**ICORS 2022 - Workshops**

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| **Transverse Tibial Cortex Transport Surgery: What is it and Why we need it?**Host Society: Chinese Orthopaedic Research Society |
| **Chair**: Prof. Gang Li, MBBS. DPhil (Oxon) Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong **Abstract:**Introduce the development of Transverse Tibial Cortex Transport Surgery, showcase the clinical applications of using this technique for the treatment of diabetic foot ulcers and peripheral limb avascular disorders, and explain the biological mechanisms behind this simple surgical procedure. |  |
| **Cartilage regeneration: Concepts and Techniques of improving Chondrogenesis**Host Society: ASEAN Orthopaedic Research Society |
| **Chair:** Joyce Koh**Abstract:**Our understanding and practices in cartilage regeneration have undergone paradigm shifts over the years. Conceptually, we know that cellular processes and mechanical stimuli interact to determine clinical outcomes. Practices continue to evolve as recent clinical trials fine-tune our current knowledge.This interactive workshop showcases the collaborative efforts of member countries of the Asean (AP) Orthopaedic Research Society as we share our laboratory experiences in mechanical signalling pathways, and role of various cellular components such as mesenchymal stem cells, secretome, somatotrophine and exosomes in regulating Cartilage regeneration. This is followed by a discussion of current techniques of cartilage implantation and a sharing of clinical outcomes from recent collaborative trials. | Concept Talks:**Signaling Pathways in Cartilage Repair and Regeneration** Speaker: Tunku Kamarul Zaman Director of the Universiti Sains Malaysia (USM), Advanced Medical and Dental Institute (IPPT), Malaysia**Role of MSC, secretome, somatotrophine and exosomes in regulating Cartilage regeneration** Speaker: Ismail Hadisoebroto Dilogo; Department of Orthopaedic and Traumatology, Faculty of Medicine Universitas Indonesia-Cipto Mangunksumo Central National Hospital, Jakarta, IndonesiaTechnique Talks:**Chondrocyte induced cartilage regeneration-ACI: How I do it.** Speaker: Deepak Goyal, Saumya Arthroscopy & Sports Knee Clinic, Ahmedabad, India; President , Asian Cartilage Repair Society India**Exosomes in OA of the knee- early outcomes of a multicenter trial**Speaker: Sureshan Sivananthan Department of Orthopaedic Surgery, ALTY Hospital, Menara HSC, 187 Jalan Ampang, Kuala Lumpur, Malaysia, Malaysia/USA |
| **Smart Technology in fracture treatment – current trends and future directions**Host Society: AO SDSTF |
| **Session Chairs**: Dr. Sureshan Sivananthan, MD, MS, FRCS - Alty Orthopaedic Hospital, Kuala Lumpur, MalaysiaDr. Bernd Grimm, PhD – Luxembourg Institute of Health, Luxembourg | Talks:**What’s in the literature? – A systematic review of wearable technology in trauma surgery**Speaker: Dr. Meir Marmor, MD - OTI at Zuckerberg San Francisco General, San Francisco, USA**What is out there? Wearable assisted outcome assessment – Results of an AO Survey and own experiences at a level-1 trauma center**Speaker: PD Dr. Benedikt J Braun, BG Hospital, University Tuebingen, Germany**Taking movement analysis out of the lab into clinical routine with with markerless and monocular 3D video capture.**Speaker: Dr. Bernd Grimm, PhD – Luxembourg Institute of Health, Luxembourg**Remote Fracture Treatment with the DaVinci System in Pelvis and Acetabular Surgery**Speaker: PD Dr. Steven C Herath, MD – BG Hospital, University Tuebingen, Germany |
| **Imaging innovation for foot and ankle disorders**Host Society: Japanese Orthopaedic Association |
| **Organisers**: Yasuhito Tanaka, MD, PhDProfessor, Department of Orthopaedic Surgery, Nara Medical UniversityHisateru Niki, MD, PhDProfessor, Department of Orthopaedic Surgery, St. Marianna University School of Medicine**Abstract:**Since the foot and ankle are composed of many bones and are loaded parts, it may be difficult to evaluate the pathology of the disorder. However, new modalities have recently emerged in the visualization of foot and ankle evaluations. In this workshop, four presenters will introduce the application of ultrasound examination for the foot and ankle, T1ρ mapping of osteoarthritis of the ankle, 3D MRI of lateral ankle ligament injuries, and weight-bearing CT of hallux valgus, discuss recent advances and applications in this area. Imaging innovations for the foot and ankle are expected to contribute to advances in diagnosis and treatment of disorders.  | Title: “Ultrasound evaluation of ankle ligament”Name: Hiroaki Kurokawa, MD, PhDInstitution: Department of Orthopaedic Surgery, Nara Medical UniversityTitle: “T1ρ mapping of osteoarthritis of the ankle”Name: Naoki Haraguchi, MD, PhDInstitution: Department of Orthopaedic Surgery, St. Marianna UniversitySchool of Medicine, Yokohama City Seibu Hospital Title: “3D MRI of lateral ankle ligament injuries”Name: Atsushi Teramoto, MD, PhDInstitution: Department of Orthopaedic Surgery, School of Medicine, Sapporo Medical UniversityTitle: “Weight-bearing CT of hallux valgus”Name: Tadashi Kimura, MD, PhDInstitution: Department of Orthopaedic Surgery, The Jikei University School of Medicine |
| **Adaptations of innovations and new technologies in spinal deformity treatment**Host Society: Japanese Orthopaedic Association |
| **Organiser**: Masashi Miyazaki, MD, PhDClinical Associate Professor, Department of Orthopaedic Surgery, Faculty of Medicine, Oita University**Abstract:**Profound innovation and advancement in operative techniques, supportive technologies and pharmacological treatments have impacted surgical treatment of spinal deformity surgery. In the first part of the workshop, merits and concerns in application of these technologies will be discussed on adolescent idiopathic scoliosis, adult spinal deformity including deformity arising from osteoporotic vertebral fractures. Augmented and mixed reality has taken fame in the operative theaters in various surgeries including spinal deformity. In the second part of the workshop, its application and perspectives on how it can impact surgical management of spinal deformity surgery will be discussed. Additionally, artificial intelligence will play an even greater role in various fields of spine care such as clinical decision making, imaging diagnosis, prognosis prediction, surgical support and even education for young doctors. In the third of this workshop, how we should coexist and co-prosper with this technology will be discussed.  | Talks: **Innovations and New Technologies in Spinal Deformity Treatment**Speaker: Masashi Miyazaki, MD, PhD; Department of Orthopaedic Surgery, Faculty of Medicine, Oita University**Augmented and Mixed Reality in Spinal Surgery: A Real World Experience**Speaker: Daisuke Sakai, MD, PhD; Department of Orthopaedic Surgery, Surgical Science, Tokai University School of Medicine**How will artificial intelligence change clinical practice and education for spine surgeon?**Speaker: Takashi Kaito, MD, PhD; Department of Orthopaedic Surgery, Osaka University Graduate School of Medicine  |
| **The biology of growth plate and its clinical application**Host Society: Japanese Orthopaedic Association |
| **Chairs:** Hirotaka Chikuda, MD, PhDProfessor, Department of Orthopaedic Surgery, Gunma University Graduate School of MedicineTaku Saito, MD, PhDAssociate Professor, Orthopaedic Surgery, Sensory and Motor System Medicine, Surgical Sciences, Graduate School of Medicine, The University of Tokyo **Abstract:**In recent years, the mechanism of growth control of growth plates has been elucidated, and its clinical application is progressing. In this workshop, we will introduce the latest findings from basic research to clinical application. |  |
| **Bone infection: a clinical priority for clinicians and scientists**Host Society: Orthopedic Research Society |
| **Chairs:** Prof. E.M. Schwarz Prof. R.G. Richards**Abstract:** Bone infection has received increasing attention in recent years as one of the main outstanding clinical problems in orthopaedic and trauma surgery. The continued threat of antibiotic resistance, and the increasing number of patients projected to receive arthroplasty in the coming years, ensures this clinical problem will continue to impact patients at an unacceptably high rate without significant new interventions. The basic biology of bone infection dominates the clinical management of bone infection as best illustrated by the importance of biofilm formation on implant revision and antibiotic treatment protocols. In recent years, we have seen important new discoveries in relation to bacterial invasion into bone, host immune responses, as well as interventions custom-designed to target bone infection. These scientific advances are likely to pave the way for improved therapeutics in future years. The following session will present the clinical challenges of bone infection, and how recent scientific advances focussed on this problem has revealed new targets for intervention, ultimately aimed at improving patient care. | Talks:**Emergence of virulent pathogens revealed by phylogenomic studies from a registry for bone infection.**Speaker: Stephen L Kates MD, Virginia Commonwealth University. **Phage therapy for complicated bone infection**Speaker: Willem-Jan Metsemakers MD, University Hospital Leuven. **Deciphering immune responses in humanized mice with S. aureus bone infection**Speaker: Gowrishankar Muthukrishnan PhD. **Antibiotic therapy for bone infection: impact on gut microbiome and implications for bone health**Speaker: Fintan Moriarty PhD (AO Research Institute Davos) |
