy, targeted chemotherapy

Biography

Dr. Chin-Tarng Lin, D.D.S., Ph.D. is an Emeritus professor right now at the College of Medicine, National Taiwan University. He has published more than 92 papers and obtained 12 patents. His major interests are to investigate the molecular pathogenesis of NPC with or without Epstein-Barr virus infection and of ovarian cancer. He and his colleague have identified 3 specific peptides to localize their targeted proteins and to identify the cancer xenograft by MRI, and to perform peptide-targeted chemotherapy for different cancers with minimal adverse event.

A comparative study: The effect of UVC sterilization on the mechanical properties of a new mechanical design using Epoxy material to convert a traditional manual wheelchair into an electrical one

Mohamed Abdelkader Aboamer

Department of Medical Equipment Technology, College of Applied Medical Sciences, Majmaah University, Majmaah 11952, Saudi Arabia

Abstract

This study's goal is to the effect of UVC sterilization on the mechanical properties of a new mechanical design using Epoxy material to convert a traditional manual wheelchair into an electrical one. The chosen UVC dosage of 13.5 J/cm2 with an exposure time of 48 minutes corresponds to 3650 sterilization treatments or 10 years of sterilization. Three Epoxy resin parts have been used as a new mechanical design for each electric wheel. Stress, Strain, Displacement, and factor of safety have been selected as mechanical parameters to discover the effect of UVC radiation in a sterilization process. Energy Dispersive x-ray analysis will be used to validate the effect of UVC radiation in the Epoxy resin material. A real compression test for the base part discovered that the yield force or the limit load which can the base withstand without any deformation is 25 KN or approximately 2500 Kg. Therefore, the new mechanical parts can withstand the high loads and can use as a new part to help in converting the old or traditional wheelchairs to electrical.

Keywords

Compression test; Wheelchair; Epoxy resin material; UVC radiation

Biography

Mohamed A. Aboamer obtained a bachelor's degree in biomedical engineering in 2004 and a master's degree in the same field in 2009. He earned a doctorate in biomedical engineering from Cairo University's Faculty of Engineering in 2014. He got a Canadian Educational Credential for a Ph.D. degree from World Educational Service on February 19, 2020 (Ref#: 3811222 IMM). In addition, he obtained a Biomedical Engineering consultant number 19157660 from the Saudi Commission for Health Specialties in 2022. He is currently working as an Assistant Professor in the Department of Medical Equipment Technology at Majmaah University. His current profession focuseson biomechanics and biomaterials research.

Deaminaseenzymes:biologyandapplications

DespoinaTrasanidou

PostDocresearcher,WageningenUniversity&Research

Abstract

The deaminase superfamily consists of enzymes that are involved in biological processes crucial forhealth and survival. Based on the specificity of their substrates, these enzymes are divided intoadenosinedeaminases(ADs)andcytidinedeaminases(CDs).ADsconvert(deoxy) adenosineto(deoxy)inosine,whileCDsconvert(deoxy)cytidineto(deoxy)uridine.Bothprokaryot esandeukaryoteshave a high prevalence of ADs and CDs. Here, we describe the mechanism of action, the currentclassification, the biological role and the impact of the dysregulation of deaminases in human health.Moreover, we discuss about the exploitation of deaminases not only in conventional medicine butalso in gene therapy. We outline how ADs and CDs have been developed into programmable geneticengineering tools (called 'base-editors') for the treatment of genetic diseases, and we propose novelbase-editorsfor applications in humancells andpotentially inplants.

Biography

Dr. Despoina Trasanidou is a Postdoctoral researcher at Wageningen University & Research in the Netherlands (Prof. Dr. John van der Oost lab) and a Research fellow at Florida State University in the United States (Dr. Hong Li lab), specialized in CRISPR-Cas protein engineering for applications in human cells and plants. She obtained her PhD from the Wageningen University & Research with a focus on the in vitro/ in vivo characterisation and engineering of novel enzymes to create genetic tools with improved traits. Specifically, she invented CRISPR-Cas (e.g. base editors) and anti-CRISPR tools to manipulate human and bacterial cells for applications in medicine and biotechnology. She previously obtained her MSc in Cellular and Molecular Biotechnology from the same university and her BSc from the University of Aegean in Greece. To date, Dr. Despoina Trasanidou has received 5 grants and 6 awards, and she has several publications and a patent on the CRISPR-Cas technology.

Bionanomaterials Based on Carbon Nanotubes and Glyconanoparticles for the Design of Biosensors and Biofuel Cells

Serge Cosnier, Paulo Henrique M. Buzzetti[1], YannigNedellec[1], Monica Brachi, [1]AnastasiiaBerezoska[1], Dan Shan[2]

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[2]School of Environmental and Biological Engineering, Nanjing University of Science and Technology, Nanjing, 210094 Jiangsu, China

Abstract

For four decades, the functionalization of electrodes by biomaterials based on electrogenerated polymers, carbon nanotubes and / or nano-objects, was widely used in the field of analytical chemistry and energy conversion for the design of biosensors and biofuel cells. Some new approaches for developing nanostructured biomaterials based on functionalized carbon nanotubes, glyconanoparticles and compressions of carbon nanotubes will be illustrated with enzymes or antibodies as catalytic or biosensing element.

In particular, the anchoring of biological macromolecules to the surface of electrodes has been carried out by chemically functionalizableelectrogenated polymers. Composite bioelectrodes by compression of enzymes and carbon nanotube mixtures will be also reported. In addition, the self-assembly of carbon nanotubes via crosslinking polymers in the form of conductive sheets (buckypapers) was used to generate bioelectrodes. Recently, the concept of hollow bioelectrodes based on the bonding of two buckypapers was developed to generate a microcavity defined by the thickness of the glue linking the two sheets. These buckypapers are permeable only to water and enzyme substrates but not allow the permeation of enzymes. Therefore, the enzyme trapped in powder form is then solubilized inside the microcavity leading to a high density of biocatalyst in solution with an electrical connection with the buckypapers. The electrocatalytic performance of the bilirubin oxidase hollow electrode was described as a function of pH, temperature and the amount of entrapped enzyme. Such type of bioelectrodes was applied to the design of biofuel cells which were implanted in rats.

The development of glyconanoparticles resulting from the self-assembly of block copolymers composed of polystyrene and cyclodextrin as an inclusion site will be also reported. These glyconanoparticles, which are stable in water, constitute a multivalent platform for binding hydrophobic fluorescent or electroactive molecules. These nanoparticles were applied to the elaboration of solubilized enzymatic fuel cell in solution or were grafted on surfaces for the development of amperometric enzyme electrodes.

Keywords
carbon nanotube; enzyme; organic nanoparticle; electrode

Biography

Dr Serge Cosnier is currently Research Director exceptional class at CNRS at the Grenoble Alpes University (France) and the scientific director of the POLYNAT Carnot Institute. He received his doctoral degree in Chemistry from the Toulouse university (1982) and was an Alexander von Humbold postdoctoral fellow at the university of Munich, Germany. He is member of the Council of the Bioelectrochemical Society (2016-2023) and serves as Editor of Bioelectrochemistry, Specialty Chief Editor of Frontiers in Analytical Chemistry and Commissioning Editor for Electroanalysis.

