



Human iPSC-derived Cardiomyocytes

Product Information

Catalog Number ASE-9027 (derived from normal human PBMC)

Description **Applied StemCell Inc.** provides ready-to-use **beating human induced pluripotent stem cells (iPSC)-derived cardiomyocytes** expressing typical markers of cardiomyocytes, e.g. TNNT/cTnT and α -Actinin (Figure 1), with the purity higher than 90%. These iPSC-derived cardiomyocytes are especially important because of lack of a natural source for cardiomyocytes for use in research. These *in vitro* differentiated beating cardiomyocytes are an essential tool for *in vitro* “gain-of-function” and loss of function genetic studies as well as for drug development and preclinical studies^{1,2}. As well, these human stem cell-derived cardiomyocytes can be used for preclinical cardiac safety assessment based on the Comprehensive *in vitro* Proarrhythmia Assay (CiPA) initiative, a novel safety screening proposal led by FDA, which will improve current regulatory guidances³. ASC’s Cardiomyocytes can be used for electrophysiological and biochemical assays, for example, the effect of compounds on the heart rate can be assayed by impedance-based measurements (Figure 2).

These iPSC-derived cardiomyocytes derived from normal human PBMC (peripheral blood mononuclear cells) in a feeder free culture system (passage# 5-10) are cryopreserved and delivered frozen. Once thawed and subcultured, the cells will aggregate and start beating in 7~10 days after replating.

Applied StemCell, Inc. also provides customized differentiation service. Contact us at info@appliedstemcell.com for more details.

Pack size 1 x 10⁶ cells/ vial (ASE-9027-1)
4 x 10⁶ cells/ vial (ASE-9027-2)

Shipping Dry ice

Storage and Stability Store in liquid nitrogen freezer immediately upon receipt. This product is stable for at least 6 months from the date of receiving when stored as directed.

Quality Control Functional validation of iPSC-derived cardiomyocytes has been done by patch-clamp and **Fluo-4TM Direct Calcium Assay**. The purity is > 85% as assayed by TNNT staining and cells are integration and footprint free. All cells provided are negative for mycoplasma, bacteria, yeast, and fungi. HIV-1, hepatitis B and hepatitis C.

Safety Precaution **PLEASE READ BEFORE HANDLING ANY FROZEN VIALS.** Please wear the appropriate Personal Protection Equipment (lab coat, thermal gloves, safety goggles and a face shield) when handling the cells. Handle the frozen vials with due caution. Please be aware that the following scenario can occur: Liquid nitrogen can leak into the vials when the vials are submerged in liquid nitrogen. Upon thawing, the liquid nitrogen returns to the gas phase, resulting in a dangerous build-up of pressure

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within the vial. This can result in the vial exploding and expelling not only the vial contents but also the vial cap and plastic fragments of the vial.

Restricted Use

This product is for research use only and not intended for human or animal diagnostic or therapeutic uses.