| **Research: Pearls for Success for Surgeons**Host Society: Orthopedic Research Society |
| Moderator: Theodore Miclau, MD | Talks:**Introduction:**  Theodore Miclau, MD **Characteristics of the successful surgeon scientist: Observations over the Decades**Speaker: Geoff Richards, PhD **Being Productive as a Clinical Researcher with a Busy Practice** Speaker: Michael McKee, MD **Balancing Growth of a Basic Research Program With Clinically Activity** Speaker: Emil Schemitsch, MD**Developing Collaborative Teams with Surgical Colleagues**Speaker: Chelsea Bahney, PhD**Balancing Early Career Demands: Is There Enough Time for Everything?**Speaker: Prism Schneider, MbD **Panel Discussion/Questions** |
| **Moving the Needle: Impactful Research in Orthopaedics**Host society: Canadian Orthopedic Research Society |
| **Chairs:** Mario LamontagneJoy Macdermid (CORS Executive)**Abstract:** We aim to showcase important musculoskeletal research from Canadian centres that has influenced clinical practice in orthopaedics. The purpose is to highlight the importance of the collaboration between scientists and clinicians in our field. |  |
| **Additive manufacturing of orthopedic biomaterials – from lab to application**Host Society: European Orthopaedic Research Society |
| **Chairs:** Nicola Baldini (Bologna, Italy), Holger Jahr (Aachen, Germany)**Abstract**Additive manufacturing, or 3D printing, provides unparalleled opportunities to realize the challenging requirements of producing personalized and even bone-mimetic implants. This session will give you the latest insights on instruments and materials currently being used for 3D printed customized medical devices for total knee arthroplasties from an industrial point of view. Additive manufactured solutions and perspectives based on clinically relevant needs will be addressed. Furthermore, novel approaches towards mimicking biological gradients in the design of 3D printed scaffolds to regenerate skeletal pathologies in the future will be presented. Due to the high economical and personal impact of surgical complications resulting from implant infections, we will further specifically address current trends in combining additive manufacturing and nanoscale materials to control cells fate and manage implant-related bone infections. Bone substitutes should not only fight infections, but also facilitate osseointegration. To this end, metallic materials are promising to tackle this challenge and a special attention will thus be devoted to metal-based biomaterials and nanomaterials. We will discuss the impact of topological design of future 3D printed metallic implants and associated technological challenges thereof. Finally, direct printing of porous absorbable metal implants for the treatment of large bone defects will be presented as a solution providing mechanical support in load-bearing anatomical regions, facilitating osseointegration, and ultimately eliminating the risk of implant-associated osteitis after their job is done. New strategies to better predict the translational potential of these antibacterial and osteogenic medical devices will be briefly addressed as well. | Talks: **3D printing in Total Knee Arthroplasty – Implants, Instruments, complex customized devices and related materials**Speaker: Berna Richter(Aesculap AG, Germany)**Towards mimicking biological gradients in 3D scaffolds design for skeletal regeneration**Speaker: Lorenzo Moroni(MERLN, Netherlands)**Combining additive manufacturing and nanoscale materials to control cells fate and discourage infection**Speaker: Gabriela Graziani(Bologna, Italy)**Translational potential of novel 3D printed porous absorbable metallic medical devices**Speaker: Holger Jahr(RWTH Aachen, Germany) |
| **Digitalization in orthopaedics and traumatology – global data and patient outcomes**Host Societies:European Orthopaedic Research Society/ AO Research |
