March 2022 | Volume 06
Journal of Cell Science and Mutation &
The Journal of Endocrine Disorders & Surgery

Joint Event

6th International Webinar on

STEM CELL AND DIABETES RESEARCH

March 16, 2022



Scientific Program

AGENDA

Wednesday, March 16, 2022

09:00-09:15

Opening Ceremony

KEYNOTE FORUM

09:15-10:00

Title: Case report: Psoriatic arthritis and stem cell therapy

Paul Dreschnack | Optimal Wellness | USA

10:00-10:45

Title: Diabetes is a complex neurological, multisystemic, multipathological, polygenomic disorder

Graham Wilfred Ewing | Northumbria University | UK

Networking & Refreshment Break 10:45-11:00

Session on: Stem Cells | Stem Cell Transplantation | Cell and Stem Cell Therapy



Session Chair: Paul Dreschnack
Optimal Wellness | USA

11:00-11:30	Title: Expression profiling in COPD – A new approach to resolving a complex pathophysiology **Rolf Ziesche** | Medical University of Vienna | Austria
11:30-12:00	Title: Understanding developmental mechanisms of primate just after implantation **Tomonori Nakamura** | Kyoto University | Japan
12:00-12:30	Title: Degenerative osteoarthritis a reversible chronic disease **Valerio Di Nicola** | University Hospitals Sussex | UK
12:30-13:00	Title: CMV serostatus of donor-recipient pairs as a risk factor for CMV infection after allogeneic stem cell transplantation **Anna Dmitrova** | National Research Center for Hematology | Russia

Lunch Break 13:00-13:15

Session on: Diabetes | Diabetes Diagnosis and Treatment | Diabetes Management



Session Chair: Graham Wilfred Ewing
Northumbria University | UK

13:15-13:45 Title: Management of newly diagnosed type 2 diabetes mellitus in alternative medicine: A case reports

Niraj Khatri Sapkota | Bishow Pharma | Nepal

13:45-14:15 Title: Targeted IL-22 as a therapeutic approach to islet and hepatic dysfunction in obesity

John Prins | University of Melbourne | Australia

14:15-14:45 Title: Discussion of a novel adjunctive therapy for patients with type 2 diabetes and mild cognitive impairment or Alzheimer's disease: A test for the hypothesis that vascular factors are modifiable risks for cognitive impairment

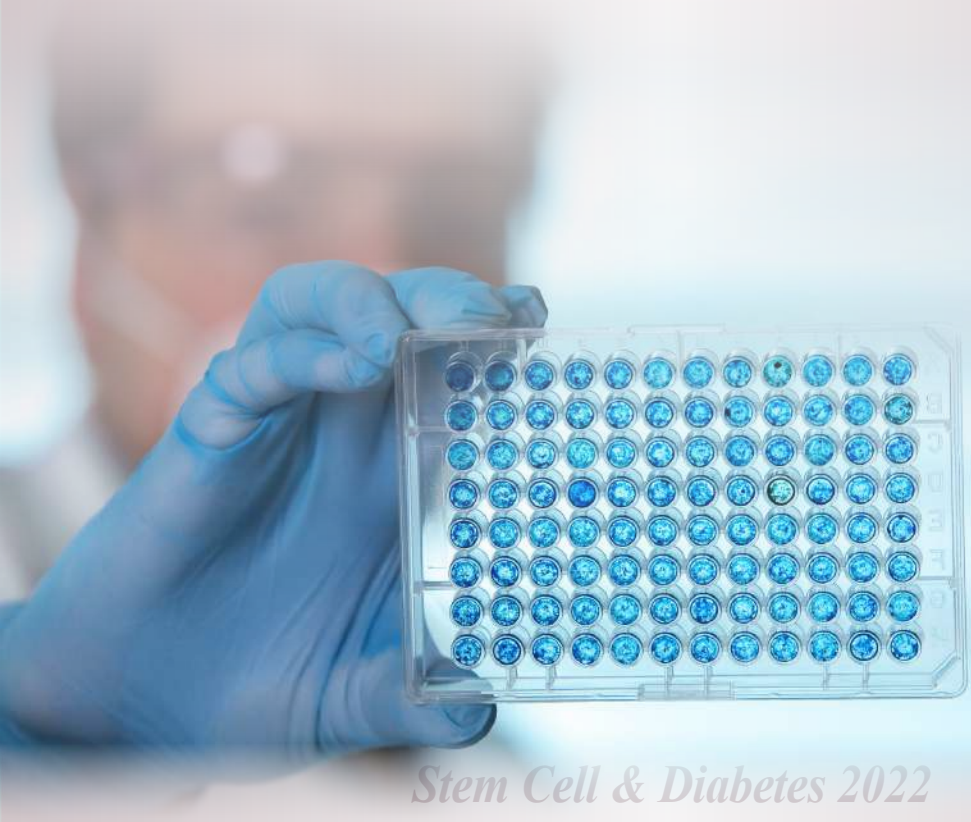
Patrick M Moriarty | University of Kansas Medical Center | USA

