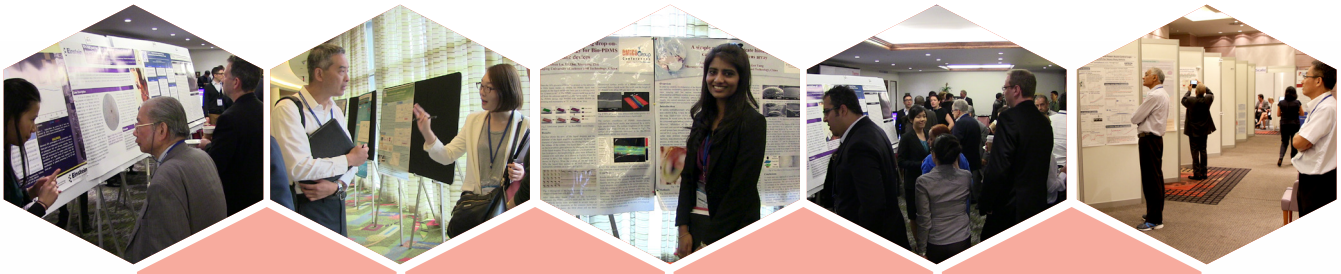
12th Euro Biotechnology Congress

November 07-09, 2016 Alicante, Spain

Posters



Woo-Young Jeon et al., J Biotechnol Biomater 2016, 6:7(Suppl)
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Samsoeum water extract attenuates allergic airway inflammation via modulation of Th1/Th2 cytokines and decrease of iNOS expression in asthmatic mice

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Background & Aim: Samsoeum has long been used in Korea and other Asian countries as a traditional medicine to treat various diseases. In this study, we investigated the antiasthma effect of the herbal medicine Samsoeum water extract (SSEW) using an ovalbumin (OVA)-induced asthma mouse model.

Methods: BALB/c mice were sensitized by an intraperitoneal injection of OVA and subsequently challenged with nebulized OVA. We investigated the number of inflammatory cells, the production of Th1/Th2 cytokines and chemokine in bronchoalveolar lavage fluid (BALF), histological changes in lung tissue, the infiltration of inflammatory cells and hyperplasia of goblet cells in lung tissue, the levels of immunoglobulinE (IgE) in BALF and plasma and the expression of inducible nitric oxide synthase (iNOS) in lung tissue.

Results: Our results indicated that SSEW decreased the accumulation of inflammatory cells (particularly, eosinophil and neutrophil) and regulated the balance in the production of Th1/Th2 cytokines and chemokine in BALF. Moreover, SSEW suppressed the level of IgE in BALF and plasma and inhibited the infiltration of inflammatory cells, hyperplasia of goblet cells and the expression of iNOS in lung tissue.

Conclusions: These findings suggest that, because of its anti-inflammatory and antiasthma properties, SSEW may be useful in reducing airway inflammation in the treatment of asthma.

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Investigation of potato viral diseases in Georgian region Akhalkalaki

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To avoid virus infection of seed potatoes apical meristem method is used all over the world which allows receiving virus free plants. The main problem in seed potato industry is viral contamination. Potato virus symptoms are not always revealed immediately, it depends on such factors as growth conditions, season, time of plant infection, existence of virus vectors, etc. There are number of viruses which affect the plant productivity, they can cause significant decrease in yield. In spite of diverse climatic conditions, potato is high spreading culture in mountain regions of Georgia. The main goal of the research was to study the potato viral diseases distribution in Georgia. Survey for the detection of viral agents was conducted from potato varieties; Agria, Impla, Nevsky, Marfona located in Alkalaki region. Potato cultivars were tested for 6 types of viruses: PVA, PVS, PLRV, PVY, PVM, PVX by means of Double Antibody Sandwich-Enzyme Linked Immunosorbent Assay (DAS-ELISA) using monoclonal and polyclonal antibody. The result showed that PVY and PLRV virus presence respectively: 27.8% and 18.6% in collected samples was relatively high comparing to others. PVM virus distribution was minority (2.45%) and existence of PVX, PVA and PVS was not revealed. In the same samples were found double infection particularly 8.3% of patterns were containing PVY/PLRV combination. Therefore, based on the result of our study it can be concluded that the only way to avoid reduced harvest yields is regular potato seed production sampling and testing of all stage (lab, greenhouse & open field).

Biography

Iveta Megrelishvili has completed his PhD from Ivane Javakhishvili Tbilisi State University, Georgia. She is the main research scientist of Georgian Technical University, Biotechnology Center and Head of Virology Lab, Scientific-Research Center of Agriculture. He has published more than 12 papers in reputed journals and has great experiences in plant biotechnology sphere.

