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Scientific Tracks & Abstracts

Day 1

Thomas A McKeon, J Biotechnol Biomater 2017, 7:6 (Suppl)
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Reducing petroleum use by developing renewable resources that replace petrochemicals

Thomas A McKeon
International Society for Biocatalysis and Agricultural Biotechnology, USA

The bio-based economy of previous centuries was rapidly displaced with the widespread availability of petroleum and rapid progress in the development of petrochemistry. However, seed oils from some crops are able to provide chemical products that could readily supplant many petroleum-derived products. Biodiesel is an obvious example, and many seed oils are useful in producing fatty acid methyl esters for biodiesel. Yet, certain oilseed crops are especially useful in providing replacements for more complex, higher value products, such as polymers, lubricants and coatings. These crops include but are not limited to linseed, tung, jojoba and castor, with the castor plant perhaps the most broadly useful. The castor oil plant produces a seed containing >50% oil with up to 90% ricinoleic acid, 12-hydroxy oleic acid. The presence of the mid-chain hydroxyl group imparts physical and chemical properties making castor oil uniquely useful as a feedstock for numerous products. However, limited production of castor has allowed petroleum-derived products to displace many castor oil based products from the marketplace, despite better performance characteristics of the castor-based products. A focus on improving castor will ultimately support expanded castor oil production. While castor oil can provide numerous replacements for petrochemicals, there are other oil crops that are perhaps limited in the number of products that they can provide. Nevertheless, these oil crops can have a significant role in reducing the need for petrochemicals, and these crops will also be discussed..

Biography

Thomas A McKeon has received his PhD in Biochemistry at UC Berkeley with Postdoctoral research in Plant Biochemistry at UC Davis. He is currently a Research Chemist with the US Department of Agriculture, Agricultural Research Service at the Western Regional Research Center in Albany, CA. He has over 100 publications, mostly in plant lipid enzymology and molecular biology. He is an Editor and Chapter Author for the book *Industrial Oil Crops*, published in March 2016 by Elsevier and AOCS Press. He is an Editor for *Biocatalysis and Agricultural Biotechnology* (BAB), a Board Member for American Oil Chemists Society (AOCS) Biotechnology Division and International Society for Biocatalysis and Agricultural Biotechnology (ISBAB). He has organized conferences for ISBAB and for US-Japan Natural Resources (UJNR) Food and Agriculture Panel.

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Ze-Chun Yuan, J Biotechnol Biomater 2017, 7:6 (Suppl)
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Developing biopesticides, biofertilizers and bioproducts for next generation green revolution and sustainable agriculture

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Modern agriculture is largely based on dense cropping and heavy application of pesticides and fertilizers, resulting in very serious issues such as soil pollution and land degradation. Therefore, it is necessary to develop alternative and greener strategies to combat pests and pathogens towards sustainable agriculture and environment. There are large number of microorganisms in nature, soil, capable of suppress crop pathogen, diseases and pests. In addition, accumulating reports uncovered the beneficial microbes for crop growth promotion, including phosphate or potassium solubilization and nitrogen fixation. The beneficial traits of microorganisms can be harnessed and utilized as alternative strategies to fertilize crops or reduce crop disease and pests. Over the years, we have been isolating, characterizing and applying beneficial microorganisms as biopesticides, biofertilizers or bioproduct factories. These include *Paenibacillus polymyxa* CR1, *Burkholderia cenocepacia* CR318, *Bacillus velezensis* 9D-6, *Arthrobacter sp*. LS16 and *Acinetobacter calcoaceticus* CA16. We are also carrying out complete bacterial genome sequencing to further characterize the genetics and regulatory pathways for the beneficial traits of the isolated bacteria. Here, we will summarize our research and latest discovery in develop biopesticides and biofertilizers, and discussing their potential application in reducing chemical fertilizers and pesticides, towards more sustainable agriculture and environment.

Biography

Ze-Chun Yuan is a Research Scientist and Principal Investigator at Agriculture and Agri-Food Canada. He is a Research Professor and Graduate Student's Supervisor at the Department of Microbiology and Immunology, University of Western Ontario, Canada. He has expertise in soil microbiology, bacterial genetics and genomics with great passion in improving crop health and productivity through alternative strategies. He has been isolating and characterizing beneficial microorganisms to manage crop disease or improve crop health and productivity, in particular, developing biofertilizers and biopesticides to reduce the use of classical fertilizers and pesticides in agriculture and horticulture. He is also interested in developing renewable bioproducts from biomass, in particular, crop residues. His research also involves synthetic biology and microbial engineering aiming at rewiring microbial metabolic pathways towards higher productivity of bio-based products and chemicals. He looks for opportunities for collaborative research and training of highly qualified personnel.

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Quick detection method for foodborne bacterial pathogens

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Globalization of food supplies has increased risks for food safety and contributed to international foodborne outbreaks. Accurate and quick detection of foodborne pathogens is essential for food industry and outbreak investigation. Tremendous efforts have been made to improve current methods and develop new methods, both culture- and molecular-based, by scientists of academics, industries, and government agencies worldwide. The status of quick detection techniques is reviewed. There are many methods available, including conventional polymerase chain reaction (PCR), multiplex PCR, real-time PCR, DNA microarray, metagenomics, whole genomics sequencing (WGS), loop-mediated isothermal amplification (LAMP), isothermal nucleic acid amplification assay based on the nicking enzyme amplification reaction (NEAR) technology (ANSR), biosensors, enzyme-linked immunosorbent assay (ELISA) and lateral flow immunoassay, etc. Nucleic acid-based methods generally are more sensitive and reliable compared to antibody-based methods. Therefore, they are more widely used for the detection of foodborne pathogens. Among nucleic acid-based detection methods, PCR has been accepted as standard detection protocols for numerous pathogens by many organizations. LAMP and ANSR assays are equally effective as PCR for detecting most pathogens, but simpler, faster, and easier to operate. Detection techniques using metagenomics and WGS are advancing rapidly. The future of this technology, in large part, depends on data base construction and development and improvement of software for data analysis. Also, we observed a new trend: mini portable devices, mini devices with smartphone, and 3-D Printing. A few examples of quick detection technology will be illustrated.

Biography

Guodong Zhang has started his career as a Professor at Northeast Agricultural University of China in 1989. He went to Purdue University in 1993 as a Visiting Associate Professor and worked on crop genetics and breeding with USDA. In 2000, he has decided to focus on Food Microbiology at University of Georgia and the Centers for Disease Control and Prevention (CDC). He is currently a Senior Research Microbiologist at the US Food and Drug Administration (FDA), working on both culture and molecular method development and validation for the isolation, detection and identification of foodborne pathogens. Besides more than 90 publications, he has served on Editorial Boards of several scientific journals. He is actively involved in ISO, IAFP and AOAC. He has developed official analytical methods for FDA. He is a FDA subject matter expert for *Salmonella*, shell eggs, produce, and spices. He also serves on a few scientific committees.

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Monize C Decarli et al., J Biotechnol Biomater 2017, 7:6 (Suppl)
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Scaling up the biotechnological process of the recombinant rabies virus glycoprotein

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The rabies virus glycoprotein (RVGP) is the main antigen of vaccine formulations. A robust *Drosophila* S2 cell line (S2MtRVGPH-His) was engineered by our group for the expression of recombinant RVGP (rRVGP) using metal-inducible promoters. The objective of this work was to evaluate the potential of a WAVE BioreactorTM in the initial steps of scaling-up the rRVGP production process by the S2MtRVGPH-His cell line to produce rRVGP in sufficient quantities for immunization and characterization studies. The WAVE bioreactor is an innovative approach for the cultivation of animal cells as it offers high process flexibility, as well as cost and time savings. For this purpose, we firstly established a Schott flasks procedure for culturing the S2MtRVGPH-His lineage. Using an inoculum of 5x105 cells/mL in culture medium (Sf900-III) induced with CuSO4, adequate pH range and parameter values such as time of induction (72 h) and temperature (28°C) to optimize rRVGP production could be defined. In the sequence, the procedure was reproduced in culture experiments conducted in a WAVE bioreactor 2/10 using a 2 L Cellbag. The results in Schott flasks and WAVE bioreactor were very similar, yielding a maximum titer of rRVGP above of 1 mg/L. After the rRVGP production process, the animals were immunized with rRVGP and submitted to rabies virus challenge. The rRVGP assessed in the immune system of the vaccinated animals showed high levels of anti-RVGP antibodies, statistically not different from the levels induced by a commercial vaccine. The animals immunized with rRVGP also survived the rabies virus challenge, whereas two negative group controls did not. This bioprocess enables an efficient scale-up of the production with high quality immunoactive glycoprotein and may be promising in terms of obtaining rRVGP in the near future in the order of grams for use in immunological, preclinical or clinical assessments.

Biography

Monize C Decarli is Biotechnologist. She has completed her Bachelor's and Master's degrees at Federal University of São Carlos, UFSCar, SP, Brazil and currently, she is developing her PhD Thesis in Chemical Engineering at the State University of Campinas (UNICAMP, SP, Brazil). She has expertise in Bioprocess, Biotechnology, Animal Cell Culture and Microbiology, and has been working in these fields since 2010. She has developed the bioprocess production of rRVGP in Wave Bioreactor for two years and half, in the course of her Master research work. This approach can be promising in terms of obtaining in the near future rRVGP in order of grams to use in preclinical assessments aiming the development of a recombinant rabies vaccine.

