10th International Conference on

CANCER STEM CELLS AND ONCOLOGY RESEARCH

June 26-28, 2017 London, UK

Scientific Tracks & Abstracts

Day 1

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Cancer Treatment and Therapeutics | Onco-Cardiology | Blood Cancer

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Diana Anderson
University of Bradford, UK

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Session Introduction

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Jeehyun Yoe, Pohang University of Science and Technology, Korea

Arjun Ghosh, J Cancer Sci Ther 2017, 9:5(Suppl)
DOI: 10.4172/1948-5956-C1-102

Cardio-oncology- What it is and why we need it?

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Barts Health NHS Trust, UK

Cardio-Oncology is an emerging specialty. It deals with the cardiac care of cancer patients in the most holistic sense. Screening, monitoring and intervention are the 3 key therapeutic initiatives in cancer patients exposed to potentially cardiotoxic chemotherapy and/or radiotherapy. Cardiotoxicity is a significant burden in those treated with anthracyclines and Trastuzumab and can complicate therapy with newer agents such as proteasome inhibitors. In addition, chemotherapy can result in arrhythmias, myocarditis, arterial and venous thromboembolism and hypertension while radiotherapy can lead to valve disease, pericarditis and diastolic and systolic dysfunction.

Biography

Arjun Ghosh, MBBS, MRCP (UK), MRCP (Card), MSc, PhD, FHEA, is working as a Consultant Cardiologist at Barts Heart Centre (BHC), St. Bartholomew's Hospital, London and at University College London Hospital (UCLH) is one of the first Cardiologists in the UK appointed specifically in Cardio-Oncology. He helped establish Cardio-Oncology services at both these hospitals. The services deal with screening for cardiotoxicity, monitoring patients on potentially cardiotoxic therapy and managing cardiac complications of cancer therapy. Patients are seen in clinics at BHC twice a week and once a week at UCLH. These clinics are one-stop with investigations (echocardiography, cardiac MRI etc.) on the day enabling rapid assessment and formation of a management plan on the day itself. Alongside the clinical service, Cardio-Oncology research is undertaken at both sites and there is a thriving educational component to the service with fellows from the UK and across the world. He has also established one of the first Cardio-Oncology MDTs in the world at BHC. He will explain the role of Cardio-Oncology in the management of cancer patients and expand on the Cardio-Oncology service models at BHC and UCLH.

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Notes:

Adnan Yousif Rojeab, J Cancer Sci Ther 2017, 9:5(Suppl)
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A new approach strategy to cure cancer

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The original of the cancer is a special mechanism which been created to eliminate the severe damage against the body, while the immune system is failing to cure the damages. The right method to vanish the action of the cancer is by applying a direct, right and simple treatment to those of previous diseases, which have caused to create the cancer, but without trying to treat the cancer itself. There is a similarity in lengthening characteristic of the telomere, in every replication of DNA, between the cancer cells and with those of stem and germ cells, where these cells are not forming a tissue. While in somatic cells, the telomere shortens in every DNA replication, which is by the action of remnant magnetisation. One other, possible, method to eliminate the cancer is, by, exposing the cancer cells to a suitable amount and direction of a magnetic field. This method is aimed in direction of inhibiting the lengthening of telomere, towards the characteristic of somatic cells.

Biography

Adnan Yousif Rojeab is working in the Electrical and Electronic Engineering Department, at London College UCK, London, UK. His international experience includes various programs, contributions and participation in fields of study. His research interests reflect in his wide range of publications in various national and international journals. He has been a recipient of many award and grants.

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Songul CETIK et al., J Cancer Sci Ther 2017, 9:5(Suppl)
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Hypericum triquetrifolium Turra against cyclophosphamide-induced hemorrhagic cystitis in rats

Songul CETIK[1], **Cumali Keskin**[1], **Cemil Demir**[1] and **Adnan Ayhanci**[2]
[1]Mardin Artuklu University, Turkey
[2]Eskisehir Osmangazi University, Turkey

A cyclophosphamide (CYP) usage is limited by side effects of it, are commonly used as antineoplastic drug. Hemorrhagic cystitis is one of the most important side effects of CYP chemotherapy. Antioxidants such as *Hypericum triquetrifolium* Turra (HT) show an important antioxidant and anti-carcinogenic properties with its rich contents. This study investigated the possible cytoprotection effect of HT (25, 50, 100 mg/kg, i.p., for 6 days) in CYP (150 mg/kg, single dose, i.p.) treated rats, and attempted to obtain a suitable new agents. Creatinin (CK), malondialdehyde (MDA), total oxidant capacity (TOC), total antioxidant capacity (TAC) and oxidative stress index (OSI) levels were measured in blood serum. Furthermore, the bladder tissue samples were investigated histopathological. In the only CYP group CK, MDA, TOC and OSI levels found increased while TAC level decreased. According our results high dose CYP caused the edema, necrosis, bleeding and tissue erosions, hemorrhage and separation of the muscle fibers supported the our biochemical results. After pretreatment with HT doses observed an important decrease in the CYP toxicity, decreased the cell damage and oxidative stress parameters while increased TAC. Based on the present experimental study's findings, we may say that HT pretreatment has the potential to be a therapeutic option for the management of CYP-induced HC.

Biography

Songul CETIK is an Assistant Professor at Vocational Higher of Health Services, Mardin Artuklu University in Turkey. She has completed her graduation from Eskisehir Osmangazi University, Faculty of Arts and Sciences, Department of Biology, 2009. She has done her Post-graduation from Eskisehir Osmangazi University, Faculty of Science, 2014.