| **Organiser:** Prof Boyko Gueorguiev, AO Research Institute Davos, Switzerland**Abstract:**Implementation of digital technologies has been enhancing the translational research and development in focusing towards innovative clinical solutions and applications, and solving existing clinical problems. Aim and scope of this workshop is dissemination of novel approaches in orthopaedics and traumatology to promote excellence in patient care and outcomes in trauma and musculoskeletal disorders, to focus on the importance of the chain training-indication-improvement-therapy-outcome-monitoring-rehabilitation, and to contribute to enhancing today's postoperative care. | Speakers: Dr. Roland Herzog, AO Innovation Translation Center, SwitzerlandDr. Markus Windolf, AO Research Institute Davos, SwitzerlandDr. Alexander Joeris, AO Innovation Translation Center, Switzerland |
| **Biomimetic Approaches for Bone Tissue Engineering**Host Society: Australia and New Zealand Orthopaedic Research Society (march 17th) |
| **Chairs:** Dr Iman Roohani, Senior Research Fellow (University of Sydney)Dr Yinghong Zhou (Queensland University of Technology) **Abstract:**The modest clinical translation of bone tissue engineering can be attributed to overlooking key events that occur during fracture healing, embryonic and postnatal development and also an oversimplification of structure, composition and functional properties of the target tissue. This workshop will focus on advances made in the generation of truly biomimetic grafts to replace or regenerate damaged tissues and organs, employing emerging technologies such as bioprinting strategies to bottom-up approaches using microtissues and organoids for the development of large scale tissues |  |
| **Artificial Intelligence and computational automation in orthopaedics: The good, the bad and the ugly**Host Society: Australia and New Zealand Orthopaedic Research Society |
| **Chairs:** A/Prof David Ackland and Dr Damith Senanayake**Abstract**: Artificial intelligence (AI) is being increasingly incorporated into main-stream orthopaedics, facilitating applications that include image diagnostics, human motion classification, surgical planning, clinical decision making, and medical device development. This workshop will present recent advances and best practices in AI techniques and other forms of computational automation that are supporting the orthopaedics industry, and the challenges that must be overcome in the adoption of this emerging technology | Speakers: A/Prof David Ackland, Dr Damith Senanayake (University of Melbourne)A/Prof Dominic Thewlis (Adelaide University) |
| **Tissue regeneration & Repair**Host Society: Korean Orthopaedic Association |
| **Chair:** Kwang Hwan Park, MD, PhDSecretary General, Korean Orthopaedic Research Society (KORS).Clinical Associate Professor, Department of Orthopaedic Surgery, Yonsei University College of Medicine, Seoul, Korea. **Abstract:**Regenerative medicine for the repair of skeletal tissues is a rapidly changing filed of great interest in various biomedical research. Many kinds of biological sources, such as stem cells, biomaterials, and small molecules, has been tried for skeletal tissue repair, but unfortunately the clinical association between the various biological sources is often not made. Particularly, it would be important to understand the natural associations between biological sources for the successful regeneration of skeletal tissues such as cartilage, tendon, and peripheral nerve. Regenerative medicine and biological source for the repair of skeletal tissues address this gap in the market by bringing together the clinical association of cartilage, tendon, peripheral nerve to provide a review of the different strategies, and more importantly provide a clear discussion of practical techniques and biological sources that can be employed to repair the skeletal tissues. In this workshop, we will firstly discuss the results of study on the regeneration of tendon and ligament using biologics. Second, we will focus on the use of mesenchymal stem cells (MSCs) and small molecules for osteoarthritis (OA) treatment. Third, we will discuss the development of an efficient decellularized nerve allograft for establishment of protocols for harvesting and processing of nerve allografts. Lastly, we will then discuss the biomaterials and enhanced fixative methods for successful cartilage regeneration. | Talks:**Regeneration therapy for shoulder and elbow tendinopathy** Speaker: Professor, Jun-Gyu Moon, Korea University Guro Hospital, Seoul, Korea **Priming of mesenchymal stem cells for the treatment of osteoarthritis**Speaker: Professor, Hyuk-Soo Han, Seoul National University, College of Medicine, Seoul, Korea**Nerve regeneration: Development of an efficient decellularized nerve allograft**Speaker: Professor, Yang-Guk Chung, Seoul St. Mary’s Hospital, The Catholic University of Korea, Seoul, Korea**Adhesive tissue glue for repair** Speaker: Professor, Byoung-Hyun Min, School of Medicine, Ajou University, Suwon, Korea, Adjunct professor, Wake Forest University, Florida, USA, CEO, Advanced Translational Engineering Medicine (ATEMs) |