Thanks Giving & Closing Ceremony

Supporting Journals

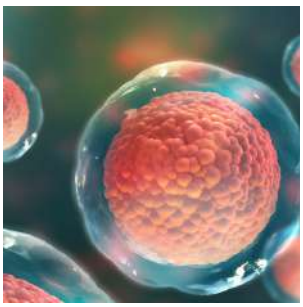
Journal of Cell Science and Mutation

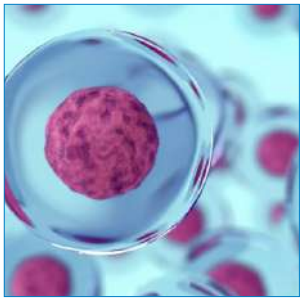
The Journal of Endocrine Disorders & Surgery



Keynote Forum
March 16, 2022

Stem Cell 2022 and
Diabetes Research 2022




6th International Webinar on

Stem Cell and Diabetes Research

March 16, 2022 | Webinar



Paul Dreschnack

Optimal Wellness, USA

Case report: Psoriatic arthritis and stem cell therapy

We report a case of a 63-year-old patient with a 20-year history of psoriatic arthritis that covered 80% of her body. After failed methotrexate therapy, her symptomology was well controlled with topical clobetasol. After treatment with adipose-derived stem cells for a painful knee, her skin pathology disappeared for 7 months without any further treatment. When lesions did return, they were of less severity then usually seen.

Speaker Biography

Dreschnack has completed his MD at Ross University and postdoctoral studies from State University of New york at Brooklyn and Louisiana State University School of Medicine in Plastic, Hand and Microsurgery. He is the director of Optimal Wellness. He is a multiple Nobel Peace Prize nominee for his work as Assistant Director of The India Project. His team operated on over 300,00 children in India with congenital birth defects free of charge. He is a researcher in stem cells and exosomes since 1982 at Yale University.

e: drpaul@microsurgery.com



Graham Wilfred Ewing

Northumbria University, UK

Diabetes is a complex neurological, multisystemic, multipathological, polygenomic disorder

This paper illustrates that the brain is a biophysical entity in which both sensory and biological input sustain its biophysical and computational function. This leads to the conclusion that the brain works in a multi-level and coherent manner to optimise and/or regulate the body's multi-systemic stability and function. It further illustrates that the 'optimisation of blood glucose levels' exhibits the characteristics of a neurally regulated physiological system in which blood glucose levels are regulated between higher and lower limits i.e. 4-8 mmol/l blood glucose; that types 1 and 2 diabetes are comorbidities thereby explaining the inaccuracies reported when diagnosing diabetes; that under pathological conditions mainly in the pancreas, but also as a result of pathological onset in adjacent organs and systems, there is an imbalance between insulin expression and insulin reactivity which leads to increased or decreased blood glucose levels, elevated blood viscosity, the onset of free radical reactions, the subsequent production of complex glycated proteins/ lipids and metabolites, altered colour perception. Moreover, such precise knowledge; which is embodied in Grakov's mathematical model of the relationship between sense perception, brain function, the autonomic nervous system and physiological systems, and pathological onset; can be applied to screen the patient's health (as Strannik Virtual Scanning) and/or as a neuro modulation type technique (as Strannik Light Therapy) to treat autonomic dysfunction and the range of comorbidities experienced by diabetic and obese patients.

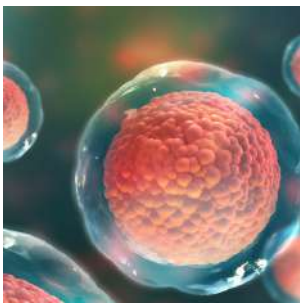
Speaker Biography

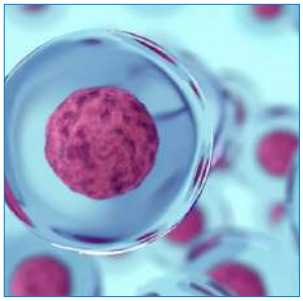
Graham is author of ca90 peer-reviewed medical papers, several books and book chapters, various rapid responses in the BMJ, many articles in trade magazines; a key opinion or thought leader; a ResearchGate index of 16.58; >22,000 Linkedin connections; 20,000-30,000 downloads of his papers by researchers; a researcher of growing international repute re: the relationship between sense perception, brain function, the ANS and physiological systems, and cellular and molecular biology; how such knowledge can be applied as the basis of a sophisticated Artificial/ Actual Intelligence technique; author of an extensive program of articles re diabetes and related diabetic comorbidities incl. Alzheimer's Disease, which illustrate the multi-systemic nature of the condition(s); the aging process (the autonomic hypothesis); how organs function in coherent systems; the limitations of biomedicine; how Strannik compares with the key aims and objectives of the EC's Human Brain Project, etc. This program of articles illustrates the brain regulates, and yet is influenced by, the visceral organs; why the effectiveness of drugs declines over a period of time; why most diagnostic tests are not, and cannot be 'a precise measure' of a medical condition; why CAM therapies may have a therapeutic effect; why flashing lights cause photosensitive events and can have a therapeutic effect; the significance of the EEG frequencies; how an understanding of the ANS could reduce the need for organ transplants; and the fundamental causes of migraine, dyslexia and autism.

e: graham.ewing@quemaco.co.uk

Scientific Tracks & Sessions
March 16, 2022

Stem Cell 2022 and
Diabetes Research 2022




6th International Webinar on

Stem Cell and Diabetes Research

March 16, 2022 | Webinar

Stem Cells | Stem Cell Transplantation | Cell and Stem Cell Therapy



Chair
Paul Dreschnack
Optimal Wellness
USA

Session Introduction

Title: Expression profiling in COPD – A new approach to resolving a complex pathophysiology
Rolf Ziesche | Medical University of Vienna | Austria