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Mohammed N Baeshen, J Biotechnol Biomater 2017, 7:6 (Suppl)
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The past, present and future potential applications in natural product genomics and bioengineering of the medicinal desert shrub *Rhazya stricta*

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Rhazya stricta has recently acquired a strong reputation in the scientific media that have interest with pharmaceutical and biotechnology applications, this was first refer to its therapeutic properties along history in folkloric medicine used by many nations to treat diseases, inflammations and some abnormal conditions. This was proven later by many studies and researches that showed the magnificent potential curative effects against MDR's, cancer, inflammations, diabetes and obesity. With the development of the scientific tools, bionanotechnology applications are invading the *R. stricta* research area. In the other hand, while studying the medicinal properties of the plant, another field of investigation was added to complete the series of its novel discoveries depending on its marvelous properties in resisting many biotic and abiotic stress conditions. This was noticed when founding that the plant was always evergreen all year and sometimes flowering and fruiting when the rain season was absent for two years ones in some areas of Arabia desert with all its harsh conditions. From here, studying the genome of this plant and the metagenomics of its community including all its lifestyles started. The expected results of these investigations will be very useful in the industrial and commercial biotechnology of pharmaceutics, food, agriculture, biofuels and environmental applications.

Biography

Mohammed N Baeshen is an associate professor in the section of genomics and biotechnology, department of biology, faculty of science, University of Jeddah (UJ) – Saudi Arabia since 2016 until now. Also he is the vice dean of the faculty of science (UJ). He had his Ph.D in thesis 2010 from king Abdulaziz University (KAU), department of biology in molecular medical microbiology then been assigned as an assistant professor at the department of medical laboratories at the faculty of health sciences. He was also assigned as a visiting fellow in the period of Nov 2011 – Oct 2013 in the department of biology, university of Essex (UE), UK as a Post-Doc in joint research work of Rhazya stricta metagenomics between KAU and UE.

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Biotechnologies: Which one(s) and what trends and future for mid-size pharma companies

Jean A Boutin
SERVIER, France

The burst of technology has changed the landscape of research and production in Pharmaceutical companies, namely, and among many other areas: the manipulation of the synthetic capacities of microorganisms, the possibility to chemically synthesize enzymes, the access to stem cells-derived cellular tools and the use of vegetal cells to produce new compounds. Considering that the changing capacities in microorganisms is essentially a problem of enzyme(s) manipulation, it comes more and more important to understand the path between fundamental and practical knowledge on enzyme catalysis and mutagenesis and the catalytic capacities of those enzymes performing tasks they did not evolve to do. Further to this, it becomes easier to synthesize proteins in which exotic, non-natural amino acids have been incorporated in the sequence either to gain new function(s) or to incorporate specific signals, for example to follow the fate of the protein in cell. Stem cells can be derived, at least theoretically, to a large set of proteins. Even if the consideration of using those cells as therapeutic agents is still arguable, the use of those cells as host for biological experiments is of the highest importance for a better understanding of physiological processes at the cellular level. Finally, the immense amount of ethno-pharmacological data, accumulated for centuries in various countries, should lead us towards a better rationalization of the finding of the actives in the mixture used. To do so, emphasis should be put on the collection of plants in natura, and the description of the secondary metabolites found by such samples, and the way to render this approach a little more environment-friendly. Taking as examples some approaches, we chose in the last few years, such as protein engineering, total protein chemical synthesis and plant cell modification potential, the impact of those strategic changes and challenges in a mid-size company is described. How these new paradigms alter the classical organization and comprehension of the future of Pharma companies will also be discussed.

Biography

Jean A Boutin is graduated from Nancy University (France) on Drug Metabolism. He did two Postdoctoral training periods at Johns Hopkins University School of Medicine (Baltimore) and at the Karolinska Institutet (Stockholm, Sweden). He was hired as Protein Chemist in Les Laboratoires SERVIER (LLS) in 1986. During the 30th last years, he has moved from oncology to peptide research and then molecular and cellular pharmacology. Recently, LLS has created a drug discovery platform which he led until the 1st October 2016. Since then, he is the Directeur de la Prospective particularly in the technological areas associated with molecular pharmacology. These areas include, but are not limited to drug molecular modeling, ligand/protein biophysical interaction measurements, protein chemistry, stem cells, structural biology, chemogenetics, HTS, biologics. The main interests of him are N-myristoyltransferase, melatonin, quinone reductase 2, MCH and autotaxin.

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Photo-curable natural polymer derivatives for bio-medical application

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To be biomedical applications, these materials require properties such as biocompatibility, biodegradability, and low-toxicity. Chitosan is a natural polymer with these properties. In addition, chitosan has anti-bacterial activity. For this reason, chitosan is suitable as a biomaterial. Growth factors are biomolecules, mainly proteins. Growth factors such as epidermal growth factor, transforming growth factor-β and bone morphogenetic protein-2 play an important role in the physiological activity process. Although growth factors affect their diverse physiological activities in biological processes, their biomedical applications are very limited. Because growth factors have a half-life that causes to rapidly decrease the physiological activity in the body. Protein immobilization methods are a way to solve these problems. Various immobilization methods have been developed. However, methods using chemical agents may form by-products that can potentially cause denaturation of immobilized protein. It is also difficult to immobilize them in the same chemical method because the residue of each amino acid is different. To solve these problems, our research team have developed a photo immobilization method for immobilizing proteins using UV and visible light photo-reactive chitosan derivatives. The additional advantages of this method are relatively simple process, low cost, easy scale-up, and low toxicity. Photo immobilization methods will be used to immobilize various biomolecules. Our research team report the preparation of photo-reactive chitosan derivatives that can be used for the immobilization of various biomolecules via photo-immobilization method.

Biography

Tae-Il Son has completed his PhD from Tokyo Institute of Technology, Japan in 1989. Currently, he is a Professor in the Department of Systems Biotechnology, Chung-Ang University, Republic of Korea and the President of Biomaterial Field in The Korean Society of Industrial and Engineering Chemistry (KSEC). He has published more than 80 papers in reputed journals.

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Improving the nutritional quality of cherry tomato fruits by LED lighting

Simon Miranda and **Talia del Pozo**
Universidad de Chile, Chile

Statement of the Problem: Fruits and vegetables account for an important part of the human diet, whose benefits are strongly related to their nutritional quality. In the last few decades, this concept has emerged as an important agricultural trait, due to the increasing demands of consumers who look for healthier commodities. Within this context, LED (light-emitting diode) lighting is emerging as a promising and sustainable technology used in greenhouse cultivation and in food production. For growing plants, the advantage of this kind of lighting is the possibility to optimize the selection of the light spectrum at physiologically relevant wavelengths to regulate specific processes in plants. Despite of LED lights benefits, the relationship between lighting conditions and nutritional quality has not been deeply addressed.

Methodology: Therefore, in this work we studied the effect of light stress doses and/or light regimens with different spectral quality on the accumulation of several nutrients (vitamin C, vitamin E and lycopene) in fruits of cherry tomato *(Solanum lycopersicum* cv. *cerasiforme)*.

Findings & Conclusions: By regulating the lighting conditions, we found that the accumulation of the compounds analyzed was significantly altered. Furthermore, these metabolite changes were correlated with the expression of several genes involved in the main pathways related to the biosynthesis of vitamin C, E and lycopene. Thus, correlations are discussed in terms of the metabolic pathways involved. Experiments for further optimization are underway, which will allow us to increase the nutritional quality of plant crops by a customized selection of spectral quality, but also will provide insights into the complex metabolic network that is responsible for the antioxidant metabolism in fruits.

Biography

Simon Miranda is a Biologist and Master in Biological Sciences of the University of Chile, whose main interests are within the field of plant molecular biology and nutrition. During his Master thesis, he has acquired ample skills in plant molecular biology, phenotyping and in vitro transformation and regeneration of genetically modified plants, for studying the metabolism of antioxidant compounds related to human health. Therefore, he is currently working, along with Talia del Pozo (PI), in a research project for addressing diverse questions related to biofortification of fruits, with the aim of applying available genomic and biotechnological tools for obtaining plants enriched in bioactive compounds.

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Liliana Perez-Manriquez, J Biotechnol Biomater 2017, 7:6 (Suppl)
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Bioinspired solvent-resistant nanofiltration membranes

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In the last decades, there has been a trend towards bio-inspired approaches for the formation of nanocoatings as well as to accomplish energy-intensive industrial separations in a more sustainable fashion. Organic solvent nanofiltration (OSN) is a pressure driven technology where the operation conditions are moderate and additional waste streams are minimized, making this a favorable energy efficient approach for challenging molecular separations such as purification of active pharmaceutical ingredients, production of specialty chemicals and in the petrochemical industry just to mention a few examples, where this technology can be currently applied. The overall performance of OSN membranes is determined by solute/solvent interactions with the membrane top layer. Therefore, the modification of the membrane surface becomes crucial to obtain high -performance OSN membranes, as well as exploring novel and green approaches to improve the separation properties of OSN membranes, without sacrificing their permeation properties. One alternative for the fabrication of the thin-films in OSN membranes proposed in this work is the use of bio-polyphenolic molecules. Among the many classes of phenolic biomolecules, plant phenols are capable of binding and cross-linking due to their strong interfacial activity. Here, the successful optimization of the interfacial polymerization reaction for the manufacture of OSN membranes is demonstrated by replacing the common toxic amines used for this method with natural occurring bio-polyphenols such as dopamine, tannic acid, morin hydrate and catechin. These bio-polyphenols can be found in mussels, date fruits, guava fruits and green tea respectively and they were used to form a selective thin film on top of a crosslinked polyacrylonitrile or a cellulose support. These membranes have shown an exceptional performance and resistance towards harsh solvent environments. Due to the incorporation of natural compounds for the manufacture, they provide a cost-effective alternative for industrial separations due to the ease of chemical modification and preparation, which is potentially easy to scale up at low cost taking advantage of the natural compounds for their manufacture.

Biography

Liliana Perez-Manriquez is pursuing her PhD at King Abdullah University of Science and Technology (KAUST); her main research focuses on the incorporation of natural compounds for the manufacture of solvent resistant nanofiltration membranes providing a cost-effective alternative for harsh industrial separations processes. These membranes are easy to reproduce making them potentially easy to scale up at low cost taking advantage of the natural compounds for their manufacture with applications in pharmaceutical, petrochemical, textile and biotechnological industries. Her research has been showcased in three international conferences so far as a speaker and she won a poster presentation award in the last euromembrane conference.

