

Messenger RNA–Based Expression of Cardiomyocyte Phenotype Sensors and Differentiating Genes for In Vitro Correction of Cardiac Disorders

Current solutions for symptomatic bradyarrhythmia require invasive treatment

Symptomatic bradyarrhythmia is a life-threatening condition if left untreated. All current treatments rely on implantation of an electronic pacemaker which mostly consists of a battery operated generator and electrical lead wires. Although electronic pacemakers generally work well, device-dependent technology suffers from problems inherent to the implanted foreign body as well as device malfunctions.

With the use of this invention, implantation of such devices may not be necessary in a considerable number of cases.

New innovation allows for direct and non-invasive treatment for arrhythmias

This invention comprises the use of expression of a synthetic messenger RNA modulate cells. In particular, by generating de novo pacing, this invention provides a novel and direct mode of treatment for arrhythmias, obviating the surgical implantation of a pacemaker device.

Summary Bullets

- This invention uses a gene therapy as a direct treatment for symptomatic bradyarrhythmia and removes the needs for implantation of electronic pacemakers.
- The innovation does not lead to spillover to the liver, spleen and lungs; allows for mRNA gene transfer to stay focal to the injection site; and does not have danger of integration into the host's DNA.
- The new gene therapy could be used as first-line treatment of arrhythmias and consequent ailments and to circumvent the need for major surgical interventions.

Solution Advantages

- Does not have danger of integration into the host's DNA.
- mRNA gene transfer stayed focal to the injection site.
- Unlike the use of adenoviruses, this invention does not lead to spillover to the liver, spleen and lungs.
- Circumvents the need for major surgical intervention.

Potential Commercial Applications

- First-line treatment of arrhythmias and consequent ailments

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IP Status

<p>The following patent application has published and additional international coverage is pending.</p>:
US20210000879A1

Publications

[Synthetic TBX18 mRNA provides transient biological cardiac pacing in a preclinical porcine model of complete heart block](#), Nature Biomedical Engineering (in print) - 2023

Images

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