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9th International Webinar on

BIOTECHNOLOGY RESEARCH

February 25, 2022 | Webinar

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Scientific Program

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Webinar
Biotechnology Congress 2022

Opening Ceremony/ Introduction 09:00-09:15

February 25, 2022 (Friday)

Keynote Forum

09:15-10:00

Title: A novel approach for enhancing disease and pest resistance in soybean
Madan K Bhattacharyya, Iowa State University, USA

Panel Discussion

Sessions on: Biotechnology | Plant Biotechnology | Food Biotechnology | Bio-Science | Gene Sequencing | Genome Editing

10:00-10:30
Title: Axonal regeneration and beyond: New biotechnologies magneticallyactuated to improve axon outgrowth
Alessandro Falconieri, University of Pisa, Italy

10:30-11:00
Title: Nicotinamide: A new NAD + dress for an old vitamin form in energy metabolism and inflammation
Josep Julve, Hospital de la Santa Creu i Sant Pau, Spain

11:00-11:30
Title: Oncogenic viruses and recombinant vaccines: HPV and HCV
Rachel siqueira de queiroz simões, Institute of Technology in Immunobiologicals, Brazil

Networking and Refreshment Break 11:30 -11:45

11:45-12:15
Title: Sudanese gums as prebiotic supplementation: What does it mean from a biotechnological and immune boosting perspective?
Ahmed A M Elnour, International Islamic University Malaysia, Malaysia

12:15-12:45
Title: Genetic diversity, expression and characteristics of protease genes of haloalkaliphilic bacteria from the saline habitats
Satya P Singh, Saurashtra University, India

12:45-01:15
Title: Tensiometry method for monitoring of animal fluids
Sergei Yu Zaitsev, Federal Research Center for Animal Husbandry, Russia

Thanks Giving and Closing Ceremony

Scientific Program

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9th International Webinar on Biotechnology Research

February 25, 2022 | Webinar

Keynote Forum



35 YEARS OF EXCELLENCE IN MEDICAL PUBLISHING



Madan K Bhattacharyya
Iowa State University, USA

A novel approach for enhancing disease and pest resistance in soybean

A large number of genes are transcriptionally regulated following infection of a plant with a pathogen. In soybean, following infection with the fungal pathogen *Fusarium virguliforme* we identified four classes of genes, expression of which is rapidly suppressed in infected roots. We hypothesized that these genes could be defense-related and pathogen somehow suppresses expression of these genes to facilitate disease development. To test the hypothesis, we exchange promoters of one member from each of the four classes of genes with two strong root-specific and infection-inducible promoters. The four fusion genes were expressed in soybean. Three of the four fusion genes enhanced resistance of transgenic soybean lines against *F. Virguliforme*. Of these, the gmdr1 fusion gene enhanced resistance of transgenic soybean bean lines also against spider mites (*Tetranychus urticae*, Koch), soybean aphids (*Aphis glycines, Matsumura*) and soybean cyst nematode (Heterodera glycines) in addition to F. Virguliforme. The gmdr1 is an integral plasma membrane protein. To understand the molecular basis of this broad-spectrum resistance induced by gmdr1, we conducted a transcriptomic study of the soybean leaves treated with chitin, a molecular pattern found in all four pathogen and pests. We identified 10 TIR-NB-LRR, one CC-NB-LRR, two NB-ARC-LRR, five LRR kinase and one WRKY transcription factor genes, transcription of which was significantly induced among the transgenic lines overexpressing gmdr1 as compared to the control plants. A subset of these genes is significantly induced in *F. Virguliforme* infected roots of transgenic soybean plants as compared to that in the nontransgenic control. Our data suggest that gmdr1 is most likely a master switch that regulates the expression of several disease resistance receptor protein genes for enhancing broad-spectrum disease resistance in soybean.

