Volume XIII | Volumes III & IV

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Linking the international community of tissue engineers and regenerative medicine scientists

Letter from the President

Dear TERMIS Members,

2018 was a year of the 5th TERMIS World Congress, which was held in Kyoto, Japan the city referred to as “Japan’s heartland” from September 4-7 and chaired by Dr. Yasuhiko Tabata and Dr. Yoshiki Sawa. In the midst of one of the worst typhoons to hit Japan in 25 years, the World Congress continued with over 2,300 people in attendance. The conference kicked off with the Tissue Engineering & Regenerative Medicine Exposition (TERMEX) that consisted of a full day of talks focusing on industrialization, regulation, market insights and international developments within TERM in North America, Europe and Asia. The next three full days of programming included presentations from plenary lectures from:

“Delivery of Anabolic Genes, miRNA and CRISPR Systems for Stem Cell Fate Modulation and Tissue Regeneration” - Yu-Chen Hu (National Tsing Hua University, Taiwan); *“Immune reaction of retinal cell therapy using iPS cells”* – Masayo Takahashi (RIKEN, Japan); *“Clinical Cell Therapy of Heart Failure”* - Philippe Menasché (Department of Cardiovascular Surgery, Hôpital Européen Georges Pompidou, France); *“Diversity of extracellular vesicles and their potential in regenerative medicine”* - Jan Lötvall (Krefting Research Centre, University of Gothenburg, Sweden); *“Biomaterials for Tissue Engineering and Regenerative Medicine”* - Antonios G. Mikos (Department of Bioengineering, Rice University, USA); *“Frontiers of human organs-on-chip research and technology”* - Gordana Vunjak-Novakovic (Columbia University, USA); *"Cerebral organoids: Modeling human brain development and disease in stem cell derived 3D culture"* - Jürgen Knoblich(IMBA - Institute of Molecular Biotechnology, Austria).

Congratulations to Dr. Tabata and Dr. Sawa for organizing a successful World Congress!
As 2018 is drawn to a close and my term as President ends, I would like to thank you for your continued support of the Society. The organization continues to grow through the diligent efforts of the Chapters and most importantly the council members, who volunteer their time to ensure that TERMIS flourishes.

As you are aware, Geoff Richards from the AO Institute in Davos, Switzerland, was recently elected to serve as the incoming President and he will begin his term in 2019. The Society and its members is being relayed to good hands and we look forward to his term as the President.

It was a pleasure to serve as your President for the last three years.

Sincerely,
Rui L. Reis
TERMIS President

2018 TERMIS World Congress Overview

From the 2018 World Congress Chairs:

Yasuhiko Tabata, Ph.D.,D.Med.Sci.D,Pharm of Institute for Frontier Life and Medical Sciences, Kyoto University and **Yoshiki Sawa**, MD.,Ph.D. of Graduate School of Medicine, Osaka University

Over 2,400 people from 53 coutries attended the 5th TERMIS World Congress Kyoto held from September 4 to 7, 2018, at the Kyoto International Conference Center, Kyoto, Japan. The TERMIS-WC Kyoto 2018 is the premier event for the dissemination of cutting edge research in tissue engineering and regenerative medicine and the purpose is the worldwide advancement of both the science and technology of tissue engineering and regenerative medicine.
This year's meeting was co-chaired by **Yasuhiko Tabata**, Ph.D.,D.Med.Sci.D,Pharm of Institute for Frontier Life and Medical Sciences, Kyoto University and **Yoshiki Sawa**, MD.,Ph.D. of Graduate School of Medicine, Osaka University, Japan, who worked together with an Internationl and Local Advisory Committees or the board members of the Japanese Society for Regenerative Medicine (JSRM) to crete the TERMIS-WC Kyoto 2018 programs.The TERMIS-WC 2018 Kyoto was co-hosted with JSRM.

Regenerative medicine is defined as an advanced medicine technology that enhances the natural-healing potential of the body, which is based on the cells ability for proliferation and differentiation. If regenerative medicine is realized, it will be an ideal therapy to gently implement to the human body. Our scientists and clinicians are working diligently to bring regenerative medicine therapies to the patients.

