18th Stem Cell Club Meeting

Embryonic Stem Cells and Cardiac Specification

(Organised by the Stem Cells Research, Singapore, Website Committee, http://www.stemcell.edu.sg)

Date: December 12th, 2006 (Tuesday)
Time: 6:00 pm
Venue: Creation, Matrix building, level 4

Host: French Embassy, Scientific Mission

Time	Title	Speaker
6:00-6:45	Oct-3/4 dose-dependently regulates specification of embryonic stem cells toward a cardiac lineage and early heart development.	Michel Pucéat, ***I-Stem, Evry, France***
6:45 –	Networking Session	

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Oct-3/4 dose-dependently regulates specification of embryonic stem cells toward a cardiac lineage and early heart development

Michel Pucéat, INSERM U421, I-Stem, France

In embryogenesis, cell fate is directed by morphogens which switch on specific gene developmental programmes. Yet, the transcriptional mechanisms underlying lineage specification and differentiation of stem cells remain elusive. Oct-3/4 (*POU5f1)* is one of the earliest transcription factors expressed in the embryo. Both the pluripotency and the fate of embryonic stem (ES) cells depend upon a tight control of Oct-3/4 expression. We found that transgene- or TGF-β-induced increase in Oct-3/4 mRNA and protein levels in undifferentiated ES cells and at early stages of differentiation triggers expression of mesodermal and cardiac specific genes. This transcriptional event is mediated by Smad2/4 but not Smad3. cDNA antisense and siRNA which both prevent upregulation of Oct-3/4 in ES cells or in the inner cell mass of blastocysts, inhibit specification of ES cells or of the epiblast toward the mesoderm, and impair cardiac cell differentiation and heart morphogenesis, respectively. Thus, quantitative Oct-3/4 expression is regulated by a morphogen pointing to a pivotal and physiological function of the POU factor in mesodermal and cardiac commitments of ES cells and of the epiblast.