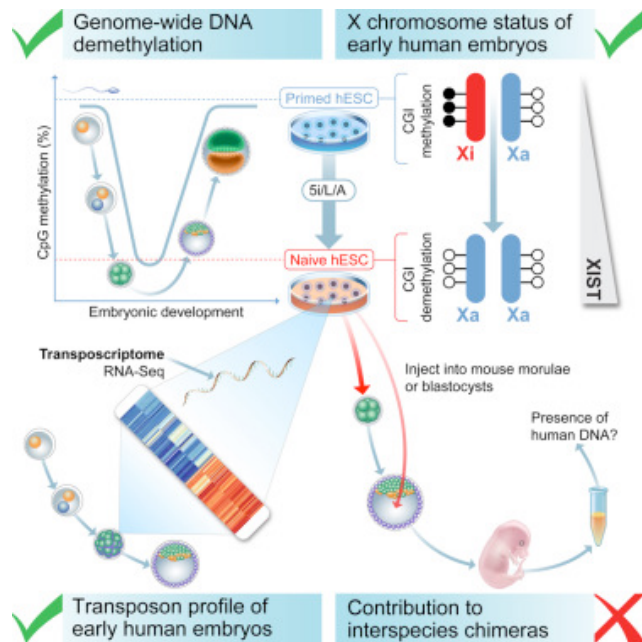


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“Capturing the Ground State of Human Pluripotency”



Thursday, January 26, 2017

11:00-11:50 am

CCRC Auditorium



Host: Steve Dalton

Capturing the Ground State of Human Pluripotency

Presentation Abstract

Pluripotent stem cells (PSCs) are widely used to investigate human development and disease mechanisms. However, under conventional culture conditions human PSCs do not resemble "naive" pluripotent cells found in the blastocyst, but instead are regarded as more mature "primed" cells that are poised to differentiate. This has prompted interest in capturing human PSCs that more closely resemble the naive ground state of the blastocyst. By screening a small molecule library, I identified a combination of five kinase inhibitors that could induce defining features of naive pluripotency in conventional human PSCs. To assess the correspondence between different stem cell states *in vitro* and human pluripotent cells *in vivo*, I examined three molecular criteria: the collective expression of transposable elements, the genome-wide DNA methylation landscape, and X chromosome status in female cells. This analysis revealed that naive human PSCs adopt key molecular signatures of the pre-implantation embryo. The isolation of naive human PSCs presents a novel model system to study mechanisms of early human development and X-linked diseases, and may enable the generation of interspecies chimeras upon injection into the blastocyst of an animal host. I will discuss strategies to improve the long-term stability of naive human PSCs and their potential applications in biomedical research.

Dr. Theunissen is a candidate for a faculty position in the UGA Center for Molecular Medicine. He received his PhD in Biochemistry and Stem Cell Biology in 2011 from the University of Cambridge, United Kingdom, under the direction of José Silva. In 2012, Dr. Theunissen joined Rudolf Jaenisch's laboratory in the Whitehead Institute for Biomedical Research, Massachusetts Institute of Technology, as a Sir Henry Wellcome Postdoctoral Fellow. His current research interests are in stem cell biology, developmental biology and epigenetics.