Regenerative medicine is classified into two fields: regeneration therapy and regeneration research. Regenerative research includes cell research and drug discovery. To realize both the regeneration therapy and research, it is of prime importance to enhance the cells ability for proliferation and differentiation. To further improve both the fields, the further development of stem cell biology is undoubtedly necessary. In addition, it is practically indispensable to develop biomaterials technology and methodology, so-called tissue engineering to provide cells with a good, local environment to allow to enhance the cells ability for tissue regeneration.

To realize the regeneration therapy, there are two practical approaches: cell transplantation and tissue engineering. In the former, cells with a high ability for proliferation and differentiation are expanded in vitro and transplanted into the body. Based on the inherent ability of cells transplanted for tissue regeneration, tissue repair and disease healing are expected. Tissue engineering is a newly emerging biomedical technology or methodology with biomaterials to provide a local environment which enables cells to enhance their proliferation and differentiation for cell-induced tissue regeneration. Cell transplantation therapy will be further improved by combining with tissue engineering. In addition to the scientific technology, discussion about the quality control of cells, life ethics, and regulation is required to bring the regenerative medicine therapies to fruition. Regenerative medicine is an interdisciplinary

field it is imperative for the collaboration and integration of industry, government, and academia in order to further the developmentsof regenerative medicine therapies.

Based on this concept, the theme for the 2018 TERMIS-WC is "**Integration of Industry, Government, and Academia for Regenerative Medicine**," reflecting the importance of strong cooperation of Industry-Government-Academia to realize tissue engineering and regenerative medicine. To this end, the 2018 scientific program will focus on the innovative technologies, regulation, and commercialization within tissue engineering and regenerative medicine. The following 3 points which characterze this meeting are;

1) The WC discusses the innovative technologies, legal regulation, and commercialization related to tissue engineering and regenerative medicine.
   Symposia, Oral and Poster Presentations
2) The WC brings together researchers, scientists, clinicians, trainees, and students from both academia and industry to exchange the ideas and discuss critical developments in the field of TERM.
   Symposia, SYIS Activities, Exhibition, and Luncheon Seminars etc.
3) The WC gives participants a chance to touch Kyoto tradition and culture.
   Social Events (at Kiyomizu-dera temple of world heritage), Japanese Sake, Japanese Tea

As a preview event of TERMIS-WC, the Tissue Engineering & Regenerative Medicine Exposition 2018 (TERMEX2018) was organized on September 4, 2018. Unfortunately, a typhoon passed through near Kyoto, and some people could not come to attand the world congress due to the typhoon cancellation of some airlines and train. However, even though the bad weather, 1,200 people attended the TERMEX2018 for activated discussion. This event was an exposition which aims to introduce the very up-to-date situation of industrialization, regulation, market insights, international development and other surrounding issues of Tissue Engineering/Regenerative Medicine field of eight countries from North America, Europe and Asia-Pacific regions. In TERMEX 2018, each country's unique approach will be revealed and it will be an excellent opportunity to develop relationship with TE/RM players attending 2018 TERMIS-WC from all around the world in convivial atmosphere. After the TERME exposition, a social gathering (mixer) of TERMEX 2018 and a Welcome Reception of TERMIS-WC were held at the same time to promote world-wide technological and human interactions. At the welcome reception, participants enjoyed watching the "Nou" performance of a traditional Japanese dancing.

