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2nd Global Conference on

TISSUE ENGINEERING AND REGENERATIVE MEDICINE, STEM CELL RESEARCH

March 25-26, 2019 | Amsterdam, Netherlands

WORLD BIOCHEM 2019 & REGENERATIVE MEDICINE 2019



SCIENTIFIC TRACKS & ABSTRACTS

DAY 1

DAY 1 SESSIONS

MARCH 25, 2019

Stem Cells | Tissue Engineering | Structural Biochemistry | Regenerative Medicine
3D Bioprinting Techniques | Ethical and Legal Issues

SESSION CHAIR

David Capaldi
Rejuva Stem Cell Clinic, USA

SESSION INTRODUCTION

Title:	East-West-Monitoring: The meaning of the inner structure of the "Bagua" axes related to ethical and legal topics in research? - A new perspective?
	Rainer Fromknecht, Institute of Information and Energy Medicine, Germany
Title:	Novelties in additive manufacturing and bio-printing
	Dirk Jan Cornelissen, University of Strathclyde, UK
Title:	Plant growth regulators mediated growth and yield enhancement of bitter gourd (Momordica charantia L)
	Suchit Ashish John, Sam Higginbottom University of Agriculture, Technology and Sciences, India
Title:	Proteomic analysis of targets of ser65 phosphorylated ubiquitin
	Julius T Dongdem, University of Nottingham Medical School, UK
Title:	The construction and clinical application of tissue engineered bone
	Guoxian Pei, Airforce Military Medical University, China

Rainer Fromknecht, J Genet Mol Biol 2019, Volume 3

EAST-WEST-MONITORING: THE MEANING OF THE INNER STRUCTURE OF THE "BAGUA" AXES RELATED TO ETHICAL AND LEGAL TOPICS IN RESEARCH? - A NEW PERSPECTIVE?

Rainer Fromknecht
Institute of information and Energy Medicine, Germany

Based on the Taoist and Western thinking ethical and legally challenging tasks in today's science are represented by East-West monitoring for possible decision-making aids. In conjunction with the peer-to-peer outcomes of the today physics, it is likely to be able to tackle this challenging task with new and mature insights. The I Ching, whose origin dates back to the 3rd millennium BC., comprises 64 hexagrams and claims to be the blueprint for spiritual life. The futurologist C.G. Jung saw in it synchronicity with a completely new perspectives and all-round scientist Leibniz recognized in it a "binary coding". Further, physician M. Schoenberger worked out that the genetic DNA code consisting of 64 code words has the same structure as the I Ching hexagrams. In the Taoist mindset, from the immaterial energy Qi via the Yin-Yang principle, eight basic trigramsmcan be derived and displayed in a bagua. The exchange of two axes leads to an abstract, timeless inner world order and a temporal system with transience, while in the latter one the previous inner world order shines through. These are not immutable state descriptions, but principles of lawful variability, transparency or permeability of their environment. The positive and negative aspects depend on the relative appropriateness of the means and can be both encouraging and devastating if there is no balance. Further, the receiving and sensitized matter, through which the energy animates organic life with more or less conscious life, awakens to the light and strives for light through the other two axes. The German physicists B Heim`s and W Droescher, developed a unified field theory by introducing a 12-dimensional internal space based on the geometrization principle. In this discrete space-time concept, there is no physics below the Planck scales. This fact has dramatic consequences, and leads to the concept of parallel (or hyper) space, and is based on the following four simple and general principles, geometrization principle for all physical interactions, optimization, dualization, quantization principle. Further, the process-oriented metaphysics of AN Whitehead with the four desiderata, coherent, logical, applicable, appropriate, nullifies the denaturalization of the subject and thus the exhaustion of nature. The topics to be covered include targeted drug delivery, tumor therapies, and remote catheter navigation. It will be shown how iMRI enhances the safety and efficacy of these procedures.

BIOGRAPHY

Rainer Fromknecht completed his internship in a doctors office for gynaecology and Traditional medicine.His present research was on Development of Nano systems in ceramic oxides by ion implantation and their analysis by Rutherford Backscattering, Electron and Transmission Electron Microscopy and energy dissipative X-ray spectroscopy.

