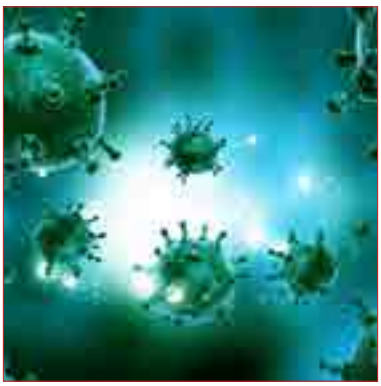
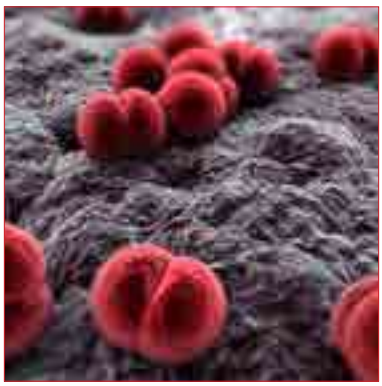
Keynote Forum
August 17, 2017

Biotechnology 2017





ANNUAL BIOTECHNOLOGY CONGRESS

August 17-18, 2017 | Holiday Inn Toronto International Airport
Toronto, Canada

Guido Krupp, Ann Biol Sci, 2017, 5:3
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ANNUAL BIOTECHNOLOGY CONGRESS

August 17-18, 2017 | Toronto, Canada

Guido Krupp

AmpTec GmbH, Germany

Synthetic mRNAs as optimised tools for stem cell generation and for manipulating cellular phenotypes

Availability of synthetic mRNAs enabled progress in their applications. Tremendous interest of private investors and PHARMA has created a billion € business. AmpTec supports new players by providing customized, high quality mRNA products. Important features, technical options for high-amount, high-quality mRNA synthesis and GMP-compliant manufacturing will be presented. Specific mRNA features will be presented for diverse applications like (i) mRNA-directed expression of antigens in dendritic cells for vaccination projects in oncogenesis, infectious disease and allergy prevention; (ii) reprogramming of adult cells to induced pluripotent stem cells with their subsequent differentiation to the desired cell type; (iii) applications in gene therapy. A recent overview has summarised applications and syn-mRNA quality requirements. Syn-mRNAs can be generated by *in vitro* transcription (IVT) from defined templates containing the synthetic gene of interest. In principle, linearised plasmids (with a restriction enzyme) can be used directly as templates in IVT reactions, However, this procedure is hampered by several disadvantages: incomplete plasmid cleavage results in variable amounts of very long and undefined background transcripts; high amounts of plasmid DNA introduce undesired bacterial components. Furthermore, optimal mRNA activity depends on a very long, unmasked poly(A) tail, like 120 A. However hompolymeric repeats are prone to random deletions/elongations during plasmid propagation in bacteria. Instead of plasmids, we use well defined PCR-products as IVT-templates. This approach with examples will be shown. Technical problems in IVT-based mRNA synthesis and problem-solutions will be presented, plus a detailed list of quality requirements for GMP-compliant synthetic mRNAs.

Speaker Biography

Guido Krupp, PhD, is the CEO and President of AmpTec GmbH. In 1981, he received PhD degree from Würzburg University & Max-Planck-Institute Martinsried. From 1983 to 1987, he was a Post-doc at Yale University. From 1987 to 2002, he worked as Research Group Leader at Kiel University. He is also the Founder of Artus GmbH (1998) & AmpTec GmbH (2005) & KSK Diagnostics GmbH (2015). His primary area of research includes nucleic acid technology with focus on RNA, plant pathogens (viroids), ribozymes and telomerase. He has more than 60 publications, Editor of *Ribozyme Biochemistry & Biotechnology*, and of *Telomeres, Telomerases & Cancer*, Editorial Board Member of *Biotechnology Annual Review*.

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Kiminobu Sugaya, Ann Biol Sci, 2017, 5:3
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Kiminobu Sugaya

University of Central Florida, USA

Pharmacological approaches for the neural regeneration; Alzheimer's disease therapies

Despite decades of investigations in both laboratory and clinic, the pathophysiological mechanism of Alzheimer's disease (AD) still remains unknown. Current problem of developing AD research is that many treatments have been found to be very effective in AD animal models but they failed to show significant effects in clinical trials. Thus, establishment of an effective treatment in a model, which represents pathophysiology of AD, is needed. Previously, we were able to show improved cognitive function of aged, memory-impaired animals through the implantation of human neural stem cells (NSCs), which produced much excitement throughout the research world and the overall medical community; given the implication that this could lead to a cure for all neurodegenerative diseases, including AD. However, when we transplanted NSCs to a transgenic animal model produced Amyloid-β (Aβ) plaque formation in the brain by expressing familial AD mutant amyloid precursor protein (APP), mimicking the pathological condition of AD, we did not find any new neuronal development formed from the donor cells. This indicates that transplantation of NSCs by itself may not be a cure for AD. Here, we show that the combination drug therapy of Posiphen (reduce APP level) and NBI-18 (increase endogenous neural stem cell) increased neurogenesis and significantly improved memory in the transgenic AD mouse model. This combination therapy could bring us an effective treatment for AD. I will further discuss the use of iPS cell to confirm this efficacy *in vitro* 3D human AD brain model.

