

Speaker: Dr. Michel Puceat, INSERM U421, I-Stem, France
Title: Potential embryonic stem cell therapy of heart failure
Date: 15th December 2006, Friday
Time: 11.00 AM – 12.00 PM
Venue: Biopolis, Matrix Building Level 4@Discovery Theatre
Host: Dr Gerald Udolph, PI of CMM-Regenerative Medicine Group



ABSTRACT

Potential embryonic stem cell therapy of heart failure

Myocardial regeneration with stem or stem cell-derived myogenic cells is expected to relieve heart failure following ischemic heart disease. Clinically-oriented considerations have led to focus primarily on autologous stem cells, i.e., skeletal myoblasts and bone marrow-derived cells. However, these cells do not convert into new cardiomyocytes that could contribute to synchronously increase contractile function. This highlights the potential therapeutic utility of embryonic stem cells (ESC) which feature a high plasticity and an alleged immune privilege when transplanted in a cardiac environment. I will show that xenografting of -Gal and EYFP β BMP2-treated murine ESC genetically modified to express both -actin in infarcted sheep under transcriptional control of Nkx2.5 and myocardium is tolerated even in the absence of immunosuppression of the host. -Gal and EYFP expressing ES cell-derived cardiomyocytes integrated the scar area and express Cx43. FISH experiments using a sheep specific probe excluded fusion of murine ES cells with endogenous myocardial cells. Colonisation of the scar area by ESC-derived mature cardiomyocytes is accompanied by functional benefit of the failing myocardium.

Human ES cells can also be committed to a cardiac lineage using BMP2. These cells engrafted into rat infarcted myocardium spontaneously differentiate into cardiomyocytes. These results obtained both in small and in a clinically relevant large animal models of heart failure open a potential path for the therapeutic use of ESC.

BIOGRAPHY OF DR. MICHEL PUCEAT

Dr Puceat is currently a Career scientist (Director of Research, French National Institute of Health and Medical Research, INSERM) & a Principal Investigator leading the stem cell research and cardiac differentiation laboratory at INSERM/I-stem. He obtained his PhD from Paris-Sud University, Orsay, France in 1991.

His research interest is in the area of molecular biology, cell biology, developmental biology and physiopathology of the heart. For the last eight years, he became interested in the intracellular

signaling pathways of growth factors which specify the cardiac cell in the early embryo. The major emphasis of his research lab has been to understand how a pluripotent embryonic stem cell takes the decision to become a cardiomyocyte and how both cardiac commitment and differentiation of stem cells are regulated. His research aims at a better understanding of biological processes underlying early cardiogenesis to uncover potential embryonic origins of cardiac diseases and to develop tools for regenerative cell therapy of heart failure.

ALL ARE WELCOME