

Use of Cardiomyocytes Derived from Pluripotent Stem Cells for Cardiac Regeneration Therapy: Ready for the Next Stage

Kiwon Ban, Ph.D

Department of Biomedical Sciences, City University of Hong Kong, Hong Kong

Heart disease is the leading cause of death worldwide with the majority of fatalities due to coronary artery disease and correlating heart failure. Due to limited therapeutic options for severe myocardial infarction and advanced heart failure, stem cell-based therapy has emerged as a promising therapeutic option. Particularly, cardiomyocytes derived from pluripotent stem cells (PSCs) including both embryonic stem cells (ESCs) and induced pluripotent stem cells (iPSCs) are regarded as one of the most promising sources for multiple applications such as development of new treatments for heart diseases, establishment of platforms for drug discovery and predictive toxicology, creation of *in vitro* models of human disease, and cardiac tissue engineering.

While cardiomyocytes derived from hPSC (hPSC-CMs) are attractive sources for the use of heart repair and many other applications, numerous hurdles stand in the way of their clinical use. Their applicability is significantly limited by a number of major reasons such as i) low yields, ii) heterogeneity of differentiated hPSC-CMs, iii) immaturity of hPSC-CMs, and v) lack of optimal methods to deliver hPSC-CMs into the hearts.

Hence, in my presentation, I will discuss my studies that have been designed and performed to solve the current limitations in the use of hPSC-CMs for future clinical applications.