Title: Understanding developmental mechanisms of primate just after implantation
Tomonori Nakamura | Kyoto University | Japan

Title: Degenerative osteoarthritis a reversible chronic disease
Valerio Di Nicola | University Hospitals Sussex | UK

Title: CMV serostatus of donor-recipient pairs as a risk factor for CMV infection after allogeneic stem cell transplantation
Anna Dmitrova | National Research Center for Hematology | Russia

Expression profiling in COPD – A new approach to resolving a complex pathophysiology

Rolf Ziesche
Medical University of Vienna, Austria

Three features of COPD have possibly troubled physicians most: a) a complex pathology characterized by relentless bronchial inflammation, dissolution of gas exchanging tissue combined with focal scarring, and all this driven by environmental hazards, b) its individual heterogeneity, and finally, c) the sheer length of this process, frequently covering decades.

A prospective study combining the analysis of validated clinical measures of COPD with genome-wide transcription analysis of peripheral lung tissue has now allowed for the first integrated view of COPD pathology.

The data suggest an incremental pathology commencing with the biophysical and metabolic consequences of failing surface integrity. This initial step results in an unresolved vulnerability towards any airborne hazards causing chronic airway inflammation and by that, in a growing challenge to organ repair. Owing to an individual's regenerative repair capacity upholding structure and function, this process may span decades. Only when the glycosaminoglycan matrix of the bronchial wall and the surrounding alveolar compartment will dissolve in combination with reduced primary repair, full-blown COPD will appear, and the prevailing secondary repair will then just permit a maintenance of structure at the prize of loss of function. This first holistic view must now be confirmed and further exploited in more detail. Nonetheless, we have come a step closer to an understanding of COPD pathology.

Speaker Biography

Rolf Ziesche MD is working as Associate Professor of Pulmonary and Internal Medicine at the Medical University of Vienna, Austria. He is also founder of the Pharmaceutical and Medical Research Start-up Transgenion in Vienna.

e: rolf.ziesche@meduniwien.ac.at

Understanding developmental mechanisms of primate just after implantation

Tomonori Nakamura
Kyoto University, Japan

It has been 15 years since the first human iPSC was established. Since then, various differentiation systems using human PSCs (pluripotent stem cells) have been established, and the PSC derivatives are now expected to be perfect source for regenerative medicine. As you know, mice are excellent mammalian model, and have contributed not only to the elucidation of many evolutionarily conserved phenomena, but also the establishment of the many human PSC differentiation protocols. However, species differences between mice and humans have also become apparent. For example, although BMPs are used in various differentiation systems and the differentiated human PSCs are reported to give rise to trophectoderm lineage, such phenomena has not been seen in mouse model. Such contradictions are caused by the lack of the knowledg of human embryogenesis, especially the molecular mechanisms underlying the human gastrula development which takes place immediately after implanation. To overcome this issue, we have studied primate development using cynomolgus monkeys which are the evolutionaly closest animals among the experimentaly ameneable organisms. In my talk, I will provide an overview about non-human primates from the evolutional aspect, and the recent outcomes of the research which I have done using the cynomolgus monkeys.

Speaker Biography

Tomonori Nakamura has completed his PhD from the Center for iPSC Research and Application (Dr. Shinya Yamanaka lab) at Kyoto University and postdoctoral studies from Graduate School of Medicine (Dr. Mitinori Saitou lab) at Kyoto University. He is now an associate professor of a New Institute for The Advanced Study of Human Biology, and The Hakubi Center for the Advanced Research at Kyoto University. He has been working on pluripotency using stem cells and *in vivo* materials of mouse as well as human and monkey, and published more than 25 papers on those studies in reputed journals.

e: nakamura.tomonori.4v@kyoto-u.ac.jp

Notes:

Degenerative osteoarthritis a reversible chronic disease

Valerio Di Nicola
University Hospitals Sussex, UK

Osteoarthritis (OA) is the most common chronic musculoskeletal disorder. It can affect any joint and is the most frequent single cause of disability in older adults. OA is a progressive degenerative disease involving the entire joint structure in a vicious circle that includes the capsule-bursa tissue inflammation, synovial fluid modifications, cartilage breakdown and erosions, osteochondral inflammatory damage leading to bone erosion and distortion.

Research has identified the initial inflammatory-immunologic process that starts this vicious cycle leading to so-called early OA. Research has also identified the role played in the disease advancement by synoviocytes type A and B, chondrocytes, extracellular matrix, local immune-inflammatory mediators and proteases.

This article investigates the joint-resident MSCs that play an essential local homeostatic role and regulate cell turn over and tissue repair. Resident MSCs establish and maintain a local regenerative microenvironment. The understanding of OA physiopathology clarifies the core mechanisms by which minimally invasive interventions might be able to halt and reverse the course of early-stage OA. Interventions employing PRP, MSCs and exosomes are considered in this presentation.