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Jerzy Henryk Czembor et al., J Biotechnol Biomater 2016, 6:7(Suppl)
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Identifying new molecular markers for resistance to barley powdery mildew

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Powdery mildew, caused by *Blumeria graminis* f. sp. *hordei* the windborne fungal pathogen, is one of the most economical important barley foliar diseases in harvest. Breeding for resistance is the important direction for breeders. Introducing and pyramiding new resistance genes to cultivars leads to reducing the impact disease to yield. Barley landraces are rich sources of genetic diversity, but still low operated. Disclosure this materials open new dimension for breeders. Barley landrace Bgh255-3-3, resistant to broad spectrum to B. graminis isolates was crossed with susceptible cultivar Manchurian. The main aim was to define new resistance locus. To achieve this goal; 100 molecular SSR markers was tested in bulk segregants analysis (BSA) method and high throughput diversity array technology (DArT) was applied to F2 population. Identifying new sources of resistance and new molecular markers associated to resistance genes provide possibility to use marker-assisted selection (MAS). This work has practical importance by broadening barley gene pool available to breeders.

Biography

Jerzy Henryk Czembor has completed his PhD in 1995 from Montana State University, Bozeman, USA. He has worked as a Professor of Agriculture (2012), Head of Laboratory of Applied Genetics (2008-2016) and Head of Department of Plant Breeding and Genetics (2011-2016). He is currently the Head of National Centre of Plant Genetic Resource (Polish GeneBank). He is the author of more than 200 scientific papers and communications.

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Maia Kukhaleishvili et al., J Biotechnol Biomater 2016, 6:7(Suppl)
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Hormonal treatment effect in combination with sucrose on *in vitro* potato varieties

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In vitro plant reproduction widely used in agriculture and biotechnology and has a great advantage compared to traditional breeding methods allows to obtain get planting material in a short-term and plant reproduction can be conducted throughout the year. The present investigation was carried out to select best MS medium protocol and identify perfect hormonal/sucrose combination for three varieties of potato (*Solanum tuberosum* L): "Nevski", "Riviera" and "Zefira" for their *in vitro* cultivation. Potato varieties were studied on three types of MS medium: MS+30 g/l sucrose (6% MS medium), 6% MS medium +1 mg/l BAP+0.05 mg/l IBA and 6% MS medium+1 mg/l BAP+0.1 mg/l IBA. It was revealed that high concentration of IBA has negative effect on plants development, respectively 6% MS medium+1 mg/l BA+0.1 mg/l IBA was not optimal neither cultivars of potato. According to the results cultivars Zefira and Riviera had maximum potential for *in vitro* rooting (correspondingly: 82.97% and 100%) and shoots (100% and 87.34%) formation on 6% MS medium+1 mg/l BA+0.05 mg/l IBA but Nevsky gave maximum development (rooting 82% and shoot formation 87%) on 6% MS medium. In conclusion, both hormones combination presented in experiment with 30 g/l sucrose showed optimal result on *in vitro* growing potato cultivars Zefira and Riviera but best *in vitro* cultivation of Nevsky was revealed MS medium supplemented only 30 g/l sucrose without growth hormones, probably Nevsky has ability to produce itself the amount of hormones which is necessary for its normal growing.

Biography

Maia Kukhaleishvili has completed his PhD from St. Andrew the First Called Georgian University of the Patriarchate of Georgia. She is the Director of Georgian Technical University, Biotechnology Center, Scientific-Research Center. She has published more than 15 papers in reputed journals and has great experiences in agriculture and biotechnology sphere.

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Inhibitory binders derived from ABD-domain scaffold targeting human IL-17RA receptor as a non-immunoglobulin alternative for modulation of Th17-mediated pro-inflammatory axis

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Interleukin 17 (IL-17) and its cognate receptor (IL-17RA) play a crucial role in Th17 cells-mediated pro-inflammatory pathway and pathogenesis of several autoimmune disorders including psoriasis. Psoriasis is a chronic inflammatory skin disease with prevalence up to 3% worldwide, it is characterized by hyperplasia of the epidermis, infiltration of leukocytes into both dermis and epidermis and dilation and growth of blood vessels. IL-17 is mainly produced by Th-17 helper cells and via binding to its receptor, mediates IL-17-driven cell signaling in keratinocytes. This work was aimed to generate novel protein binders of IL-17RA that will prevent from binding of IL-17A cytokine to this receptor expressed on the surface of keratinocytes. To this goal, we used a high-complex combinatorial library derived from scaffold of albumin-binding domain (ABD) of streptococcal protein G and ribosome display selection, to yield a collection of ABD-derived high-affinity ligands of human IL-17RA called ARS binders. From 67 analysed ABD variants, 7 different sequence families were identified. Representatives of these groups competed with human IL-17A for binding to recombinant IL-17RA receptor as well as with IL-17RA-IgG chimera as tested in ELISA. Five ARS variants bind to IL-17RA-expressing THP-1 and Raji cells, as tested by flow cytometry. The four variants exhibited high-affinity binding in nanomolar range to human keratinocyte HaCAT cells, as measured using Ligand Tracer Green Line system. Thus, we identified several ARS inhibitory variants with a blocking potential that will be further tested for their immunomodulatory function.