Biography

Madan K Bhattacharyya teaches the Plant Genetics course for graduate students. His main focus of research is soybean sudden death syndrome, though he is also interested in other plant-pathogen interactions.

mbhattac@iastate.edu

Upcoming Conferences

4th International Conference on

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February 25, 2022 | Webinar



Scientific Tracks & Abstracts

35 YEARS OF EXCELLENCE IN MEDICAL PUBLISHING

Sessions

Biotechnology | Plant Biotechnology | Food Biotechnology | Bio-Science | Gene Sequencing | Genome Editing

Session Introduction

Title: Axonal regeneration and beyond: New biotechnologies magneticallyactuated to improve axon outgrowth
Alessandro Falconieri, University of Pisa, Italy

Title: Nicotinamide: A new NAD + dress for an old vitamin form in energy metabolism and inflammation
Josep Julve, Hospital de la Santa Creu i Sant Pau, Spain

Title: Oncogenic viruses and recombinant vaccines: HPV and HCV
Rachel siqueira de queiroz simões, Institute of Technology in Immunobiologicals, Brazil

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Ahmed A M Elnour, International Islamic University Malaysia, Malaysia

Title: Genetic diversity, expression and characteristics of protease genes of haloalkaliphilic bacteria from the saline habitats
Satya P Singh, Saurashtra University, India

Title: Tensiometry method for monitoring of animal fluids
Sergei Yu Zaitsev, Federal Research Center for Animal Husbandry, Russia

Axonal regeneration and beyond: New biotechnologies magneticallyactuated to improve axon outgrowth

Alessandro Falconieri
University of Pisa, Italy

The ability to improve nerve regeneration is considered a "Holy Grail" for the scientific community. Historically, the role of chemical signaling, in which signal molecules were perceived by the growth cone influencing direction and orientation, was recognized. Recently, the role of force in axonal outgrowth has been highlighted, a phenomenon known as "stretch-growth" (SG). To generate external mechanical forces, we developed two different methodologies, each with a different biotechnology as protagonist, magnetic microposts and magnetic nanoparticles (MNP). Both methods foresee the possibility of applying forces on neurites of mice hippocampal neurons, either through the interaction of the neurites with the microposts or by labeling them with MNPs. In both cases the application of external magnetic fields will generate the force necessary for axonal elongation. We showed that both methodologies induced a significant increase in length of stimulated axons. The increase in length was understood as mass addition without thinning as we did not observe a reduction in axonal caliber. Studies carried out in electron microscopy have also shown an accumulation of the endoplasmic reticulum cisternae, confirming this mass addition. We also found an increase in the ability to form branches, an increase in maturation, an activation of translation and a reduction in intracellular calcium transients, consistent with evidence that low calcium transients correlate with rapid axonal elongation rates. In conclusion, we observed that both methodologies magnetically-actuated are capable of promoting SG, inducing similar molecular and cellular effects. In light of our recent studies, these methodologies could represent a new therapeutic perspective for promoting nerve regeneration. In support, the use of magnetic fields and MNPs has already been approved for therapies on humans while the scaffold of which the microposts are made has all the potential to be exploited in translational medicine.

Biography

Alessandro Falconieri has his expertise in the field of molecular biology, nanotechnologies and neuro-mechanobiology. His study of axonal growth following mechanical stimulation proposes a new model of neuritic development based on the establishment of a complex dialogue between local phenomena. The model based on this "cross-talk" came from his Ph.D work which ended in June 2021. In the recent period, he is investigating the molecular pathways activated by tension as well as the mechanisms of repair and recovery following prolonged stimulation. The prospect of exploiting mechanical stimulation to accelerate the rate of axonal outgrowth is very intriguing as it would give the possibility of proposing a new therapeutic target for the treatment of neurons damaged following injury or disease.

alessandro.falconieri@biologia.unipi.it

Nicotinamide: A new NAD + dress for an old vitamin form in energy metabolism and inflammation

