magnus Group

3RD EDITION OF

EURO-GLOBAL CONFERENCE ON

BIOTECHNOLOGY AND BIOENGINEERING

VIRTUAL EVENT

14-15 JUNE 2023

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BOOK OF ABSTRACTS

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ABSTRACTS

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Luis Jesus Villarreal Gomez

Universidad Autonoma de Baja California, Mexico

Cristiano Jose De Andrade

Federal University of Santa Catarian (UFSC), Brazil

Rajesh Pratap Singh

IIT Roorkee, India

Thank You All...

ABOUT
MAGNUS GROUP

Magnus Group (MG) is initiated to meet a need and to pursue collective goals of the scientific community specifically focusing in the field of Sciences, Engineering and technology to endorse exchanging of the ideas & knowledge which facilitate the collaboration between the scientists, academicians and researchers of same field or interdisciplinary research. Magnus Group is proficient in organizing conferences, meetings, seminars and workshops with the ingenious and peerless speakers throughout the world providing you and your organization with broad range of networking opportunities to globalize your research and create your own identity. Our conferences and workshops can be well titled as 'ocean of knowledge' where you can sail your boat and pick the pearls, leading the way for innovative research and strategies empowering the strength by overwhelming the complications associated with in the respective fields.

Participation from 90 different countries and 1090 different Universities have contributed to the success of our conferences. Our first International Conference was organized on Oncology and Radiology (ICOR) in Dubai, UAE. Our conferences usually run for 2-3 days completely covering Keynote & Oral sessions along with workshops and poster presentations. Our organization runs promptly with dedicated and proficient employees' managing different conferences throughout the world, without compromising service and quality.

ABOUT
ECBB 2023

Magnus Group is pleased to announce the 3rd Edition of the Euro-Global Conference on Biotechnology and Bioengineering (ECBB 2023). Following the success of previous conferences, this year's event will be held virtually from June 14-15, 2023. With the theme "Revealing and Transforming the Globe with Innovations in Biotechnology and Bioengineering," ECBB 2023 aims to bring together professionals, researchers, scientists, and representatives from the biotechnology industry.

The conference will provide a unique platform for academia, clinicians, and industry experts to explore disruptive technologies, novel platforms, and strategies to enhance productivity and reduce costs in the field of biotechnology. The agenda has been meticulously curated to include a variety of engaging activities such as biotechnology poster presentations, interactive panel discussions, and visionary keynote sessions.

By fostering collaboration and innovation, ECBB 2023 seeks to expand the horizons of attendees in the field of bioengineering. Magnus Group is confident that this two-day colloquium will offer an incredible opportunity to discover new avenues of research and development.

We invite you to join us in this global summit and contribute to shaping the future of biotechnology and bioengineering. We look forward to welcoming you to ECBB 2023.

BOOK OF ABSTRACTS

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14-15 JUNE

DAY 01

KEYNOTE FORUM

3RD EDITION OF

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Tailoring composition, bioactivity, and porous structure of 3D-printed scaffolds for tissue engineering

Advanced regenerative medicine strategies rely on the use of 3D scaffolds with tailored composition and porous structure in order to optimize tissue engineering processes. This contribution aims at overviewing recent research activities carried out in this context and focussed on the application of additive manufacturing (AM), often referred to as 3D printing, to develop novel approaches for processing bioactive polymeric materials. In particular, the employment of computer-aided wet-spinning (CAWS), a non solvent-induced AM technique, for the fabrication of 3D scaffolds with a dual-scale porosity (macro- and micro-structured) will be presented. The employment of different biodegradable scaffolding polymers, including synthetic and natural aliphatic polyesters, e.g., poly (ε-caprolactone) (PCL) and poly (3-hydroxybutyrate-co-3-hydroxyvalerate) (PHBV), as well as polysaccharides from marine sources, e.g., chitosan and alginate, will be discussed. In addition, special attention will be devoted to recent research on novel AM strategies for loading polymeric scaffolds with osteoinductive ceramics, antibiotics, or natural anti-inflammatory/antimicrobial agents (e.g., flavonoids and eugenol), in order to endow the polymeric matrix with bioactive properties. The potential of the developed bioactive device prototypes for advanced biomedical applications, such as bone regeneration, will by highlighted through the description of tailored experimental activities focused on their physical-chemical and biological characterization.

Audience Take away Notes

- The audience will gain advanced knowledge on modern additive manufacturing approaches to biomedical polymer processing
- The audience will be able to design novel experimental activities in bioactive polymeric materials processing and characterization
- The presented research could help other scientists to expand their research or teaching in the field of polymeric materials science and technology

Dario Puppi

BIO Lab Research Group, Department of Chemistry and Industrial Chemistry, University of Pisa, UdR INSTM – Pisa, Via G. Moruzzi 13, 56124 Pisa, Italy

Biography

Dr. Dario Puppi obtained a Master's Degree in Chemical Engineering - Materials at University of Pisa, Italy (2005). He then joined the research group of Prof. Emo Chiellini at the Department of Chemistry and Industrial Chemistry, University of Pisa. He received his PhD degree in Biomaterials in 2009 at the same institution, where he currently works as Senior Research Fellow and Assistant Professor in Industrial Chemistry. He has published more than 60 research articles in SCI (E) journals, receiving more than 2800 citations (h-index: 29, Scopus database).

Analysis of molecular features and therapeutic potential of L-asparaginase from a marine bacterium

L-asparaginase is an antileukemic enzyme that is majorly utilized in treatment acute lymphoblastic leukaemia (ALL) and other blood cancers. A number of groups have made efforts to explore this vital agent. However, use of L-asparaginase has been observed to have several side effects. Moreover, recurrent dosages of this form of enzyme is required due to its shorter half-life in blood circulation, thus limiting its clinical efficacy and increased treatment cost. Thus there are vigorous efforts undergoing to look for L-asparaginase with improved features. The work explores an extracellular glutaminase-free L-asparaginase-producing Bacillus australimaris NJB19 from marine resources. A number of parameters have been analysed to find the optimal levels for achieving increased yields of enzyme production. Further, the biochemical analysis of the protein was conducted for finding out optimum parameters, Km and Vmax. The structural analysis denotes that the protein was type II L-asparaginase with no toxin domain. Furthermore, the cytotoxicity of the produced L- asparaginase was assessed using three solid tumor cell lines employing MTT and LDH assays. The cytotoxicity evaluation demonstrates the highest cytotoxic activity for MCF-7 and to MDA-MB231 and DU-145 cells. Therefore, glutaminase-free L-asparaginase from marine B. australimaris NJB19 appears to be of potential value to be exploited commercially for ALL treatment.

Keywords: Marine, L-asparaginase, Cytotoxicity, Anti-leukemic.

Audience Take Away Notes

- The presentation will cover the various aspects of L-asparaginase particularly how marine resources could be useful in looking for therapeutically significant enzymes particularly here L-asparaginase. The various biochemical and molecular approaches to analyze this enzyme will also be deliberated
- The audience will learn the approaches to look for novel enzymes. They would also learn the distinct parameters and also the technical details that would let them understand the characteristic features of a novel enzyme. Learning and understanding these details would enable them to use it for their research and development work
- Attending this presentation will help the audience in designing their approaches for an improved outcome of the research objectives that they are involved into
- The outcomes of this presentation will help faculty and scientists to take up their research and teaching in an effective and meticulous manner

R. P. Singh*, Namrata Chakravarty

Department of Biosciences and Bioengineering Indian Institute of Technology Roorkee, Roorkee-247667, Uttarakhand, India

Biography

DR. P. Singh is currently an Emeritus Professor at the Department of Biosciences and Bioengineering, Indian Institute of Technology Roorkee, India. He had worked at the National Institutes of Health, USA and Harvard Medical School, USA as a Visiting Fellow and as a Research Officer for more than five years. He was also a visiting faculty for a year at the University of Arkansas for Medical Sciences, USA. His research interests primarily include enzyme engineering, biofuels, biopolymers and bioremediation. He is associated with several International and National organizations mainly Process Innovation and Process Intensification Network, UK; European Federation of Biotechnology; Expert Committees of the Department of Science & Technology and Department of Biotechnology and Life Science Research Board, DRDO, Govt. of India. He is a member of the editorial board of journals. He has authored several original research articles, review papers and book chapters and has one US patent to his credit.

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14-15 JUNE

DAY 01

SPEAKERS

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Sadaf-Ilyas Kayani[1,2]*, Kexuan Tang[2], Shuhao Huo[1]

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[2]Frontiers Science Center for Transformative Molecules, Joint International Research Laboratory of Metabolic and Developmental Sciences, Plant Biotechnology Research Center, Fudan-SJTU Nottingham Plant Biotechnology R&D Center, School of Agriculture and Biology, Shanghai Jiao Tong University, Shanghai, China

YABBY mediated transcriptional regulation of artemisinin biosynthesis in artemisia annua

Artemisinin is an effective antimalarial sesquiterpene lactone synthesized in *Artemisia annua*. Artemisinin-based combination therapies (ACTs) are recommended by the World Health Organization (WHO) as the best choice to cure acute malaria. Many transcription factors regulating artemisinin biosynthesis have been reported so far. However, the role of the YABBY family in artemisinin biosynthesis was not studied before. YABBY is a small family of transcription factors specific to seed plants and controls various aspects of leaf growth and development, as well as the biosynthesis of secondary metabolites. During my research, the molecular mechanism of the AaYABBY5 transcription factor regulating artemisinin and flavonoid biosynthesis is studied. In artemisinin biosynthesis: AaYABBY5 regulates artemisinin biosynthesis through activating CYP71AV1 and DBR2 *promoters*. JA-regulated AaGSW1-AaYABBY5/AaWRKY9 complex indirectly regulates artemisinin biosynthesis in a positive feedback loop. In flavonoid biosynthesis: AaYABBY5 directly targets the PAL, CHI, CHS, and UFGT genes and regulates the total flavonoid and anthocyanins content. In future work, detailed characterization of AaYAB1, AaFIL, and AaYAB3 towards artemisinin and flavonoid biosynthesis will be performed. This work will increase knowledge about YABBY-mediated artemisinin regulation. The proposed study could potentially provide a genetic resource of A. *annua* with high artemisinin and flavonoid content, thus helping the artemisinin commercialization.

Biography

Sadaf-Ilyas Kayani studied molecular biology at Quaid-e-Azam University, Islamabad, and graduated as MS in 2015. For her Ph.D. studies, she joined the research group of Professor Kexuan Tang at the Plant Biotechnology Research Center, School of Agriculture and Biology, Shanghai Jiao Tong University, China. She received her Ph.D. degree in June 2021. In August 2021, she joined School of Food and Biological Engineering, Jiangsu University, China, as a postdoctoral fellow, supervised by Professor Shuhao Huo. She is currently working in the same institution. She has published about 26 research articles in SCI journals.

Frelet-Barrand Annie*, Flourieusse A, Bourgeois P, Schenckbecher E, Palvair J, Legrand D, Labbe C, Bescond T, Orlowski S, Rouleau A, Frelet- Barrand A

Institute FEMTO-ST, UMR6174 UFC CNRS, Besancon, France

The lactic acid bacteria *Lactococcus lactic* can surprisingly produce intracellular vesicles

Membrane proteins (MPs) perform a wide variety of functions vital to the survival of organisms. Involved in numerous pathologies, they are important drug targets. In spite of their functional and biotechnological importance, their study remains difficult due to their hydrophobicity and low abundance in cells. Their overexpression in heterologous systems is mandatory for their detailed structural and functional characterization. However, this strategy leads to numerous obstacles such as their toxicity to hosts and the quality of the MP produced in these systems, especially for structural studies. An original approach to produce intracellular vesicles was tested using the ability of a small MP, cave Olin 1β, to generate membrane vesicles within the cytoplasm when heterologous overexpressed. Such structures were observed in *Escherichia coli* and insect cells. The overexpression of cave olin 1β was tested in the lactic acid bacteria, *Lactococcus lactic*, since these bacteria appeared to emerge as a good alternative to *E. Coli* and because they display a very different lipid composition. Surprisingly, *L. lactic* was able to produce intracellular vesicles with a size comparable to *E. Coli* h-coevolve. Biochemical and biophysical studies have been carried out to realize a deeper characterization of such nan vesicles prior to other further applications of these Nano vesicles.