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Estimate infectivity of human *Norovirus* in environmental water samples by in situ capture RT-qPCR method

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Human *Noroviruses* (HuNoVs) are highly infectious viruses for which water is an important medium of transmission. In this study, we explored a new *in situ* capture RT-qPCR (ISC-RT-qPCR) methodology to estimate the infectivity of HuNoV in environmental water samples. This assay was based on capturing encapsidated HuNoV by viral receptors, followed by *in situ* amplification of the captured viral genomes by RT-qPCR. We demonstrated that the ISC-RT-qPCR did not capture and enable signal amplification of heat-denatured Tulane Virus (TV) and HuNoVs. We further demonstrated that the sensitivity of ISC-RT-qPCR was equal or better than that of conventional RT-qPCR procedures for the detection of HuNoV GI and GII. We then utilized the ISC-RT-qPCR to detect HuNoV in environmental water samples for comparison against that from a conventional RT-qPCR procedure. TV was used as a process control virus. While complete inhibition of TV genomic signal was observed in 27% of samples tested by RT-qPCR, no inhibition of TV genomic signal was observed by ISC-RT-qPCR. From 72 samples tested positive for HuNoV GI signal by RT-qPCR, only 20 (27.8%) of these samples tested positive by ISC-RT-qPCR, suggesting that 72.2% of RT-qPCR-positive samples were unlikely to be infectious. From 16 samples tested positive for HuNoV GII signal by RT-qPCR, only one of these samples tested positive by ISC-RT-qPCR. Five samples that had initially tested negative for HuNoV GII signal by RT-qPCR, was tested as positive by ISC-RT-qPCR. Overall, ISC-RT-qPCR method provided an alternative assay to estimate infectivity of HuNoV in environmental samples.

Biography

Peng Tian has his expertise in human *Norovirus* and food safety. He has developed several methods to concentrate and detect human norovirus from environmental and food samples. These approaches are available to all stakeholders interested in viral contamination in food.

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Kameswara Rao Kottapalli et al., J Biotechnol Biomater 2017, 7:6 (Suppl)
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RNA-Seq analysis of aluminum stress response in sugarcane roots

Kameswara Rao Kottapalli[1], **Poornasree Kumar**[1] and **Sonia Marli Zingaretti**[2]
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Sugarcane (*Saccharum* spp.) is an important source of sugar and ethanol and it is known that the global sugarcane production will increase by 21% by 2024. With increasing demand for energy, the sugarcane crop expansion is evident in Brazil. It is predicted that due to high demand for sugarcane and ethanol, the acreage under sugarcane will increase from 9.0 million ha to 64 million ha by the years 2018/2019. As a result, more unconventional soils rich in minerals will be brought under cultivation. Aluminum ions (Al^{+3}) together with silicon and iron are the three most abundant mineral elements in soil. Although silicon and iron are required for plant growth, Al is toxic, and its bioavailability is highest on acidic soils, resulting in inhibition of root growth and architecture leading to disruption of root elongation. Our goal is to understand the molecular mechanisms of abiotic stress tolerance in sugarcane and the role of miRNA's in transcriptional regulation. Towards this goal, a relatively tolerant sugarcane cultivar CTC-2 and the susceptible RB855453 cultivar was subjected to Aluminum stress at 221 µMol. RNA-Seq was performed on 12 root tissue samples using 108 bp paired end sequencing on an Illumina HiSeq2500 sequencer. Pairwise comparisons between different treatments in tolerant cultivar identified 16,340 non-redundant differentially expressed transcripts (DETs). Functional annotation of DETs revealed that AL^{+3} tolerance was controlled by several interacting pathways like calcium and G-protein coupled receptor mediated signaling, and regulation by WRKY and R2R3-MYB transcription factors. Some of these genes could be utilized by sugarcane breeders to improve Al^{+3} stress tolerance in field conditions.

Biography

Kameswara Rao Kottapalli has completed his PhD in Biotechnology and currently, he is a Research Associate Professor in Center for Biotechnology and Genomics. He has more than 10 years of experience in functional genomics with expertise in bioinformatics analysis of genotypic data, microarray data, large protein mass data, and next-generation DNA sequence data. He has successfully obtained federal grants like USDA-AFRI, NSF, Borlaug-USDA International award, USDA Ogallala Aquifer Initiative with major focus on bioinformatics and functional genomics. He has more than 25 publications in peer-reviewed journals and was awarded International Generation Challenge Program Postdoctoral Fellow in 2005-06. He currently teaches two graduate courses on gene expression profiling by nextgen sequencing (BTEC 5312) and bioinformatics (BTEC 5001-04). He is currently supervising several MS and PhD students with research focus on functional genomics and bioinformatics.

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Impact of biotechnology in Brazilian agriculture sector

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Brazil is the second largest producer of biotech crops in the world. A strict regulatory environment has been playing a crucial role in the rapid development and commercialization of biotech products in Brazil. The 2005 Biosafety Law defined security mechanisms for genetic modified organisms (GMO) monitoring, establishing supervision procedures over the development, farming, production, research and commercialization of transgenic seeds. As a consequence of a stablished regulatory framework on biosafety, over 300 biotech companies have been working in Brazil. These companies are focusing on a vast array of biotech areas such as human and animal health, bioenergy and agriculture. Thanks to sustainable practices, to the use of technology and to committed farmers, Brazil produces a significant share of food, fibers and renewable energies consumed all over the world. As a result from GMO adoption, Brazil has increased agriculture production by 350% while its land use increased only by 50%, causing a clear impact on sustainability and biodiversity preservation. Agribusiness carries on as a growing industry. According to data released by the National Supply Company, Brazilian grain crop may reach a record production of up to 215 million tons in 2017. To reach this productivity and competitiveness level, the application of scientific knowledge in agriculture is crucial. Thanks to the use and development of new inputs, to the mechanization of the work in the fields and to the adoption of high-performance seeds developed by classical and genetic breeding, we are now able to produce more.

Biography

Adriana Brondani has her expertise in Science Communication. She is the Executive Director of Council for Information on Biotechnology (CIB) since 2011. She is a Biologist, and has completed her Master and PhD in Biochemistry and Molecular Biology. She has years of experience in research and teaching in hospital and education institutions. Currently, she is a Professor of MBA in Agribusiness at Sao Paulo University and at the Brazilian Association of Nutrology (ABRAN).

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The probable effect of MT1A (A>G) and MT1A (C>G) SNPs of metallothionein gene on whole blood mercury levels in iranian populations

Javad Babaei
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Polymorphism in metalloproteins may lead to changes in heavy metal levels in the body. The risk factors of polymorphisms in heavy metal concentrations, particularly mercury, may be due to several confounding factors including differences in ethnicity of the analyzes populations, sample size and the type of the studied environment heavy metals to which population are exposed. We study the effect of MT1A (A>G) and MT1A (C>G) polymorphisms on blood mercury level in Iranian population. 300 non exposure people to control group and 150 exposure people to case group were used. DNA extraction and PCR-RFLP and DNA sequencing was done and blood mercury level was measured via AAS technique by DMA-80. Blood mercury concentration in case group was higher than control group (p value<0.001). There was no significant differences in case and control groups to effect of MT1A (A>G) and MT1A (C>G) polymorphism on blood mercury levels and P value were 0.69 and 0.44, 0.59 and 0.56 for case and control groups, respectively. MT1A (A>G) and MT1A (C>G) polymorphism were not associated with increased level of mercury concentration in Iranian, which needs further investigations. In conclusion, this study suggest that MT1A (A>G) and MT1A (C>G) polymorphisms are not attractive susceptibility markers for high blood mercury concentration.

Biography

Javad Babaei has completed his PhD from Jondishapur University and PharmD studies from Mashhad University School of Medicine. He is the Director of Valiasr Hospital Research Center. He has published more than five papers in reputed journals and has been serving as an Editorial Board Member of repute.

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Cesar Augusto Tischer, J Biotechnol Biomater 2017, 7:6 (Suppl)
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Bacterial cellulose as matrix to functionalize macromolecules

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Statement of the Problem: Cellulose corresponds to the most abundant biopolymer on earth, constituting all plant cells walls, exceeds the biological significance and play and important role as industrial product. The cellulose is biocompatible and the interest for biomedical purposes has grown recently being studied as scaffold for tissue regeneration as well the nanocellulose and for these reasons, a plenty of studies can be found testing cellulose pure, blended or chemically modified on *in vitro* models. Nanocelluloses are the highly ordered α-(1→4) glucan chains produced naturally or by chemical processes and that are in nanometric size in at least one dimension.

Methodology & Theoretical Orientation: Different strategies for functionalization of bacterial cellulose could be used, covalently linked or not, directly on the hydroxyl group, or in more steps. Weak forces as hydrogen linkages or ionic forces could trap small or bigger molecules as proteins as aggregates to membranes. Less labile option is introducing a linker as the succinic acid between cellulose chain and the functional compound, that give steric freedom for the last to act. Different technics could reach it with the advantage that the coupling product results in a pendant carboxylic acid, which provides a site for further chemical reactions.

Findings: Proteins and enzymes could be immobilized in nanocelulose, his activity remains or are improved taking advantage of the persistent suspension formed by nanofiber.

Conclusion & Significance: Bacterial cellulose is a versatile material that is being reinvented by physical and chemical ways creating very attractive new materials.

Biography

Cesar Augusto Tischer works as Professor at Biochemistry and Biotechnology Department of State University of Paraná. He has completed his Doctorate in 2002 in Biochemistry, in the field of structural analysis of glycoconjugates. Leader of the research group called Biotechnology and Glycoconjugates (CNPq certified, CNPq - National Council for Scientific and Technological Development), with founds approved in course on research councils operating in Brazil, CNPq in projects for cellulose modification, CAPES/Araucária foundation, with changes on cellulose for your use as sun blocker activity, both with industry collaboration. He works to develop functionalized nanocellulose with proteins or aggregated with charged polysaccharides as hyaluronic acid.