Speaker Biography

Valerio Di Nicola (VDN) is a surgeon and researcher currently working as consultant in general, emergency, and lower GI Surgery and lead of research and surgical audit at University Hospitals Sussex (UHSussex), NHS Foundation Trust- Worthing Hospital- BN112DH (UK). Further, he is the scientific director of the Regenerative Surgery Unit (RSU), Villa Aurora Hospital-Foligno-Italy. VDN started his career in regenerative medicine research during his PhD in microsurgery (1994-1999) at the Policlinico Umberto I - "Sapienza" University of Rome (Italy). From May 2013 to June 2015, VDN was scientific director of the Interbion Foundation for Basic Biomedical Research. Montedato, CH-6595 Riazzino, Switzerland. VDN has recently presented to various international conferences and published his new model of care delivered by the Regenerative Surgery Unit (RSU).

e: valerio.di-nicola@nhs.net

Notes:

CMV serostatus of donor-recipient pairs as a risk factor for CMV infection after allogeneic stem cell transplantation

Anna Dmitrova
National Research Center for Hematology, Russia

Cytomegalovirus infection (CMV infection) remains a frequent complication, associated with multiorgan disease in immunocompromised patients especially in patients after allogeneic stem cell transplantation (allo-HSCT). The presence of CMV IgG antibodies shows the immune response to human CMV of individuals. Many studies have shown that donor / recipient (D / R) CMV serostatus is an important factor that influences on the patient outcomes after allo-HSCT.

In our study we try to assess the incidence of CMV infection during 6-months follow-up period in patients after allo-HSCT depending on D / R CMV serostatus. Detailed patient characteristics (n=108) are presented in a table 1. We performed the CMV IgG antibody test in patients and their donors before allo-HSCT. Then we identified the D / R pairs depending on their positive or negative CMV IgG tests (=CMV status). In every group we investigated the incidence of CMV infection from 0 to 180 days after allo-HSCT. CMV infection was defined as detection of CMV DNA in any body fluid or tissue specimen by real-time polymerase chain reaction.

Our data presented in the table 1 show, that the incidence of CMV infection during 6-months follow-up period was higher in groups, where R+ had positive tests for CMV IgG. It confirms that CMV seropositive recipient serostatus remains the significant risk factor for CMV infection. The development of CMV infection from 30 to 180 days after allo-HSCT in the group D+ / R- was higher compared to D- / R- group. Possibly, it is associated with the incidence of acute and chronic graft-versus-host disease (GVHD) and long-term immunosuppression that increase the risk for CMV infection.

Therefore, to improve patient outcomes after allo-HSCT researchers should depend not only on the human leukocyte antigens (HLA) matching but also on the donor / recipient CMV serostatus.

Table 1. The impact of CMV serostatus of donor and recipient (D / R) on the incidence of CMV infection.

Patient characteristics (n=108)	D- / R-, n = 9	D+ / R-, n = 8	D- / R+, n = 15	D+ / R+, n = 76	p-value[1]
Gender, n (%)					0.39
Female	3 (33%)	6 (75%)	9 (60%)	44 (58%)	
Male	6 (67%)	2 (25%)	6 (40%)	32 (42%)	
Age, Median (IQR)					0.79
	37 (30 – 41)	29 (23 – 46)	35 (29 – 47)	37 (28 – 43)	
Diagnosis, n (%)					
Aplastic anemia	-	-	-	1 (1.3%)	0.18
Lymphoma	2 (22%)	-	-	1 (1.3%)	
Myelodysplastic syndrome (MDS)	-	-	1 (6.7%)	12 (16%)	
Acute lymphoblastic leukemia (ALL)	3 (33%)		6 (40%)	25 (33%)	
Acute myeloid leukemia (AML)	3 (33%)		6 (40%)	35 (46%)	
Primary myelofibrosis	-		1 (6.7%)	-	
Chronic lymphocytic leukemia (CLL)	-		1 (6.7%)	-	
Chronic myelogenous leukemia (CML)	1 (11%)	-	-	1 (1.3%)	
Chronic myelomonocytic leukemia (CMML)	-	-	-	1 (1.3%)	
Conditioning regimen, n (%)					
Myeloablative conditioning regimen (MAC)	1 (11%)	2 (25%)	3 (20%)	9 (12%)	0.52
Reduced intensity conditioning regimen (RIC)	8 (89%)	6 (75%)	12 (80%)	67 (88%)	
Graft source, n (%)					
Bone marrow	1 (11%)	-	3 (20%)	17 (22%)	0.60
Peripheral blood stem cells	8 (89%)	8 (100%)	12 (80%)	59 (78%)	
Type of donor, n (%)					
Matched related donor (MRD)	1 (11%)	1 (12%)	3 (20%)	24 (32%)	**<0.001**
Matched unrelated donor (MUD)	4 (44%)	-	8 (53%)	16 (21%)	
Mismatched unrelated donor (MMUD)	-	-	4 (27%)	8 (11%)	
Haploidentical related donor	4 (44%)	7 (88%)	-	28 (37%)	
CMV infection (0 – 30 days after allo-HSCT), n (%)					
No	9 (100%)	8 (100%)	7 (47%)	56 (74%)	**0.007**
Yes	-	-	8 (53%)	20 (26%)	
CMV infection (30 – 90 days after allo-HSCT), n (%)					
No	8 (89%)	3 (38%)	3 (20%)	28 (37%)	**0.007**
Yes	1 (11%)	5 (62%)	12 (80%)	48 (63%)	
CMV infection (90 – 180 days after allo-HSCT), n (%)					
No	7 (88%)	2 (50%)	10 (83%)	48 (77%)	0.52
Yes	1 (12%)	2 (50%)	2 (17%)	14 (23%)	