Audience Take Away Notes

- My presentation on *L. lactic* and its use for production of Nano vesicles will help people facing problems of expression of proteins of interest in classical expression systems, either prokaryotic or eukaryotic and also give opportunities to develop collaborations around nan vesicles production and characterization

Biography

Dr. Annie Frelet-Barrand studied biochemistry at the University of Franche-Comté (France) and was graduated as MS in 1998. In 2006, she received her PhD degree on MP characterization at the Institute of Plant Biology, Zurich. During her postdoctoral fellowship (CEA Grenoble, France), she developed L. lactic system for functional characterization of MPs. In 2009, she became CNRS Researcher at CEA Saclay, studying MPs involved in liver detoxification. In 2015, she integrated the Institute FEMTO-ST and is now producing and characterizing diverse biological elements from proteins, vesicles to bacteria and cells. She published 21 research articles and 4 book chapters (h=17).

Anand Shubha

Department of Botany, Dayalbagh Educational Institute, Agra, Uttar Pradesh, India

Prospects of human hair keratin based materials

Keratin is the major structural fibrous protein providing outer covering such as hair, wool, feathers, nails and horns of mammals, reptiles and birds. Keratin fibers, such as wool and human hair, consist of two major morphological parts: the cuticle layer which is composed of overlapping cells that surround the cortex, the inner part of the fiber. Human hair consists primarily of keratin and keratin associated proteins. It is approximately 80% of keratin by total mass. Extracted keratin proteins have an intrinsic ability to self-assemble and polymerize into fibrous and porous films gels and scaffolds. Keratins can be fabricated into several morphologies including films, sponges and hydrogels by employing different procedures. Keratin based biomaterial have potential biomedical applications due to its biocompatibility, biodegradability, good cellular interaction and no immune reaction. The major applications explored for the keratin based biomaterial include wound dressings, drug delivery systems, ocular surface reconstructions and peripheral nerve regeneration among others.

Audience Take Away Notes

- How keratin could be fabricated into various material forms
- Current use of keratin materials in biomedical applications
- Characteristic properties of keratin based materials
- Prospects of keratin films as an alternate to conventional plastics

Biography

Dr. Shubha Anand completed B.Tech in Biotechnology at the Amity University, India in 2011. Later she completed M.Tech in Biotechnology at the A.P.J Abdul Kalam University, India in 2015. She then joined the research group of Dr. Sharmita Gupta at the Dayalbagh Educational Institute (DEI). She received her PhD degree in 2023 at the same institution. She is currently working as a Lecturer in DEI.

Arjun Rastogi, Gopal Prasad Agarwal*

Department of Biochemical Engineering and Biotechnology Indian Institute of Technology Delhi, New Delhi-110016, India

Nanofiltration mediation for efficient production of second generation bioethanol by wild-type yeast from lignocellulosic hydrolysate

Nanofiltration, a relatively new synthetic membrane based separation process was first used to fractionate lignocelluolosic hydrolysate. The fractionated streams of permeate and retentate were fermented separately to produce bioethanol in high yield. The choice of right nanofiltration membrane was critical to achieve the optimal separation of glucose and xylose of the lignocellulosic hydrolysate. The molecular weight cut off for the nanofiltration membrane was between 100 to 300 and maximum transmembrane pressure used was 30 bar. The volumetric flux of these membranes was in the range of 60 to 100 LMH (liter m-2 h-1) for transmembrane pressure > 20 bar. These nanofiltration membranes were procured from various manufacturers like Novasep USA, Snyder USA and Permionics India. The separated streams thus obtained were completely fermented via wild type yeasts namely Saccharomyces cerevisiae and Pichia stiptis into ethanol. The intervention of nanofiltration played an important role whereby the use of recombinant strain was avoided. Also the complete utilization of carbohydrates of lignocellulosic hydrolysate was obtained. Nano filtration not only separated the 5 carbons and 6 carbon carbohydrate but also separated toxins of the hydrolysate in to the stream which was fermented by Saccharomyces cerevisiae. The productivity of ethanol was 2 to 3 times faster in the present process than the conventional method which was in use so far. In nanofiltration assisted process high sugar concentration as high as 100 g/l could be fermented to its completion.

Keywords: Nanofiltration, Second Generation Ethanol, Wild type yeasts, Lignocellulosic Hydrolysate, Saccharomyces cerevisiae and Pichia stiptis.

Biography

Dr. Gopal P. Agarwal was a Professor at Indian Institute of Technology Delhi, INDIA for over 3 decades. He was teaching a course on Applications of membranes in Bioprocessing and Biotechnology to a large class of over 50 students regularly. His research interests had been to find and discover new applications of pressure driven membrane processes for food, biotechnology and renewable energy. He was Principal Investigator of many sponsored projects worth Rs 3.5 crores from Government of India and private entrepreneurs. He published in Journals of Membrane, Bioseparation, Separation Science & Technology, Journal of Chromatography and Bioresource Technology.

Prabha Muddobalaiah[1*], Vasanthapuram Ravi[2], Sushma S. Rao[1], Bhavana G[1], Sunitha P[3]

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[3]Department of Biotechnology, Maharani Lakshmi Ammanni College for Women, Bangalore

Carboxylesterase modification (with lithium) as therapeutic enzyme for human brain diseases

Carboxylesterases (CEs) are hydrolytic enzymes involved in anticancer drug metabolism. Human WHO grades all meningiomas and gliomas exhibited lower CE-specific activity which proves one of the main reasons for the failure of chemotherapy. The similar CE-specific activity between the meningiomas 20.96±5.071 (n=50) and gliomas 20.77±4.4644 nmol/min/mg (n=61) respectively, exhibited significantly lower CE activity as compared to normal Brain (n=106) 52.355 ± 11.15 nmol/min/mg of protein and p-value was less than 0.0001 extremely statistically significant. So it is necessary to enhance the CE activity in Brain tumors. The two glioblastoma cell lines LN229 and U251 were considered to enhance CE levels and total protein. The LN229 with high concentration of lithium treated (0.5µM) cells showed lower protein content (373.33mg) compared to control (640mg) and the low concentration of lithium with (0.1µM) treated cells showed comparatively higher protein content (426.66mg) content to control. While U251, high concentration of lithium treated cells showed lower protein content (720 mg), compared to control (880 mg) and also the lower concentration of lithium treated cell showed higher protein content (1520 mg), compared to high concentration of lithium treated cells and control. These results suggest that low concentration 0.1µM lithium chloride showed higher protein content while higher 0.5µM $LiCL_2$ treated cells lower protein related to anti cancerous activity in LN 229 and U251 cell lines. The LN 229 showed lower carboxyl esterase, may be one of the reasons for the failure for the chemotherapy. Whereas the higher CES-specific activities in lithium-treated Brain tumor cell lines LN 229 and U251 can be designed for the anticancer drug conjugate. The chance of solving the drug metabolism from lithium for efficient metabolism by CE-specific activity and designed for better anticancer drug therapeutics in the future. In other cases Carboxyl Esterase (CE) was assayed for four different groups of young and old aged male Albino Sprague dawley rats (2-4 and 16-18 months) in brain and liver. Among them both aged rats were treated with 37 mg of lithium chloride ($LiCl_2$) per kilogram of body weight orally for 10 days. $LiCl_2$ showed completely positive effect on releasing carboxyl esterase in both young and old groups of brain (36.1 and 89.3 nmoles/min/mg of protein) and liver (114.93 and 91.73 nmoles/min/mg of protein) respectively than control. The young and old rat brain samples treated with $LiCl_2$ showed intense band for CE in Native PAGE gel than untreated groups. Old rat brains $LiCl_2$ treated showed significant increased CE specific activity of 0.076 IU/mg protein in crude, 0.1445 IU/mg protein in Ammonium sulphate precipitated and 0.5827 IU/mg protein in ion exchange fraction than their control. So the highly purified samples of carboxyl esterase obtained with $LiCl_2$ treated brain. Enzyme kinetics of substrate concentration showed KM of 0.2 mM and Vmax of 52.631, indicating higher CE activity at pH-6 and at 60oC temperature in crude extracts of control old rats. Thus $LiCl_2$ is involved in activation of CE function and potential to be integrated into drug-development programs as neuroprotective factor to facilitate the neuronal/brain function.

Key words: Carboxylesterase, Brain tumors, LN 229 and U251 Cell lines, Rat Brain and liver, Lithium chloride.

Audience Take Away Notes

- Will come to know the importance of Hydrolytic enzymes as anticancer drug metabolizing enzyme in brain tumors
- People can also start working on proteins and enzymes for molecular diagnosis and as therapeutic enzymes
- They can utilize but in different tumors and diseases since I am working on Brain cells
- This provide a practical solution to a problem. Hence I have received invitation to deliver lecture from 12 different countries around the world.
- It will improve if we design with Advance Techniques analysis and proper standardization
- List all other benefits
    - It helps for complimentary diagnosis
    - It can also be design for surrogate biomarkers
    - The detection of the patient's condition for drug metabolism
    - It can improve the chemotherapy
    - To understand the molecular mechanism of the brain diseases

Biography

Dr Prabha M did her PhD in Neurochemistry at NIMHANS on "A Comparative Biochemical study on Hydrolytic enzymes in normal postmortem Human brain, Brain tumors and in their derived cell lines". Postdoctoral studies at NCBS (Molecular genetics) and IISc with CSIR-RA fellowship (cancer stem cells). She is currently working as Associate Professor at Ramaiah Institute of Technology, Bengaluru-INDIA. She has published 14 first author research articles, 1 book chapter and 8 conference proceedings. She has received the Distinguished woman in health and medical sciences-award -Biochemistry 2019–Chennai. She has also bagged Bharat Shiksha Gaurava Puraskar, (certificate of Excellence), Best Educationist Award and Eminent educationist of India award - 2022 by KTK foundation, Delhi. She has received NPTEL Domain Star--Biotechnology—Biosciences 2022 and winner for Women Researcher -- International Scientist Awards on Engineering, Science and Medicine (INSO awards) by VDGOOD. She is an invited editor for Journal of Clinical Science & Translational Medicine, Journal of Biomedicine and Biosensor and Biochemical Engineering & Bioprocess Technology and Invited reviewer constantly for Clinical and Translational oncology Springer, Cancer Biomarker IOS, Indian journal of Neurosciences and journal of Neurochemistry (Wiley).

Pooja Kumari[1,2*], Neel S. Bhavesh[1]

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[2]Amity University, Jharkhand, India

Structural insight into cellular regulation by human DND1 and associated conformational plasticity

RNA Recognition Motifs (RRMs) being the most abundant RNA binding domain in eukaryotes, is a major player in cellular regulation. Human DND1 (dead end protein homolog1) also known as microRNA-mediated repression inhibitor 1 is an RNA binding protein containing two RRMs in tandem. It is essential for migration and viability of primordial germ cells during development, its complete loss causes lethality and mutations in the gene are associated with perturbed cellular regulation and eventually cancer. We have determined the 2.3 Å crystal structure of the human DND1 RRM2 domain. The structure revealed an interesting non-canonical RRM fold. This is maintained by the formation of a 3D domain-swapped dimer between β1 and β4 strands across protomers. We have delineated the structural basis of the stable domain-swapped dimer formation using the residue level dynamics of protein explored by NMR spectroscopy and MD simulations. Our results indicate that monomer to dimmer switch is governed by several determinants such as hinge loop residues, its length, hydrophobicity, concentration of protein, disulphide bond, and so forth. Several variations in the canonical βαββαβ topology have been observed so far. However, this is the first report of domain swapping in RRM domain which may increase the binding surface area and allow this protein to exhibit multifaceted role during post-transcriptional regulation. Our structural and dynamics studies substantiate major determinants and molecular basis for domain-swapped dimerization observed in the RRM domain that could allow varied roles for its RRMs.

Biography

Pooja Kumari studied B.Sc. and M.Sc at the Banaras Hindu University, Varanasi from 2011-2016. She then qualified national level fellowship CSIR-JRF and secured a Ph.D. position at the International Center for Genetic Engineering and Biotechnology, (ICGEB) New Delhi and joined the group of Dr. Neel Sarovar Bhavesh gaining critical knowledge on protein biochemistry, X-Ray crystallography and Nuclear Magnetic Resonance (NMR). She received her Ph.D. degree in 2021 from Jawaharlal Nehru University Delhi. Followed by which she did her postdoctoral studies at National Center for Biological Sciences, Bangalore. She obtained the position of Assistant Professor at the Amity Institute of Biotechnology, Amity University Jharkhand in 2022. She has published seven articles in SCI journals.