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December 04-05, 2017 | Sao Paulo, Brazil

BioCAE: A multiscale framework for complex biological systems and biofabrication of tissues and organs

Janaina de A Dernowsek[1], Maria Bolina Kersanach[2], Rodrigo Alvarenga Rezende[3], Pedro Yoshito Noritomi[1] and **Jorge Vicente Lopes da Silva[1]**
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Statement of Purpose: 3D bioprinting process can be adapted to produce tissues in a variety of formats, structural complexities, such as material types, cell types, growth factors and differentiation, extracellular matrix composition, mechanical properties, macro and microvasculature and technical challenges associated with the creation of biomodels that mimic real vascularized tissues. In recent years, *in silico* approaches have been practiced in several fields, and offers new opportunities for medical discovery and investigation, helping and improving the storage, organization, and classification of the large data sets of digital biological information that is available. The purpose of this work is to present different approaches to predict the development and behavior of several biological processes, such as molecular networks, gene interactions, diffusion, cell differentiation, tissue and organ development, beyond to provide new perspectives and strategies in the biofabrication of tissues and organs.

Methods: A range of multiscale strategies was employed to develop a BioCAE for biofabrication of tissues and organs. Here we describe some approaches in steps, which may be part of the BioCAE, thereby preventing a significant amount of trial and error experiments in laboratories. *In silico* study focuses on the biological process of the angiogenesis of an aggregate of endothelial cells. The software CompuCell3D (CC3D) was used to mimic angiogenesis *in silico*. CC3D is an open-source environment for multi-cell and single-cell-based modeling of tissues, organs, and organisms.

Results & Conclusions: The emergence of integrated platforms on different systems levels to understand complex biological processes will enable the prediction and creation of biofabricated biological structures. We emphasize here that BioCAE is work-in-progress and there are a vast number of possible additions to the multiscale models for the biofabrication.

Biography

Janaina de A Dernowsek is currently working on a Postdoc Scholarship at the Center for Information Technology Renato Archer (CTI), Campinas, Brazil. She has obtained the MSc and PhD degrees in Genetics from the University of São Paulo (USP). During her PhD studies (2010–2014), she acquired knowledge and skills in posttranscriptional interactions between the miRNAs and mRNAs during the osteoblastic differentiation of human immature dental pulp stem cells. Currently, she is involved in the Biofabrication group at CTI Renato Archer working with several steps of biofabrication, mainly on the multiscale representation of tissue and organs for a blueprint. This hybrid 3D blueprint will contain all the necessary information for all bioprinting steps.

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Cry toxins and CRISPR/Cas technology: How biotechnology advances can contribute to new crops biotech

Maria F. Grossi-de-Sa, Joaquin R. Paixão, Thuanne P. Ribeiro, Fabricio B. M. Arraes, Leonardo L. P. Macedo, Maria E. Lisei-de-Sa, Dagna M. L. Silva, Isabela T. Lourenco-Tessutti, Maria C. M. Silva and **Wagner A. Lucena**
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Plants are usually sessile organisms, and they must evolve towards a developmental and physiological flexibility to generate adaptation mechanisms against different biotic and abiotic stresses. In an agronomical aspect, these environmental factors impact negatively on plant development, which represents a high economic cost. In this case, Biotechnology actively acts in the development of tools capable of optimizing agricultural production, reducing in an eco-friendly way the negative influence of the environment. Although genetically modified (GM) crops expressing Cry toxins have been worldwide applied for insect resistance, no commercial GM cotton have been successfully developed to the cotton boll weevil (CBW) control, one of the most critical cotton primary insect pest in Brazil. Recently advances showed that the transgenic expression of a Cry10 toxin conferred to GM cotton high resistance to CBW. The entomotoxic effect to CBW was maintained in T_2 plants as the Cry toxin expression levels remained high in both tissues, ranging up to 19.0 μg g^{-1} fresh tissue, and the CBW mortality rate remained around 100%.On the other hand, the development of water stress tolerance without agricultural penalties is a great challenge to Biotechnology. Genetic manipulation of plant genomes can overcome some of these difficulties. The type II CRISPR/Cas system has been adapted to plants to control the genetic modification in a more targeted and precise procedure. The catalytically inactive Cas9 (dCas9) fused to activators has already been used to regulate transcription in transformed tobacco leaves and *Arabidopsis thaliana* plants. To validate the CRISPR/Cas system, we have used the dCas9 fused to the tripartite activator VPR, as well as two Arabidopsis epigenetic modification domains (the Acetyltransferase domain from AtHAC1 - *AT domain* and the methyltransferase domain from *Curly Leaf* (CLF) gene - *SET domain*). The strategy was tested to control the endogen Arabidopsis promoter of the transcriptional factor At AREB1, known to regulate key genes in response to drought stress. The AtAREB1 transcript expression was increased in plants expressing the dCas9-VPR and dCas9-AT fusions, and these plants showed a better tolerance to drought stress. On the other hand, the results with the SET domain variated from one line to another, displaying activation and inhibition of AtAREB1 expression, with opposed phenotypes when submitted to water withdrawal. These data demonstrated that it is entirely possible to modulate gene expression in plants of agronomic interest (such as soybean and cotton) using CRISPR/Cas technology and thereby express a particular phenotype, for example, drought tolerance.Thus, the association of both technologies, Cry toxins and CRISPR/Cas system (dCas9), can be considered important biotech approaches to develop crops efficiently more resistant to insect pests. Several studies have shown that elevated levels of Cry toxins expressed in transgenic plants can reduce or prevent the emergence of toxin-resistant insect populations. In this way, it is perfectly possible to prevent possible populations of CBW resistant to Cry toxin through increased expression of the toxin mediated by dCas9-VPR/AT. Finally, the engineered transgenic plants could be introduced in breeding programs, such as pyramidalization, in which the combination of two or more characteristics could improve resistance/tolerance to both biotic and abiotic stresses. In this way, the recent biotechnology approaches can be considered to increment the world production of food and other bioproducts, which can be used to supply the needs of growing human population sustainably.

Biography

M.Fatima Grossi-de-Sa is a Plant Biotechnology research group leader at EMBRAPA Genetic Resources and Biotechnology, professor at the Genomic Sciences and Biotechnology Graduation Program at Brasilia Catholic University, Brasilia-DF, Brazil and President of the Brazilian Society of Biotechnology (SBBIOTEC). She is a full member of the Brazilian Academy of Sciences (member elected in 2011) and full fellow of the World Academy of Science -TWAS (member elected in 2014). Her current research includes Plant Pests interaction, Genetic manipulation of crop plants, Gene prospection and functional studies of plant promoters, functional genomics of plants and insect-pests, and Molecular strategies to the phytonematodes and insect pests control.

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Scientific Tracks & Abstracts

Day 2

Estela M Cruvinel, J Biotechnol Biomater 2017, 7:6 (Suppl)
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iPS-derived cardiomyocytes and keratinocytes for drug screening and cytotoxicity assays

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Induced pluripotent stem cells (iPSC) are promising tool for disease modeling, regenerative medicine and drug screening. Pluricell Biotech is a Brazilian startup that develops *in vitro* iPS-derived models. Currently, we have established a highly efficient 2D differentiation protocol to obtain iPSC-derived cardiomyocytes. After 30 days of differentiation, PluriCardio can be replated in 2D monolayers or 3D spheroids. More than 70% of our differentiations have 95% or more of purity seen through positive expression of cardiac specific markers. Different cardiomyocytes subtypes are observed depending on how cells are plated, when in monolayer, 75% of the cells have a ventricular phenotype after 15 days of culture, and 97% have ventricular phenotype in 3D plating. We show electrophysiological response to classical drugs as expected, we checked responses to beta-adrenergic, calcium, sodium, potassium receptors including the verification of the well know hERG/IK potassium receptor. These cardiomyocytes were also used the evaluate doxorrubicin toxicity, we show they are affected by this drug. Taken together, these data suggest that our cardiomyocytes are a good and reliable tool for cardiac research and drug screening. Our future direction is to develop a platform with iPS-derived cardiomyocytes is to create a score of cardiotoxicity based and combined evaluation of different cardiotoxicity assays. We also established an efficient keratinocyte differentiation protocol. To date, we obtained 90% of K14-positive cells. iPS-derived keratinocytes expressed some keratinocyte markers as K14, K5, ITGa6, ITGb4, deltaNp63. After 7 days, exposed to a high concentration of calcium medium some cells expressed K10 and involucrin. Our future direction with iPS-derived keratinocytes is to evaluate their potential to grown in 3D model and evaluated their answers in cytotoxicity analyses.

Biography

Estela M Cruvinel has her expertise in cell culture and human genetics. She is Researcher at Pluricell Biotech, a Brazilian startup that develops *in vitro* iPS-derived models. She believes that iPS-derived cells are powerful tools for basic science and clinical applications. iPS-derived cells can be important for disease modeling. She has worked with these cells in her PhD to study genomic imprinting in Prader-Willi and Angelman syndromes. Moreover, their use in drug screening and cytotoxicity assays are valuable because they are able to replace or reduce the use of some animal models or animal cells. Currently, she coordinates the project that establishes iPS cells differentiation into keratinocytes.