Dr Cosnier's activity is focused on the molecular electrochemistry and bioelectrochemistry with the development of electrode materials whose applications include analytical chemistry with biological sensors (enzyme electrodes, immunosensors, aptasensors and DNA sensors), electrocatalysis, electrochemical biomimetic systems and energy conversion (biofuel cells and abiotic fuel cells). He has developed innovative conceptual advances in the field of electrogenerated organic polymers, inorganic nanostructured materials and 3D nanostructured electrode materials based on carbon nanotubes

Dr Cosnier has authored over 390 peer reviewed publications (h-index 70). In 2009, he received the Katsumi Niki Prize of the International Society of Electrochemistry and was appointed as Fellow of this Society in 2010. In 2013, Dr Cosnier became a member of the Academia Europaea and was awarded in 2015 Doctor HonorisCausa of the University of Medicine and Pharmacy of Cluj-Napoca (Romania). Finally, he was elected member of the European Academy of Sciences (EurASc) in 2019 and Fellow of American Institute for Medical and Biological Engineering in 2021.

TNF-A andIL-10 Changes Among Adults with Acute Bloody Diarrheas of Infectious Origin

Anna Mkhoyan

Naira Gyulazyan, LusineHarutyunyan, AlvardHovhannisyan, VigenAsoyan
Infectious Diseases Department, Yerevan State Medical University named after MkhitarHeratsi,Armenia

Abstract

Recent epidemiological trends of disease burden from communicable diseases to non-communicable ones made changes in research interests of young public health specialists and health workers. However, the morbidity, mortality, disability adjusted and quality adjusted life years related to well-known infectious diseases such as diarrhea are still significant. Diarrhea remains the leading health and economic burden among all infectious diseases. Meanwhile, polymorphism of diarrheal diseases, clinical manifestations, the presence of various clinical forms ranging from mild to severe, as well as poor understanding of a number of pathogenetic mechanisms of disease makes them ubiquitous value. While among pediatric population disease burden is related to dehydration issues related to acute watery diarrheas, acute bloody diarrhea should be considered a medical emergency for adults. It is worth to mention that, there is lack of evidenced-based data related to pathogenesis of acute bloody diarrheas of infectious origin in the recent decades.

The aim of this study was to investigate frequency of detecting high serum levels of TNF-α and IL-10 and evaluate changes in mean levels of aforementioned cytokines according to the etiological factor.

The study material was 85 adult patients with bloody diarrhea hospitalized in “Nork” clinical infectious diseases hospital during the period of 2014 November to 2018 July. The study was approved by Ethical Committee of Yerevan State Medical University, and written consent forms were obtained from each patient involved in it.

Laboratory examinations included routine methods such as general and biochemical blood tests, bacteriological and coprological examination of the stool, general examination of the urine. Some specific methods were used also, such as ELISA for determination of serum levels of cytokines TNF-α and IL-10, coloredimmunochromatographic tests for the detection of Campylobacters and Clostridium difficile's toxins.

We compared the frequency and mean levels of cytokines found in the blood serum of patients with bloody diarrheas of different origin. Patients were divided into four groups according to the etiological factor. Group of patients with the mono-campylobacteriosis, mono-shigellosis, shigacobylobacteric mixed infection and group of patients with conditional pathogens.

Thus, for the first time to our knowledge, we documented that in the acute phase of the disease, the lowest mean levels of TNF-α and IL-10 were observed in the group of patients with campylobacteriosis. In the shigellosis group, we reported the highest frequency of detection and mean level of TNF-α, which was significantly higher than that of the campylobacteriosis group, with the most frequent detection of two cytokines simultaneously. In the acute phase

of the disease, only patients with the shiga-campylobacteric mixed infections had a mean IL-10 level above the upper normal limit. According to the literature, the absence of IL-10 has a significant effect on colitis caused by Campylobacter Jejuni, increasing the degree of colonization and enteritis severity, as well as increasing the possibility of extraintestinal spread.

Keywords
bacterial bloody diarrhea; TNF-α , IL-10, cytokines

Biography

Anna Mkhoyan Experienced Assistant Professor with a demonstrated history of working in the higher education industry. Skilled in Pharmacovigilance, Medical Research, Clinical Research, Statistics, and Research. Strong education professional with a Doctor of Philosophy - PhD focused in Infectious Diseases from Yerevan State Medical University after MkhitarHeratsi. Master of Public health, American University in Armenia. Research interests: Tropical diseases, diarrheal diseases, HIV, TB, viral hepatitis, health informatics, medical leadership.

Diagnostic Algorithm in Female Genital Tuberculosis

***J B Sharma[1], Sona Dharmendra[2]**

Department of Obstetrics and Gynaecology, AIIMS, New Delhi

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Abstract

Objective

Female genital tuberculosis (FGTB), an important clinical sub-type of extra-pulmonary tuberculosis (EPTB) is responsible for about 10% cases of infertility in India. It has significant impact on women's reproductive lives in the form of menstrual irregularities mainly oligomenorrhea, pelvic pain, tubo-ovarian masses and in particular infertility especially in developing nations. Diagnosis is difficult due its paucibacillary nature, as no single test has developed having much sensitivity or specificity. The study lightens the importance of Composite Reference Standard (CRS), in diagnosing this enigmatic disease and to develop a diagnostic algorithm to pick up more cases of FGTB but not to diagnose non-FGTB cases as FGTB cases.

Design

Prospective diagnostic observational cross sectional study

Methods

Over 100 infertile females found to have FGTB on composite reference standard which includes endometrial biopsy for acid-fast bacilli on microscopy or culture, histopathological evidence of epithelioid granuloma, positive gene Xpert, LAMP (Loop MediatedIsothermal Amplification) and Urine LAM (Lipoarabinomannan)or definite or probable finding of FGTB on laparoscopy.

Results

A total of 100 infertile women (78% primary, 22% secondary) having FGTB on CRS were recruited in the study. Menstrual symptoms were scanty menses (16%), irregular cycle (7%), dysmenorrhea (11%), pelvic pain (11%), vaginal discharge (65%), adnexal mass (6%), tubo-ovarian mass on ultrasound (15%), abnormal hysterosalpingography findings (57.14%), positive polymerase chain reaction (65%) and abnormal hysteroscopy (82.2%).
Mean age, body mass index, parity and duration of infertility were 28.2 years, 23.17 kg/m2, 0.24 ± 0.12 and 2.41 years respectively.

The positive findings on CRS were positive AFB on microscopy or culture (3%), positive gene Xpert (28%), epithelioid granuloma on histopathology (13%), definite findings on laparoscopy like tubercles, caseous nodules and beaded tubes in (57.19%) patients while probable findings of FGTB like straw colored fluid in POD, extensive dense pelvic, peri-tubal, periovarian

adhesions; hydrosalpinx; tubo-ovarian mass; thick fibrosed tubes; mid tubal block; peri hepatic adhesions (Fitz Hugh Curtis Syndrome); hyperemia of tubes/blue uterus on chromotubation were seen in (48.8%) patients. Patients found positive on CRS were given 6 months of anti-tubercular therapy under DOTS under NTEP.

Conclusion:

This study clearly implicates the high reliability of use of composite reference standard and as a diagnostic algorithm for diagnosis of FGTB.