The scientific program (performed in pallalelly 10 rooms) composed of 7 Plenay Lectures**: Cell Therapy Using iPS Cells**, Dr Masayo Takahashi (RIKEN, Japan), **Exosome: the Next Generation MSC Therapy**, Dr Sai-Kiang Lim (Institute of Medical Biology, A*STAR, Singapore)**, Frontiers of Human Organs-on-Chip Technology**, Professor Gordana Vunjak-Novakovic (Columbia University, USA)**, Delivery of Anabolic Genes, miRNA and CRISPR Systems for Stem Cell Fate Modulation and Tissue Regeneration**, Professor Yu-Chen Hu (National Tsing Hua University, Taiwan)**, Clinical Cell Therapy of Heart Failure**, Professor Philippe Menasché (Department of Cardiovascular Surgery, Hôpital Européen Georges Pompidou, France)**, Cerebral Organoids: Modeling Human Brain Development and Tumorigenesis in Stem Cell Derived 3D Culture**, Dr Jürgen Knoblich (Institute of Molecular Biotechnology, Vienna, Austria), and **Biomaterials for Tissue Engineering and Regenerative Medicine**, Profssor Antonios G. Mikos (Department of Bioengineering, Rice University, USA) and 2 Predsidential Lectures**: Overview of TERMIS and Natural Origin Materials for TERM**, Professor Rui L. Reis: President of TERMIS (3B´s Research Group, University of Minho, Portugal) and **Overview of JSRM and Frontier RM in Cardiovascular Area**, Professor Yoshiki Sawa: President of JSRM (Graduate School of Medicine, Osaka University, Japan).

As general and SYIS presentations (2,300 speakers). there were 95 Symposia of different topics (427 speakers), Oral presentations; 4 sessions (35 speakers), Poster presentations; 29 sessions, 1682 speakers, and SYIS presentations: Oral 97 speakers (7 sessions) and Poster 25 speakers, In addtion, Luncheon (company-sposored) Seminars (21 sessions, 37 speakers) and over 80 company exhibitins were organized (over 1,500 company partcipants). Opening, Awards, and Closed Ceremonies or the SYIS Night, Meet the Mentor, and Career Panel to encourage SYIS exchange were also performed. I strongly believe that "Taiko" performance of a Japanese traditional drum at the opening ceremony allowed all the particialnts to feel their WC Kyoto attendance as well as their presence in Kyoto, Japan.

The topics of symposia are;

- RNA interference to promote tissue regeneration
- Gene Delivery in Tissue Engineering
- Discovering Novel Tissue and Blood Proteins for Regeneration
- Mechanobiology and Force Sensing in Regenerative Medicine
- Reconstituting cell niche
- Extracellular Vesicles in Tissue Regeneration
- Regenerative Microenviroment Therapies in Ischemia Organs
- Frontier of research on interstitial cells / extracellular matrix for generating functional tissue and organs
- "Regenerative Medicine with Allogenic Mesenchymal Stem Cells
– The Current Status and Future Prospective -"
- Bioengineering tools enabling the application of MSC as trophic mediators in challenging diseases
- The interactions of biomaterials and stem cells/tissue regeneration
- Injectable scaffolds