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Notes:

Pighinelli L, J Biotechnol Biomater 2017, 7:6 (Suppl)
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Properties of hydrochloric chitosan multifilament fibers modified with nano-calcium phosphate complex

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The socioeconomic situation of the modern world has raised the interest in renewable materials to use in regenerative medicine. Biomaterials as an artificial bone are classified into surface-active materials such as hydroxyapatite (HAp), and resorbable materials such as ß-tricalcium phosphate (ß-TCP) and bioactive and biodegradable material as a chitosan and its derivatives. The composition of biomaterials as ceramics, polymers and/or composite materials, with all advantages and drawbacks, are developed to be used for bone problems. When all these properties of polymers, ceramics are considered producing composite materials have a reasonable approach. In this studies composition of chitosan and/or calcium phosphates are derived from the junction of two or more different materials, containing organic and inorganic materials, including characteristics like bioactivity and biodegradability and biocompatibility with human tissues. The chemical characteristics of chitosan and nano B-TCP/HAp complex are showed by FTIR studies and can be seen the main peaks of energy vibration of both components organic/inorganic exist in the material complex, also can be seen a good stability of the nano-ceramic formation in the chitosan salt solution by potential zeta and ceramic particles size range from 12.8 to 58 nm. In this study also is showed a new method of preparation of calcium phosphates ceramics from micro size to nano size using a common commercial calcium phosphate and describes a method for preparing chitosan fibers modified with hydroxyapatite (HAp), tricalcium phosphate (β-TCP), and HAp/β-TCP nanoparticles. Fiber-grade chitosan derived from the northern shrimp (Pandalus borealis) and nanoparticles of tricalcium phosphate (β-TCP) and hydroxyapatite (HAp) suspended in a diluted chitosan solution were used in the investigation. Diluted chitosan solution containing nanoparticles of Hap/β-TCP was introduced to a 5.16 wt% solution of chitosan in 3.0 wt% hydrochloric acid. The properties of the spinning solutions were examined. Chitosan fibers modified with nanoparticles of HAp/β-TCP were characterized by a level of tenacity and calcium content one hundred times higher than that of regular chitosan fibers. These materials can be used in future for medical applications as a base for scaffolds production and as implants in regenerative medicine.

Biography

Pighinelli L is currently an Associate Professor of Toxicology and Genetics Research Program in Lutheran University of Brazil and Assistant Professor of research program in materials engineering at the same university. He has completed his Doctorate in Biomaterials area for regenerative medicine and tissue engineering at the University of Innsbruck, Austria, in cooperation with the Institute of Biopolymers and Chemical Fibers in Lodz, Poland, by Marie Skłodowska-Curie Actions-Research Fellowship Program. He has several papers and patents in the field of regenerative medicine, tissue engineering and radiotherapy. Currently, he is developing research in biomaterials area and biodegradation of polymers used in regenerative medicine and drug-delivery. His research fields include Biomaterials and Tissue Engineering: bioactive ceramics; scaffolds for bone and tissue repair; musculoskeletal tissue engineering: bone, cartilage, articular joints, calcium phosphate-based drug delivery devices and ceramics for orthopedics.

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Abdul Rahman A I Alyahya, J Biotechnol Biomater 2017, 7:6 (Suppl)
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Genotoxicity of gemcitabine low dose in white rat bone marrow cells

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Gemcitabine is a modern chemical drug used widely against many serious diseases including advanced cancers such as lung cancer, bladder and ovarian cancers and several blood cancers. Gemcitabine is one of the preferred choices in the treatment of pancreatic cancer. Short-term tests were conducted, and the drug showed rapid and strong ability to detect toxicity or distorting the material studied in the neighborhood cells. Results showed that there are some changes in cell parameters which can be determined by cellular examination accurately. Exposing male inbred line SWR/J of laboratory mice to low dose of the drug (125 mg/kg) Gemcitabine individually and in combination affected significantly in different times intervals mitotic divisions and chromosomal aberrations and abnormalities. The severity of abnormalities was increased with the passage of treated time.

Biography

Abdul Rahman A I Alyahya is a Cell Biology Scientist since 2005. He has strong research and teaching expertise in Cell Biology, Toxicology, Animal Cell Culture, Anticancer Drugs and Pharmaceutical Biotechnology. He has obtained his PhD from King Saud University in Biology. He has joined Shaqra University in 2009. Since 2009, he has secured many national grants for many research projects. He has published 21 refereed journal papers, 10 conference presentations, three industrial reports, two conference proceedings. Formerly, he was the Dean College of Science and currently he is a Vice Rector of Shaqra University for Promotion and Quality Assurance.

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N Mostoufi et al., J Biotechnol Biomater 2017, 7:6 (Suppl)
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Modeling of fermentation process of Bacillus thuringiensis as a sporulating bacterium

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Sporulating bacteria constitute a large portion of industrial microorganisms. Many important bioproducts such as solvents, antibiotics, enzymes, and pesticides with applications in food, pharmaceutical, and chemical processes are produced by sporulating bacteria. *Bacillus thuringiensis (Bt)* is an aerobic, rod-shaped, and sporulating bacterium that during its sporulation process produces toxic crystal proteins, called delta endotoxins, which have insecticidal action. Due to the economic importance of this product, great efforts have been made to improve its operation and control procedures especially by means of mathematical models. As shown in Fig. 1, there are three distinct types of cells in a *Bt* culture: vegetative cells, sporangia, and mature spores. The aim of this work was to provide a mathematical model that can estimate the populations of these three types of cells. In this paper, a cell population balance model was used to represent the dynamic behavior of the process. An unstructured and non-segregated model was used for the dynamic fermentation process with 0%, 50% and 100% oxygen saturation in a fed-batch culture. The mathematical model consists of a partial differential equation (PDE) that describes the distribution of a cell population based on the cell age. To solve the mathematical model, the method of lines was used in MATLAB that approximates the PDE model by a set of nonlinear ordinary differential equations (ODEs). Then, the resulted ODEs were solved by the 4th order Rung-Kutta method. The results show that the proposed model can estimate the cell populations properly.

Biography

N Mostoufi is currently a Full Professor of Chemical Engineering at the University of Tehran. He has taught advanced mathematics and fluid mechanics courses for over 16 years. His research interests include process modeling, simulation and optimization, and fluidization. He holds a BEng and MSc degree in Chemical Engineering from Iran's University of Tehran and a PhD in fluidization from Canada's Ecole Polytechnique de Montréal. He has more than 270 publications in major international journals and conferences, plus five books and four book chapters. He is the Co-Author of the textbook *Numerical Methods for Chemical Engineers with MATLAB Applications*, published by Prentice Hall PTR in 1999. He is the Founder and Editor-in-Chief of *Chemical Product and Process Modeling* published by Walter de Gruyter GmbH, Germany and winner of University of Tehran's International Award, 2015. He is also the University of Tehan's distinguished Researcher, 2013.

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Wilker Ribeiro Filho, J Biotechnol Biomater 2017, 7:6 (Suppl)
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The future of pharmaceutical biotechnology with the Industry 4.0: Managing new technologies, teams and reaching customers from baby boomers to the i-generation

Wilker Ribeiro Filho
Instituto Reger, Brazil

The use of tools like Artificial Intelligence (AI), robotics, mobile devices, cloud computing, big data analysis, internet of things and others, are already changing the way we do basic research, products development, innovation, promote sales, perform medical diagnostics, advice treatments and purchase medicines. The world is changing faster day after day. The increase of life expectancy is creating a bigger mix of generations in the work force and consumer habits. Professionals of today, may drastically be reduced or even no longer exist in less than 20 years including scientists, medical doctors, sales personnel, lawyers, being substituted by new hardware and software technologies or new types of professionals. Pharmaceutical and other areas of biotechnology in all of its' production chains, from basic research to reaching their customers, will and is already being highly affected. On the way to reaching customers and making profits, is the challenge of managing teams from different generations, with a different way of doing things, and making them be challenged, interested, productive. The Industry 4.0 should not be seen only with on the technology point of view, but with the whole system involved that will be definitive to the survival of companies, no matter how big they are today. A start up may be able to knock down a super pharma becoming a big hit in just 10 years with innovative technologies and products. Being open and prepared in advance for these changes is key to survive the future not so yet to come. The use of the new technologies becoming more available daily, shall increase results for new products and treatments, as much as reduce general costs from research to production, distribution, marketing and sales. Management shall be the key. Manage the use and the application of technologies and they profile of personnel. Each generation has a different way of seeing things, learning, doing, purchasing and the companies must be prepared from now. Prepare for adaption from now, or perish.

Biography

Wilker Ribeiro Filho is a Biologist, PhD in Medical Science, specialist in pharmaceutical technology and MBA in Business Management. He has experience in public policies for industrial development of the biotech industry, project's management, businesses evaluation and management, innovation, building and managing triple helix teams with technical and C level participants. With the experience from lab tests to higher level management, he has interest in relearning things from bottom and up. Innovative, brings and forms new views and ideas when gathering old information with new ones, some yet to come, to improve competitiveness and results for partners, companies and other stake holders.

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Notes:

Rosy I M A Ribeiro, J Biotechnol Biomater 2017, 7:6 (Suppl)
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Anti-cancer drug discovery: Rational strategy to acquire anti-cancer candidate compounds

Rosy I M A Ribeiro
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Statement of the Problem: Cancer is a set of malignancies that has in common the exacerbated and uncontrolled cellular growth, as well as the capacity of cellular invasion to different organs of the primary site. Neoplastic transformation occurs through the acquisition of characteristics related to proliferation, invasion, metastasis, resistance to death, genomic instability, among others. Our research group has as main objective the search of new molecules that act inhibiting these pathways.

Methodology: Cell viability assay, combination assay, morphological analysis, proliferation assay, wound healing assay, cell cycle analysis, gelatin zymography, matrigel invasion assay, soft agar colony assay, acridine orange staining, detection of mitochondrial membrane potential, comet assay, western blot, *in vitro* retina model, *in vivo* chick chorioallantoic membrane (cam) assay and in vivo models for studying breast cancer development, and thin layer chromatography and spectrometry of masses.

Findings: We have been able to screen samples from the production of crude to fractionated extracts that are selectively cytotoxic to tumor cells. In addition, we determine the major pathways by which these cells die. We determined whether these treatments cause a change in the pattern of migration and cellular invasion and the involvement of the matrix metalloproteinases 2 and 9 in these processes. We selected several samples that will be submitted to *in vitro* cytotoxicity tests. Finally, with human cell lines, we determine the angiogenic capacity and tumor growth by CAM. If the cell line is murine, we carry out *in vivo* tests in mice. The better samples are directed to bioassay-guided purification that involves diverse chromatography methods. In addition, if the active substance is unpublished, it is directed to identification by appropriate chemical techniques.