Biography

Marie Hlavnickova is a PhD candidate at the 1st Faculty of Medicine, Charles University in Prague, Czech Republic. She is a Member of the Laboratory of Ligand Engineering at the Institute of Biotechnology CAS, v.v.i., Czech Republic. Her research topic is focused on the development of inhibitory protein binders derived from scaffold of albumin-binding domain and suppressing function of cytokine receptors modulating IL-23/Th17 pro-inflammatory axis.

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Stable cellulose degrading enzymes from thermotolerant fungi strains

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Search for energy from renewable resources is more urgent now than ever. In natural environments, fungi are the primary degraders of lignocellulosic biomass, excreting both hydrolytic and oxidative enzymes. The majority of cellulases used in biotechnology are still derived from well-characterized non-extremophilic microorganisms and there is a very little information regarding cellulases from extremophiles. An important drawback of these commonly used industrial enzymes is the lack of activity at even slightly elevated temperature and the tendency of these enzymes to denature at elevated temperatures or other critical conditions. Project is focused on obtaining stable enzymes from Durmishidze Institute of Biochemistry and Biotechnology, AUG unique extremophilic mycelial fungi collection for the creation of biotechnology of production of fuel-bioethanol from agricultural and industrial lignocellulosic wastes. Cellulase/xylanase producers, mesophil *Penicillium canescence* D 85 and thermophil *Sporotrichum pulverulentum* T 5-0 synthesizing extracellular enzymes with activities 185 U/g/1600 U/g and 110 U/g/840 U/g, correspondingly, have been selected. Optimum pH of action of the studied cellulase/xylanases was similar and equaled to 4.5-5.0. Simultaneously 21 basidial fungi strains have been selected as laccase producers. Using these enzymes allowed creation of the technology of glucose production from agricultural wastes by hydrolyzing of cellulose up to 80% or higher.

Biography

Giorgi Kvesitadze has completed his PhD from Bach Institute of Biochemistry, Moscow and Postdoctoral research at University of Pennsylvania, Philadelphia and Lehigh University, Bethlehem, USA. He is the Director of the Durmishidze Institute of Biochemistry and Biotechnology and Professor at AUG. He has been elected as a Member of GNAS in 1988. He is the author of more than 110 papers in reputed journals and has been serving as an Editorial Board Member of International journals: *Ecotoxicology and Environmental Safety, Fresenius Environmental Bulletin, EuroBiotech Journal, Journal of Biological Physics and Chemistry, Annals of Agrarian Sciences* and of national journal: *Bulletin of the Georgian NAS*.

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Isolation of *Cms* specific bacteriophages

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Bacterial ring rot is a highly infectious disease of potato caused by *Clavibacter michiganensis* subsp. *sepedonicus* (*Cms*). Crop losses caused with ring rot range from 11 to 44% in different countries and significantly increases during potato storage. In EU member states *Cms* is under strict statutory control. Management of ring rot of potato is especially difficult in storage places, where the pathogen, being in a latent form, may infect almost all tubers. Some disinfectants or fumigants are recommended on seed potatoes and during storage. Achieving sustainable agriculture necessitate the search for safer, more specific and environment-friendly control methods. The aim of the project is to identify the spread of potato ring rot in Georgia, isolate the pathogen and its specific bacteriophages for their biological control. Field studies in 5 potato production regions did not reveal ring rot disease; though there were some tubers in potato storage houses carrying *Cms*, which was confirmed by molecular detection method. Several pure *Cms* isolates were recovered from these samples and confirmed by specific PCR they are *Cms*; their cells shapes, colony morphology and biochemical tests have been studied. Collected soil and diseased potato samples were checked on *Cms* Georgian and Polish isolates on phage content. Four bacteriophages were obtained. Phagosensitivity of the isolates to phages have been studied. Phages #8 and 13 lyse almost all Georgian and Polish *Cms* isolates.

Biography

Tinatin Sadunishvili has completed her PhD from Durmishidze Institute of Biochemistry and Biotechnology, Agricultural University of Georgia (AUG) and Postdoctoral research at Institute of Enzymology and Etvos Lorand University, Budapest. She is the Professor and Head of Laboratory of Plant Biochemistry and Biotechnology at Durmishidze Institute of Biochemistry and Biotechnology, AUG. She has been elected as a Member of GNAS in 2015. She has published more than 60 papers in reputed journals and has been serving as an Editorial Board Member of journals: *Bulletin of the Georgian NAS, Annals of Agrarian Sciences* and *Microbiology and Biotechnology* (Tbilisi).

