

# **Cardiac transdifferentiation for pacemaker cardiomyocyte generation**

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## **Abstract**

Electrical impulses from cardiac pacemaker cardiomyocytes initiate cardiac contraction and blood pumping and maintain life. Abnormal electrical impulses bring patients with low heart rates to cardiac arrest. The current therapy is to implant electronic devices to generate backup electricity. However, complications inherent to electronic devices remain unbearable suffering. Therefore, cardiac biological pacing has been developed as a hardware-free alternative. The approaches to generating biological pacing have evolved recently using cell reprogramming technology to generate pacemaker cardiomyocytes in-vivo or in-vitro. Different from conventional methods by electrical re-engineering, reprogramming-based biological pacing recapitulates various phenotypes of de novo pacemaker cardiomyocytes and is more physiological, efficient, and easy for clinical implementation. We begin with the rationale for this new approach and review its advances in creating a biological pacemaker to treat bradyarrhythmia.