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Scientific Tracks & Abstracts

(Day 1)

Bassem M Raafat, J Biotechnol Biomater 2016, 6:6(Suppl)
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Hemoglobin derivatives concentration enhancement after usage of magnetic treated water (MTW) through heavy metal chelation therapy

Bassem M Raafat
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Safe drinking water is essential to humans and other life forms even though it provides no calories or organic nutrients. Access to safe drinking water has improved over the last decades in almost every part of the world but approximately one billion people still lack access to safe water and over 2.5 billion lack accesses to adequate sanitation. The aim of this work was to evaluate the enhancement of the hemoglobin different derivatives concentration when normal drinking water replaced by magnetic treated water (MTW) through a heavy metal chelation process. 41 male rats were included. Control group (G1), animals did not subject to lead poisoning and drink normal water. Second group (G2) whose did not subject to lead but drink MTW. Third group (G3) received lead ions for 21 days and drink normal water. Fourth group (G4) those received lead ions concomitant with chelation therapy of dimercaptosuccinic acid (DMSA) and drink normal water. Fifth group (G5) those subjected to lead ions concomitant with chelation therapy of dimercaptosuccinic acid (DMSA) and drink MTW. The rate by which hemoglobin undergo oxidation, hemoglobin normal and abnormal derivatives concentration, superoxide dismutase and glutathione peroxidation activity and electrical conductivity of hemoglobin were measured. Results showed a significant enhancement in normal hemoglobin derivatives concomitant with reduction in abnormal derivatives. Usage of MTW revealed increase in antioxidants activity. In conclusion, it is safe to say that MTW improved the chelation process.

Biography

Bassem M Raafat has completed his PhD from Cairo University and Postdoctoral studies from the National Research Center, Egypt. He is the Vice Dean of Applied Medical Science College, Taif University, Saudi Arabia. He is the Head of E-Learning Unit and Scientific Research and Higher Education. He is the Coordinator of The Genetic Engineering and Biotechnology Division in NRC. He has published more than 42 papers in reputed journals and has been serving as an Editorial Board Member for more than 15 international well ranked journals.

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Notes:

Saif Aldeen Saleh Al Ryalat, J Biotechnol Biomater 2016, 6:6(Suppl)
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CRISPR-Cas 9 system; the new tool to design our own bio-production system

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In 2012, Doctor Doudna and her colleagues generated a new discovery that would reduce the time and work needed to edit genomic DNA, it is Cas9 protein that can be found in Streptococcus bacteria CRISPR immune system. CRISPR-Cas 9 introduced as a tool for sequence-specific Double Strand Breakage (DSB) with low relative cost and high specificity and success rates. The capability of this system to perform targeted, highly efficient alterations of genome sequence and gene expression will undoubtedly transform biological research and spur the development of novel molecular therapeutics for human disease with significantly lower costs. The days where kilograms of animal and plant tissues or large volumes of biological fluids were needed for the purification of small amounts of a given protein are almost gone, we now have the ability to express and purify the desired recombinant protein in a large quantity with relatively low cost. In our speech, we will discuss how to design our own bio-production system by integrating all new advances in the field of genetic engineering, using E. coli bacteria as a prototype host of protein production.

Biography

Saif Aldeen Saleh Al Ryalat is a leading Researcher in several aspects of medicine, including genetic engineering and neurology. He is working on a project to design a bio-production system to design aglycosylated antibodies that can replace monoclonal glycosylated antibodies that are used in several neurological diseases (relatively high cost). He is also a peer Reviewer for several journals and a Researcher with several high impact publications. He is currently at School of Medicine at The University of Jordan where he had several honors and certificates.

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Fadia El Bitar et al., J Biotechnol Biomater 2016, 6:6(Suppl)
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Molecular research on Alzheimer's disease of Saudi patients and its applications

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Introduction & Aim: Alzheimer's disease (AD) is the most common form of dementia and neurodegeneration. Cerebral atrophy, beta amyloid aggregation and intra-neuronal neurofibrillary tangles are associated with AD. Although AD is largely sporadic occurring in the elderly, a minority of cases belongs to early onset form that appears before age of 65 and is genetically inherited. As little is known on the background of AD in Saudi population, we established research on the genetic basis of AD in Saudi patients and initiated in vitro cellular model derived from the patients that is applicable for drug discovery.

Method: To find out the genetic cause of Alzheimer's disease in Saudi patients, we recruited 100 AD belonging to familial and sporadic cases and screened them by direct sequencing for possible pathogenic mutations in AD related genes. 76 representative samples were examined for copy number of variants. Modeling of the disease was studied by direct conversion of human fibroblasts to neurons using our novel combination of chemical molecules to be applicable on fibroblasts issued from Saudi patients genetically inherited AD.

Results: We found 2 out of 24 novel variants to be potentially pathogenic mutations in exons 23 and 26 of SORL1 gene. We got out of 72 known variants, probably damaging mutations in the following genes: SORL1 exon11 (c1582; A528T); APOEe4 exon4.1 (c487; R163C) and APOEe4 exon4.2 (c526; R176C). Certain index cases displayed loss of heterozygosity on chromosomal regions that include genes causing Alzheimer's disease. We identified small-molecule cocktails that converted fibroblasts into neurons without exogenous genetic factors.

Conclusion: The outcome of this study is providing data bases for mutations of AD and favoring in the near future the Saudi patients to benefit from personalized treatments.

Biography

Fadia El Bitar is currently working in Department of Genetics, King Faisal Specialist Hospital and Research Center, Saudi Arabia.

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Procalcitonin reveals early dehiscence in colorectal surgery: The PREDICS study

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Objectives: We designed a multicentric, observational study to test if Procalcitonin (PCT) might be an early and reliable marker of anastomotic leak (AL) after colorectal surgery.

Background: Procalcitonin is a biomarker used to monitor bacterial infections and guide antibiotic therapy. Anastomotic leak after colorectal surgery is a severe complication associated with relevant short and long-term sequelae.

Methods: Between January 2013 and September 2014, 504 patients' underwent colorectal surgery for malignant colorectal diseases, in elective setting. White blood count (WBC), C-reactive protein (CRP) and PCT levels were measured in 3rd and 5th postoperative day (POD). AL and all postoperative complications were recorded.