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Atomic force microscopy: A tool to measure mechanical properties of living cells

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Atomic force microscopy is a very useful tool used to characterize various properties of samples that can be placed in distinct environment. Its main advantage is to probe elastic properties of living cells in a quantitative manner through the Young's (elastic) modulus. Mechanical properties of single cells should play a critical role in the development and progression of various diseases. In particular, the increased/decreased deformability is manifested in various cancers giving possibility to use it as a non-labeled biomarker of cancer progression. The main objective of the presented studies is to show neighboring cells of the same or distinct type influences the mechanical properties of single cells. Thus, as the investigated system, skin cells have been chosen, namely, fibroblasts (CCL-110), keratinocytes (HaCaT) and melanoma cells from radial growth phase (WM35). The first step was to measure the elastic properties of both fibroblasts and keratinocytes cultured separately (as a mono-culture) and together (as a co-culture). Then, the elasticity of keratinocytes and melanoma cells has been probed. All measurements were carried out at two time points after 24 hours and 48 hours of culture on living cells grown in culture medium of distinct composition. The obtained results have demonstrated that single cell elasticity, viability and shape are dependent on both the presence of neighboring cells and medium composition. These findings open further possibility to study the mechanics of single cancerous cells, embedded within a normal matrix containing normal cells imitating the environmental conditions of cancer invasion.

Biography

Barbara Orzechowska has completed her Master's degree at the Jagiellonian University in 2012. She is currently a PhD student at the Institute of Nuclear Physics Polish Academy of Sciences in Cracow, Poland.

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Elena Dmitriyevna Danilenko et al., J Biotechnol Biomater 2016, 6:7(Suppl)
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The development of a novel drug on the basis of conjugates of cytokines with bisphosphonates for the treatment of bone metastases

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The interest to tumor necrosis factor alpha (TNFα) and interferon gamma (IFNγ) as drug agents for the treatment of bone metastases is explained by antitumor properties of these proteins as well as by their ability to regulate the remodeling processes in bone tissue. Bisphosphonates characterized by the ability to accumulate in bone tissue and to regulate the activity of osteoclasts/osteoblasts can be used as vector molecules for the targeted delivery of cytokines into the bone. The purpose of this study was to develop the method for synthesizing the conjugates of TNFα and IFNγ with bisphosphonate alendronic acid (ALN) and to explore their antitumor activity. The conjugates of TNFα or IFNγ with ALN were obtained by the synthesis on a solid media using 1-ethyl-3-[3-dimethylaminopropyl] carbodiimide hydrochloride. The method involving the fixation of active components on a solid phase yielded conjugates of high degree homogeneity (up to 95.7%) and a stoichiometry close to 1:1. The output of conjugates in the synthesis reaction was 90±3%. In an experimental model of bone metastases of melanoma B16-F10, induced in C57Bl/6 mice by intracardiac administration was showed that the conjugates of TNFα-ALN and IFNγ-ALN had the ability to trigger necrotic changes in the tumor tissue, covering 40-90% and 30-100% of the metastasis area, respectively. The administration of TNFα-ALN conjugates reduced melanoma lesions of epiphyseal and diaphyseal bone tissue of the femur. These findings confirm the prospects of further development of a novel drug based on the conjugates of cytokines for the treatment of bone metastases.

Biography

Elena Dmitriyevna Danilenko was graduated from Novosibirsk State University and defended her dissertation for PhD in 2006. She is currently the Director of the Institute of Medical Biotechnology, the branch of the State Research Center of Virology and Biotechnology "Vector". She is the author of more than 50 articles in refereed journals and 4 patents.

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Meeyoung Lee, J Biotechnol Biomater 2016, 6:7(Suppl)
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Safety assessment of Guibi-tang: Subchronic toxicity study in Crl:CD SD rats

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Guibi-tang (Kihi-To in Japanese and Qui-Pi-Tang in Chinese) is a multiherbal traditional Korean medicinal formula used for treatment of amnesia, fatigue, poor memory or forgetfulness, anemia, insomnia and necrosis. The aim of the present study was to investigate potential safety, if any, of subchronic administration of Guibi-tang aqueous extract (GBT) in laboratory animals. For this study, 0, 1000, 2000 and 5000 mg/kg/day of GBT was administered to Crl:CD Sprague Dawley rats (10/sex/group) for 13 weeks via oral gavage. Administration of the GBT did not result in any mortality, body weight, food consumption, hematology, serum biochemistry, clinical or ophthalmological signs or changes in urinalysis, gross findings or organ weight. However, histopathology revealed forestomach hyperplasia and duodenum mucosal hyperplasia in rats of both sexes at the highest dose of GBT, 5000 mg/kg/day. Therefore, the no-observed-adverse-effect level in rats was established for GBT at 2000 mg/kg/day under the conditions of this study.

Biography

Meeyoung Lee has completed his Master's and Doctor's degree from the College of Veterinary Medicine, Chungnam National University. He is the Researcher working in K-herb Research Center of Korea Institute of Oriental Medicine. She has published more than 10 papers in reputed journals.