| **Tendinopathy - a relevant clinical problem and a growing research field**Host Society: Musculoskeletal Regeneration Network (MR-NET) of the German Society of Orthopaedics and Trauma Surgery (DGOU) |
| **Chairs:**  Prof. Britt Wildemann (Jena) Prof. Denitsa Docheva (Wuerzburg)**Abstract:**Tendon pain and dysfunction is frequent in all types of athletes and also in the aging population. "Tendinopathy" describes a broad spectrum of tendon disorders and causes activity-related tendon pain resulting in restricted movement and disability associated with in a high socioeconomic burden. It occurs in various anatomical locations of the body and affects diverse tendons such as the Achilles, patellar, and rotator cuff tendons. Despite the clinical relevance, tendon disorders are less studied compared to other tissues such as bone and cartilage. The presence and contribution of inflammation to the development of tendinopathies has been the subject of controversial discussions for years. Its pathogenic role is now well accepted, although it is far from being adequately understood. Therefore, the knowledge of tendon pathophysiology is still lagging behind and the successful treatment of tendinopathies represents an unsolved orthopaedic challenge. The Musculoskeletal Regeneration Network (MR-NET) of the German Society for Orthopaedics and Trauma Surgery (DGOU) organizes this symposium. The invited speakers, members of the network, will give an overview on the recent clinical and basic research on tendinopathy reporting on novel aspects regarding tendon healing, rotator cuff disease, enthesiopathies and biomaterials. | Talks:**Tendon repair versus regeneration from a clinical point of view**Prof. Dr. Richard Stange, University of Munster, Germany**The role of subacromial bursa in rotator cuff tendinopathy: what do we know?**Dr. Franka Klatte-Schulz, Charité-Universtätsmedizin Berlin, Germany**Tendon-enthesiopathies: molecular pathogenesis and possible therapies**Prof. Dr. Martijn van Griensven, Maastricht University, the Netherlands**Development and assessment of polycaprolactone-based implants for tendon repair**Dr. Janin Reifenrath, Medical University, Hannover, Germany |
| **Prevention of Post Traumatic Osteoarthritis: research needs and barriers?**Host Society: British Orthopaedic Research Society |
| **Chairs:**Dr Fiona WattProfessor Deborah Mason **Abstract:**This workshop is intended for patients, clinicians (surgeons, physiotherapists, vets, emergency room), scientists, and engineers with an interest in therapies for preventing PTOA.  This workshop follows on from the report from an international expert working group on considerations for the design and conduct of interventional studies following acute knee injury (Watt et al. 2019, Osteoarthritis and Cartilage, Volume 27, Issue 1, 23 – 33), which addressed key overarching considerations and highlighted the need for improved understanding of PTOA pathogenesis and appropriate timing of interventions, their feasibility and acceptability. The considerations highlighted in this paper were to be reviewed and addressed periodically and this workshop will contribute directly to this process. Prior to the workshop a survey will be conducted to assess attendees perceptions of the range, efficacy and limitations of current treatments that might prevent OA after knee injury, as well as the need for new treatments seeking to prevent PTOA, and feasibility and acceptability of different potential treatments. The workshop will present the survey questions and results in the context of these previous research recommendations, then focus on discussions of the following specific research recommendation areas highlighted, particularly considering pharmacologic interventions for prevention of PTOA after knee injury: • ‘Experimental medicine' studies in humans should be used to define the likely best delivery of an