Upasana Pathak[1,2*], Nagesh Malik[1], R. B. Pal[2]

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[2]Sir H.N. Medical Research Society, Sir H.N. Reliance Foundation Hospital and Research Centre, Mumbai, Maharashtra, India

Study of newcastle disease virus-induced oncolytic effect in MDA-MB231 breast cancer cell line

Newcastle disease virus (NDV) exhibits oncolysis in its natural form. This oncolytic virus (OV) has the potential to specifically infect, propagate, and lyse cancer cells while sparing the normal cells. This study screened for oncolytic NDV strain isolated from poultry. The cytopathic effect of ten NDV strains on cancer cell lines like MDA-MB- 231, MCF-7, PC3, and A549 along with normal control cell line HEK293 was determined by MTT assay 72 hours post infection. These cell lines were infected with three doses (1, 0.1, and 0.01 MOI). Morphological changes in MDA-MB- 231 on infection with the screened NDV isolate were analyzed using H&E hematoxylin and eosin staining. The main mode of cell death triggered by velogenic NDV was identified, and also the stimulation of apoptosis inducing proteins like bax and caspase 3 along with the gene expression levels of the same were studied. Cytopathic effect of NDV isolate was examined on MDA-MB-231 breast cancer cell line by imaging flow cytometry. Bax and caspase 3 protein activity post NDV infection was quantified using sandwich ELISA. The gene expression level of both bax and caspase 3 were evaluated using qRT-PCR. The screened NDV isolate showed the maximum cytopathic effect i.e. 61.55% on MDA- MB-231 at MOI 1 but had no potent cytotoxic effect on HEK293. DNA laddering effect was observed which confirmed the mode of death to be apoptosis. All the observed morphological changes in MDA-MB-231 were typical of the cytopathogenic effects of NDV on cancer cell lines. NDV9B induced apoptosis as well as necrosis in the MDA-MB-231 cancer cells at various time interval. NDV9B elevated the bax and caspase 3 protein activity found to be maximum 1743 pg/mL and 1364 pg/mL respectively at 72 hours after infection. NDV9B infected MDA-MB231 cancer cells exhibited maximum bax gene expression at 48 hours. In case of caspase-3 gene, mRNA expression levels showed highest fold change at 72 hours post infection. In conclusion, the screened oncolytic NDV shows effective oncolysis against MDA-MB-231 cell line. These findings suggest NDV9B as a promising oncolytic virus for MDA-MB-231 cancer cells which induces cell death mainly by apoptosis.

Audience Take Away Notes

- This study aims to screen oncolytic NDV from the poultry strains along with establishing its anticancer potential.
- This study will help in further exploration of NDV as oncolytic agent & A better understanding of NDV will enable to subdue or overcome cellular defenses in order to attain substantial viral replication within the cancer cells
- The advent of oncolytic virotherapy will not only reform the existing standard of cancer treatment but also revolutionize tumor treatment after traditional surgery and chemotherapy
- Wild type NDV remains unexplored for its immense potential as an oncolytic agent leading to a lack of progress in the clinical and preclinical trials
- Wild type strain which replicates aggressively in the tumor cells, can further be genetically altered and remodeled to comply with highest degree of tumor specificity and lowest toxicity to the patient

Biography

Upasana Pathak studied Microbiology from Mumbai University, India, and completed post-graduation in 2012. I am currently pursuing Ph.D. from VES College, Mumbai University. Also working as, a Research assistant at Sir H.N. Medical Research Society, Mumbai. Besides the ongoing Ph.D. project which involves understanding NDV as an oncolytic agent. I have also worked on various projects involving the evaluation of different methods for the detection of MRSA, Genotyping of MBL-producing Pseudomonas aeruginosa by PFGE, and published 4 research articles. A Detail-oriented Researcher with hands-on experience and expertise in microbiology, tissue culture, and molecular biology.

Sebnem Kavakli Yildiz
Ege University Graduate School of Natural and Applied Sciences, Ege University, Izmir, Turkey

Plant MiRNA applications and importance against SARS-CoV-2 Genome

RNA interfarence is a post transcriptional modification of gene silencing mechanism. It presents in a wide range organsims like plants, fungi, both verebrates and invertebrates and inside of this most importantly mammals. As shortly RNAi mechanism can apply by double-stranded short interfering RNA (siRNA) or MicroRNA (MiRNA). These RNAs can sometimes prevent or sometimes degradate the translation of an targeted mRNA that contains complementary of the target. MiRNAs are 20-25 nucleotides long, highly conserved, single stranded non-coing RNAs. They can use gene regulation at post transcriptional level by interact with the 3'untraslated region (3'UTRs) or to bind a specific region in open reading frames (ORFs) of target mRNAs. After binding MiRNAs to 3'UTR's of target genome, target mRNA degradate and the targets protein can not translate. If target is a virus, it's mean virus RNA translation or replicaion can be possible to degradate with MiRNA applications. Coronavirus has a single strand RNA. This virus can infect human and cause pandemi kwons as COVID 19.This illness genome SARS-CoV-2 is similar to mRNA genomes in structurals. It has 3'UTR and open reading frames (ORFs). MiRNA applications try to bind COVID19 genome at these parts of the genome. MiRNA applications at virus genomes can apply by using different plant genomes. This process known as host-virus-plant interactions. It is a kind of cross-kingdom interaction. A plant species MiRNA interact with another species and then this plant MiRNA uses to silence other species genome. There are conserved parts at 3'UTRs of virus genomes. These parts use for silencing. SARS-CoV-2 genome has different conserved 3'UTR regions that match different plant MiRNAs. In this study, these plant MiRNAs will try to explain in which plants and seuences searched by bioinformatic studies. Becides edible nanoparticles (ENPs) and applications will explain. ENPs are bioavailable forms that filled with MiRNAs. ENPs applications try to use as an alternative treatment at cross-kingdom interactions. Plant MiRNAs have different databases. In this study will also explain which databases there are for plant MiRNAs and which plant species thay can use.

Audience Take Away Notes

- RNA interferance mechanism
- What's micro RNA, plant MiRNAs and plant MiRNAs virus interactions
- SARS-CoV-2 genome and importance of MiRNAs for COVID19
- Plant MiRNAs and COVID19 interactions
- Edible nanoparticles (ENPs) and applications
- Plant MiRNA databases

Biography

Sebnem Kavakli Yildiz studied MSc. and PhD at Ege University Biotechnology Departmant Plant Biotechnology from 2003-2012. She did her postdoctorral studies with TUBITAK postdoctoral fellowship at Tokyo University. She works plant biotechnology expecially plant MiRNAs. She still works at Ege University.

Mustafa Kotmakci[1*], Zafer Yildirim[2], Busra Bara[2], Ezgi Oner[3], Vildan Bozok Cetintas[2]

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Preparation and characterization of STING agonists-delivering LNP systems for cancer treatment

Glioblastoma (GBM) is the most common brain tumour in adults that has poor prognosis and still considered incurable with a very short median survival after diagnosis. The stimulator of interferon genes (STING) in conjunction with cyclic GMP-AMP synthase (cGAMP) is cytosolic DNA-sensing machinery which stimulates activation of type I interferons and other inflammatory cytokines. cGAS is a pattern recognition receptor that has affinity to viral or bacterial non-self DNA or cytosolic self-DNA derived from cancer cells. In addition, STING also acts as a receptor for bacteria-derived cyclic dinucleotides. Although the main function of cGAS-STING pathway is to protect the organism against pathogen attacks, irregularities in this pathway trigger inflammatory response, an underlying cause of many diseases. In the past several years, substances showing agonist activity on STING have become increasingly attractive for developing new treatment strategies against several cancer types including GBM. Of these, natural and synthetic cyclic dinucleotides and non-nucleic acid agonists have shown huge potential and entered preclinical and clinical studies. As with majority of therapeutic molecules, these also have some disadvantages such as low solubility, unspecific biodistribution, low blood brain barrier penetration and adverse effects related to excessive cytokine release upon systemic administration. The aim of this study was to prepare STING agonist-loaded Lipid Nano Particles (LNPs) to be used as delivery systems in an in vivo GBM model. We prepared the LNP formulations by lyophilisation followed by rehydration and either freeze-thaw cycles or ultrasonication. A hydrophilic synthetic cyclic dinucleotide and a hydrophobic non-nucleotide STING agonist were loaded to these nanoparticles and characterized in terms of drug loading capacity and particle size. The toxicity of the nanoparticles was assessed on fibroblast (L929) and glioblastoma (GL261) cell lines. Cellular entry of the delivery systems was evaluated on GL261 cell lines. The cytokine stimulation activity was assessed on peripheral blood mononuclear cells and THP1 cell line. The probe sonication method allowed us to obtain LNPs below 250 nm. However, larger LNPs were obtained when we used the freeze-thaw method. The surface charge was modified by inclusion of a cationic lipid and LNPs with both positive and negative zeta potential were obtained. Drug entrapment efficiency was higher than 99% for the lipophilic drug, while for the hydrophilic drug the entrapment efficiency was below 40%. When the cytotoxic effect of the delivery system was analysed on fibroblast cells, no significant change was observed on cell viability. Higher cell entry was observed with the cationic LNPs. The candidate formulations performed comparable to the free drug molecules in terms of cytokine secretion in vitro. Further in vivo experiments are ongoing to test the efficacy of the selected formulation against GBM in orthotropic GBM mouse model.

Acknowledgement: This study is supported by the Health Institutes of Turkiye (TUSEB, Project #4469)

Audience Take Away Notes

- The role of STING agonists in cancer treatment
- The preparation of lipid nanoparticles of hydrophilic and lipophilic STING agonists
- The in vitro performance of the designed nanoparticles

Biography

Dr. Kotmakcı studied Pharmacy (BPharm) at the Gazi University, Ankara, Turkiye (2006). Afterwards he obtained his MSc (2009) and PhD (2013) from Ege University Institute of Health Sciences. He joined as a visiting postdoc the Pharmaceutical Biotechnology Research Group of Prof. Ernst Wagner at the Faculty of Chemistry and Pharmacy, LMU-Munich, with the support provided by TUBITAK. His research is mainly focused on development and evaluation of Nano particulate delivery systems for nucleic acids, as well as proteins and small molecule drugs. Currently he works as Assistant Professor at the department of pharmaceutical biotechnology, Faculty of Pharmacy, Ege University Izmir-Turkey.

D.I. Daudi[1*], M.A. Dmitrieva[1], Grin N. A[2]

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Influence of proteins extracted from tarantula spider silk on the survival of mesenchymal stem cells

The skin is the largest organ in the human body. The skin's main function is barrier, and it protects internal organs, so it accounts for the greatest amount of damage. Wound healing is a complex process involving the interaction of cells and matrixes with further formation of new tissue. In this paper, the effect of spidroins (spider silk proteins) on human mesenchymal cells is examined with the aim of further using this type of proteins in tissue engineering.

Audience Take Away Notes

- The resulting work may be useful to researchers who use biopolymers in their work
- A study was conducted on the natural silk web on the survival of human stem cells
- The study is unique and provides insights into the potential of silkworm silk for medical applications
- This work will provide new insights into the properties of silk and enable its use in medical dressings or healing solutions

Biography

Mr. Dauddin studied chemistry at Gubkin Russian State University of oil and gas, Moscow, and received a bachelor's degree in 2021. Then he joined Prof. Krivoshapkin's research group at ITMO National Research University, in the SCAMT chemistry-biology cluster, where he is currently pursuing a master's degree. He is the author and co-author of more than 30 scientific publications on petroleum chemistry. Also he has scientific publications on tissue engineering topics. Dauddin is winner and prizewinner of international scientific conferences.