Josep Julve
Hospital de la Santa Creu i Sant Pau, Spain

Vitamin B3 is commonly found in living beings as different molecular forms. Nicotinic acid is likely the most known form of vitamin B3 as it has traditionally been used for the treatment of cardiovascular diseases during decades; However, Recent human studies have questioned its therapeutic effectiveness to decrease residual cardiovascular risk. Noteworthy, in the last decade, different experimental studies have suggested that the treatment with other forms of vitamin B3, including nicotinamide (NAM), nicotinamide riboside (NR) and nicotinamide mononucleotide (NMN) conferred protection against body weight gain and adiposity by directly boosting energy metabolism in treated mice. On the other hand, NAM also protected against inflammation in different experimental settings. In this seminar, experimental evidence on the favorable effect of nutritional intervention of NAM on excess adiposity and its relationship with global dysinflammation will be shown in appropriate experimental models. NAM supplementation prevented body weight gain and reduced adiposity by enhancing adipose tissue energy metabolism and beiging. In independent studies, the dietary supplementation with NAM also protected against one of the main adverse outcomes, atherosclerosis, in treated mice. Particularly, reduced development of aortic atherosclerotic plaque in NAM-treated mice was decreased up to 50% compared with untreated mice and related to lower oxidability of apob-containing lipoproteins and dysinflammed aortas. These data may suggest that dietary supplementation with NAM would confer protection against obesity and development of atherosclerosis, thereby opening new therapeutic venues to combat atherosclerotic cardiovascular diseases in cardiometabolic conditions, such as obesity.

Biography

Josep Julve got his Ph.D, degree in Biology in 2000 at the University of Barcelona. He is currently employed as a researcher at the Research Institute of the Hospital de la Santa Creu i Sant Pau. His research focus is on the evaluation of different interventions on energy and lipid metabolism and their relationship with the progress of obesity and diabetes mellitus and their main complications in patients and appropriate experimental models.

jjulve@santpau.cat

Oncogenic viruses and recombinant vaccines: HPV and HCV

Rachel siqueira de queiroz simões
Institute of Technology in Immunobiologicals, Brazil

Oncogenic viruses, mainly human papillomavirus (HPV) and hepatitis C virus (HCV), play a key role in the development the new biopharmaceuticals and vaccines. Papillomaviruses are constituted of a closed circular double-stranded DNA genome, are non-enveloped, non-segmented, with approximately 8 kb. HPV is the most common sexually transmitted disease and have been described in the alphapapillomavirus genus. More than 200 HPV genotypes and several HPV types have been associated to oral lesions (Heck´s disease, oropharyngeal carcinoma, laryngeal papillomas), anogenital warts (Bowenoid papulosis, Buschike-Lowenstein tumor), Epidermodysplasia verruciformis (Plane warts, Pityriasis-like plaques, or squamous cell carcinomas of sun-exposed skin). HPV vaccination is the best preventive strategy against cervical cancer, cervical intraepithelial neoplasia and genital warts. Recently, virus–like particles (VLP) independently of the viral genome have been used since some viral particles have the ability to self–assembling. So, a recombinant DNA technology has allowed the development of prophylactic vaccines for HPV. Papillomaviruses can be also used as viral vectors for gene therapy and new therapeutic targets have been successfully applied by recombinant DNA methods. Viral vectors such as lentiviruses are also used as plasmids in cloning projects and will also be addressed. The HCV is a worldwide public health problem that affects more than 70% of the 170 million people with chronic hepatitis, and leads to severe fibrosis and cirrhosis, hepatic failure, or hepatocellular carcinoma. The hypervariable region 1 (HVR1) located in the N–terminus end of the E2 envelope protein in a region of 27 amino acids is relevant to generate HCV neutralizing antibodies. E2 envelope protein of HCV is also the target of several neutralizing monoclonal antibodies and some amino acid positions are conserved despite high degree of genomic variability. However, the high variability of this antigenic fragment represents the major obstacle in the development of an HCV vaccine. Novel biotechnological approaches such as chimeric vaccines using conserved peptides are promising peptide vaccine alternatives against HCV infection. Likewise, therapeutic antibodies and introduction of biosimilars in the technology transfer process will also be a crucial key in biotechnological advances.

