



**BIOZENTRUM**

Universität Basel

2010

# lectures

**Design Principles of Pluripotency**



**Basel  
Stem Cell  
Network**

**Austin Smith**

Director, Wellcome Trust Centre for Stem Cell Research  
University of Cambridge

8 June 2010

Time: 16:00

Hörsaal 1, Pharmazentrum  
Klingelbergstrasse 50-70  
Basel



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## Design Principles of Pluripotency

Pluripotency is the capacity of an individual cell to initiate formation of all lineages of the mature organism plus the germline directed by extrinsic cues from the embryo. A pluripotent cell has no predetermined programme. In mice and rats this naïve state at the foundation of mammalian development can be captured in culture in the form of self-renewing embryonic stem (ES) cells.

Activation of the extracellular signal regulated kinase (Erk) cascade triggers differentiation of pluripotent cells. ES cells can be most efficiently derived and maintained by inhibiting this pathway and in parallel reducing activity of glycogen synthase kinase-3 (Gsk3). The cytokine LIF also supports derivation and propagation of ES cells through activation of Stat3 without reducing Erk activity. We are investigating how Erk antagonism, Gsk3 inhibition and Stat3 activation contribute to creating, maintaining and recreating authentic pluripotency.



### **Austin Smith**

Director, Wellcome Trust Centre for Stem Cell Research  
University of Cambridge

**Dr. Austin Smith** is Director of the Wellcome Trust Centre for Stem Cell Research at University of Cambridge. Dr. Smith was captivated by pluripotency and stem cell self-renewal by undergraduate lectures from Professor Chris Graham in Oxford and pursued this interest through his studies. Today, his research interests are centered on the biology of embryonic stem (ES) cells and in particular the molecular basis of pluripotency. His approach is to identify and manipulate pivotal extrinsic and intrinsic regulators of the pluripotent state, comparing cultured ES cells with resident pluripotent cells in the mammalian embryo.

Dr. Smith was awarded an MRC Research Professorship in 2003. He coordinated the European Commission integrated project EuroStemCell (2004-2008) and currently coordinates the EuroSyStem project (2008-2012). Professor Smith is a Fellow of the Royal Society of Edinburgh, an elected member of EMBO, and a Fellow of the Royal Society of London. He was awarded the Louis-Jeantet Prize for Medicine in 2010.

Dr. Smith received his Ph.D. in Developmental Genetics from the University of Edinburgh under the mentorship of Dr. Martin Hooper in 1986. Following postdoctoral research at the University of Oxford with Dr. John Heath, he returned to Edinburgh where he became a group leader at the Centre for Genome Research. In 1996, he was appointed Director of the Centre, which under his leadership became the first Institute for Stem Cell Research in the United Kingdom. In 2006 he moved to the University of Cambridge where he is currently Director of the Wellcome Trust Centre for Stem Cell Research.

The **Biozentrum Lectures** are organized by the Biozentrum, University of Basel and were initiated in 2009. The lectures present speakers who have made outstanding contributions in the field of Life Sciences. The goal of the series is to highlight the work of these individuals in an event that brings together researchers from the entire community in Basel and its surroundings.

Past speakers in the Biozentrum Lectures Series:

**James E. Rothman**

Chairman, Department of Cell Biology  
Professor, Department of Chemistry Yale University

**Thomas Walz**

Investigator, Howard Hughes Medical Institute  
Professor, Dep. of Cell Biology, Harvard Medical School

Upcoming lecture:

**12 October 2010**

**Sir Richard Timothy Hunt**

Principal Scientist, Clare Hall Laboratories  
Cancer Research UK, London Research Institute