

## Product Information

### Human iPSC-Derived Cardiomyocytes

Catalog Number	40HU-008	Cell Number	1.0 million cells/vial 4.0 million cells/vial
Species	<i>Homo sapiens</i>	Storage Temperature	Liquid nitrogen

## Product Description

Cardiomyocytes or cardiac muscle cells (also known as myocardiocytes or cardiac myocytes) are the muscle cells (myocytes) that make up the cardiac muscle. Due to the lack of natural source of cardiac cells, in vitro differentiated human cardiomyocytes have been proven as an essential tool not only for general cardiovascular research, as well as drug development and pre-clinical research [1, 2].

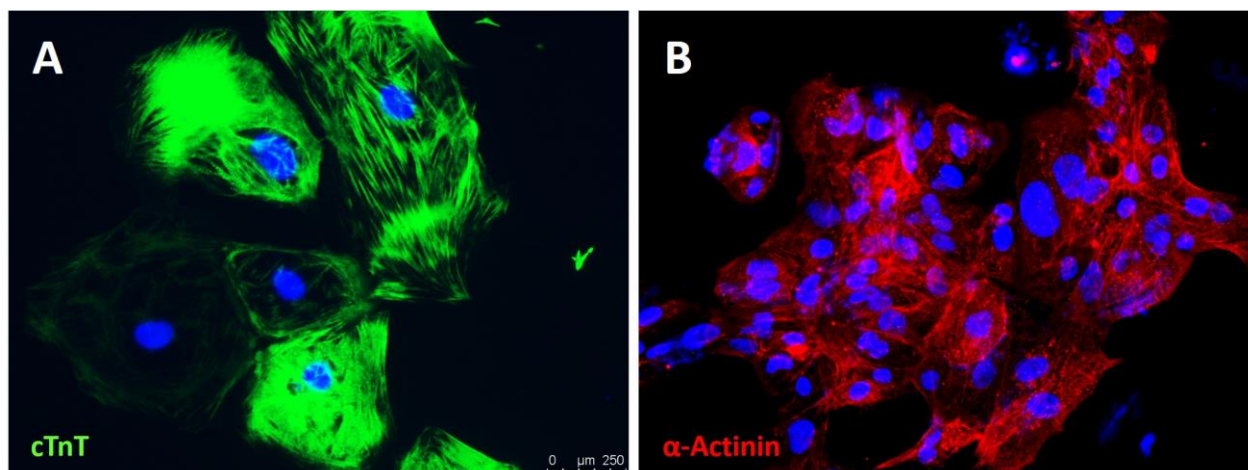
The Comprehensive in vitro Proarrhythmic Assay (CiPA) initiative, a novel safety screening proposal led by FDA, which is intended to improve current regulatory guidances. The new predictive technologies are evaluated, including using human stem cell-derived cardiomyocytes (hSC-CMs) in the preclinical cardiac safety assessment [3].

**iXCells Biotechnologies** provides ready-to-use beating human induced pluripotent stem cells (iPSC)-derived cardiomyocytes ([Video 1](#)). These cells express typical markers of cardiomyocytes, e.g. TNNT/cTnT and  $\alpha$ -Actinin (Figure 1), with the purity higher than 90%. Functional validation of iPSC-derived cardiomyocytes has been done by patch-clamp and Fluo-4™ Direct Calcium Assay ([Video 2](#)). When cultured with the rigorously optimized Cardiomyocyte Replating Medium (Cat# MD-0046) and Cardiomyocyte Maintenance Medium (Cat# MD-0045), the cryopreserved iXCells™ cardiomyocytes will begin beating within 3 days after thawing and become assay-ready within 10 days post replating.

