

# The use of induced pluripotent stem cell-derived cardiomyocytes to study cardiac arrhythmias and cardiomyopathies

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## SCOPE OF THE METHOD

<b>The Method relates to</b>	Human health
<b>The Method is situated in</b>	Basic Research, Translational - Applied Research
<b>Type of method</b>	In vitro - Ex vivo
<b>This method makes use of</b>	Human derived cells / tissues / organs
<b>Specify the type of cells/tissues/organs</b>	Induced pluripotent stem cell-derived cardiomyocytes

## DESCRIPTION

### Method keywords

induced pluripotent stem cells

Disease modeling

Cardiomyocyte

drug screening

CRISPR/Cas

### Scientific area keywords

cardiac arrhythmia

cardiomyopathy

Brugada syndrome

### **Method description**

Cardiomyocytes derived from induced pluripotent stem cells (iPSC-CMs) offer an attractive platform for cardiovascular research, including disease modeling, drug toxicity testing and development of regenerative therapies. Patient-specific iPSC-CMs are very useful to study disease pathogenesis and have a huge potential for evaluation of disease prognosis and development of personalized treatment. In our research group we study inherited cardiac arrhythmias (currently with a focus on Brugada syndrome) and cardiomyopathies. We create iPSC-CM models, either patient-derived or using CRISPR/Cas, to evaluate the functional effect of specific genetic variants, assist the search for modifier genes and novel therapeutic targets, and screen for novel drug compounds.

### **Lab equipment**

- Biosafety cabinets ;
- Nucleofector ;
- Patch-clamp equipment ;
- Multi-electrode array (MEA) ;
- Next-generation sequencing (NGS) instruments.

### **Method status**

Still in development

Internally validated

### **PROS, CONS & FUTURE POTENTIAL**

#### **Advantages**

Human model mimicking the native cardiomyocyte environment, patient-based disease model recapitulating full genomic background.

#### **Challenges**

Relative immaturity of the cells, variability of the phenotype of the final iPSC-CM

model

## **Modifications**

Improved protocols for more standardized differentiation and maturation of the cardiomyocytes.

## **Future & Other applications**

iPSC-CMs can as well be used for drug cardiotoxicity screening and regenerative therapies after further improvements and validation.

## **REFERENCES, ASSOCIATED DOCUMENTS AND OTHER INFORMATION**

### **Associated documents**

## **PARTNERS AND COLLABORATIONS**

### **Organisation**

**Name of the organisation** University of Antwerp

**Department** Center of Medical Genetics

**Country** Belgium

**Geographical Area** Flemish Region

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