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Baculovirus-mediated MIR-214 suppression shifts osteoporotic ASCs differentiation towards osteogenesis and improves osteoporotic bone defects repair

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Osteoporotic patients often suffer from bone fracture but its healing is compromised due to impaired osteogenesis potential of bone marrow-derived mesenchymal stem cells (BMSCs). Here we aimed to exploit adipose-derived stem cells from ovariectomized (OVX) rats (OVX-ASCs) for bone healing. We unraveled that OVX-ASCs highly expressed miR-214 and identified 2 miR-214 targets: CTNNB1 (β -catenin) and TAB2. We demonstrated that miR-214 targeting of these two genes blocked the Wnt pathway, led to preferable adipogenesis and attenuated osteogenesis, undermined the osteogenesis of co-cultured OVX-BMSCs, enhanced exosomal miR-214 release and altered cytokine secretion. As a result, OVX-ASCs implantation into OVX rats failed to heal critical-size metaphyseal bone defects. However, using hybrid baculoviruses expressing miR-214 sponges to transduce OVX-ASCs, we successfully suppressed miR-214 levels, activated the Wnt pathway, upregulated osteogenic factors β -catenin/Runx2, downregulated adipogenic factors PPAR- γ and C/EBP- α , shifted the differentiation propensity towards osteogenic lineage, enhanced the osteogenesis of co-cultured OVX-BMSCs, elevated BMP7/osteoprotegerin secretion and hindered exosomal miR-214/osteopontin release. Consequently, implanting the miR-214 sponge-expressing OVX-ASCs tremendously improved bone healing in OVX rats. Co-expression of miR-214 sponge and BMP2 further synergized the OVX-ASCs-mediated bone regeneration in OVX rats. This study implicates the potential of suppressing miR-214 in osteoporotic ASCs for regenerative medicine.

Biography

Yu-Chen Hu received his BS degree in Chemical Engineering from National Taiwan University (1992) and earned his PhD degree in Chemical Engineering from University of Maryland (USA) in 1999. He worked as a post-doc at the National Institutes of Health from 1999 to 2000 and returned to the Department of Chemical Engineering, National Tsing Hua University, Taiwan, in 2000. Dr. Hu's main research interests include vaccine development, gene therapy, tissue engineering, cancer therapy and synthetic biology. Dr. Hu's lab has developed the enterovirus 71 (EV71) vaccine based on virus-like particle technology and avian influenza vaccine based on baculovirus vector. Dr. Hu also utilizes baculovirus as a gene vector to deliver various genes encoding growth factor or microRNA into adult stem cells/cell sheet for the modulation of cellular differentiation states and tissue regeneration. His recent animal studies have demonstrated that the baculovirus-engineered cells, after implantation into animals, repair massive defects in cartilage and bone. Dr. Hu's lab also exploits baculovirus-engineered stem cell sheet for the management of myocardial infarction and bone infection. Dr. Hu's works have paved a new avenue to the use of baculovirus as a novel vector for regenerative medicine. Dr. Hu has won the Asia Research Award (Society of Chemical Engineers, Japan), Outstanding Research Award (Ministry of Science and Technology, 2006, 2014), BEST Biochemical Engineering Achievement Award, Wu Ta-You Memorial Award (NSC), Outstanding Academia-Industry Research Award and Outstanding Young Investigator Award in Taiwan. He is inducted as a fellow of American Institute for Medical and Biological Engineering (AIMBE), and is elected the Member of the Tissue Engineering International & Regenerative Medicine Society-Asia Pacific (TERMIS-AP) Council and the Vice President of Biotechnology and Biochemical Engineering Society of Taiwan. He is the Program Chair of the TERMIS-AP meeting, 2016. He also sits on the editorial board of 10 international journals and currently serves as the associated editor of Current Gene Therapy and deputy editor of Journal of Taiwan Institute of Chemical Engineers.

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Green synthesized silver nanoparticles (AgNP) of nano dimensions (1.5nm-15nm) eliminate bacterial and fungal contamination in tissue culture of *Capparis decidua* (FORSK.) Edgew

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Silver nanoparticles were synthesized using fruit extract of *Capparis decidua* as a reducing agent (cost effective and eco friendly approach) and Characterized by UV-Vis spectroscopy (462 nm absorbance) and Transmission Electron microscopy (size 1.5 – 15nm). The explants of *Capparis decidua* were treated with the AgNP solution (1.5-15nm) by soaking directly in three different concentrations of nanoparticle solution or by exposing to the nanoparticles in the medium and decontamination as well as the survival rate was determined. Soaking experiment has 3 different concentrations viz., 100mg/L, 300mg/L and 500mg/L and controlled by 0.1% mercuric chloride treatment. Whereas for media supplementation experiment four different concentrations viz., 50mg/L, 100mg/L, 300mg/L and 500mg/L were used and controlled by 70% ethanol treatment. The results of the soaking experiment were very encouraging as far decontamination was concerned; however the survival was compromised except when soaked in 100mg/L for 20 or 30 minutes. The results of the media supplementation experiment revealed that at 150mg/L of AgNPs the decontamination was 90.2% for bacteria and 94.4% for fungal contamination with 80.5% survival. Further increase in the concentrations led to 100% decontamination of bacteria and 98.6% of fungus. However, the survival rate decreased to 68.5. The high rate of decontamination may be attributed to the minute size of nanoparticles that may diffuse easily into the tissues. The findings recommend that the lower concentrations of AgNP, being innocuous to plant growth factors may be considered as a successful replacement to antibiotics and toxic substances as a decontaminating agent in tissue culture process.

Biography

Jyoti Ahlawat is Research Scholar at Department of Botany, Maharishi Dayanand University, Rohtak, Haryana, INDIA. She is pursuing Ph.D. registered in Oct'13 in Plant Biotechnology and in process of Thesis finalisation & submission. she has published three papers as first author and one book chapter as secondary author in reputed journals. Three papers are under communication. She has presented 11 posters overall, 7 posters in National and 4 in International conferences related to research work.

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Fungal diversity across conventional, oasis and organic farming systems in arid areas of Oman

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This study examined fungal diversity in conventional, oasis and organic farms in arid areas of Oman. Fungal diversity was assessed using pyrosequencing and culture-based techniques from crops of date palm, acid lime, mango, cucumber and tomato. Pyrosequencing revealed that fungal diversity was variable among different farming systems as well as among different crops within the same farm. Fungal diversity was high in organic farms compared to other farms. In addition, the rhizosphere of date palms had more fungi compared to other crops. Ascomycota was the dominant phylum in most of the soil samples. The other common phyla were *Microsporidia*, *Chytridiomycota* and *Basidiomycota*. Classes *Dothideomycetes*, "Teresporidia", *Sordariomycetes* and *Eurotiomycetes* and fungal genera *Systemostrema*, *Hypocrea*, *Cladosporium* and *Oidium* dominated soils from all samples. Principle component analysis revealed that fungal diversity was affected by the farming system as well as the type of crops grown. Pyrosequencing was more efficient (4-6 times) than culture based techniques for estimating fungal diversity. Our study indicated that differential levels of fungal diversity are associated with different farming systems and crops, and effects of cultural practices, plant species, soil type and other factors on fungal diversity are discussed.

Biography

Elham Kazerooni is a PhD student at the Department of Crop Sciences, College of Agricultural and Marine Sciences, Sultan Qaboos University, Oman. She is doing her PhD in the field of plant pathology. Elham has one paper published in *Frontiers in Plant Sciences*. Her focus in the PhD program is on the population structure of beneficial and pathogenic fungi in different cropping systems.

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In silico Studies on structures of functional amyloids

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The classical histopathological definition of amyloid is an extracellular proteinaceous deposit exhibiting β -sheet structure usually associated with neuro-degenerative diseases in mammals. Microbial amyloids termed as 'functional amyloids' are reported for functional physiological traits that benefit the producing organism. Functional amyloids have been reported to contribute to biofilm formation, host colonization, immune activation and invasion. In this study, we generated various amyloid protein structures of different microorganisms by homology modelling and analysed *in silico* their attributes. In this *in silico* study, we have analysed the various microbial functional amyloids and their attributes. Using the FASTA sequences available on NCBI GenBank, the protein sequences and their homologous structures (PDB) were constructed using online servers (Swiss model, CPH). GROMACS and MD- simulation were used to check the changes in protein by applying temperature, pressure, potential and density, various result were formed in the form of graph i.e; radius of gyration, RMSD (backbone after Isq fit to backbone) and RMSD(backbone after Isq to system). And VMD was used to see all result and trajectory was also seen. And in PMDB all the protein PDB formats were submitted. The structural differences before and after simulation were significant.

Biography

Kush K Mehta is a Research student at C.G. Bhakta Institute of Biotechnology, Uka Tarsadia University, Gujarat, India. He completed his integrated Masters in the year 2016. He has been studying protein structure analysis using GROMACS, Gromos and AutoDock including basic bioinformatic tools like ExPASy, Swiss PDB viewer and PyMol, etc.

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Generation of spring wheat mutation resource for improving yield- and grain quality traits.

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Fe and Zn deficiency affects over half of the world's population. Wheat (*Triticum aestivum* L.) is a major cereal source of essential nutrients for human and animal. To generate genetic variation, spring wheat seeds of cv. Eritrospermum-35 were γ -irradiated with 100 and 200 Gy doses using ⁶⁰Co and grown in field to the M₇ generation with successive rounds of selection for the highest yielding lines. Selected lines were evaluated for components productivity, and grain Fe, Zn and phytic acid (PA) concentrations. A number of mutant lines had 2 to 3 times more grain Fe and Zn concentrations, and less PA concentrations (1.1-3.5 times) and higher grain protein content (GPC) (11.2-12.4 %) relative to the parent. The M₇ lines with significantly larger thousand grain weight (1.3-1.5 times), grains per spike (2.0-2.1 times) than the parent were identified. Within the irradiated mutant lines there were a significant correlation between Zn and Fe concentrations, and between GPC, Zn, Fe and PA concentrations in 100 Gy-dosed lines ($r^2=0.110$, $r^2=0.607$ and $r^2=0.711$). Only in 100 Gy-dosed germplasm PA concentration was significantly correlated with grain weight per spike ($r^2=0.313$). These wheat grain quality properties can be improved without negatively impacting on crop productivity and these new mutation resource provide genetic diversity with promising donors for breeding.

Biography

Saule Kenzhebayeva has completed her PhD at the age of 30 years from Moscow State University named after M.V. Lomonosov and Postdoctoral studies from Kazakh Institute of Physiology, Genetics and Bioengineering of Plants. She is the Professor of Kazakh National University named after al-Farabi. She has published more than 125 papers in reputed journals.

