13th Biotechnology Congress

November 28-30, 2016 San Francisco, USA

Keynote Forum

Day 1




Bio America 2016

Xiaohua He, J Biotechnol Biomater 2016, 6:8(Suppl)
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Xiaohua He

United States Department of Agriculture-Agricultural Research Service, USA

Outbreaks of Shiga toxin-related poisoning and methods for early detection

Shiga toxin (Stx) is one of the major virulence factors produced by Shiga toxin-producing *Escherichia coli* (STEC) and is noted for its association with a wide spectrum of diseases such as hemorrhagic colitis (HC) and hemolytic uremic syndrome (HUS), the leading cause of acute renal failure in children. The outbreaks caused by Stx have raised serious public health concerns and resulted in huge economic losses. In 1982 the first reported outbreak of STEC was caused by an *E. coli* O157:H7 serotype in undercooked hamburger but in a report published in 2012, six non-O157 serotypes were revealed to be responsible for 113,000 illnesses annually in the United States alone, almost double the amount of illness caused by O157. Other serogroups, including the highly virulent *E. coli* O104:H4, have also caused large outbreaks of HC and HUS. As the sources of outbreaks have changed, a variety of detection methods for Stxs and organisms that produce them have evolved as well. Here, we will discuss the recent advances on the detection, characterization and typing of Stxs with emphasis on work performed at the Western Regional Research Center, USDA, ARS.

Biography

Xiaohua He is a Research Molecular Biologist at the Western Regional Research Center, USDA-ARS. She has completed her PhD from UC Riverside and had Post-doc experiences at Purdue and Cornell Universities. She has received the 2015 USDA Federal Laboratory Consortium for Technology Transfer, Far West Region and Outstanding Technology Development Award for her contribution to the development of novel monoclonal antibodies against a broad range of Shiga toxins. She has served as an Academic Editor and Editorial Board Member of several leading journals and is an author/inventor of over 70 publications and patents with 14 technologies licensed to industry.

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Luisa Cheng

United States Department of Agriculture-Agricultural Research Service, USA

New methods for the detection and mitigation of food-borne toxins

Food-borne toxins such as botulinum neurotoxins (BoNTs) and mycotoxins are food-borne toxins that cause severe human diseases. Because of their acute toxicity, there are intense research efforts to develop sensitive detection tools, vaccines and therapeutics. In our laboratories, high-affinity monoclonal antibodies (mAbs) have been developed for the detection of different BoNT serotypes in commonly used ELISA and new immunoassays using electrochemiluminescence and microfluidic platforms. Detection limits of these new assays fall within the pg per ml range that is well below those of standard assays for BoNTs. New gas chromatography and mass spectrometry (GC/MS) methods are tested for the early detection of fungal contamination in nut products. A better understanding of the biology of toxins in plants and animals and the factors that affect their toxicity, coupled with the development of more sensitive detection and simpler diagnostic tests, would be invaluable for advancing food safety and protection.

Biography

Luisa Cheng has completed her PhD at the University of California, Los Angeles and her Postdoctoral research at the University of California, Berkeley focusing in the pathogenesis of food-borne pathogens. She has joined the Agricultural Research Service in the U.S. Department of Agriculture in 2006 and is currently the Research Leader of the Food-borne Toxin Detection and Prevention Research Unit in the Western Regional Research Center. Her research program focuses on the development of sensitive detection assays for food-borne toxins, the study of biological mechanisms underlying toxin absorption and action and the identification of prevention and therapeutic strategies.

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Zhanyuan J Zhang

University of Missouri, USA

Plant transformation services

University of Missouri (MU) Plant Transformation Core Facility was established in 2000. The key mission of the facility is to enhance both basic and applied plant biology research by providing plant transformation services and advancing transgenic technologies. Since 2000, the facility has been providing state-of-the-art plant transformation services. The services are on fees for cost recovery only, not for profit. The facility staff is dedicated to providing various types of transformation services with a focus on maize (*Zea mays*), soybean (*Glycine max*), switchgrass (*Panicum virgatum*), sorghum (*Sorghum bicolor*), wheat (*Triticum aestivum*) and model plant species. The service categories include both standard and customized transformation. Transformation systems for all crops utilize *Agrobacterium*-mediated approaches and somatic embryogenesis processes except for soybean. The *Agrobacterium*-mediated cot-node transformation system coupled with organogenesis regime is employed for soybean transformation. The facility is also ready to take on new service projects to transform new plant species as user's requests. Research activities are geared towards developing high-throughput transformation systems, effective small RNA-mediated gene silencing, gene stacking through coordinated transgene expression and precise genome modifications to meet the needs of crop improvement and genome discoveries. More details on the facility operations and experiences as well as its impact on research collaborations and funding opportunities will be discussed wherever appropriate during the talk.