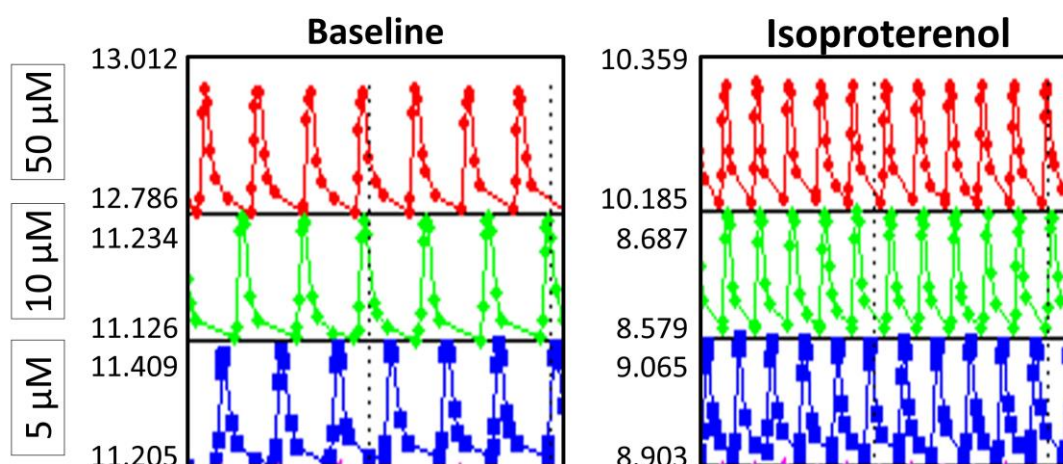
iXCells™ Cardiomyocytes can be used for electrophysiological and biochemical assays in toxicology, drug discovery, and basic life science research applications. For example, the effect of compounds on the heart rate can be assayed by impedance-based measurements (Figure 2).

All the cells provided by iXCells are negative for mycoplasma, bacteria, yeast, and fungi. HIV-1, hepatitis B and hepatitis C. The basic donor information (gender / age / race) is provided for each cell lot purchased.

**iXCells Biotechnologies** also provides customized differentiation service. Contact us at [orders@ixcellsbiotech.com](mailto:orders@ixcellsbiotech.com) for more details.



**Figure 1.** After replating in Cardiomyocyte Maintenance Medium on Matrigel-coated plates for 2 days, more than 90% of the iPSC-derived cardiomyocytes express cTnT and  $\alpha$ -Actinin (Figure A and B).



**Figure 2.** Beating rate of iXCells™ cardiomyocytes measured with xCELLigence RTCA Cardio System (ACEA Biosciences and Roche Applied Science). Cells were treated with various dosages of Isoproterenol. **(Left)** Before Treatment (50  $\mu$ M; 10  $\mu$ M; 5  $\mu$ M); **(Right)** 30 min after treatment (50  $\mu$ M; 10  $\mu$ M; 5  $\mu$ M).

## Product Details

<b>Tissue Origin</b>	Human cardiomyocytes derived from iPSCs (Normal)
<b>Package Size</b>	1.0 million cells/vial; 4.0 million cells/vial (frozen)
<b>Shipped</b>	Cryopreserved
<b>Media</b>	Cardiomyocyte Replating Medium (Cat# MD-0046) Cardiomyocyte Maintenance Medium (Cat# MD-0045) Matrigel-coated Plate (Cat# MD-0023)

## Protocols

### Thawing of Frozen Cells

1. Upon receipt of the frozen cells, it is recommended to thaw the cells and initiate the culture immediately in order to retain the highest cell viability.
2. To thaw the cells, put the vial in 37°C water bath with gentle agitation for ~2 minute. Keep the cap out of water to minimize the risk of contamination.
3. Transfer the cells into a 15 mL conical tube with 5 mL Cardiomyocyte Replating Medium (Cat# MD-0046). Centrifuge at 250 g for 5 minutes at room temperature.
4. Aspirate the supernatant, resuspend the cells in 1 mL Cardiomyocyte Replating Medium. Check cell number and viability. Dilute cell to a concentration of  $0.5 \times 10^6$ /mL and apply 1 mL/well into matrigel-coated 24 well plate (Cat# MD-0023). Put the plate into 37°C incubator overnight.
5. Next day, aspirate Cardiomyocyte Replating Medium, wash briefly by pipetting several times with 1XDPBS to get rid of the unattached cells, apply 1 mL Cardiomyocyte Maintenance Medium (Cat# MD-0045) to each well.
6. Change medium with Cardiomyocyte Maintenance Medium (Cat# MD-0045) every other day.

**Note:** Normally the cells will start beating within 3 days after thaw and be ready for assays within 10 days post replating.

## References

- [1] Matsa E, Burridge PW, Wu JC. Human stem cells for modeling heart disease and for drug discovery. *Sci Transl Med*. 2014 Jun 4;6(239):239ps6.
- [2] Jiang W, Lan F, Zhang H. Human Induced Pluripotent Stem Cell Models of Inherited Cardiovascular Diseases. *Curr Stem Cell Res Ther*. 2014 Oct 16.
- [3] Cavero I, Holzgrefe H. Comprehensive in vitro Proarrhythmia Assay, a novel in vitro/in silico paradigm to detect ventricular proarrhythmic liability: a visionary 21st century initiative. *Expert Opin Drug Saf*. 2014 Jun;13(6):745-58.

## Disclaimers

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