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Phosphate solubilizing *Bacillus* species as potential biofertilizers

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The intensive usage of agro-chemicals is a serious concern on the security of natural resources. Agro-chemicals reduce the soil quality, increase the pathogen durability and create risks on human health and environmental safety. Consequently, in recent years the sustainable agricultural production systems are targeting the use of microbial fertilizers and organic products as biocontrol agents. Rhizobacteria (plant growth promoting rhizobacteria, PGPR) are promote plant growth by supplementing the nutrients required for plants. *Bacillus* species, due to their significant soil amendment properties, are important members of PGPR. In this study, with the aim to discover potential biofertilizers, 440 *Bacillus* isolates from soil and compost sources were screened qualitatively for phosphate solubilizing and positive isolates were processed for quantitative estimation of solubilized phosphate and organic acid production. Confirmation of organic acid production and quantitative estimation ($\text{ng } \mu\text{l}^{-1}$) was done by gas chromatography (GC). Results indicate that phosphate solubilization ranges from 6.9 ± 1.00 to $95.5 \pm 1.83 \mu\text{g ml}^{-1}$ for *Bacillus* isolates and most of the isolates are able to produced more than one organic acid. Six best phosphate solubilizing isolates were further tested for IAA production, molecular identification by 16S rDNA sequencing, in vitro seed germination and pot trails. All six strains were observed to produce IAA, significantly enhanced radicle and hypocotyl germination, considerably increase plant growth by improving development of roots and stems. On the basis of results these *Bacillus* strains can be considered as potential biofertilizers.

Biography

Fakhra Liaqat is currently doing PhD in Biotechnology at Ege University, Izmir, Turkey. She did her MPhil in Microbiology from University of Veterinary and Animal Sciences, Lahore, Pakistan. She has published 6 research articles in the microbiology field in reputed journals.

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Contribution of biotechnology in the molecular diagnosis of cutaneous leishmaniasis at microclimates area of Boulemane and Sefrou provinces, Morocco.

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Leishmaniasis is among the most important emerging vector-borne protozoal diseases in terms of disability adjusted life year (DALY's). In Morocco, 2933 cases of CL were declared in 2015 with fluctuations in the number of cases reported over the years. As with other vector-borne diseases, the geographical distribution of cases suggests that CL transmission is sensitive to vector density which is correlated to climatic conditions. Our study target Boulemane and Sefrou provinces (among the most endemic foci of CL in Morocco) which are characterized by a diversity of microclimates area. The objectives of this study are to (i) determine the impact of the environmental conditions on the distribution of CL in these provinces, and (ii) identify the *Leishmania* species responsible for CL at each microclimate of these provinces using molecular techniques.

Molecular characterization of parasites was performed using a previously described PCR-ITS1-RFLP method. Ordinary least squares regression (OLSR) analysis was performed to study the impact of poverty, vulnerability, population density, urbanization and bioclimatic factors on the distribution of CL in this province.

The molecular identification of *Leishmania* species in Boulemane and Sefrou provinces shows the diversity of species according to different microclimates area. In fact, *Leishmania major* and *Leishmania tropica* was identified in the first province with the coexistence of these two species in the same district. In Sefrou province both *Leishmania infantum* and *Leishmania tropica* are identified. Among several environmental factors included in the study, poverty had the greatest influence on the spatial extension of the disease in these provinces.

To our knowledge, this the first study utilizing molecular techniques to confirm the diversity of *Leishmania* species at different microclimates in these areas. Our findings indicate that the spatial and temporal distribution of CL in Boulemane and Sefrou Provinces is strongly related to poverty, population movement and human behavior.

Biography

Hmamouch Asmae is a PhD student at the age of 27 years in laboratory of Microbial Biotechnology, Sciences and techniques Faculty, Sidi Mohamed Ben Abdellah University, Fez, Morocco. She has published more than 8 papers in reputed journals such as Parasite and vector, Acta tropica and journal of Parasitology and Vector Biology. She has participate in several congress and conference national and international with 4 oral presentation and 8 poster presentation.

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Photonic-Bandgap effect of a Ti:LiNbO₃ (Zut-Cut) Fabry-Perot resonator-based biosensor

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One of the numerous biosensor facilities has been established within our laboratory (FEMTO-ST Institute). In real terms, it is a platform for the biomolecules detection based on micro and nanotechnology, made up especially of a Ti:LiNbO₃ (Z-Cut) Fabry-Perot cavity. The interaction between the specific analyte and the sensitive grafted layer on this platform was fairly consistent to achieve the variation in the spectral response. However, there are many technological factors that goes into making this platform enough complex to elicit the desired response. In this work, we will expose the spectral response obtained after reaction in a specific way with the targeted biological entity. Knowing that our system is structured to exhibit a photonic band gap effect, we have observed, after detection, an enlargement and a shift of about 27 nm of this band gap and also an attenuation of the transmitted signal up to 5.7 dB.

Biography

Chafia Benmouhoub received her engineering and M. Sc degrees in Optics and Precision Mechanics from Setif University, Algeria, in 1994 and 2005. Her Ph.D. was received from Franche-Comte University, Besancon, France, in 2014. Her current research interests include integrated optics, MOEMS and biosensors applications. Dr. Benmouhoub is actually member of Growth and Characterization of New Semiconductors Laboratory, Electronics Department, Setif University, Algeria.



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Assessing genetic diversity in Tunisian phytoresources and relationship with geographic origin

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In the Mediterranean context and especially taking into account the social reality and the environmental conditions of Tunisia, the effectiveness of research studies are focused on biotechnologies and environment protection. In fact, the molecular markers were used to analyze and estimate the genetic diversity among a collection of forage species as *Medicago Sulla*, *Hedysarum* and *Lathyrus*. These spontaneously widespread species in Tunisia are renowned as salt tolerant species and has a great potential for fodder and/or pastoral development. Molecular technology, agro-morphological characterisation and environmental evaluation are exploited on research studies in order to establish approaches able to protect environment and conservation of well adapted local bio-resources. This work aims to estimate genetic diversity and structure and to identify relationships with geographical origin of local phytoresources. Simple sequences repeats (SSRs), Amplified fragments length polymorphisms (AFLP) and Sequence related amplified polymorphisms (SRAP) markers were used to analyze and estimate the genetic diversity among accessions. Analysis of genetic diversity involved pheno-morphological characterization and molecular relationships could be exploited in breeding programs to improve the damaged arid and semi-arid Mediterranean areas.



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Synergistic antibacterial effect of silver nanoparticles combined with ineffective beta lactam antibiotic on ESBL producing uropathogenic *E.coli* strains

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The increase in antibiotic resistance among Extended spectrum beta lactamases (ESBLs) producing uropathogenic *E. coli* is a major concern worldwide. ESBLs are diverse group of plasmid mediated enzymes produced by Gram negative bacteria. The current study included 120 uropathogenic *E. coli* strains isolated from a tertiary care hospital, Islamabad. A total of 72(60%) isolates were found to be ESBL producer. High rate of resistance was observed against ceftriaxone (100%), ciprofloxacin (94%) and cotrimoxazole (79%). Out of 72 ESBL *E. coli* isolates 51 (71%) of the isolates exhibited blaCTX-M genes, 21(29%) isolates were positive for blaSHV gene, 21(29%) isolates harbored both blaCTX-M and blaSHV genes while blaTEM gene was not detected in any isolate. Positive synergism was observed when silver nanoparticles synthesized from chemical reduction method using sodium borohydride as a reducing agent was combined with beta lactam antibiotics ceftriaxone were tested against ESBL *E. coli* strains. However, negative synergism was observed when silver nanoparticles and beta lactam antibiotic imipenem was combined. The present study concludes that there has been a rise in ESBL *E. coli* with polymorphism of blaCTX-M, blaSHV causing Urinary tract infections. The drug-AgNPs synergistic effect can be used to combat uropathogenic infections.



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A preliminary investigations of novel putative non-stereo specific dehalogenase producing bacteria from Antarctic Psychrotropic *Bacillus sp. Ih1*

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2, 2 dichloropropionic acids (Dalapon) like most halogenated compounds are commonly used as herbicides and employed in agricultural areas and industries. Toxicity of these xenobiotic compounds causes serious environmental problems. *Bacillus sp ih1* was isolated from top cliff soil collected from Antarctica. The bacteria was first grown on Antarctic bacterial medium and later transferred to a minimal medium containing 2, 2, dichloropropionic acid as carbon source. It grew slowly in the minimal media in different concentrations of 10mM, 20mM, 30mM and 40mM of 2, 2 DCP. The best growth was observed in 20mM of 2, 2-DCP with 32hours as doubling time. To monitor the degradation activity of the bacteria, halide ion assay was carried out to check the release of chloride ion. The best release of chloride was 0.657 mMol/L in 20mM of 2, 2-DCP. The bacteria was identification using 16S rRNA, genomic DNA extraction method and PCR amplification of 16S rRNA was performed using universal primers 27F and 1492R. Nucleotide blast (BLASTn) showed 97% similarity with *bacillus sp.* Results from biochemical tests further confirm the bacteria as *bacillus sp.* Using phylogeny.fr, sequences from nucleotide blast result were used to build a phylogeny tree based on neighbor to neighbor joining.

Biography

Ismail Haruna is an assistant lecturer in Department of Microbiology Bauchi State university Gadau, Nigeria. He has a bachelors degree in Microbiology and Masters degree in Biotechnology. He has published 2 papers in reputed journals. He is also a member of Nigerian Society For Microbiology (NSM). He is looking for a PhD opportunity.



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Expression of genes involved in Taxol biosynthetic pathway in *Taxus baccata* L. and application of Magnetic- and carbon-based nano-adsorbents for pre-purification of Taxol

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This work was undertaken to elucidate the consequences of some environmental cues (i.e. day length, temperature, hours of sunlight and relative humidity) on the expression patterns of TXS, DBAT, BAPT and DBTNBT genes contributed to the taxol biosynthetic pathway. Our results indicated that environmental cues have synergistic or antagonistic regulatory roles of on transcription activity and taxanes accumulation in yew, though DBAT activity is less influenced, could be accordingly a rate-limiting enzyme. Furthermore, a modified analytic hierarchy process (AHP) approach based on refinement assay of non-dominated alternatives was employed to monitor the most reliable callus maintenance media of *T. baccata* callus cultures in terms of five criteria. Our results connoted that L-glutamine-based feeding appears to generate more significant results either for calli growth continuously or taxanes production, while, for stems, both amino acid supplies had fairly equal worth. Meanwhile, considering decolorization efficiency, purity of taxol, recovery and reusability of adsorbents, Fe₃O₄NPs@GO (50 g/L) in dichloromethane was selected as the best medium for pre-purification of paclitaxel. Finally, based on RSM data, the optimum conditions to simultaneously acquire the maximum EPPR (94.0%) and ETP (11.4%) were recorded as adsorbent dosage of 37.7 g L⁻¹, sorption temperature of 30.7°C and agitation power of 153.1 rpm; and the predictive results were confirmed using experimental rechecking survey.