Conclusion & Significance: By combining such approaches, we maximized the selection of molecules potentially relevant for the discovery of anticancer molecules.

Biography

Rosy I M A Ribeiro has obtained her postgraduate degree from the University of Minas Gerais (UFMG) in Pathology. She is an Associated Professor of Cell Biology at Medicine Department of Federal University of São João del Rei (UFSJ), Brazil. Currently, she is the Coordinator of the Biotechnology Graduate Program of UFSJ. Her research and publications are about the action of both synthetic and natural products on pathological processes such as wound healing and cancer.

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Paula Barjona do Nascimento Coutinho et al., J Biotechnol Biomater 2017, 7:6 (Suppl)
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Comparative analysis of two inducible promoters for controlled nuclear transgene expression in *Chlamydomonas reinhardtii*

Paula Barjona do Nascimento Coutinho, Christine Friedl Rainer Buchholz and **Stephanie Christine Stute**
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Genetically, well characterized microalgae like *Chlamydomonas reinhardtii* offer the potential to photosynthetically produce high value products such as recombinant proteins for the pharmaceutical and chemical industry. Several attempts have been made to enhance expression of foreign genes in this green alga and in principle, allow protein production at large scale. However, satisfying and economically attractive levels of recombinant gene products have not been achieved yet. Inducible promoters represent a useful alternative to optimize protein yield. By providing regulated gene expression, they allow the biosynthesis of gene products at most suitable moments of cultivation, guaranteeing higher space-time yields. In this study, two inducible promoters were compared. We demonstrate the kinetics of induction and deactivation of the iron-responsive *Fea1* promoter and the ammonium/nitrate-responsive *Nit1* promoter in the green alga *C. reinhardtii* via the fluorescent protein mCherry and detection of mRNA levels through qPCR. Our work lays the foundation for the establishment of a cyclic process in which promoter activity is activated and deactivated alternately by changes in the iron and ammonium concentrations in the culture media. Fluorescence microscopy picture of *C. reinhardtii* cells expressing mCherry under the control of the *FEA1* promoter

Biography

Paula Barjona do Nascimento Coutinho has her expertise in genetic transformation of the green alga *Chlamydomonas reinhardti* and the methods developed for the detection of the fluorescent reporter protein mCherry (flowcytometry, western blot and fluorescence microscopy).

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Young Research Forum

Day 2

Santos K M et al., J Biotechnol Biomater 2017, 7:6 (Suppl)
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Bauhinia stem extracts as a possible new treatment for breast cancer and metastasis: Inhibition of migration, invasion and of the activity of matrix metalloproteinases

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Metastasis is the main cause of cancer-related death and requires the development of effective treatments with reduced toxicity and effective activity. The breast cancer is the most common among women and the second most prevalent type in the entire population. Thus the search for new sources of antitumor and anti-metastatic therapies, such as plants, is very important. In this work, we showed the antitumor and antimetastatic activities of four fractions (ID7, IID10, IA19 and IIIA32) of the stems of *Bauhinia* species on the murine breast cancer line 4T1. These fractions were used because they completely inhibited the MMP-2 and MMP-9 activity. The viability assay (MTT, Trypan blue) showed that all fractions studied decreased the viability of 4T1 cells, being the ID7 fraction the most selective. The fluorescence microscopy assay with acridine orange and propidium iodide showed that fractions increased the apoptotic cells percent. The wound closure and trans well assays were used to evaluate the migration cell, and the trans well assay with Matrigel was used to evaluate the invasion cell, wherein all fractions inhibited the 4T1 wound closure, IID10, IA19 fractions inhibited trans well migration, and ID7, IID10, and IIIA32 decreased invasion cell. Furthermore, all fractions increased the 4T1 adhesion to basement membrane components and decreasing the MMP-2 activity in the 4T1cells supernatant. In the in vivo assay, this fraction decreased the volume and weight of the tumor extracted from mice induced with 4T1 and treated with ID7, in addition to decreasing the number of lung metastases. The ID7 ESI-MS(-) characterization suggesting the presence of fatty acids, phenolic acids, and diterpene. Thus, it was found that the *Bauhinia* fractions tested, exhibited selective antitumor and antimetastatic activity of breast cancer.

Biography

Santos K M is a Biomedical from José do Rosário Vellano University (2010). She has completed her Master's degree in Biotechnology from the Federal University of São João del Rei (2013). Currently, she is a PhD student in Biochemistry and Molecular Biology by Multicentral Program of the Brazilian Society of Biochemistry and Molecular Biology, working on the main themes: medicinal plants (Bauhinia) fractionation and identification of compounds, cancer and metastasis (metalloproteinases), Alzheimer (acetylcholinesterase inhibition), cryopreservation and culture of tumor cells and depression (behavioral assays). She is also Professor at the Biomedicine and Physiotherapy courses at the José do Rosário Vellano University and at the University Center of Formiga.

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Aline T M Coelho et al., J Biotechnol Biomater 2017, 7:6 (Suppl)
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Activity of derived extracts from *Annona coriacea Mart.* on head and neck tumor lines

Aline T M Coelho[1], Rodolfo E M Ribeiro[1], Ana G Silva[1], Gilvânia A R Cordeiro[1], João G M Junqueira[2], Vanessa G P Severino[2], Renato J S Oliveira[3], Rui M V Reis[3] and **Rosy I M A Ribeiro[1]**

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Head and neck squamous cell carcinoma (HNSCC) makes up about 90% of head and neck neoplasms. The treatment is aggressive, the 5-year survival rate is around 50-60% and the local recurrence is 20-30%. Studies report that the use of new antitumor drugs of natural origin, besides efficient, offers a wide field for new research. So the objective of this work is to identify the antineoplastic potential of seven extracts of the species *Annona coriacea Mart*. on head and neck tumor lines. In the cell viability assay, only the compound C4 did not reach representative IC50 values on the tested lines (HN13 and FaDu). Of the seven compounds, four (C1, C2, C3, and C5) exhibited better results and were selected to follow in further assays. In the cell migration assay, it was seen that the C2, C3, and C5 compounds inhibited the migration in HN13 and C3 and C5 in FaDu, above all in 48 hours after treatment. Changes in cell morphology were observed in the lines, which after treated with the compounds in the time of 48 hours showed cytoplasmic projections and vacuoles (HN13) and higher nuclear condensation (FaDu) compared to the control (Images 3 and 4). The results of this study contribute to the development of new antineoplastics that may help the treatment of HNSCC improving the prognosis and leading to cure.

Biography

Aline T M Coelho is a Biochemistry student at Federal University of São João del-Rei, Campus Centro-Oeste Dona Lindu (UFSJ-CCO), Technician in Pharmacy by the institution Conceição Ferreira Nunes, Divinópolis/Mg and student of scientific initiation in the Laboratory of Experimental Pathology (Lapatex), UFSJ-CCO.

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Lucas S Azevedo et al., J Biotechnol Biomater 2017, 7:6 (Suppl)
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Evaluation of activities of *Miconia cuspidata* extracts on gelatinases and HeLa cell lines

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Statement of the Problem: According to National Cancer Institute (INCA), in 2016, 12.7 million cases of neoplasms were diagnosed worldwide, of which 7.6 million died. In Brazil, 500 thousand new cases are estimated in 2017, which 61 thousand cases of prostate and 58 of breast cancer. The treatments available have many side effects and, depending on the region affected, provide a poor prognosis, mainly because of metastatic capacity that does not have viable treatments. Thus, it is extremely important to develop more effective and specific treatments of this disease.

Methodology & Theoretical Orientation: There were verified the presence of secondary compounds by phytochemical study analyses. In parallel, zymograms were made with gelatin as a substrate to evaluate the inhibitory capacity against Matrix Metalloproteinases (MMPs). Subsequently, the extract activity on HeLa (human cervical neoplasia) cell lines was evaluated by cell viability assay. Finally, inhibitory capacity was evaluated by migration assay.

Findings: Hexanic partition exhibited the presence of steroids/triterpenoids, flavonoids, saponins, alkaloids, tannins and coumarins. It also inhibited approximately 50 percent of MMP-9 activities. The IC_{50} was achieved with 7.38 μg/mL on HeLa. This extract decreased closure by 20 percent in compared to control in both 24 and 48 hours.

Conclusion & Significance: It is suggested that *Miconia cuspidata* hexanic partition has antitumor potential owing to its secondary compounds.

Biography

Lucas S Azevedo is a Biochemistry student at Federal University of São João del-Rei (UFSJ). He develops research in Experimental Pathology Laboratory (LAPATEX), which focuses on activities evaluation of Cerrado plants in neoplasic cells.

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Notes:

Lorena R Sousa et al., J Biotechnol Biomater 2017, 7:6 (Suppl)
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Evaluation of the antineoplastic potential of new natural compounds in glioblastoma lines

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Nowadays, cancer is one of the diseases with the highest number of deaths worldwide. Glioblastomas are one of the most aggressive tumors of the central nervous system in adults. The average survival rate of patients diagnosed with this disease is only 3% in five years. The available treatments are only palliative, justifying the need of studies aimed at screening new compounds more effective for clinical use. The present study aimed to evaluate the antitumor potential of plant extracts of *Annona coreacea* in two human glioma lines, GAMG and U251. Cell viability was quantified by the reduction of MTT ([3-(4,5-dimethylthiazol-2yl)-2,5-diphenyltetrazolium bromide) to formazan, its metabolization being proportional to the number of viable cells. The absorbance was measured by the spectrophotometer at wavelength 570 nm after 2 hours and 30 minutes incubation with MTT (2.5 mg/mL). The IC50 of all compounds was elucidated by a 24 hours dilution curve with concentrations (1 µg/mL, 7 µg/mL, 15 µg/mL and 25 µg/mL). AcL3 was the most promising partition for U251, with IC50 equal to 1.355µg/mL, and for GAMG AcL1 partition shown the best result, IC50 equal to 3.355 µg/mL. Migration assay was performed using the "wound-healing" methodology and aimed to evaluate the potential inhibition on cell migration of the partitions against U251 cell lines. Cells were treated with the IC50, pre-determined by MTT assay. Relative migration was estimated by the formula: % wound-healing percentage: (%) = 100 (AB)/A, where A is the width of the wounds before treatment, and B is the width of the wounds after treatment. The images were obtained at times 0, 12, 24 and 72 hours after treatment for measurements. AcL3 and AcL4 shown to be the best compounds when analyzed the inhibitory potential of the extracts on cell migration.