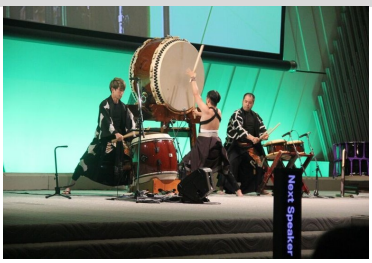
● Research Challenges in Stem Cell Culture and Differentiation on Biomaterials targeting for Stem Cell Therapy
● Platelet derivatives and platelet-derived biomaterials in TERM
● Advances in cell encapsulation technologies for regenerative medicineg
● Polymer, Biopolymer, and Matrix-Mediated Delivery of Cell Signaling Proteins
● CLAY MATERIALS FOR HARD AND SOFT TISSUE ENGINEERING: from Bench to Clinical translation
● Electroactive Biomaterials and Electrostimulation in TERM applications
● Biomaterials for Modulating Vasculature: Therapeutic Applications
● Clinical translation of tissue engineering techniques using various biomaterials
● In situ tissue regeneration: endogenous stem cell recruitment, bioactive signals, and biomaterial design
● Elastin in regenerative medicine: biomaterials and biosynthesis
● Development and manufacture of silk-based medical devices: from basic systems to clinical use
● Silk biomaterial matrices
● Multi-Scale Approaches For Complex Tissue Generation
● Live-cell Bioprinting for Tissue Engineering
● Advances in Scaffold-Free, Cell Spheroids-Based Tissue Engineering
● Biomaterials-Bio3D Printing
● Biofabrication: from new technologies to clinical applications
● New frontier strategies in the fabrication of vascularized tissues
● Vascularization in Tissue & Organ Engineering
● In vivo Bioreactor ? In situ Tissue Regeneration
● Scaffold-free strategies to engineer tissue for regenerative medicine
● 4D-Tissue Regeneration: Integration of Cells and Scaffolds in Three-Dimension and Temporal Regeneration
● Recapitulating tumor microenvironments to screen biotherapeutics
● Recent achievements and future perspective of micro-physiological cell culture systems toward in vitro physiology
● Multi-parametric quantitative imaging of live cells in 3D tissue models
● Computational Modeling Stem Cell Fate
● Recall the Regenerative Potential Through Robot Engineering and Mechanical Stimulation
● Laser perforation and alternative strategies for matrix repopulation
● Quantitative X-ray Micro-CT Imaging for Tissue Engineering
● Tissue engineering and regenerative medicine for joint preservation
● Cell therapies for tendon repair ? nature's engineers doing their job
● Regeneration of the Anterior Cruciate Ligament - Current Status and Challenges
● Potential of polydactyly-derived cells for regenerative medicine
● Dental pulp regeneration: How can we reach the goal?
● Immunomodulation in orthopaedic and dental tissue engineering
● Translation of novel developments in bone engineering? where do we stand?
● Gene therapy for bone regeneration
● Translating skeletal muscle tissue engineering into clinics
● Regenerative medicine for muscular diseases
● Advanced skeletal regenerative therapies in the context of aging
● Gene2Skin Twinning H2020 Project- Roadmap for advanced genetic engineering-based skin therapies
● Forefront of clinical study in craniofacial regeneration therapy
● Towards clinical development of advanced nerve conduits for peripheral nerve regeneration
● Advances in neural tissue engineering and regenerative medicine
● Tissue Engineering and beyond in peripheral nerve regeneration - from supportive biomaterials and cells to functional recovery
● Vascular Tissue Engineering
● Recent Advance in Myocardial Tissue Engineering
● Current update of tissue engineering and biomaterial for corneal diseases: what is the bottleneck for translational research?
● Tissue engineering of human vocal fold repair and regeneration
● Innovative devices for the treatment of endocrine/metabolic diseases
● TERMIS-WC Business Plan Competition Finals
● Bringing Cell Therapy to Industrialized Processing for Burns and Wounds"
● Cell manufacturability in cell manufacturing process
● Animal models in clinical translation and commercialization of tissue engineering and regenerative medicine therapies - Myths and reality
● Role of Stem Cell Research in Academia
● ISBF-TERMIS Joint Young Scientist Chapters. Biofabrication in TERM
● Regenerative Rehabilitation: the Key to Translating Tissue Engineering and Regenerative Technologies
●'One Health' - Translational regenerative medicine in the veterinary sector
●Challenges to Stem Cell Therapy Development and Regulation in Dogs and Cats
● ESAO@Termis 2018 joint Symposium of the Working Groups on Tissue engineering and Bioartificial Organs
● Biomaterials and Additive Manufacturing for early intervention of osteoarthritis (H2020-MSCA-RISE BAMOS project)
● Tissue Engineering and Regenerative Medicine of the Cornea: Towards a clinical reality through the

cooperation of Industry, Government and Academia
● disease model for a new drug using an iPSC technology
● Progress in cell sheets therapy for various diseases
● Regenerative therapy for GI and HPB diseases
● Kidney and endocrine organs
● Regenerative therapy in Reconstructive and Aesthetic Plastic Surgery
● National Projects and Organizational Approaches to Promote and Spread the Regenerative Medicine
● Public-private partnership for research on standardization and validation of methods for tumorigenicity assessment of regenerative medical products (MEASURE)
● Regenerative medicine in opthalmological field
● Cardiovascular regenerative therapy)

The titles of SYIS chaired sessions are;
●Biomaterials
●Tissue Repair/Angiogenesis/Cell Transplantation
●Functionalized materials / Small Molecules / Extracellular Vesicles
●Cell Stimulation and Modulation
●Organoids / Cell- Tissue Niche
● Technology/Imaging
●Additive Manufacturing/Methods

As Gala Event of one scosial event, we organized a night visit of Kiyomizu-tera Temple of a world heritage on September 6. 1,400 people enjoyed Kiyomizu-tera temple chatered for the WC and lighted up. To allow participants to see, feel, and enjoy Kyoto cultures, we served some Japanses Sakes of a traditional spirit at the Poster session and the performance of Kyoto tradition handcraft over the period of WC.