Biography

Mohammad Reza Naghavi is an academic member at the University of Tehran, Iran. He has published more than 140 research articles in the field of plant biotechnology. He has been serving as an editorial board member of four International and National Journals.

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CenC, a multidomain thermostable GH9 Processive Endoglucanase from *Clostridium thermocellum*: Cloning, characterization and saccharification studies

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The growing demands of bioenergy has led to the emphasis on novel cellulases to improve efficiency of biodegradation process of plant biomass. Therefore, a thermostable cellulolytic gene (CenC) with 3,675 bp was cloned from *Clostridium thermocellum* and over-expressed in *Escherichia coli* strain BL21 CodonPlus. It was attested that CenC belongs to glycoside hydrolase family 9 (GH9) with four binding domains, a processive endoglucanase. CenC was purified to homogeneity, producing a single band on SDS-PAGE corresponding to 137.11 kDa, by purification steps of heat treatment combined with ion-exchange chromatography. Purified enzyme displayed optimal activity at pH 6.0 and 70°C. CenC had a half-life of 24 min at 74°C, was stable upto 2 h at 60°C and over a pH range of 5.5-7.5. Enzyme showed high affinity towards various substrates and processively released cellobiose from cellulosic substrates confirmed by using HPLC technique. It efficiently hydrolyzed carboxymethyl cellulose (30 U/mg), β -glucan Barley (94 U/mg); also showed activity towards p-nitrophenyl- β -D-cellobioside (18 U/mg), birchwood xylan (19 U/mg), beechwood xylan (17.5 U/mg), avicel (9 U/mg), whatman filter paper (11 U/mg) and laminarin (3.3 U/mg). CenC exhibited K_m , V_{max} , K_{cat} , $V_{max} K_m^{-1}$ and $K_{cat} K_m^{-1}$ of 7.14 mM, 52.4 $\mu\text{mol mg}^{-1}\text{min}^{-1}$, 632.85 s^{-1} , 7.34 min^{-1} and 88.63, respectively used CMC as substrate. Recombinant CenC saccharified pretreated wheat straw and bagasse to 5.12% and 7.31%, respectively at pH 7.0 and 45°C after 2 h incubation. Its thermostability, high catalytic efficiency and independence of inhibitors make CenC enzyme an appropriate candidate for industrial applications and cost-effective saccharification process.

Biography

Ikram-ul-Haq (SI) has completed his Postdoc from Cornell University, New York, USA, and Ph.D. in Industrial Microbiology from University of the Punjab, Lahore, Pakistan. He has been the Dean, Faculty of Science and Technology and founding Director of Institute of Industrial Biotechnology, Government College University (GCU), Lahore. He has successfully completed 16 Projects sponsored by Pakistan Science Foundation, Pakistan Atomic Energy Commission, HEC, GCU & Ministry of Science and Technology while 4 Projects are in process sponsored by MoST, PSF and Pakistan Academy of Sciences. He has published more than 309 papers in journals of international repute, with 1734 citations and has been serving as an editorial board member of reputed Journals

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Gene silencing a powerful tool in cancer research

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The ability to disrupt the expression of a particular gene is primarily valuable to researchers in biology and medicine. Such approaches allow researchers to assess the phenotypic consequences of the specific genetic modification that has been introduced. Abolishing the function of the gene permanently or transiently has been widely used to examine the pathogenesis of cancer and its metastatic ability. These technologies have permitted researchers to distinguish between tumor suppressors and oncogenes. I will discuss the role of a cofactor to BRCA1 in the maintenance of the pluripotent state of mouse embryonic stem cells and the establishment of human tumor progression, as learned by modifying the gene locus or preventing its translation.

Biography

Asma Amleh is an Associate Professor of Developmental Biology at The American University in Cairo. She received her Ph.D. from McGill University in Montreal and did postdoctoral research at the National Institutes of Health (NIH). She has also been an instructor at the Department of Molecular Medicine, Institute of Biotechnology, at the University of Texas Health Science Center and a senior research scientist at the Developmental Biology Program, Memorial Sloan-Kettering Cancer Center in NY. Her research interests are focused on understanding the genetic control of normal and abnormal development in the mammalian system including the incidence of cancer.



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Genetic engineering of tobacco plants by expressing arsenic responsive genes of *Lysinibacillus sphaericus* and *Arabidopsis thaliana* for removal of arsenics from the contaminated lands

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Contamination of foods and water with heavy metals is a severe threat to human health and the environment. Long-term exposure to these metals such as arsenics leads to chronic poisoning of human body and results in severe diseases like keratosis, gangrene, kidney damage, neuro-vascular disorders and many forms of cancer. Here we report our recent results on genetic engineering of tobacco plants for removal of arsenics from the contaminated lands so that arsenic free foods and fodders can be obtained from these soils. Previously, by using bioinformatics, molecular biology and microbiology tools we have identified and studied three key genes suitable for this purpose. One of these genes (*PCSI*) was isolated from the model plant *Arabidopsis thaliana* and the other two genes (*arsB* and *arsC*) were isolated from an arsenic-resistant bacterium *Lysinibacillus sphaericus* collected from an arsenic contaminated land in South East Asia.

Our modeling studies show that by overexpressing *PCSI* it is possible to increase the uptake and accumulation of arsenic in the roots of the model plant *Arabidopsis* by 38% indicating that the arsenic content in the growth medium could be reduced by the same amount. Results obtained in the laboratory experiments show that transgenic *Escherichia coli* overexpressing *arsB* and *arsC* genes of *Lysinibacillus* can reduce arsenic content in the liquid growth medium by 46%. Recently, we have transferred these genes into tobacco plants in various combinations by T-DNA mediated gene transformation and regenerated transgenic plants. Results on bioremediation potentials of these transgenic plants will be discussed.

Biography

Abul Mandal has completed his PhD in 1983 from University of Agriculture in Cracow, Poland and postdoctoral studies from University of Stockholm, Sweden. In 2010 Mandal was appointed as a Professor of Molecular Biology at the University of Skovde, Sweden. Currently, he is heading the Biotechnology Research Division at this University. He also functions as the Academic Coordinator for Internationalization. He has published about 100 papers in peer reviewed journals. His recent publications are available at www.his.se/mana. He also has registered four patents, three in USA and one in India. Until today, Mandal has supervised 12 doctoral (PhD) dissertations.



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Reconnaissance of pterin deaminase

Angayarkanni Jayaraman

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Pterin deaminase is an amidohydrolase enzyme which hydrolyses pteridines to produce lumazine derivatives and ammonia. Eventhough the enzyme was reported as early as 1959 for its anticancer efficacy there was a long gap in the communique after that which was in 2012. It was reported to be ubiquitously present in prokaryotes both bacteria and fungi. It was also stated to be present in some eukaryotes such as honey bee, silkworm and rats. The enzyme has been observed to have a spectrum of substrates with the formation of respective lumazines. The substrates of the enzyme, which includes an array of pteridines, seems to play a significant role in various metabolic pathways. This fact in turn accredits the biological significance of the enzyme in both prokaryotes and eukaryotes. Even though the functions of the enzyme have been explored in prokaryotes their niche in eukaryotic system is not clear. There is very few information on the structural and functional properties of the enzyme which needs to be addressed by the scientific community.

Biography

J. Angayarkanni is the Head of the department of Microbial Biotechnology, Bharathiar University. She finished her Ph.D. degree in Biotechnology in 2002 and joined as teaching position in 2005. She has published around 67 publications and one book chapter. She has also got one Indian patent in pterin deaminase.

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GAVIN CONFERENCES

International Conference on Advances in Biotechnology

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The Genotyping-By-Sequencing SNP Calling Reference Optional Pipeline (GBS-SNP-CROP) and its application in plant breeding

Arthur Melo

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Designed for both paired-end and single-end reads, GBS-SNP-CROP is an open-source pipeline that maximizes data usage by eliminating read length uniformity requirements. Through its strategy of SNP calling based on both within-individual to across-population patterns of polymorphism, the pipeline identifies and distinguishes high-confidence SNPs from both sequencing and PCR errors, whether or not a reference genome is available. In the latter case, GBS-SNP-CROP employs a clustering approach to build a population-specific “Mock Reference” of consensus GBS fragments to guide alignment. As demonstrated with a population of 48 tetraploid *Actinidia arguta* (kiwiberry) accessions, GBS-SNP-CROP performs favorably compared to both the TASSEL-GBS (reference-based) and TASSEL-UNEAK (*de novo*) pipelines, in part due to its ability to access 4.4 and 2.0 times more sequence data, respectively, for SNP discovery. The pipeline’s modular design permits easy inspection of all intermediate results, and additional tools allow users to convert the final genotyping matrix into formats suitable for downstream analysis in R, PLINK, and TASSEL. To illustrate its practical use, results are presented from two studies of *Actinidia* species. In the first, *de novo* SNP data generated by the pipeline facilitated the identification of an extensive number of redundant accessions in USDA repositories, effectively deconvoluting a multi-species, multi-ploidy germplasm collection. In the second, GBS-SNP-CROP results enabled the efficient development of sex-associated markers that are now being used for high-throughput screening of breeding populations. The features of GBS-SNP-CROP make it worthy of consideration by plant curation and breeding programs, and the current version is available at <https://github.com/halelab/GBS-SNP-CROP.git>.

Biography

Arthur Melo concluded his Ph.D in January of 2015 in Genetics and Plant Breeding at the Agronomy School from Federal University of Goias, Brazil. Since February of the same year, he joins the Professor Iago Hale Lab at College of Life Sciences and Agriculture from University of New Hampshire as a Bioinformatic Postdoctoral Research.



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The importance of computer vision technology is growing with increasing interest in smart agriculture

Esmael Hamuda

National University of Ireland, University Road, Galway, Ireland

The computer vision technology has played crucial role in several agricultural applications such as weed control, crop fertilization, plant species recognition and detection, growing phase determination, plant disease detection, harvesting fruits, etc. These applications are growing in importance with increasing interest in smart agriculture.

Many researchers have developed computer vision (image processing) methods as guidance for machine vision, working in different fields and environments (under controlled and uncontrolled conditions). The machine vision technology has shown a potential for success in a number of case studies, especially in robotic weed control systems, despite some serious challenges that will be discussed in this talk. I will also present the most available image-based plant segmentation techniques as well as my recent contribution to automatic crop detection against various weather conditions.

Biography

Esmael Hamuda is currently Ph.D student at the National University of Ireland at Galway (NUIG). He is also working part time at the NUIG as a teaching assistant. Esmael received a Bachelor's degree from Almergibe University, Libya in Electrical and Computer Engineering. He received a Master's degree from Universiti Teknologi Malaysia at Johor Bahru in Electronic and Telecommunication Engineering. He previously held a head position of Electrical Engineering department at the University of Almergib in Libya for 3 years. Specific interests are object detection, recognition, and tracking. He recently published two journal papers that related to plant detection and segmentation.



