Oncobeat:
Methods for Preventing 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:


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## Cornell Reference:

- D-8784, D-8785
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<table>
<thead>
<tr>
<th>Technology Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Screening platform for identifying cardioprotective drugs</td>
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<tr>
<td>2. Prevention of chemotherapy-induced cardiotoxicity using CardioPro drug candidate</td>
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<td>3. Platform for modeling other cardiac diseases such as cardiomyopathy</td>
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<th>Technology Advantages</th>
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<td>1. Platform integrates both pacemaker and cardiomyocyte cell types, providing a more complete picture of cardiotoxicity than current platforms</td>
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<td>2. Isolation of pacemaker and cardiomyocytes, as well as analysis of cardiotoxicity, is made easier by the development of several reporter lines</td>
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<thead>
<tr>
<th>Supporting Data / Figures</th>
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<td>Figure 1: Schematic of screening platform for cardioprotective drugs.</td>
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Supporting Data / Figures

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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