Results: We registered 28 (5.6%) anastomotic leaks. Specificity and negative predictive value for AL with PCT less than 2.7 and 2.3 ng/mL were, respectively, 91.7% and 96.9% in 3rd POD and 93% and 98.3% in 5th POD. Receiver operating characteristic curve for biomarkers shows that in 3rd POD, PCT and CRP have similar area under the curve (AUC) (0.775 vs. 0.772), both better than WBC (0.601); in 5th POD, PCT has a better AUC than CRP and WBC (0.862 vs. 0.806 vs. 0.611). Measuring together PCT and CRP significantly improves AL diagnosis in 5th POD (AUC: 0.901).

Conclusions: PCT and CRP demonstrated to have a good negative predictive value for AL, both in 3rd and in 5th POD. Low levels of PCT, together with low CRP values, seem to be early and reliable markers of AL after colorectal surgery. These biomarkers might be safely added as additional criteria of discharge protocols after colorectal surgery.

Biography

Valentina Giaccaglia is a Female General Surgeon expert in proctology and female pelvic floor diseases from diagnosis to minimally invasive therapy. She is the Principal Investigator of PREDICS study (Procalcitonin Reveals Early Dehiscence After Colorectal Surgery), whose results have been published in the prestigious *Annals of Surgery* journal. She has published many papers, wrote book chapters and received prestigious research awards like RAS-ACS international exchange program of American College of Surgeons and Best Podium Lecture at Annual International Colorectal Disease Symposium (ACDS), Ft. Lauderdale, Florida, USA. She is an Associate Fellow of American College of Surgeons.

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Mohamed Mostafa Shokry, J Biotechnol Biomater 2016, 6:6(Suppl)
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Potential of camel-derived hemoglobin oxygen carriers as a blood substitute

Mohamed Mostafa Shokry
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The quest for producing a blood substitute is the result of an incessant demand not only for routine surgery and accidents but also in cases of mass civilian casualties during natural disasters, terrorism and wars. The risks of allogenic blood transfusion are multiple and include infections transmission (HIV and Hepatitis B and C), delayed postoperative healing, transfusion reactions, transfusion-related lung injury, immunodilution and potential risk of cancer recurrence. Blood primarily functions transport oxygen to tissues. This function performed by hemoglobin (Hb), a protein encapsulated inside the red blood cells (RBCs) that is capable of binding and releasing oxygen. Hb-based oxygen carriers HBOCs are being developed as substitute to replace the oxygen-carrying functions of erythrocytes and thereby lessen the demand of donor blood during surgery and trauma situations. Artificial blood substitutes present several advantages over the use of donor blood for blood transfusions because they have no antigenic blood groups on their surface, no possibility for transmitting infections; they have a longer storage lifetime and are cost efficient. Bovine and human Hb forms the bases of many different types of (HBOCs) ranging from chemically modified Hbs, including cross-linked, polymerized, polymerized conjugated to particle encapsulated.

Biography

Mohamed Mostafa Shokry has completed his PhD from Cairo University, Egypt. He is a Professor Emeritus of Veterinary Surgery & Anesthesia in Cairo University, Egypt. He has published more than 75 papers in scientific journals and has published many library books.

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Hosam Gharib Abdelhady, J Biotechnol Biomater 2016, 6:6(Suppl)
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4D molecular scale imaging of the effect of suicide anticancer nano-particles on individual live cancer cells

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The unique ability of the real time Atomic Force Microscopy (AFM) in providing valuable information in the field of biomolecular sciences, gene delivery and cancer therapy will be demonstrated. For example, the formation of the most durable, individual, DNA nanoparticles (DNPS) able to resist the enzymatic digestions of cancer cells and evoke apoptosis was monitored in 4 dimensions (4D) from the first second of the interaction between individual DNA molecules and individual dendrimers nano-polymers till the death of individual cancer cells in their environment. Optimizing both, the incubation time between DNA/dendrimers and the DNA/dendrimers ratios have shown significant effects in producing the best DNPS. Finally, cancer cells were exposed to the ideal DNPS and directly imaged by 4D AFM. Cell membrane liquefaction, cytoplasmic shrinkage, cytoskeleton structure loss and changes in cellular nanomechanical properties were observed. In contrast, control cells have no changes. Thus, understanding the real-time effects of anticancer DNPS on the cytoskeletal and nanomechanical behaviors of cancer cells may provide new methods for cancer treatment.

Biography

Hosam Gharib Abdelhady has completed his PhD in Biophysics and Surface Analysis from College of Pharmacy, University of Nottingham in 2004 and Postdoctoral studies with Professor Donald Dendrimers at Central Michigan University in 2005. He has then served as a Senior Scientist and directed the Analytical Department at Dendritic Nanotechnologies, CMURC, Michigan from 2005-2009. He is currently an Associate Professor at College of Pharmacy, Taibah University, Saudi Arabia. He has published more than 15 papers in reputed journals, a patent in Nanomedicine and received more than $ 1M grants.

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The association of single nucleotide polymorphism of *interleukin*-21 gene and serum *interleukin*-21 levels with systemic lupus erythematosus

Dina Mohammad Erfan
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Background: Systemic lupus erythematosus (SLE) is a common autoimmune disorder which commonly results from the combined effects of a large number of genes. Variations in the DNA sequence in the *Interleukin-21 (IL-21)* gene may lead to altered *IL-21* production and/or activity which can affect an individual's susceptibility to SLE. *IL-21* is a novel class I cytokine produced by activated CD4+ T cells, natural killer T cells and T helper (Th) cells. There is increasing evidence that *IL-21* contributes to the pathogenesis of SLE due to its biological activity.

Aim: To investigate the association between single nucleotide polymorphism (SNP) of *IL-21 rs2221903* gene and serum *IL-21* levels with SLE and to detect the possible association between *IL-21* serum levels and the pathogenesis of the disease.

Subjects & Methods: This study was conducted on 30 SLE patients and 20 age and sex matched healthy controls. Serum *IL-21* levels were measured using enzyme-linked immunosorbent assay (ELISA) technique and SNP of *IL-21 rs2221903* gene was detected by genotyping assay, using real-time polymerase chain reaction (RT-PCR).

Results: Serum *IL-21* levels were significantly higher in patients compared with controls ($p<0.001$). Patients with high activity index of SLE had significantly higher levels of serumIL-21 (p value<0.001). A statistically significant association was found between the T allele of SNP *rs2221903* and SLE, whereas; no association between SNP of *IL-21 rs2221903* genotypes and SLE or serum *IL-21* levels could be detected.