intervention, its optimal time-window and initial pharmacokinetics, to support future clinical trials • Patient and public involvement should be sought, particularly around areas of assessing risk of disease, risk of harm, risk of overtreatment and acceptability of different types of proposed interventions Feasibility studies are encouraged to address questions specific to an intervention, acceptability to patients, and refine best outcomes. Attendees will be assigned to small, inter-disciplinary, breakout groups with facilitators and rapporteurs to address key questions in each of the areas above. All groups will report their findings at the end of the workshop and final opinions of all workshop attendees recorded using a survey within the workshop. The findings from this workshop will feed into ongoing working group activity in this area.  |  |
| **How does joint loading influence pain and degeneration in osteoarthritis?**Host Society: British Orthopaedic Research Society |
| **Chair:**Prof Ilse Jonkes, KU Leuven, Belgium  | Talks: **What does epidemiology and genetics tell us about mechanical risk of OA?** Speaker: Mark Wilkinson, Sheffield, UK (orthopaedic surgeon)**How does mechanical loading alter biological signals in the joint?** Speaker: Deborah Mason, Cardiff, UK (bioscientist) **Personalised HTO interventions for early knee OA, can mechanical re-alignment be a cure?** Speaker: Richie Gill, Bath UK, (engineer) |
| **New focus areas in osteoarthritis research**Host Societies: Taiwanese Orthopaedic Research Society, European Orthopaedic Research Society |
| **Chairs:** Feng-Sheng Wang (Taiwan)Holger Jahr (Aachen, Germany)**Summary**Osteoarthritis (OA) is the most frequent, and highly heterogeneous, form of arthritis. While affecting the whole joint, a progressive loss of articular cartilage is still a hallmark. Better biomarkers would allow for an early detection of this disease, when its progression may still be altered by therapeutic intervention and a deeper understanding of mechanisms causing OA is essential for developing novel disease-modifying therapeutics. Ideally tailored to the diversity of clinical phenotypes, early identification of OA subtypes may transform clinical treatment efficiency. Biochemical and imaging biomarkers are important diagnostic and research tools assisting with this challenge. As a number of mechanisms may be shared by several phenotypes, using artificial intelligence during non-destructive quantitative optical characterization of early changes in the cartilage holds tremendous potential to this end. Microenvironmental factors and their differences between different subtypes may further assist in decision making of improved early pharmacological intervention. The gut microbiome is responsible for a series of metabolic and immunological functions, potentially elucidating the heterogeneity of OA phenotypes. Hinting at human relevance, a couple of recent studies have suggested that patients diagnosed with OA possess a quantifiable dysbiosis in the gut microbiome. Aiming at shedding light on this “gut-joint axis”, the interactions between gut microbiota and factors relevant to OA progression, the role of innate immunity, and probiotics and other potentially promising manipulations of the microbiome in the management of OA will be presented. Moreover, mitochondrial energetics in chondrocytes, articular cartilage integrity, microbiota-derived metabolites as potential biomarkers related to inflammation, their potential to predict OA progression and monitoring therapeutic intervention efficacy will be discussed.  | **Talks:** **Tissue-dependent biomarkers and microenvironmental factors in osteoarthritis**Speaker: Holger Jahr, PhD, Dept. Orthopedic Surgery, MUMC+/Dept. Anatomy, RWTH Aachen**Introducing a future-oriented, AI-supported, non-destructive quantitative optical biopsy for early disease detection**Speaker: Bernd Rolauffs, PhD/MD, Dept. **Orthopedics and Trauma Surgery, Freiburg****Gut microbiota-derived metabolites regulate chondrocyte metabolism and obesity-induced osteoarthritis****Speaker:** Feng-Sheng Wang, MS, PhD, Kaohsiung Chang Gung Memorial Hospital, Taiwan**The** **role of gut ecosystem in the development of osteoarthritis: friend or foe****Speaker:** Wei-Shiung Lian, PhD, Kaohsiung Chang Gung Memorial Hospital, Taiwan |
| **A sound-based biofabrication platform for rapid orchestration of multicellular living systems**Host Society: AO Research |