Keywords

Female Genital Tuberculosis, Composite Reference Standard, Loop MediatedIsothermal Amplification, Algorithm

CoxiellaburnetiiEndocarditis in a Patient with Systemic Lupus Erythematosus: A Case Report of a Diagnostic Challenge

Dr. Ahmed Alqallaf

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Abstract

Objective:
Rare co-existence of disease or pathology

Background: There is a close association between Q fever and autoimmune disease, with some case reports in the literature of Q fever presenting as systemic lupus erythematosus (SLE) and others documenting their coexistence. However, making the correct diagnosis remains challenging and Q fever often is overlooked. Therefore, it is essential to review such a rare presentation to help in accurate diagnosis in future cases. This report is of a case of endocarditis due to Coxiellaburnetiiin a patient with Q fever and a history of SLE.

Case report: We report the case of a 43-year-old man with a history of SLE and rheumatic heart disease, status post-valve replacement. The patient initially presented with an acute kidney injury in the setting of a history of full-house lupus membranous nephropathy, which was diagnosed on kidney biopsy. The patient had been on immuno- suppressive therapy for 2 years. Shortly after he was admitted, echocardiography was ordered because the patient had progressive dyspnea, revealing infective endocarditis involving multiple valves. He underwent valve repair surgery and was placed on an extended course of antibiotic therapy. His symptoms gradually resolved, with normalization of his immunological markers. The patient's immunosuppressive regimen was eventually discontinued. He remains on lifelong antibiotic suppression therapy.

Conclusions: This case highlights the importance of awareness of infectious causes of endocarditis in patients with under- lying autoimmune diseases such as SLE. This rare case of C burnetiiendocarditis may have been associated with underlying valvular SLE.

Biography

Dr. Ahmed Alqallaf, MD Consultant in Internal Medicine, Nephrology & Kidney Transplant Head of Nephrology Division in Jaber Al- Ahmad Hospital Head of Nephrology Division in AL- Sabah hospital Kuwait 1. Board in Internal Medicine inKuwait Institute for Medical Specialization (KIMS) Board in Internal Medicine (2009) 1.Nephrology Clinical Fellowship, University of Toronto, Canada, 2014 2. Renal Transplant fellowship at McGill University,

Montreal, Canada, McGill University Health Center (MUHC), accredited and certified by American Society of Transplantation (AST), 2015 3. Received a Young Investigator Award for the American Transplant Congress (ATC) 2015 meeting 4. Director of Research support office at Kuwait Institute for Medical specializations (KIMS), Kuwait 5. Member to the Houston Methodist Global Alliance, from January, 2018 till present 6.Member of Kuwait Nephrology Association (kna.org.kw) 7. Member of Kuwait society of Transplantation.

Global Meet on Biotechnology and Bioscience &
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Evaluation of Effector Properties of T-Cell in HIV Individuals Under Anti-Retro Viral Therapy from India

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Abstract

Background: In human immunodeficiency virus (HIV) infection, T lymphocyte homeostasis significantly perturbs and eventually depletes CD4 T-cell population and alters CD8 T cell immune functions. Due to the persistence of HIV-specific antigens that drives CD8 T-cell differentiation and its effector potential including secretion of cytokines and cytolytic molecules that affects the functioning of the immune cells. Most importantly, the expression of cytolytic granules is essential for effective immune control of infections re-enforcing the anti-viral immunity in the CD8 T-cell response in comparison to CD4 cells.
Objectives: To determine the alterations in the effector immune responses using cytolytic and cytokine markers on CD4 and CD8 subset of T-cells in HIV-infected individuals on antiretroviral therapy (ART) from India. To correlate the expression of cytolytic granules and cytokine with the viral load and host immune status.

Methodology: In this study among HIV-infected individuals on ART, blood samples were obtained from sixty-eight HIV-infected individuals attending the HIV clinic at YRG CARE, Chennai, India, at the time of their routine monthly visit, during the period December 2020 to April 2022 with median age of 48.5 years and 58.8% were males and 41% were females. HIV viral load was estimated using automated specimen processing (COBAS® AmpliPrep) and amplification and detection (COBAS® TaqMan® 48 Analyzer) for the detection of HIV-1 RNA. CD4 count was enumerated using the BD FACS Count system (Becton Dickinson, US). The cytotoxic potential and cytokine were determined using intracellular staining method in the 18 hours stimulated cultures (2 × 106 cells) using PMA (20 ng/ml), ionomycin (1 ug), gag peptides (1 ug), and Brefeldin A (10 ug). After incubation, the cells were washed, fixed, permeabilized with Becton Dickinson (BD) Cytofix/Cytosperm and stained with antibodies (CD3 -APC-H7, CD4-PECF594; CD8-APCR700, granzyme A-PE, granzyme B-APC, granulysin -AF488 and perforin-PERCP5.5; IFN-g-PECy7 (BD Biosciences), and the cells were analyzed on a FACS

ARIA III SORP flow cytometer (BD). A minimum of 1,000,000 total events were acquired and data were analyzed using FlowJo software, version 10.5. Percentage frequency of the effector molecules expression was determined. Values were presented as mean and standard deviation. For all analyses, differences were considered significant if the p-value was <0.05. Correlation matrixes based on Pearson co-efficient was constructed to determine the high viral loads with high expression of cytolytic granules. Heat map was generated to determine the influence of high CD4/CD8 ratio with expression of cytolytic granules.

Results: In CD4 cells of the HIV individuals under ART, the expression of granzyme A was found in 19±15% and in CD8 cells it was 44±28%; P<0.0001. Similar range was observed for the expression of granzyme B in CD4 cells (19±20.3%) and CD8 cells (41±19.3% P< 0.0001). In addition, the double positives for granzyme A+B+ was seen in 13±14.20% and 30.5±23.7% amongst CD4 and CD8 cells, respectively. Fifteen percent of individuals had the expression of granulysin in CD4 and 17.27± 16.19%; P= 0.001 had in CD8 cells and very low-level expression of perforin was evident in (3.17± 3.09) CD4 and (3.9±4.3%) CD8 cells, without any significant difference. Further, the expression of cytokine IFN-g was observed in 15.18±15.16% and 24±19.5% amongst CD4 and CD8 cells; P= 0.008, respectively. In addition, positive correlation (r = 0.16) between high viral loads and cytolytic (granulysin and perforin) expressions were evident in CD8 and CD4 cells, respectively, followed by granzyme A+B+ (r = 0.22) and IFN-g (r = 0.33) in CD4 cells and IFN-g (r = 0.30) in CD8 cells.

Conclusions: Our study presents evidence of a comparatively higher expression of granzyme A and B; moderate expression of granulysin and IFN-g and lower-level expression of perforin both in CD4 and CD8 T-cells. Of note, the expression of all effector molecules was found to be higher in CD8 cells in comparison to CD4 cells, signifying the cytotoxic potentiality of CD8 cells among HIV-infected individuals on suppressive ART. A positive correlation was observed with high viral loads and lytic expressions such as granzyme-A+B+ in CD4 cells; granulysin in CD8 cells; cytokine expression like IFN-g in CD4 and CD8 cells. Further, the impact of high CD4/CD8 ratio and cytolytic activity in granzyme-A expression in CD8 cells, granzyme-B expression in CD4 cells and moderate expression levels of granulysin amongst CD8 cells was also found. Several HIV vaccine candidates have been focused on the induction of CD8+ T-cell responses, i.e., as a therapeutic approach in order to control viremia. Previous studies support a role for CD8+ T cells in HIV eradication and durable remission or rebound approaches. These studies demonstrate the potential of CD8+ T-cell-based therapeutic strategies for HIV treatment or cure. Combination of different strategies, such as vaccine induction of virus-specific CD8+ T-cells and subsequent adoptive transfer, could limit viral replication and/or rebound after cART interruption.

