



STEM CELL SOCIETY
SINGAPORE

STEM CELL SOCIETY SEMINAR

Wednesday 28 March 2012 • Creation Theatrette, Matrix Building Level 4,
30 Biopolis Street, Singapore 138671



PROGRAMME

4.00 - 5.00pm

Prof. Ian Chambers

Professor of Pluripotent Stem Cell Biology, University of Edinburgh, Scotland
Group Leader, Institute for Stem Cell Research

“Transcription factor control of transitions in pluripotent cell states”

Hosted by

Dr Ng Huck Hui

President, Stem Cell Society Singapore
Executive Director, Genome Institute of Singapore

From 5.00pm

AGM

Only for members of SCSS

Followed by

Network Social

Only for members of Stem Cell Society Singapore; Non-members who wish to attend Network Social are welcome to sign up for membership at www.stemcell.org.sg/scss_membership.php.

SPEAKER

Prof. Ian Chambers

Transcription factor control of transitions in pluripotent cell states

Abstract

Embryonic stem cells are defined by two key characteristics; the ability to differentiate into cells of all three germ layers, a property referred to as pluripotency and the ability to undergo apparently symmetrical self-renewing cell division, essentially indefinitely. Pluripotent cell identity is governed by the action of a gene regulatory network centred around Oct4, Nanog and Sox2, three transcription factors that bind to closely localised sites in ES cell chromatin. Binding sites for each are present in the Oct4, Nanog and Sox2 genes and these sites are generally considered to reflect positive feedback interactions that stabilise expression of the three genes. However, Nanog is expressed heterogeneously in embryonic stem (ES) cells with some Oct4-expressing undifferentiated ES cells completely lacking Nanog. The mechanisms giving rise to this heterogeneous expression pattern are unknown. I will present recent data from our lab showing that in certain conditions this heterogeneity is abolished. This is a starting point for studies to re-impose heterogeneity and to link alterations in transcription factor state to the functionality of the pluripotent compartment.

Biography

Prof Ian Chambers is Professor of Pluripotent Stem Cell Biology in University of Edinburgh and also Group Leader at the Institute for Stem Cell Research, Scotland. The major interest of his group is to define the mechanisms by which key regulatory molecules direct ES cell self-renewal and differentiation, with principal focus on self-renewal. His goal is to (i) identify the molecules that direct self-renewal, (ii) determine the biological function of these molecules and (iii) define how these molecules interact at an atomic level to fulfil their function.

Prof Ian Chambers studied Biochemistry at University of Strathclyde and obtained 1st Class Honours for his undergraduate studies. He then continued his doctorate training with Dr Paul Harrison at Beatson Institute for Cancer Research and Post-doctoral Fellow with Nobel Laureate Prof. Paul Berg at Dept Biochemistry in Stanford University, California, USA. From 2006, Prof Ian Chambers became the Group Leader at Institute for Stem Cell Research, University of Edinburgh, Scotland and was a full professor in 2010. He is the co-discoverer of the homeodomain protein Nanog which maintains

ES cell self-renewal in the absence of cytokine stimulation, conditions under which differentiation normally ensues. In recognition of this, they named the protein Nanog after the Celtic Land-of-the-Ever-Young, Tir nan Og. He was also first to demonstrate functional consequences of heterogeneous transcription factor expression in pluripotent cells. Cells with lowered Nanog expression are primed for, but uncommitted to differentiation and can fluctuate back to a high Nanog expressing, differentiation-resistant state