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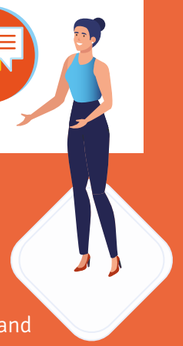

CONTACT

Project Coordinator
Dr Christian Bergaud
Centre National de la Recherche Scientifique (CNRS)
Paris, France
E-Mail: bergaud@laas.fr

Project Manager
Annika Enning
Eurice – European Research and Project Office GmbH
St. Ingbert, Germany
E-Mail: a.enning@eurice.eu

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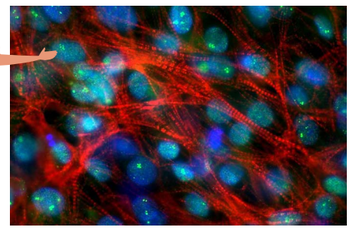
EMAPS

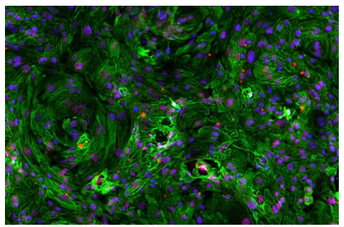
Advancing the Understanding and Treatment of Heart Diseases

ABOUT EMAPS-CARDIO

Cardiovascular diseases cause 45% of deaths in Europe annually. Despite this, the number of approved cardiac drugs is decreasing as cardiac drug candidates are tested on living tissue and animal models, which fail to accurately predict drug effects in humans.

The EMAPS-Cardio project aims to revolutionise cardiovascular drug development by developing artificial organ tissue that mimics the behaviour of the body's heart cells in healthy and diseased states.

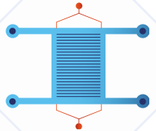




Immunofluorescent images of hiPSC-derived cardiomyocytes generated in EMAPS-Cardio. Provided by partner BioTalentum Ltd.

SCIENTIFIC APPROACH

- Developing a bioreactor that provides all necessary stimuli to generate adult-like cardiac cells derived from human stem cells (hiPSC-derived cardiomyocytes)
- Combining novel electro-mechanoactive polymer-based scaffolds (EMAPS) for 3D cell cultures with bioactive membranes
- Characterising the effects of cardiovascular drugs by developing a 3D-printed multi-material heart-on-chip device that mimics the functionality of a human heart
- Developing and testing deep-learning-based algorithms to increase the sensitivity and accuracy of the model



Organ-on-chips contain hollow microfluidic channels lined with living human cells that mimic living organs. The heart-on-chip technology is a revolutionary way to screen drug candidates for efficacy and toxicity.

IMPACT

- Increased approval rate of highly efficient cardiovascular drugs resulting in fewer deaths
- Fewer failed clinical trials and costly drug development processes ease the burden on healthcare systems
- Improved understanding of heart diseases
- Reduced need for animal testing

More Accurate Prediction

Higher Drug Approval Rate

Fewer Failed Clinical Trials

No Animal Testing