Conclusion: *IL-21* plays an important role in the immune-pathogenesis of SLE and could be used as a possible target for novel immunotherapy. The T allele of SNP *rs2221903* suggests that the *IL-21*gene may contribute to an inherited predisposition to SLE.

Biography

Dina Mohammmad Erfan has completed her MD and Postdoctoral studies from Faculty of Medicine, Ain Shams University, Egypt.

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Potential use of marine *Enterococcus spp.* to ferment seaweeds and enhance anticoagulant properties

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The current investigation was performed to evaluate the ability of marine lactic acid bacteria (LAB) as starter cultures for seaweeds fermentation to enhance their anticoagulant activity. 24 LAB isolates from seven marine sediment samples and seven shrimp specimens collected from the Red Sea, Egypt were characterized for their ability to use selected local seaweeds (*Sargassum* sp., *Pterocladia capillacea* and Ulva *lactoca*) as sole carbon source in the growth media. Two LAB strains were selected for seaweed fermentation according to their ability to grow and produce organic acids as indicated by marked pH decreases of the media. Potent strains were biochemically identified as: *Eterococcus durans* MED5 and *Eterococcus hirae* MEH23. The optimum seaweeds fermentation period was determined by monitoring the fermented samples at regular interval for a period of 5 weeks during which activated partial thromboplastintime (APTT), prothrombin time (PT) as well pH values were recorded. The most promising results were observed in cases of *Sargassum* sp., fermented by *E. durans* MED5 and *E. hirae* MEH23 for 2 weeks as they inhibited intrinsic blood coagulation system and recorded APTT assay results of 982 s and 820 s, respectively without affecting the PT assay records at the assessed concentrations. Moreover, *Sargassum* sp., samples fermented by *E. durans* MED5 showed enhanced antioxidant activities compared to the control as they recorded 68.42% in the 2,2-diphenyl-1-picrylhydrazyl (DPPH) scavenging assay. Sulfated polysaccharides (SP) with anticoagulant activity (APTT>1000 s) were partially purified from *Sargassum* sp., sample fermented with *E. durans* MED5 by anion exchange chromatography using DEAE-cellulose column. The FTIR spectrum of the partially purified SP was very much typical to that previously reported for fucoidan, which is the SP characteristic to brown algae. The total dry matter yield in the crude seaweed extract (CSE) and ethanol precipitate (PPT) represents 25 and 13.3% of the fermented seaweed dry weight, respectively. Therefore, this study reveals a novel well-defined starter culture from marine origin intended for seaweed fermentation for recovery of anticoagulant compound and provides information to pave a way towards the development of wide range of seaweed functional foods.

Biography

Khouloud M Barakat is presently working as an Assistant Professor of Marine Microbiology at Alexandria University, Egypt.

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Membrane extractions and adsorptions in separation of biomolecules from multi-component mixtures

M Hossain
United Arab Emirates University, UAE

Separations based on membrane-based extractions and adsorptions have been demonstrated to be potentially selective process for biomolecules such as antibiotics and proteins. These methods offer the advantages of strong affinity between the target solutes in various phases and additional interaction between the charges of the molecules and the exchangeable charge groups in the membrane. Recently efforts have been intensified to develop separations based on solvent extractions using membranes or simple adsorption on membrane that provide simplicity in the process, selectivity in separation and faster recovery of the solutes. In this article experimental results obtained using commercially available membranes and membrane modules are presented. The systems considered were: (1) Separation of an antibiotic from its mixture and (2) separation of major whey proteins, α-lactalbumin (α-La), β-lactoglobulin (β-Lg) and bovine serum albumin (BSA). Experiments were performed in a bench-scale hollow-fibre membrane contactor using an eco-friendly solvent for the system in (1) and for (2) a laboratory-scale ion exchange membrane unit; Sartobind® Anion Exchanger-D75 was used. The processes showed superior selectivity in antibiotic separation and good capacity for adsorption of proteins. The results are considered very well because these were obtained with commercially available membrane units and in a wide range of solute concentrations. These processes have the potential to be upgraded to selectively separate a desired component from a multi-component mixture when optimized conditions are determined.

Biography

M Hossain was graduated from the Department of Chemical Engineering, Bangladesh University of Engineering & Technology (BUET) in 1977. He has obtained his MEngSci in 1985 and PhD in 1988 from the University of Queensland, Australia. After several years of research at IRL he then joined as a Senior Lecturer at the Department of Chemical & Materials Engineering, University of Auckland, New Zealand. He is involved in teaching Chemical Engineering (Thermodynamics, Transport Processes and Reactor design), Biochemical Engineering (Biotechnology and Bioseparations), Water Desalination and Water Treatment. He has published more than 67 research papers in international journals and presented 65 articles at the international/national professional conferences. His current research interests are membrane technology to chemical & biochemical processes and removal of ions (inorganic and organic ions) from water and wastewaters.

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Pranab Goswami, J Biotechnol Biomater 2016, 6:6(Suppl)
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Development of DNA aptamers against human heart type fatty acid binding protein for early detection of acute myocardial infarction

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Cardiovascular diseases are the single greatest cause of adult mortality globally, constituting about 31% of all global deaths. Detection of cardiovascular diseases has thus emerged as not only a social and clinical issue but also as an economic one. The current investigation is centered on the development of specific aptamers against human heart type fatty acid binding protein (FABP3), a novel early marker for detection of acute myocardial infarction (AMI). It also encompasses the detection of FABP3 using the developed aptamers on a specially designed paper based microfluidic device (μPAD). Two ssDNA aptamers, N13 and N53 were isolated through Systematic Evolution of Ligands by Exponential Enrichment (SELEX) against human heart-type fatty acid binding-protein (FABP3). The aptamers bound to FABP3 with dissociation constants 0.0743±0.0142 μM and 0.3337±0.1485 μM, respectively. The aptamers displayed stable behavior at different pH, temperature and ionic strength. Considering the large sizes of the aptamers, limited proteolysis of the aptamer-protein complex was performed to map the amino acids involved in binding, which was then used to screen docked structures. The N13 led interaction with stronger affinity, involving more salt bridges and fewer hydrogen bonds, whereas N53 had less number of salt bridges with higher number of hydrogen and hydrophobic interactions. The greater footprint of N53 incited synergistic conformational changes in N53 and FABP3 leading to decrease in binding affinity during the recognition. The aptamers so developed and characterized were then used to detect FABP3 on a paper based microfluidic device designed for the same with leak proof property and low cost. An aptamer modified gold nanoparticle aggregation assay was used as the Yes/No format for the detection of FABP3 with a minimum detection limit of 54 ng per ml.