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Dirk Jan Cornelissen et al., J Genet Mol Biol 2019, Volume 3

NOVELTIES IN ADDITIVE MANUFACTURING AND BIO-PRINTING

Dirk Jan Cornelissen, G M Skeldon, A Faulkner-Jones, J Casey, A Courtney and **W Shu**
University of Strathclyde, UK

It can take 10 to 20 years to fully develop new drugs, with an estimated average of 9 to 12 years. On top of that, only 16% of the drugs that begin pre-clinical testing end up to be approved for use in humans, but even than it can be taken of the market again due to unforeseen toxicity. Some of this low success rate can be attributed to the different responses that animals and humans have to the drugs being tested; some drugs have to be withdrawn from market due to toxic effects on human organs such as liver and heart, despite being tested safely on animals. HepaRG cells are a unique human hepatoma cell line, capable of expressing both phase 1 and 2 drug metabolizing enzymes. They are regarded as a promising alternative for primary human hepatocytes when it comes to drug and toxicity testing, but they have the advantage of being a cell line that can be cultured indefinitely. It has been shown that cells in 3D behave differently to cells cultured in a 2D environment. This seems to be especially true for drug testing, where 3D structures of hepatic cells can show hepatoxic effects that cannot be shown with any other pre-clinical test.

In this work, we developed a one-step method for the fabrication of encapsulated HepaRG organoids for drug and toxicity testing. Encapsulated organoids are easier to handle and upscale compared to non-encapsulated aggregates, and the combination of the cell type and the 3D culturing method will create clinically relevant test subjects with more ease of access than traditional primary cultures. We have shown that in our method, HepaRG cells will readily aggregate and rearrange into organoids within our capsules. These organoids show an increase in enzymatic break-down activity when introduced to certain drugs.

BIOGRAPHY

Dirk Jan Cornelissen is currently finishing his PhD at the University of Strathclyde at the department of Biomedical Engineering under supervision of Prof Will Shu. His research involves developing an encapsulation method for cells and organoids, to be used for transplantation and drug testing purposes. He focused on encapsulating pancreatic islets for transplantation in patients with diabetes type I. Previously, Dirk-Jan studied Biomedical Engineering at the University of Twente.

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Note:

Suchit Ashish John et al., J Genet Mol Biol 2019, Volume 3

PLANT GROWTH REGULATORS MEDIATED GROWTH AND YIELD ENHANCEMENT OF BITTER GOURD (*MOMORDICA CHARANTIA L.*)

Suchit Ashish John and **S S Meena**
Sam Higginbottom University of Agriculture, Technology and Sciences, India

A field experiment was conducted with an aim to enhance the growth and yield of bitter gourd (*Momordica charantia L.*) at SHUATS, Allahabad. The results indicated that all the treatments enhanced the growth and yield compared to control. Amongst different treatments and their combinations it was observed that the combined effect of GA3 and NAA was significantly better over individual treatments. The foliar spray of GA3 @ 60 ppm together with NAA @ 100ppm showed significantly higher growth and yield except for days to flower initiation and days to fruit maturity which were better at GA3 @ 60 ppm + NAA @ 50 ppm and GA3 @ 40 ppm + NAA @ 100 ppm respectively.

BIOGRAPHY

Suchit Ashish John is an associate professor in the Department of Biological Sciences, Sam Higginbottom University of Agriculture, Technology & Sciences, Allahabad, Uttar Pradesh, India. Engaged in teaching and research, at the Department of Biological Sciences for last 17+ years. Established a multi-disciplinary, comprehensive research in the area of mitigation of plant stress (biotic & abiotic) through PGRs, PGPRs, biopesticides, organic agriculture and development of environment friendly 'stress busters' for plants. Successfully guided over 80 masters and PhD scholars. Authored and co-authored over 45 peer reviewed research papers apart from book chapter, refereed research articles, bulletins and press reports. Resource person for workshops, winter and summer schools. Invited for presentations at different science and research programs at China, Malaysia, Singapore, Indonesia and India. Also been rapporteur for numerous seminars and workshops. Active life member of renowned national and international societies.