International Conference on Advances in Biotechnology

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Investigation of Hereditary Primary Microcephaly in Consanguineous Families

Fouzia Kausar

Women University of Azad Kashmir, Bagh, AJ&K, Pakistan

Genetic studies mainly focus on identifying mutations at nucleotide level, causative genes for that particular disorder which are basically the output of consanguineous marriages in most of the cases especially in Asian population. For the present study genetic disorder i.e. *Hereditary Primary Microcephaly in Consanguineous Families* has been selected to investigate the linkage analysis and variant mapping. Hereditary primary microcephaly (MCPH) is a neurological disorder in which prenatal brain growth is significantly reduced. Moreover, MCPH is identified by measuring circumference of head from the forehead to the occipital prominence at the back of the head. MCPH is genetically heterogeneous mapped to different regions (MCPH1-MCPH10) including *NDE1* gene. MCPH encoding genes are involved in regulating cell cycle checkpoint, in DNA repairing events, centrosome related functions, spindle formation, kinetochore attachment to spindle and apoptosis. Its incidence rate is found to be high in consanguineous population. Abnormal spindle-like microcephaly associated (*ASPM*) gene accounts for most of the cases of MCPH. About more than 85 mutations have been reported in *ASPM* so far, including non-sense, frame shift and splice site mutations. Present study involves genetic mapping in three consanguineous Pakistani families (A, B, C) with hereditary microcephaly. These families were characterized by typical features of MCPH, having reduced head circumference along with sloping forehead in most cases. Linkage in these families was tested by microsatellite markers for the causative MCPH genes. Family A was excluded from all the respective MCPH loci where as Family B, C depicts linkage to the MCPH1 and MCPH5 locus. Sequence analysis of coding exons of *Microcephalin*, at MCPH1 was carried out in an affected member (V-5) of family B but failed to identify any functional sequence change in the coding region of this gene signifies the involvement of regulatory region. In family C, coding exons (15, 16, 17) of *ASPM* gene are selected for exon sequencing in an affected member (IV-2). DNA sequence analysis revealed a G to A transition at nucleotide position 3978, producing immediate premature stop codon (p.Trp1326*) in exon 17 of the *ASPM* gene. In carrier member (III-1) sequencing result revealed heterozygosity for this sequence variant.

Biography

Fouzia Kausar has completed her Mphil from Quaid-i-Azam University, Pakistan in Biochemistry. Human Molecular Biologist with 4 years national, international research experience in molecular genetics. Currently, she is working as Lecturer in the department of Biotechnology, Women University of AJ&K, Pakistan.



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International Conference on Advances in Biotechnology

July 10-12, 2017 Dubai, UAE

Identification of heterotic loci associated with grain yield and its components using two CSSL test populations in maize

Hongqiu Wang, Xiangge Zhang, Jihua Tang and Dingming Kang

China Agricultural University, Beijing, China

Heterosis has widely been used to increase grain yield and quality. In this study, the genetic basis of heterosis on grain yield and its main components in maize were examined over 2 years in two locations in two test populations constructed from a set of 184 chromosome segment substitution lines (CSSLs) and two inbred lines (Zheng58 and Xun9058). Of the 169 heterotic loci (HL) associated with grain yield and its five components identified in CSSL × Zheng58 and CSSL × Xun9058 test populations, only 25 HL were detected in both populations. The comparison of quantitative trait loci (QTLs) detected in the CSSL population with HL detected in the two test populations revealed that only 15.46% and 17.35% of the HL in the given populations respectively, shared the same chromosomal regions as that of the corresponding QTLs and showed dominant effects as well as pleiotropism with additive and dominant effects. In addition, most of the HL (74.23% and 74.49%) had overdominant effects. These results suggest that overdominance is the main contributor to the effects of heterosis on grain yield and its components in maize, and different HL are associated with heterosis for different traits in different hybrids.

Biography

Hongqiu Wang is a PhD student at China Agricultural University, Beijing, China. He majored in biological Science and genetics and had success in map-based cloning and functional analysis of a mutant gene controlling seed size in maize.



International Conference on Advances in Biotechnology

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Application of microfluidic platforms in gene therapy: Complexation of cationic liposome and small interfering RNA

Ismail Eş¹, Meryem Tyrrasch Ok², Marcelo Augusto Szymanski de Toledo³, Marianna Teixeira de Pinho Favaro³, Adriano Rodrigues Azzoni⁴ and Lucimara Gaziola de la Torre¹

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Gene therapy, as a promising technique which involves the delivery of correct copy of the defective gene, can be an approach in treatment of genetic diseases. The present study was aimed to technological development of microfluidic platforms in order to incorporate small interfering RNA (siRNA-silencer) in nano-scaled cationic liposomes (CLs) for further application of non-viral vectors in gene therapy. The production of CLs-siRNA complexes (lipoplexes) by using microfluidics technology, which processes fluids in small amounts, could provide the continuous operation as a single-phase system. For this purpose, CLs were produced in microfluidic device which was fabricated with PDMS (Polydimethylsiloxane) using soft lithography. The electrostatic complexation between CLs and siRNA was evaluated using both conventional and microfluidic processes. The physicochemical and biochemical properties of CLs and lipoplexes were evaluated and showed promising characteristics as delivery vector. The transfection study in HeLa cells was successfully carried out in ELISA plates using the most appropriate lipoplexes, which were previously produced. The result of cytotoxicity analysis of the lipoplexes was highly comparable with Lipofectamine, which is a commonly-used commercial carrier. Furthermore, as a part of optimization study, theoretical molar charge ratio between cationic liposome and siRNA were calculated and was compared with experimental value. Preliminary characterization of lipoplexes (size, polydispersity, zeta potential, siRNA accessibility, and morphology) prepared on microfluidic platform presented favorable characteristics. The results obtained in this study shed light on the benefits of utilizing microfluidics to optimize vectors for gene therapy.

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Cutting edge concepts in the use of stem cell and PRP Injections in an office setting

Joseph Purita

Director Institute of Regenerative and Molecular Orthopedics, Boca Raton, Florida, USA

The presentation concerns PRP and Stem Cell (bone marrow, adipose, and V cells) injections for musculoskeletal conditions in an office setting.

Indications are given as to which type of cell and technique to use to accomplish repair. Stem cells, both bone marrow derived (BMAC) and adipose, are used for the more difficult problems. While V cells (Very Small Embryonic Like Stem Cells) are utilized for autoimmune diseases including osteoporosis. PRP injections are utilized for the less severe problems. Indications are given when to use Stem Cells verses PRP. The newest concepts in stem cell science are presented. These concepts include the clinical use of MUSE cells, exosomes, and V cells. Basic science of both PRP and stem cells are discussed. This presentation defines what constitutes an effective PRP preparation.

Myths concerning stem cells are dispelled. One myth is that mesenchymal stem cells are the most important stem cell. This was the initial interpretation of Dr. Arnold Caplan the father of mesenchymal stem cell science. Dr. Caplan now feels that MSCs have an immunomodulation capacity which may have a more profound and immediate effect on joint chemistry and biology. We now learn in the talk that the hematopoietic stem cells are the drivers of tissue regeneration.

Also discussed are adjuncts used which enhance the results. These therapies include supplements, LED therapy, lasers, electrical stimulation, and cytokine therapy. The scientific rationale is presented for each of these entities as to how they have a direct on stem cells.

Biography

Joseph Purita is director of Institute of Regenerative and Molecular Orthopedics (www.stemcellorthopedic.com) in Boca Raton, Florida. The Institute specializes in the use of Stem Cells and Platelet Rich Plasma injections. Dr. Purita is a pioneer in the use of Stem Cells and Platelet Rich Plasma. He received a B.S. and MD degree from Georgetown Univ. Dr. Purita is board certified in Orthopedics by ABOS. He is a Fellow American College of Surgeons, Fellow American Academy Orthopedic Surgeons, and a Fellow American Academy of Pain Management. He is also certified in Age Management Medicine.

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International Conference on Advances in Biotechnology

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Tolerance to Salt Stress by Plant Growth-Promoting Rhizobacteria on *Brassica rapa* var. *glabra*

Khalid A. Hussein^{1,2} and Jin Ho Joo²

¹Botany and Microbiology Department, Assiut, Egypt

²Department of Biological Environment, Kangwon National University, Republic of Korea

Salinity has been a threat to agriculture in some parts of the world; and recently, the threat has grown. Plant growth-promoting rhizobacteria (PGPR) may benefit plant growth, either by improving plant nutrition or producing plant growth hormones. The effects of rhizobacterial strains to attenuate the salinity stress on the germination of Chinese cabbage seeds were tested using four different concentrations of NaCl (50, 100, 150, and 200 mM). Also, PGPR strains were tested to enhance the early germination of Chinese cabbage seeds under normal conditions. *Azotobacter chroococcum* performed best with enhancing the radicle length of 4.0, 1.2, and 1.0 times at treatments of 50, 100, and 150 mM of NaCl, respectively. Additionally, significant differences were found in plumule length, *A. chroococcum* and *Lactobacillus* sp. showed remarkable activation either in normal or under stress conditions. Co-inoculation by three rhizobacterial strains (LAPmix) indicated synergistic effect to enhance the early germination of the seeds. The results of this study are promising for application of rhizobacterial strains that possess plant growth promoting traits to enhance the plant tolerance against salinity.

Biography

Khalid A. Hussein, PhD is a Lecturer at Assiut University, Faculty of Science and a Post-Doctor fellow in the Kangwon National University, in South Korea. He has over thirteen published scientific papers. He is a faculty member of Botany and Microbiology Department, Science Faculty, Assiut University, Egypt. He has been awarded the Excellence Award from Kangwon National University (KNU) at PhD, graduation. He has served as a member of various scientific projects and supervising post graduate students. He got the BSc. in "Chemistry & Microbiology" from Assiut University and the MSc. in using "Fungi as Biocontrol Agents". He holds the PhD degree in "Microorganisms as Biofertilizers" from Kangwon National University, in South Korea in 2013. Currently He is a Post-Doc fellow at Biological Environment Department, Kangwon National University, South Korea. He attended several International Conferences and Symposiums, and participated in many workshops.

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International Conference on Advances in Biotechnology

July 10-12, 2017 Dubai, UAE

Green technology for harmful mosquitoes

M. Nalini

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Mosquitoes are notorious undesirable pest which transmit dreadful diseases while sucking human blood. Among the diseases caused, malaria is one of the oldest disease in the world whereas dengue a current one which is often fatal. WHO estimates that 2.5 billion people have been infected with dengue vector and this viral infection increases with increase in urbanization. Since no vaccines or drugs available, these mosquito-borne diseases can be prevented by killing the mosquitoes and restrict them from breeding and biting humans. Usage of synthetic insecticides and growth regulators pose severe environmental health problems due to long-term residual accumulation, on non-target organisms and their prolonged usage lead to resistance in mosquitoes.