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Use of defense mechanisms to quantify resistance of wheat genotypes to drought

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Survival and productivity of crop plants exposed to environmental stresses are dependent on their ability to develop adaptive mechanisms to avoid tolerate stress. This study was following to find characters of resistant under drought stress, it was carried out to study the influence of water deficit in the leaves and roots of durum wheat plants were grown in hydroponic medium and were subjected to different water treatment. At the third leaf emergence stage two genotypes are compared with each other for their tolerance and their biochemical and physiological responses to water deficit. The following parameters are measured superoxide dismutase SOD: Activity, malondialdehyde MDA content, hydrogen peroxide H2O2 level, the content of anthocyanins and chlorophyll. These parameters made difference between genotypes. Thus, this attributes can be used as screening tool for drought tolerance in wheat. They lend full support to results presented by researchers showing that wheat lines can differ consistently for their defensive mechanism. These results also emphasize the important role of secondary metabolites that are anthocyanin in the defense against oxidative stress caused by abiotic stress in the detoxification of reactive oxygen species (ROS) under stress conditions.

Biography

Bousba Ratiba has received her degree in 2012 in plant physiology and biochemistry from Constantine University. She is life member of network durum wheat research and her current research interests include: abiotic stress, molecular marker, plant physiology and plant biotechnology. Presently she is assistant professor at Constantine University and published six papers. She is reviewer in many journals of plant crop research, genetics and physiology. She has done many handouts on mycorhyses, symbiosis and QTL cartography and genetic association phenotype genotype in durum wheat.

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Khaled M Al-Qaoud, J Biotechnol Biomater 2016, 6:7(Suppl)
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Electrochemical impedance spectroscopy (EIS) biosensor for detection of Chinese hamster ovary-host cell protein (CHO-HCP) residues in bio-therapeutics

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Production of recombinant therapeutic proteins using cell-based host expression system is regarded as the corner stone in the treatment of various life-threatening diseases including cancer and autoimmune diseases. About 70% of the recently approved therapeutic proteins are produced in Chinese hamster ovary (CHO) cell lines. However, the presence of host cell proteins (HCPs) as low as (1 to 100 ppm) will adversely affect the quality, safety and immunogenicity thus affecting the acceptance of the produced bio-therapeutic proteins. Searching for reliable, detectable and generic method for HCP detection is mandatory. In this regard, we assume that Electrochemical Impedance Spectroscopy (EIS) is the method of choice. Polyclonal rabbit antibody raised against CHO cell proteins extract were immobilized to a gold electrode that has been treated with 8-mercaptooctanoic acid and then activating the layer with EDC/NHS. Following the addition of CHO proteins and its further interaction with the rabbit antibodies, the charge transfer resistance is monitored. Notably the addition of successive concentrations of CHO protein extracts increased the charge transfer resistance of the electrochemical system. Results comparison with a commercial ELISA quantification system revealed consistent results with higher sensitivity using the electrochemical system. System validation using real and CHO-HCP-spiked therapeutics is in progress.

Biography

Khaled M Al-Qaoud was graduated in 1999 from the Bernhard Nocht Institute for Tropical Medicine in Hamburg and is working as a full Professor in the Department of Biological Sciences at Yarmouk University. He has published about 35 international publications and 3 patents in the field of camel antibody discovery and pharmaceutical usage. He succeeded in gaining good experience in linking the scientist in the academia with the industrial sector in the field of biotechnology, ended by the establishment of a biotech cluster of scientists from different disciplines.

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Rosario R Martinez Garcia et al., J Biotechnol Biomater 2016, 6:7(Suppl)
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Performance of the AbSolute® High Cap resin in the Nimotuzumab capture step

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Protein A is the affinity chromatography ligand of choice for first-step capture in the purification of mAbs as its high selectivity gives excellent purity plus high yields and also functions as the key volume reduction step in the process since Protein A concentrates the product stream. The relatively high cost of these resins leads to consider different operational strategy as evaluate protein A matrixes with better performance in dynamic binding capacity at high flow rates. Recently a new Protein A ligand, AbSolute® High Cap (AbSolute HC), was introduced by Novasep Company that is modified with respect to high binding capacity at higher velocities. This study investigated the performance of AbSolute HC resin during Nimotuzumab capture by measuring its DBC at different flow rates and feed concentrations at lab scale. AbSolute HC data were also compared with Mab Select SuRe, current affinity gel used in the purification process. The process conditions were adjusted including the maximum speed for all steps with an assessment of impact on Nimotuzumab purity using AbSolute HC. In addition the impact of loading amount on aggregates formation with this media and the resin lifetime were evaluated. The results showed better DBC at 10% on AbSolute HC than Mab Select Sure, with a higher DBC at 10% on Absolute HC with IgG concentration at 2 g/L than 0.13 g/L. No significant loss of purity or yield for speeds until 1000 cm/h for all steps was obtained using AbSolute HC resin. The lifetime of the media was tested up to 200 cycles with suitably results using NaOH and PAB solution.