Biography

Zhanyuan J Zhang has completed his PhD from University of Nebraks-Lincoln, USA and Postdoctoral studies from the same university. He is the Director of Plant Transformation Core Facility at University of Missouri, Columbia. He has published more than 30 papers in reputed journals and has been serving as an Editorial Board Member of two international journals. He is also a peer Reviewer of over 10 international journals.

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Day 2




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Fuad Fares

University of Haifa, Israel

A novel strategy for developing long acting recombinant proteins: From bench to bedside

One major issue regarding the clinical use of many peptides is their short half-life due to the rapid clearance from the circulation. To overcome this problem, we succeeded to ligate the signal sequence of O-linked oligosaccharides to the coding sequence of the hormones. The cassette gene that has been used contains the sequence of the carboxyl-terminal peptide (CTP) of human chorionic gonadotropin β (hCGβ) subunit. The CTP contains 28 amino acids with four O-linked oligosaccharide recognition sites. It was postulated that O-linked oligosaccharides add flexibility, hydrophilicity and stability to the protein. On the other hand, it was suggested that the four O-linked oligosaccharides play an important role in preventing plasma clearance and thus increasing the half-life of the protein in circulation. Using this strategy, we succeeded to ligate the CTP to the coding sequence of follitropin (FSH), thyrotropin (TSH), erythropoietin (EPO) growth hormone (GH) and thus to increase the longevity and bioactivity of these proteins *in vivo*. Interestingly, the new analogs of FSH and GH were found non-immunogenic in human and it is already passed successfully clinical trials phase III and phase II respectively. Moreover, FSH long acting was approved by the European Commission (EC) for treatment of fertility. In addition, our results indicated that long acting GH is not toxic in monkeys and the results from clinical trials phase I and phase II seem to be promising. Designing long acting peptides will diminish the cost of these drugs and perhaps reduce the number of injections in the clinical protocols.

Biography

Fuad Fares has completed his MSc and DSc studies at the Faculty of Medicine, Technion-Israel Institute of Technology and Postdoctoral studies at the Department of Molecular Biology and Pharmacology, School of Medicine, Washington University, St. Louis Missouri, USA. He has developed the Molecular Genetic Laboratory at Carmel Medical Center, Haifa, Israel and led the laboratory for last 20 years until 2015. He is the Head of Molecular Genetic Laboratory at the Department of Human Biology, University of Haifa, Israel since 2004 and teaching genetics, genetic engineering and endocrinology at the Faculty of Natural Sciences at University of Haifa, Israel. He has published more than 90 manuscripts in reputed journals and serving as a Member of the Israel Council for Higher Education since 15 years. Moreover, he is the Founder and the Inventor of PROLOR Biotech Company for designing long-acting recombinant proteins.

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Edward Crabbe

Bristol Myers Squibb, USA

Leveraging process characterization, manufacturing process history and facility fit considerations to improve cell culture process performance

In commercial manufacturing of biopharmaceutical products using mammalian cell culture bioprocessing, variation in bioreactor product titer could have a significant impact on drug substance yield without having a significant effect on drug substance critical quality attributes. Variation in titer presents potential drug supply challenges to an organization and its patients. At commercial scale, applying any mitigation strategy to alleviate variation in bioreactor product titer faces technical challenges for manufacturing processes that utilize semi-defined production media, varying production scales, different process technologies and multiple manufacturing facilities. The contribution of raw material lot-to-lot variability in semi-defined production media on product titer is well-documented. Mitigating variation in product titer due to raw material lot-to-lot variability involves considerable in-house investment in time and resources as well as collaborations with vendors and external partners. In this presentation, we mitigated the impact of raw material lot-to-lot variability on bioreactor product titer by leveraging process characterization information, manufacturing process history analysis and facility fit considerations to improve bioreactor product titer by 10% while maintaining product quality.

Biography

Edward Crabbe has completed his PhD in Kyushu University, Fukuoka, Japan. He is a Senior Scientist in the Manufacturing Sciences and Technology Division of Bristol-Myers Squibb facility located in Syracuse. New York.

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