In this context, biologically active molecules from natural sources like bacteria, fungi and plants, will be safe and non-hazardous. Therefore, nanoparticles (NPs) ranging less than a micron to that of individual atoms have been synthesized for varied applications. These NPs involve inorganic including metallic NPs, oxide NPs, sulfide NPs and other typical NPs. Many physical, chemical, biological and hybrid methods available to synthesis these NPs, and those produced using physical and chemical methods has their limitation in biomedical applications due to the use of toxic chemicals during synthesis. Hence, reliable, nontoxic, and eco-friendly methods are required to expand their biomedical applications which include a wide spectrum of applications involving targeted drug delivery, cancer treatment, gene therapy and DNA analysis, antibacterial agents and biosensor in electronic devices.

Plants possess compounds at various constitutional levels naturally avail non-toxic product serves as alternative source for mosquito control. Extracts and oils from serve as potential anti-mosquito agents. Therefore, using plant extracts in NPs synthesis has enabled large-scale production of biogenic nanocides effective in controlling the mosquito population.

Biography

M. Nalini, Assistant Professor in the Dept. of Zoology, Poompuhar College. She did her postdoctoral research at Masaryk University, Czech Republic and Andong National University, Republic of Korea. She has published 30 research articles in reputed journals, has presented her research findings in various national and international forums and has been serving as reviewer for many peer reviewed journals. She is a recipient of International Travel Grant from DBT, Summer Research Fellowship-2013 from Indian Sciences Academies'. She has delivered several guest lectures, organized and conducted scientific workshops for students, researchers and faculties. Has guided students for M.Phil. and doctoral degrees. To her honour she has two patents to her credit. She is a Member of American Microscopical Society, Life member of Indian Science Congress and Entomology Academy of India.

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Exploring the incidence trends of tuberculosis: An integrated study of orphan children of Azad Jammu and Kashmir, Pakistan

Madiha Khalid

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Pakistan is a developing country and falls fifth among the 22 countries with highest incident TB cases. Orphan children constitute a high risk group for tuberculosis infection owing to their poor socio-economic status. Our study included 1708 children, which were analyzed during four years. First round of screening was carried out in 2011 involving 733 children from seven districts of AJK and three years later, 975 unrelated children were investigated. The antibody positive subjects were subjected to sputum smear and PCR test to confirm the active tuberculosis. Major risk factors and values of plasma markers in diseased participants were also assessed. In 2011, an overall 5.18% seroprevalence and 3.41% active tuberculosis was found. Females with 3.13% seroprevalence and 2.05% active infection indicated higher infection rate as compared to the male children by 2.05% and 1.36% respectively. In 2014, we found 2.77% and 1.95% antibody positive and active tuberculosis cases respectively. The infected females included 1.64% and 1.12% and males included 1.13% and 0.83% positive for antibody and active TB. The infected children had an overall elevated plasma values for lymphocytes, granulocytes, relative volume of platelet PCT%, mean corpuscular hemoglobin concentration MCHC and red cell distribution width RDW. However, a decrease was observed for mean corpuscular volume MCV, haematocrit HCT, blood calcium and body mass index of infected subjects. A general decline in tuberculosis during four years is indicated in a high risk group that can be attributed to the improvement in the overall living and medical facilities in the recent years. This declining trend is suggestive of further studies encompassing more risk groups in order to gauge the overall trend of tuberculosis in Pakistan.

Biography

Madiha Khalid has completed her MPhil from University of Azad Kashmir, Muzaffarabad, AJK, Pakistan in Biotechnology. Human Molecular Biologist with 3 years national, international research experience in Human Molecular biology. Currently, she is working as a lecturer in the department of Biotechnology, Women University of AJ&K, Pakistan.



International Conference on Advances in Biotechnology

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Mutation screening of *CYP21A2* and *ATP6V0A4* genes in patients with inherited defects in the genitourinary tract

Maliha Rashid

Women University of Azad Kashmir, Pakistan

Genitourinary tract is the system of combination of organs related with the production and excretion of urine and those related with reproduction. Genitourinary system disorders include both symptomatic and asymptomatic disorders. These disorders may be caused by congenital abnormalities, infectious diseases, trauma or any damage to urinary structural conditions. Congenital adrenal hyperplasia is one of the many forms of genitourinary tract disorders which has autosomal recessive mode of inheritance. CAH due to 21-hydroxylase (encoded by *CYP21A2* gene) deficiency is a common metabolic disorder that causes abnormal androgen synthesis in body. We have analyzed *CYP21A2* gene for all 10 coding exons in 15 Pakistani families. Mutational screening has identified a synonymous single nucleotide polymorphism in two families (PB1442 and PB1553) and a recurrent polymorphism in another family (PB1295). However pathogenic mutations were not identified in the coding region. Kidneys are the organs that have regulatory role in animals. One of the important functions of the kidneys is the maintenance of acid base balance. Disturbance in this balance will lead to urinary tract infections. Renal tubular acidosis is one of the major forms of kidney disorders. *ATP6V0A4* gene coding the α 4 isoform of v-ATPases plays an important role in RTA. We have screened selected exons of this gene in two RTA affected Pakistani family. Mutational screening has identified a C>T variation in intron 7 of *ATP6V0A4* gene. A heterozygous variation has been identified in exon 9 of this gene where G has been replaced by A at nucleotide position 945 changing the codon GAC (coding aspartate) to AAC (coding asparagine). However, sequencing of more exons and regulatory regions and functional studies are needed to prove that this variation has some role in RTA phenotype.

Biography

Maliha Rasheed has completed her Mphil from Quaid-i-Azam University, Pakistan in Biotechnology. Human Molecular Biologist with 4 years national, international research experience in molecular genetics. Currently, she is working as Lecturer in the department of Biotechnology, Women University of AJ&K, Pakistan.



International Conference on Advances in Biotechnology

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Applied biotechnology to identify new circulating species of leishmaniasis in Taza province, Morocco

Maryam Hakkour^{1,2,3}, Asmae Hmamouch^{1,4}, Mohamed Mahmoud El Alem^{1,2}, Abdelkbir Rhalem³, Hajiba Fellah¹, Abderrahim Sadak² and Faiza Sebti¹

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³Agronomy and Veterinary Institute Hassan II

⁴Laboratory of Microbial Biotechnology, Sidi Mohammed Ben Abdellah University, Fez, Morocco

Background: In Morocco, leishmaniasis is an endemic disease. Two forms of leishmaniasis are reported: visceral leishmaniasis due to *Leishmania infantum* and cutaneous leishmaniasis caused by three *Leishmania* species (*Leishmania tropica*, *Leishmania major* and *Leishmania infantum*). The identification of these species remains important for a better control strategy. In fact, this study aims to apply the biotechnological assays especially the PCR-ITS1-RFLP to identify the *Leishmania* species circulating and responsible of the recent cases of CL and VL leishmaniasis in Taza province which continues to record a high number of cases.

Results: The molecular study in Taza Province has shown for the first time the presence of 41% cases of CL due to *L. infantum* with a percentage (27/63) beside *L. tropica*. Also, this study shows the coexistence of these two species in the same sectors of Taza, namely Taza High, Oued Amlil, Tahla, Tainaste and Bouhlou. The abundance of *L. infantum* among the total could be due firstly to the presence (plus touche) of VL due to *L. infantum* in this province and in the neighboring areas.

Conclusions: The results of this study show for the first time, the existence of non-sporadic cases of CL due to *L. infantum*. They also indicated that CL due to this species is more prevalent than reported in the literature. These results will be helpful for better management and control of this disease which it is crucial to target the various links of the cycles of disease by targeting dogs that constitute a reservoir of *Leishmania infantum*.

Biography

Maryam Hakkour from Rabat - Morocco, PhD Student at university Mohamed V, Faculty of science-Rabat my research topic is about the epidemiological study of leishmaniasis in humans and animals in northern Morocco. This work is performed at the National Reference Laboratory of Leishmaniasis in National Institute of Hygiene (NIH) with a collaboration of the Agronomic and Veterinary Institute Hassan 2 (AVI) (Rabat). I have published three articles until now.

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Identification of nitrogen use efficiency genes in Barley: Searching for QTLs controlling complex physiological traits

Mei Han

University of Alberta, Edmonton, Canada & Nanjing Forestry University, China

Over the past half century, the use of nitrogen (N) fertilizers has markedly increased crop yields, but with considerable negative effects on the environment and human health. Consequently, there has been a strong push to reduce the amount of N fertilizer used by maximizing the nitrogen use efficiency (NUE) of crops. One approach would be to use classical genetics to improve the NUE of a crop plant. This involves both conventional breeding and quantitative trait loci (QTL) mapping in combination with marker-assisted selection (MAS) to track key regions of the chromosome that segregate for NUE. To achieve this goal, one of initial steps is to characterize the NUE-associated genes, then use the profiles of specific genes to combine plant physiology and genetics to improve plant performance. In this study, on the basis of genetic homology and expression analysis, barley candidate genes from a variety of families that exhibited potential roles in enhancing NUE were identified and mapped. We then performed an analysis of QTLs associated with NUE in field trials and further analyzed their map-location data to narrow the search for these candidate genes. These results provide a novel insight on the identification of NUE genes and for the future prospects, will lead to a more thorough understanding of physiological significances of the diverse gene families that may be associated with NUE in barley.

Biography

Mei Han is an associate professor at the College of Biology and Environment, Nanjing Forestry University. In 2013, she obtained Ph.D. degree from Heidelberg University, Germany. She did his postdoctoral research at University of Alberta, Canada. She has published more than 15 research articles in Plant Molecular Biology and Genetics field. She has been serving as a guest reviewer of Plant Science and BMC Plant Biology.



International Conference on Advances in Biotechnology

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Differential expression of phosphatases in legumes' nodules as molecular traits tolerance to phosphorus deficiency

Mohamed Lazali

University of Khemis Miliana, Algeria

Symbiotic nitrogen fixation (SNF) by legumes may provide an ecologically acceptable complement or substitute for mineral nitrogen fertilizers that farmers cannot afford for economic limitation or try to minimize for environment sake. However, P-deficiency is a major limiting factor for legume-rhizobia symbioses, particularly in acidified or calcareous soils. Nevertheless, the legume SNF potential and expression under P-deficiency may be improved. In this study we have compared the expression of various phosphatases (APases) in nodules of common bean recombinant inbred lines (RILs) that were previously selected for their contrast in P use efficiency for SNF. In order to assess the contribution of APases activity to P use efficiency for SNF in legume nodules, an in situ RT-PCR methodology was used to localize and quantify the transcripts of candidate APases genes in nodules of two *Phaseolus vulgaris* RILs in hydroaerobic culture under deficient vs sufficient P supply.

