New era of regenerative medicine for cardiovascular diseases

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The increasing life expectancy in many parts of the world has led to an epidemiologic transition in the leading causes of death from infectious diseases and acute illness to chronic illness related to organ or tissue degeneration. For example, chronic non-communicable diseases, including cardiovascular diseases, chronic respiratory diseases and cancer now account for an estimated 80% of total mortality and 70% of disability-adjusted life-years lost in China (1). Despite the recent advances in medical and surgical therapies, a large number of patients with cardiovascular diseases remain severely symptomatic with poor clinical outcomes. Many currently untreatable cardiovascular disorders arise from disease process due to significantly loss of cardiomyocytes that do not otherwise regenerate. As a result, stem cell therapy has been explored as potential treatment to limit the progression of diseases or to regenerate damaged heart in patients with different cardiovascular diseases. Indeed, stem cell therapy was conceptualised more than a decade ago in the treatment of acute myocardial infarction (2). The articles in this Theme issue of *Thrombosis and Haemostasis* tackle several of the important topics in cardiovascular regeneration using stem cell therapy.

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iPS cell technology should provide an unlimited supply of even specified cells, not limited to cardiomyocyte, but also hepatocytes, beta-cells and neurons etc. for tailored made patients-specific cell-based therapy for treatment of various human diseases, and to develop human cell based platform for drugs screening. On the other hand, significant challenges, such as risk of viral vector and low efficacy during reprogramming as well as the potential for tumour formation remain to be overcome before the translation of iPS cell technology into clinical practice. In summary, it is anticipate that regenerative medicine will play an ever more prominent role in the new era of modern cardiovascular therapies; however, significant challenges must be overcome before that promise is realised.

References