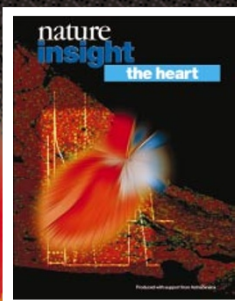


nature insight

the heart



Cover illustration

Behind the cartoon of the heart is a diagram of electrical activity during atrial arrhythmic generation (courtesy S. Nattel) and stained myocardium (courtesy P. Anversa).

Ever since William Harvey defined an animal's heart as "the sovereign of everything within them, the sum of their microcosm," in *De Motu Cordis* in 1628, the heart has been one of the most widely studied organs of the body — and fortunately so, given that heart disease is the world's leading cause of death.

Each year, around 8 million people die from heart attacks and many millions more suffer from, and eventually succumb to, heart diseases such as congestive heart failure and arrhythmia. Global figures are rising, yet calculations suggest that this number could be slashed by around 50 per cent if smoking were removed from the equation. However, decreases would be offset to some degree as the world's population ages, diets become more fat-laden and lifestyles more sedentary, as all these factors are detrimental to a healthy heart.

Although scientific study of the heart began four centuries ago, the past few decades have seen a paradigm shift in research. We are now able to monitor the process of contraction and relaxation that underlies the gross function of the heart at close quarters by tracking the movement of calcium and other ions within myocytes.

Ultrastructural examination of ion channels is revealing how the regular rhythmic beating of the heart can become disordered. And genetic information is not only uncovering the basis of conditions such as cardiomyopathy — in which the heart becomes weak and unable to fulfil its blood circulatory role — but is also being exploited with relative success in trials of cardiac gene therapy. Thus, as with all diseases, understanding the processes involved at the molecular and genetic level is enabling us to make inroads in preventing and treating heart disease.

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Karen Birmingham

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