Asit Kumar Chakraborty, MSc, PhD

Department of Biotechnology and Biochemistry, Oriental Institute of Science & Technology-West Bengal, Vidyasagar University, India

Biotechnological explorations of phyto-drugs against MDR bacterial infections from medicinal plants of West Bengal, India

Escherichia coli, Salmonella enterica, Acinetobacter baumannii, Pseudomonas aeguginosa, Enterococcus faecium and Klebsilla pneumoniae etc mediated infections were not cured by conventional antibiotics due to presence multiple large and small MDR plasmids with >10 mdr (amp, bla, cat, str, aac, aph, aad) genes and drug efflux genes (tetA/B/C, acrAB-TolC, mexAB-OprM) in those pathogens. MDR genes inactivate antibiotics through phosphorylation, acetylation, adenylation or antibiotic cleavage. Chromosomal genes mutations (rpoB, gyrA/B) in Mycobacteriaum tuberculosis were reported for drug resistance to conventional anti-tuberculosis drugs. Thus, development of new antibiotics is urgently needed. Plants secret anti-metabolites to retard growth of soil and water bacteria and are ideal source of new antibiotics. A Cassia fistula bark saponin polybromophenol compound (CU1) inhibited (IC50=20-30µg/ml) RNA polymerase from Escherichia coli as well as Mycobacterium tuberculosis as compared to refampicin. Similarly, well cultivated Suregada multiflora root extract was found exceptionally active (18 fold than natural sources) against MDR bacteria and TLC-purified NU2 glycoside inhibited E. coli DNA topoisomerase I at 10-20µg/ml and RNA polymerase to some extent at >20µg/ml. Ethanol extracts of Jatropha gossipifolia root, Shorea robusta inner bark, and Trapa bispinota fruit peel also have good MDR antibacterial activities. Phyto-chemical in each extract was abundant and gave a distinct band on preparative TLC (20cmx15cm) needed for large quantity purification for characterization and commercialization. MDR-bacteria were isolated from Ganga River water, rain water, chicken meat, milk and human hair and at least resistant to three antibiotics comprising ampicillin, tetracycline, chloramphenicol, streptomycin, erythromycin and ciprofloxacin. Distinct plasmid was isolated from MDR-bacteria and purified through agarose gel elution method and further transformed into drug sensitive E. coli DH5a giving distinct colonies on LB-agar-antibiotic plate. However, ampicillin (~2000cfu/ml), cefotaxime (~50cfu/ml) and imipenem (~2cfu/ml) resistant bacteria have also isolated from Ganga river water and inhibited by phyto-extracts. We think antibiotic void will increase due to few reasons: (1) mdr genes are accumulated in large conjugative plasmids with many IS elements; (2) the spread of mdr genes in bacteria is increasing at ~5%/year and (3) mdr genes protect gut microbiota from antibiotics. Thus, phyto-drugs discovery is logistic and demanding. We proved that MDR-CURE, an antibacterial Phyto-Drugs combination is useful to tackle multi-drug resistant human nail infections. Toxicological study against molly fishes and HeLa cells suggested 95% purified phytochemicals were less toxic up to 50µg/ml concentration.

Audience Take Away Notes

- The lecture will be very informative on abundance in MDR bacteria in Ganga river water as well as in chicken meat and milk as well as its present status on mdr enzymes that inactivate antibiotics. A details purification and characterization of phyto-drugs through MASS, HPLC, NMR, FTIR will be focused. Toxicological study using HeLa cells and molly fishes will be discussed. Further, few human clinical trials on MDR nail infections will be reported

Biography

Dr Asit Kumar Chakraborty was performed his PhD at CSIR-Indian Institute of Chemical Biology, Kolkata and awarded PhD degree in 1990 from Calcutta University. He did postdoctoral work at University of California at Berkeley and visiting scientist at Johns Hopkins University School of Medicine. He was Associate Professor of Biochemistry at OIST, Department of Biotechnology, Vidyasagar University and now retired. He published more than 60 papers in reputed journals.

Shilpy Singh
Department of Biotechnology and Microbiology, Noida International University, Gautam Budh Nagar, Uttar Pradesh, India

Insights into molecular evolution, characterization, and expression analysis of SPL gene family in chickpea (*Cicer arietinum*)

Background: Plant-specific transcription factors (TFs) named SQUAMOSA promoter binding protein-like (SPL) proteins have a number of developmental roles in plants, including growth, flowering, and signal transduction. A gene family that encodes SPL proteins has been identified in two model species, A. thaliana and O. sativa. Chickpea (*C. arietinum*), a leguminous crop, has not been thoroughly explored with regard to the SPL gene family.

Objective: Chickpea SPL family genes were identified and characterized in silico by using a genomic database. Gene data were retrieved from the phytozome database. The genetic information from chickpea was examined using bioinformatics methods.

Results: In this article, genome-wide characterization, expression, and structural analysis of the SPL gene family were carried out to examine the potential roles of SPLs in chickpea. 19 SPL genes were detected from the Cicer arietinum genome. Phylogenetic analyses revealed that the SPLs in chickpea evolved into 4 groups, Group-I with 2 introns, Group-II and IV with 1-2 introns (except CaSPL13 and CaSPL15 having 3 introns) and Group-III with 9 introns (except CaSPL1 and CaSPL11 with 1 and 8 introns respectively). The SBP domain revealed that SPL proteins featured two zinc-binding sites i. e. C_3H and C_2HC and one nuclear localization signal. All CaSPL proteins contain highly conserved motifs i.e., Motif 1, 2 and 4 except CaSPL10 in which Motif 1 and 4 were absent. Following analysis, it was discovered that motifs 1 and 2 of the chickpea SBP domain were Zn finger motifs, whereas motifs 4 carried a nuclear localization signal. All pairs of CaSPL paralogs developed by purifying selection. The promoter study of the CaSPL genes indicated the existence of cis-elements that are sensitive to stress, light, and phytohormones. Examination of their expression patterns showed most of the CaSPLs expressed predominantly in young pod and flower. Some CaSPL genes were also expressed in stress condition mainly in cold, salt and drought stress conditions, indicating their functions in plants' growth and development as well as their ability to respond to abiotic stress by controlling the expression of their target genes.

Conclusion: The majorities of the CaSPL genes are expressed in many tissues and play significant roles in plant growth and development, including responses to stressors. Future research on the function and evolution of SPL genes in chickpea may be made possible by our study's full understanding of the CaSPL gene family.

Keywords: *Cicer arietinum*, SPL family, SQUAMOSA Promoter-Binding domain, Phylogenetic, Expression profile.

Audience Take Away Notes

- This study indicates SPL genes functions in plants' growth and development as well as their ability to respond to abiotic stress by controlling the expression of their target genes
- This study helps the audience as SPL genes have the ability to respond to abiotic stress by controlling the expression of their target genes. This study belongs to Plant science

- Future research on the function and evolution of SPL genes in chickpea may be made possible by our study's full understanding of the CaSPL gene family
- By using this we identify which specific genes show their expression in which specific tissue and under which environmental stress condition
- There is no research available on chickpea related to SPL gene family, so this provides will the new information related to SPL gene family in chickpea
- List all other benefits
    - Identify the functional role of SPL gene family in chickpea
    - Identification of cis-elements that are sensitive to stress, light, and phytohormones
    - Helps to improve the yield and production of chickpea
    - Helps in genetic modification of chickpea

Biography

Dr. Shilpy Singh an Assistant Professor in the Department of Biotechnology and Microbiology, Noida International University, Gautam Budh Nagar. Earlier she was working as an Assistant Professor of Biotechnology at Mangalmay Institute of Management & Technology, Greater Noida. She completed her doctorate in Plant Biotechnology from Sardar Vallabhbhai Patel University of Agriculture & Technology, Meerut and Master in Biotechnology from The IIS University, Jaipur. She earned best young faculty award, young fellow award, young researcher award and poster presentation award in the field of Biotechnology. She also holds 10 publications in peer- reviewed journals.

Haet Kothari, Ajay Kumar Raj, Kiran B. Lokhande, Tanay Kondapally, Kratika Khandelwal, Vaidehi Patel, Nilesh Kumar Sharma*

Cancer and Translational Research Lab, Dr. D.Y. Patil Biotechnology & Bioinformatics Institute, Dr. D.Y. Patil Vidyapeeth, Pune, Maharashtra, India

Detection of ellagic acid at the intracellular level led to the design of mimetic of ellagic acid (MEA) as potential inhibitor of c-Raf and c-Ras

The side effects of existing drugs and other methods, which are effective in decreasing the progression of cancer, are quite harmful and toxic to our body. To tackle this, a safer method needs to be derived. Dietary and their gut metabolized chemicals are being explored for inhibitory roles in cancer cells. In essence, mimetic of metabolites are conceived as a potential sources of new class of anticancer drugs. Anticancer compositions of ellagic acid enriched compositions were prepared and processed in our lab. We have employed a novel vertical tube gel electrophoresis (VTGE) assisted and LC-HRMS based intracellular metabolite profiling approach to detect metabolites/chemicals in HCT-116 cells treated by ellagic acid enriched compositions. Furthermore, we used molecular docking and molecular dynamics (MD) simulations to assess the inhibitory role of ellagic acid and mimetic of ellagic acid (MEA) upon various intracellular oncoproteins including c-Raf and c-RAS. We also performed ADMET profiling of ellagic acid and their mimetic to assess their toxicity profile using VNN-ADMET and SwissADME. Ellagic acid enriched compositions showed appreciable cell death in HCT-116 and MCF-7 cancer cells. Intracellular profiling of cancer cells indicated the presence of ellagic acid, a metabolized product of ellagitannins. Molecular docking data suggested the specific and strong binding upon a key intracellular RAS and c-Raff kinase among several screened intracellular proteins. MD simulations data strengthened the possibilities with revelations on the inhibitory of MEA with a comparison to known Ras inhibitor, salirasib and c-Raf kinase inhibitor. Further, ADMET predictions showed that ellagic acid is safer than known inhibitors and can be used safely at higher concentrations as well. MEA, a metabolized dietary chemical, could be explored as an inhibitor of c-Ras and c-Raf kinase oncoprotein as a potential anticancer agents.

Audience Take Away Notes

- This presentation will help to understand the importance of mimetic of ellagic acid as a potential anticancer agent
- In the future, preclinical and clinical studies by other researchers will be encouraged

Biography

Dr. Nilesh Kumar Sharma completed his Ph.D. from the Indian Institute of Technology, Roorkee in 2009 with a Health Science specialization (Free Radical Biology and Oxidative Stress). Dr. Sharma has completed post-doctoral research training for more than three years in DNA repair genes and cancer biology at NIEHS, NIH, USA, and Rutgers University, New Jersey Medical School, NJ, USA. Currently, a Professor (Specialization Cancer Biology and Medical Biotechnology) at DYPBBI, Dr. D. Y. Patil Vidyapeeth, Pune, India. Dr. Sharma has actively been engaged in academic work to teach subjects like Cancer Biology, Immunology, Molecular Cell Signaling, and Molecular Biology to undergraduate and post-graduate students Dr. Sharma has been credited with more than 90 publications including in indexed National and International journals, book chapters/conference proceedings, Seven Indian patents (Published and Granting process is in progress), and Several new mimetic of metabolites are designed and submitted to PubChem.

Emmanuel Ifeanyi Obeagu, PhD

Department of Medical Laboratory Science, Kampala International University, Western Campus, Ishaka, Uganda

Coagulation in human immunodeficiency virus infection: A target for improvement of the patients

According to UNAIDS, there were approximately 37.9 million people across the globe with HIV/AIDS in 2018. Of these, 36.2 million were adult and 1.7 million were children (<15years old). New HIV infection – An estimated 1.7 million individuals worldwide were newly infected with HIV in 2018. Blood coagulation abnormalities occur frequently in people infected with Human Immunodeficiency Virus (HIV). Researches so far shows the retrovirus is associated with endothelial dysfunction and liver damage. Both endothelial dysfunction and liver damage can result in coagulation defect because most coagulation factors are produced in the liver and some are activated by the tissues therefore default to them can lead to coagulation defect. It is therefore expected that as HIV progresses coagulation abnormalities increases. However, few studies showed the association of these abnormalities with antiretroviral therapy (ART). Prothrombin time (PT) and partial thromboplastin time with kaolin (PTTK) use to assess the extrinsic and intrinsic pathway respectively alongside with platelet count help to screen for coagulation abnormalities in HIV infected person.

Audience Take Away Notes

- About HIV
- What is haemostasis
- What is coagulation
- Which factors are coagulation in HIV
- Effects of coagulation in HIV patients

Biography

Dr. Emmanuel Ifeanyi Obeagu obtained PhD in Hematology and Blood Transfusion Science from Imo State University in 2019. He joined Kampala International University, Western Campus, Uganda 2022. He performs dual roles in academics and Research in the University. He is a passionate researcher who has published many papers in reputable Journals (Scopus, Web of Science, Pubmed) both locally and internationally and has earned many international awards through dedication. He is an editor to many journals and also a reviewer to many journals. He attends many conferences on different capacities.