Biography

Pranab Goswami has completed his PhD degree from Gauhati University during 1994. From 1991 to 2002, he was a Scientist at CSIR, India. He was a BOYSCAST Fellow of DST, India at University of Massachusetts, Boston. He has joined IIT Guwahati in 2002 and became Professor in 2009. He was the Founder Head of CIF Centre during 2004 to 2006 and Head, Biotechnology Department during 2006 to 2009 at IIT Guwahati. Currently he is the Head of Energy Centre at IIT Guwahati. He is working in the field of biosensors with focus on developing novel biorecognition system for various diagnostic applications.

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Exploration and Purification of Bioactive compound from seaweeds against human bacterial pathogen

Sahaya Sukeetha D[1] and John Antony B[2]
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Treatment of Infectious diseases by the use of commercially available drugs are becoming certain limitations due to changing patterns of resistance in pathogens and causing side effects. These limitations demand for improved pharmacokinetic properties which necessitates continued research for the search of new novel drugs. Marine organisms are rich source of structurally novel and biologically active metabolites. The cell extracts and active constituents of various algae and seaweeds have been shown to have antibacterial activity against gram positive and gram negative bacteria. Hence the crude extracts from the seaweeds Amphiroa foliacea, Chactomorpho tortuosa, Caulerpa scalpelliformis and Sargassum sp were tested for their resistance against multidrug resistance pathogens such as Staphylococcus aureus, Klebsella sp, Proteus sp. The extracts were obtained with the solvents methanol, chloroform, ethyl acetate and hexane. A highest zone of inhibition was observed in the hexane extract of Amphiroa foliacea and ethyl acetate extract of Sargassam sp against Proteus sp, Staphylococcus aureus respectively. An inhibition zone of 8mm was observed in ethyl acetate extract of Sargassam sp against Staphylococcus aureus. Further the extract of Sargassum sp was purified using silica column chromatography. Single compound fractions were separated and each fraction was screened for antibacterial activity against Staphylococcus aureus. F4 fraction possessed antibacterial activity of 7mm which is similar to crude extract. Further the F4 fraction is subjected NMR analysis. Ethyl acetate fraction was found to be posses α-hydroxy stearic acid.

Biography

D. Sahaya Sukeetha M.Sc., M.Phil., (Ph.D) is an graduate from Bharathidasan University. Presently she is working as a scientific officer in the department of molecular biology, Inbiotics, Nagercoil. She had worked as an Assistant professor for 7 years and handled biotechnology classes for both under graduate and post graduate students. Also she had guided 12 project post graduate students. In her academic career she had published 5 research papers and attended various conferences.

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(Day 2)

V Rajendran et al., J Biotechnol Biomater 2016, 6:6(Suppl)
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Development of nanocomposite materials for biomedical applications

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The biomaterials with unique physicochemical behaviors are currently attracted for different biomedical applications such as surgical materials, implants and replacement devices. An increasing demand for newer surgical implants in prosthetic and orthopedic applications requires engineering of nanostructured materials with enhanced biological properties. The high purity nanobiomaterials like titania nanocomposites (TiO_2-Chitosan, TiO_2-Graphene, etc.), metal oxides doped hydroxyapatite (nano silicon doped HAp), nanobioactive glass composites (NBG glasses) etc., are synthesized over wide range of compositions using conventional methods. Comprehensive characterizations of the prepared nanobiomaterials are used to explore the properties like mechanical strength, anticorrosive, antimicrobial, biocompatibility, *in vitro* bioactivity, etc., and to confer the optimized composition, to meet out the demand exist in biomedical field. The toxicological behavior of the prepared nanocomposites is assessed through *in vitro* studies using simulated body fluid and animal cell lines, while the in vivo studies using zebrafish. The optimized concentration of nanobiomaterials is further coated on commercial implants namely stainless steel (SS304) and Ti alloy to validate their efficiency in conferring the properties like anticorrosive and antimicrobial, biocompatibility and bioresorbability. Similarly, the nanocomposite materials are used as dental fillers and dental carries prevention applications. The obtained results reveal the promising applications of these nano biomaterials as potential candidate in tissue engineering and bone regenerative applications.

Biography

V Rajendran is the Professor and Director of R&D and Centre for Nano Science and Technology, K. S. Rangasamy College of Technology, India. He has published more than 204 research papers in peer reviewed international journals, 125 papers in conference proceedings, 25 text books, 2 research books, 1 monograph, 1 compendium book, 14 edited research books, 7 edited conference proceedings and 15 patents.

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The oral microbiome and salivary biomarkers in health and disease

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The oral microbiome plays a relevant role in human health and it is a key element in a variety of oral and systemic diseases. There is a relation between oral and systemic diseases, but the question remains whether the oral diseases are the cause or the consequence of pathological process in other body sites. We aim to compare the bacterial community and the level of selected biomarkers in the saliva of adults in health and disease conditions. 90 saliva samples were collected from three equal groups (obese with diabetes, obese without diabetes and healthy control). Resistin (a biomarker of insulin resistance) was measured in saliva using ELISA technique. Real-time PCR was used to quantify selected bacterial species associated with oral infections. Salivary resistin was significantly higher in the obese patients (diabetics and non-diabetics) compared to the healthy control. Fusobacterium (associated with gingivitis), Porphyromonas gingivalis and Tannerella forsythia (associated with periodontitis) were detected in significantly higher quantities in the obese patients (diabetics and non-diabetics) compared to the healthy control. No correlation was found between the levels of salivary resistin and different oral bacteria. This study highlighted the importance of saliva as a non-invasive sample for the detection of biomarkers and microbes associated with oral and systemic diseases. This may pave the way for more effective diagnostic and therapeutic methods which can contribute to the development of personalized medicine and personalized dental medicine.

Biography

Farah Ibrahim Al-Marzooq is a medical doctor specialized in microbiology. She has completed her PhD degree (with thesis distinction) from the Department of Medical Microbiology, Faculty of Medicine, University of Malaya, Kuala Lumpur, Malaysia in 2015. During her PhD study, she was able to identify 3 novel gene varients (related to antibiotic resistance) reported for the first time at the global level. She is currently working as a postdoctoral research associate in the Research Institute of Medical & Health Sciences , University of Sharjah , UAE. Her research work was published in several reputable international journals.