Keywords
HIV, CD4, CD8, effector molecules

Biography

DR. Nusrath Unissa A has a background in infectious diseases with more than 15 years of working experience in the broad area of drug resistance and immune disturbances in infectious diseases. DR. Nusrath has undertaken numerous research studies on tuberculosis, and HIV infection. Her research interests include drug resistance in TB, HIV, and identification of cellular and immune biomarkers for predicting immune dysfunction among HIV-infected individuals under treatment. She had 25 first author publications that includes four in depth reviews in areas of drug resistance. She has obtained several fellowships including two post-doctoral fellowships from Indian Council of Medical Research.

Tuberculosis among Pediatric Household Contacts Of Drug Sensitive and Drug – Resistant Tuberculosis Patients- A Prospective Cohort Study

Sangeeta Sharma

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Abstract

Objective:

Data on the rate of TB infection (TBI) and subsequent risk of active disease in householdcontacts (HHC) has not been consistent. Different studies have reported differences in prevalence of TB infection and progression.

Study Design:

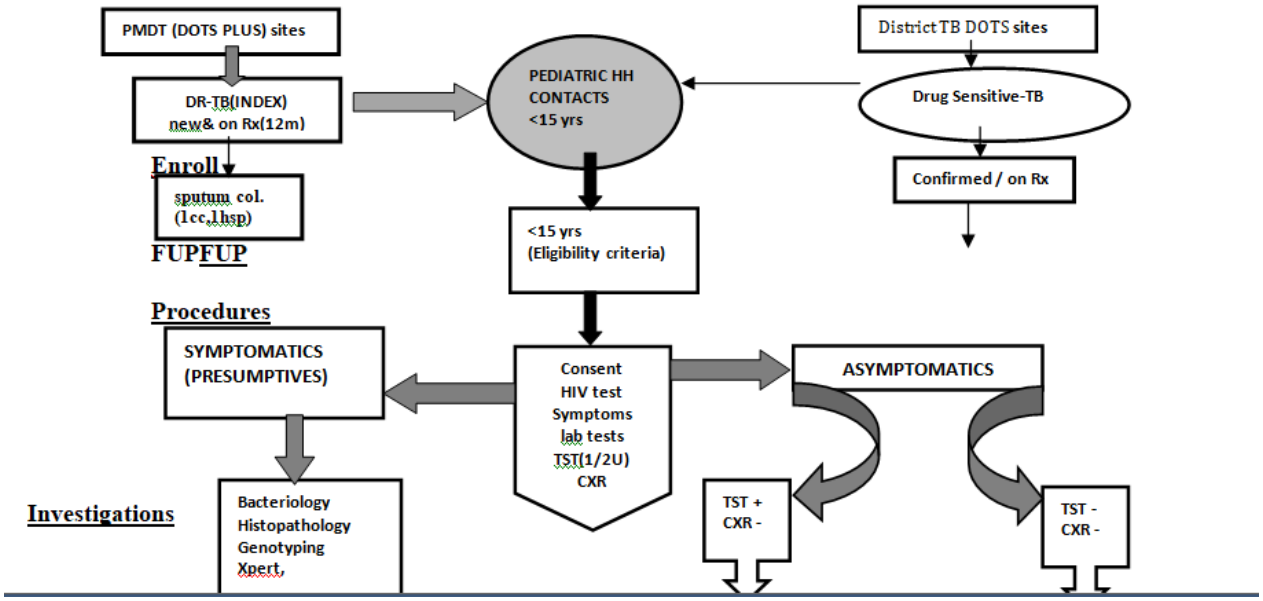
Prospective cohort study 1 year follow-up of HHCof drug sensitive (DSTB) and drug resistant (DRTB) smear-positive Pulmonary TB cases to assesstheir outcome as per standard WHO definitions.

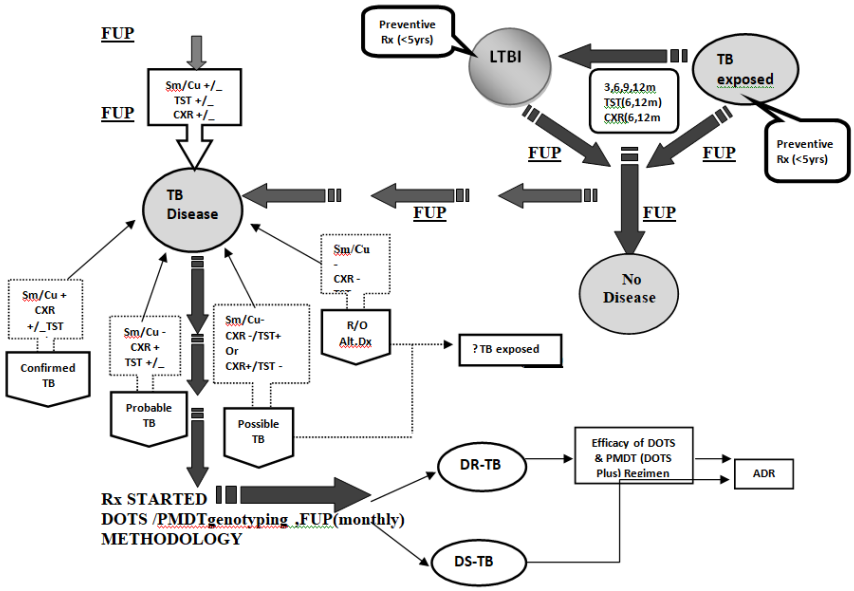
Results

Out of 779 householdcontacts of 400 smear-positive Pulmonary TB index cases, 496(63.67%) DSTB and 283(36.33%) DRTBwere enrolled over 2 years and followed up for 1 year. Out of 496 DSTB HHC enrolled, 175(35.28%), 193(38.91%), 128(25.81%) were in 0-5, 6-10 and 11-14 year age groups respectively. At time of enrollment, 90(19.7%) were symptomatic and 406 (80.2%)asymptomatic. In symptomatics,positive by TST 30(40%), X-ray 29(32.22%), CBNAAT 9(10%), smear 6(6.67%) and MGIT culture3(3.33%). In asymptomatics, 165(40.64%) were TST positive, 314(77.34%) X-ray positive, 13 (3.20%) CBNAAT positive, 2 (0.49%) smear positive and 2 (0.49%) MGIT culture positive. After1 year follow-up of 496 DS HHC, 21(4.23%) developed TB disease with 14(66.67%) symptomatic and 7(33.34%) asymptomatic, 16(76.19%) had microbiological confirmed DSTB, 3(14.28%) pleural effusion and 2(9.52%) abdominal TB.

Out of 283 DRTBHHC enrolled, 71(25.08%), 120(42.40%) and 92(32.51%) were in 0-5, 6-10 and 11-14 years age groups respectively. Out of these, 17 (6.01%) were symptomatic and 266 (93.99%) were asymptomatic. In symptomatic, 10 (58.82%) were TST positive, 5(29.41%) Chest X-ray positive, 1(5.88%) CBNAAT positive and 1(5.88%) smear positive. In asymptomatics, 96(36.09%) were TST positive, 58(21.80%) Chest X-ray positive, 8(3.01%) CBNAAT positive, 1(0.37%) smear positive and 1(0.37%) MGIT culture positive.After 1 year follow-up,6(2.12%) HHCs developed TB disease, 4(66.67%) were symptomatic and 2 (33.34%) were asymptomatic, out of which 3(50%) developed microbiologically confirmed DSTB, 2 (33.34%) had Pleural effusion and 1(16.67%) miliary TB.