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14-15 JUNE

DAY 01

POSTERS

3RD EDITION OF

EURO-GLOBAL CONFERENCE ON

BIOTECHNOLOGY AND BIOENGINEERING

Fanny Gimie[1,2*], Colette Cordonin[1], Imade Ait Arsa[1,2], Eva Naffrichoux[1,2], Giovédie Stanislas[1], Emmanuelle Jestin[2], Vincent Meneyrol[2], Koushanee Madub[3], Itisha Chummun Phul[3], Nowsheen Goonoo[3] and Archana Bhaw-Luxinom[3]

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[3]Biomaterials, Drug Delivery and Nanotechnology Unit, Centre for Biomedical and Biomaterials Research (CBBR), MSIRI Building, University of Mauritius, Reduit, Mauritius

Comparison of different nanofiber scaffolds effects on bone regeneration of calvaria defect in a Wistar rat model _Importance of porosity

Skeletal tissue injury is a major burden on the global healthcare system due to an aging population. In addition, metabolic disorders such as diabetes and osteoporosis further impede the healing process. Tissue engineering scaffold for reconstructive strategies offer exciting opportunities to overcome poor self-healing capacity of the skeletal tissue. We studied bone regeneration potential of cellulose-based nanostructured-biomaterials on a pre-clinical model of surgically induced cranial bone defect in Wistar rats. The results obtained for cellulose-based nanofiber, cryosponge and hybrid scaffolds will be presented. These were compared with a commercial scaffold used as a positive control. Healing was monitored over different periods up to 12 weeks using clinical monitoring of animals, CT and PET imaging with the 18FNa radiotracer histology, immunohistochemistry and immunofluorescence. The results showed that a strong metabolic stimulation induced by the scaffolds, allowing complete healing of the bone defect. Due to their structural constitution, the scaffolds presented different healing profiles. The results showed that porosity seemed to be an important parameter in the scar stimulation capacity of scaffolds. This work is on-going on a more complex in vivo model of pathological bone regeneration, such as long bone skeleton defect on animal with metabolic disorders.

Audience Take Away Notes

- The audience will be able to see an example of biological studies (in vitro and in vivo) to assess the healing potential of a cellulose-based nano-biomaterial
- The audience will be able to see the usefulness of monitoring healing with high-performance tools such as CT imaging or PET imaging and the conclusions we can draw from it
- The audience will be able to see an example of a study highlighting the importance of the physical structure, and in particular the porosity, on the phenomena of bone healing

Biography

Fanny Gimie completed her veterinary studies at the National Veterinary School of Toulouse in France from 2005 to 2009. At the end of her studies, she obtained a master's degree in Bio health at the Paul Sabatier University thanks to a grant from Sanofi Aventis for a year. In addition to her activity as a practicing veterinarian, she was hired in 2013 at the CYROI biomedical research center on Reunion Island, where she took over the management of the animal facility which has a microsurgery and preclinical imaging devices. On the other hand, she chairs the only ethics committee in Reunion on the use of animals for scientific purposes.

Pamela Obando*, Guerra Daniel

Single Molecules, Research and Development Labs, Cayetano Peruvian University Heredia, Lima, Peru

Diversity of cadmium repressor genes and their use in whole cell biosensors

Cadmium is a toxic heavy metal that is present as a contaminant in water and soil. Despite this, there are microorganisms that have developed tolerance and resistance to this metal due to their continuous exposure. The most common strategy in microorganisms is to activate the expression of an efflux pump; in other cases, they store the metal in special compartments when the safe concentration within the cell is exceeded. Under normal conditions, the gene for this pump is repressed by a transcription factor. When cadmium enters the cell, it binds to the transcription factor, allowing for the release of DNA and consequently permit the transcription of the efflux pump. There are three important groups of cadmium repressors: CadC, CmtR, and CadR, the first two belonging to the SmtB/Ars family of transcription factors, and the latter to the MerR family. These repressors are distributed in different species throughout the planet, and although they are not completely specific to cadmium, they have a great affinity for this metal and can be used in the construction of biosensors for environmental monitoring purposes.

Audience Take Away Notes

- The project will provide information of the diversity of repressors genes and their regulation. So, we can use them in the design of genetic circuits to detect heavy metal
- Since most of these genes are not well studied, we provide an approach on how to identify their regulation sequences and if they can be used when interchange those sequences
- Biosensors tend to stay in the labs but few of them go to the field, so we expect to use this biosensor in real situation and explain what the difficulties are involved

Biography

Pamela Obando is currently working on her doctoral thesis in the Biochemistry and Cellular Biology program at the Cayetano Heredia University in Peru. She holds a master's degree in Environmental Microbiology from the same university and she is also an Electronics Engineer from the National University of San Marcos. She has published a scientific article on bioactive compounds of microorganisms isolated from mines. Diana has also been a teacher at both the Cayetano Heredia University and the National University of Engineering.

Maysaa Abdul Razzaq Dhahi
Microbiology Department, College of Medicine, Al Nahrain University, Baghdad, Iraq

Sequencing analysis of pyelonephritis-associated pili gene of uro-pathogenic *Escherichia coli* isolated from Iraqi patients from Baghdad

Pyelonephritis-associated pili (Pap) fimbria considered as the main adhesive virulence factor that enable Escherichia coli (E. coli) to colonize in the urinary tract and resist the avoiding by the flow of urine. DNA adenine methyl-transferase gene (Dam) have a role in regulation of pap E expression and in bacterial DNA repair system and it could be targeted by antibiotics. Sixty Four isolates of E. coli from urine specimens were obtained from hospitalized and outpatients suffering from signs and symptoms of urinary tract infections (UTI). These isolates were identified molecularly as uropathic E. coli (UPEC) by detection of pap E using conventional PCR. Partial sequencing of pap E was done to study variation among isolates according this gene and its role in susceptibility to antibiotic. Also, Dam was detected using conventional PCR. Detection of papE in E. coli strains revealed that 26/64 (42.6%) were considered as UPEC. Analysis of nucleotide sequence changes from partial sequencing tree of pap E showed that there were three clads and UPEC included in clade B displayed the most nucleotide sequence changes. Dam was detected in 11/64 (17.1%) E. coli isolates. The study of multi-drug resistance (MDR) risk in association with the presence of pap E and Dam in UPEC revealed that Dam could be considered as etiological factored to developing MDR. In conclusion, Dam should be taken in consideration as one mechanism of MDR development in UPEC.

Audience Take Away Notes

- It is not long enough to Identification only the presence of bacteria in human specimens to consider it as pathogens, especially these bacteria which could be act as human microbiota and pathogens, but it need for identify the main virulence factoe(s) that enable the bacteria to cause disease
- Identification of main colonization factors of bacteria isolated from specific human tissue sit reflect the degree of bacterial pathogenicity
- Searching for new antibiotics targets such as bacterial DNA methylation patterns will improve in solving antibiotic resistance, especially in bacterial with high tendency to antibiotic resistance

Biography

Dr. Maysaa studied Biotechnology at Baghdad University, College of Sciences, and Biotechnology Department and graduated as M.Sc. in 2001. She worked as researcher in Biotechnology Institute, Al-Nahrain University (2001-2007). She studied Medical Microbiology at Al-Nahrain University, College of Medicine, and received her Ph.D. degree in 2009. She accepted as Fulbright Scholar at 2014 in University of Central Oklahoma, USA. She worked as staff-member in Medical Microbiology Department, Al-Nahrain University, College of Medicine (2007- till now) teaching Bio-Medical molecular biology to under and postgraduates. She has published more than 34 research articles

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14-15 JUNE

DAY 02

KEYNOTE FORUM

3RD EDITION OF

EURO-GLOBAL CONFERENCE ON

BIOTECHNOLOGY AND BIOENGINEERING

Engineering of extracellular vesicles for nanomedicine applications

The healthcare and pharmaceutical industries need ever more performing, safe and economical solutions for both diagnostic and therapeutic applications including anti-inflammatory, antioxidant and antitumor remedies, but also nutraceutical and cosmeceutical preparations. Since many oral, nasal, transdermal and injectable remedies on the market are not available in the ideal formulation, nanotechnologies are making an impressive contribution to the development of modern pharmaceutical solutions that can also be designed for the needs of individual customers or patients. Medications containing drug molecules, nucleic acids, proteins and nanoparticles need more customized loading and carrying strategies able to enhance their biostability and therapeutic effect while avoiding side effects and non-compliance with established treatments. Among the various drug carriers, nanoparticles, hydrogels and foams, the lipid nano vesicular ones successfully support clinical applications approaching such problems as insolubility, biodegradation, and difficulty in overcoming the skin and biological barriers such as the blood–brain and placental ones. In the broad category of lipid-based nanovesicular systems, both of biological or synthetic origin, liposomes, niosomes, proniosomes, ethosomes, transferosomes, pharmacosomes, ufasomes, phytosomes, catanionic vesicles and extracellular vesicles (EVs) are counted. Undoubtedly the most heterogeneous and versatile lipid vesicles are the EVs since they are ubiquitarian and can be isolated both from healthy and tumoral cells culture media and from all the major biological fluid such as urine, plasma, saliva, amniotic and cerebrospinal fluid and semen. As cell-derived vesicles, the EVs, coming from both plant and human eukaryotic cells, have been successfully used for drug delivery applications since their membrane is characterized by biological moieties related to their parental cells, able to direct specific homing or targeting phenomena. The EVs, as the key physio-pathological intracellular mediators, are indeed able to transport nucleic acids, proteins, and other biological molecules resulting in excellent candidates for post isolation drug delivery load and engineering nanotechnological modifications.

Audience Take Away Notes

- The contents of the presentation will be able to provide the audience with the necessary tools to understand the needs of clinics and pharmacologists assisting them by designing and producing diagnostic and treatment tools to be applied in nanomedicine
- The topics covered during the presentation will provide not only updated knowledge to biotechnologists engaged in research and teaching but also to those of pharmaceutical companies and big pharma to produce new drugs or reposition some existing ones
- Among the contents presented in the talk, a patent was presented that will certainly make it much easier for many colleagues to load a wide range of active pharmaceutical ingredients into EVs carriers

Tania Limongi

Department of Applied Science and Technology (DISAT) Politecnico di Torino Corso Duca Degli Abruzzi 24, 10129 Torino, Italy

Biography

Tania Limongi currently works as Assistant professor at DISAT (Department of Applied Science and Technology) of the Politecnico di Torino. She does research in applied physics, biology, biomedical engineering and material sciences. Her current projects are drug technology and delivery, engineering of liposomes and extracellular vesicles, development of biomimetic nanotools for combined therapeutic and diagnostic applications, fabrication of biocompatible and biodegradable scaffolds, single molecules detections. She is author of 4 patents and of more than 80 publications, editorial board member and reviewer of many international scientific journal.

A review of nanomaterials in humans

Nanotechnology is now a mature field in numerous industries from energy to building constructs to medicine. Nanomaterials have specifically revolutionized how we prevent, diagnose, and treat diseases. In this presentation, a review of the use of nanomaterials in humans will be provided which have shown improved bone growth, decreased infection, limited inflammation, and decreased cancer to mention just a few applications. It will focus on novel materials that can both diagnose and treat diseases or health ailments. It will also emphasize materials that are being commercialized into real products and helping human health. Lastly, this talk will discuss the future of nanomaterials in medicine and what research is needed to reach such applications such sensors, 3D and 4D printing, and more.

Audience Take Away Notes

- How nanomaterials are being used in medicine
- What is the future of nanomaterial use in medicine
- How nanomaterials are helping human health

Thomas J. Webster

School of Health Sciences and Biomedical Engineering, Hebei University of Technology, Tianjin, China

Biography

Thomas J. Webster's (H index: 118; Google Scholar) degrees are in chemical engineering from the University of Pittsburgh (B.S., 1995; USA) and in biomedical engineering from RPI (Ph.D., 2000; USA). He has served as a professor at Purdue (2000-2005), Brown (2005-2012), and Northeastern (2012-2021; serving as Chemical Engineering Department Chair from 2012 - 2019) Universities and has formed over a dozen companies who have numerous FDA approved medical products currently improving human health. He is currently helping those companies and serves as a professor at Hebei University of Technology, Saveetha University, Vellore Institute of Technology, UFPI, and others. Dr. Webster has numerous awards including: 2020, World Top 2% Scientist by Citations (PLOS); 2020, SCOPUS Highly Cited Research (Top 1% Materials Science and Mixed Fields); 2021, Clarivate Top 0.1% Most Influential Researchers (Pharmacology and Toxicology); 2022, Best Materials Science Scientist by Citations (Research.com); and is a fellow of over 8 societies. Prof. Webster is a former President of the U.S. Society for Biomaterials and has over 1,350 publications to his credit with over 53,000 citations. He was recently nominated for the Nobel Prize in Chemistry (2023).