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Nanotoxicity nano-threat to nature

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Production of nanoparticles is ever increasing with concomitant development of nanotechnologies. Current core concern is on the biological properties of nanoparticles and in fact is a subject of active consideration. Till date, no specific conclusion is derived about their actual harmful effects. Recent nanotoxicity studies have mainly focused on the health risks to healthy adult human population. The nanotoxicity effects on susceptible organisms with simpler systems such as bacteria, earthworms, fishes, chick embryos have often been overlooked. Since the morphological, anatomical, physiological and genetic structures differ in these organisms, from those as in human, they often suffer more damage from the same exposure. Therefore, the present comprehensive study was initiated to check possible toxicity of single walled carbon nanotubes (SWCNT) and multi-walled carbon nanotubes (MWCNT) in sensitive biological systems like growth of *E. coli* and *S. aureus*, micronuclei in earthworm coelomocytes, fish gill chromosomes, skeletal defects in chicken embryos and compared with damage in bone marrow chromosomes of mouse and chromosomal aberrations in human peripheral blood lymphocytes, after acute or chronic *in vitro* exposure. Virtually in all biological systems studied, we found toxicity of both SWCNT as well as MWCNT. The present study describes in details fine analysis of toxicity in different systems explaining probable mechanisms of nanotoxicity. For studying nanomaterial interactions, novel approaches are required since they are novel chemicals. In order to foresee and prevent the potentially harmful effects of nanoparticles in nature, on health and the environment in particular, the results of the present study will be of considerable help.

Biography

Meonis Pithawala is presently working as an Assistant Professor at C G Bhakta Institute of Biotechnology, Uka Tarsadia University, India. He has 19 research papers and 9 review articles published in peer reviewed national and international journals. He has presented oral presentations at 2 international conferences. He has remained Principal Investigator for government funded major research project. He is a Reviewer in more than five international journals, Member of Institutional Animal Ethical Committee and is associated with couple of administrative and examination bodies of the university. He is also a Member of the Society for Ethnopharmacology, Kolkata, India.

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Role of vitamin D deficiency in susceptibility to tuberculosis and treatment response

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Vitamin D, a fat soluble vitamin, is well known for calcium homeostasis. Deficiency of vitamin D is not only linked with rickets or osteomalacia but with many other infectious and metabolic disorders. Emerging evidences suggest the relation of vitamin D deficiency in tuberculosis. The objectives of this study were to investigate the association of vitamin D deficiency with tuberculosis and to see its impact on anti-tuberculous response. We recruited 260 TB patients from Gulab Devi Chest Hospital, Lahore who had yet not started anti TB treatment for this admission. Any patient with co morbidity or age above 60 years was excluded. Serum 25(OH) D was measured in TB cases, contacts of TB patients and controls from general population. Baseline vitamin D status was significantly associated with TB ($P<0.01$). Mean vitamin D level in TB patients was 23 nmol per L which is much lower than TB contacts and controls from general population. Sputum smear sample for the presence of acid fast bacilli was examined after every two weeks for all included cases, till sputum converted negative for AFB. Survival analysis indicates that patients with deficiency of vitamin D required more time to sputum smear conversion (median days 22.5, IQR 22.5-37.5). And this association of vitamin D with response to anti-tuberculous treatment was genotype independent. Allelic discrimination assay for VDR, CYP2R1 and VDB indicate none of these SNPs are associated with vitamin D deficiency and not with incidence of tuberculosis. High prevalence of vitamin D deficiency in pulmonary TB patients indicates that vitamin D is a risk factor for the development of active tuberculosis. Furthermore, its impact in response to anti-tuberculous treatment also explains its significant role in the management of tuberculosis. As early sputum smear conversion can break the chain of infection and further spread of tuberculosis. Therefore, maintaining vitamin D status in TB patients might be helpful to control tuberculosis.

Biography

Kashaf Junaid has completed her PhD from the Department of Microbiology and Molecular Genetics, University of The Punjab, Pakistan. She also did research work in Bart's Institute of Primary Health Care, Queens Mary University of London. She is working as an Assistant Professor in The University of Lahore, Pakistan.

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Molecular characterization of the activity and requirements of a novel and promiscuous bacteriophage integrase

Mohammed R Mohaisen, Alan J McCarthy and Heather E Allison
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Stx bacteriophages are responsible for the dissemination to and production of Shiga toxin genes (stx) in the Enterohaemorrhagic *E. coli* (EHEC). These toxigenic bacteriophage hosts can cause severe, life-threatening illness and Shiga toxin (Stx) is responsible for the severe nature of EHEC infection. At the point of infection, the injected phage DNA can direct its integration into the bacterial chromosome becoming a prophage; the host cell is then known as a lysogen. Unusually, our model Stx phage, Φ24B, can integrate into at least four distinct sites within the *E. coli* genome that shared no easily identifiable recognition sequence pattern. The identification of what are actually required for phage and bacterial DNAs recombination has been tested using both an in vitro and in situ recombination assays. These assays enable easy manipulation of bacterial attachment site (attB) and phage attachment site (attP) sequences. The aim of our study is to fully characterize the requirements of this promiscuous integrase, carried by the Stx phage Φ24B (IntΦ24B), to drive integration. So far, a number of successful assays have enabled us to identify the minimal necessary flanking sequences for all of four attB sites (50 bp each side) and attP site (150 bp each side). The later one is very similar in size to the lambda attP (117 bp each side of the crossover site). Moreover, within these four attB sites, we have identified the primary site.

Biography

Mohammed R Mohaisen has completed his BSc degree in General Biological Sciences and MSc degree in Medical Microbiology, Anbar University, Iraq. He is currently a PhD student at the Institute of Integrative Biology, University of Liverpool, United Kingdom.