[1]Fisher's exact test; Kruskal-Wallis rank sum test

Speaker Biography

Anna Dmitrova has completed her study at RUDN University, Russia at the age of 23 years. She is a fellow in the department of bone marrow transplantation in National Research Center for Hematology, Russia. She studies reconstitution of cytomegalovirus-specific T cell immunity in patients after allogeneic stem cell transplantation, management and prophylaxis of cytomegalovirus infections. She has over 50 publications. She is also working on development of unrelated donation in Russia with the unrelated donor-recruiting group in National Research Center for Hematology, Russia.

e: dr.admitrova@gmail.com

Diabetes | Diabetes Diagnosis and Treatment | Diabetes Management



Chair
Graham Wilfred Ewing
Northumbria University
UK

Session Introduction

Title: Management of newly diagnosed type 2 diabetes mellitus in alternative medicine: A case reports

Niraj Khatri Sapkota | Bishow Pharma | Nepal

Title: Targeted IL-22 as a therapeutic approach to islet and hepatic dysfunction in obesity

John Prins | University of Melbourne | Australia

Title: Discussion of a novel adjunctive therapy for patients with type 2 diabetes and mild cognitive impairment or Alzheimer's disease: A test for the hypothesis that vascular factors are modifiable risks for cognitive impairment

Patrick M Moriarty | University of Kansas Medical Center | USA

Management of newly diagnosed type 2 diabetes mellitus in alternative medicine: A case reports

Niraj Khatri Sapkota
Bishow Pharma, Nepal

Herbal drugs are usually incorporated plant formed mixture in the treatment of diabetes and other disease in Ayurveda and their reported side effects are very less and cost effective. Type 2 diabetes is a condition of insulin insensitivity or the state of resistance of insulin which leads to impairment of glucose utilization. Debix an Ayurved herbal drugs mixture was provided to manage the newly diagnosed diabetes in otherwise healthy 33 years old male with no history of any other disease or medication, on continuous 4 months of treatment plus recommendation to adopt lifestyle modification and 30 minutes of exercise the patient exhibited normal blood glucose report as well as HbA1c was quite improved and finally reached at normal percentage. This sort of data in Ayurveda clinical case study is scarcely reported and published means no report is generally made in scientific way in Ayurveda hence this case presentation will be beneficial to the Ayurveda practitioner.

The rationale of this case report is, basis of treatment in Ayurveda can be commenced in newly diagnosed diabetes by Debix, a proprietary Ayurvedic medicine manufactured by Sandu Pharmaceutical Pvt.Ltd without any report of side effects under continuous supervision, at least for four months to fully manage the case.

Speaker Biography

Niraj Khatri Sapkota has completed his PhD in Molecular Physiology applications to pharmacology at the age of 32 years from Zhejiang University, China, one of the Thomson Reuters and Elsevier best ranked university of the world; he is now working as an Associate Professor in the Department of Physiology in Chitwan Medical College affiliated to Tribhuvan University, Nepal. He is an active researcher and academician of his country, Nepal. He has published more than 50 papers both original and review papers as a single author or with collaboration in reputed international journals and is serving as a reviewer, advisory and editorial board member and Editor of more than 30 international reputed journals.

e: labphysiology0@gmail.com

Notes:

Targeted IL-22 as a therapeutic approach to islet and hepatic dysfunction in obesity

John Prins, Sumaira Hasnain and **Michael McGuckin**
University of Melbourne, Australia

IL-22 is and endogenous cytokine with recognized actions to reduce cellular oxidative and ER stress. IL-22 is under therapeutic investigation and clinical trial in a range of inflammatory disorders but off-target effects are reported, particularly in skin and gut. To address this challenge and improve the therapeutic window for IL-22, we have developed a range of IL-22-based peptide drugs that have a specific moiety targeting the IL-22 to pancreatic islets and liver. Preclinical studies confirm that IL-22 is preferentially targeted to these organs, with minimal exposure to skin and gut. *In vitro* and preclinical data show that the action and efficacy of the IL-22 in unimpaired by the targeting moiety. In a range of mouse models of obesity, T2D and NAFLD twice- weekly sc administration of targeted IL-22 provides significant improvement in insulin levels and glucose tolerance (GTT and ITT). Therapy also significantly improves hepatic steatosis and inflammation, liver weight, and serum transaminases in a dose- dependent manner. Total body weight is reduced with therapy. Hepatic and islet tissue analyses demonstrate reduction in oxidative and ER stress in response to the targeted IL-22 therapy, confirming the proposed mechanism of action. We are currently evaluating the effect of targeted IL-22 in a range of preclinical models of liver disease with prominent steatosis and/or fibrosis and comparing this effect to existing therapies. To date, we have not observed any off-target organ adverse effects of targeted IL-22 and there is no evidence of systemic toxicity. We believe that targeted IL-22 is a promising approach to harnessing the beneficial effects of this endogenous anti-inflammatory cytokine. Given the dual action to improve glucose metabolism and reduce steatosis and hepatic dysfunction, targeted IL-22 may be a useful and efficacious therapy in a range of patients with metabolic dysfunction associated with obesity.