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Qamar Bashir, J Cancer Sci Ther 2017, 9:5(Suppl)
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Self-multimerization of transglutaminase-2 mediated by the calcium binding C1 domain

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[2]Oslo University Hospital-Rikshospitalet, Norway

Transglutaminase 2 (TG2) is ubiquitously expressed enzyme with multiple functions. It belongs to the large TG2 family of eight isozymes including blood coagulation factor XIII and TG1-7. TG2 is present in blood, extracellular matrix and intracellular compartments. TG2 is primarily involved in deamidation of glutamine residues or covalent cross linking between glutamine and lysine residues. TG2 induces wound healing, cell growth, differentiation and apoptosis. It is thus involved in treatment of cancer, liver diseases, diabetes, fibrosis, and neurodegeneration as well as inflammatory and autoimmune disorders. TG2 is centrally involved in celiac disease by being the target for highly disease specific autoantibodies and by deamidating gluten epitopes for recognition of pathogenic T cells and B cells. It has been demonstrated that TG2 utilizes itself as a substrate that leads to the formation of TG2 multimers. Gluten peptides can be incorporated into the multimers, forming TG2-TG2-gluten complexes. Such multivalent complexes are excellent antigens both for TG2-specific and deamidated gluten specific B cells and also to lead efficient activation of gluten specific T cells. TG2 consists of an N-terminal domain, a catalytic core domain and two C-terminal domains. TG2 is a calcium dependent enzyme and its activity is mediated by calcium binding to the core domain. Previous studies have reported the binding of at least six calcium ions, out of which five have been located in the catalytic core domain. In the current study, we have identified a calcium binding site at the first C-terminal domain. We have characterized TG2 self multimerization and found that it is mediated by the calcium binding C1 domain. Our findings offer insight into the functional mechanism of TG2 and will help in development of new and improved therapeutics.

Biography

Qamar Bashir has completed his PhD and Post-doctoral studies from Leiden University, The Netherlands. Currently, he is a Researcher at University of Oslo, Norway. He has published more than 15 papers in reputed journals, with a cumulative impact factor of 76 and 340 citations.

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Shahtaj khan et al., J Cancer Sci Ther 2017, 9:5(Suppl)
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Childhood leukemias in Khyber Pakhtoonkhwa and Afghanistan children, visiting Hayat Abad Medical Complex Hospital

Shahtaj Khan, Awal Mir, Baber Rehman Khattak and **Ansa Kalsoom Rehman**
Hayatabad Medical Complex, Pakistan

Objective: The aim of the present study is to evaluate the frequency of childhood leukemias in the children from different districts of Khyber Pakhtoonkhwa (KP) and Afghanistan presenting to Hayat Abad Medical Complex Hospital, Peshawar.

Material & Method: This descriptive cross sectional study was conducted in Pathology department Hayat Abad Medical Complex hospital, Peshawar. Duration of the present study was, from January 2014 to December 2016. A total number of 605 children were enrolled up to 18 years of age, who suspected to have leukemia went through bone marrow examination by different department clinicians. 3 ml blood was collected in EDTA tube (purple top) and complete blood count was performed by hematology analyzer. By aseptic techniques bone marrow aspiration and bone marrow trephine biopsy samples were collected from all patients. Slides were papered from bone marrow aspirates, fixed with methanol and stained with Giemsa, myeloperoxidase and periodic acid Schiff stain. Trephine biopsy slides were stained with haematoxylin and eosin and reticuline stain. Immunohistochemistry was done after initially seeing of bone marrow aspirate slides. All data was documented and statistical analysis was performed by SPSS-20 software.

Results: Among 605 children, 173(61.6%) were males and 108(38.4) were females and their age range from 3 months to 18 years with median age of 9.8 years. In total children 281 (46.5%) were diagnosed different type of leukemias. Out of 281 cases, 208(74.03%) were diagnosed to have acute lymphoblastic leukemia and rest of the children were 61 (21.70%) acute myeloid leukemia, 7 (2.49%) chronic myeloid leukemia, 3 (1.07%) had juvenile chronic myelomonocytic leukemia (JCMML).

Conclusion: In the present study acute lymphoblastic leukemia were more prevalent leukemia in the children of Khyber Pakhtoonkhwa and Afghanistan. Juvenile chronic myelomonocytic leukemia was found less commonest leukemia in the present study.

Biography

Shahtaj Khan is an Assistant Professor of Hematology, and Head of the Department of Pathology at Hayatabad Medical Complex, Peshawar, Pakistan. She is also working as Consultant Hematologist at Rehman Medical Institute. Her research interests reflect in her wide range of publications in various national and international journals.

