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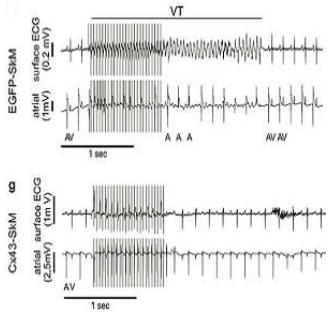
Gene therapy sparks healthy heartbeats



Following a heart attack, often the heart has difficulty performing one of its most basic jobs: beat at a normal rate. This is because after myocardial infarction, heart muscle cells are replaced by fibroblasts and new blood vessels, which do not conduct electricity and leave the heart susceptible to ventricular tachycardia – an excessive heart rate that can result in sudden death.

These non-heart cells disrupt the normal pattern of electrical conduction that is critical for effective pumping. Researchers now say a simple gene therapy is showing promise in experiments (using mouse models) to bridge this "conduction block". Their study is published in Nature Scientific Reports.

The new study, led by Bernd Fleischmann, MD, professor and chairman of the Institute of Physiology at the University of Bonn, shows a dramatic reduction of post-infarction arrhythmias in mice following the transfer of a single gene, Connexin43, which electrically couples non-excitable cells to undamaged heart cells.

Michael Kotlikoff, provost of Cornell University and a professor of molecular physiology, is part of this international collaboration that is aiming to develop new approaches to reduce dangerous post-infarction complications.

“We’ve created a bridge for the electrical signal,” Fleischmann said. “We suspected it would work. We suspected that the cells we were putting in were actually working in this way, but it is really exciting.”

The group’s excitement is tempered by the reality that these are mouse hearts, with induced, regularly shaped infarctions that are fractions of the size of those in humans. The spatial difference, Kotlikoff noted, is not trivial.

“Whether this will work in humans, or even in larger animals, that’s still a question and my colleagues in Germany are pursuing this,” Kotlikoff said.

Still, he said, what’s most exciting about this is the ease with which this procedure could be done, if tests on larger animals prove successful.

“It could be a very simple medical procedure,” Kotlikoff said. “One could imagine a relatively noninvasive procedure in which the gene is introduced through a catheter, resulting in long-term protection.”

Source: Nature Scientific Reports
Image Credit: Nature Scientific Reports

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