

Day 1, 13 November 2019

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## Welcome & Opening of Symposium

- 8:30 – 8:45 **Welcome Address**, Shigeki Sugii, Simon Cool, *Co-Chairs of Organizing Committee*  
**Introduction to the Singapore Cell Therapy Manufacturing Programmes**
- 8:45 – 8:55 **Allogeneic Stem Cell Manufacturing (ASTEM)**  
Simon Cool, *Institute of Medical Biology, A\*STAR*
- 8:55 – 9:05 **Integrated Manufacturing Programme for Autologous Cell Therapy (IMPACT)**  
John Connolly, *Institute of Molecular and Cell Biology, A\*STAR*
- 9:05 – 9:15 **Critical Analytics for Manufacturing of Personalized-Medicine Programme (CAMP)**  
Krystyn van Vliet, *MIT and Singapore-MIT Alliance for Research & Technology*
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- 9:15 – 10:00 **KEYNOTE LECTURE** (Chair: Steve Oh, *Bioprocessing Technology Institute, Singapore*)  
**Genetically engineered immunity for cancer: the development and global regulatory approvals of chimeric antigen receptor (CAR) T cells and what's coming next**  
Bruce Levine, *University of Pennsylvania, USA*
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## Session 1. Stem Cell Therapy

*Chair: Simon Cool, Institute of Medical Biology, Singapore*

- 10:00-10:20 **Long term clinical outcomes of stem cell therapy in cartilage repair: Are we ready for the next step?**  
Francis KL Wong, *Duke-NUS Medical School, Singapore*
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10:20 – 10:50 MORNING TEA BREAK

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## Session 1 cont. Stem Cell Therapy

- 10:50 – 11:10 **Establishing the National Cell Therapy Program for process development and clinical manufacturing of cell & gene therapy products in Singapore**  
Lip Kun Tan, *National University Hospital, Singapore*
- 11:10 – 11:30 **“Stem cell expansion of cord blood graft” vs “bridging support with 3rd party hematopoietic stem/progenitor cells”**  
Satoshi Takahashi, *University of Tokyo, Japan*
- 11:30 – 11:45 **Short talk: The Influence of the amniotic fluid stem cell secretome on cardiomyocyte cellular behaviour**  
Marek Kukumberg, *National University of Singapore*
- 11:45 – 12:00 **Short talk: Long-term culture of human pancreatic progenitors: an alternative source of insulin-secreting beta cells**  
Jamie Trott, *Institute of Medical Biology, Singapore*
- 12:00 – 12:20 **Cardiovascular progenitors for heart regeneration in preclinical models**  
Lynn Yap, *Duke-NUS Medical School, Singapore*
- 12:20 – 12:35 **Short talk: Generation of induced motor neurons (iMNs) from human fibroblasts for cell therapy in spinal cord injury model**  
Hyunah Lee, *Ulsan National Institute of Science and Technology, Korea*
- 12:35 – 12:55 **Softer, faster, better! – Substrate mechanics drives superior somatic cell reprogramming outcomes**  
Justin Cooper-White, *Australian Institute for Bioengineering and Nanotechnology, Australia*
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12:55 – 14:15 LUNCH BREAK

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## Session 2. Manufacturing and Quality Control

Co-Chairs:

Anthony Davies, *Dark Horse Consulting, USA*

Shin Kawamata, *Foundation for Biomedical Research & Innovation, Japan*

14:15 – 14:35 **Effective & cost-effective, but unaffordable? The future of cell and gene therapy**  
Anthony Davies, *Dark Horse Consulting, USA*

14:35 – 14:55 **Bringing immune cell therapies to patients, innovative solutions for CAR T manufacturing, enabling scalability and cost reduction**  
Ohad Karnieli, *ADVA Biotechnology, Israel*

14:55 – 15:15 **Closing the loop: a software hypervisor to direct a structured, data science approach to cell process development**  
Drew Titmarsh, *Scaled Biolabs, USA*

15:15 – 15:35 **Future of transfusion medicine – Human induced pluripotent stem cells derived blood?**  
Jaichandran Sivalingam, *Bioprocessing Technology Institute, Singapore*

15:35 – 15:50 **Short talk: Ascorbate is required for the specification of human mesenchymal stem cells from human pluripotent stem cells for cartilage repair via ascorbate/iron-dependent demethylase**  
Tong Ming Liu, *Institute of Molecular and Cell Biology, Singapore*