The World Congress organizing teacordially appreciates the support and assistance of commitees and sponsors to succeed in the academic and industrial activities of TERMIS-WC. We are strongly convinced that all the participate in the 2018 TERMIS-WC could bring back good memories and human relationships from Kyoto, Japan.



"Taiko" Performance


"Nou" Performance


2018 FTERM Fellows

Interview with Heinz Redl

BMC Biomedical Engineering recently attended the 2018 TERMIS World Congress, where we had the privilege to meet Prof Heinz Redl, the Chair for TERMIS-Europe and a renowned thought leader in the field of tissue engineering and regenerative medicine. In this interview, Prof Redl shares his insights on TERMIS, his research philosophy and highlights, as well as

his recent book series published by Springer.

[Full Interview Available Here]

TEN: Drs. Heungsoo Shin and Xiumei Wang named Co-Editors-in-Chief of *Tissue Engineering*

Congratulations!

The leadership of *Tissue Engineering Parts A, B, and C* and its publisher, Mary Ann Liebert, Inc., publishers, are pleased to announce that **Dr. Heungsoo Shin**, Professor in the Department of Bioengineering at Hanyang University, Seoul, Korea, will assume the role of Co-Editor-in-Chief of *Tissue Engineering Part B: Reviews* with current Co-Editor Dr. Katja Schenke-Layland.

We would also like to warmly welcome **Dr. Xiumei Wang**, Professor at the School of Materials Science and Engineering in Tsinghua University, Beijing, China, will assume the role of Co-Editor-in-Chief of *Tissue Engineering Part C: Methods* with current Co-Editor Dr. John Jansen.

Please join us in congratulating both Drs. Shin and Wang on their new prestigious Editorial appointments. We look forward to a very exciting and impactful new year ahead in celebration of the 25th Anniversary of *Tissue Engineering*.

We would also like to take this opportunity to thank the Tissue Engineering and Regenerative Medicine International Society (TERMIS), the official society of the journal, along with our editorial board, reviewers, and authors for their continuing commitment and dedication to the field.
Happy Holidays!

The Editors of *Tissue Engineering Parts A, B, and C*

Dr. Antonios Mikos
Dr. John Fisher
Dr. Katja Schenke-Layland
Dr. Heungsoo Shin
Dr. John Jansen
Dr. Xiumei Wang

Thematic Groups

Vascular Tissue Engineering (VTE)

Dear Colleagues,

The Thematic Group on Vascular Tissue Engineering (VTE) held a Symposium at this year's 5th

TERMIS World Congress in Kyoto on September 4-7, 2018, which was organized by Profs. Deling Kong and Anthony Weiss. Prof. Anthony Weiss was the keynote speaker. The other speakers of the symposium were Profs. Xiumei Mo, Chuhong Zhu, Toshiharu Shinoka, and Gary Bowlin. Further to the involvement of our Thematic Group at the TERMIS meeting, several other international congresses concerning vascular tissue engineering were, and will be organized.

In the same month Prof. Beat Walpoth organized a Vascular Tissue Engineering Symposium during the meeting of the European Society for Artificial Organs (ESAO) which was held in Madrid from 12-15 September, 2018. This was followed by the meeting of the International Society for Applied Cardiovascular Biology (ISACB) held in Bordeaux from 16-19 September, 2018, organized by Pros. Elena Aikawa and Nicolas L'Heureux.

There will be a combined International Symposium for Applied Cardiovascular Biology and Vascular Tissue Engineering (ISACB + ISVTE) which will be held in Zurich, Switzerland on June 19-21, 2019 organized by Profs. Simon Hoerstrup, Elena Aikawa and Beat Walpoth.