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Day 1

Muhammad Uzair Rehman et al., J Cancer Sci Ther 2017, 9:5(Suppl)
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Evaluation of the effects of platelet rich plasma in regeneration of the spinal cord

Muhammad Uzair Rehman[1, 2, 3], **Maria Fatima Ali**[1, 2, 3] and **Rubina Ghani**[1, 2, 3]
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[2]Pathological and Molecular Laboratories, Pakistan
[3]Musavvir Stem Cell Clinic, Pakistan

The purpose of study is to explore the efficacy and safety of platelet rich plasma (PRP) and adipose-derived stem cells in the non-operative management of shoulder tendinopathy amongst individuals with spinal cord injury. In this case in road traffic accidents that cause spinal injuries to the central nervous system, which increased morbidity and motility. The complications in patients were developed, resulting to a challenging problem for medicine. Platelet is the important component of blood which naturally holds the growth factors and cytokines. As a concentrated source of autologous platelets, PRP contains several different growth factors and other cytokines stimulating and healing of soft tissue. Platelet rich plasma therapy utilizes growth factors present in alpha granules of platelets in autologous adult stem cells reside in adult tissues and serve as the source for their specialized cells. In response to specific factors and signals, adult stem cells can differentiate and give rise to functional tissue specialized cells. In recent advancement in the field of regenerative medicine it was thought that this would grant a new approach to this problem, as it had proven beneficial in the repair of peripheral nerve injuries and their regeneration. This study was done to evaluate the effect of Platelet Rich Plasma (PRP) and adult stem cells (ASC) and its effect on the spinal cord post trauma. Subsequently, it was seen that PRP and ASC proved beneficial with marked positive effects in both muscle tone and muscle control and marked clinical improvement although it can still be said that further research must be done in this field.

Biography

Muhammad Uzair Rehman has received his Bachelor of Medicine and Bachelor of Surgery from Liaquat National Hospital and Medical College Karachi, Pakistan. He is currently an MPhil Scholar at Dadabhoy Institute of Higher Education. During 2013-2014, he completed his House job at Abbasi Shaheed Hospital and Jinnah Post-graduate Medical Centre following which in November 2014 he joined Musavvir Stem Cell Clinic in the capacity of Research Associate. In January 2015, he took up the position of Lecturer at Jinnah Medical and Dental College finally parting ways in 2017 and taking up the post of Senior Lecturer at United Medical and Dental College. He is currently pursuing his MPhil in the field of Molecular Medicine and Medicinal Chemistry. His current research interests include Stem Cells, Platelet Rich Plasma, Platelet Rich Fibrin, Regenerative Medicine and Virology.

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Maria Fatima Ali et al., J Cancer Sci Ther 2017, 9:5(Suppl)
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Role of platelet rich plasma in repairing of non healing wounds and bones in clinical setup

Maria Fatima Ali[1, 2, 3], **Muhammad Uzair Rehman**[1, 2, 3] and **Rubina Ghani**[1, 2, 3]
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PRP stands for Platelet Rich Plasma, which is a main component of a PRP stem cell injection. In the last few decades, thousands of patients have benefited from platelet rich plasma (PRP) therapies, emerging as a safe alternative in many different medical fields. The term is used very loosely to include anything that has growth factors and cytokines derived from blood (Platelets). When cells talk to each other, they make proteins and peptides that are the messages that pass from one cell to another and determine how the cell will respond. These are called cytokines and include growth factors. PRP stem cell injections for the knee, hip and spine use these cytokines to control the actions of surrounding cells. Platelets store granules of these cytokines that can be harvested and used. The use of platelet-rich plasma (PRP) in medicine has become increasingly more widespread during the last decade. Most studies on the subject are carried out in areas such as orthopedics, sports medicine, and odontology. Recently platelet-rich plasma (PRP) has also been used in the dermatologic and wound healing field, where PRP has been used in order to promote accelerated wound healing and as an adjuvant treatment in rejuvenation, alopecia, hair loss and even following laser sessions. The use of platelets was particularly fortuitous given that the main initial interest was to take advantage of the adhesive and haemostatic properties of the homologous fibrin during bone surgery. A realization of the clinical potential of PRP-therapies has also followed the positive clinical observations, such as enhanced bone formation and anti-inflammatory functions, during oral and maxillofacial applications. PRP seems to have a role to play in the treatment of extra-articular symptoms.

Biography

Maria Fatima Ali received her Bachelor of Dental Surgery from Jinnah Medical and Dental College Karachi Pakistan. She is currently an MPhil scholar at Dadabhoy Institute of Higher Education. In 2014, she joined Hamdard University Dental Hospital where she did her House job following which in 2015 she joined the Department of Pharmacology as a Lecturer and later that year she took up the position of Research Associate at Musavvir Stem Cell Clinic. She is currently pursuing her MPhil degree in the field of Molecular Medicine and Medicinal Chemistry. Her current research interests include Stem Cells, Platelet Rich Plasma, Platelet Rich Fibrin and Regenerative Medicine.

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Maria Mufti et al., J Cancer Sci Ther 2017, 9:5(Suppl)
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Stem cell donation decision in Saudi Arabia: Factors and attitudes

Maria Mufti, Shaden Almojel, Layla Alshammary, Dabiah Thaqfan, Razan Alghamdi and **Samah F Ibrahim**
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Background: Stem cells (SC) transplantation becomes the base line management in many diseases. The SC donors' number is still insufficient to cover the SC transplants' needed number. Encouraging adults to be SC donors is the main donation concern.

Objective: The objective of the study is to identify the factors affecting Saudi population's attitudes concerning SC donation.

Materials & Method(s): This is a case control study with a 600 questionnaires filled by Saudi participants aged between 18-50 years in SC donation campaign, King Faisal Hospital, Riyadh.

Result(s): 300 males and 300 females with mean age of 29.24 ±9.32 years were included. Although 41.7% of participants were aware about SC, 93% of them had bad knowledge score. 67.3% were registered in SC donation campaign as a donor while 15.5% of participants had knowledge about Saudi SC donation centers. A significant difference was found between registered and non-registered participants regarding many factors e.g. age, education level and knowledge score (P value≤0.05). The main encouraging positive attitude was relieving patient's pain (65.3%) while the main negative one was considering SC donation as unsafe procedure (35%).

