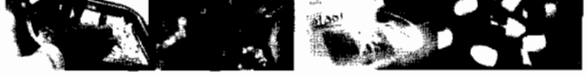

# Human Embryonic Stem Cells, Gene Therapy & Tissue Engineering: From Molecular Design to Transplantation

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Dr Li is Associate Professor of Medicine, Division of Cardiology, at the University of Hong Kong, and the Program Coordinator of Cell Therapy and Tissue Engineering, one of the five themes within the Research Centre of Heart, Brain, Hormone and Healthy Aging. Dr Li is currently also Associate Professor, and the Director of the Section of Stem Cell Engineering and Bioelectricity at the University of California, Davis. Before he joined HKU and the Center of Regenerative Medicine in Sacramento in light of California's 3-billion-US-dollar stem cell initiative (a.k.a. Proposition 71), he was Assistant Professor at The Johns Hopkins University School of Medicine, Baltimore, USA, with dual appointments in the Department of Medicine and the Program of Cellular & Molecular Medicine from 2002 till 2005.

Dr Li holds a BSc (Hons), Biochemistry (Biotechnology Option), from the University of Waterloo, Canada, a PhD, Physiology (Cardiology), from the University of Toronto, Canada, and received his postdoctoral training at the Johns Hopkins University. Dr Li is the two-time recipient of the Top Medicine Faculty Research Award at Johns Hopkins (2002 & 2004). Dr Li has also received such major awards and honors as the Top Prize, Young Investigator Award from the Heart Rhythm Society (2002), Research Career Development Award from the Cardiac Arrhythmias Research & Education Foundation (2001), Top Prize for Young Investigator Basic Research from The Johns Hopkins University School of Medicine (2001), First Prize, Basic Research Fellow Award, from The Johns Hopkins University Department of Medicine (2001), etc.

Dr Li's group is one of the five labs worldwide to have reported the successful derivation of heart cells from human embryonic stem cells (hESCs) to date, and was the first and only group to have generated genetically-engineered human heart cells from hESCs. Dr Li's current research focuses on the construction of a library of "custom-tailored" hESC-derived heart cells to meet the needs of different patient populations.

Human embryonic stem cells (hESCs), isolated from the inner cell mass of human blastocysts, can propagate indefinitely in culture while maintaining their pluripotency, including the ability to differentiate into human heart cells that do not otherwise regenerate once damaged; therefore, hESCs may provide an unlimited *ex vivo* source of cardiomyocytes for transplantation and other cell-based heart therapies. In combination with recent advances in biomedical engineering techniques, hESCs have enabled researchers to pursue the revolutionary paradigm of regenerative medicine for repairing, replacing or enhancing organ function in such irreversible aging-related diseases as heart failure. The lecture will discuss how we employ a broad range of state-of-the-art techniques in protein- and tissue-engineering, gene transfer, large animal transplantation models (swines and non-human primates), etc, to focus on the translation of experimental concepts into potential therapies.