Speaker Biography

Kiminobu Sugaya is a Professor of Medicine in Burnett School of Biomedical Science, College of Medicine, University of Central Florida (UCF) since 2004. He is a Director of Multidisciplinary Neuroscience Alliance of UCF and a Chair of Central Florida Chapter of Society for Neuroscience. He moved from Japan to Mayo Clinic, US as a Post-doctoral Researcher in 1992 when he was a Lecturer in Science University of Tokyo and was promoted to be an Associate Consultant in 1994. Then he moved to University of Illinois at Chicago as an Assistant Professor in 1997 and got promoted to an Associate Professor in 2002. He has been conducting stem cell researches to treat neurodegenerative diseases by the adult stem cells. He recently received National Honor Plaque of Panama for exceptional contribution to neuroscience based on his study on stem cell therapies for neurodegenerative diseases from the President of Panama. His publication regarding improvement of memory in the aged animal by stem cell transplantation was reported in Washington Post, BBC, NBC, ABC and other media in all over the world. He is also a Founder and Chair of Progenicyte, which is a biotech company holding his 67 patent licenses. Among those are a revolutionary process of creating IPS (induced pluripotent stem) cells from a patient's own cells and a novel pharmacological approach to increase endogenous stem cells. With his proprietary technologies covering all aspects of stem cell manipulations, Progenicyte is launching services to include: modified stem cell banking and a commercial product to increase cellular regeneration which fights against aging.

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Mohini M Sain

University of Toronto, Canada

Organic electronic devices : cellulosic nanocomposites

Organic electronics gained significant interest at a time when neural-network or artificial intelligence become a main-stream technology after more than 25 years of nascent stage. Transportation industry is an early adaptor of the technology. When next generation vehichle systems, including autonomous vehicle need a significantly precise control of the sensing mechanism, the success of the technology will also depend on how precisely such device can predict human behaviour. As a result, a significant amount of research has been underway on neural-network system to more accurately predict human behavior in a sensor dominated world, with a precise control of predictability behavior over the service life of new vehicle systems. This presentation will highlight the design, construction and validation of flexible elelctronic devices from laboratory scale to pilot scale and present early stage data on relations between the unit process and intrinsic uncertainty to predict human behaviour with confidence. To address these issues an artificial intelligent system seems to be a very good option. Artificial neural networks (ANNs) are a family of models inspired by biological neural networks (brain). On the bright side, we only need approximate formulation, we can show the program some examples of input and output, and let the program find out how to provide output from the input. The ANN has its own drawbacks. Although ANN is used for LCA, all the aspect of the LCA is fuzzy in nature.

Speaker Biography

Mohini Sain has completed his PhD in 1989 and worked in industry as Consultant before he became an Academic. He is the Professor/Director of Centre for Biocomposites and Biomaterials Processing, University of Toronto, a premier advanced biomaterials research organization. He has published more than 400 papers in reputed journals, spinned off several companies for his research inventions and holds more than 40 patents and patent applications. He is the Author and Editor of seven books.

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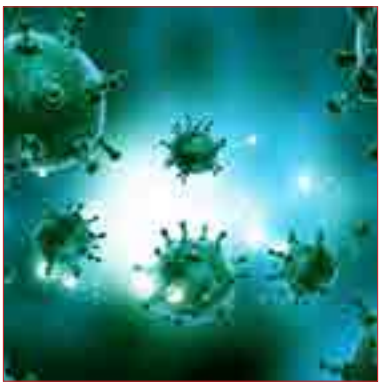

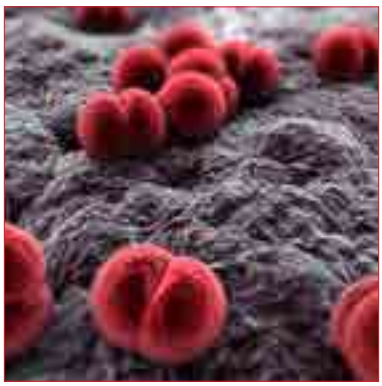

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Poterszman Arnaud

Starsbourg University, France

Bottom-up strategies for reconstitution of multi-protein complexes using the baculovirus expression system