Biography

Rachel siqueira de queiroz simões graduated in veterinary medicine from the Universidade Estadual do Norte Fluminense darcy ribeiro and master's in animal production from UENF. Ph.D. in animal science, Center for Agricultural Sciences and Technologies, Universidade Estadual do Norte Fluminense Darcy Ribeiro, laboratory of animal health, virology and viruses sector, Veterinary hospital. The laboratory techniques of the doctoral thesis were developed in partnership with the laboratory of animal cytogenetics of the Universidade federal fluminense and the laboratory of genetics of the Butantan Institute. Junior post-doctorate in public health from the Oswaldo Cruz Foundation at the molecular virology laboratory. Specialization in applied ethics and bioethics from Instituto Fernandes Figueira, Fundação Oswaldo Cruz and specialization in Biotechnology from Universidade Estadual de Maringá. Professional experience in virology and genetics, with emphasis on human papillomavirus and animal, working mainly on the following topics: epidemiology, oncobiology, oncogenic viruses, viral infection and molecular biology.

rachel.queiroz@bio.fiocruz.br

Sudanese gums as prebiotic supplementation: What does it mean from a biotechnological and immune boosting perspective?

Ahmed A M Elnour
International Islamic University Malaysia, Malaysia

The european union, the codex alimentarius, and the food and drug administration have finally agreed that Sudanese gums (SGs) are dietary fiber. This pioneering study aimed to screen the potential prebiotic activity of an optimum blended formula of SGs (composed of *acacia seyal* gum and *acacia sengal* gum), commercially known as prebio-m and prebio-t, respectively, to evaluate their biomarker status using short-term batch in-vivo experiments to support the innate immune system. Artificial stomach (SHIME system) and quantitative polymerase chain reaction (qPCR) analysis are used for evaluating the potential prebiotic properties of Prebio-M and Prebio-T. The biomarker substances, including short-chain fatty acids, ammonium, pH and prebiotic bacteria, were investigated using an artificial stomach (pH2, pepsin); small intestine (porcine pancreatic enzymes and bile salts); and large intestine (representative bacterial inoculum). Samples were taken at the beginning, after 24h and 48h for DNA extraction. The short-chain fatty acids (SCFA) produced by prebio-m led to an increase of all three main SCFAs (proportionally more propionate), While prebio-t was mainly correlated to a butyrogenic effect. High lactic acid production was seen in prebio-t compared to Prebio-M. The ammonium concentration of Prebio-T was 34% lower, significantly ($P \leq 0.05$) than production compared to Prebio-M. Intestinal incubation with Prebio-T revealed a higher concentration of pH decrease. Gas production, Prebio-M led to higher gas production as compared to Prebio-T. Moreover, both products increased the concentration of total bacteria and were correlated with a bifidogenic and lactobacillogenic effect. However, both products clearly indicated potential prebiotic activity, leading to different fermentation profiles. Thus, Prebio-M released higher SCFA production and bifidogenic/lactobacillogenic effects. Overall, Prebio-T is mostly butyrogenic, with less ammonium and gas production and an effect that is bifidogenic or lactobacillogenic. Finally, this data suggests that both products might have prebiotic ingredients for future biological applications.

Biography

Ahmed A M Elnour received his B.Sc. degree in biochemistry from the University of Kordofan-Sudan. He also holds a master's degree "excellent" in analytical chemistry from Khartoum University and a doctorate "Excellent/best thesis" in biotechnology engineering from the International Islamic University Malaysia. In 2020, he was appointed as a postdoctoral research fellowship sponsored by the islamic development IsDB merit scholarship program. His project is entitled "Cancer-on-a-chip base as a new paradigm potential application of gum arabic extraction toward development of breast cancer therapeutics". Elnour's main research interests are integrating biotechnology engineering and phytochemistry related to medicinal plants and chemical solvent system extracts of leading bioactive compounds (LBCPs) to apply to the human organs-on-a-chip model as a novel technique for personalized medicine and anti-inflammatory agents.

ahmedrashma@gmail.com

Genetic diversity, expression and characteristics of protease genes of haloalkaliphilic bacteria from the saline habitats