Biography

Lorena R Sousa has formed in Biology in 2015 at University Federal of Pampa located in SG, RS. Currently, she is pursuing her MS in Biochemistry and Molecular Biology at University Federal of São Joao Del Rey located in Divinopolis, MG. She works with glioblastomas cell lines, an aggressive tumor of the nervous central system of adults. In past, she worked with some other diseases such as Alzheimer's and Parkinson, using *Drosophila melanogaster* as an alternative model organism.

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Antitumor activity of Miconia chamissois Naudin fractions in human glioma lines: *In vitro and in vivo*

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Introduction: Gliomas represent nearly 70% of the central nervous system tumors. Despite the progress of chemotherapy and radiotherapy, the median survival is around 12-17 months. Studies have shown that the use of new natural antineoplastic agents has been highly effective and offers a wide field of research. The aim of this study is to investigate the antitumor potential of *M chamissois* Naudin chloroform partition and fractions on glioma cell lines.

Results & Discussion: The chloroform partition and fractions exhibited dose-dependent cytotoxic effects in the majority of the glioma cell lines. Amongst the fractions tested, McC1 and McC3 displayed the best activity, with an IC_{50} mean ranging from 0.25 to 30 μg/mL and index selectivity. These fractions also showed a significant reduction in cell migration (35% for McC1 and 24% for McC3), and invasion (24% for McC1 and 22% for McC3). Furthermore, the clonogenicity was reduced 40% for GAMG and 50% for U251MG with McC1. Both fractions had a synergistic effect when combined with the chemotherapeutic temozolomide. The fractions promoted a significant increase of pH2AX, cleaved PARP and cleaved caspases (3, 7 and 9) levels ($p<0.05$), suggesting DNA damage and cell death by apoptosis. *In vivo* chicken chorioallantoic membrane assay, the McC1 fraction inhibited angiogenesis and tumor perimeter. The two best fractions McC1 and McC3 were characterized by electrospray ionization mass spectrometry, both containing six molecules.

Conclusion: These findings contribute to new treatments for human glioblastoma, in addition to the combination with conventional therapy potentiate its therapeutic effect.

Biography

Ana G Silva is a PhD student in the Biotechnology program of the Federal University of São João del-Rei. She has completed her Master's degree in Biotechnology Applied to Health (2017) and Bachelor's degree in Nursing (2014) from the Federal University of São João del-Rei, Campus Centro Oeste Dona Lindu, Divinópolis/MG. She participates in the research group Biological Activity of natural products. It currently focuses on screening new compounds from natural products *in vitro* and *in vivo* in human glioblastoma tumor cell lines.

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Break of dormancy and evaluation of the germination rate of the cerrado medicinal species: *Eriosema pycnanthum*

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Eriosema (DC) Desv. is a genre present in Africa and America. 30 species in Brazil 19 of which are Cerrado species such as *E. pycnanthum.* This species is a subcultural leguminous found in soils of the Iron Quadrangle of Minas Gerais and in the region of Itapecerica, where it is as natural cicatrizant. Although it is used in traditional medicine, there are no studies aimed the germinative effectiveness *in vitro* of this species. The seeds obtained in the field were disinfested with hydroaalcoholic solution (70%-1') followed by hypochlorite (1%-15') and then treated in KNO^3 (2%). The variables of number of groups, time in KNO^3, time at storage were defined by analysis of variables by statistical software SISVAR (Ferreira, 2011). As seeds were inoculated with or without the integument in tubes with MS medium supplemented with 30 g/L of sucrose and solidified with 6 g/L of agar at pH 5.7±0.1. It was evaluated if light (40 µmol, 45 days I in a 16-hour photoperiod affect the germination. Tetrazolium Bromide (1%) was used as a marker of the electron transport chain. Seeds with tegument for 24 hours.

Biography

José A R Neto is a PhD candidate with Biotechnology in the area of isolation of molecules with application in human health. He has completed his Master in Biotechnology, UFSJ, in the area of Isolation of molecules and bioprocesses applied to the environment and Bachelor in Biological Sciences is a Specialist in Environmental Management and Management in Forest Systems-UFLA-MG and international specialization by the Brazil/Argentina Center for Biotechnology in Biotechnology tools for the conservation, management, and analysis of plant genetic resources-CABBIO-Brazil-Argentina. He is an illustrator of books in the areas of Public Health and Parasitology. He has trained in research centers such as Fiocruz and Embrapa. He has experience in laboratory work, bioprospecting, obtaining, fractionation and use of natural extracts to combat *Culicidae*, pest identification, public health, cicatrizant biocomposites production, *in vitro* propagation of plant species, plant acclimatization, maintenance and multiplication *in vitro* of human tumor cell lines, besides the large areas of Bioethics, Entomology, Biochemistry, Microbiology, Cellular and Molecular Biology.

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Screening of extracts of the Cerrado in human glioblastoma tumoral cell line

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Introduction: The Cerrado is the second biome among the five largest ones located in Brazil, with a vast variety of species that were still not studied regarding their biological properties. For that reason, the investigation of the potential cytotoxic activities in cancer of these species seems very promising. Glioblastoma, for instance, a central nervous system's tumor, is presented as an of the most aggressive types of cancer, with a poor prognostic and high mortality rate. Thus, this work had as objective the screening of six Cerrado's species in human glioblastoma tumoral cell line.

Results & Discussion: Among the six vegetal extracts evaluated, three species (EB01, EB02 and EB03) presented high cytotoxicity in U251 cell line, having IC50 value lowest that 40 μg/mL at 24 hours of treatment – 38.93 μg/mL, 12.08 μg/mL and 14.27 μg/mL, respectively. The current chemotherapeutic used to treat that type of tumor, Temozolomide, presents an IC50 value of 129.8 μg/mL at 72 hours of treatment. These findings are interesting because, when compared with the currently used chemotherapeutic, these extracts have a much lower cytotoxic concentration.

Conclusion: The early screening allowed to find three potential antitumoral extracts in glioblastoma cell line since they were cytotoxic at very lowest concentration than the currently used chemotherapeutic.

Biography

Patrik S Vital is a Biochemistry student by Federal University of São João del-Rei, Campus Centro-Oeste Dona Lindu (UFSJ-CCO); Industrial Automation Technician by Conceição Ferreira Nunes College (CECON), Divinópolis-MG, Technician Buildings by Serviço Nacional de Aprendizagem Industrial College (SENAI), Divinópolis-MG and Scientific Initiation Student in the Laboratory of Experimental Pathology (LAPATEX), UFSJ-CCO.

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Izabela N F Gomes et al., J Biotechnol Biomater 2017, 7:6 (Suppl)
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Xylopia aromatic hexane extract promotes antitumor effects in Ehrlich tumor carcinoma

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Introduction: The *Xylopia aromatica*, a typical Brazilian cerrado species, has been used in several studies due to the biological properties related to the presence of alkaloids, flavonoids and acetogenins presence in genus *Annonaceae*. In this study, we evaluated the antitumoral effect of extracts of *X. aromatica* and identify their secondary metabolites.

Methodology: The hexane and ethyl acetate extracts were obtained by liquid-liquid fractionation of hydroalcoholic extract (CE). A cell line of Ehrlich ascites carcinoma cells (EAC) was obtained from the peritoneal cavity. $2.5x10^5$ cells/well and it was distributed and treated with a serial dilution of 1000 $\mu g.mL^{-1}$ to 32.3 $\mu g.mL^{-1}$ of extracts. The cells were count at 6, 12, 18 and 24 hours after treatment. To assay in vivo, the animals were inoculated with $2x10^6$ cells/well in suspension (PBS, pH 7.2), in the right flank. The animals were treated intraperitoneally with 32.3 $mg.kg^{-1}$ of hexane partition and 32.3 mg.kg-1 of ethyl acetate partition. The tumor growth was accompanied for 20 days. Secondary metabolites were identified by HPLC-DAD.

Results: All partitions and CE were cytotoxic against EAC *in vitro*. The lowest concentrations of hexane and ethyl acetate partitions (62.5 $mg.mL^{-1}$ and 32.3 $mg.mL^{-1}$, respectively) were more cytotoxic than other treatments. For the *in vivo* assay, hexane partition induced a decrease of necrosis area, inflammatory infiltrate and MMP-2 expression. The extracts demonstrated a band characteristic for phenolic acid (263 nm), flavonoids (255 and 354 nm) and alkaloids (282 and 302 nm).

Conclusion: The study concludes that hexane extract of *X. aromatic* may be a promising natural source for active compounds against cancer.

Biography

Maria Juliana Ferreira Passos holds a degree in Biochemistry from the Federal University of São João Del-Rei (2013). She has concluded the scientific initiation with the development of the work entitled "Isolation and characterization of isolated peptides of venom of the snake *Crotalus oreganus abyssus* with pharmacological action on the control and release of insulin", in two consecutive years as CNPq fellow. She has completed her Master's degree at the Federal University of São João Del Rei by the Graduate Program in Pharmaceutical Sciences, finalizing the project that involves the research by targets, through the technique of Reverse Vaccinology, that allow the development of vaccines against *Schistosoma mansoni*. Currently, she is a PhD student in the multicenter program of postgraduate in Biochemistry and Molecular Biology, with emphasis on the discovery of natural extracts that have antitumor action on human glioma lines.

