

Field Potential Analysis of iCell Cardiomyocytes² with the CFPS-32 system

Purpose

The purpose of this experiment is to optimize the seeding density of iCell Cardiomyocytes² cells using the CFPS-32 system.

Experiment Overview

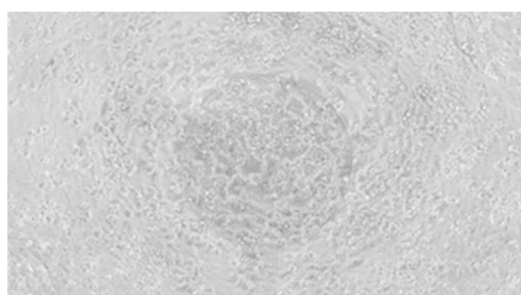
Cell Name	iCell Cardiomyocytes ²	Seeding quantity	25,000 ~ 50,000 cells
System	CFPS-32	Cell chip	CFPS-ITO-16W2E
Coating	Fibronectin 50µg/mL		

Workflow

DIV0	DIV1-DIV8
-Coat CFPS-plate with Fibronectin and plate iCell Cardiomyocytes ²	-Replace half of maintenance media every 48 hours until DIV8 -Field potential recording using the CFPS-32 System

Results

iCell Cardiomyocytes² on CFPS-ITO-16W2E Cell Chip



35,000
iCell Cardiomyocytes²

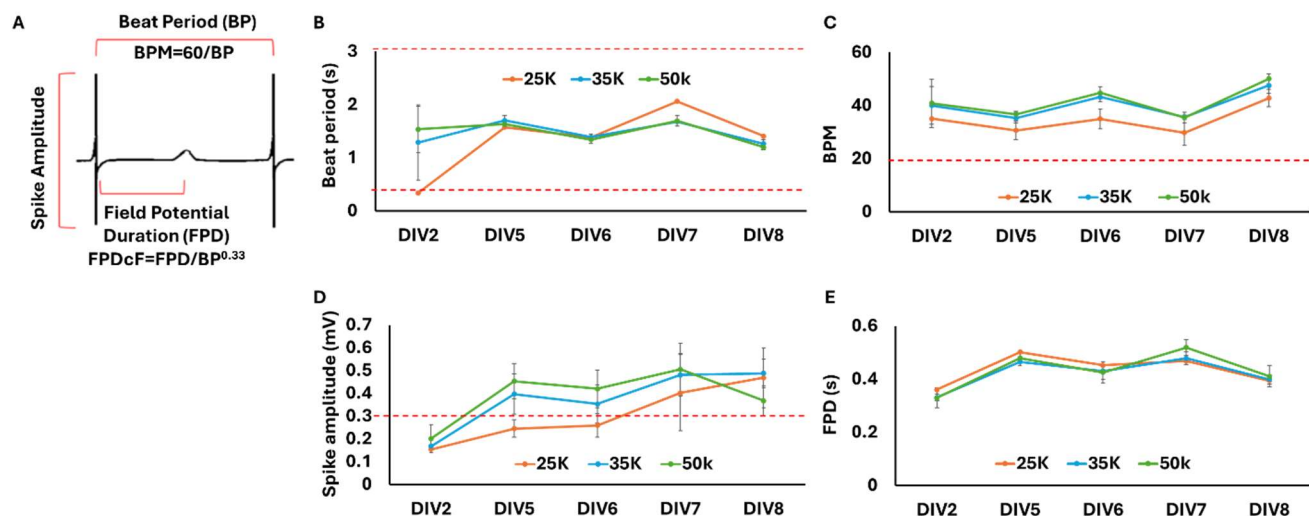


50,000
iCell Cardiomyocytes²

The image shows the results of 35K and 50K cells seeded on the fibronectin-coated recording electrodes of the CFPS-ITO-16W2E cell chip on DIV6. During incubation, the morphology and beating of iCell Cardiomyocytes² were clearly observed through the transparent electrodes.



Field Potential Measurement of iCell Cardiomyocytes²



Analysis of Field Potential Parameters in iCell Cardiomyocytes² Using the CFPS-32 System

- (A) Key parameters, including spike amplitude, beat period (BP), and field potential duration (FPD), were analyzed based on the acceptance criteria proposed by Blinova et al. and the HESI CiPA (Comprehensive in vitro Proarrhythmia Assay) protocol: spike amplitude (≥ 0.3 mV), beat period (0.67–3 seconds), and BPM (20–90 beats/min, or 0.3–1.5 Hz).
- (B) Beat period stabilized from DIV5, consistently meeting the acceptance criteria.
- (C) BPM consistently met the criteria from DIV5 onward.
- (D) Spike amplitude consistently fulfilled the criteria at 35K and 50K densities across all time points. At 25K density, the spike amplitude satisfied the criteria starting from DIV7.
- (E) FPD stabilized from DIV5 to DIV8 across all densities, meeting the acceptance criteria outlined in the protocol.

Summary

- ✓ From DIV5 to DIV8, 35K and 50K seeding densities demonstrated stable BP, BPM, spike amplitude, and FPD, consistently meeting the acceptance criteria. At 25K seeding density, the criteria were met from DIV7 to DIV8, allowing for stable evaluations. Therefore, seeding densities of 35K or higher are recommended, and for 25K, toxicity evaluations can be conducted from DIV7 onward.