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Molecular basis of multiple sclerosis explains the disease pathophysiology

Eiman M A Mohammed
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Multiple sclerosis (MS) is a complex, multifactorial autoimmune disorder of the central nervous system (CNS) that causes inflammation, demyelination and neurodegeneration. The increased prevalence of this disease in Arabian Gulf Countries (AGCs) has captivated many over the last several years. To explain the disease pathophysiology, one must consider the smallest variant within the body; the cell. Understanding the plethora of cellular variables involved is critical to help clarify why such disease tends to increase in these populations. MS develops from the interaction of different genetic and environmental factors. Genetic, epigenetic and even mitochondrial genomic variants are all associated with immune response initiation, facilitation of migration through the blood-brain barrier (BBB), inflammatory molecule mediation and the attack of cellular components. Collectively, this culminates in CNS demyelination and predisposition to MS symptoms. More so, environmental modulators such as vitamin D, UVR, EBV infection, smoking and obesity, influence disease pathophysiology through modulation of gene transcription, thereby predisposing to MS. Detailed knowledge of susceptibility factors underlying any disease is essential to properly understand disease pathophysiology, especially if correlated with population-related variables.

Biography

Eiman M A Mohammed has completed her MSc in Molecular Biology from Kuwait University, College of Medicine. She is currently working at the Immunology Laboratory in the Kuwait Cancer Control Centre, the only referable laboratory for organ transplantation testing, autoimmune disease testing and HLA typing. She has published two papers on multiple sclerosis.

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Reduction in radiation induced DNA damage in human peripheral blood lymphocytes by treatments of *Alstonia scholaris* bark extracts

Dhruti Mistry and Meonis Pithawala
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It is well established that radiation exposure causes DNA damage. Compounds within certain plants have often been targeted as protectors against radiation induced DNA damage. In the present study, use of aqueous-methanolic extracts (50 µg per ml) from bark of Alstonia scholaris as radioprotectors has been reported. The cytogenetic parameters studied as indices for DNA damage were Chromosomal Aberrations (CAs) and Micronuclei (MN) frequency from human peripheral blood lymphocytes. Blood was irradiated to 0, 2, 4 and 6 Gy of X-rays radiation (Source: 6MV X-ray Photons, Siemens, Oncor Expression Medical Linear Accelerator). The irradiated samples were exposed to aqueous-methanolic bark extracts under three different situations: To rule out whether presence of components in extract may not allow the damage to take place, blood samples were irradiated, simultaneously exposed to extracts and then cultured; to rule out the possibility of possible DNA damage repair capability of extracts, blood samples were irradiated and cultured for 24 hours and then exposed to extracts; and to rule out the possibility of possible radioprotective properties of the extracts, blood samples were exposed to extracts first, cultured for 24 hours and then exposed to radiation. In all three conditions, we found that presence of extracts had significant contribution in the reduction of DNA damage, measured both as CAs as well as MN frequency. Since the study used crude extracts, number of compounds present in the extracts might have played a role, some as protectors, some as mitigators and still certain with DNA damage repair capabilities. Once the actual compounds present in the extracts be determined and their probable role be decided in reducing radiation induced DNA damage, new sort of drugs be formulated with potential to protect against radiation damage.

Biography

Dhruti Mistry is currently pursuing her PhD in Applied Sciences (Biotechnology) from Uka Tarsadia University, India. She is also working as a Teaching Assistant at C G Bhakta Institute of Biotechnology. She has 4 research papers and 6 review articles published in peer reviewed national and international journals. She is a Member of the Society for Ethnopharmacology, Kolkata, India.

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Development of an anti-VEGF Fc-fusion angiogenesis-inhibiting protein

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Angiogenesis is a hallmark of cancer and VEGF is the most potent pro-angiogenic factor that stimulates angiogenesis in diseases such as cancer metastasis, age-related macular degeneration, diabetic retinopathies, psoriasis and rheumatoid arthritis. Hence, blocking VEGF is the best way to prevent angiogenesis. An anti-VEGF, Fc-fusion protein, VEGFR1(D1-D3)-Fc, was developed in-house, using recombinant DNA technology. VEGFR1(D1-D3)-Fc fusion gene was generated by PCR amplification, followed by fusion of genes encoding the first three extracellular domains of VEGFR1 and human IgG1-Fc region. The fusion gene was cloned in expression vector, pXC17.4, following which it was used to transfect mammalian cell line, CHOK1SV GS-KO. However, protein degradation was observed during production of indigenous VEGFR1(D1-D3)-Fc and measures were taken to inhibit proteolytic cleavage of the fusion trap. The Fc-fusion protein was characterized the in terms of molecular weight, secondary and tertiary structure, thermal stability, purity, isoelectric point and glycosylation profiling. Strong binding affinity of the fusion traps for VEGF-A was demonstrated and the angiogenesis-inhibitory functions were confirmed, both in cell-based assays as well as a xenograft animal model. VEGFR1(D1-D3)-Fc was demonstrated to have potential in advancing in the pipeline of anti-cancer drug development. Since the VEGFR1(D1-D3)-Fc protein has high binding affinity for VEGF, it will remove circulating VEGF from the system, thus inhibiting the downstream signaling giving rise to cell survival and proliferation. Hence, this anti-VEGF molecule will act as a very effective anti-angiogenic agent, as has already been shown in in vitro and in vivo experiments.

Biography

Sanjukta Chakrabarti is currently pursuing her PhD from Deakin University, Australia. She has completed MSc in Biochemistry from Calcutta University, followed by MTech in Biomedical Engineering from Indian Institute of Technology Mumbai, India. She is a Senior Scientist working with Reliance Life Sciences, a premier organization dealing with pharmaceuticals, biopharmaceuticals, molecular medicine, regenerative medicine and clinical research in Mumbai, India. She has published 4 papers in reputed journals and has been working in biopharmaceutical industry for the last 15 years.

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Tracing the neuroblasts from subventricular zone to olfactory bulb in adult mice brains using anti-doublecortin antibodies and H&E stain

Zainab Zahid Saadoon and Huda Mahdi Al Khateeb
Baghdad University, Iraq

Background: Neural stem cells are not confined to the embryonic development of the brain as believed in the past; in contrasts, it continues life-long in the adult mammalian brains even in non-pathological state. Neural stem cells and their progeny, the neuroblasts are residents in the subventricular zone (SVZ) of the lateral ventricle in the adult mammalian brains. The neuroblasts after they were produced in the SVZ would migrate in a well-defined pathway emerged from the SVZ and directed towards the olfactory bulb (OB). This pathway is called the Rostral Migratory Stream (RMS) and its main components are the neuroblasts.