Biography

Rosario R Martinez Garcia is a Chemical Engineer graduated in 1993 at High Polytechnic Institute Jose A. Echeverría (ISPJAE). Cuba. He has obtained his Master of Science degree in Biotechnology Process (1999). Since 1993, he has been working in the Biotechnology field from 1997 at Center of Molecular Immunology (CIM). He has participated in many postgraduate courses and training related with different themes of biotechnology and its application for the industry. Presently, he is the Chief of Department of Plant Vaccines at CIM.

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Ileana Vera Reyes et al., J Biotechnol Biomater 2016, 6:7(Suppl)
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Utilization of zinc oxide nanoparticles doped with silver against phytopathogenic fungi

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Modern agriculture requires low impact products; metallic nanoparticles (NPs) with antimicrobial effects could serve for this purpose. For that reason the aim of this work was to analyze the effect of pure zinc oxide nanoparticles (ZnO NPs) and zinc oxide NPs doped with silver (1.25 and 2.5 % w/w), against two very damaging plant pathogenic fungi: *Fusarium oxysporum* and *Alternaria solani*, which are the main pathogens responsible for severe diseases of a large number of agricultural crops. We synthesized nanometric ZnO particles at very low-temperature by using a mechanically assisted metathesis reaction, that permitted the formation of spherical nanoparticles with mean sizes of around 20 nm. NPs characterization was accomplished by X-ray diffraction; the size and shape of the particles were studied by transmission electron microscopy (TEM). The effect of ZnO NPs and Ag-doped ZnO NPs against the fungi was done using NPs incorporated to PDA growth medium at different doses (0, 250, 500 and 1000 mg L^{-1}). ANOVA and Tukey multiple range tests were used to analyze data. The application of 1000 mg L^{-1} concentration of ZnO NPs produced maximum growth inhibition of fungal hyphae. We also assessed the effectiveness of combining the ZnO and silver nanoparticles, however they did not exhibit a greater antimicrobial activity than pure ZnO NPs. Based on this results; it is viable that tested ZnO NPs could be used in programs of sustainable agriculture, since they are required in minute quantities by comparison to conventional pesticides.

Biography

Ileana Vera Reyes has completed her PhD from Centro de Investigacion en Estudios Avanzados del Instituto Politecnico Nacional, Mexico. She is a recipient of a CONACYT Research Fellow.

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Notes:

Lucie Mareckova et al., J Biotechnol Biomater 2016, 6:7(Suppl)
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Development of high-affinity protein binders for selective detection and separation of circulating tumor cells (CTCs) by microfluidic chip technology

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Most cancer-related deaths are caused by blood-borne metastasis initiated by circulating tumor cells (CTCs) identified in blood stream. CTCs are heterogeneous population of cancer cells of yet not well defined composition which are thought to be metastatic precursors. A population of CTCs which undergo the epithelial-mesenchymal transition (EMT) process may have enhanced ability to intravasate and to participate on distal metastases formation. Generally, occurrence of mesenchymal CTCs phenotype is supposed to represent a higher risk in diagnosis of further metastatic cancer progression. The monitoring of CTCs in peripheral blood of cancer patients represents an enormous potential for early non-invasive diagnostics of cancer progression, identification of recurrence risks and real-time monitoring of treatment responses. The development of novel types of high-affinity protein binders for epithelial and mesenchymal membrane markers of CTCs is a crucial step for the development of tools for selective CTCs detection and monitoring such as microfluidic chip technology. Small artificial protein binders represent a non-immunoglobulin alternative to antibodies and can be easily modified for the purpose of a chip design. Moreover, they do not contain disulfide bridges, have sufficient thermal stability and are resistant to many organic solvents. In addition, they can be easily produced en mass in *E. coli* strains. Protein binders targeting CTCs epithelial membrane marker EpCAM or mesenchymal membrane marker N-Cadherin were developed and characterized. The most promising variants will serve as captured proteins on the surface of a microfluidic chip for fast and more precise screening of patients with lung adenocarcinoma.

Biography

Lucie Mareckova is currently a PhD student of Biochemistry at the Faculty of Science, Charles University of Prague, Czech Republic. She is a Member of the Laboratory of Ligand Engineering at the Institute of Biotechnology CAS, v.v.i., Czech Republic. Her research topic is focused on the development of novel protein binders, derived from small protein domains, targeting diagnostically important molecules.

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Notes:

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12th Euro Biotechnology Congress

November 07-09, 2016 Alicante, Spain

Properties of silver doped carbon biomaterial prepared by thermionic vacuum arc method

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Studies have shown that carbon thin films, having good biocompatibility, are suitable as surface coatings on biomedical devices, including bone implants and cardiovascular devices. Doping of carbon with selective elements is an attractive method to enhance the biological and other properties of the thin film. Silver (Ag) is known to be a potent antibacterial agent that has been used in biomedical engineering with good effects. In this work, Silver was chosen as the dopant because of its anti-bacterial properties. Silver carbon nanoparticles were deposited on glass and silicon substrates by Thermionic Vacuum Arc (TVA) method in one electron gun configuration. As the chemical interactions between Ag and C generally are very weak and the interactions between the used transition metals and C are strong, it was expected that Ag to form a separate phase. This was observed as the nanocomposite films were consisting of Ag grains embedded in a nanocrystalline or nanocomposite matrix. The effects of silver on the carbon matrix surface morphology and wettability were investigated by using: Scanning Electron Microscopy (SEM) and Free Surface Energy (FSE) by See System. From the TEM measurements we obtained 6.85 nm for Ag nanoparticle and 159.61 nm for carbon and the Free Surface Energy proved a hydrophobic character for the CAg thin film.