Our findings have revealed that the transcript localization of phytase, phosphoenol pyruvate phosphatase, fructose 1,6 bisphosphatase and trehalose 6P phosphatase was found to be tissue specific and to differ among APase genes, P treatment and legume genotype. The expression of these genes was positively correlated with increases both of the rhizobial symbiosis efficiency in use of P for N₂ fixation and nodule O₂ permeability. Under P-deficiency, this positive correlation was more significant for the RIL115 that is tolerant to P-deficiency than the sensitive RIL147. It is concluded that these APases contribute differently to the use of organic P for N₂ fixation and play a role in adaptation to P-deficiency.

Biography

Mohamed Lazali is a Professor and the Director of the Research Laboratory, Faculty of Nature, Life and Earth Sciences, University of Khemis Miliana, Algeria. His teaching activities have been focused predominantly on plant and agricultural biotechnology. He did his postdoctoral research at INRA France. He has published more than 25 research articles and book chapters. My research aims to investigate nutrient dynamics at the rhizosphere scale with particular focus on the possible links between nutrient use efficiency and yield stability of legume-non-legume cropping system to single or combinations of abiotic stresses.



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Nanoflower amplified immunosensor for rapid detection of *Salmonella* Enteritidis from milk and cheese using smart phone

Mohamed Maarouf Ali Zeinhom

Salmonella is a standout amongst the most foodborne pathogens causing harmful disease. To protect consumers from food poisoning due to *Salmonella* infection, it is important to develop a quick, simple, reliable and sensitive method which can detect *Salmonella* in foods at low concentration in a timely manner. We have effectively established a novel magnetic nano biosensor with high sensitivity for the visual and quantitative detection of *S. Enteritidis* from milk, cheese and water. Milk, cheese and water samples inoculated with different concentrations of *S. Enteritidis* have been tested using anti *S. Enteritidis* streptavidin magnetic beads and biotin labeled antibody as capture platform and coupled with nanocomposite (detecting antibody-HRP enzyme and inorganic nanoflower), where the signal amplification based on HRP enzyme which is enhanced by the action of nanoflower and produce visual color easily detected by the smartphone device in a very low concentration range. The developed assay was able to detect *S. Enteritidis* in PBS and all analyzed specimens with a detection limit of one CFU/ mL or g. Recoveries percentages of spiked milk, cheese and tap water samples with 10^2 , 10^3 and 10^4 CFU/mL from live *Salmonella* were 98.2, 96.1 and 95.4 (in milk), 94.3, 98.6 and 99.5 (in cheese) and 95.8, 101.2 and 97.8 (in water) using designed device, respectively. The effective application of this new innovation in milk and cheese indicates the possibility of its application in various food products.

Biography

Mohamed Maarouf Ali Zeinhom is an Associate Professor at Faculty of Veterinary Medicine, Beni-Suef University. He received his Ph.D. degree in Food Microbiology from Beni-Suef University in collaboration with University of Guelph, ON, Canada in July 2011. Currently, he is a visiting scholar in the School of Mechanical and Materials Engineering at Washington State University, USA. He published more than 15 papers in reputed journals. His scientific interests focus on development of rapid and sensitive nano-biosensor for detection of Food borne pathogens.



GAVIN CONFERENCES

International Conference on Advances in Biotechnology

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Mushroom Biotechnology: Premises, promises and challenges

Mohan Prasad Singh
University of Allahabad, India

Population explosion, dwindling agricultural land and less scope of quantum jump in production of food grains after green revolution has compelled scientists to look for alternative source of food which can cater to the need of exploding population. Mushrooms are one of the best alternatives which grow independent of sunlight and fertile land and can produce highest quantity of protein per unit area and time from the lignocellulosic wastes. Hence, Mushroom Biotechnology came into existence which deals with discovery of new edible mushrooms from nature, domestication of newly discovered as well as other wild mushrooms, enhancement in the production of fruit bodies, increase in nutritional and medicinal attributes and applications in mitigating the environmental pollution and providing low cost, viable, multipurpose technology to farmers to meet the growing demand of food, feed, fodder, fertilizer and energy. It is also concerned with exploitation of medicinal and tonic properties and cosmetics as well as nutritious beverages products. Presently mushrooms are among the most popular, nonconventional food accepted the world over and the increased consumer demand over the years has led to quantum jump in its production. Mushrooms are not only used as an effective weapon against malnutrition but also an important tool for restoration, replenishment and remediation of earth's overburdened ecosphere.

Biography

Mohan Prasad Singh is presently working as Professor of Biotechnology at University of Allahabad (India). After completion of M. Phil. and qualifying NET and JRF, he joined as Lecturer in HNB Garhwal University in Botany in 1992. In 1998 he completed his Ph.D. and in 2000 he moved to the Department of Biotechnology at VBS Purvanchal University, Jaunpur where he became Reader in 2000 and Professor in 2008. Prof. Singh has been carrying out his research on various aspects of edible oyster mushroom over last two decades. He has improved production and nutritional content of mushroom and suggested the effective way to get rid of environmental problems through mushroom. He has published 45 research papers, edited three books and has been serving as an editorial board member of repute. His research area is Mushroom nutraceuticals, biodegradation & bioremediation.

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Tracking microbial potential of degrading polycyclic aromatic hydrocarbons, by CG-MS and qPCR

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The bioremediation of hydrocarbon-contaminated environments involves management of both biotic and abiotic factors, such as aeration, pH, addition of nutrients, temperature, etc. Regarding soil bioremediation, previous studies showed that low cost practices including aeration and setting soil pH to 7.0, can stimulate the soil microbiota to degrade hydrocarbons. Petrochemical oily sludge is a dangerous waste generated by petroleum refinery, and its accidental spill into the natural environment (soil, ocean, rivers) causes injury to animals and humans, although for some bacteria it is no more than nutrients. It happens due to a huge genetic diversity that allows bacteria to degrade xenobiotic molecules throughout a large set of metabolic pathways. Considering it, why do not take advantage of this natural process? The study of bacteria that are able to degrade oily sludge quicker can help on managing environmental issues, through biodegradation and detoxification of toxic molecules. Hydrocarbon biodegradation research have increased due to GC-MS and advanced molecular biology approaches. The aims of this study were to evaluate the potential of a *Bacillus cereus* to degrade PAHs in vitro beneath three oily sludge concentration (0%, 1%, and 6%), and also, point out the metabolic pathways involved in the process. 34 metabolites involved with PAHs biodegradation were measured by CG-MS. It was detected that *Bacillus cereus* inoculation reduced about 70% of the oily sludge's PAHs added initially. This knowledge allows the selection of optimal biotic and abiotic condition to enhance controlled bioremediation processes.

Biography

Patricia Dorr de Quadros has completed his PhD in Soil Science from Federal University of RS / UFRGS (Brazil) and University of Florida (USA), where studied soil microbial diversity and abundance of different environments, including agricultural soils from Everglades/FL and Brazil, and degraded soils after coal mining. She has 4 years of postdoctoral study on fuels biodeterioration and oily sludge biodegradation, having published more than 15 papers in reputed journals. In February 2017, she started a postdoctoral research in the University of Toronto / CA, about phytoremediation of hydrocarbon contaminated soils (natural oil soaked soils).

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Bioconversion of Fruit Peel Waste into Value Added Products

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Fruit peels are a class of agro wastes that may be regarded as a non-product flow of raw materials whose economic values are less than the cost of collection and recovery for reuse; and are therefore discarded. However, in spite of their pollution and hazard aspects, in many cases, fruit processing wastes have a good potential for conversion into useful products of higher value as by-product, or even as raw materials for other industries. Fruit peels contain an appreciable amount of carbohydrates which could be utilized by microorganisms producing economically important biopolymers (Polyhydroxyalkanoates), Single Cell Proteins and other valuable products with potential application in food, agriculture, packaging, and pharmaceutical industries. Polyhydroxyalkanoates are class of bioplastics exclusively synthesized as intracellular carbon and energy storage compounds by wide range of microorganisms and are reported to be completely degraded in to benign compounds both aerobically and anaerobically. SCPs are protein rich microbial biomass or total proteins extracted from microbial cell that could be used as protein supplement in food and feed. Fruit peel wastes could be thus considered as valuable by-product if appropriate technical means are used to increase the value of the subsequent products to exceed the cost of reprocessing. Thus the present research highlights easily adoptable biotechnological methodologies for recycling, reprocessing and eventual utilization of fruit peel waste for biopolymer and SCP production rather than their discharge to the environment which might cause detrimental environmental effects.

Biography

Preethi Kathirvel currently serves as Assistant Professor in the Department of Microbial Biotechnology, Bharathiar University, Tamil Nadu, India. She was awarded the PhD degree from Bharathiar University, for her work on "Studies on Antioxidant and Pharmacological Activities of *Muntingiacalabura* Fruits". She has published 22 research articles, 2 book chapters and edited 2 books in Antioxidants and Waste Management field. Her thrust area of research includes antioxidants, biopolymers and biosurfactants, solid waste management and nanobiotechnology. She is a Life Time Member in Association of Microbiology and Society of Biological Chemist, India.

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Relationship among circulating anti-Müllerian hormone, insulin like growth factor 1, cadmium and superovulatory response of dairy cows

Rabie Lotfy Abdel Aziz Ramadan

The objectives of this study were 1. to determine the associations among circulating anti-Mullerian hormone (AMH), insulin like growth factor 1 (IGF1) and Cadmium (Cd) concentrations of lactating Holstein cows at the time of superovulation and 2. to determine the effect of circulating AMH, IGF1 concentrations on the superovulatory response in Holstein dairy cows. Holstein cows (n = 30) were synchronized for superovulation and flushed. Blood samples for AMH, IGF1 and Cd analysis were collected prior to superovulation, at estrus and at the time of embryo collection. The concentrations of blood markers prior to superovulation were highly correlated to superovulatory response. Circulating concentrations of AMH, IGF1 prior to superovulation were negatively correlated to Cd concentrations ($P < 0.05$). There was no correlation between circulating concentrations of AMH and IGF1. The number of corpus luteum ($r = 0.71$), total embryo ($r = 0.67$), total transferable embryo ($r = 0.51$) and total grade 1 embryo ($r = 0.5$) were positively correlated to AMH concentrations ($P < 0.05$). There was a trend for negative correlation found between circulating Cd and grade 1 embryo yield ($r = P < 0.1$). When cows were classified into quartiles of circulating AMH concentration, the superovulatory response parameters evaluated were increased with increased AMH concentrations; particularly we observed a >2-fold difference between first and fourth AMH quartiles in total transferable embryo yield and total Grade 1 embryo yield. In conclusion, circulating AMH concentration was robustly associated with superovulatory response. Measuring AMH before enrolling cows in superovulation programs will likely allow practitioners to improve numbers of embryos produced and, thereby, reduce costs per embryo produced.

