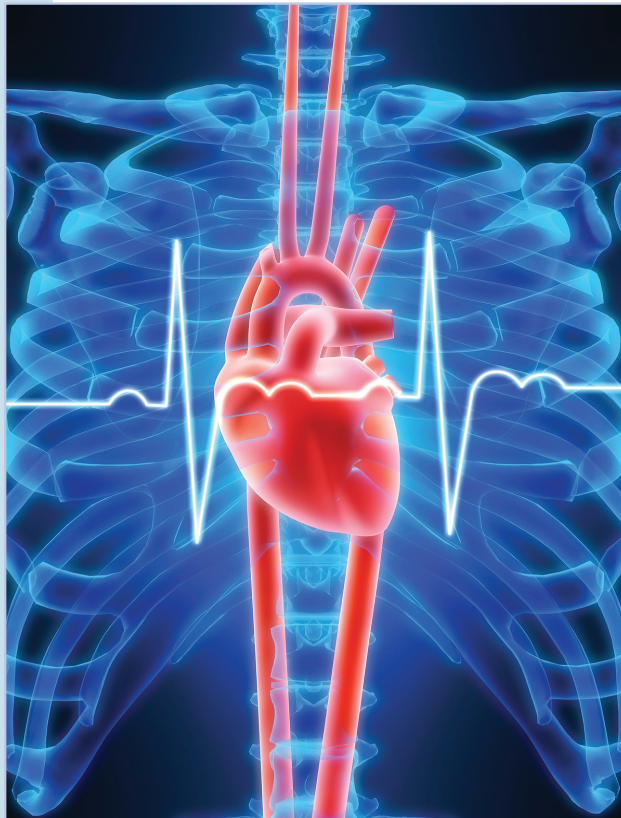




Keeping the Beat

The heart's function of pumping blood may seem fairly simple but the underlying mechanisms and electrical impulses that maintain a healthy rhythm are extremely complex. Many areas of mathematics, including differential equations, dynamical systems, and topology help model the electrical behavior of cardiac cells, the connections between those cells and the heart's overall geometry. Researchers aim to gain a better understanding of the normal operation of the heart, as well as learn how to diagnose the onset of abnormalities and correct them.

Of the many things that can go wrong with a heart's rhythm, some measure of unpredictability is (surprisingly) not one of them. A healthy heartbeat is actually quite chaotic—not regular at all. Furthermore, beat patterns become less chaotic as people age and heart function diminishes. In fact, one researcher recom-



mends that patients presented with a new medication should ask their doctors, “What is this drug going to do to my fractal dimensionality?”

For More Information:

“Taking Mathematics to Heart: Mathematical Challenges in Cardiac Electrophysiology,” John W. Cain, *Notices of the AMS*, April 2011, pp. 542-549.

Image: Eraxion/Bigstock.com.



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