STEMCELL™ TECHNOLOGIES

LUNCH & LEARN WITH LOCAL EXPERTS

Cambridge Organoids Lunch & Learn

DATE Wednesday, December 5, 2018

TIME 11:30 - 14:00
*Lunch Provided

LOCATION STEMCELL Technologies
Building 7100, Cambridge Research Park,
Beach Drive, Waterbeach, Cambridge CB25 9TL

Agenda

TIME	SESSION
11:30 - 12:00	Arrival and Refreshments
12:00 - 12:10	Welcome by Dr. Laurence Lamarcq, STEMCELL Technologies
12:10 - 12:30	Stem Cell-Derived Organoids: Disease Modelling and Regenerative Medicine **Dr. Vivian Li, The Francis Crick Institute**
12:30 - 13:15	Lunch
13:15 - 13:35	Adult Stem/Progenitor Cells and Organoid Cultures. Applications for the Study of Human Biology and Disease **Dr. Meritxell Huch, The Gurdon Institute**
13:35 - 13:55	Organoids: New 3D Culture Systems for Biological Research and Much More **Dr. Salvatore Simmin, STEMCELL Technologies**
13:55 - 14.00	Closing Remarks by Dr. Julia Coughlan, STEMCELL Technologies

Abstracts

Stem Cell-Derived Organoids: Disease Modelling and Regenerative Medicine

Dr. Vivian Li, The Francis Crick Institute

Wnt signalling is altered in nearly all colorectal cancers, yet there are significant challenges in targeting the Wnt pathway due to its pivotal role more broadly in stem cell function and tissue homeostasis in many body systems. Our lab investigates how Wnt signalling is precisely regulated in intestinal stem cell and cancer, with the emphasis on finding new therapeutic targets. With the use of organoid technology, we are also interested in developing research tools for regenerative medicine, disease modelling and drug screening. One of our research interest is to bioengineer intestinal grafts to treat intestinal failure using patient-derived organoids. We have also established a 3D collagen-based co-culture system to study the impact of the stromal microenvironment to epithelial cells. Our ultimate goal is to translate basic stem cell and cancer research to the clinic to aid cancer treatment and regenerative medicine.

Adult Stem/Progenitor Cells and Organoid Cultures. Applications for the Study of Human Biology and Disease

Dr. Meritxell Huch, The Gurdon Institute - Wellcome Trust/Cancer Research UK, University of Cambridge UK

In vitro 3D cultures are emerging as novel systems to study tissue development, organogenesis and stem cell behaviour ex vivo. For several endoderm- and ectoderm-derived organs, embryonic stem cells (ESCs) grown in 3D self-organize and acquire the right tissue patterning to develop into the corresponding embryonic buds and organs. Tissue-resident adult stem cells (AdSCs) grown in 3D maintain their properties of self-renewal and multipotency, while preserving their genetic integrity and lineage commitment. In this talk, we will present our novel culture system where mouse and human liver stem/progenitor cells can be indefinitely expanded in vitro (for >1 year), into “liver organoids”. The expanded cells are highly stable at the chromosome and structural level, while single base changes occur at very low rates. The cells can readily be converted into functional hepatocytes in vitro and upon transplantation in vivo. We will also show several examples of the use of organoid cultures for understanding tissue biology as well as to model several monogenic and complex genetic diseases. In that line, we have recently demonstrated that patient-derived organoid cultures can be established from 3 different subtypes of liver cancer and these recapitulate all the features of the tumours of origin in a patient-specific manner. Clonal long-term expansion of primary adult stem/progenitor cells opens up experimental avenues for disease modeling, toxicology studies, regenerative medicine, and gene therapy.

Organoids: New 3D Culture Systems for Biological Research and Much More

Dr. Salvatore Simmini, STEMCELL Technologies

The development of organoid culture systems for a variety of tissues has been one of the most revolutionary advances in stem cell research of the past decade. Following the generation and expansion of organoids from the mouse intestine in 2009, several protocols have been developed to allow derivation of organoids from a wide range of organs across different animal species. Common properties shared throughout all organoid systems consist of 3D cultures that can self-renew and retain the capacity to differentiate into an organized structure and recapitulate some function of the organ of origin. Due to these unique features, organoids potentially provide a greater physiological relevance when compared to other culture systems, and represent a valuable tool to expand the types of questions that can be addressed by scientists.

STEMCELL Technologies is committed to providing researchers with robust high quality products for organoid cultures, which include optimized media and protocols, facilitating the integration of these systems into your experimental workflow. We have developed HepatiCult™ Organoid Growth Medium (Mouse) and IntestiCult™ Organoid Growth Media (Mouse and Human) that enable establishment and long term culture of hepatic and intestinal organoids, respectively. In this presentation, we will present an overview of these two systems.

Speaker Biographies

Vivian Li PhD

Group Leader, Francis Crick Institute, London UK

Vivian Li obtained her PhD at the University of Hong Kong in 2008, characterising human colonic development and tumourigenesis. She then received the Croucher Foundation Fellowship to pursue her post-doctoral training with Hans Clevers at the Hubrecht Institute, where she studied Wnt regulatory mechanisms in intestinal stem cells. Dr. Li established her own lab initially at the MRC National Institute for Medical Research, one of the Crick's parent institutes in 2013. Her group at the Crick investigates signalling regulation of intestinal stem cell and cancer, with primary focus on Wnt signalling pathways. She has recently been awarded the 2018 Future Leaders in Cancer Research Prize by CRUK for her contribution to the understanding of bowel cancer.

Meritxell Huch PhD

Group Leader, The Gurdon Institute - Wellcome Trust/Cancer Research UK, University of Cambridge UK

After obtaining her PhD degree at the Center for Genomic Regulation in Barcelona, Spain, she moved to the Netherlands to join the laboratory of Professor Hans Clevers in order to redirect the focus of her research into Adult Stem Cell Biology. In her postdoctoral stay, she isolated adult mouse stomach and mouse and human liver cells and proved these can be expanded in culture, forming stomach and liver organoids in vitro.

In 2014, Dr. Huch established her independent lab at The Gurdon Institute, University of Cambridge, where she works on elucidating the replicative potential of adult stem cells during tissue regeneration and disease.

Research Prizes & Awards:

2018: Cambridge Independent's Science & Technology Awards: 'Highly Commended' in the 'Researcher of the Year' category. "For world-leading research on liver and pancreas organoids".

2018: The Women in Cell Biology Early Career Medal for 2018. The British Society for Cell Biology. "For pioneering research on stem cell, in particular the work on liver organoids".

2016: The Hamdan Award for Medical Research Excellence. "For innovative methods and research that resulted in novel discoveries and inventions".

2014: Wellcome-Beit Prize for outstanding scientists of the 2014, year as additional recognition to the success in obtaining Wellcome Trust Fellowship to become independent.

2014: NC3Rs International Prize. National Centre for the Replacement, Refinement & Reduction of Animals in Research, UK. "For growing 'mini-livers' in culture".

Salvatore Simmini PhD

Scientist, Research and Development, STEMCELL Technologies, Cambridge UK

Dr. Salvatore Simmini, originally from the province of Lecce, studied at the University of Bologna, where he obtained a degree with honors in Molecular and Industrial Biotechnology. He subsequently obtained his PhD in Stem Cell, Development and Cancer at the University of Utrecht. After a postdoctoral period in Amsterdam, Dr. Simmini is currently a scientist in the Research and Development department at STEMCELL Technologies in Cambridge (UK), where he works on the development of three-dimensional gastrointestinal culture systems.

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