Aims: To trace the chain arrangement of neuroblasts along the RMS using Hematoxylin and Eosin and the specific marker of the neuroblasts "anti-doublecortin antibody", describing grossly how the pathway emerges from SVZ proceeding rostrally to the OB in the adult mice brains.

Materials & Methods: Adult mice brains from both brain sexes were used in this experiment to view both coronal and sagittal sections upon which Hematoxylin and Eosin and immunohistochemical staining were exploited. Anti-doublecortin antibody, the specific marker of the immature neurons was used in the immunohistochemical staining of this study.

Results: This study revealed clustering of the neuroblasts in the SVZ and while this special arrangement carried out at the SVZ, the neuroblasts changed their arrangement when being traced sagittaly into chain-like strip of cells forming a sigmoidal shape stream. The chain of the neuroblasts in the stream demonstrated changing in shape and direction throughout its length with special arrangement at its starter from the lateral ventricle forming a funnel shape limb before joining the rest of stream. It delineated four limbs here along its pathway.

Conclusion: The neuroblasts take different arrangement through their period of life from their site of origin to their final destination, the olfactory bulb through the RMS. In the stream the neuroblasts follow a sigmoidal shape pathway described here as four limbs instead of 3 ones in previous studies. The new described part is the funnel shape limb which is named the infundibulum at which the neuroblasts in the stream starting up their migration from SVZ before they join the next limb, the vertical limb.

Biography

Zainab Zahid Saadoon is an Assistant Lecturer at College of Medicine, Baghdad University, Iraq. She has completed her MSc and currently pursuing PhD at College of Medicine, Baghdad University, Iraq.

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ROS might just be a sideshow: Exploring simultaneous observation of mTORC1 activity and increase in ROS

Mohammad Farahmandnia, Mohammadreza Dorvash and Mohammadhossein Khorraminejad-Shirazi
Shiraz University, Iran

There is huge debate regarding whether reactive oxygen species (ROS) are the cause for aging. Meta-analyses indicate antioxidants have little effect, if any, on lifespan. This mandates the need for rethinking causality of ROS in senescence. In this article, high quality studies (n=20) were sorted into three categories: Basic, clinical/meta-analytic and ROS-mTOR relationship. Evidences were compared to discover inconsistencies and bigger-picture revelations. Studies showed simultaneity of mTORC1 activity and increased ROS. Basic studies suggested that ROS causes cell damage and genomic instability leading to aging. Nevertheless, meta-analyses clarify antioxidants have literally zero outcome affecting lifespan. This questions the causal role of ROS in senescence. Considering that hyperactive mTORC1 intensifies aging while decreasing ROS has little benefit, ROS could be thought of as mere chemical byproducts with no causal role and can be eliminated from the picture. This new perspective also indicates that it is the time to look for other roles for ROS rather than regarding it as the cause of senescence.

Biography

Mohammad Farahmandnia is a undergraduate Medical Doctor student at Shiraz University of Medical Science. He is a holder of Silver Medals in Biology and Basic Medical Science Olympiads. He has also co-authored 6 papers in reputed journals on stem cell research. He is currently a Member of Cell and Molecular Medicine Student Research Group\ with particular focus on systems biology of aging.

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Reproductive toxicity of aqueous wood-ash extract of *Parkia biglobosa* on male Swiss albino mice

Timothy Auta
Federal University Dutsinma, Nigeria

The use of wood-ash extracts, including that of *Parkia biglobosa* as food additives and for medicinal purposes by Gbagyi, Koro, Ebira and other ethnic groups in the Middle-Belt Region of Nigeria, without knowledge of its possible reproductive toxicity has been an age long practice. This study thus investigated the toxicity of aqueous wood-ash extracts of *P. biglobosa* on male reproductive ability, using mice as models. Aqueous extraction of the wood ash of *P. biglobosa* was performed using the traditional percolation method. Four different dose levels of 0, 5, 50 and 100 mg/kg body weight were administered to 20 male mice (five per group) for seven days, which were sacrificed 35 days thereafter. Gonadosomatic index, sperm motility, sperm count, sperm morphology, serum follicle stimulating hormone (FSH), luteinizing hormone (LH) and testosterone assay and histopathology of testes were carried out using standard methods. Data were analyzed using descriptive statistics and ANOVA, considered significant at $P<0.05$. Though no significant toxic effect on testicular weight, FSH, LH and testosterone was recorded, sperm motility, live/dead sperm and sperm count decreased significantly with significant increase of abnormal sperm cells when compared to control. Dose dependent depletion of spermatogenic cells were recorded in the testes. Aqueous wood-ash extract of *P. biglobosa* had damaging effects on sperm cells and testicular tissues, which could compromise reproductive potentials.

Biography

Timothy Auta is currently a Doctoral degree candidate in University of Ibadan, Nigeria, where he has obtained his Master's degree in 2011. He is a young Faculty Member at Federal University Dutsinma, Katsina State, Nigeria and teaches Biology. He has published 13 papers in reputed journals and presented several papers at different academic conferences/meetings.

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Evaluation of Antimicrobial, Antioxidant Activity and Preliminary Phytochemical Investigation of Medicinal Plants Used in Traditional Medicine

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[3]Council of Science & Technology, Lucknow, India

Medicinal plants are the best source to obtain a variety of herbal drugs. Mankind owes its existence to plant life to a great extent. The use of plants as food, clothing, ornaments, transport, shelter etc. had been known since the beginning of time. For a long period of time, plants have also served as a valuable source of natural products for treatment of various infectious diseases and maintaining human health. A large portion of the world's population, especially in developing countries, still depends on the traditional system of medicine. The present investigation aims to study the antimicrobial activity and antioxidant activity of commonly used plants in unani medicine. The plants undertaken study includes Lallemantia royleana, Rosa indica and Solanum nigrum. The plant parts studied include the seeds of Lallemantia royleana, the petals of Rosa indica and the berries or fruit of Solanum nigrum. The plant extracts were prepared using organic and inorganic solvent. The in-vitro efficacy of selected promising plant extracts and their fractions against different drug resistant enteric bacteria was performed. The phytochemical analysis of biologically most active plant extracts and fractions was also performed and the phytoconstituents are estimated qualitatively and quantitatively. The plant extract showed promising antimicrobial and antioxidant activity, therefore, can be evaluated for isolation of bioactive natural products. This may serve as leads in the progress of development of fresh pharmaceuticals addressing to the unmet therapeutic requirements for better health.

