

# The use of induced pluripotent stem cellderived cardiomyocytes to study cardiac arrhythmias and cardiomyopathies

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# **Organisation**

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Geographical Area Flemish Region

## **SCOPE OF THE METHOD**

The Method relates to	Human health
The Method is situated in	Basic Research, Translational - Applied Research
Type of method	In vitro - Ex vivo
Specify the type of cells/tissues/organs	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