Satya P Singh
Saurashtra University, India

Over the years, haloalkaliphilic bacteria from the saline habitats of coastal gujarat, India have been investigated with the focus on their distribution, diversity and enzymatic characteristics. These microorganisms widely produce extracellular proteases. The proteases share certain unique characteristics; such as salt-dependent temperature profiling, resistance against chemical denaturation and ability to function under multitudes of extreme conditions. Catalytic efficiency of the proteases is enhanced at high temperatures in the presence of salt. The bacteria widely produce extracellular proteases with the diversity of their genes and expression. By designing 12 different specific primers and using gradient PCR, proteases from different haloalkaliphilic bacteria and actinomycetes were amplified. The study reflected diversity of the protease genes with respect to length (~ 400 bp to ~ 2000 bp), amino acids and other characteristics. The ORF of a protease gene on the blastp analysis revealed highest homology with a known serine protease of *Bacillus megaterium* strain corresponding to the peptidase domain of the S8 and S53 families. The halostablity of the protease was identified with the greater negatively charged amino acids and low GRAVY index. Similarly, a highly thermostable alkaline serine protease of nocardiopsis alba tata-5 was cloned using TA cloning and expressed into *E. Coli* (BL21), a mesophilic expression. The MALDI-TOF mass spectroscopic analysis revealed insight into the peptide masses. Further, the 3-D structures of the enzyme were created by SWISS MODEL and the stability of the protease structure was confirmed by the analysis of the ramachandran plot. On accounts of the metagenomics, protocols for the extraction of quality environmental genomic DNA from different saline habitats were established. The metagenomically derived protease genes were cloned, expressed and characterized using degenerative primers that revealed sequence and function-based diversity.

Profiling, cloning and expression of protease genes facilitated the elucidation of the structural and functional attributes of the enzymes.

Biography

Satya P Singh, currently working as UGC-BSR faculty at the department of biosciences, Saurashtra University, Rajkot, India, Worked as professor & amp; Head in the same department from 2003-2020. He was also coordinator of the UGC- CAS program. Having a master's in microbiology from the G. B. Pant University of Agriculture and amp; Technology, Pantnagar, India, He carried out his doctoral research at the Griffith University, Brisbane, Australia. He worked at the National Food Research Institute, Tsukuba, Japan as visiting scientist and as visiting professor at Vangon University, Myanmar. He has published 104 research papers, 24 book chapters and 1 edited book, with H-Index and citations of 31 and around 3000.

satyapsingh@yahoo.com

Tensiometry method for monitoring of animal fluids

Sergei Yu Zaitsev
Federal Research Center for Animal Husbandry, Russia

The measurement of the surface tension (ST) parameters of the major animal fluids (blood, urea, milk, etc.) is one of the promising methods for monitoring of animal's physiological-biochemical status (APBS). Our group is working over 20 years on APBS fundamental and applied aspects.

The aim of this work was to obtained equilibrium surface tension (eST) and extrapolated tilt angle (eTA) of the blood serum of hybrid pigs using PAT-device ("Sinterface Technologies", Germany). The PAT-device is using "hanging drop" method.

The average eST and eTA data of the blood serum at initial (final) point of hybrid pig's fattening were the following: mean 44.04±0.16 (43.58±0.23) mN/m and 13.16±1.16 (14.40±1.46) $mN \cdot m^{-1} \cdot s^{-½}$; Standard deviations (SD) 0.88 (0.84) mN/m and 6.33 (5.28) $mN \cdot m^{-1} \cdot s^{-½}$, respectively. The SD values had the following meaning: the low standard deviation in the case of eST indicated that the values tend to be close to the average eST data ("expected values") of the set, While a high standard deviation in the case of eTA indicated that these values are spreading out over a wider range.

It is important to highlight that moderate correlations were found between the eST (eTA) parameters and the studied biochemical parameters: total amount of proteins, albumins, globulins, The ratio of albumins to globulins, Total phospholipids, Activity of aspartate aminotransferase, Activity of alanine aminotransferase, De Ritis coefficient, Total cations and Total anions.