Biography

Saadia Mohammed Ali has completed Ph.D. in Biotechnology from Integral University, Lucknow, India. Saadia was awarded with a Gold medal at University for securing the first position in Life Sciences and also been awarded with the SC Pant Memorial Young Scientist Award in 2009 for her outstanding research work. She has published papers in several International and National reputed journals.

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Dissecting functional importance of polyketide modifying enzymes in mycobacterial biology

Priti Saxena
South Asian University, India

Corynebacterineae includes some of the deadliest human pathogens such as, *Mycobacterium tuberculosis* (*Mtb*) and *Mycobacterium leprae*. In Recent years have seen a remarkable increase in our understanding of secondary metabolic networks that impart these potentials to this order of organisms. One of the major secondary metabolites is polyketides. Comparative genomics of closely related genera from this family have revealed unusual polyketide biosynthetic potentials with the existence of genes homologous to type III *pkss*. Type III polyketide products in recent years have been remarkably associated with cell wall modifications. Long-chain alkylresorcinols and alkylpyrones replace membrane phospholipids in *Azotobacter* cells differentiating into dormant cells. Alkyl phloroglucinols are key signaling factors required for differentiation and development of *Dictyostelium* molds. These phenolic lipids in Streptomyces confer resistance to β-lactam antibiotics by altering properties of the cytoplasmic membrane. Although, resorcinolic/phloroglucinolic lipids are not known in *Mtb*, our functional characterization of PKS18 identified alkylpyrones as major polyketide products *in vitro*. These metabolites are crucial components of pollen exine in *Arabidopsis thaliana* and could be synthesized by PKSIIINc from *Neurospora crassa*. Type III polyketide quinones have been recently identified to be key molecules required for anaerobic respiration in mycobacterial biofilms. Interestingly, many of the type III polyketides require modifying enzymes in order to become fully functional. These modifying enzymes are generally cytochrome P450s, desaturases, methyltransferases, sulfotransferases, oxidoreductases and others. Often these modifying enzymes are present in cluster with type III pks genes and transcriptionally expressed together. In this study, we have identified two unique polyketide clusters in *Mycobacterium marinum*. Our biochemical, mutational and structural studies provide evidence for an unanticipated potential of these proteins to cyclize a common biosynthetic intermediate to generate chemically and structurally distinct metabolic entities utilizing a single catalytic site and a limited pool of precursor molecules. These metabolites are variously modified to become biologically active. These observations not only provide interesting clues to the possible role of these small molecules in Corynebacterineae physiology and virulence but can be further exploited for generating a reservoir of structurally and chemically distinct unnatural bioactive scaffolds.

Biography

Priti Saxena completed her PhD in Chemical Biology from National Institute of Immunology, New Delhi. She worked as a Scientist Fellow at Institute ofGenomics and Integrative Biology, Delhi and has published several articles in reputed high impact journals. She has been awarded with the premier fellowship of Innovative Young Biotechnologist Award (IYBA) of DBT, India and SAU Intramural Grant of South Asian University, India. Her research interests focus on delineating molecular mechanisms underlying mycobacterial pathogenesis in the capacity of an Assistant Professor at South Asian University, India.

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Engineering consequences of recent discovery of gravitational waves

Srinivasa Rao Jammi
Vibration Institute, India

Man has been always curious in knowing about Earth and Universe around. The first success in scientific understanding was provided by Newton in 17th century with an understanding of gravity that was limited for forces between objects: E.g., Sun and Earth or simply an Apple falling on earth. Einstein a century ago; introduced gravitational waves that communicate information between two colliding objects through space-time; problem of action at a distance. However they were elusive for measurement until recently. It is only recently on 15th September 2015 their measurement was achieved and announced on 11th February 2016; Two Laser Interferometry Gravitational Observatories (LIGO) built in USA, measured this minutely small value of 10^{-22} that has the accuracy of measurement of a hundred of the diameter of a proton in an atom. We will first explain this measurement. Several phenomena that happened on earth e.g., Pangea broke and drifted from the South Pole, the force behind their movement is not properly understood. Gravitational waves seem to provide the answer. The earth has also seen alternate chills and global warming. This paper provides an FE model of earth and the rise in temperature that occurs over long periods. Yet another unexplained phenomenon is the tectonic plate movement, e.g., Gondwana land traveling over 50 million years pushing the Eurasian plate and forming Himalayan ranges. The earthquakes attributed here due to the plate movement can be also attributed to gravitational waves. An approach for crack propagation due to this northward plate movement is also presented.

Biography

Srinivasa Rao Jammi has completed his PhD and DSc from IIT Kharagpur and Postdoctoral studies from University of Surrey. He is the President of The Vibration Institute of India, a premier institute promoting worldwide academic and industrial research. He has published more than 170 papers in reputed journals and 275 in conferences worldwide. He is the Chief Editor of International Journal of Vibration Engineering and Technology and has been serving as an Editorial Board Member of several reputed journals. He is a Consultant for over 30 industries worldwide, received over 30 awards, written over 20 books and Member of several societies.

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Saif Aldeen Saleh Al Ryalat
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Feasibility of investing time and money in genetic engineering: Commercial's perspective

As we previously stated in our first speech, the emerging technologies (e.g., CRISPR-Cas9) provided an opportunity to every scientist with innovative view to achieve his goal with minimal money and time. To get an overview about the importance of genetic research, 2 examples will be discussed in details in this regard; the highest cited article in NATURE is a genetic study entitled "An integrated encyclopedia of DNA elements in the human genome" that has more than 4200 citations in the past 4 years. The other example is what professors Gerngross and Hutchinson achieved in the years 2000 to 2006; they genetically modified the yeast *Pichia pastoris* to produce functional erythropoietin. In 2006, Merck offered 400 million in cash to buy their innovative invention and keep them on the head of their project but huge funding. With the emerging technologies that ease the genetic engineering, it is worth to think of an investment in this field, there are many similar examples where simple lab with few innovative scientists turned into "money factory".

Biography

Saif Aldeen Saleh Al Ryalat is a leading Researcher in several aspects of medicine, including genetic engineering and neurology. He is working on a project to design a bio-production system to design aglycosylated antibodies that can replace monoclonal glycosylated antibodies that are used in several neurological diseases (relatively high cost). He is also a peer Reviewer for several journals and a Researcher with several high impact publications. He is currently working at School of Medicine at The University of Jordan where he had several honors and certificates.

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