Conclusion(s): The majority of Riyadh's population accepted the idea of SC donation and registered in stem cell donation campaign; however, there was lack of knowledge about SC and Saudi donation centers.

Recommendations: Awareness strategies are urgently needed to enhance population's SC knowledge, clarify the role of Saudi stem cell donation centers and improve their attitude by correcting wrong ideas.

Biography

Maria Mufti is a third year Medical student at Princess Nourah Bint Abdulrahman University. She graduated from Al-Rowad High School in 2012 with percentage of 98 and finished four years in Medical College. She had her first Medical Research about stem cells and stem cells donation: factors and attitudes in 2016\2017. She had courses such as: English course at Alfaisal Universal Academy with a grade of 90 at the 6th level; other is self-development and problem solving and much other Medicine related courses. Her good attendance at English classes made her eligible to take the IELTS exam with grade of 5.5. She is interested in volunteering community services regularly, as she volunteered once to be a photographer for orphan children, she volunteered also in recovering from cancer day as a speaker about cancer awareness, also she was four times a volunteer at campaigns of stem cell donation center at King Faisal Hospital taking swabs and register donors.

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Notes:

Dzwigala M E et al., J Cancer Sci Ther 2017, 9:5(Suppl)
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Stem/progenitor cells in human milk and relations between number of cells in human milk and breastfeeding mother-infant dyad

Dzwigala M E[1,2], Zychowicz M[2], Sarnowska A[2] and **Romejko-Wolniewicz E[1]**
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Human breast milk consists of different types of cells: leukocytes, epithelial cells, fibroblasts and pericytes. The aim of this study was to confirm presence of stem/progenitor cells in human milk, to evaluate their pluripotent and regenerative potential and to test correlation between mother, infant and number of cells in human milk. Fresh milk samples were acquired from women 0-7 days post-delivery. The consent according to the Ethics Committee of Warsaw Medical University guideline was obtained from each woman. The samples were collected manually or by breast pump from 47 mothers. Cells isolation was performed within 4 hours after sample collection. Various types of media were used in cells culture (MammoCult, DMEM + 10% FBS and others). Cells were characterized by flow cytometry (FC), RT-PCR and immunocytochemistry. Health status of the mother and the child was estimated. Anthropometric data was obtained from patients' history. Stem/progenitor cells present in human milk displayed heterogeneous expression of pluripotency genes characteristic for human embryonic stem cells such as: transcription factors OCT4, SOX2 and NANOG. No statistical relationship was found between number of cells in human milk and any of the following: previous surgical procedures, marital status, smoking during pregnancy, regular or irregular menstruation cycle, child's sex and others. Negative correlation ($r=-0.5384$, $p<0.0012$) was found between the day of sample collection and the number of milk cells. The study confirms presence of stem/progenitor cells in human breast milk and the correlations might argue the decreasing number of cells in human breast milk during first week from delivery.

Biography

Dzwigala M E is a 5th year student of Faculty of Medicine at the Warsaw Medical University, Poland. In 2011, she received her Master of Science degree from the Warsaw School of Economics. From 2015, she started taking part in projects carried out by Students' Scientific Group in the Department of Obstetrics and Gynecology under the supervision of Assoc. prof. Ewa Romejko-Wolniewicz (Chief of Department Krzysztof Czajkowski PhD, MD) and she is also involved in basic research working in the Translative Platform for Regenerative Medicine, Medical Research Centre, Polish Academy of Sciences under supervision of Anna Sarnowska PhD, MD (Chief of the Platform of Regenerative Medicine in Polish Academy of Sciences). She is interested in the Stem Cell Biology field, especially human mesenchymal stem cells, human placenta stem cells, human breast stem cells and cervical cancer stem cells. In the area of obstetrics and gynecology, she is involved in the research concerning pregnancy programing, intrauterine infection, amniotic fluid microbiome, pregnancy diabetes and hypertension, perinatology.

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Capicua regulates self-renewal and tumour progression of breast cancer cells

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Cancer stem cells (CSCs) are capable of tumour initiation and growth, and play a critical role in metastasis, therapeutic resistance, and disease recurrence in breast tumours. Therefore, if cancer arises and is maintained by the small population of CSCs within the bulk tumours, it is of central importance that definitive marker genes for CSCs are identified and regulatory mechanisms that promote stem cell maintenance be understood. Here, we show that the developmentally regulated HMG-box protein Capicua (CIC) is a transcriptional repressor that suppresses CSC properties in both the luminal and basal/myoepithelial subtypes of breast cancer cells. Mammosphere formation in culture was used to reveal stem cell properties, where expression of CIC was consistently down regulated in primary mammospheres in comparison to parental adherent cells then in secondary mammospheres upon serial passage. Knockdown of CIC increased mammosphere formation, while CIC overexpression prevented mammosphere formation, effect dependent on continuous CIC expression. Furthermore, CIC knockdown MCF7 and MDA-MB-231 breast cancer cells contained a higher percentage of $EpCAM^{+}/CD44^{+}/CD24^{low/}$ cancer-initiating cells than in control cells grown as monolayer cultures and propagated as mammospheres. Loss of CIC relieved repression of *PEA3* group genes, especially *ETV4,* which was necessary and sufficient for driving mammosphere formation. Moreover, we observed upregulation of the pluripotency-associated transcriptional factor SOX2 in MCF7 CIC knockdown cells and demonstrated significant rescue effect on mammosphere formation following SOX2 knockdown in CIC knockdown cells. Therefore, we propose CIC as a potential biomarker of breast cancer stem cells and a novel target in stem cell and cancer therapy.