The authors recommended to use the eST and eTA data in the range of 42-46 mN/m and 10-30 $mN \cdot m^{-1} \cdot s^{-½}$, Respectively, As reference for the blood serum evaluation APBS at initial (final) point of hybrid pig's fattening.

Biography

Sergei Yu Zaitsev graduated 1980 from the lomonosov Moscow State University and worked 1980-1999 at research positions in the Shemyakin–Ovchinnikov Institute of Bioorganic chemistry. In 1991–1993 Zaitsev worked in several USA and German Universities. 1999-2019 Zaitsev worked as the biochemistry department head. Since 01.09.2019 Zaitsev works as the analytical biochemistry head. Zaitsev authored over 400 publications, including 15 monographs, handbooks, study guides; more than 200 articles; 11 patents. Zaitsev supervised 2 D.Sc., 17 Ph.D, about 100 magister and bachelor works. Zaitsev is member of the expert's board of the Russian ministry of science and education and in various Russian science foundations in a number of physical-chemical methods and biomedical issues.

s.y.zaitsev@mail.ru

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Accepted Abstracts

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In-planta enhancement of Artemisia annua bioactive compounds as an affordable cure in treatment of malaria and cancer

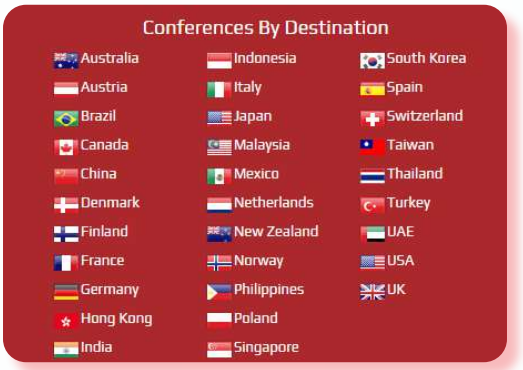
Shashi Pandey Rai
Banaras Hindu University, India

Artemisia annua, a herbaceous plant commonly known as sweet wormwood, is the only medicinal, commercial and economical source of the sesquiterpene lactone artemisinin which is currently represented as the starting point for an unprecedented discovery in the treatment of cerebral malaria fever worldwide. *Artemisinin* along with its derivatives are the best antimalarial therapeutics presently delivered as artemisinin combination therapy (ACT). Beyond the therapeutic value as antiparasitic agent against Plasmodium parasites. the compound atremisnin along with *Artemisia* leaf flavanoids have potential as antiviral and anticancerous agent. But the having about 0.01 to 1.2 % dry weight (DW) *in-planta* concentration restricts its availability and makes artemisinin relatively expensive to meet global demand. High medicinal potential, large demand, low yields of artemisinin and annual life cycle of the species are prompting significant research efforts on *A. annua*. Making it increasingly popular for the molecular and physiological dissections for its sesquiterpene metabolism. Although artemisinin is a major bioactive component present in the herbal parts of plants, leaf flavonoids, have a variety of biological activities and may synergize the effects of artemisinin against malaria and cancer. The combination of dihydroartemisinin with ferrous sulfate has been recorded as tumor suppressor due to this characteristics iron is often administered several hours before artemisinin to enhance targeting of the cancer cells while sparing normal cells. Significant efforts have been made for enhanced production of artemisinin and flavanoids *in-planta* which includes diverse approaches such as abiotic elicitation, genetic manipulation and role of transcription factors regulating secondary metabolism in this plant. However, further efforts should be addressed toward enhanced, cost-effective approaches for synthesis and production of these bioactive compounds.

shashi.bhubotany@gmail.com

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Email: contactus@pulsus.com

Address:
Pulsus Healthtech
35 Ruddlesway
Windsor, Berkshire
SL4 5SF
Phone: +44-203-769-1778 | +44-741-860-2028
USA/Canada Toll Free: 1-800-982-0387 | UK Toll Free: 0-800-088-5419

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