This license is for the README file template

American Heart Association
README file

A README file is often the first file someone will open in your data repository. The purpose of this file is to provide a roadmap for your data deposit and contextualize your project by providing metadata for the inquirer.

Instructions: Fill out this document to its entirety and upload with your data deposit in an American Heart Association approved repository.

Each data deposit into a repository requires a README file and a Data Dictionary.

General information

10/28/2025

1. PI's name: Sung Jin Park
2. PI's ORCiD ID: 0000-0002-2047-5922
3. Association award number: 857583
4. Association award do Enter Association award doi i:
5. Association award title: Development of Cardiac Pacemaker Organoids Using Light-Based Biomanufacturing Technologies
6. Date range of data collection: years 2022 to 2023
7. List of up to six key words to describe data topic:
   a. Optical Mapping
   b. Electrophysiological Signal
   c. Calcium Activity
   d. Pacemaker
   e. Enter Keyword 5
   f. Enter Keyword 6
8. Other: Enter other text, or N/A

Data and file overview

1. For each file name, a short description of what data it contains. (1) GenBank data: General GenBank file format available at https://doi.org/10.7910/DVN/VBEF5P (2) Two-Dimensional Tissue Optical Mapping data: Optical mapping dataset provided in compressed (ZIP) format, available at https://doi.org/10.7910/DVN/XSA5XT; These files are in binary format containing extensive spatial and temporal information. Because of their large size, conversion into ASCII format is not feasible. To ensure accessibility, I have also uploaded our laboratory software for processing these binary files: https://doi.org/10.7910/DVN/MUNJZS. (3) Optical Mapping Data of HCN4-integrated 2D tissue: Provided as MATLAB MAT files (containing optical flow data and

200 frames) at https://doi.org/10.7910/DVN/GXO9Q4.These are binary MAT files compatible with MATLAB (newer than 2018 version). The total number of files is approximately 950, making conversion to ASCII format impractical due to excessive data volume and storage requirements. (5) Optical Mapping Data of pacemaker-like spheroid-integrated three dimensional cardiac tissues Acquired by Scimedia High Speed Camera. Each zip file consists of: GSD: data file GSH: header file CSV: sample traces TXT: memo; Files are at https://doi.org/10.7910/DVN/W6BYN8

2. Other: Enter other text, or N/A

Note the data files you upload should be in a common format, accessible by anyone (Excel, Word, pdf, CSV, txt). Data files should not require a specialized software or application to open. Any analyses performed should be described below in sharing and access information (software, hardware with version).

The Association's Open Science Policy states: Any factual data that is needed for independent verification of research results must be made freely and publicly available in an Association-approved repository as soon as possible, and no later than the time of an associated publication or the end of the award period (and any no-cost extension), whichever comes first.

Sharing and access information

1. Licenses on data (The Association recommends CC-0 + attribution or CC-BY 4.0): N/A

2. Licenses on source code: N/A

3. Links to other data deposits/repository links: https://doi.org/10.7910/DVN/VBEF5P; https://doi.org/10.7910/DVN/XSA5XT; https://doi.org/10.7910/DVN/MUNJZS; https://doi.org/10.7910/DVN/GXO9Q4; https://doi.org/10.7910/DVN/W6BYN8

4. Recommended citation for the data: Enter citation information, or N/A

Methodological information

1. Description of model:
    a. Human, animal: Animal
        i. Animal model, enter additional information: neonatal rat ventricular cardiomyocyte
    b. Sex: Mixed cells population from both sex
    c. Sample size: N=4 (https://doi.org/10.7910/DVN/XSA5XT); N=950 (https://doi.org/10.7910/DVN/GXO9Q4); N=8 (https://doi.org/10.7910/DVN/W6BYN8)
    d. Age: 2 days old Rat
    e. Disease state: No disease
    f. Interventions: N/A
    g. Comparisons: N/A
    h. Other: N/A

2. Description of methods for data collection (may include links or references to publications or other documents): Calcium activity in the muscle circuit was monitored using the genetically encoded calcium indicator GCaMP6 and a modified tandem lens macroscope. The macroscope (Scimedia) was equipped with a high speed camera (MiCAM Ultima, Scimedia), a Plan Apo 0.63× objective, a collimator (Lumencor), and a 200 mW mercury lamp for epifluorescence illumination (X Cite exacte, Lumen Dynamics). GCaMP6 fluorescence was recorded using a GFP/FITC filter set (Chroma 49002: ET470/40x excitation, T495lp dichroic mirror, ET525/50m emission), optimized for 488 nm excitation and green emission. Tissues at ≥3 days post transduction were rinsed with fresh culture medium and placed in a stage top incubator (Okolab) on the macroscope, with bath temperature maintained at approximately 37 °C. Calcium images were acquired at 200–600 Hz over a 16 × 16 mm field of view.

3. Description of methods used for processing data (how were data processed from raw data to analyzed data): Post processing of raw calcium imaging data was performed using custom routines written in MATLAB (MathWorks, Natick, MA). A 3 × 3 pixel spatial filter was first applied to each frame to improve signal to noise ratio (software was deposited at https://doi.org/10.7910/DVN/MUNJZS) .

4. Describe any software or instruments needed to interpret or understand the data/results of your study. Please be specific to include software and hardware version numbers. Matlab program (2018 version or newer than 2018 version) and our software (https://doi.org/10.7910/DVN/MUNJZS).

5. Other: Enter other text, or N/A