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**Microenvironment for hiPSC-derived pacemaking cardiomyocytes**

**Grant Award Details**

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Microenvironment for hiPSC-derived pacemaking cardiomyocytes

**Grant Type:** Quest - Discovery Stage Research Projects

**Grant Number:** DISC2-10120

**Project Objective:** Develop a proof-of-concept biopacemaker consisting of hiPSC-derived cardiomyocytes in a porcine matrix scaffold from the sinoatrial node.

**Investigator:**

<b>Name:</b>	Deborah Lieu
<b>Institution:</b>	University of California, Davis
<b>Type:</b>	PI

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**Disease Focus:** Heart Disease

**Human Stem Cell Use:** iPS Cell

**Award Value:** \$2,042,728

**Status:** Active

**Grant Application Details**

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**Application Title:** Microenvironment for hiPSC-derived pacemaking cardiomyocytes

**Public Abstract:****Research Objective**

This proposal investigates the effects of the microenvironment on the development and maintenance of pacemaking function in human induced pluripotent stem cell (hiPSC)-derived cardiomyocytes.

**Impact**

Pacemaking function of hiPSC-derived cardiomyocytes is lost over time. Sustainability of pacemaking function of these cells is critical for engineering an biopacemaker from the patient's own cells.

**Major Proposed Activities**

- Determine the effects of matrix scaffolds on the differentiation and maintenance of pacemaking function in hiPSC-derived cardiomyocytes.
- Determine the appropriate hiPSC-derived cardiac cells to be subjected to the microenvironment for efficient yield of pacemaking hiPSC-derived cardiomyocytes.
- Induce vascularization in tissue constructs in small animals to sustain pacemaking tissue construct.
- Test sustainability of a functional pacemaking tissue construct in a small animal model.

**Statement of Benefit to California:**

Over 350,000 patients a year in the U.S. require an electronic pacemaker to restore their heart rhythm. The annual healthcare burden amounts to \$20 billion. Repeated surgeries to replace battery and electrical parts generate additional costs and suffering for the patients. A biopacemaker engineered from human stem cell-derived pacemaking cells can overcome problems associated with electronics and improve the quality of life for the pacemaker recipient while reducing cumulative health care costs.

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**Source URL:** <https://www.cirm.ca.gov/our-progress/awards/microenvironment-hipsc-derived-pacemaking-cardiomyocytes>