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Note:

Julius T Dongdem et al., J Genet Mol Biol 2019, Volume 3

PROTEOMIC ANALYSIS OF TARGETS OF SER65 PHOSPHORYLATED UBIQUITIN

Julius T Dongdem, Simon Dawson and **Robert Layfield**
University of Nottingham Medical School, UK

Recent studies have highlighted additional levels of complexity in the post-translational modification of proteins by ubiquitin (Ub). For example, Ub itself can be modulated by phosphorylation to act as a second messenger in PINK1-Parkin mediated mitophagy. However, the full physiological significance of Ub phosphorylation is unclear. Thus, the project sought to catalogue mammalian target proteins modified by covalent attachment of phosphoSer65-(poly)Ub.

Ub-WT and Ub-Ser65Asp (phosphomimetic mutant) sequences were engineered to allow overexpression of His/FLAG-tagged proteins in HEK293T cells. An additional Leu73Pro mutation was introduced to stabilise targets of Ub modification. Endogenous proteins modified by covalent attachment of transfected Ub sequences were purified by IMAC. Covalent modification was confirmed by western blotting and targets of modification were identified by LC-MS/MS.

Western blotting affirmed greater target protein modification by Ub-Ser65Asp and Leu73Pro mutants, the latter an indication of higher resistance to deubiquitination. Proteomic analysis suggested differential modification of various target proteins by Ub compared to Ub-Ser65Asp, including endogenous SUMO2. By transfecting GFP-SUMO2 and its C-terminal–GG deletion mutant, along with phosphomimetic Ub, we confirm that Ub-Ser65Asp modifies SUMO2, rather than vice versa. Finally, we confirm that transfected His/FLAG-SUMO2 is modified by endogenous phosphoSer65-Ub. SUMO2 represents a novel target of Ser65 phosphorylated ubiquitin.

The topics to be covered include targeted drug delivery, tumor therapies, and remote catheter navigation. It will be shown how iMRI enhances the safety and efficacy of these procedures.

BIOGRAPHY

Julius T Dongdem is currently a PhD candidate in the area of molecular cell biology and development at the University of Nottingham, UK. He has completed an MPhil degree in Biochemistry and Molecular Pharmacology at the University of Nottingham, UK. Julius had earlier obtained a BSc degree in Biochemistry and Chemistry and MPhil in Biochemistry and Molecular Medicine from the University of Ghana Legon, Ghana. He is a lecturer at the University for Development Studies, ghana and has more than 10 articles to his credit in reputable Journals. He has also served in editorial board to more than seven Journals.

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Note:

Guoxian Pei, J Genet Mol Biol 2019, Volume 3

THE CONSTRUCTION AND CLINICAL APPLICATION OF TISSUE ENGINEERED BONE

Guoxian Pei
Airforce Military Medical University, China

Tissue engineering construct has been already used to repair some kinds of bone defect in clinical patients, but repairing massive segmental bony defect in tibia more than 10cm still has not been reported. We describe a case of patient who received a tissue engineered bone graft for repairing the 12cm bone defect in his right tibia and report the findings after 36 months of follow-up. The recipient, a 35-year-old man from China, had his leg severely injured in September, 2014 and got massive tibia defect after 1 year of treatment using external fixator.

Implantation of tissue engineered bone graft was done in August, 2015. A β-tricalcium phosphate (β-B-TCP) scaffold was custom-made according to the shape of the bone defect area. The patient got bone marrow aspiration and 15ml bone marrow was used for isolation and proliferation to get enough autologous bone menchymal stem cells (BMSCs) with serum-free stem cell medium to avoid immune rejection. 3.4×10 6 cells were seeded onto the β-B-TCP scaffold and then implanted into the bone defect area after two weeks of co-culture. Laboratory blood examination was used to observe the immune rejection or infection. The radiography and three-dimensional computed tomography (CT) were used to detect the bone repair effect. No major complications and no obvious immune rejection or infection occurred after the surgery.

After 3, 6, 12, 24 and 36 months, radiography showed bone defect gradually repaired with time, and bone repair effect was satisfactory. The patient was allowed to gradually regain limb function after 12 months. After 36 months, the patient recovered a full function of the lower extremity without any support. Our promising results suggest the clinical safety and effectiveness of tissue engineered bone for repairing massive weight-bearing tibia bone defect more than 10cm. And our treatment procedure might be an option for those patients with weight- bearing massive bone defect.