Biosurfactant: Production and potential applications

Biosurfactants are amphipathic molecules that can be applied in a wide range of areas. These compounds can be widely used in industries as pharmaceutical agents, and for microbial-enhanced oil recovery, among others. Amongst these biosurfactants, surfactin, rhamnolipids, and mannosileritritol lipids (MEL) show remarkable properties. Thus, they can be applied in a wide range of applications.

Production of surfactin (inducers): It was investigated the effect of hydrophobic inducers on surfactin production by Bacillus subtilis ATCC 6633 using cassava wastewater as a low-cost culture medium. Palmitic acid led to the highest yield in terms of surfactin production (≈1.3 g/L of pure surfactin). The inducers triggered the production of new surfactin homologues that represent, potentially, new biological activities.

Antimicrobial and antioxidant of MEL: It was evaluated the MEL combined with Thymus vulgaris, Lippia sidoides, and Cymbopogon citratus essential oil emulsions (O/W) and evaluates their antimicrobial and antioxidant capacity. The antimicrobial activity of Thymus vulgaris and Lippia sidoides was increased against Escherichia coli (500 µg/mL), Staphylococcus aureus (600 µg/mL), Bacillus subtilis (120 µg/mL), Pseudomonas aeruginosa (1500 µg/mL), Penicillium sp. (62.25 µg/mL), Aspergillus flavus (250 µg/mL), Fusarium oxysporum (100 and 250 µg/mL), and Candida albicans (125 and 250 µg/mL).

Biosurfactants as structure directing agents (SDAs) of porous siliceous materials: SDAs are essential for the synthesis of siliceous materials, such as zeolites. Porous structures are usually achieved by using SDAs in the synthesis process, improving their mass transfer. However, synthetic SDAs present disadvantages. Thus, green biosurfactants are remarkable alternatives, since they show lower critical micelle concentration (1–200 mg/L), lower surface tensions (25–38 mN/m), unique self-aggregation structures, higher biodegradability, and lower toxicity. MEL as stimulant on the germination of Lactuca sativa L.: It was evaluated the biostimulant effect of MEL-B on the germination of SF 31 monic lettuce (Lactuca sativa L.) seeds. The seeds germinated at different concentrations of MEL-B. The incidence of germinated seeds, the germination index, and the average germination time were evaluated. Regarding root morphology, the length of the seedlings, gross mass, development of lateral roots, and roots under biotic stress were evaluated. The MEL-B at 158 mg/L stimulated seed germination, growth, and seedling development parameters. The appearance of lateral roots and a lower incidence of stressed roots were also noticed. In addition, MEL-B at 158 mg/L was the highest concentration in which there was no phytotoxic effect on seeds. In contrast, MEL-B from 316 mg/L showed an inhibitory effect on seed germination and contributed to the oxidative stress of the medium.

Cristiano Josede Andrade

Chemical and Food Engineering Department, Federal University of Santa Catarina, Florianopolis, Santa Catarina, Brazil

Biography

Dr. Edward studied Chemistry at the Sofia University, Bulgaria and graduated as MS in 1999. She then joined the research group of Prof. James at the Institute of General and Inorganic Chemistry, Bulgarian Academy of Sciences (IGIC-BAS). She received her PhD degree in 2004 at the same institution. After one year postdoctoral fellowship supervised by Dr Williams at the Catalysis and Spectrochemistry Laboratory, France she obtained the position of an Associate Professor at the IGIC. She has published more than 70 research articles in SCI (E) journals.

The increase in enzymatic activity corroborates the phytotoxic effect and consequent stress of seeds at 316 and 632 mg/L concentrations. In vivo acute toxicity of MEL to swiss mice after intraperitoneal administration: Therefore, the main goal of this study was to evaluate in vivo acute toxicity of the homologue MEL?B in swiss mice, 24 and 72 h after its intraperitoneal (IP) administration at doses of doses 50 and 150 mg/kg. The oxidized intracellular 2′,7′-dichlorofluorescein (DCF), sulfhydryl, and superoxide dismutase (SOD) - biochemical parameters - were evaluated in different organs: spleen, lung, liver, kidney, heart, and gastrocnemius. The triglyceride levels, CK-MB and LDH enzymes were also analyzed. The analysis of results demonstrated that the MEL-B administered via IP did not induce acute toxicity in 5 out of 6 organs - except liver, very likely, due to the etabolization of MEL-B. The triglyceride levels, CK-MB and LDH enzymes did not present any significant alteration.

Audience Take Away Notes

- The potential on the production of biosurfactants: Quite a novel approach
- It is a multidisciplinary talk, for instance, the engineers, chemists, and biologists, among others
- Surfactants are derived from petroleum, sooner or later, biosurfactants will be widely applied on an industrial scale

ChAgG-PCL/PVP electrospun fibers as wound dressings

Luis Jesus Villarrea[1] Gomez[1,2*], Yoxkin Estevez Martinez[3], Victoria Leonor Reyes Guzman[1], Yesica Itzel Mendez Ramirez[3], Juan Antonio Paz Gonzalez[1], Arturo Zizumbo Lopez[4], Hugo Borbon[5], Eder German Lizarraga Medina1, Jose Manuel Cornejo Bravo[2], Graciela Lizeth Perez Gonzalez[1,2], Arturo Sinue Ontiveros Zepeda[7], Armando Perez Sanchez[1], Elizabeth Chavira-Martinez[4]

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Wound dressings have been used to clean, cover, and protect the wound from the external environment. However, choosing an adequate dressing will reduce the time of healing, provide cost-effective care, and improve the patient's quality of life. Electrospun fibers have gained attention in this area due to their variety of properties such as biocompatibility, biodegradability, adequate mechanical properties, and moisture. An additional property such as bioactivity against microorganisms is always desired, for that reason, the objective of this work is to propose a wound dressing system made of functionalized electrospun nanofibers of poly (caprolactone)/poly (vinyl pyrrolidone) (PCL/PVP) with a nanocomposite of Chitosan/Silver Nanocrystals/ Graphene Oxide (ChAgG). The ChAgG nanostructured composite material is composed of Chitosan from corn (Ch), silver nanocrystals from garlic (Allium sativum), and Graphene Oxide (G), therefore, these fibers were functionalized with ChAgG nanocomposite solution using blending electrospinning in different proportions (1, 5, and 10%). By infrared spectroscopy (FTIR) and through the deconclusion of the bands by X-Ray photoelectron spectroscopy (XPS) and images by transmission electron microscopy (TEM), the nanocomposites were characterized for the presence of the different elements that compose them. On other hand, resulting fibrous dressings were characterized using scanning electron microscopy, to observe the morphology and obtain fibers diameters data. Thermal analyses (TGA and DSC) and FTIR in order to evidence the incorporation of ChAgG in/on the fiber's polymeric matrix. Mechanical properties indicated that fibers with 5% of the ChAgG formulation were the most interesting formulation and the best candidate for wound dressing applications. For future work, citotoxicity, antimicrobial activity and animal testing demonstration of the capacity of the chosen system can be done. These results will lead to an optimized wound dressing with antimicrobial properties that can compete on the actual market.

Audience Take Away Notes

- The audience will learn about the basis of the electrospinning technique, the potential use of electrospun nanofibers, method for surface modification of these fibrous smart in order to promote bioactive properties such as antimicrobial, desired mechanical properties and biocompatibility. Audience interested in biomedical devices, biomaterials and drug delivery system will be benefited

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Biography

Dr. Luis Villarreal is a research professor at the Faculty of Engineering Sciences and Technology, Autonomous University of Baja California, Tijuana, Baja California, Mexico. So far, Dr. Villarreal has published 42 indexed articles, with a total of 652 citations in Scopus. He has participated in more than 55 national and international congresses. Founder and editor-in-chief of the Revista de Ciencias Tecnologicas (RECIT), member of the editorial board of important publishers such as Bentham, MDPI, Hindawi and referee of 162 articles. Evaluator of research projects in Mexico, Italy, Malaysia and Peru. His research lines Biomaterials, Tissue Engineering, Drug-Release Systems and Biotechnology

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SPEAKERS

3RD EDITION OF

EURO-GLOBAL CONFERENCE ON

BIOTECHNOLOGY AND BIOENGINEERING

Yan Xiaojun[1*], Zhang Yuanyuan[1], Xu Huanye[1], Guo Leilei[1], Liu Zixin[1], Zhou Xiang[1], Wang Haiwen[1], Zhao Hongli[1], Liu Wei[1], Du Yanan[2]

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Dissolvable 3D macroporous microcarrier based large-scale manufacturing system for cell and gene therapy

Researchers in the field of cell and gene therapy have long faced the daunting task of efficiently and extensively expanding cells. Overcoming the limitations of the 2D planar culturing system has been a significant challenge. However, we have made a groundbreaking advancement by introducing a revolutionary automated closed large-scale cell production platform. This platform utilizes 3D TableTrix microcarriers to cultivate adherent cells, effectively addressing the major drawbacks of the 2D planar culturing system. 3D TableTrix is a novel GMP-grade microcarriers registered as pharmaceutical excipient under Drug Master Files with the United States (U.S.) Food and Drug Administration (FDA, DMF #35481) and the Chinese Center of Drug Evaluation (CDE, F20200000496 and F20210000003). These microcarriers are macroporous with high culture surface area and fully dissolvable for efficient cell harvest at a recovery rate of 98.6±0.1%. To scale up, different models of stirred-tank bioreactors (vivaSPIN) are used for cell expansion on 3D TableTrix microcarriers. We demonstrated the potential of our production platform with Umbilical Cord-Mesenchymal Stem/Stromal Cells (UCMSCs), as the broad potential of Mesenchymal Stem Cells (MSCs) in regenerative medicine is widely recognized. A three-stage expansion was conducted with 1 L, 5 L and 15 L bioreactors. A final yield of 2.09×1010 MSCs with an overall expansion factor of 1975 within 13 days was achieved. To complete the production process, the cells were harvested, concentrated, washed and formulated automatically with the closed cell processing system, vivaPREP PLUS. A fully automated and closed fill and finish system, vivaPACK, was then used to aliquot these cells into cryobags. Cells harvested from 3D microcarrier culture retained their immunophenotypic characteristics, tri-lineage differentiation potential, genome stability and low indications of senescence phenotype, among a series of quality tests performed. Results indicated that there was no significant difference with cells cultured by the conventional 2D planar method. Residuals of microcarrier and microcarrier dissolution reagent were also evaluated to be within safety limits. The potential of 3D TableTrix microcarriers were further testified with other adherent cells commonly used in cell and gene therapy, such as HEK293T and Vero cells. After serial expansion in vivaSPIN bioreactors, cell concentration for HEK293T cells reached a maximum of 1.02×107 cells/ml, while Vero cells expanded to 1.07×107 cells/ml. This study introduces a bioprocess engineering platform that leverages on macroporous and dissolvable 3D TableTrix microcarriers to successfully achieve large-scale production of adherent cells relevant to the cell and gene therapy industry.

Audience Take Away Notes

- The audience will be able to learn about a new dissolvable microcarrier that could be used for expansion and efficient harvesting of adherent cells
- The audience would then know that MSCs could be efficiently expanded in an automated manner in compliant to GMP standard, which could help them improve their cell manufacturing capability
- This is a practical design of an automated and efficient cell manufacturing facility

Biography

Dr. Yan studied Chemical and Biomolecular Engineering at National University of Singapore and graduated as a Bachelor in 2012. She then joined Professor Du Yanan's laboratory at Tsinghua University to research on 3D cell culture and biomaterials. She received her Master's degree and PhD degree from Biomedical Engineering at Tsinghua University in 2015 and 2018 respectively. She then co-founded Beijing CytoNiche Biotechnology Co., Ltd. to develop and commercialize a novel 3D macroporous dissolvable microcarrier for large-scale cell expansion. She has published nearly twenty research articles in SCI (E) journals and books, as well as applied for over 60 patents.