The production of a homogeneous protein sample in sufficient quantities is an essential prerequisite not only for structural investigations but represents also a rate-limiting step for many functional studies. In the cell, a large fraction of eukaryotic proteins exists as large multicomponent assemblies with many subunits, which act in concert to catalyze specific activities. Genome editing allows to isolate native protein complexes produced from their natural genomic contexts but their limited natural abundance is often limited and so recombinant expression and reconstitution are then required. The *baculovirus* expression vector system (BEVS) has turned out to be particularly powerful, unlocking the structure and mechanism of many important complex assemblies that had remained inaccessible to detailed analysis beforehand. Here, we will comment on current developments and their potential to accelerate protein complex research: Use of Lambda red recombination in *E. coli* for manipulation and improvement of the baculoviral genome, vector development for parallel expression/co-expression screening and assembly of multi-gene constructs from synthetic biology approaches. As model systems, we will use human multi-protein complexes invoved in the regulation of gene expression such the pTefb cdk/cyclin pair, nuclear hormone receptor complexes or the 10 subunits transcription/DNA repair complex TFIIH. We will describe state-of-art strategies for the efficient production of multiprotein complexes using the baculovirus/insect cell expression system. Here, we will comment on current developments and their potential to accelerate protein complex research: Use of Lambda red recombination in *E. coli* for manipulation and improvement of the baculoviral genome, vector development for parallel expression/co-expression screening and assembly of multi-gene constructs from synthetic biology approaches. As model systems, we will use human multi-subunit transcription factors such as Cdk/cyclin pairs, nuclear hormone receptor complexes or the 10 subunits transcription/DNA repair complex TFIIH.

Speaker Biography

Poterszman Arnaud, after studying at ENS Cachan, completed his PhD from Strasbourg University and joined the CNRS one year later. He holds a CNRS Research Director position and performs his studies at the Department of Integrated Structural Biology at IGBMC, Illkirch France. He has a dual expertise in Structural and Molecular Biology, with insights on expression technologies and sample preparation. His research is focused on eukaryotic multi-protein complexes involved in transcription regulation and DNA repair by nucleotide excision, particularly, the transcription/DNA repair factor TFIIH and its partners. He has around 50 publications in Pubmed, h-index 21.

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Faiez Alani

McMaster University, Canada

Recent developments in biosynthesis of noble metal nanoparticles and application in nanobiotechnology

Production of silver and gold nanoparticles by biosynthesis have many advantages over chemical and physical synthesis. Biogenic nanoparticles are cheaper, environmental friendly, and biologically compatible as compared to chemical and physical method. In this presentation different biosynthesis methods of nanoparticles are discussed such as using microbial cells, bacteria, yeasts and moulds under different environmental conditions. Optimization, scale-up, engineering and applications of nanoparticles such as antimicrobilal agents, nanomedicine, diagnosis & therapy, in addition to gene and drug delivery will also be discussed.

Speaker Biography

Faiez Alani obtained his PhD and MSc from University of Strathclyde and was Visiting Professor at University of Waterloo. He was Assistant Professor at Brandon University, Manitoba, and currently is Associate Professor of Nanobiotechnology at School of Engineering Practice and Technology at McMaster University. He served as Chair of Biotechnology at McMaster and is serving as Editorial Board Member for *The International Journal of Engineering Education (IJEE),* and *Journal of Science and Technology Policy Management* (JSTPM), Member of the Society for Industrial Microbiology and Biotechnology. He has published more than 30 papers in world class journals.

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Ganapathy Sivakumar

University of Houston, USA

Biomanufacturing of biorhizome

Gloriosa superba seed is the most important traditional plant-based colchicine source for pharmaceutical industry. Colchicine prevents microtubules assembly and thereby suppresses cancer cell division by inhibiting mitosis as well as successfully used in gout medicine. My lab established the biorhizome platform to biomanufacture natural isomer colchicine, which is a new biotech concept in industrial biotechnology. However, limited emphasis has been placed on identifying colchicine biosynthetic pathway genes in *G. superba biorhizome*. In addition, understanding the dynamics of biorhizome developmental events is essential to improve the colchicine biomanufacturing. The presentation will cover current knowledge of colchicine biosynthetic pathway elucidation and biorhizome-based colchicine biomanufacturing.

Speaker Biography

Ganapathy Sivakumar has extensively studied the plant-based small molecules pathway biochemistry, synthetic biotechnology and metabolic and bioprocess engineering. His research is primarily focused on Biomanufacturing and Biotech implications of Biopharmaceuticals. He is internationally recognized in the field of Biopharmaceuticals and a pioneer in Biomanufacturing of biorhizome-based colchicine. He has over 45 publications. He is also on the editorial board of several journals. He serves as an expert of grant proposals as well as numerous scientific journals. His laboratory focuses on metabolic and bioprocess engineering of colchicine pathway and developing potential anticancer medicine.

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