Methodology (Flow Chart)





Conclusion:

Contact tracing is an important tool towards End TB strategy bridging the case detection gap by early diagnosis and proper management of TBI and disease.

Keywords

Drug Sensitive and Drug – Resistant Tuberculosis, Smear positive Pulmonary TB, Pediatric Household Contact, CBNAAT (Cartridge based Nucleic Acid Amplification Test)

Biography

Dr. Perez-Camargo has dedicated 28 years to pet nutrition research and pet diet development Prof. Sangeeta Sharma Global Member, World Health Organization (WHO) Childhood and Adolescent TB Working Group since 2018. contributed as an Expert in WHO's meetings on Tuberculosis (TB) and MDRTB (2019-till date) MDRTB Systematic Review & Individual Patient Meta-Analysis 2022 (follow up meta analysis -2022) which lead to policy changes and revision of DRTB drug doses and regimens in children (in press) • MDRTB Systematic Review & Individual Patient Meta-Analysis 2018 which lead to policy changes and revision of DRTB drug doses and regimens in children. Member,WHO-GoI Joint Monitoring Mission (JMM) for NTEP 2019 National: NTEP • Co-chair, National Technical Expert Group (NTEG) Pediatric TB • Principal contributor to the formulation of Pediatric TB and DRTB Guidelines 2003 and subsequent revisions in 2012, 2015 and 2019. • National Expert member, NTEG on TB Diagnosis, Treatment, Latent TB Infection(LTBI), Pediatric TB, Women TB, TB in Special situations and Co-morbidities. National Facilitator training to WHO fellows, National & Regional Training of Trainers (TOT) . • visiting professor Medical Colleges Member of 5 year National Child Action Plan and "Right to Child Health" Expert,updation of TB component in RBSK questionnaire 1. Publications(International & National papers/books/ chapters) : 76 2. Projects:(as Principal investigator, ICMR and Central TB Division MoHFW funded projects) PI: Use of newer drugs bedaquiline and delamanid in children < 18 years, -PI: one year follow-up of 900 household contacts.

Genital Tuberculosis: Important Factor in Infertility in India

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Abstract

Objective

Female genital tuberculosis (FGTB) is a silent cause of infertility. Due to its paucibacillary nature, diagnosis is difficult as no single test has developed so far to elucidate its diagnostic modality. The study elucidates the importance of FGTB in infertility patients.

Design:

Prospective observational cohort study

Methods

Over 320 infertile females were screened for FGTB. Inclusion criteria consists of endometrial sampling of acid-fast bacilli on microscopy or culture, histopathological evidence of epithelioid granuloma, positive gene Xpert and definite or probable finding of FGTB on laparoscopy.

Results:

Out of 320 infertile women screened, 175 women were found to have FGTB. Mean age, body mass index, parity and duration of infertility were 28.2 years, 23.17 kg/m2,0.24 ± 0.12 and 2.41 years respectively. Various symptoms and signs were scanty menses (14%), irregular cycle (26%), dysmenorrhea (12%), pelvic pain (13%), vaginal discharge (45%), adnexal mass (12%), tubo-ovarian mass on ultrasound (15%), abnormal hysterosalpingography (HSG) findings (59.04%), PCR test (68%) and abnormal hysteroscopy (83.12%). The positive AFB on microscopy or culture (2.87%), positive gene Xpert (29%), epithelioid granuloma on histopathology (15%), definite findings on laparoscopy like tubercles, caseous nodules and beaded tubes in (65.19%) patients. Probable findings of FGTB like straw colored fluid in POD, extensive dense pelvic, peri-tubal, peri-ovarian adhesions; hydrosalpinx; tubo-ovarian mass; thick fibrosed tubes; mid tubal block; peri hepatic adhesions (Fitz Hugh Curtis Syndrome); hyperemia of tubes/ blue uterus on chromotubation were seen in (43.2%) patients. All patients found to be positive were given 6 months of anti-tubercular therapy (ATT) under DOTS.

Conclusion:

FGTB is an important cause of infertility. Timely diagnosis and treatment can elucidates better fertility outcomes.

Keywords
Female Genital tuberculosis, Infertility, Gene Xpert, Hysterosalpingography (HSG)

M. tuberculosis Proteins and Peptides and their Antibody Reactivity in Rabbits

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Abstract

Background:
Tuberculosis is a major health problem. Despite having the BCG vaccine, there is a need to develop a new, more effective vaccine. This requires the identification of major antigens and peptides of Mycobacterium tuberculosis. It has also been observed that the immunogenicity of antigens may vary depending on the species tested. This study aimed to determine the antigen-specific antibody responses in rabbits to proteins and peptides encoded by M. tuberculosis-specific regions of difference (RD) genes, i.e., RD1 (PE35, PPE68, ESXA, and ESXB) and RD9 (ESXV).

Methods:
Sera were obtained from i. rabbits immunized with pure recombinant PE35, PPE68, ESXA, ESXB, and ESXV. ELISAs were performed with the sera to determine the antibody reactivity to purified proteins, peptide pools, and individual peptides of RD1 and RD9 proteins. The optical density (OD) values were measured at 405 nm. E/C was calculated, and the values of E/C>2 were considered positive.

Results:
The ELISA results with sera from rabbits immunized with pure proteins showed positive antibody reactivity with all immunizing proteins and their peptide pools. Testing of the sera with individual peptides showed positive antibody reactivity with PE35 peptides P1, P2, P5, and P6, PPE68 peptides P9, P11, P14, P22, P23, and P24, all peptides (P1 to P6) of ESXA and ESXB, and ESXV peptides P1, P2, P3, P5, and P6.

Conclusions:
The results suggest that all of the tested proteins have several antibody-inducing epitopes and demonstrate the superiority of rabbits for studying antibody responses to various antigens.

Keywords
Mycobacterium tuberculosis, Recombinant vaccine vectors, ELISA, Antigens, Antibodies, different species

Biography

Dr. Hanif is an Associate Professor at the Kentucky College of Osteopathic Medicine, University of Pikeville. Dr. Hanif has authored 26 full-length peer-reviewed papers, 2 book chapters, and 66 abstracts. Dr. Hanif has received several research & travel awards. She has professional skills in handling infectious diseases, tissue culture, immunological & molecular techniques, and animal work. Dr. Hanif has taught both undergraduate and graduate-level students. Dr. Hanif is also a member of the editorial board for the Journal of Mycobacterial Diseases and Guest Editor for the Special Issue of "Advance in Plasmid DNA and mRNA as Vaccine Technologies," "Topic Advisory Panel Members' Collection Series: Immunization and Vaccines for Infectious Diseases" and "Review Special Issues Series: Vaccines and Immunotherapy for Infectious Diseases" for vaccines journal. Dr. Hanif is a National Faculty in the Clinical Department of Foundational Biomedical Sciences-Microbiology/Immunology Division of the National Board of Osteopathic Medical Examiners (NBOME). Dr. Hanif's research interest is in infectious diseases, particularly Tuberculosis. Dr. Hanif's research focused on developing new diagnostic methods, drugs, and vaccines for TB.