Mohamed Zarid*,

Department of Agronomical Engineering: Food Technology Area, Universidad Politecnica de Cartagena. E-Cartagena, Spain

Advances in artificial intelligence (AI) for plant digital genomics: approaches, breakthroughs and methodologies

Plant digital genomics is a rapidly growing field that aims to study plant biology through high-throughput techniques such as transcriptomics, genomics, and proteomics. Artificial intelligence (AI) algorithms have emerged as powerful tools to analyze the large datasets generated by these techniques, leading to new insights into plant biology and potential applications in crop breeding and genetic engineering. This presentation reviews recent advances in the application of AI algorithms in plant digital genomics and discusses the challenges and opportunities for further research

Audience Take Away Notes

- Understanding the integration of AI algorithms in plant digital genomics
- Insight into recent advances in plant digital genomics
- Identification of challenges and opportunities for further research
- Familiarity with AI-driven tools and resources in plant digital genomics
- Awareness of ethical considerations and challenges in plant digital genomics

Biography

Mohamed ZARID studied Food Technology at the FST-BM, Morocco and graduated as MS. He then joined the research group of Prof. Juan Pablo Fernández Trujillo at the Univesrsidad Politécnica de Cartagena (UPCT), Spain. He received his PhD degree in 2020 at the same institution. After two years postdoctoral fellowship supervised by Dr Bénédicte QUILOT-TURION at the INRAE-Avignon, France he obtained the position of Teaching and Research Staff at the UPCT. He has published more than 13 research articles in SCI (E) journals.

Romulo R. Macadangdang Jr.

Science Cluster, Department of Nursing, College of Allied Health, National University, Manila City, Philippines

Applications of photocatalysts in biotechnology and the environment

Photocatalysts have been studied for a variety of applications in biotechnology, including in the field of medicine, agriculture, and environmental biotechnology. In medicine, photocatalysts have been studied for their ability to kill bacteria and viruses, and have been used in the development of antimicrobial coatings for medical devices and surfaces. Photocatalysts have also been used in the synthesis of drugs and other bioactive compounds. In agriculture, photocatalysts have been studied for their ability to promote plant growth and protect crops from pests and diseases. They have been used in the development of coatings for seed and plant surfaces, as well as in the treatment of irrigation water. In environmental biotechnology, photocatalysts have been used for the treatment of wastewater, to remove pollutants from contaminated soils and groundwater, and to degrade organic pollutants in air. In general, photocatalysts application in biotechnology is not yet commercialized, as the technology is still under development and research. However, it is considered as a promising technology to improve the biotechnology industry in the future.

Audience Take Away Notes

- Importance of photocatalysts
- Will provide insight on the development of recent photocatalysts for environmental applications
- This research that other faculty could use to expand their research or teaching
- Hopefully this provide a practical solution to a problem that could simplify or make a designer's job more efficient

Biography

Mr. Macadangdang studied chemistry from the University of Santo Tomas in Manila, Philippines under Dr. Binag (an outstanding young scientist in the Philippines) focusing on conducting polymers. He earned his professional license in Chemistry while working on his Master's degree in Teaching Chemistry. While in the academe, Rome has shifted his interest in smart materials, photocatalytic studies for environmental applications. To date, he has published at least 10 Scopus indexed papers on materials science and photocatalysts. He is on his way to finishing his PhD at St. Paul University, Philippines.

Pooja Bhadrecha

Department of Biotechnology, University Institute of Biotechnology, Chandigarh University, Punjab, India

Nature's own micro-factories: Microorganisms

Nature has blessed humans in numerous ways and the tiniest one is 'microorganisms' which instead of being so small in size, have served in a huge manner to all. They are well-documented for production of various primary and secondary metabolites which hold outstanding industrial significance. Recent advances in biotechnology tools have bestowed the analysis of their substantial roles in their niche/host organism, detection of essential biomolecules produced by them and enabled enhancement of the production of these metabolites by multiple times, in optimized conditions. Biotechnology tools and techniques have been employed to procure essential biomolecules from symbiotic as well as pathogenic microorganisms. The most important requisite is detection of the microbe's capability to produce the compounds of interest, and manipulation of the production conditions for increased production rate. Hence, I am presenting some of my research work related to increased production of 'xanthan gum' by the plant pathogen *Xanthomonas campestris*, and production of 'folic acid' by rhizospheric microbiota of the plant *Hippophae rhamnoides L.* The phytopathogen *Xanthomonas campestris* causes black rot in crucifers, but also produces xanthan gum, which has a wide range of applications in various industries, including medicines, cosmetics and food. Hence the bacterium is popularly employed for large scale production of xanthan gum, but as the bacterium grows it produces this exopolysaccharide which increases density of the medium, hindering the growth of this strictly aerobic bacterium. So, we manipulated the production medium and procured 15 times more xanthan gum, at laboratory scale. In another case, rhizospheric microbiome of wonder-plant Hippophae rhamnoides which is popularly known for production of medicinally important compounds was employed to procure intra- and extra-cellular folic acid. Folic-acid helps in preventing birth defects in brain and is therefore recommended for every pregnant woman, world-wide. Hence, we conclude that whether it is microorganisms which live in a symbiotic relationship with plants or those which are pathogenic for plants, they can be successfully utilized to avail beneficial metabolites of great medicinal and industrial values.

Audience Take Away Notes

- Industrial significance of microorganisms
- Utilization of biotechnology for production of significant microbial compounds
- Manipulations of growth conditions to enhance the production of microbial metabolites
- Detection and analysis of microbial metabolites
- Significance of microorganisms to nature and humans

Biography

Dr. Pooja Bhadrecha studied Biotechnology at Mumbai University and graduated in 2009. Later she joined Lovely Professional University (LPU) and completed M.Sc. (Honors) and M.Phil. Biotechnology in 2012. She then joined the research group of Dr. Manoj Kumar at LPU, and Dr. Madhu Bala at Institute of Nuclear Medicines and Allied Sciences. She received her Ph.D. degree in 2018 at LPU and obtained the position of Assistant Professor in Chandigarh University. Her area of specialization is in plant-microbe interactions and microbial biotechnology and she has published 6 research articles, 2 review articles and 9 book chapters in reputed SCI journals.

Kunal

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Microorganism mediated mineral solubilisation and sustainable agriculture

Conventional farming techniques help in fulfilling food demand but they are harmful to humans and environmental sustainability. These largely depend on chemical fertilizers that cause food contamination and soil toxicity and deteriorate the physical, chemical, and biological properties of soil. Minerals are essential macro and micronutrients that play a vital role in plant growth and development. However, the solubility of minerals is very low and unavailable to plants. Plant Growth-Promoting (PGP) microorganisms are a group of beneficial soil microorganisms that could be rhizospheric, endophytic, and phyllospheric or inhabit extreme habitats, and majorly belongs to bacteria, fungi, and actinomycetes. PGP microorganisms play a dynamic role in the accessibility of various minerals, especially Nitrogen (N), Phosphorus (P), Potassium (K), Zinc (Zn), Silicon (Si), and Iron (Fe). Mineral Solubilizing Microorganisms (MSMs) increase the mineral concentration by mineral solubility in soil and its availability to plants. MSMs showed their ability to convert the insoluble form of minerals to soluble forms through different mechanisms such as acidification, exchange reactions, chelation, production of acid phosphatases and phytases, phytohormone production, and siderophore. This promotes the uptake of minerals in plants, thereby relieving the plants from abiotic stress (salinity, drought, flooding, and extreme temperature) and increasing productivity. Biofertilizers developed using MSMs could be an eco-friendly solution to the sustainable food production system worldwide. However, it's important to note that the effectiveness of mineral-solubilizing microorganisms can vary depending on environmental factors, soil conditions, and specific crop requirements. Therefore, it is recommended to conduct site-specific research and consult with agricultural experts to determine the most appropriate microbial strains and application methods for a given farming system. A limited number of studies reported where a single microorganism solubilizes several minerals and utilize them as biofertilizers. Currently, we are working on identifying the multi-mineral solubilizing microorganism from rhizosphere of different crops and medicinal plants, and their potential roles in crop improvement and agricultural sustainability.

Audience Take Away Notes

- Mineral solubilizing microorganisms have the potential to be employed as biocontrol agents or biofertilizers in agricultural crops, to improve crop yields and the plant's tolerance to biotic and abiotic stress
- Rhizospheric, endophytic, and phyllospheric microorganisms could be a possible source of secondary metabolites or hormones for sustainable agriculture
- Further characterization of multi-mineral solubilizing microorganisms will provide a great achievement in the production of biofertilizers to manage biotic and abiotic stress in plants
- The use of multi-mineral solubilizing microorganisms as biofertilizers not only increases crop productivity but also improves the socio-economic status of farmers in low and middle-income countries

Biography

Dr. Kunal is working as an Associate Professor at the Department of Microbiology, Faculty of Allied Health Sciences at SGT University, Gurugram (Haryana, India). He received his Ph.D. in Microbial Technology in 2014 and his Post-Doctorate in 2021. He has more than 10 years of experience in the field of Microbiology and allied fields of Agriculture, Environment Science, and Engineering. He has authored more than 70 articles in referred national and international journals, conferences, and books. His major area of research is soil microbial diversity studies, plant-microbe interaction studies, nutrient use efficiency in crop plants, and microbial interactions with industrial wastes and concrete composites.

Touria Bounnit[1*], Hareb Al Jabri[1,2], Eric Leroy[3], Jack Legrand[3]

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Towards sustainable pigments and bio bitumen production with carbon sequestration, using desert microalgae

Over the past decade, development of renewable non-petroleum based sustainable processes for bitumen has attracted attention. Recently, proof of concept was established to transform algae-biomass residues into a material mimicking the rheological behaviour of a bitumen through a process called hydrothermal conversion. Production of bio-bitumen from algae can be applied to different types of algae, as the process does not target one specific metabolite, but rather a general group of biomass components. The applied conditions determine the properties of the resulting material, and researchers found that it had viscoelastic properties which were very similar to that of petroleum-based bitumen. However, although bio-bitumen can be a high-volume product, it is not exhibiting a high-value outcome. Hence, to design an economically feasible production process, it is necessary, as part of the biorefinery concept, to use the microalgae biomass to first produce a high-value product prior to bio-bitumen production from the leftover biomass. This would be highly favourable, maximise the profitability and can make the production process economically more attractive. In this sense, the goal of this work is to apply the algo refinery approach to first produce the phycobiliproteins from local algae isolate Pleurocapsa sp. QUCCCM 54, followed by an HTL process to the left-over biomass and study the possibility of producing bio-bitumen. Strain was cultivated outdoor at 200L open ponds using f/2media (Guillard, 1975) with 2 different nitrogen concentrations (10X and 2X), and the impact of outdoor culture conditions and biochemical composition on the growth and HTL product was investigated. Results showed that higher initial nitrogen concentrations of the nutrient medium (10X) slightly led to an increase in biomass productivity to reach 14g/m^2/day compared to 12g/ m^2/day in 2X highlighting that the nitrogen concentration didn't tremendously influence the growth. With regards to the HTL conversion, the highest hydrophobic yield was observed for QUCCCM 54-2X followed by QUCCCM 54-10X with 59% versus 54% respectively. Moreover, the rheological data plotted in the Black diagram of the strain showed a viscoelastic material behaviour comparable to that of a conventional bitumen with a continuous curve from 90 °C, where the material is liquid, to 0 °C, where the material is an elastic solid. This continuity of the curve is highlighting the thermostability of the material molecular structures. Nonetheless, even though the overall viscoelastic signature was similar to conventional bitumen, the stiffness of the HTL fractions was lower than for the conventional.

Audience Take Away Notes

- The work demonstrate the application of biorefinery concept to demonstrate the production of algal biobased bitumen and pigments of local marine isolate from desert environment which is not heavily investigated
- The data can be used as reference to compare the bio bitumen previously issued from fresh algal strains from Europe, also the obtained biocrude can be used as a promising alternative for petrocrude in the petroleum refinery
- Yes this research that other faculty could use to expand their research

- The process helps to reduce the climatic effects of increasing atmospheric CO_2 levels. It refers to capture and long-term storage of carbon dioxide (or other forms of carbon) to reduce the atmospheric CO_2 concentrations and can play an important role in addressing the issue of climate change. With a product lifetime of over 20 years, the sequestrated carbon within the product is stored for a long-term. Moreover, it might be possibility of recycling the bitumen into new roads, leading to an even longer retention of the sequestered CO_2

Biography

Touria Bounnit is currently a Research Associate at the Centre for Sustainable Development, Qatar University. Mrs. Bounnit joined Qatar University in 2011 as Research Assistant in the Biofuel project, funded by Qatar Airways, QSTP, and Qatar University. Within this project, she had a key role in investigating the potential of local isolates for Biofuel production. From 2015 until present, she is active as a Research associate in the center, where she is conducting research in several, individual and collaborative, projects related to (a) Bioenergy, (b) Health and (c) Environment using Qatar local isolates. She has published number of peer-reviewed papers, conference papers, in the fields of sustainable algal production for biofuel application, high valuable products, aquaculture and impact of nanoparticles on the algal growth in addition to one book chapters related to date palm biotechnology.

