



Weill Cornell Medicine

Oncobeat: Platform for Screening for Chemotherapy-Induced Cardiotoxicity

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Methods for Preventing Chemotherapy-Induced Cardiotoxicity

Background & Unmet Need

- Cardiotoxicity is a major concern for patients receiving chemotherapy, as well as the development of new chemotherapeutic drugs
- Of the 50% of cancer patients that receive chemotherapy, between 5–25% of survivors develop chemotherapy-induced cardiovascular diseases
- Moreover, cardiotoxicity is a leading cause of failure for new chemotherapy drug development
- Chemotherapy-induced toxicity affects multiple cardiac cell types, including both cardiomyocytes and pacemaker cells
- Current cardiotoxicity screens only evaluate cardiotoxicity to cardiomyocytes, but not pacemaker cells
- **Unmet Need:** Methods for screening drugs that protect both cardiomyocytes and pacemaker cells from chemo-induced cardiotoxicity

Technology Overview

- **The Technology:** A human stem cell-based platform to screen for cardioprotective drugs
- **The Discovery:** The inventors have developed a method of generating and isolating sinoatrial node (SAN) cells, also known as pacemaker cells, from human embryonic stem cells
- These SAN cells can be used as part of a platform for screening chemotherapeutic drugs for cardiotoxicity
- **PoC Data:** SAN cells generated using this system demonstrate molecular and electrophysiological characteristics of pacemaker cells
- A candidate cardioprotective drug, *CardioPro*, has been identified which protects heart cells from doxorubicin-induced cardiotoxicity *in vitro* and *in vivo*

Inventors:

Shuibing Chen
Todd Evans
Zaniar Ghazizadeh

Patents:

[US Patent Application Filed](#)

Publications:

[Ghazizadeh et al. *iScience*. 2022.](#)

[Tsai et al. *Cardiovascular Res.* 2020.](#)

[Chen. *Circ Res.* 2019.](#)

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Cornell Reference:

D-8784, D-8785

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Technology Applications

- Screening platform for identifying cardioprotective drugs
- Prevention of chemotherapy-induced cardiotoxicity using CardioPro drug candidate
- Platform for modeling other cardiac diseases such as cardiomyopathy

Technology Advantages

- Platform integrates both pacemaker and cardiomyocyte cell types, providing a more complete picture of cardiotoxicity than current platforms
- Isolation of pacemaker and cardiomyocytes, as well as analysis of cardiotoxicity, is made easier by the development of several reporter lines

Supporting Data / Figures

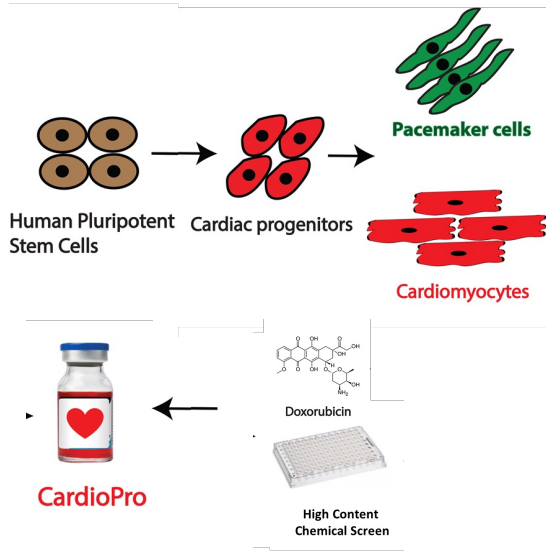


Figure 1: Schematic of screening platform for cardioprotective drugs.

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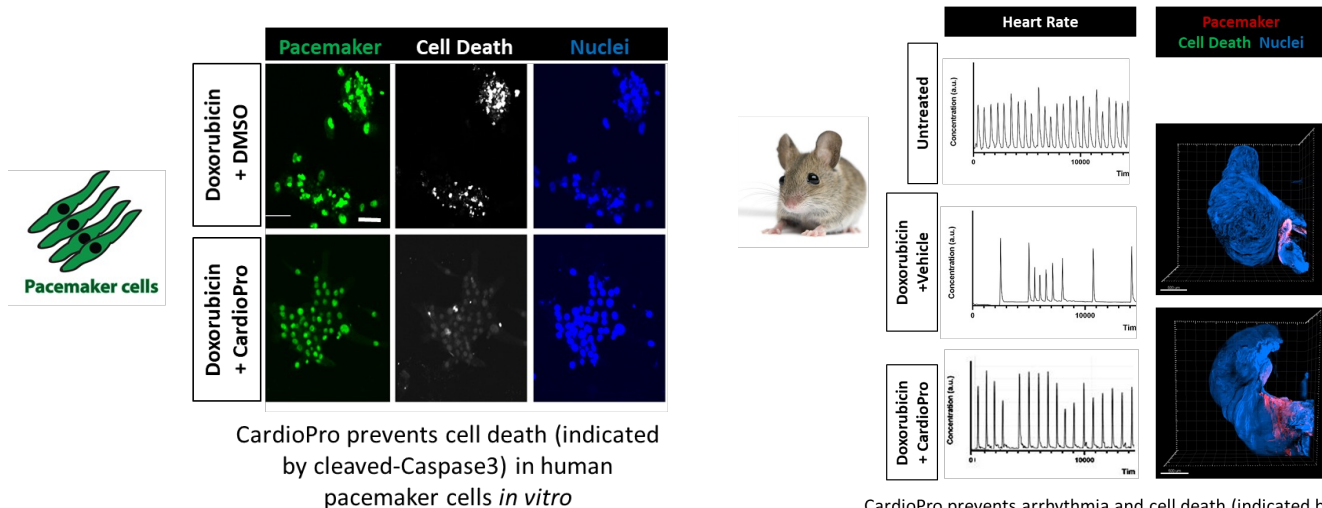


Figure 2: Left: Candidate *CardioPro* prevents cell death in human pacemaker cells *in vitro*. **Right:** *CardioPro* prevents arrhythmia and cell death in the murine heart *in vivo*.

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