Bio-Threat Detection, Monitoring, Triggering andIdentification Techniques for Bio-Defence

Dr. StefStiesntra

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Abstract

The threat of infectious diseases is with the growing population in dense populated cities and lot of travel movements between the cities a growing threat.
In modern society emerging biological threats disrupt both society and military operations. The recent outbreak of SARS-CoV-2 is a an example of an emerging pathogen, which has spread all over the world with a huge effect on the world economy. In the future we can expect more nasty viruses, which could create a lot of fear and economic damage.
These disease outbreaks can be the result of a natural outbreak or accidental release of a (modified) pathogen from a laboratory. Bio-crime with biological toxins and infectious pathogens, like bio-terror incidents have taken place and can be expected in future.
Therefor it is of utmost importance to do research on the new emerging contagious diseases and to develop suitable sample collection and identification techniques. At the same moment biothreat awareness, especially in laboratories doing 'gain of function' research, is important as a simple mistake can have global effects.
New tools to monitor, detect and identify the threat of new pathogens with different techniques, which can give a prompt and reliable results are developed. Classical culture techniques are replaced by PCR, MALDI-TOF, spectral techniques, flowcytometry, immunological techniques and sometimes complete new technologies.
The new techniques in a bio-watch program shouldn't give too much false positive results nor false negatives. This is a challenge together with determining, which should be the right trigger level of the detection of a potential pathogen. In the complete chain of pathogen-identification the forensic aspects are important to give the court proper prove to prosecute the offenders.

Biography

Works internationally for several medical and biotech companies as scientific advisory board member and was titl this year an active reserve-officer of the Royal Dutch Navy in his rank as Commander (OF4). For the Dutch Armed Forces he is CBRNe specialist with focus on (micro)biological and chemical threats and medical- and environmental functional specialist within the 1st CMI (Civil Military Interaction) Battalion of the Dutch Armed Forces. For Expertise France he has managed from 2014 to 2019 an EU CBRN CoE public health project in West Africa. He is visiting professor at the University of Rome Tor Vergata giving lectures for the CBRN Master study. For the EU he is advisor on (CBRN) resilience in relation to preparedness in public health requirements. In this role he advises the Resembid program of the EU, performed by Expertise France.

In his civilian position he is at this moment developing with MT-Derm in Berlin (Germany) a novel interdermal vaccination technology as well as a new therapy for cutaneous leishmaniasis for which he has won a Canadian 'Grand Challenge' grant. With Hemanua in Dublin (Ireland) he has developed an innovative blood separation unit, which is also suitable to produce convalescent plasma for Ebola Virus Disease therapy.

He has finished both his studies in Medicine and in Biochemistry in The Netherlands with a doctorate and has extensive practical experience in cell biology, immuno-haematology, infectious diseases, biodefense and transfusion medicine. His natural business acumen and negotiation competence helps to initiate new successful businesses, often generated from unexpected combinations of technologies.

The Genome-Wide SNP Analysis of Recently Isolated Strains of Yersinia pestis from Georgia

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Abstract

Background: Plague is endemic to the Caucasus region.Two naturalplague endemic areas are located in Georgia: plane-foothills and high mountainous foci. In May 2019, an epizootic in wild rodentswas recorded after almost 50 years of plague activity silence in the plane-foothill plague focus closelyto the border with Azerbaijan. Two novel Y. pestis isolates were obtained from dead Libyan jirds (Meriones libicus). In this study,SNP typing based on whole genome sequencing (WGS) was performed to define genetic relationship between the mostrecently obtained isolates and archivalY. pestis strains fromthesame region.

Materials and Methods: WGS of new Y. pestis isolates was performed using Illumina MiSeq platform. Sequence data processing was conducted on CLC bio genomic workbench and EDGE bioinformatics software package. Genome alignment, SNP identification, phylogenetic tree construction and analysis were performed using phylogenetic and molecular evolutionary (PhaME) analysis software. Isolates collected from the other Caucasus plague foci were included for comparisons.

Results: Totally, 206-220 contigs were obtained for each genome. An average genome assembly size was 4,6Mb. Each strain had three virulence plasmids pMT, pCD, and pPCP characteristic for fully virulent wild-type strains. Phylogenetic analysis has confirmed that recently obtainedY. pestisisolates belong to the 2.MED1 branch of biovar Medievalis previously described in Caucasus. New isolates clustered together close to the strain isolated from the same plague focus in 1966 and with the strain KIM10 isolated from Iranian Kurdistan. Isolates from Azerbaijan and RF also shared common features with new isolates indicating close phylogenic relationships of these strains.New SNPs were identified that allowed to differentiate the newly obtained isolates from an archival Y. pestis strain from the same foci.

Conclusion: The genome-wide SNP analysis enabled unbiased comparison and identification of genetic relationshipbetween recently obtainedY.pestis isolates and a strain previously obtained from the same focus. The occurrence of the most recent epizootics shows that plague

can disappear from foci for a long period of time prior to re-emerging again. Therefore, continuous surveillance of rodents and vector populations of the focusis important as plague has a potential for spreading into human population.

Keywords
Yersinia pestis; SNP; Georgia;Plague

Biography

Ekaterine Zhgenti, Ph.D. scientist with the background in microbiology. She has been working at the National Center for Disease Control and Public Health of Georgia (NCDC) since 2001. Currently she is a chief specialist in the department of the Virology, Molecular Biology and Genome Research. She is involved in all activities in the molecular epidemiology laboratory, including diagnostic, genotyping and NGS analysis of especially dangerous and other bacterial and viral pathogens (B. anthracis, Y. pestis, Brucella, F.tularensis, CCHF, etc.). Ekaterine improved her experience in various international laboratories such as Lawrence Livermore National Laboratory, USA, Lawrence Berkeley National Laboratory , USA; Los Alamos National Laboratory , US; AFRIMS, Bangkok, Thailand; London School of Hygiene & Tropical Medicine, UK; University of Maryland School of Medicine , USA, Walter Reed Army Institute of Research, USA, Northern Arizona University, USA; The Health Protection Agency, UK; University of Cardiff, UK; University of California, Davis, USA etc. She is actively participated in a number of research projects related to genetic studies of various infectious agents; most of these works have been published (~20 publications). Over the years she participated in the development and implementation of up-to-date methods for molecular diagnostics and genotyping of bacterial and viral pathogens at NCDC. She has been involved in the trainings and professional development of new staff, regional offices, and colleagues from neighboring countries. In 2011 she received the best poster award (The German Society of Military Medicine and Pharmacy Congress; Munich, Germany).

Pediatric Tuberculosis:a Review

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Abstract

Total 10.6 million cases, children accounts for 11% of the world's TB cases. In worldwide, the reported percentage occurring in children varies from 3% to more than 25%.

The diagnosis in children of pulmonaryand extrapulmonarydisease is based on a combination of clinical picture, radiological and microbiological confirmation in a presumptive TB cases which includes unexplained feverand / or cough with persistent expectoration for >2 weeks, history of ≥ 5%weight loss in past 3 months, anorexia and history of household/ close contact with an infective active TB person in last 2 years. Diagnosis is difficult due to pauci-bacillary nature.