Speaker Biography

John Prins is an endocrinologist and scientist with a longstanding interest in obesity and associated metabolic dysfunction, particularly T2D and NAFLD. He is currently head of the medical school at the University of Melbourne, and senior consultant endocrinologist at Royal Melbourne Hospital. He has over 150 publications and his H-index is 54.

e: john.prins@unimelb.edu.au

Notes:

Discussion of a novel adjunctive therapy for patients with type 2 diabetes and mild cognitive impairment or Alzheimer's disease: A test for the hypothesis that vascular factors are modifiable risks for cognitive impairment

Patrick M Moriarty[1], L Gorby[1], D Salat[2], J Burns[3], T Moreno[4] and **J Helfgott[4]**

[1]University of Kansas Medical Center, USA

[2]Harvard Medical School, USA

[3]Kansas University Alzheimer's Disease Center, USA

[4]Renew Research, USA

All major dementias share an underlying vascular component. In Alzheimer's disease (AD), nearly 80% of autopsy-confirmed cases show evidence of cerebrovascular disease, doubling the likelihood that neurodegenerative pathology will manifest as dementia or mild cognitive impairment (MCI) earlier in life. Often, vascular pathologies precede neurodegeneration associated with AD. Type 2 diabetes (T2D) involves a complex cascade of cardiovascular malfunction that impairs glucose delivery to neurons and doubles the risk of developing AD. Cerebral hypoperfusion and endothelial dysfunction in T2D may underlie this risk relationship and contribute to neuronal apoptosis. Following the WHO proclamation linking global brain and cardiovascular health efforts, 3 important considerations are necessary to translate clinical evidence into effective interventions for patients with AD: 1) recognizing that vascular components of brain health provide new target opportunities for effective AD prevention; 2) realizing that ongoing efforts to repurpose and reindicate regulatory-approved vascular interventions for AD treatment can offer an innovative, efficient approach to provide safe and quickly effective interventions for dementia; and 3) appreciating that there are under-represented, vulnerable populations with increased burden and more rapid progression of dementia, due to increased risk for cardiovascular comorbidities, higher incidence of T2D, and less access to quality healthcare. Addressing these 3 factors should increase the likelihood of available effective dementia interventions. Specifically, external counterpulsation (ECP) technology offers one novel approach to introduce both an FDA-approved product and a CMS-eligible medical therapy that may be reindicated for the AD and comorbid T2D population. Presently, this therapy is indicated for refractory angina to improve coronary and peripheral hemodynamics. ECP sequentially compresses and decompresses the vasculature of extremities in synchrony with the cardiac cycle to increase blood flow, instigate angiogenesis, and improve endothelial function, all of which have been shown to influence neuronal function and brain health. In light of recent approval of aducanumab, the need for therapies to ameliorate a vital clinical feature of the disease (ie, cognitive decline), and thereby reduce duration of disability, is especially clear.

Speaker Biography

Patrick M Moriarty, MD, is professor of medicine at University of Kansas Medical Center in Kansas City. He is director of Clinical Pharmacology and the Atherosclerosis & Lipid-Apheresis Center. He earned his Doctorate in Medicine and Surgery at University of Rome School of Medicine and Surgery, Italy, and completed his residency in internal medicine and training in clinical pharmacology at University of Kansas Medical Center. He is a fellow of the American College of Physicians, American College of Cardiology, European Society of Cardiology, and National Lipid Association; he was 2014-2015 president of the International Society for Apheresis. He is a manuscript reviewer for multiple journals, and associate editor for *Journal of Clinical Apheresis* and *Journal of Clinical Lipidology*. Dr. Moriarty has published over 100 peer-reviewed articles/chapters. His research activities include atherosclerosis, familial hypercholesterolemia, Lp(a), lipoprotein-apheresis, vascular inflammation, dementia, and hemorheology. He has participated in numerous trials related to dyslipidemia, Lp(a), obesity, hypertension, dementia, and diabetes. He is a member of the scientific advisory board for the FH Foundation. His clinical activities involve the treatment and diagnosis of atherosclerosis and cardiovascular disease. University of Kansas Lipoprotein-Apheresis Center is the largest in North America for treatment of familial hypercholesterolemia and elevated Lp(a)..