| **Organiser:** Tiziano Sera, AO Research Institute Davos**Abstract:** Spatial patterns of cells, organoids, or inorganic particles can be forced on demand using acoustic standing waves, such as the Faraday waves. We call this method Sound Induced Morphogenesis (SIM). SIM allows tuning of pattern parameters under contactless, fast and mild culture conditions, for intimate and controlled cell-cell communication, anisotropic organization, and coordination towards directing morphogenesis and achieving tissue functionality. |  |
| **Application of Advanced Technologies in Bone and Cartilage Research**Host Society: International Chinese Musculoskeletal Research Society (ICMRS) |
| **Organisers:** Professor Minghao Zheng M.D., Ph.D.Professor of Orthopaedic ResearchMedical School of The University of Western AustraliaProfessor Wentian Yang M.D., Ph.D.Associate Professor of Orthopaedics and MedicineBrown University Alpert Medical SchoolProvidence, RI 02903, USA**Abstract:** This workshop focuses on several technological advances that have been applied for bone and cartilage research during the past few years. Professor Zheng's research primarily centers on translational medicine and bioengineering of bone, cartilage, and tendon. He developed the first cellular engineering product for cartilage repair MACI approved by the FDA and Celgro collagen technology platform for tendon, nerve, cartilage, and bone regeneration. Dr. Zheng has published over 200 papers and holds 30 patents. He has over 9000 citations with H index of 54. In this workshop, Dr. Zheng will discuss the real-time confocal assessment of osteocytes. Dr. Yang studies the role of protein tyrosine phosphatases (PTPs) in skeletal development and diseases, particularly the ubiquitously expressed PTP SHP2 with cellular context-specific effects. Somatic SHP2 deletion in chondroid and bone cells causes a cartilage tumor syndrome metachondromatosis and defective ossification, respectively, implicating a crucial role for SHP2 in the skeleton. How SHP2 functions in skeletal cells, however, remains incompletely understood. In this Workshop, Dr. Yang will discuss the use of a series of genetically modified mice in combination with cutting-edge technologies, including live cell lineage tracing, phosphoproteomics, scRNA-seq, RNAscope®, and biochemical assays to dissect the role of SHP2 at the cellular and molecular levels in the skeletal tissue. Lastly, Dr. Xia will introduce Colour Electron Microscopy and its application in Metallosis studies. Metallosis, also termed adverse reactions to metal debris, is a combination of aseptic inflammation, local tissue necrosis, toxic metal ions increasing in tissue and blood, and fibrosis secondary to metallic corrosion and release of wear debris. Consequently, it results in loosening or failure of the implanted devise. Metal allergy can partially explain some clinical cases, but the mechanism is still not fully understood. Dr. Xia will discuss several important findings of metallosis from his team using color electron microscopy in combination with nanostructure and element analysis. | Talks:**Reali-time Confocal Assessment of Osteocytes**Professor Minghao Zheng M.D., Ph.D.Professor of Orthopaedic ResearchMedical School of The University of Western Australia**New Technology-based Novel Insights into *PTPN11* Regulation of Skeletal Development and Diseases**Professor Wentian Yang M.D., Ph.D.Associate Professor of Orthopaedics and MedicineBrown University Alpert Medical SchoolProvidence, RI 02903, USA**Colour Electron Microscopy: See Through Metallosis** Zhidao Xiao, M.D., Ph.D.Senior Lecturer of Regenerative MedicineCentre for Nanohealth, Swansea University Medical School, Singleton Park, Swansea SA2 8PP, United Kingdom |
|  **Non-Surgial Treatments of OA** Host Society: Turkish Orthopaedic Research Society(meeting 15th March) |
| **Chair:**Feza Korkusuz | Talks:**Meniscus Biological Treatment Methods**Speaker: Mustafa Akkaya, Assoc. Prof. Orthopedics and Traumatology Ankara Yildirim Bayezit University **PRP Applications in Orthopedic Practice**Speaker: Ahmet Emre Paksoy, Assist. Professor Orthopedics and Traumatology Erzurum Ataturk University **Viscosupplementation Treatment**Speaker: Zekeriya Öztemur, Prof. Orthopedics and Traumatology Sivas Cumhuriyet University **Mammalian target of rapamycin (mTOR), sestrin 1 (SESN 1), Serum Glucagon-Like Peptide 1 (GLP-1) Effect in Bone Healing**Speaker: Ozhan Pazarci, Assoc. Prof. Orthopedics and Traumatology Adana City Training and Research Hospital |
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