Biography

Jeehyun Yoe is a PhD candidate with particular interests in Stem Cell and Cancer Biology. Her current research has 2 aims: 1) to better understand the role of CIC in tumourigenic process in different cellular contexts and environments and 2) to further identify the molecular mechanisms that regulate CSC characteristics. Prior to enrolling at POSTECH for the combined MS and PhD program, she graduated with a BS in Biology and minors in Chemistry and Music from the University of North Carolina at Chapel Hill, USA.

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Notes:

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Scientific Tracks & Abstracts

Day 2

Sessions

Cancer stem cell | Molecular Medicines for Cancers | Stem cell markers | Breast Cancer Stem Cells | Cancer Stem Cells in Brain Gliomas

Session Chair
Chiara Mondello
Institute of Molecular Genetics, Italy

Session Introduction

Title: **Use of 3D spheroid cultures to screen for drugs targeting cancer stem cells**
Ines Prieto, StemTek Therapeutics, Derio, Spain

Title: **Chemotherapy curable malignancies; Unique genetic events, frozen development, natural apoptosis and absent cancer stem cells**
Philip Savage, Brighton and Sussex University Hospitals NHS Trust, UK

Title: **Cancer stem cells in isocitrate dehydrogenase wild type glioblastoma express components of the renin-angiotensin system and cathepsins B, D and G**
Tinte Itinteang, Gillies McIndoe Research Institute, Wellington, New Zealand

Title: **The expression of the classical stem cell markers in pancreatic adenocarcinoma cell line**
Hussain R Al-Turaifi, Newcastle University, UK

Title: **The activation of RAF/MEK/ERK kinase cascade by variable β3-αC loop deletions triggers oncogenesis**
Hu Jiancheng, National Cancer Centre Singapore, Singapore

Title: **Identification of a novel target that regulates breast cancer stem cells**
Monther Al-Alwan, King Faisal Specialist Hospital and Research Centre, Saudi Arabia

Title: **Cell-based therapy using miR-302-367 expressing cells represses glioblastoma development**
Thierry Virolle, Institut de Biologie Valrose- Ibv, France

Video Presentation

Session Introduction

Title: **Stem cell transplantation: A new treatment for blood cancer patients**
Naser Mobarra, Golestan University of Medical Sciences, Iran

Ines Prieto et al., J Cancer Sci Ther 2017, 9:5(Suppl)
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Use of 3D spheroid cultures to screen for drugs targeting cancer stem cells

Ines Prieto, Juan Gumuzio, Estibaliz Ruiz, Olatz Leis and **AG Martin**
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The cancer stem cell (CSC) concept has important implications not only for our understanding of carcinogenesis, but also for the development of cancer therapeutics. There is a growing body of preclinical evidence showing that cancer stem cells contribute to chemotherapy and radiation resistance in breast cancer. The use of drugs that interfere with stem cell self-renewal represents the strategy of choice for novel effective anti-cancer treatments, but also a great challenge because cancer stem cells and their normal counterparts share many pathways. The biology of cancer stem cells has proven complex and difficult to translate into effective therapeutic strategies. The question arises as: how do we test compounds for anti-cancer stem cell activity? The answer is: phenotypic screening. There are indeed several functional assays well validated in the scientific literature that have been used for years associated to the ability of cancer cells to demonstrate stem cell behavior. The most relevant is the 3D tumor spheroid assay. This assay has been used to uncover and culture stem cells from many tissues as well as from tumors. There are multiple reports now, that show that spheroid derived cells are enriched in tumor initiating or cancer stem cells, derived from cell lines and from natural fresh tumors as well. Here, we describe the use of 3D spheroid models to profile compound activity against cancer stem cells. Furthermore, a case of compounds preventing hypoxia-inducible transcription factor (HIFs) activity is presented. Recently, HIF transcription factor biology has been linked to pathways that regulate stem cell self-renewal and pluripotency, suggesting a new mechanism whereby HIF proteins may drive tumor growth, through the generation of tumour-initiating cells or cancer stem cells. Therefore, targeting the HIF pathway may provide a novel therapeutic avenue to target cancer stem cells. We demonstrate that interfering with HIF pathway activation prevents mammosphere formation, validated through independent confirmation through Sox2 promoter activation, Aldefluor® assay and *in vivo* proof-of concept experiments targeting tumor initiation.

Biography

Ines Prieto Remon is currently Senior Researcher at StemTek Therapeutics, a biopharmaceutical company located in the Basque Country, Spain. She earned her Bachelor of Biochemistry at the University of the Basque Country, Spain, in 2006, and her PhD in Molecular Biology and Biomedicine from the University of Cantabria, Spain, in 2013, working with Dr Carlos Pipaon Gonzalez and Dr Marian Ros. In her thesis work she studied signaling pathways in Fanconi anemia patients samples, regarding their aberrant acute sensitivity to chemotherapeutic agents. She also studied microphthalmia with Fancd2-/- mouse model. After her PhD, Ines accepted a postdoctoral position at the Laboratory for Experimental Hematology & DNA Repair, at Herman B Wells Center in Indianapolis, IN, US. There, she worked with Dr. Helmut Hanenberg in a project which aimed to study the protective effect of compounds in order to reduce/remove side effects of chemotherapy.

