The Mitochondrial Calcium Uniporter Controls Fight or Flight Heart Rate Increase

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Technology description

This invention is a novel therapy for treating tachycardia by inhibiting the mitochondrial calcium uniporter (MCU), which leads to heart rate stabilization. The invention in its current form targets pacemaker cells by delivering the dominant negative transgene, DN-MCU, selectively controlling the MCU in the pacemaker cells. DN-MCU can be delivered by a virus; however, ideally, DN-MCU will be packaged in a virus capable of long-term expression.
It has been determined that the MCU is an important factor in controlling heart rate acceleration.
Background Information
Heart rate increases are a fundamental adaptation to physiological stress. Cardiac arrhythmias, or the irregularities in the cadence of heartbeats, that affects about 14 million people in the USA each year. The symptoms associated with the arrhythmia are often extremely bothersome, or even life-threatening. Arrhythmias are experienced by patients who suffer from pacemaker cell dysfunction. Current treatments include vagal maneuvers, ablation therapy, surgery, or medications. Medications for controlling tachycardia, a faster-than-normal heartbeat rhythm, often requires a pacemaker because they slow the heart down to an unsafe cadence. These medications also often lead to asthma, depression, and edema. Excessive resting heart rate slowing can lead to loss of consciousness, heart failure, ventricular arrhythmias, and surgical implantation of artificial pacemakers.
Technology Summary
This invention is a novel therapy for treating tachycardia by inhibiting the mitochondrial calcium uniporter (MCU), which leads to heart rate stabilization. The invention in its current form targets pacemaker cells by delivering the dominant negative transgene, DN-MCU, selectively controlling the MCU in the pacemaker cells. DN-MCU can be delivered by a virus; however, ideally, DN-MCU will be packaged in a virus capable of long-term expression.
It has been determined that the MCU is an important factor in controlling heart rate acceleration.

Advantages

- Control heart rate acceleration without slowing resting heart rate
- DN-MCU can be delivered by a virus

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