15:50 – 16:10 **Nature inspired DMSO-, protein-, serum-free and chemically defined biopreservation solution, new horizon of precision in cell manufacturing and processing**  
Mark Kline, *X-Therma, USA*

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16:10 – 16:40 AFTERNOON TEA BREAK

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16:40 – 17:00 **In process monitoring for mass production of pluripotent stem cells**  
Shin Kawamata, *Foundation for Biomedical Research & Innovation, Japan*

17:00 – 17:20 **Automated cell expansion: Trends & outlook of critical technologies**  
May-Win Naing, *Singapore Institute of Manufacturing Technology, Singapore*

17:20 – 17:40 **Regeneus' novel allogeneic stem cell platform for Osteoarthritis**  
Charlotte Morgan, *Regeneus, Australia*

17:40 – 17:55 **Short talk: Sub-confluent culture of human mesenchymal stem cells on biodegradable polycaprolactone microcarriers enhances bone healing of rat calvarial defect**  
Alan Tin-Lun Lam, *Bioprocessing Technology Institute, Singapore*

17:55 – 18:40 **Panel discussion**  
Panellists: C Morgan, MW Naing, O Karnieli, M Kline, D Titmarsh  
Moderators: A. Davies and S. Kawamata

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END OF DAY 1

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Day 2, 14 November 2019

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**Session 3. Business of Cell & Gene Therapy**

*Chair: Steve Oh, Bioprocessing Technology Institute, Singapore*

08:30-08:50 **Developing allogeneic cellular immunotherapies with iPSC technology**  
*Wen Bo Wang, Fate Therapeutics, USA*

08:50-09:10 **Radically simplifying scale-up and clinical translation of hMSCs and extracellular vesicles**  
*Mayasari Lim, RoosterBio Inc, USA*

09:10-09:25 **Short talk: Characterization and application of size-dependent mesenchymal stem cell subpopulations separated using label-free microfluidics**  
*Yin Lu, Singapore-MIT Alliance in Research and Technology, Singapore*

09:25-09:45 **Characterization of extracellular vesicles produced by human mesenchymal stromal cells in an improved extracellular vesicle-free medium**  
*Arthur Sampaio, STEMCELL Technologies, Canada*

09:45-10:05 **Development of an injectable cartilage gel using chondrogenic progenitor cells**  
*Bryan Choi, ATEMs, Korea*

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10:05-10:35 MORNING TEA BREAK

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10:35-10:55 **Commercialization of advanced allogeneic cell therapy product in Korea and beyond**  
*Antonio Lee, Medipost, Korea*

10:55-11:15 **Continuous bioprocessing platform for CAR T**  
*Xiangliang Lin, Esco Aster, Singapore*

11:15-11:35 **The patient in the incubator: the cytocentric approach to avoiding suboptimal transients**  
*Alicia Henn, Biospherix Ltd, USA*

11:35-11:55 **Pooled mesenchymal stromal cells – a potential break through therapy for critical limb ischemia (CLI) Management**  
*Pawan Gupta, Stempeutics, India*

11:55-12:35 **Panel discussion**  
Panellists: B Levine, M Lim, A Sampaio, B Choi, XL Lin, A Henn, P Gupta  
Moderators: WB Wang & T Lee

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12:35-14:00 LUNCH BREAK

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## **Session 4. Responsible Pathways to Translation with Cell Therapies**

*Chair: Tamra Lysaght, National University of Singapore*

**14:00-14:05 Introduction**

*Tamra Lysaght, National University of Singapore, Singapore*

**14:05-14:25 The use of professional disciplinary systems to regulate innovation: lessons from stem cell practice in Australia**

*Cameron Stewart, University of Sydney, Australia*

**14:25-14:45 The oversight of clinical innovation in a medical marketplace**

*Wendy Lipworth, University of Sydney, Australia*

**14:45-15:05 Expedited regulatory pathways for stem cell-based products in Malaysia: ethical and legal considerations**

*Mohammad Firdaus Bin Abdul Aziz, University of Malaya, Malaysia*

**15:05-15:20 Short Talk: Autologous cell treatments: who owns the cells?**

*Patrick Foong, Western Sydney University, Australia*

**15:20-15:40 Regulatory updates on cell and gene therapy products in Singapore**

*Lee Lee Ong, Health Sciences Authority, Singapore*

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**15:40-16:10 AFTERNOON TEA BREAK (hosted by BIOSPHERIX)**

