

# Using Liposome-mediated Transfection for Gene Delivery

## Introduction

This protocol describes how to deliver plasmid DNA into iCell® Cardiomyocytes using the ViaFect Transfection Reagent.<sup>1,2</sup>

## Required Consumables

The following consumables are required in addition to the materials specified in the iCell Cardiomyocytes User's Guide.

Item	Vendor	Catalog Number
iCell Cardiomyocytes Kit	Cellular Dynamics International (CDI)	CMC-100-010-001 CMC-100-010-005
Opti-MEM Reduced Serum Medium	Life Technologies	31985-062
Plasmid DNA	Multiple Vendors	
Sterile 1.5 ml Centrifuge Tubes	Multiple Vendors	
ViaFect Transfection Reagent	Promega	E4981

\* Other transfection reagents may have been tested. Contact CDI's Technical Support (support@cellulardynamics.com; +1 (877) 320-6688 (US toll-free) or (608) 310-5100) for more information.

## Methods

### Culturing iCell Cardiomyocytes

1. Thaw and maintain iCell Cardiomyocytes according to the iCell Cardiomyocytes User's Guide.

**Note:** iCell Cardiomyocytes have been transfected successfully at day 7 post-plating; however, other time points may be acceptable. Contact CDI's Technical Support for more information.

### Transfecting iCell Cardiomyocytes

1. On the day of transfection, aspirate the spent medium and replace with fresh iCell Cardiomyocytes Maintenance Medium (Maintenance Medium) at 90% of the culture medium.

**Note:** For a 96-well cell culture plate, replace with 0.09 ml/well of medium.

2. Incubate the plate in a cell culture incubator at 37°C, 5% CO<sub>2</sub> for 2 - 4 hours.

- Prepare a 10X transfection complex solution in Opti-MEM Reduced Serum Medium according to the manufacturer's instructions.

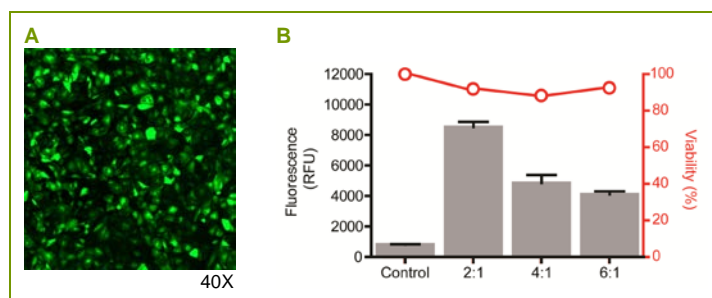
**Note:** For a 96-well cell culture plate, prepare 0.01 ml/well of solution.

**Note:** For ViaFect Transfection Reagent, an optimal reagent ( $\mu$ l):DNA ( $\mu$ g) ratio of 2:1 has been determined for use with iCell Cardiomyocytes.

- Add the 10X transfection complex solution to the center of each well containing iCell Cardiomyocytes in Maintenance Medium.

**Note:** It is recommended to rock the plate gently to distribute the transfection complexes evenly across the cell monolayer.

- Incubate in a cell culture incubator at 37°C, 5% CO<sub>2</sub> overnight.
- Replace 100% of the medium with fresh Maintenance Medium.
- Measure transfection efficiency (optional, Figure 1).



**Figure 1: iCell Cardiomyocyte Are Transfected with High Efficiency and Low Toxicity Using ViaFect Transfection Reagent**

iCell Cardiomyocytes were cultured for 7 days in a 96-well cell culture plate before transfection with a GFP-expressing plasmid DNA (pZsGreen1-N1 VectorGreen, Clontech, Cat. No. 632448) and analyzed at 24 hours post-transfection by (A) fluorescence microscopy. Quantification of cell viability and transfection efficiency was determined at different reagent:DNA ratios using (B) the CellTiter-Glo Luminescence Cell Viability Assay (Promega, Cat. No. G7572) and GFP fluorescence intensity, respectively.

- Prepare transfected iCell Cardiomyocytes for the desired endpoint assay.


## Summary

iCell Cardiomyocytes provide a relevant in vitro test system that recapitulates native human cardiac myocyte physiology. Here we describe a protocol for efficiently transfecting foreign DNA in human cardiomyocytes using a liposome-mediated system for assessment of a gene or protein function.

## References

1. Cellular Dynamics International, Inc. (2012) iCell Products Application Note: Applying Transfection Technologies to Create Novel Screening Models. [www.cellulardynamics.com/lit/](http://www.cellulardynamics.com/lit/).
2. Anson BA. (2015) Building Richer Assays: Transfection of iPSC-derived Tissue Cells Is a Powerful Addition to the Biologist's Tool Box. GEN **35**(2).

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