Regeneration of Cardiac "Biological Pacemaker"

In the developed world, an expanding aging population is associated with an increase in the incidence of cardiac arrhythmias. One of the most common cardiac arrhythmias related to aging is dysfunction of the sinoatrial node, the native cardiac pacemaker. The main treatment for such arrhythmias is implantation of an electronic pacemaker (cost approximately HK$40,000 per patient). Costs are further increased by the need to replace the batteries of these devices every 5 to 10 years and several complications are associated with the implantation, the mortality rate is 0.1%, 1-3% of patients may have infection, bleeding and other related problems after implantation.

In Hong Kong, an increasing number of such procedures are performed each year: over 1000 pacemaker devices were implanted in 2002. The ideal pacemaker, in terms of physiological function of the heart and adaptability to human body, would be biological. A novel approach is to regenerate an ideal cardiac "biological pacemaker" using gene therapy and /or bioengineering techniques, if the test on pig is successful, clinical test on human would be held after 3 to 7 years and it might offer a cheaper, safer alterative to the existing electronic implant.