BIOGRAPHY

Guoxian Pei, the professor and chairman of department of Orthopaedic Surgery, Xijing Hospital the Fourth Military Medical University and he was served as the fifth academic degree committee of the state council subject review group, he was the general secretary of international composite tissue allo-transplantation, the primary chairman of Chinese Microsurgery Society, the chief editor of Chinese Journal of Orthopaedic Trauma, chairman of the digital orthopaedics society SICOT China chapter. He has been the editor of 12 monographs including the hand surgical anatomy and clinic microscopic hand surgery and transplantation of allogeneic limbs and has published 156 treatises as the first corresponding author in the domestic and international fields, including 32 articles collected by SCI.

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SCIENTIFIC TRACKS & ABSTRACTS

DAY 2

DAY 2 SESSIONS

MARCH 26, 2019

Stem Cell Transplant | Acellular Prosthesis | Bioprocessing Techniques For Enzyme Production | Enzyme Kinetics | Future Scope- Biomedical Technology | Advances In Cellular And Molecular Biology

SESSION CHAIR

David Capaldi
Rejuva Stem Cell Clinic, USA

SESSION INTRODUCTION

Title: Impact of the process of erosion on the properties of black soil soils of the South Eastern parts of the Great Caucasus

Aliyev Z H, National Academy of Sciences, Azerbaijan

Title: Morphometric and histological effects of aqueous extract of costus afer stem juice on cutaneous wound of adult albino rats

Kudighe Patrick Udoh, University of Uyo Teaching Hospital, Nigeria

Title: Vascularization of a bone marrow model

Kübrah Keskin, Technische Universität Berlin, Germany

Aliyev Z H, J Genet Mol Biol 2019, Volume 3

IMPACT OF THE PROCESS OF EROSION ON THE PROPERTIES OF BLACK SOIL SOILS OF THE SOUTHEASTERN PARTS OF THE GREAT CAUCASUS

Aliyev Z H
National Academy of Sciences, Azerbaijan

Shamakhi region, situating in south-east slope of Great Caucasian has 393, 3 thousand hectare area. The area of region is situated in 200-2500 m. height above seal level.

As in all regions of great caucasian, this region is belonged to low mountainous zone, from geological and geomorphologic point of view. In soil formation process, rocks play a great role in formation of their fertility. When the rocks, rich with mineral elements are weathered in the region, absorbs into soil a great number of nourishment elements. A lot of potassium and other elements are absorbed into the structure of soils, of which hydromica arises from fieldspar, mica and slates. In mountainous part of the region, soil former rocks mainly consist of slates, marls and sandy. But in watersheds, basalt, marble and granites are met. In middle mountainous part the rocks mainly consist of clayey slates, clay with lime mixture and sandy. As it is known, climate plays a very great role in soil formation process. V V Dokuchayev, I P Gerasimov, I F Figurovski, A Shikhlinski , and others have informed about a great role of climate in erosion formation process. Climate of Shamakhi region corresponds to the climate of Middle Europe. Here, the minimum temperature is observed between 3rd ten days of december and 2nd ten days of february. And the maximum temperature is observed in february, july-august months. Average yearly quantity of rains is about 460-600 mm. Mountain and meadow, mountain and forest, mountain-chernozem, mountain and grey-dark brown soils have spread in region area. Because of our investigation covers mountain-chernozem, we dwell on their main character V V Akimitsev, M A Salayev, G B Salamov, and others have noted on spreading of chernozem in mountain zone of Azerbaijan. Chernozems have spread in limited area in Great Caucasian and are strongly used under agriculture plants.

They have mainly developed in middle mountainous area of Shamakhi and Ismayilli regions. We have investigated mountain-chernozems in Shamakhi region. Morphological description of soils types, flushed in average degree and subjected to erosion is indicated below.Section 1: Divided in the region of Jabani village, gentle east Bakharli slope. A 0-17 cm chernozem clayey, heap, hard, dry, plant roots, rootlets, worm ways, small stones, boils for the impact of chlorine acid, the passage is clear. B 17-39 cm chernozem, upper layer is relatively light, clayey, heap a little hard, root and rootlets, small stones, spots in brown vein form, worm ways, damp, oils for the impact of chlorine acid, passage is gradual.

BIOGRAPHY

Aliyav Z H was professor in Institute of Erosion and Irrigation, Azerbaijan National Academy of Sciences, Azerbaijan.