Microbiological confirmation is achieved by molecular tests or liquid culture fordetection of Mycobacterium tuberculosis(MTB), Rapid diagnostic tests like genotypic drug sensitivity testing (DST) using Nucleic Acid Amplification Tests (NAAT) for rifampicin resistance, the Cartridge Based (CBNAAT or Xpert MTB/RIF™ Gene Xpert) andChip Based NAAT (Truenat™/MTB-RIF Dx™), Xpert XDR, First Line Probe Assay (FL-LPA) for RH resistance while Second Line Probe Assay (SL LPA)and Xpert Ultrafor FQ and SLI resistance. Myco bacterialgrowthindicatortubes(MGIT) followed by genotypic or phenotypic DST are being recommended for timely diagnosis as these testshaveahigher sensitivity, specificity and a faster turn-around time.

Newer tests like loop-mediated isothermal amplificationtest (LAMP; real-time nested PCR) developedreplacing the smear while urinary lipo-arabinomannanassay (LAM); highly sensitive test in CLHIV with CD4 ≤100/ ml with TB is recommended. In cases where microbiological confirmation fails, treatment is based on DST result of household contact.

Treatment includes WHO recommended all oral regimens for drug sensitive and drug resistant TBdepending upon the severity and site of disease. 6 month regimen (2 HRZ(E)/ 4 RH(E) and 4 month regimens[(2 HRZ (E)/2 HR) and (2 HPZM/ 2 HPM) for less severe disease. Less severe disease is defined as intrathoracic disease with smear and / or culture negative, NAAT positive single lobe opacification, uncomplicated pleural effusion, mediastinallymphadenoapthy without compression; EPTB peripheral lymphadenopathy only. For DRTB, all oral shorter and individualized longer regimen is recommended. Treatment regimens for DS TBMare 2 RHZE/10 RHE or 6 months Ethionamide based regimen. Compliance is through Directly Observed Treatment (DOT) or Video Observed Treatment (VOT).Achild friendly formulations

are available for almost all anti-TBdrugs. Drugs are given daily as per body weight. Monitoring is done for checking compliance, assessment for adverse drug effects and response to treatment. For TB prevention household and close contact for all ages are given preventive therapy (6H, 3RH, 3 HP, 1 HPafter ruling out active disease. A child born to mother having TB in pregnancy is continued breast feeding with face mask, BCG vaccination given at birth and INH chemoprophylaxis after ruling out disease. Research on newer diagnostics, drugs, regimens and vaccines are ongoing as clinical trials.

R- Rifampicin
H- Isoniazid
Z- Pyrazinamide
E- Ethambutol
P- Rifapentine
M- Moxifloxacin
DOT- Directly Observed Therapy
VOT- Video Observed Therapy
FQ- Fluoroquinolone
LOD- Limit of Detection
SLI- Second Line Injectables.

Keywords
Pediatric Tuberculosis, LAMP (loop-mediated isothermal amplificationtest), Gene Xpert, LAM (lipo-arabinomannan assay)

Advances in the study of the angiogenic process in animal and human dirofilariasisas a survival mechanism

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Abstract

Cardiopulmonary dirofilariasis is a vector-borne zoonotic disease caused by the parasitic nematode Dirofilariaimmitis, which is mainly located in the pulmonary arteries of the host causing proliferative endarteritis and pulmonary hypertension, obstruction, and hypoxia, among others, the main triggering stimulus for angiogenesis. Subcutaneous dirofilariasis caused by Dirofilaria repens is a vector-borne zoonotic disease that mainly affects canids and humans. This parasite, when causing subcutaneous nodules, interacts with the vascular endothelium and survives in the host within these nodules. Angiogenesis is a process involving a series of endothelial morphogenetic changes that result in the formation of new vessels from existing ones. This process arises as a response to hypoxia by endothelial cells, which try to form structures in the direction of a hypoxic VEGF-producing focus. The aim of this session is to provide an overview of the management of dirofilariasis from the One Health point of view, while at the same time delving into the inflammatory and angiogenic process of the disease as a survival mechanism of these parasites, consideringWolbachia sp. as an endosymbiont bacterium of these parasites and its relationship with the proinflammatory and antiangiogenic processes. Due to the complexity of these processes and the interaction between parasite and host, the modulation of angiogenesis, which is essential for parasite survival and disease pathogenesis, will be studied.

Modeling of multicellular colonies functioning under programmed cell death (apoptosis)

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Abstract

Apoptosis is a form of programmed cell death. In some cases , cells dying from apoptosis are known to be absorbed by neighboring cells. In this paper, apoptosis is modeled by sets of differential equations under an assumption that parts of dead cells are absorbed by their neighbors. A modeling is conducted, taking into account both extrinsic and intrinsic pathways of apoptosis. Using numerical methods, a study of the behavior of the colony is carried out for various parameters, such as the initial level of nutrients, the initial number of healthy cells, or the coefficient of absorption of dead cells by healthy cells in the colony. With a sufficient amount of nutrients, a rapid growth of the colony and then the establishment of an almost constant number of cells is observed. The number of healthy cells experiencing a lack of nutrients is found to decrease at first, and then begins to increase as the colony adapts. Also, our calculations show that there are values of the parameters at which growth of the colony is not observed, and the number of cells is set at some lower value. In addition, the study investigates the behavior of the colony during the abrupt death of a large number of cells at the beginning, during the execution of both the apoptosis pathways, or of the external pathway only

It is a joint work with my young colleagues AlinaShipitsina (MPTI and ICS of Russian Academy of Sciences) and TimofeyLomonosov (HSE University, Moscow, Russia).

Biography

Positions: a) Head, Department of Mathematics for Economics, National Research University Higher School of Economics; b) Head, International Centre of Decision Analysis and Choice, National Research University Higher School of Economics Contacts: 20 Myasnitskaya Str., Moscow 101000, Russia; Phone (+7) (495) 621-1342, E-mail: alesk@hse.ru https://www.hse.ru/en/org/persons/140159 c) Head, Laboratory of Choice Theory and Decision Analysis, Russian Academy of Sciences Institute of Control Sciences Contacts: 65 Profsoyuznaya Str., Moscow 117997 Russia, Phone (+7) (495) 334-8869, E-mail: alesk@ipu.ru EDUCATION 1969--1974, Student, Mathematics Faculty, Moscow State University 1981, Ph.D. in Control in Socio--Economic Systems (thesis title “Interval Choice”) DISTINCTIONS AND AWARDS 1993, Doctor of Science (thesis title “Local Aggregation Models”) - First prize: Vavilov's Scientific Society, 1986. - Second price: All--Union Exhibition on Advanced Studies, 1989. - First prize: Popov's Scientific Society, 1989. - Award “Golden Vyshka” by the State University “Higher School of Economics” for the scientific achievements, 2004 - Honorary Worker of Science and Technology of Russian Federation, 2011 - Medal of the Order "For Merit II" (Decree of the President of Russia on 21.12.2013) - Letter of gratitude from the government

of Russian Federation, 2017 - Walter Scott Award of International Academy of Information Technology and Quantitative Management for remarkable record of creativity in enhancing the theory, algorithm, education and applications of information technology, December 2017 - Member of the Academia Europaea (2018) - Anniversary Diploma “Agora 2020” from Agora University in Oradea, 17.03.2020.