Biography

Virginia Dinca-Balan has completed her PhD from Bucharest University, Romania. She is the Assistant Professor Doctor of Biophysics and Medical Physics at Ovidius University of Constanta, Romania. She has published more than 22 papers in reputed international journals and three chapters in books.

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Growth and characterization of Ag-Ti thin films obtained by thermionic vacuum arc (TVA) method for biomedical applications

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Silver and silver-based compounds are known as potent antibacterial agents having a large spectrum of activity and they have been studied in biomedical applications for many years. Furthermore, in weird situations, the incorporation of silver into Ti compounds can modify their properties by acting as a solid lubricant. It is bioinert, it does not react with anything inside the body, making it the prime candidate for use in procedures such as dental implants, orthopaedic rods, bone plates and other prosthetics. The aim of this paper is to investigate the growth and structure properties of Ag-Ti thin films deposited by thermionic vacuum arc (TVA) technology on silicon, glass and OLC 45 special substrate. TVA method consists from an externally heated cathode surrounded by a Wehnelt cylinder that concentrates high voltage accelerated electrons on the anode material. The anode is a crucible with a spoon like shape which contains the material to be deposited (Ag-Ti). Due to the applied high voltage, continuous evaporating anode material ensures the metal vapor density in steady state in order to ignite and to maintain a bright discharge in carbon vapors in the inter-electrodes space. Because the discharge sustaining gas is just the evaporating atoms in vacuum, the carbon film deposition is carried out in high purity conditions. The properties of the deposited Ag-Ti thin films were investigated in terms of morphology, tribology and wettability. The thin films were characterized using Scanning Electron Microscopy with energy-dispersive X-ray detection (SEM/EDX). Also, the free surface energy has been evaluated by means of Surface Energy Evaluation System using contact angle method. With this measurement we can evaluate the hydrophilicity or hydrophobicity of a thin film.

Biography

Aurelia Mandes has completed her Doctoral studies at the University of Bucharest in 2010 with the thesis entitled Comparative study of carbon nanostructures deposited by the thermionic vacuum arc method and magnetron sputtering. She has 24 papers published in international journals and three chapters in books.

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Fazouane-Naimi Fethia et al., J Biotechnol Biomater 2016, 6:7(Suppl)
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Plant biomolecules in health: Effect on skin healing

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Medicinal plants growing in Algeria feature pharmacological properties distinguished according to their adaptation to the climates of different regions and during the seasons. The aim of our work is to search in the plant biodiversity representing a local genetic resource, the plants traditionally used and to identify which biomolecules have a healing effect on burns and wounds. These are *Phlomiscrinita, Carthamuscaeruleus* and *Pistacialentiscus*. These plants are genetically different but have common phytochemical characteristics such as the presence of abundant molecules in plant organs (leaves, rhizomes, fruits) such as polyphenols, O-glycosides, C-glycosides, mucilage, the saponins and unsaturated fatty acids. GPC analysis revealed that *Pistacialentiscus* is rich in oleic acid (14.94%), linolenic acid (36.17%), linoleic acid (28.90%); *Phlomiscrinita* is rich in oleic acid (18.33%), linoleic acid (39.83%); *Carthamuscaeruleus* is rich in oleic acid (12.94%) and myristic acid (70.03%). The second phase of our study is the ointment formulation based on plant extracts from aqueous macerated from *Phlomiscrinita*, rhizomes for *Carthamuscaeruleus* and oil seeds of *Pistacialentiscus* for wound rats which suffered from surface burns and wounds. The wound assessment is made by macroscopic observations, planimetric studies, statistical and histological studies. The ointment showed a positive effect on wound healing with a significant contraction reaching approximately on the fourth day with 50% shrinkage and to achieve 100% reduction on fourteenth day against 96% for the wounds treated with Madécassol. The plant extract ointment showed an obvious healing activity consistent with the efficacy which is used in folk medicine. These plants can be phylogenetic in perspective study and can be used in the production of recombinant enzymes involved in the synthesis of their biomolecules.

