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MAJOR RESEARCH INTERESTS

Research in my laboratory revolves around the developing human fetus. The group has wide ranging collaborations within NUS, SGH and SICS in Singapore, and with University College London, King's College London, Imperial College London, Karolinska Institute, University of Queensland and the Liggin's Institute. Current projects include:

1. Fetal Stem Cells (mesenchymal, endothelial and neural), their role in development, and downstream applications for cellular replacement and gene therapy, for haemophilia, thalassaemia and lysosomal enzyme deficiency diseases.
2. Elucidation of the mechanisms governing mesenchymal stem cell recruitment, homing and migration.
3. The development of fetal neural stem cells as an in vitro model for developmental epigenetics.
4. The development of the non-human primate for gene and cellular therapy, and generation of fetal growth restriction.
5. Tissue engineering through the integrative use of fetal stem cells, bioreactors, molecular imaging & various animal models.

RECENT PUBLICATIONS

1. Zhi-Yong Zhang, Swee-Hin Teoh, Mark SK Chong, Jan Thorsten Schantz, Nicholas M Fisk, Mahesh A Choolani, **Jerry Chan**. Superior osteogenic capacity for bone tissue engineering of fetal compared to perinatal and adult mesenchymal stem cells. **Stem Cells (2008): In Press**.
2. Kennea N, Waddington S, **Chan J**, O'Donoghue, Yeung D, Taylor DL, Al-Allaf, FA, Pirianov G, Themis M, Edward AD, Fisk NM, Mehmet H. Differentiation of Human Fetal Mesenchymal Stem Cells into cells with an oligodendrocyte phenotype. **Cell Cycle 2008 (In Press)**
3. S Ponnusamy, N Mohammed, SSY Ho, HM Zhang, YH Chan, YW Ng, LL Su, Mahyuddin AP, Venkat A, **J Chan**, M Rauff, A Biswas, M Choolani. In vivo model to determine fetal-cell enrichment efficiency of novel noninvasive prenatal diagnosis methods. **Prenatal Diagnosis 2008 Jun;28(6):494-502**.
4. **Chan J**, Kumar S, Fisk NM. First Trimester Embryo-Fetoscopic And Ultrasound-Guided Fetal Blood Sampling For Ex-Vivo Viral Transduction Of Cultured Human Fetal Mesenchymal Stem Cells. **Human Reproduction 2008; doi: 10.1093/humrep/den302 ePub Aug 6**.
5. Guillot PV, Abass O, Chapon C, Bassett DJH, Shefelbine SJ, Bou-Gharios G, **Chan J**, Kurata H, Bakhoo K, Williams G, Polak J and Fisk NM. Intrauterine transplantation of human fetal mesenchymal stem cells reduces bone pathology in osteogenesis imperfecta mice. **Blood 2008 111;(3): 1717-1725**
6. Kurata H, Guillot PV, **Chan J**, Fisk NM. Osterix induces osteogenic gene expression but not differentiation in primary human fetal mesenchymal stem cells. **Tissue Engineering 2007 13;(7); 1513-23**
7. Aguilar S, Nye E, **Chan J**, Loebinger M, Spencer-Dene B, Fisk N, Stamp G, Bonnet D, Janes SM. Murine but not human mesenchymal stem cells generate osteosarcoma-like lesions in the lung. **Stem Cells 2007 25;(6):1586-94**
8. **Chan J**, Waddington SN, O'Donoghue K, Kurata H, Guillot P, Gotheystrom C, Themis M, Morgan JE, Fisk NM. Widespread distribution and muscle differentiation of human fetal mesenchymal stem cells after intrauterine transplantation in dystrophic *mdx* mouse. **Stem Cells 2007 Apr;25(4) 875-884**
9. Guillot PV, Gotheystrom AC, **Chan J**, Kurata H, Fisk NM. Human first trimester fetal mesenchymal stem cells (MSC) are more primitive than adult MSC. **Stem Cells. 2007 Mar;25(3):646-654**
10. **Chan J**, Kennea N, Fisk NM. Placenta Stem Cells. **Am J Obstet Gynae 2007 Feb;196(2):e18 Epub 2006 Sep 7**.
11. **Chan J**, O'Donoghue K, Fisk NM: Developmental stem cell therapy. In: **Progress in Obstetrics and Gynaecology, Vol 17**, J Studd, Seang Lin Tan, FA Chervenak (eds), pp 15-30. London: Elsevier, **2006**.
12. **Chan J**, O'Donoghue K, Gavina M, Torrente Y, Kennea N, Mehmet H, Stewart H, Watt D, Morgan JE, Fisk NM. Galectin-1 induces skeletal muscle differentiation in human fetal mesenchymal stem cells and increases muscle regeneration. **Stem Cells. 2006 Aug;24(8):1879-91**
13. O'Donoghue K & **Chan J**. Human fetal mesenchymal stem cells. **Current stem cell research and therapy 2006; 1(3):371-386**
14. **Chan J**, O'Donoghue K, de la Fuente J, Kumar S, Roberts IA, Morgan JE, Fisk NM: Human fetal mesenchymal stem cells as vehicles for gene delivery. **Stem Cells 23 (1) 93-102, 2005**.
15. O'Donoghue K, **Chan J**, de la Fuente J, et al: Microchimerism in female bone marrow and bone decades after fetal mesenchymal stem cell trafficking in pregnancy. **The Lancet 364: 179-82, 2004**.