e: pmoriarty02@gmail.com

Upcoming Conference

3rd International Conference on

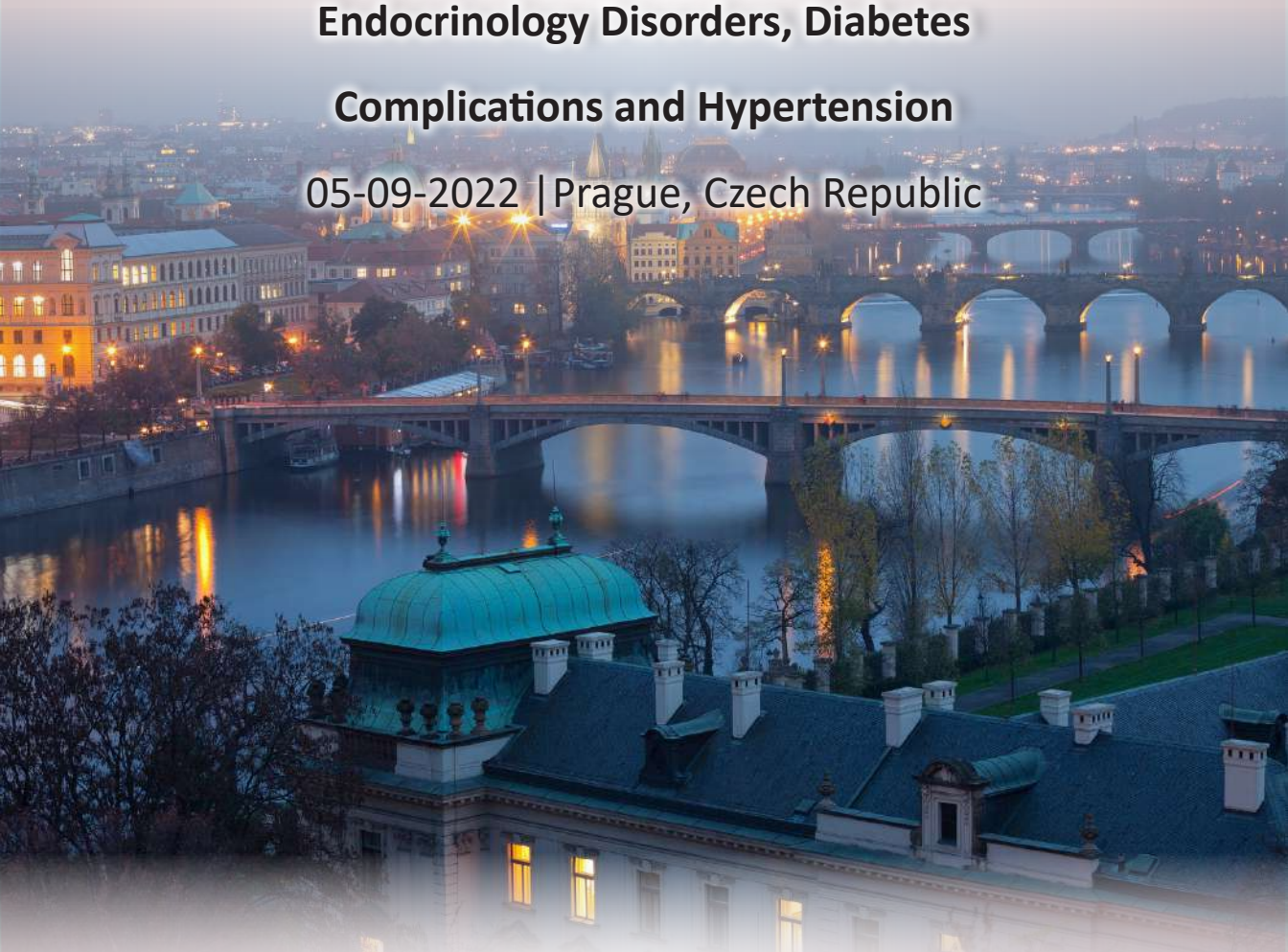
Clinical Oncology and Pharmacology

June 6-7, 2022 | Webinar

4th International Conference on

Endocrinology Disorders, Diabetes Complications and Hypertension

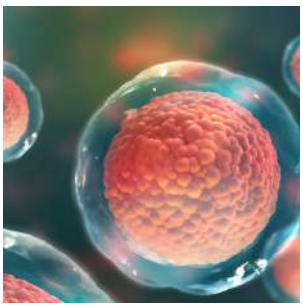
05-09-2022 | Prague, Czech Republic

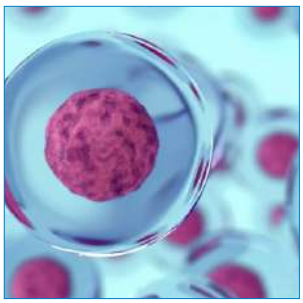


Stem Cell & Diabetes 2022

Accepted Abstracts

Stem Cell 2022 and Diabetes Research 2022




6th International Webinar on

Stem Cell and Diabetes Research

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Intestinal stem cell differentiation after massive small bowel resection is regulated by Notch signaling in a rat model

Igor Sukhotnik
University of Michigan Medical School, USA

Objective: Notch signaling promotes differentiation to the absorptive cell lineage rather than to the secretory cell lineage. The objective of this study was to determine the role of Notch signaling in intestinal stem cell differentiation in a rat model of short bowel syndrome (SBS).

Methods: Male Sprague-Dawley rats were randomly assigned to one of two experimental groups of 8 rats each: Sham rats underwent bowel transection and re-anastomosis, SBS- rats underwent 75% mall bowel resection. Rats were sacrificed on day 14. Illumina's Digital Gene Expression (DGE) analysis as used to determine Notch signaling gene expression profiling. Notch-related gene and protein expression were determined using Real Time PCR, Western blotting and immunohistochemistry.

Results: From 7 investigated Notch-related (by DGE analysis) genes 6 genes were up-regulated in SBS vs control animals with a relative change in gene expression level of 20% or more. A significant up-regulation of Notch signaling related genes in resected animals was accompanied by a significant increase in Notch-1 protein levels (Western Blot) and a significant increase in NOTCH-1 and Hes -1 (target gene) positive cells (immunohistochemistry) compared to sham animals. Evaluation of cell differentiation has shown a strong increase in total number of absorptive cells (unchanged secretory cells) compared to control rats.

Conclusions: Two weeks after bowel resection in rats, stimulated Notch signaling directs crypt cells population toward absorptive progenitors.

e: igor-dr@internet-zahav.net

Homogeneous distribution of hMSC in 3D PCL scaffold by electrical stimulation

Jong-Chul Park
Yonsei University College of Medicine, Republic of Korea

Tissue engineering has shown tremendous promise in creating biological alternatives for harvested tissues, implants, and prostheses. An ideal scaffold for tissue regeneration should possess large porosity and pore size for good infiltration of cells, high pore interconnectivity for tissue ingrowth. Cell culture in 3-D porous scaffolds is often impaired by the difficulty of achieving a homogeneous cell seeding and by the diffusion constraints within the cell-scaffold constructs. In the present study, we investigated the effect of electric stimulation on the migration of hMSCs and infiltration of hMSCs into 3D PCL scaffold by electric stimulation.