Differential Degree of DnmtsGene Expressions by GST O1 and GST O_2 Polymorphism in Arsenic Exposed People of West Bengal with and Without Malignancy

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Abstract

Arsenic is a carcinogen although is a poor mutagen. Its carcinogenic action is through epigenetic modifications. Though chronic arsenic exposure causes skin manifestations and even cancer, yet, the response varies widely among persons despite receiving similar cumulative exposure through their food or drinking water or both. These differentiations in manifestations may be due to polymorphic distribution of arsenic metabolizing genes like GSTs among exposed people or due to expressional variations in methyl transferase genes.

Polymorphism of GSTO1, GSTO2 and their frequency distribution may modify skin manifestations and development of arsenic induced cancer in exposed persons through food chain. Polymorphic variations of GSTO1 and GSTO2 have been studied on 112 subject including control. All of the exposed subjects were recruited from one of major arsenic affected district, Nadia of West Bengal, India, having high arsenic content in their food. Exposed subjects were categorized into three groups, i.e, with arsenical skin lesions and with out arsenical skin lesions and arsenic induced cancer. Control subjects were 33 in number and they were recruited from non-endemic area of arsenic. The control subjects were free from any degree of arsenic exposure. Concentration of arsenic in urine, hair, drinking water, food, extent of clinical manifestations, GST O1and O2status was determined for every participant. DNMT1, 3A, and 3B were studied for their expression profile and analyzed with GSTO1 and O2 polymorphisms.

Genetic polymorphism of GSTO1 gene polymorphism is significantly associated with arsenic induced skin scores in skin lesion positive cases and arsenic induced cancer cases and also significant increase is seen in DNMT expression and MDA level in exposed cases with homozygous wild type variants. Total urinary arsenic decreases significantly in wild

type GSTO1 genotype, although, GSTO2 polymorphism showed no statistically significant differences in skin manifestations, and DNMTs expression. Frequency of GSTO1 and O2 polymorphic variety showed prevalence of wild type homozygous in arsenic induced cancer cases.

GSTO1 polymorphism shows significant association with DNMT expression profile in arsenic exposed people.

Keywords

arsenic exposure, genetic polymorphism, DNMT expression, skin lesions

Biography

Dr. Perez-Camargo has dedicated 28 years to pet nutrition research and pet diet development Dr. Sarmishtha Chanda did her graduation on Physiology and did her PhD on Molecular Biology on 2006. The topic of her thesis is 'Molecular Changes Induced by Arsenic'. After that she pursued her Post-Doctoral research from Indian Institute of Science, Bangalore, India and Indian Institute of Chemical Biology, Kolkata, India.On 2008 she joins on West Bengal education service as assistant Professor in Physiology. Since then till now, she is working as a faculty of Physiology in a Government Graduate College under West Bengal Education Service, Higher Education Department, West Bengal, India. She is actively involved in teaching and contemporary research since last 14 years after joining as faculty on 2008. The core area of her research is heavy metal induced cancer and its molecular mechanismand also radiation induced cancer. She Published several national and international papers and book chapters in journals of international reputes. She received numbers of national awards and honorary memberships from different national and international scientific bodies like ACSE, AIBMS, STOX, Bentham Science ect. Dr. Chanda is also involved as a reviewer of Springer-Nature journals and Wiley journals and also working as editor in a few international toxicology journals.

Factors associated with non-adherence to tuberculosis treatment among patients in African countries: a systematic review

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Abstract

Background

Tuberculosis (TB) is a disease that is among the top ten causes of deaths globally. The disease can be cured with antibiotic treatment for a period of six months. The main challenge is the non-adherence to the treatment which has a negative impact on the prevention and control of TB. Patients who interrupt the TB treatment are at high risk of transmitting the disease to their close contact and may develop TB drug resistance. Furthermore, the patients may end up dying due to non-adherence to the treatment.

Methodology

The literature search was conducted using Science Direct, Google Scholar and Pubmed databases to identify studies exploring the factors associated with non-adherence to TB treatment among patients in African countries. The relevant search terms used included non-adherence, TB treatment, patients and Africa. The studies that focused on the factors associated with non-adherence to TB treatment among patients in Africa and published in scientific journals from the year 2015 to date were selected for inclusion.

Results

Of the 340 articles accessed, only six articles were included in the review. The studies included in the review highlighted the factors associated with non-adherence to TB treatment such as lack of social support, stigma and drug side effects. Other reported factors that contributed to non-adherence to TB treatment were lack of knowledge among patients about the causes and transmission of TB as well as the duration of TB treatment.

Conclusion

The studies included in the review reported a variety of factors associated with non-adherence to TB treatment. Educating the patients about the causes and transmission of TB as well as the duration of the treatment are necessary to empower patients with knowledge that can enable them to adhere to treatment. Furthermore, social support for TB patients is important in helping them to adhere to the treatment.

Keywords
TB treatment, TB drug resistance, non-adherence, contagious disease

Biography

France Raphela is a lecturer at the Central University of Technology. He has research experience in Environmental Health focused on electromagnetic fields, respiratory diseases and non-communicable diseases.

Houses Improving As A Supplemental Intervention Tools For Reducing Indoor Vector Densities And Malaria Prevalence In Emana, Center Cameroon

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Abstract

Objective:
Improvement of Typical rural houses can effectively reduce indoor vector densities and consequently malaria transmission. We assessed this supplemental control effects in a MILDA low coverage area of center Cameroon.

Methods:
16 houses were firstly selected based on their indoor density of resting malaria vectors. Half of them randomly chosen for eaves screens (experimental) with fibreglass coated wire mesh and half left unscreened (control). Entomological baseline were collected monthly in both groups. Outdoors and indoors adults mosquitoes were sampling for entomological data collection in each houses using Human Landing Catch (HLC). Malaria prevalence surveys were conducted after mosquitoes sampling in both groups.

Results:
A total of 300 mosquitoeswere collected over six months period using HLCin 16 houses (mean mosquitoes =18.75). Among An. funestus, 63.9% were unfed, 32.9% blood fed, 0.39% gravid and 1.56%half gravid females. 17.7% of An. gambiae were unfed and 82.2% blood fed. More

indoor adult mosquitoes were collected in the control (n=74) than experimental houses (n=56). Parasitological surveys resultsto relatively low malaria parasite prevalence rates in screened houses compared to the control houses. Overall, malaria prevalence was 57.8% (95% CI: 0.32-0.74) n=90, with baseline prevalence rate of 58.5% (95% CI: 0.67-1.13), n=65 and 2ndfollow-up survey prevalence of 42.0% (95% CI: 0.52-0.76) n=66. At all the two parasitological follow-up survey points, house screening significantly reduced the malaria prevalence by 43% ($p<0.001$).

Conclusion:
Housing improvement has potential to reduce indoor vector densitiesand malaria prevalence.

Keywords
Housing improvement, Anopheles density, eaves screened, Malaria prevalence, Cameroon

Biography

Dr POUMACHU is an Assistant Researcher of Parasitology and Medical entomology at the Malaria Research Unit at OCEAC in Yaounde working on: Genering approach for sexing mosquitoesOCEAC,Yaounde. He received his PhD in mosquito's genetics at the University of Dschang (Cameroon) in 2021 in collaboration with the International Atomic Energy Agency (Austria)Insect Pest Control Laboratory, Insect Pest Control Section of the Joint FAO / IAEA Division of Nuclear Techniques in Food and Agriculture in Vienna. He is a current member of Royal Society of Tropical Medicine and Higiene has been awarded several research projects including the prestigious Royal Society of Tropical Medecine and Hygiene Small Grant Fellowship.

Thank You!