Biography

Rabie Lotfy Abdel Aziz is an Associate Professor at Faculty of Veterinary Medicine, Beni-Suef University. He received his Ph.D. degree in Theriogenology and Biotechnology from Beni-Suef University, April 2013. Currently, he is a visiting scholar in the College of Veterinary Medicine, at Washington State University, USA. He published more than 11 papers in reputed journals. His scientific interests focus on application of modern reproductive biotechnologies for genetic improvement in imported dairy breeds of cattle.



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Depletion of carcinogenic Cr (VI) from aqueous solution by heat dried biomass of a newly isolated fungus *Arthrimum malaysianum*: A mechanistic approach towards 'Green Science'.

Rajib Majumder

CSIR-Indian Institute of Chemical Biology, India

The rapid industrialization and economic growth has brought many benefits to India, but the environment has suffered a lot culminating serious health issues. Chromium, Arsenic and Lead are the major pollutants in industrial effluents that affect human health by adsorption through skin and by accumulating in the food chain. Hence, there is always a surge for an alternative eco-friendly solution. Here, for the first time, the heat dried biomass of a newly isolated fungus *Arthrimum malaysianum* was studied for the toxic Cr(VI) adsorption involving more than one mechanism like physisorption, chemisorption, oxidation-reduction and chelation. The process was best explained by the Redlich-Peterson isotherm and pseudo-second order kinetic model with maximum predicted biosorption capacity (Q_m) of 100.69 mg g⁻¹. Film-diffusion was the rate-controlling step and the adsorption was spontaneous, endothermic and entropy-driven. The mode of interactions between Cr(VI) ions and fungal biomass were investigated by several methods [FT-IR, X-ray Diffraction (XRD) and Energy-Dispersive X-ray spectroscopy (EDX)]. X-ray Photoelectron Spectroscopy (XPS) studies confirmed significant reduction of Cr(VI) into non-toxic Cr(III) species. Further, a modified methodology of Atomic Force Microscopy was successfully attempted to visualize the mycelial ultra-structure change after chromium adsorption. Influence of pH, biomass dose and contact time on Cr(VI) depletion were evaluated by RSM. Additionally, FESEM-EDX analysis exhibited arsenic (As) and lead (Pb) peaks on fungus surface upon treating with synthetic solutions of NaAsO₂ and Pb(NO₃)₂ respectively. The biomass could remove chromium from industrial effluents, suggesting the fungal biomass as a promising adsorbent for toxic metals removal.

Biography

Rajib Majumder, is a Postdoctoral Fellow at CSIR-Indian Institute of Chemical Biology (CSIR-Govt. of India). He did his Ph.D. from University of Calcutta, India. He has published three 1st author papers and other five (5) co-author papers to his credit in diverse research fields. His research interest is focused on the synthesis of metal nanoparticles using microorganism as a living nanofactory and its wide application in pollution control management.



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Authentication of wood and Non-wood forest products through DNA barcodes

Suma Arun Dev

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Forest resources in the Western Ghats of India are facing several threats including habitat destruction, forest fragmentation, regeneration problems, illegal and selective felling of commercially important trees as well as extraction of non-wood medicinal forest products. This has instigated a recent trend to adulterate/ substitute the existing resources to satisfy the demand of the growing industries. Adulteration/ substitution compromises the therapeutic value and are extremely difficult to authenticate using taxonomic tools. The ability to track and authenticate forest resources of economic value is thus critically essential for the effective management of the natural resources and appropriate regulation of the trade. *DNA barcoding*, as facilitated by the Consortium for the Barcode of Life (CBOL), is the process of identification of a species using short conserved standard set of gene regions and is proposed to precisely identify species at all the lifecycle stages. Developments over the last 10 years in the development of successful barcode even from dried and processed plant samples offer a promising molecular tool for the authentication of forest wood and non-wood forest produce and thereby to curb illegal and adulteration activities. In this paper, we demonstrate the potentialities of DNA barcodes to authenticate original timber species East Indian sandalwood (*Santalum album*) and red sandalwood (*Pterocarpus santalinus*) as well as Ayurvedic raw drugs in the Western Ghats of India from their market adulterants/ substitutes.

Biography

Suma Arun Dev is a Senior Scientist at the Forest Genetics & Biotechnology Division of Kerala Forest Research Institute, Kerala, India Since 2010 onwards. She did her postdoctoral research at Indian Institute of Science, Bangalore, India in Molecular Population Genetics and is having 12 years of postdoctoral experience. Presently, her research is targeting on Conservation genetics of forest Genetic Resources, Developing genetic tools and DNA barcoding for the certification of wood and non-wood forest produce, transcriptomics for adaptive traits for productivity improvement. She has published more than 35 papers in reputed journals, a member of many scientific bodies and has been serving as an editorial board member of Crop Genetics & Breeding, Biotropica, Food Biotechnology etc.



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Suppression of extracellular invertase inhibitor gene expression improves seed weight in soybean (*Glycine max*)

Tao Su

Heidelberg University, Germany & Nanjing Forestry University, China

Cell wall invertase (CWI) and vacuolar invertase (VI) play multiple functions in plant growth. As well as depending on transcriptional and post-transcriptional regulation, there is growing evidence that CWI and VI are also subject to post-translational control by small inhibitory proteins. Despite the significance of this, genes encoding inhibitors, their molecular and biochemical properties, and their potential roles in regulating seed production have not been well documented in soybean (*Glycine max*). In this study, two invertase inhibitor isoforms, GmCIF1 and GmC/VIF2, were characterized to possess inhibitory activities in vitro via heterologous expression. Transcript analyses showed that they were predominantly expressed in developing seeds and in response to ABA. In accordance with this, surveys of primary targets showed subcellular localizations to the apoplast in tobacco epidermis after expressing YFP fusion constructs. Investigations using RNAi transgenic plants demonstrated marked elevations of CWI activities and improvements in seed weight in conjunction with higher accumulations of hexoses, starch, and protein in mature seeds. Further co-expression analyses of GmCIF1 with several putative CWI genes corroborated the notion that GmCIF1 modulation of CWI that affects seed weight is mainly contingent on post-translational mechanisms. Overall, the results suggest that post-translational elevation of CWI by silencing of *GmCIF1* expression orchestrates the process of seed maturation through fine-tuning sucrose metabolism and sink strength.

Biography

Tao Su is an associate professor at the College of Biology and Environment, Nanjing Forestry University. In 2014, he obtained Ph.D. degree from Heidelberg University, Germany. He did his postdoctoral research at University of Alberta, Canada. He has published more than 12 research articles in Plant Molecular Biology and Ecophysiology field. He has been serving as a guest reviewer of Scientific Report and Bioinformatics and Biology Insights.



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A Novel Current to Voltage DNA Biosensor: Cervical Cancer Eradication by early detection of Human Papillomavirus (HPV) strain 16

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The development of novel sensors towards diagnosis of infection disease causing agents was been promoted by nanoparticle-mediated bio-sensing. Cervical cancer infection is one of the severe issues, was stimulated by high risk types of Human Papillomavirus (HPV) strains especially HPV 16. Mostly 70% of cervical cancers are caused by infection of this genotype. This paper presents optimization and characterization of HPV DNA probe immobilization on Interdigitated Electrodes (IDEs) sensor using 3-Aminopropyl trimethoxysilane [APTES; $\text{NH}_2-(\text{CH}_2)_3-\text{Si}(\text{OC}_2\text{H}_5)_3$] to produce a thin, stable silane layer on the sensor device. The sensor was fabricated using conventional photolithography integrated with an inductively dry etching process. The effect of APTES concentration and silanization time on the formation of silane layer is studied using Fourier transform infrared spectroscopy (FTIR) and atomic force microscopy (AFM). Surface analytical techniques such as FTIR and atomic force microscopy (AFM) are employed to characterize the biochemically modified surfaces at each step of the biomolecule immobilization process. A uniform, homogenous and highly dense layer of biomolecules are immobilized with optimized on IDEs substrate. The complement of the target DNA of HPV 16 to the carboxylate-probe DNA could be translated into electrical signals and confirmed by the increased conductivity in the current-to-voltage curves. The specificity experiments indicate that the biosensor can discriminate between the complementary sequences from the base-mismatched and the non-complementary sequences. After duplex formation, the complementary target sequence can be quantified over a wide range with a detection limit of 1.0×10^{-12} M. With its excellent detection capabilities, this sensor technology is promising for early detection of cervical cancer, presented a sensitive platform for HPV detection and would become a powerful tool for pathogenic microorganisms screening in clinical diagnosis.

Biography

Uda Bin Hashim received BSc Hons. degree in Physical and Applied Physics from Universiti Kebangsaan Malaysia, in 1987, and Ph.D in Microelectronic Engineering from the same university in 2011. Since 1988, he has been serving MIMOS Berhad for 14 years and experienced in the CMOS wafer fabrication foundry. In 2002, he joined Universiti Malaysia Perlis, Malaysia as a lecturer in the School of Microelectronics Engineering. Currently, he is a Senior Professor in Universiti Malaysia Perlis and Director to the Institute of Nano Electronic Engineering, Universiti Malaysia Perlis. His research interest includes Nanobiosensor, DNA Chips, Microfluidic and Nano Lab-On-Chip devices for medical, food and agriculture applications. Under Scopus database, his current H-Index is 18 with 1624 citations from the total number of 539 papers. He also has successfully supervised 3 Post-Doctoral students, 24 PhD students and 36 MSc students, while 5 PhD and 4 MSc are still working towards completion.

Recently in 2014, Prof. Dr. Uda Hashim has been awarded as Top Research Scientist Malaysia (TRSM) by Academic of Sciences Malaysia. He is one of the recipients of ISESCO Laureate in 2012. He also obtained National Patent Award in 2013 from Perbadanan Harta Intelek Malaysia (MyIPO). He was a former Vice President of Malaysia Nanotechnology Association and a Fellow to The Malaysian Solid State Science & Technology Society. Recently, he has been appointed as a main committee member for national nanotechnology under Nanotechnology Directorate MOSTI and also serves as deputy committee cluster Nanotechnology under National Professor Council. On top of that, he has been appointed as Visiting Professor to Universiti Teknikal Melaka Malaysia, Academic Adviser to AIMST University and Visiting Research Scientist to Wayamba Universiti of Sri Lanka.

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Empowering enzyme characteristics through rational design

Ugur Uzuner

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Enzymes are the key players of modern biotechnology. Varying and rapidly augmenting industrial applications on human nutrition, animal feed and bio-based fuels necessitate the discovery, improvement and effective use of non-toxic and environmentally-friendly enzymes during different processing steps. The preference of highly efficient enzymes in biotechnology is thus of great interest due to obtaining cost-effective and higher outcomes. Further improving the characteristics of biocatalysts is therefore an indispensable need. Rational design-based enzyme engineering thus stands as a superior approach to enhance the adaptability and tolerance of enzymes over diverse processing conditions of industry. Recently developed numerous high-throughput bioinformatics software focusing on protein structure and dynamics analyses enable knowledge-based design of enzyme characteristics including increased thermostability and enhanced pH tolerance.