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Video Presentation

Peng-Sheng Wei, J Biotechnol Biomater 2017, 7:6 (Suppl)
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2nd World Biotechnology Congress

Pore shape affected by gravity

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The pore shape in solid as a result of entrapment of a bubble by a solidification front is predicted in this work. Pore formation in solid influence microstructure of materials, and contemporary issues of biotechnologies, etc. It has been known that scaffolds were engineered to be bioactive or bioresorbable to enhance tissue growth. Scaffolds are also designed to induce bone formation and vascularization. These scaffolds are often porous, biodegradable materials that harbor different growth factors, drugs, genes or stem cells. In this work, extending previous models by accounting for mass and momentum transport across a coupled shape of the cap, and focusing on case 1 which indicates that solute transport is from the pore into surrounding liquid in the early stage, it shows that controlling gravity is an interesting and important factor in manufacturing porous materials. An increase in gravity can increase bond number, hydrostatic head, and ambient pressure. In contrast to hydrostatic head and ambient pressure, an increase in bond number decrease pore size and time for bubble entrapment. The predicted pore shape agrees with experimental data.

Biography

Peng-Sheng Wei has received his PhD in Mechanical Engineering Department at University of California, Davis, in 1984. He has been a Professor in the Department of Mechanical and Electro-Mechanical Engineering of National Sun Yat-Sen University, Kaohsiung, Taiwan, since 1989. He has contributed to advancing the understanding of and to the applications of electron and laser beam, plasma, and resistance welding through theoretical analyses coupled with verification experiments. Investigations also include studies of their thermal and fluid flow processes, and formations of the defects such as humping, rippling, spiking and porosity. He has published more than 80 journal papers, given keynote or invited speeches in international conferences more than 90 times. He is a Fellow of AWS (2007), and a Fellow of ASME (2000). He also received the Outstanding Research Achievement Awards from both the National Science Council (2004), and NSYSU (1991, 2001, 2004), the outstanding Scholar Research Project Winner Award from National Science Council (2008), the Adams Memorial Membership Award from AWS (2008), the Warren F Savage Memorial Award from AWS (2012), and the William Irrgang Memorial Award from AWS (2014). He has been the Xi-Wan Chair Professor of NSYSU since 2009, and Invited Distinguished Professor in the Beijing University of Technology, China, during 2015-2017.

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Evaluation of flavonoid catechin from an endophytic fungus Curvularia australiensis FC2AP for treating cervical cancer in female Sprague Dawley rats

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Introduction: There is an increasing emergence of bio products from microbes such as metabolites in the fields of medical and pharmaceuticals. Most of the people in the current world are affected with cancer; especially, women are in major risk of cervical cancer. In this due, this research has been focused to obtain antioxidants or potential metabolites to treat against the cervical cancer. Majorly among the microbes, endophytic fungi have been considered as prospective one which produces novel metabolites substantially. With this in view, the current investigation has been designed for the activity of anti-cancer drug flavonoid catechin in Sprague Dawley rats.

Materials & Methods: The secondary metabolites have been explored from *Curvularia australiensis* FC2AP (KR363626) isolated from *Aegle marmelos* by statistically optimized fermentation conditions, purified (chromatographic techniques) and characterized (HRLC- MS/MS, FT-IR and NMR: ^{1}C & ^{13}C) as a potential secondary metabolite as flavonoid catechin (MM4). The potential product was taken to assess the acute toxicity in albino mice, anti- inflammatory property in Wistar rats and anti-cancer evaluation in Sprague Dawley rats by following the CPCSEA standards. All animal procedures were performed in accordance with Institutional Animal Ethic Committee (IAEC) guidelines, after getting the approval from the Committee for Control and Supervision of Experiment on Animals (CPCSEA) at KMCH college of Pharmacy, Coimbatore, Tamil Nadu, India.

Results: Through this study, we found that the effective dosage for the survival is 1.25 g/kg (Gp V) and the lethal dosage as 1.5 g/Kg (Gp IV) in acute toxicity assessment. Above 1.5 g/Kg of the purified compound MM4 produced hyper sensitivity, righting reflex, tremors and convulsions leading to the death of the animal. The anti-inflammatory analysis resulted with the percentage of inhibition was found to be 41.09% (300 mg/kg) which was found to be twice than the standard drug indomethacin (20.17%) used whereas, the Group IV showed only 12.9% inhibition. This proved that the compound flavonoid catechin was efficient against inflammatory responses. The cervical cancer was induced in female rats using DEN (N-Nitrosodiethylamine) and the treatment was continued with flavonoid catechin for 180 days. After the stipulated days the rats were taken for hematological, biochemical and histopathological studies and the results indicated that the compound MM4 has the ability to reduce the tumor by not affecting the nearby non- tumor cells. Further, the investigation will be carried in higher animals.

Conclusion: This study explores the biomolecule flavonoid catechin from an endophytic fungus to explore the anticancer potentiality through animal models. This is the first report of flavonoid catechin production from an endophytic fungus *C. australiensis* has the anticancer potentiality. This metabolite can be stated as anticancer drug.

Biography

Vellingiri Manon Mani has started up her research on anti-cancer with bioactive microbial metabolites in a passionate aim to achieve the grail for human wellbeing. Her experience gained on research and teaching has been explored to make the students to get higher knowledge on biotechnological fields. The research gained by her had a great impact on treating the cervical cancer and moreover the drugs obtained by her research have been implied on the medicinal fields. She has developed a new technique on the extraction of microbial metabolites and its application as a drug in medicinal fields which is under filed in IPR. The technical approach developed by her will have highest reach on the research field in future biotechnological field.

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Chemical characterization and optimization of 4MHA pentapetide lactone from Streptomyces parvulus C5-5Y

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Introduction: The needs for increase in novel drugs urged to discover and develop new antibiotics with biopotentiality. The natural products have been developed from medicinal plants and the recent research has mainly focused on the microbial sources for novel antibiotics with bioactivities and this is economical in state. In this investigation we have developed a new bioactive compound with maximum antioxidant and antimicrobial activities.

Methodology: To increase the metabolite production as well as organism's growth, we aimed to optimize the medium with economical parameters and sources rapidly. This bioactive compound was elucidated from *Streptomyces parvulus*.

Results: The maximum growth and pigment production was evaluated with the standard formula, and the production was higher in optimal pH, temperature, carbon and nitrogen sources. The carbon sources are found to increase the growth of the organism especially in starch. The mass production was obtained in the optimized medium and the extracted pigments were subjected to HPLC analysis where the peak 4 was eluted and found to contain bioactivity through antimicrobial assessment. The compound AP4 was structurally elucidated with raw data, finally the AP4 was 4MHA (4-Methyl 3-Hydroxy anthranilic acid) pentapeptide lactone and it represents the half actinomycin structure with antioxidant properties.

Conclusion: Further studies will be focused on two-dimensional NMR spectroscopy to confirm the structure and application of pigment as pharma product in *in vivo* studies.

Biography

Arockiam Jeyasundar Parimala Gnana Soundari has explored her research in Microbial Biotechnology especially in microbial metabolites for human welfare and disease prevention. Her experience has built many years in research and teaching which emphasizes student's development in research areas. Her research is mainly focused to create an economical antibiotics and pharmaceutical products from microbial origin and use it against dreadful diseases. Her foundation implies on separating a purified bioactive metabolite and applies for various medicinal fields. This makes the society to get the antibiotics in low cost. This research is a promising strategy and successful one which could be taking to higher degree levels for prevention of many diseases by microbial metabolites.

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Un-regulatory actions of ecdB transcription factor present in echinocandin B biosynthetic gene cluster

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Statement of the Problem: Candida infection is a major threat for, immunocompromised patients, in transplantation, AIDS and malignancy patients undergone in ICU which accounts ~40% ICU mortality. Echinocandin B (ECB), a cyclic hexa-peptide antifungal is mainly used for the treatment of such *Candida* and *Aspergillus* infectious pathogens that refractory to Azoles and Polyenes. It inhibits 1,3-β- glucan synthase by blocking the cell wall synthesis. The biosynthetic gene cluster of Echinocandin B of *Aspergillus nidulans* NRRL 11440 was identified, it contains various structural genes such as NRPS, transporters, acyl-AMP ligase, various oxygenases adjacent to a transcription factor *ecdB*. The regulatory mechanism and function of this *ecdB* transcription factor was not so far known which has been targeted to be explored in present study.

Methodology & Theoretical Orientation: The functional analysis of *ecdB* transcription factor was investigated by gene knockout strategy. The ECB production and transcriptional analysis was observed by HPLC and semi-quantitative PCR respectively.

Findings: The Echinocandin B production in *ecdB* knockout strain (Δ*ecdB*) and WT and no significant difference was found both at production and expression level as compared to WT, while expression of *ecdB* gene is completely lost in Δ*ecdB* strain. Moreover, growth, sporulation, spore germination rates and morphology were also found same with no difference as compared to WT.

Conclusion & Significance: Taken together, *ecdB* present with in the gene cluster has no direct role in regulation the ECB biosynthesis, in addition to that it also not involved in developmental and morphological process of the cell. We suggest that other regulatory network present outside the cluster may have role in ECB biosynthesis.

Biography

Arvind Kumar has completed his MTech in Biotechnology and recently engaged in the research as PhD Fellow in Central University of South Bihar, Patna, (India). He has expertise in elucidation of regulatory network involved in fungal secondary metabolite biosynthetic gene clusters. He also has expertise in the screening, isolation and characterization of bioactive secondary metabolites from fungi as well as plants. Recently, he has started working in the field of molecular characterization and elucidation of regulatory network involved in echinocandin B production. Previously, he has identified a new plant derived insecticide for mosquito control and patented for its commercial use.

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