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Chemotherapy curable malignancies; Unique genetic events, frozen development, natural apoptosis and absent cancer stem cells

Philip Savage
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Despite over 40 years of the 'War on Cancer' the list of metastatic malignancies that can be cured with drugs is unchanged from the 1970s. Whilst the paradigm of cancer cells being sensitive to DNA damaging chemotherapy as a result of rapid growth and then developing chemotherapy resistance and hence avoiding being killed is well established. We would like to present an alternate interpretation of the data and a new hypothesis. The new hypothesis relates to the biological properties of the chemotherapy curable cancers which comprise trophoblast tumours, germ cell tumours, acute leukemia, high grade lymphoma, and the rare childhood malignancies. Each of the chemotherapy curable malignancies arises from specialist cells that naturally undergo DNA manipulations that are intrinsically associated with high levels of endogenous apoptosis during development. Trophoblast tumours arise from the cells of conception, which have just undergone nuclear fusion. Germ cell tumours arise from pre-malignant precursor cells that are subject to pressures to undergo meiosis and mitosis. In the B cell malignancies, acute leukaemia that arises from cells linked to VDJ rearrangement of the immunoglobulin genes, whilst diffuse large B cell lymphoma which is closely linked to somatic hypermutation. Each of these unique genetic processes is naturally linked to a period of extreme sensitivity to DNA damage/apoptosis and we would argue that this apoptotic sensitivity is then maintained in the malignant cells arising at these developmental points. The other key biological characteristic the chemotherapy curable malignancies have is that their unusual developmental pathway means that they are not linked to any conventional hierarchical cancer stem cells. As a result, there is no pool of chemotherapy resistant stem cells available to replenish the tumour after treatment. Further pathway based research may be interesting and lead to novel therapeutic avenues.

Biography

Philip Savage is a Consultant Medical Oncologist in Brighton, UK. His Medical degree is from Bristol University and trained in Medical Oncology at the Royal Marsden and Hammersmith Hospitals in London. He previously specialised in the treatment of trophoblast and germ cell tumours whilst working at Charing Cross Hospital in London. He holds a PhD in tumour immunology from London University and has additional research interests in healthy economics and cancer treatment history.

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Cancer stem cells in isocitrate dehydrogenase wild type glioblastoma express components of the renin-angiotensin system and cathepsins B, D and G

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Introduction: Isocitrate dehydrogenase wildtype glioblastoma (GB), the most aggressive form of brain glioma, is associated with a median survival of 25 months. Cancer stem cells (CSCs) have been proposed to be the origin of many cancers, including GB. Renin-angiotensin system (RAS) has been associated in CSCs in different types of cancers. This study aimed at identifying and characterising the CSC population within GB tissues for the CSC markers, components of the RAS, and the protease cathepsins B (CathB), D (CathD) and G (CathG), which provide potential bypass loops for the RAS. As well neuro-spheres derived from fresh GB samples were investigated their expression of stem cell markers, TRA 1-60, OCT4, SOX2 and SSEA-1, and the aforementioned markers.

Methodology: DAB and immunoflourenscent immunohistochemical (IHC) staining was performed on 7 GB samples for the expression of CSC markers SALL4, OCT4, SOX2, pSTAT3 and NANOG; components of the RAS, namely pro-renin receptor (PRR), angiotensin converting enzyme (ACE), angiotensin II receptor 1 (ATIIR1) and angiotensin II receptor 2 (ATIIR2); and CathB, CathD and CathG. NanoString mRNA analysis was performed on 5 of the original 7 GB samples, for the transcriptional expression of the same markers. 6 fresh samples of the original cohort of GB were grown in culture and stained for TRA 1-60, OCT4, SSEA-1 and SOX2, markers associated with CSCs. These cells were subjected to transcriptional analysis for CSC makers, components of RAS and CathB, CathD and CathG.

Results: IHC staining demonstrated a significant number of GB cells expressing SOX2 and pSTAT3. A subset of these expressed OCT4, SALL4 and NANOG. NanoString mRNA analysis demonstrated the expression of mRNA transcripts for the markers examined. Cultures of GB tissues yielded tumour-spheres which expressed TRA 1-60, OCT4, SSEA-1 and SOX2. These tumour-spheres also expressed mRNA transcripts for the CSC and RAS markers, CathB and CathD demonstrated by IHC staining on GB tissues.

Conclusion: The finding of this study confirms the putative presence of 2 CSCs within GB. The ability for primary cells derived from GB to form tumour-spheres *in vitro*, that express CSCs markers underscores the critical role of CSCs in the biology of GB. The expression of the components of the RAS, CathB and CathD, but not CathG by CSCs in GB and the GB-derived tumour-spheres, suggests CSCs as a novel therapeutic target by modulation of the RAS using existing medications.

Biography

Tinte Itinteang serves as the current Chief Scientific Officer and the Evans Family Research Fellow of the Gillies McIndoe Research Institute (GMRI) in Wellington, New Zealand. He completed his Medical Training at the Melbourne University in 2001, and then completed his Basic Medical Residency in New Zealand, from 2008-2010. He completed his PhD from Victoria University of Wellington, NZ on the role of stem cells and the renin-angiotensin system (RAS) in infantile haemangioma. From 2012-2014, he was appointed as a Research Fellow at the Gillies McIndoe Research Institute, during which he spent six weeks at the Friedlander laboratory at The Scripps Research Institute in San Diego investigating the role of iPSCs for disease modelling. He was then appointed as the Chief Scientist of the GMRI from 2015. His work on the role of stem cells and the RAS in infantile haemangioma has been acknowledged with the International Society for the Study of Vascular Anomalies John Mulliken award as well as several national and international honours. He is the author of over 50 peer reviewed articles and has given over 100 presentations at international conferences.