Through integrative and complementary bioinformatics analyses, 4 mutants of *Geobacillus*_sp._TF16 endoxylanase (optimum_pH_8.5) was developed to improve its pH optimum, through knowledge-based transferring large and negatively charged amino acid-rich peptides from *Bacillus*_halodurans_C-125 endoxylanase. Two of four *in silico* designed mutants were successfully expressed in *E.coli* and for their pH optima shifts towards alkaline conditions. This new approach enabled to improve pH optimum about 1.5 units and also enhanced the efficiency throughout broader pH range (7.0-10.0). In addition, optimum temperature of GeoInt3 mutant was improved by 5°C.

Consequently, current findings suggest that introduction of negatively charged amino acids onto protein surface may improve both pH optimum and thermostability of enzymes to alkaline conditions. Structure dynamics-based rational engineering of biotechnologically crucial enzymes could thus be operated as a genuine strategy to invigorate current industrial bio-processes.

Biography

Ugur Uzuner is an Assistant Professor and Program Director of Biotechnology at the Department of Molecular Biology and Genetics in Karadeniz Technical University, TURKEY. He completed his PhD research at the Department of Plant Pathology and Microbiology of Texas A&M University, TX, USA in 2013. He has published several outstanding research articles on the structure dynamics analysis and rational design of enzymes in reputed journals. He has been serving as an editorial board member of Turkish Journal of Botany. His research interests are focused on structure dynamics analysis-based modeling and engineering of industrial enzymes, development of versatile and robust strains towards efficient bioremediation of various wastes from industrial power plants.

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Osteogenic differentiation of highly mineralizing human bone marrow-derived MSC is modulated by ALP, IGFBP5, and LRP3 through TGFB signaling pathway

Amer Mahmood

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Understanding regulatory networks underlying human bone marrow stromal cells (hBMSCs)-lineage differentiation and fate determination is a pre-requisite for their use in therapy. The goal of current study was to unravel the novel role for low-density lipoprotein receptor-related protein 3 (LRP3) in regulating osteogenic and adipogenic differentiation of hBMSCs. Using global gene expression profiling, LRP3 exhibited significant up regulation in the highly osteogenic hBMSC clone (CL1) compared to the less osteogenic clone (CL2) and during osteogenic induction of the CL1 clone. Functional and gene expression data demonstrated LRP3 as a molecular switch promoting hBMSC lineage differentiation into osteoblast and inhibiting adipocytic differentiation. Interestingly, microRNA (miRNA) expression profiling identified miR-4739 as the most down regulated miRNA (-36.11 fold) in the CL1 vs CL2 clone. Using TargetScan prediction algorithm, combined with functional and biochemical assays, LRP3 was identified as a novel gene target for miR-4739, with a single potential binding site for miR-4739 in LRP3 3' UTR. Regulation of LRP3 expression by miR-4739 was subsequently confirmed by qRT-PCR, western blotting and luciferase assay. Forced expression of miR-4739 mimicked the effects of LRP3 knockdown on promoting adipogenic and suppressing osteogenic differentiation of hBMSCs. Hence, we report for the first time a novel biological role for the LRP3/hsa-miR-4739 axis in balancing osteogenic and adipocytic differentiation of hBMSCs. Our data support potential utilization of miRNA-based therapies in regenerative medicine.

Biography

Amer Mahmood received his MSc from Copenhagen University in the field of autoimmune destruction of beta cells in Type 1 diabetic patients. He obtained his Ph.D. in Medical Sciences in the field of human Embryonic Pluripotent Stem Cell research and bone biology from the University of Southern Denmark. He is currently working as Associate Professor of Stem cell and regenerative medicine, his recent research focus on the field of Mesenchymal Stem Cells and Regenerative Medicine particular in skeletal-bone disorders. He has published his work in peer reviewed international journals with high impact factor. He recently established a consulting and training company Aracure LLC in partnership with other highly qualified scientists, whereby he gives professional consultation in stem cell and molecular biology including stem cell therapy.



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ACL regeneration and osteointegration using a new silk fiber-based scaffold: Results from a study in sheep

Thomas Nau

The Austrian Cluster for Tissue Regeneration, Austria

Because of ongoing limitations with ACL reconstruction, new approaches in the treatment of ACL injuries, in particular strategies based on tissue engineering have gained increasing research interest. To allow ACL regeneration, a structured scaffold which provides the mechanical basis, cells from different sources, and mechanical as well as biological factors are needed. The optimal scaffold for ACL regeneration is regarded to be biocompatible and biodegradable to allow tissue ingrowth, but also needs to have the right mechanical properties to provide immediate mechanical stability.

Hypothesis: A degradable silk-fiber based scaffold with mechanical properties similar to the native ACL is able to initiate ligament regeneration and osteointegration after ACL resection and reconstruction under in-vivo conditions.

Methods: Thirty-three mountain sheep underwent ACL resection and randomization to two experimental groups: 1) ACL reconstruction with scaffold alone (SA), 2) ACL reconstruction with cell-seeded scaffold (CS). Histological evaluation of the intra-articular portion of the reconstructed/regenerated ligament was performed after six and twelve months. Additional bone histology was performed to assess osteointegration.

Results: After six months, connective tissue surrounded the silk scaffold with ingrowth in some areas. The cell seeded scaffolds had significant lower silk content compared to the unseeded scaffolds and demonstrated higher content of newly formed tissue. After twelve months, the density of the silk fibers decreased significantly, and the ingrowth of newly formed tissue increased in both groups. No differences between the two groups regarding the silk fiber degradation as well as the regenerated tissue were detected anymore at twelve months. Bone histology revealed good osteointegration after 12 months.

Conclusions: The novel silk-fiber based scaffold was able to stimulate ACL regeneration as well as osteointegration under in-vivo conditions. Additional cell seeding lead to increased tissue regeneration and decreased silk-fiber content after 6 months, whereas these differences diminished after twelve months.

Biography

Thomas Nau has completed his MD from Karl-Franzens University Graz, Austria and his specialist orthopaedic trauma training at the Medical University of Vienna, Austria. As academic surgeon he is an Adjunct Professor at the LBI for Experimental and Clinical Traumatology, Austrian Cluster for Tissue Regeneration where he is directing the bone and ligament regeneration group. He is a Consultant Orthopaedic Surgeon at American Hospital Dubai.

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Honey as a novel bio-mediated synthesis of silver nanoparticles and promising of its antibacterial activity

Ghada Amin Youssef
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In recent years, researchers in the field of nanotechnology are finding that metal nanoparticles have all kinds of previously unexpected benefits. Synthesis of inorganic nanoparticles by biological systems (nanobiotechnology) makes nanoparticles more biocompatible and environmentally benign. A novel approach of synthesis of silver nanoparticles (Ag NPs) using a bio-derived product-honey. Honey was chosen as the eco-friendly reducing and stabilizing agent. Nanoparticles of different sizes could be obtained and the solution turned to black by time. Characterization of the Ag NPs was done by UV-Visible Spectroscopy, Fourier transform infrared spectroscopy (FTIR), Dynamic light scattering analysis (DLS), transmission electron microscopy (TEM) and scanning electron microscope (SEM) imaging. The colloid obtained at a pH of 8 was found to be spherical uniformly distributed with some agglomeration which is a significant advancement in biosynthesis. An intense surface plasmon resonance band at 400 nm in the UV-visible spectrum clearly revealed the formation of Ag NPs. Antibacterial activity of silver nanoparticles AgNPs was investigated against six pathogenic strains; *Escherichia coli*, *Proteus mirabilis*, *Klebsilla pneumonia*, *Pseudomonas aeruginosa* (Gram-negative), *Staphylococcus aureus*, *Streptococcus mutans* (Gram-positive). The results suggest that the synthesized Ag NPs act as an effective antibacterial agent, and can potentially be used in human contacting areas.

Biography

Ghada Amin Youssef is an associate Prof. of Applied Microbiology at University of Alexandria, Egypt where she studies microbiology and biological science. She graduated from Faculty of Science, with honor bachelor degree. She did her postdoctoral research at Alex. University. She has attended many training courses, workshops and more than 10 conferences around the world ended with EMBO International Conference "Fission Yeast" at (UK) London University, Senate house (24-29/June/2013) as an international conference. She has published more than 25 papers in reputed journals and has been serving as reviewer of AJMR.

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Dereplication and optimization through intact cell mass spectrometry for non-ribosomal peptide producers from natural products

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Natural products are an unfurled promising resource with magnanimous diversity. With millions of years of continuous evolutionary development natural resources viz. microbes have acquired incredible adaptability due to their strong flexible metabolic power as potential resources of new drug leads. The wonderful interaction of molecular dialogue between the two organisms viz. microbe and plant induces dramatic changes and studies have shown that vast repertoire of genes are involved in this biosynthesis of secondary metabolites such as Non Ribosomal Peptides (NRPs), polyketides, terpenoids and pyrones. History witnessed major backtrack in drug discovery efforts from unfurled golden mine of natural products despite possessing magnanimous diversity due to frequent re-discovery of known compounds, trace level production, lengthy processing time and complex natural mixtures as some major challenges faced. Dereplication is therefore an exigent need at incipient stages of discovery processes. An expeditious and efficient dereplication strategy was applied on epiphytes and endophytes of medicinal plants, soil microbes using Intact Cell Mass Spectrometry [ICMS] technique. ICMS is a simple, rapid and sensitive technique for direct detection of peptaibiotics using MALDI TOF/TOF mass spectrometer. With microgram amount of sample and any prerequisite for chromatographic separations and processing, accurate reproducible results can be obtained giving quick insight into possible peptaibiotics producers. Study of optimization experiments at miniaturized level for maximized production of desirable secondary metabolites can also be carried out using this technique which saves time and resources and expedite drug discovery efforts from natural products.

Biography

Deepika Singh is Senior Scientist at Quality Control and Quality Assurance Division, CSIR-IIIM Jammu. She did her post graduation in Organic Chemistry and in Modern Methods of Chemical Analysis from IIT-Delhi. She has published more than 20 research articles. Her research interest lies in dereplication for identification of novel metabolites from natural products and their isolation and characterization. She has good experience and expertise in method development and validation of pesticides, heavy metals, antibiotic drug residues, vitamins and aflatoxins in agricultural and processed foods as well as in Chemistry Manufacturing and Control (CMC) of herbal extracts and formulations using modern analytical instruments like MALDI-TOF/TOF, LC-MS/MS, NMR, HPLC, GC-MS/MS and ICPMS.

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