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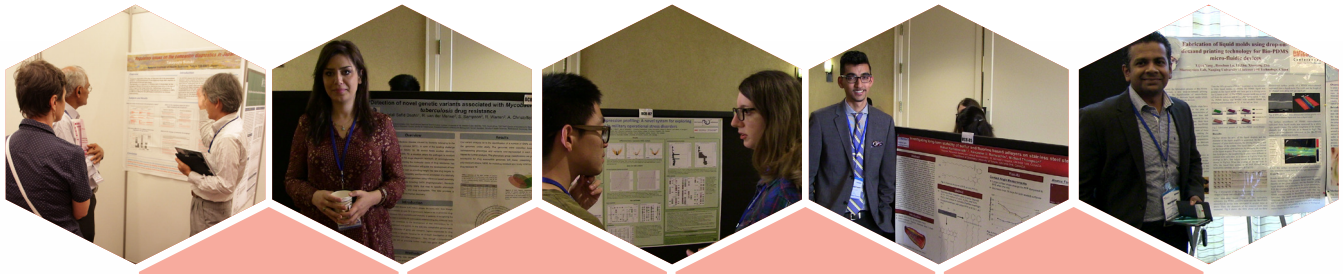

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Integration of *SINA* gene for drought tolerance in Moroccan durum wheat by biolistic approach

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In this study, the effect of nitrogen source in the induction media and the nature of phytohormone in the regeneration media on the genetic transformation efficiency were studied. Mature embryos of three Moroccan durum wheat varieties (Amria, Marouane and Isly) and the pANIC5E plasmid were used. This plasmid contained the *SINA* gene linked to drought tolerance and bar gene as selectable marker. Two different induction media cultures have been tested: MS and Modified MS with ammonium nitrate as a single source of nitrogen. The effect of phytohormones AIA or Zeatinon the regeneration media were also tested. The results showed an important embryogenic callus induction for both media without a significant difference for the three varieties tested with an average of 72% for MS medium and 67% for modified MS. Plantlets regeneration rate after the bombardment was affected by the nature of phytohormones used; Medium with Zeatin induced the highest rate of regenerated plantlets for Isly and Merouane varieties with an average of 40% and 32% respectively, against 18% and 12% with the AIA auxin. However, Amria has shown an average of 27% with the AIA and 18% with Zeatin. Evaluation of the expression of the bar gene in leaves by basta painting and molecular analysis are underway.

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Symbiotic nitrogen fixation of melilot in Northern Kazakhstan

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It is known that deficiency of nitrogen in the soil can to a large extent be compensated for by biological means, from stocks of nitrogen in the soil which have been accumulated by nitrogen-fixing microorganisms. The symbiotic nitrogen fixation is done by strains of bacteria of the genus *Rhizobium*, isolated from nodules of melilot and genetic identification of bacteria was conducted by 16S RNA. On the basis of the selected bacteria strains inoculum was created for the pre-seed treatment of 20 samples of melilot. For this purpose liquid yeast extract was placed in a flask with biomass of the genus bacteria *Rhizobium* and incubated on a shaker at 24 °C until the optimal titer. Research on the study of nitrogen fixation was conducted on southern black carbonate soil in the period from 2015 to 2016 at the stationary field A.I. Barayev SPCGF. In the flowering phase of different varieties samples of *Melilotus officinalis* (L.) Pall., and *Melilotus wolgicus* Poir., 10 plants with inoculation and without inoculation (control) were identified from each plot and the numbers of nodules formed were counted. Calculations of symbiotic nitrogen fixation were carried out by comparison with the non-legume crop. As a result of these studies, it was found that the highest nitrogen fixation was in crops of *Melilotus officinalis* (L.) Pall., (from inoculation) in 5 samples KD-1824, KD-1825, KD-1683, KD-1683a and KD-1823. The controls exceeded an average of 1.2-3%. In crops of *Melilotus wolgicus* Poir., a high nitrogen fixation in comparison to the control (no inoculation) was observed in the samples: KD-1687 (92.3%) and KD-1823 (88.9%). In other cases, molecular nitrogen fixation was negligible. The most promising examples of the *Melilotus wolgicus* Poir., are KD-1687, KD-1823 and *Melilotus officinalis* (L.) Pall., KD-1824, KD-1683, KD-1683a with the most symbiotic potential, which will be studied for further research in the selection process.

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Application of natural dye (neem) on silk fabric before and after exposure to UV/ozone

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Neem plant as a source of natural dye was used to dye silk fabrics. This plant has not been exploited as natural dye by far. Optimization of natural dye extraction from leaves with respect to dye bath concentration to aid exhaustion was done. The effect of changed dye bath concentration on the reflectance spectra was followed using spectrophotometer tool. The changes in the optical parameters including the CIE tristimulus values, color parameters, absorption coefficient, absorption edge, band tail width, optical band gap, extinction coefficient and color strength were determined as a function of UV/ozone exposure times. The data obtained indicated that the color parameters were highly affected by changing dye concentration by this new dye. Finding shows that the natural dye extracted from leaves have good potential in textiles dyeing and can be exploited further. So, the present work gives the chance to produce different hues from a new traditional natural dye to improve the natural dyeing cultural heritage to meet the environmental future demands technology of high quality fantastic dyed pattern through an economical point of view.

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