



STEM CELL SOCIETY
SINGAPORE

TECHNICAL SEMINAR SERIES

Friday 22 May 2009 • Aspiration Theatre, Matrix Level 2M, 30 Biopolis Street

PROGRAMME

11.00 - 12.00pm

Dr Paul Robson

Stem Cell & Developmental Biology,
Genome Institute of Singapore, A*STAR

“Single Cell Gene Expression Analysis”

12.00pm

Lunch

Provided by Fluidigm

Hosted by

Dr Andre Choo

Stem Cells Group,
Bioprocessing Technology Institute, A*STAR

SPEAKER

Paul Robson

Abstract

Developmental processes occur at the cellular level whereby a precursor cell is required to make a decision whether to initiate differentiation along a particular lineage or to remain uncommitted. To fully understand these decision-making processes it is essential to understand the underlying molecular profile that defines the cellular phenotypes involved. The vast majority of studies in developmental and stem cell biology are performed with cell populations whereby the perceived gene expression signal is derived from the average of a cell population; as a result individual cellular variability is masked. This is problematic considering most tissues (and cell culture systems) are heterogeneous in nature. The biological insight provided by the ability to analyze developmental systems at the single cell level has been well documented

in the application of FACS analysis to the hematopoietic system. However FACS analysis is limited to a current maximum of 12 proteins and requires specific antibodies directed to accessible epitopes. Recent developments in microfluidics has now enabled the detection of mRNA through real time PCR at the single cell level with many genes in parallel. I will discuss how we have applied this technology to profile the expression of 48 genes in parallel in over 450 cells through mouse preimplantation development. The throughput capabilities allow us to capture cells in transition from one developmental state to the next providing novel insight into the developmental mechanisms of blastocyst formation that would otherwise remain enigmatic by profiling populations of cells

Biography

Paul Robson is a Group Leader in the Stem Cell & Developmental Biology program at the Genome Institute of Singapore where he has led a research team for the past 6+ years in investigations on the molecular control of early embryonic development.