Afsana Praveen*, Shilpy Singh

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Nitric oxide exposure impacts on morphology and auxin transport of *Oryza sativa* under arsenic stress

Nitric Oxide (NO), a signal molecule plays vital role to provide tolerance to abiotic stress in plants by interplay with reactive oxygen species, and thus promoting their growth and development. Arsenic (As) is a toxic metalloid and its contamination found in crop plants, mainly rice which is an important diet for millions of people. In this study 7 days old hydroponically grown rice seedlings were exposed to As (III) (150 µM), NO (100 µM), As (III) +NO for 48 h and control (without metal). We observed NO mediated alteration on physiological, biochemical and stress related parameters along with auxin transporter PIN genes (OsPIN1a, OsPIN1b, OsPIN1c, OsPIN1d, OsPIN2, OsPIN5a, OsPIN5c, OsPIN8, OsPIN9, OsPIN10b),expression under As stress. As exposure reduced the overall plant growth, formation of lateral roots, chlorophyll and protein content and enhanced the oxidative stress by increasing the level of antioxidant enzymes (SOD, CAT, APX, GR), and stress related parameters (cysteine, proline, MDA, H_2O_2). Supplementation of NO along with As reduced the accumulation of As in rice seedling, improved plant growth, lateral root formation, increased chlorophyll and protein content, diminished the level of antioxidant enzymes and stress related parameters by reducing the ROS generation. Addition of NO also up regulates the gene expression of auxin transporters. Overall, NO reduced the toxicity of as using various mechanism and provide tolerance to its stress in rice seedlings.

Audience Take Away Notes

- Plants have the ability to adapt themselves under stressed (heavy metals such as arsenic) conditions through reprogramming their growth and development. Understanding the mechanisms regulating overall growth of stressed plant is an important issue for plant and environmental biology research
- This study will be helpful for Plant/Environmental Biotechnology researchers. Since, most of the developmental processes in plants are govern by the hormonal actions, the present study will benefit in future work to provide more insight about the molecular mechanisms of NO in modulating plant As tolerance through hormonal interaction network, and As induced morphological responses in crop plants
- These experimental studies could facilitate in future to produce as tolerant plants. This will help to confront the As toxicity in the environment and to reduce the challenges in way of agriculture productivity and global food demands
- It will help to reduce the toxicity of As in crop plants through generation of As tolerant transgenic plants
- A systematic understanding of genes involved in as tolerance will enable breeders to improve the plant growth leading to generation of crop with high yields and better tolerance to as by using genetic manipulation

- List all other benefits
    - NO could be used to alleviate the toxicity of As in crop plants in edible portion
    - Its entry into food chain could be reduced/eliminated thus associated disease like skin lesions and cancer in humans could be prevented
    - Phytotoxicity could be reduced as well yield will be enhanced by overexpressing the As tolerant genes

Biography

Dr. Afsana completed M.Sc. with distinction from Jamia Millia Islamia, New Delhi (A central University) India. She has qualified the DBT-JRF (Department of Biotechnology, Government of India) and joined the same University for pursuing Ph.D. She Awarded degree in 2019 in Plant Biotechnology. She has joined Noida International University, Greater Noida, Uttar Pradesh, India as an Assistant professor. She has published 9 publications in Scopus, SCI (E) journal, 1 book chapter with 206 citations.

Moulai Djilali[1,2,*], Bakhti Abednasseur[1, 2]

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Interesting AI project idea for increasing and managing the productivity of field crops: Artificial trees

Agricultural production of arable crops will necessarily call on the full range of available solutions: choice and rotation of crops, tillage, fertilizers, phytosanitary products, biological control of pests, varietal selection, irrigation...etc. Today, the arable crops sector uses more and more sophisticated equipment, with machines equipped with guidance devices, on-board electronic tools, and the operation of which it is necessary to know. So artificial intelligence (AI) in agriculture deserves serious consideration as an alternative. The call for (AI) in biotechnology and agricultural production is becoming important to better reconcile the increase in agricultural productivity, the preservation of major ecological balances, economic efficiency, and social acceptability. This study illustrates an interesting idea based on the establishment of artificial trees in arable land. These trees have roots attached with probes or microprobes to record the edaphic parameters and leaves as sensors or micro sensors measuring the atmospheric parameters or to use solar energy to power the computer integrated in the trunk. Several data were finally recorded such as temperature, pH, NPK levels, humidity, photoperiod...etc. The cumulative information is used to protect the crop or to prevent the next crop; the fertilizers used the favourable conditions for fungal attacks and even for the choice of best planted varieties if the crop is used without rotation.

Keywords: Artificial intelligence, Biotechnology, Field crops, Artificial tree, Probe, Sensor.

Biography

Dr. Moulai D obtained his Bachelor's degree in 1995. He studied Genetic at the Oran University, Algeria and graduated as DES in 1999. He then joined the research group of Prof. Fyad-lameche F Z at Laboratory of Genetic and the plant breeding, Faculty of Nature Sciences and Life, Oran 1 University. He received his Magister and PhD degree in 2009, 2019 respectively at the same university. Now, he obtained the position of an Associate Researcher at the laboratory of Geomatic ecology and environment, University of Mascara, Algeria. He has published 3 articles with DOI.

Delia Teresa Sponza

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H_2 Production from wastewaters containing sulphur via photo catalysis using TiO_2-N-G Nano composite

In this study nitrogen containing TiO_2 nanoparticles were doped on GO and TiO_2-N-GO Nano composite was produced under laboratory conditions to treat the chemical industry wastewater containing high H_2S under UV light. 5%- 3%-1%, 3%- 5%-1% and 1%- 5%-1%3 ratios for TiO_2-N-GO Nano composite composition was researched for maximal hydrogen production. The structural, optical and morphological aspects of nanocomposites were studied using XRD, UV-DRS, Raman, XPS, FESEM, and TEM. The TiO_2-N-GO nanocomposite with 1% GO, 5% N exhibited enhanced photo catalytic H_2 production 3450 μmol h–1 under UV light irradiation The increase of photocatalytic activity was the high N doping resulting in high porous surface in the nanocomposite. 98% of the TiO_2-N-GO was reused 60 times.

Audience Take Away Notes

- This can be expand their research or teaching
- It could provide practical solution to simplify or make a designer's job
- It can be provide new information to assist in a design problem

Biography

Prof. Dr. Delia Teresa Sponza is currently working as a professor at Dokuz Eylul University, Department of Environmental Engineering. Scientific study topics are; Environmental engineering microbiology, Environmental engineering ecology, Treatment of fluidized bed and activated sludge systems, Nutrient removal, Activated sludge microbiology, Environmental health, Industrial toxicity and toxicity studies, The effect of heavy metals on microorganisms, Treatment of toxic compounds by anaerobic / aerobic sequential processes, Anaerobic treatment of organic chemicals that cause industrial toxicity and wastewater containing them, Anaerobic treatability of wastewater containing dyes, Treatment of antibiotics with anaerobic and aerobic sequential systems, Anaerobic and aerobic treatment of domestic organic wastes with different industrial treatment sludges, Treatment of polyaromatic compounds with bio-surfactants in anaerobic and aerobic environments, Treatment of petrochemical, Textile and olive processing industry wastewater by sonication, Treatment of olive processing industry wastewater with nanoparticles and the toxicity of nanoparticles. She has many international publications.

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Tadof1 enhances carbon and nitrogen assimilation in transgenic wheat under nitrogen defecient conditions

The expression of a set of genes in a metabolic pathway can be regulated by a single transcription factor (TF). The use of TFs can, therefore, be a promising strategy in generating plants with superior traits. Triticum aestivum Dof1 TF is known to regulate nitrogen assimilation in plants. The present study was aimed at the development of transgenic wheat overexpressing TaDof1 by using a constitutive promoter. The transgenic wheat was developed by Agrobacterium-mediated transformation. For the transformation study, two cultivars of wheat (Galaxy and Faisalabad-2008) were selected. The screening of T0 plants was done on selection medium with BASTA (herbicide). The results of PCR using gene-junction primers confirmed the integration of complete TaDof1 cassette in 8 out of 31 plants. The transformation efficiency of 0.08% and 0.46% was obtained for Faisalaad-2008 and Galaxy, respectively. In order to check the expression level of genes regulated by TaDof1, T1 plants were grown under nitrogen-deficient conditions and subjected to quantitative RT-PCR. After 4 weeks of nitrogen stress, a significant increase in the expression of genes regulated by TaDof1 was observed. These genes include isocitrate dehydrogenase (ICDH), citrate synthase (CS), pyruvate kinase (PK) and phosphoenolpyruvate carboxylase (PEPC), while ICDH exhibited the maximum fold increase of 464. Our findings reveal that TaDof1 modulates nitrogen and carbon metabolism pathways as they cross talk with each other. Moreover, there was a notable increase in different agronomic traits in transgenic wheat overexpressing TaDof1. A profound change was observed in various biochemical and physiological markers which include protein content, soluble sugar content and chlorophyll content compared to wild type plants. The outcomes of the study clearly indicate the merits of engineering plant metabolism with transcription factors. The overall impact on the entire nitrogen metabolic pathway resulting in enhanced nitrogen assimilation will lead to better crop yields.

Audience Take Away Notes

- Audience will get to know about the importance of developing genetically modified crops
- They would gain insight into the basic principal of developing GM crops
- Since it is an applied research, the findings of this study can be used to develop future projects targeting the genes involved in nitrogen assimilation pathway
- The presentation would help faculty to develop projects on molecular characterization of transcription factors regulating vital pathways
- The presentation would help faculty to develop projects on introducing novel traits into crops that may lead towards the goal of sustainable agriculture

Biography

Dr. Ammarah Hasnain, Vice Principal, Ruth Pfau College of Life Sciences, Lahore Medical and Dental College hold PhD degree in Biotechnology. Her research interests include molecular characterization of transcription factors, enhancement in fertilizers uptake efficiency in genetically modified plants using molecular approaches, increased production of pharmacologically important secondary metabolites in medical plants using elicitation techniques. She has published her research work in international peer-reviewed journals which include Frontiers in Plant Science, Phytotherapy Research, Plant Disease, Agronomy, Plant Molecular Biology Reporter, Pakistan Journal of Botany. She was declared as HEC Approved Supervisor by Higher Education Commission (HEC) Pakistan on the basis of her contribution towards research.

Fabian Echeverria-Beirute[1*], Andres Gatica-Arias[2], Jose Andres Rojas-Chacon[1]

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Coffee mutagenesis for leaf rust resistance

Coffee Leaf Rust (CLR) caused by *Hemileia vastatrix* is a major disease for coffee-producing countries. Breeding for resistant varieties is the main strategy for controlling CLR, however, the rapid spread of this disease around the globe and ongoing CLR races, are limiting cultivar´s resistance durability. This study reports the CLR resistance performance under controlled conditions, of new candidate mutants obtained by EMS mutagenesis. Variable response of CLR tolerance was exhibited by an originally susceptible variety. Three M1 plants showed similar tolerance compared to resistant varieties under controlled inoculation conditions, while tolerant-susceptible levels were shown by the general population. Further genomic information will show potential mutant sections which may confer tolerance or susceptibility.

Audience Take Away Notes

- New coffee mutants can have different tolerance to CLR
- Breeding alternatives can be explored to solve old problems
- More biotechnologies should be incorporated to understand better such tolerance

Biography

Fabian studied Biotechnology Engineering at TEC was graduated in 2006. While been the Coordinator of the Breeding Program at ICAFE, he completed his MS in the UCR in 2012. He later joined World Coffee Research and the Texas A&M University to conduct his PhD project in coffee quality, physiology and transcriptomics. He graduated in 2018 and joined TEC. His now days the Coordinator of a Center for Research and Development for Sustainable Agriculture, professor of Plant Breeding and Biotechnology. He is contributing in over 7 research projects nationally and internationally and been part of over 44 research thesis.

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