

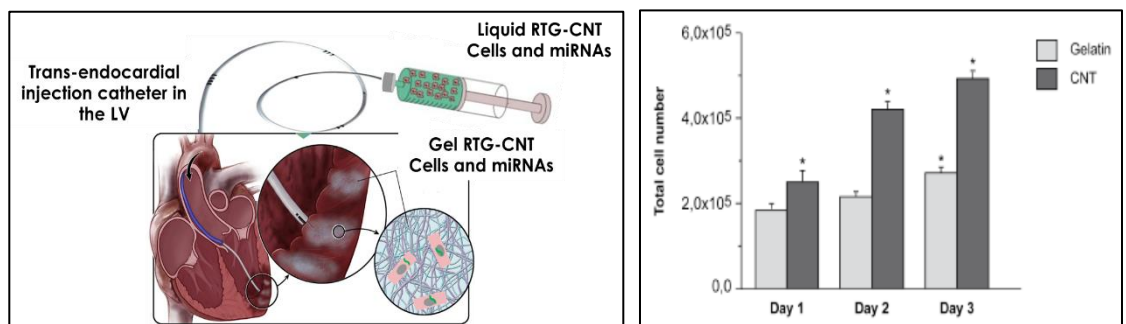
Background on CU4362H

Cardiovascular disease is the leading cause of death in the US, accounting for one in every four deaths. Many types of heart failure are caused by the degeneration of cardiomyocytes, requiring specialized interventions, most notably heart transplantation. Adult hearts have difficulty restoring these cells making efforts to regenerate damaged tissue challenging. In response, researchers have investigated novel approaches to regenerate cardiomyocytes through surgical implants and injection of stem cells; however, many of these techniques require invasive surgery. These efforts have been hindered by the short lifespans of cardiomyocytes and their inability to remain at the target site. A less invasive approach is needed to promote stable cell regeneration.

Technical Innovation

Researchers at the University of Colorado have created an injectable carbon nanotube functionalized reverse thermal gel (RTG-CNT) for cardiac tissue engineering and long-term cardiomyocyte (CM) survival. The gel provides a solution-based delivery vehicle of CMs, which transitions to a gel-based matrix shortly after reaching body temperature. The rapid and reversible transition of the polymer from liquid (at room temperature) to solid (at body temperature) permits the injection of the polymer through a small-gauge needle directly at the target site. The CNT-supported 3D gel scaffolds provide better development of cardiomyocyte cells than other techniques. This technology shows promise for the treatment of heart failure

Figures: Panel 1 (left) illustrates how CMs and the RTG-CNT is delivered to a damaged site. Panel 2 (right) shows that CM can effectively proliferate on a CNT scaffold.



*US patent pending: “Carbon Nanotube-Functionalized Reverse Thermal Gel And Methods Of Forming And Using Same”—Filed 2020.

Product

Carbon Nanotube Reverse Thermal Gel

Indication

Cardiac Cell Therapy

Value Propositions

- ▶ CNT scaffold increases viability of Cardiomyocytes
- ▶ Minimally invasive delivery system



Market

- ▶ \$3.7 Billion—Heart Failure Treatment Market in 2020 (CAGR of 19.5% through 2028)

Intellectual Property

- ▶ Patent Pending*
- ▶ Available for Licensing

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