To fabricate the porous scaffold, we simulated the current distribution in designed scaffold using comsol physics computer program. We designed lattice structure for difficult infiltration without any stimulation. Then, 3D PCL scaffolds was fabricated by 3D printing. During electrotaxis on 2D, hMSCs moved toward the anode or cathode under direct current electric fields. Cell seeded into PCL scaffold, incubated for 1day, and then treated 1000 μA electric for 3h using a customized agar-salt electrotaxis chamber. After electric current treatments, cell distribution on PCL scaffold were visualized by immunofluorescence staining. As a result, if there was no electric treatment, cell stayed near the surface of scaffold. However, electric stimulation enhanced the infiltration of cells into scaffold and hMSC distributed and proliferated on 3D scaffolds for 28 d, homogenously. In conclusion, the infiltration of hMSCs into scaffold was enhanced by the control of migration using physical stimulations as electrical stimulation.

e: parkjc@yuhs.ac

An autofluorescence-based isolation of Leydig cells for testosterone deficiency treatment

Peng Luo
Sun Yat-sen University, China

Statement of the Problem: Testosterone deficiency (TD) occurs when the serum testosterone levels are insufficient and can cause a series of clinical symptoms, including sexual dysfunction, obesity, muscle weakness and osteoporosis. Leydig cells (LCs) produce more than 95% of serum testosterone and the in-depth study of biological characteristics and regulatory mechanisms of LCs on testosterone production is helpful to elucidate the pathogenesis of TD. However, the density gradient centrifugation, as the currently main method for LC isolation, remain challenging. The purpose of this study is to identify the testicular autofluorescent cells and describe a simple and effective autofluorescence-based method for isolating LCs. Methodology: Testicular autofluorescent cells were isolated by FACS, and identified by qRT-PCR analysis and immunofluorescence staining. Then, the autofluorescent cells were further divided into two subpopulations by the combination of two fluorescence channels in FACS. The immunofluorescence staining, Live/Dead assay, cell counting, substrate utilization assay and LH stimulation assay were respectively used to evaluated the purity, viability, quantity and function of obtained LCs. Finally, the isolated LCs were subcutaneously implanted into castrated mice to evaluate the therapeutic potential of LCs *in vivo*. Findings: Testicular autofluorescent cells were composed of macrophages and LCs. Our autofluorescence-based method by the combination of two fluorescence channels successfully purified LCs from macrophages. Of note, the isolated LCs had high purity (>98%), viability (>98%) and quantity (approximately 4 × 105 cells per mouse) and maintained intact biochemical function. Moreover, subcutaneous transplantation of isolated LCs could relieve the symptoms of TD in castrated mice. Conclusion & Significance: we established a simple autofluorescence-based method that allows efficient isolation of well-functioning LCs with high purity, viability and quantity. This method can be used in detailed biological studies of LCs and will promote further advances in LC replacement therapies for TD.

e: cmy810218@gmail.com

Magnesium sulfate improves insulin resistance in type 2 diabetic parents and their offspring in both animal model and diabetic patients

Nepton Soltani

Isfahan University of Medical Sciences, Iran

The role of magnesium sulfate ($MgSO_4$) in attenuates insulin resistance (IR) in type 2 diabetic (T2D) patients and the reduction of the risk of IR in liver and muscle of their offspring. T2D was induced by high fat diet and 35 mg/kg of streptozotocin. The male and female diabetic rats were then divided into three groups: CD, Mg, and insulin. NDC group received a normal diet. All the animals were studied for a six-month. Their offspring were just fed with normal diet for four months. Blood glucose was measured weekly in patients and their offspring. Intraperitoneal glucose tolerance test (IPGTT), urine volume, and water consumption in both patients and their offspring were performed monthly. The hyperinsulinemic euglycemic clamp in both patients and their offspring was done and blood sample collected to measure hemoglobin A1c (HbA1c) and plasma lipid profile. IRS1, Akt and GLUT4 gene expressions in muscle were evaluated in all the groups. FOXO1 and phosphoenolpyruvate carboxykinase gene expressions also measured in all groups. Plasma and liver lipid profile and liver glycogen level were measured in all groups. $MgSO_4$ or insulin therapy decreased blood glucose, IPGTT, plasma lipid level and HbA1c in patients and their offspring compared to DC group. They also increased glucose infusion rate in patients and their offspring. IRS1, Akt and GLUT4 gene expressions improved in both patients in comparison with DC group. $MgSO_4$ could decreased gluconeogenesis pathway in both parents and their offspring. $MgSO_4$ exerts beneficial effects on IRS1 and Akt gene expressions in Mg treated offspring. $MgSO_4$ therapy improved insulin resistance in diabetic patients by increasing the expression of GLUT4 in the muscle and reduce gluconeogenesis pathway in the liver it also could improve plasma lipid profile in both parents and their offspring. $MgSO_4$ is also indirectly able to reduce insulin resistance in their offspring possibly through the increased gene expressions of IRS1 and Akt and gluconeogenesis pathway in the liver.

e: solnep2002@yahoo.com

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