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Kudighe Patrick Udohl, J Genet Mol Biol 2019, Volume 3

MORPHOMETRIC AND HISTOLOGICAL EFFECTS OF AQUEOUS EXTRACT OF COSTUS AFER STEM JUICE ON CUTANEOUS WOUND OF ADULT ALBINO RATS

Kudighe Patrick Udoh
University of Uyo Teaching Hospital, Nigeria

Skin regeneration is a major challenge of adult mammals that has only been overcome with elaborate and expensive procedures. This calls for the search for cheaper and readily available wound regeneration products. Thus, this study was to investigate the wound healing potential of costus afer stem juice which has been shown to contain pro-healing biomolecules and minerals. The study was carried on twenty-five adult female albino rats weighing between 243-320g. The rats were divided into 5 groups of group A without treatment; group B, treated only on the first day with iodine ointment; group C, treated for 7days with iodine ointment; group D, treated only on the first day with costus afer paste; and group E, treated for 7days with Costus afer paste. They were wounded on their dorsum under ketamine hydrochloride anaesthesia and were treated according to their groups upon haemostasis. Rate of contraction and re-epithelialization were evaluated digitally. The tensile strength of healed skin was measured using a tensiometer. Samples of the healed tissue were collected for H&E and Masson's trichrome histological assessment. It was found that groups D and E wounds treated with costus afer extract maintained an uninfected moist wound environment despite being open to the atmosphere. The rate of re-epithelialization was significantly highest in group D which also had a significantly highest tensile strength of 692.2g at $p<0.05$. There was no significant difference in the rate of contraction. H&E and Masson's trichrome sections showed randomly organized collagen fibres in groups D and E. There was also indication of growing hair follicles in group D. in conclusion, aqueous extract of costus afer stem prove to be more effective in wound healing than iodine. With advanced investigations, it could provide a convenient, common and affordable wound healing agent that can lead to skin regeneration.

BIOGRAPHY

Kudighe Patrick Udoh is a lecturer with the University of Uyo Teaching Hospital, Nigeria. She obtained her BSc. Anatomy and MSc from the University of Uyo. She is a passionate educator and researcher with research interest in tissue regeneration. She seeks to discover natural remedies that can be used effectively for regeneration of loss tissues. Her present work discovered a plant product that maintains an open moist wound environment and drives the healing process towards skin regeneration. She has publications in many journals and she is open for research collaboration.

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Note:

Kübrah Keskin et al., J Genet Mol Biol 2019, Volume 3

VASCULARIZATION OF A BONE MARROW MODEL

Kübrah Keskin, Sieber S, Marx U, Lauster R and **Rosowski M**
Technische Universität Berlin, Germany

The bone marrow is, as a harbour of the endosteal and perivascular niche of haematopoietic stem and progenitor cells (HSPCs), an important organ of the human body and has a tremendous role in regenerative medicine. Sieber et al. (2017) mimicked the endosteal niche by developing a dynamic bone marrow model harbouring HSPCs in co-culture with Mesenchymal Stromal Cells (MSCs) for up to eight weeks in a hydroxyapatite coated zirconium oxide-based ceramic. The cultivation of the 3D construct is realized within the "Multi-organ-chip" (MOC) developed at our chair. The MOC is a microfluidic device consisting of a circular channel system which connects two wells to cultivate organoids. To additionally mimic the perivascular niche, vascular structures must be added to the model. HUVECs, in co-culture with MSCs, elongate and form a primitive network. Since HSPCs must be cultivated in serum-free medium to prevent uncontrolled differentiation, tri-cultures were performed in which MSCs, HSPCs and HUVECs were cultivated in serum-free medium for 1 week. It could be shown that HUVECs survive in the serum-free medium and maintain primitive vascular structures. Moreover, it is planned to connect this tissue engineered vascularized dynamic 3D model with the endothelialized channel system of the MOC, to set up a closed *in vitro* system of a vascularized bone marrow model. This will give the opportunity for basic research als well as for diagnostics in regenerative medicine more efficiently without animal testing.

BIOGRAPHY

Kübrah Keskin is a Graduate of Biotechnology and is currently doing her PhD in the Department of Medical Biotechnology at the Technical University Berlin.

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