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The expression of the classical stem cell markers in pancreatic adenocarcinoma cell line

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Pancreatic cancer has been the third leading cause of cancer-related death in USA. Most of the cancer patients get diagnosed in late stage and this minimizes the effectiveness of surgical intervention to less than 20 percentage. Moreover, chemo-radio therapy is not curative thus the survival rate of patients with pancreatic cancer after 5-years was 7%. In USA, 53,070 new cases were estimated diagnosed with pancreatic cancer in 2016, while 41,780 patients was the estimated death from pancreatic cancers. Similar percentage was reported globally, estimated by World Health Organization in 2012 [23]. Presence of cancer stem cells (CSCs) within pancreatic tumor was reported by several groups using unspecific biomarkers. Pluripotent transcription factors such as OCT4, SOX2 and NANOG, that upregulated in embryonic stem cells in contrast to somatic cells, were detected in various types of cancer tumors from adult patients. The aims of this study was to investigate the expression of the classical stem cell markers in pancreatic adenocarcinoma cell line (PANC1). PANC1 cells were characterized by RT-PCR/immuno-staining. Transient over-expression of stem cell promoter-driven reporter plasmid Oct4-eGFP was undertaken using Lipofectamine 2000 transfection reagent. Several embryonic stem cell markers and other cancer related markers were detected which illustrate the nature of pancreatic cancer.

Biography

Hussain R Al-Turaifi obtained his PhD from North East England Stem Cell Institute, Faculty of Medical Sciences, Newcastle University UK and is focusing on Translation Medical Research through enrolling in Translational Medicine Program at The University of Edinburgh, College of Medicine and Veterinary Medicine, School of Biomedical Sciences Edinburgh. As Head of Referral Laboratory, Head of Blood Bank Donation Testing Center and Consultant of Molecular Pathology and Clinical Biochemistry he concentrates on diagnostic clinical laboratory at King Fahad Hofuf Hospital, KSA. He worked in academic field as a faculty of Biomedical School, Newcastle University and in the Department of Medical Biochemistry, College of Medicine, Dammam University, KSA.

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The activation of RAF/MEK/ERK kinase cascade by variable β3-αC loop deletions triggers oncogenesis

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RAF/MEK/ERK kinase cascade has well-defined role in cancer development. Aberrant activation of this kinase by genetic alterations exists in >40% human cancers, which functions as a driver to trigger cancer pathogenesis. In current study, we identified a new catalogue of mutations in RAF and MEK with variable deletions of β3-αC loop. These mutants are constitutively active and highly oncogenic *in vitro* and *in vivo*. To develop strategies for targeting these mutants-driven cancers, we tested whether they were sensitive to RAF/MEK inhibitors that used for clinic treatment of BRAF (V600E)-harboring cancers or undergoing clinic trials, and found that all of them exhibit a strong drug resistance at cellular level and in tumor-xenograft mouse model. To explore molecular mechanism that underlies this phenomenia, we next carried out a serial of biochemistry and structral analysis and demonstrated that β3-αC loop deletions stimulate the homo-oligomerization of both RAF and MEK, which not only triggers their kinase activity but also dramatically decreases their drug affinity. Together, our study provides a solid evidence that RAF and MEK mutants with β3-αC loop deletions function as a cancer driver and a clear molecular basis that β3-αC loop deletions activate RAF and MEK and lead to strong inhbitor resistance, and appeals a development of new inhibitors.

Biography

Hu Jiancheng received his PhD from University of Colorado Denver in 2007 and then Post-doctoral training at Washington University in St. Louis and Howard Hughes Medical Institute. Since 2014, he has joined National Cancer Centre Singapore where he has served as the Principal Investigator at the Laboratory of Cancer Signaling. He has published more than 15 papers in international renowned journals. His research interests include: (1) the regulatory mechanism of RAF kinase and other oncogenic protein kinases under normal/pathological conditions; (2) molecular basis that underlie intrinsic and acquired resistance of kinase inhibitors in clinic treatment of cancers; (3) the development of novel kinase inhibitors.

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Identification of a novel target that regulates breast cancer stem cells

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There have been significant advances in breast cancer treatment, which have been attributed to the use of targeted therapy in combination with surgery and chemotherapy. However, the tumor-related mortality remained high mainly due to chemoresistance resulting in relapse and metastasis. Chemoresistance is widely believed to be regulated by a small subpopulation of the tumor bulk that possess stem cell-like features and thus are called cancer stem cells (CSCs). We have shown significant association between worse clinical outcome in breast cancer patients, including metastasis and shorter survival, and expression of fascin, an actin-bundling protein. Moreover, we have also reported that fascin is a critical mediator of breast CSCs and chemoresistance, via the activation of focal adhesion kinase (FAK), which is known to directly bind members of the integrin adhesion molecules. Here we have used fascin loss and gain of function approaches to examine if fascin influences integrin expression to regulate breast CSC function. Our results have demonstrated that fascin expression in breast cancer cells is directly associated with increased expression of integrins including: CD49a, CD49C, CD49f, CD29 and CD61. Fascin-mediated integrin expression on breast cancer cells enhances their adhesion, chemoresistance and tumorsphere formation ability. This study supports a role for fascin in the maintenance of breast CSCs via the regulation of integrin expression. The outcome of this study is expected to provide another evidence that fascin targeting may present a new approach for optimal treatment of breast cancer from the root.