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**16:10-16:30 Making the unproven proven**

*Mickey Koh, St George's Hospital, UK*

**16:30-17:20 Panel discussion**

*Panellists: C Stewart, W Lipworth, F Aziz, P Foong, LL Ong, M Koh*

*Moderator: T Lysaght*

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**17:20-18:05 KEYNOTE LECTURE (Chair: Ray Dunn, IMB, Singapore)**

**The evolution and challenges introducing cell-based therapies into burn care and scar therapy**

*Fiona Wood, Royal Perth Hospital, Australia*

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**18:05-20:00 POSTER SESSION WITH WINE & CHEESE**

**END OF THE DAY 2**

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Day 3, 15 November 2019

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**Session 5. Immuno & Gene Therapy**

*Chair: John Connolly, Institute of Molecular and Cell Biology, Singapore*

09:00-09:25 **Virus specific T cells as platform for solid tumor immunotherapy**

*John Connolly, Institute of Molecular and Cell Biology, Singapore*

09:25-09:40 **Short talk: FOXP3 gene editing towards autologous stem cell therapy to cure IPEX Syndrome**

*Esmond Lee, Stanford University, USA*

09:40-10:05 **Gamma Delta T cells for anti-cancer immunotherapy**

*Shu Wang, National University of Singapore, Singapore*

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10:05-10:35 MORNING TEA BREAK

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10:35-11:00 **T cell therapy as a localized modulator of tumor immune environment**

*Antonio Bertolotti, Duke-NUS Medical School, Singapore*

11:00-11:15 **Short talk: Characterisation of novel human genomic safe harbours for transgene expression**

*Matias Autio, Genome Institute of Singapore, Singapore*

11:15-11:40 **Expansion of human tumor infiltrating  $\gamma\delta$  T cells for cancer therapy**

*Michael Lotze, University of Pittsburgh, USA*

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11:40-13:15 LUNCH BREAK

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## Session 6. Advanced Technologies

*Chair: Karl Tryggvason, Duke-NUS Medical School, Singapore*

- 13:15-13:35 **The Science of stem cell therapy – parameters affecting dosing and efficacy**  
*Andre van Wijnen, Mayo Clinic, USA*
- 13:35-13:50 **Short talk: Metformin affects pancreatic differentiation from human embryonic stem cells**  
*Adrian Kee Keong Teo, Institute of Molecular and Cell Biology, Singapore*
- 13:50-14:10 **Cellular therapy for burns/skin injuries: Laminin-based epidermal keratinocytes culture system in xeno-free and chemically defined condition**  
*Monica Tjin, Duke-NUS Medical School, Singapore*
- 14:10-14:30 **Minimizing immunogenicity of iPS cells by custom disruption of HLA genes utilizing CRISPR-Cas9 genome editing: Towards 2<sup>nd</sup> generation iPS cell stock for cost-effective cell therapy**  
*Akitsu Hotta, Kyoto University, Japan*

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14:30-15:00 AFTERNOON TEA BREAK

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- 15:00-15:20 **Manufacturing cell therapies with predictive therapeutic outcomes: Case studies in critical quality attributes for stem & stromal cell therapies**  
*Krystyn J. Van Vliet, MIT and Singapore-MIT Alliance for Research & Technology*
- 15:20-15:40 **Astrocytes derived from spinal muscular atrophy (SMA) patients are hyper-reactive and exacerbate neuronal degeneration**  
*Lawrence Stanton, Qatar Biomedical Research Institute, Qatar*
- 15:40-16:00 **Endothelial instability predisposes ischemic stroke patients to recurrent vascular events**  
*Christine Cheung, Nanyang Technological University, Singapore*
- 16:00-16:15 **Short talk: Retina specific laminins model inter-photoreceptor matrix to drive differentiation of photoreceptors from human pluripotent stem cells**  
*Hwee Goon Tay, Duke-NUS Medical School, Singapore*
- 16:15-16:45 **DR SUSAN LIM AWARD FOR OUTSTANDING YOUNG INVESTIGATOR 2019 LECTURE (Introduction: Larry Stanton, Qatar Biomedical Research Institute)**
- Global translation in early embryos and embryonic stem cells depends on the essential transcription factor PRDM10**  
*Daniel Messerschmidt, Institute of Molecular and Cell Biology, Singapore*

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16:45-17:00 AWARDS, CLOSING REMARKS & FAREWELL

END OF DAY 3 & END OF SYMPOSIUM

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