CELLNETICS

PCI VENTURES

Company Overview

Cellnetics LLC, formed out of the University of Pennsylvania's UPstart program in 2014, is developing methods to reduce myocardial damage during reperfusion by altering free radical formation. Their technology uses an optimized magnetic field effect that selectively modifies spin state and facilitates radical recombination to decrease reperfusion injury.

Problem

Patients that present with an acute ST-segment elevation myocardial infarction (STEMI) (400K patients per year) require therapeutic intervention to reduce the acute myocardial ischemic injury and limit the size of the myocardial infarction (MI). This requires reperfusion using either thrombolytic therapy or primary percutaneous intervention. However, myocardial reperfusion itself can induce further cardiomyocyte death and increase the infarct size in MI patients, a phenomenon known as myocardial ischemia-reperfusion injury (IR). There is currently no effective therapy to prevent this reperfusion injury.

Solution

The technology developed by Cellnetics for protecting cardiomyocytes during myocardial reperfusion is based on the principle of nuclear and electron spin conservation. The technology uses an optimized external magnetic field that causes spin conversion, switching the reaction during reperfusion in MI patients between spin forbidden and spin-allowed states. This activity reduces free radical formation in cardiomyocytes, which has the potential to prevent IR injury, thus reducing infarct size and improving health outcomes. The medical device is comprised of two magnets placed above and below the patient that apply an optimized magnetic field during a reperfusion procedure.

Founder Information

Dr. Cengel is an Associate Professor in the Perelman University of Pennsylvania School of Medicine, Department of Radiology Oncology. He is an expert in the response of cells to free radicals and methods to measure and alter their effect. (Keith.Cengel@uphs.upenn.edu)

Dr. Lawrence Dougherty is an Associate Professor of Radiology and Technical Director of the Center for Magnetic Resonance Imaging and Spectroscopy at the University of Pennsylvania PSOM. He has worked in the field of Magnetic Resonance Imaging for 30 years and is an expert in imaging physics. (Doughel@uphs.upenn.edu)

Dr. Kassaee is an Associate Professor in the Perelman University of Pennsylvania School of Medicine, Department of Radiology Oncology. He is an expert in free radical physics and their effect on normal and diseased tissue. (Ali.Kassaee@uphs.upenn.edu)

Dr. James J. Pilla has been Research Faculty at the University of Pennsylvania PSOM for 20 years. His research has focused on ventricular remodeling post myocardial infarction. He is an expert in cardiac function and mechanism of remodeling post myocardial infarct and has significant experience with pre-clinical infarct models and methods to reverse remodeling post-infarct. (Jim.Pilla@uphs.upenn.edu)

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