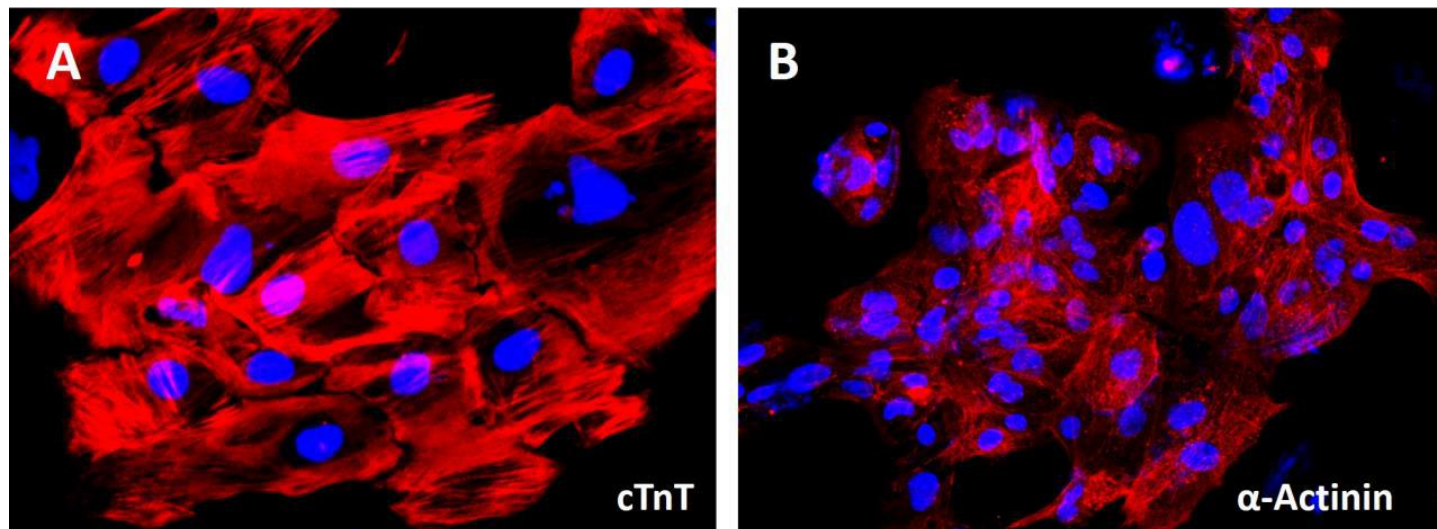


Figure 1. After replating in Cardiomyocyte Maintenance Medium on the Matrigel-coated plates for 2 days, more than 85% of the iPSC-derived cardiomyocytes express cTnT and α -Actinin (Figure A and B).

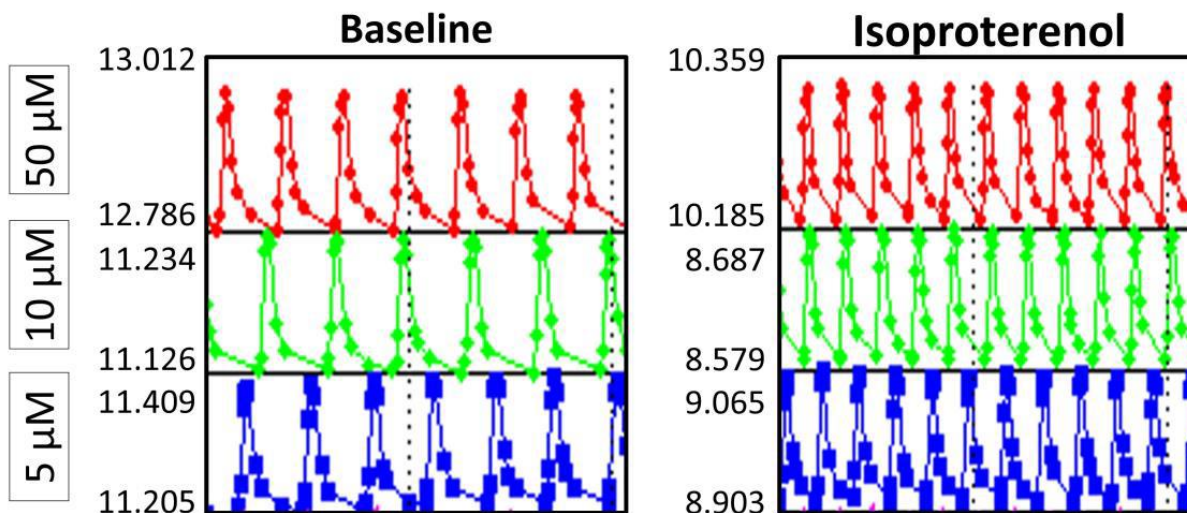


Figure 2. Beating rate of iPSC-derived cardiomyocytes measured with xCELLigence RTCA Cardio System (ACEA Biosciences and Roche Applied Science). Cells were treated with various dosages of Isoproterenol. **(Left)** Before Treatment (50 μ M; 10 μ M; 5 μ M); **(Right)** 30 min after treatment (50 μ M; 10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

Media and Material

Catalog #	Component	Product details
ASE-9027-1	iPSC derived cardiomyocytes (from normal human PBMC*)	1 x10 ⁶ cells/vial
ASE-9027-2	iPSC derived cardiomyocytes (from normal human PBMC*)	4 x 10 ⁶ cell/vial
ASM-6033	Cardiomyocyte (iPSC derived) Replating Media	50 mL
ASM-6034	Cardiomyocyte (iPSC derived) Maintenance Media	100 mL

*The basic donor information (gender / age / race) is provided for each cell lot purchased.

Material needed but not provided

Matrigel® - BD (Cat# 354277)

Protocol

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 Cardiomyocytes Replating Medium.
4. Centrifuge at 250 g for 5 minutes at room temperature.
5. Aspirate the supernatant, and resuspend the cells in 1 mL Cardiomyocytes Replating Medium. Check cell number and viability. Dilute cell to a concentration of 0.5 x 10⁶/mL and apply 1 mL/well into Matrigel-coated 24 well plate. Put the plate into 37°C incubator overnight.
6. Next day, aspirate Cardiomyocytes Replating Medium, apply 1 mL Cardiomyocytes Maintenance Medium to each well.
7. Change medium with Cardiomyocytes Maintenance Medium every other day.

Notes: Normally the cells will aggregate and start beating in 7~10 days after replating.

References

1. Matsa E, Burrige 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, Holzgreffe 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.