Symposium Website

On behalf of the VTE Committee: Beat H. WALPOTH, Geneva, Switzerland, Joris ROTMANS, Leiden, Netherlands, Toshiharu SHINOKA, Colombus, USA, Xiumei MO, Shanghai, China, Deling KONG, Tianjin, China.

Bioreactor Technologies Thematic Group (TG)

SEEKING NEW LEADERS

TERMIS is seeking new leaders to reestablish the Biorector Technologies Thematic Group. If you are interested, please contact the Executive Administrator.

2019 Chapter Conferences

Abstracts Open - 1 February 2019

Call for Symposia and Pre-Conference Workshops Now OPEN:

Deadline to Submit - February 4, 2019

Submit a Conference Symposia Proposal

Submit a Proposal for Pre-Conference Workshop

2020 Chapter Conferences
Mark Your Calendars

2020 TERMIS-EU – Manchester, United Kingdom

Conference Dates: 26-29 May 2020
Conference Location: Manchester Central Convention Center
Conference Chairs: Prof. Sue Kimber & Prof. Sarah Cartmell
Programme Chair: Dr. Stephen Richardson

2020 TERMIS-AP – Kuala Lumpur, Malaysia

Conference Dates: September 21-24, 2020
Conference Location: Istana Hotel, Kuala Lumpur
Conference Co-Chairs: Dr. Thamil Selvee Ramasamy, Dr. Angela Ng Min Hwei and Dr. Badrul Hisham Yahaya

2020 TERMIS-AM Conference - Toronto, ON, Canada

Conference Dates: December 13-16, 2020
Conference Location: Sheraton Centre Toronto Hotel
Conference Co-Chairs: Prof. Alison McGuigan and Prof. Penney Gilbert

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2021 TERMIS World Congress

Mark your Calendar - 31 May - 4 June

The 6th TERMIS World Congress will be held in **Maastricht, The Netherlands** from **31 May - 4 June**.

The Conference Chairs:

Prof. dr. Lorenzo Moroni
MERLN Institute - Maastricht University

Prof. dr. Liesbet Geris
University of Liège – KU Leuven

Prof. dr. med. Stefan Jockenhövel
RWTH University Aachen

TERMIS-EU Announcements

2019 Awards Program - Nomination Packages

NOMINATION PACKAGES ARE DUE BY 31ST JANUARY 2019

Nomination packages for any TERMIS-EU award should be submitted to the Executive Administrator by Thursday, 31st January 2019. The criteria for submitting a nomination must be followed in order for the nomination to be accepted.

Awards Program Information & Guidelines

2022 Call for Proposals

DEADLINE TO SUBMIT PROPOSALS IS 28TH FEBRUARY 2019

On behalf of the TERMIS-EU, we would like to announce the solicitation of proposals for consideration to host the 2022 TERMIS-EU Conference.

If you are interested in hosting the 2022 TERMIS-EU conference, please contact the EU Secretary, e.farrell@erasmusmc.nl to request the meeting host application form, the conference hosting guidelines and a sample contract.

After the deadline, the proposals are reviewed by the TERMIS-EU Council. The proposers are asked to present their proposals during the TERMIS-EU Council meeting that will be held during the 2019 TERMIS-EU Conference in Rhodes, Greece.

The deadline for submitting proposals for consideration to host the 2022 TERMIS-EU conference is 28th February 2019.

To request a meeting host application form, the sample of the meeting fixed fee contract, and the guidelines for hosting a TERMIS conference, please contact the EU Secretary, e.farrell@erasmusmc.nl.

TERMIS-EU Summer/Winter School or Symposia Support Request Form

The submission of proposals for the EU to support a summer/winter school or a symposium will be accepted throughout the year. The council will review the submissions two times per year (1st March and 1st September) for consideration of support. Please note that when submitting your request, please ensure that the summer/winter school or symposia cannot be held within two months of the review deadlines.

Form

Tissue Engineering Resource Center

Tissue Engineering is the preeminent, biomedical journal advancing the field with cutting-edge research and applications on all aspects of tissue growth and regeneration. The Journal is proud to facilitate and advance research and communication across academia, industry, and government, as well as provide authors with tools to support their contribution to this evolving field of science.

More Information