Biography

Monther Al-Alwan has completed his PhD in immunology from Dalhousie University and postdoctoral studies from University of Manitoba, Canada. He is a Scientist at the stem cell and tissue re-engineering program (SCTRP) at King Faisal Specialist Hospital and Research Centre and Adjunct Associate Professor at AlFaisal University, Riyadh, Saudi Arabia. Currently, he is actively involved in dissecting the molecular pathways that regulate the function of cancer stem cells and how this is related to chemoresistance and metastasis. He has more than 22 peer-reviewed publications in reputed journals and has been serving as an Editorial Board Member of various international journals.

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Cell-based therapy using miR-302-367 expressing cells represses glioblastoma development

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Glioblastomas are incurable primary brain tumors that affect patients of all ages. The aggressiveness of this cancer has been attributed in part to the persistence of treatment-resistant glioblastoma stem-like cells (GSC). We have demonstrated that microRNA cluster miR-302-367 has the potential to force GSC exit from stemness, promoting loss of stemness properties and tumorigenicity and revealing a great therapeutic interest. In our study we attempt to develop a cell-based therapy for miR-302-367 continuous delivery by taking advantage of the capability of glioma cells to secrete exosomes that enclose small RNA molecules. We engineered primary glioma cells to stably express the miR-302-367. Remarkably, these cells altered, in a paracrine manner, the expression of stemness markers, the proliferation and the tumorigenicity of neighboring glioblastoma cells. Further characterization of the secretome derived from miR-302-367 expressing cells showed that a large amount of miR-302-367 was enclosed in exosomes, which were internalized by the neighboring glioblastoma cells. This miR-302-367 cell-to-cell transfer resulted in the inhibition of its targets such as CXCR4/SDF1, SHH, cyclin D, cyclin A and E2F1. Orthotopic xenograft of miR-302-367-expressing cells together with glioblastoma stem-like cells efficiently altered initiation and tumor development in mice brain.

Biography

Thierry Virolle is a Research Director (permanent position) at Institut National de la Santé et de la Recherche Médicale (INSERM), Head of the Team Cancer Stem Cell Plasticity and Functional intra-tumor Heterogeneity at the Institute of Biologie Valrose (iBV). He is Co-Founder of the French National Sud Cancer Stem Cell Network, SUNRiSE dedicated to the study of cancer stem cell. He is Doctor of Science (PhD) at Nice Sophia Antipolis University (2000), his researches focus on the regulation of the plasticity of glioblastoma cancer stem cells and its contribution in the genesis of functionally divergent tumor territories.

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Stem cell transplantation: A new treatment for blood cancer patients

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Cancer is the major cause of death in the world today. The International Agency for Research of Cancer estimated that 94.4 thousand deaths would occur in 2012 due to blood cancer in the countries of the European Union. All cancers demand new treatments, and we focused on specific type of cancer: blood cancers or haematological malignancies. There are four broad categories of blood cancers: leukaemia, myeloma, Hodgkin lymphoma and non-Hodgkin lymphoma. Together, these account for around 9% of all cancers and are currently the fourth most common in both males and females in the world. Because of this high mortality rate, the development and progressive evolution of stem cell transplantation in recent decades has been an important medical advance. Haematopoietic stem cell transplantation (HSCT) has become an effective treatment for malignant and benign haematological diseases that could not be cured by other therapies, allowing for an increasing number of patients to become long-term survivors. It is an essential part of the therapeutic strategy which is clinically recommended for blood cancer patients whose clinical condition indicates transplantation. Hematopoietic stem cells (HSCs) are found at the apex of this system and are defined by their ability to self-renew and to give rise to all hematopoietic lineages. HSCs can be identified through the expression of CD34 on their surface and a lack of expression of CD38.

Biography

Naser Mobarra has received his PhD (2014) from Tehran University of Medical Sciences, Tehran. He has published more than 25 papers in reputed journals and has been serving as an Editorial Board Member of few ISI journals.

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An experimental study about efficacy of cabbage and barely complex on cancer prevention and treatment.

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The purpose of this study was to find out whether or not the mentioned complex might be effective in cancer prevention by the use of evaluating the ratio of IFN-γ/IL4 in BALB/c inbred mice receiving solution containing diluted and dynamized complex of cabbage and barley prepared in homoeopathic manner. 28 female BALB/c inbred mice (6-8 weeks) were divided into 4 equal groups: namely control group (normal-without tumor); remedy group (normal-without tumor); tumor control group and under treatment group. We observed the groups for 12 weeks. Then, their spleens were eviscerated in order to evaluate the density of IFN-γ/IL4 ratio. Significant increase of IFN-γ/IL4 ratio in the tumor under treatment group was observed. Considering the Homoeopathy and Iran Traditional Medicine function similarities, we selected one of the latter's anticancer complexes and diluted and dynamized it using homoeopathic manner and assessed it against Spontaneous Mammary Adenocarcinoma in BALB/c inbred mice by evaluating IFN-γ/IL4 ratio.

Biography

Nader Nemati was born in Tehran, Iran and is a graduate of Azad University. He obtained his medical degree at Azad University in Ardabil .He completed post-doctoral training (Homeopathy) at Tehran University Medical School. Dr. Nemati has twenty years experience in animal's vitality , with special interest in cancer research, viral and bacterial treatment. He is an official member of the Iranian Medical Council and an official member of iranian homeopathic association.

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