

## Press release

Universitätsmedizin Göttingen - Georg-August-Universität

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## Detecting side effects of new drugs on the heart more efficiently

**Scientists at the University Medical Center and the University of Göttingen have developed a novel method to predict the side effects of new drugs and therapeutic approaches on the heart more efficiently. The advantage: this method is already effective in a very early test phase, even before preclinical screening in the living organism. The results were published in the renowned journal Cardiovascular Research.**

(umg/mbexc) Newly developed drugs and therapeutic approaches often have side effects on the heart. Comprehensive preclinical testing of new drug candidates therefore precedes clinical trials and application, with the aim of ruling out potential side effects as far as possible in advance. However, current procedures usually only cover part of the possible side effects on the heart. Improving the test procedures is therefore essential in order to predict the risk of undesirable side effects with a high degree of specificity and sensitivity.

A team led by Prof. Dr. Tobias Brüggemann, research group leader at the Institute of Cardiovascular Physiology at the University Medical Center Göttingen (UMG), in cooperation with Prof. Dr. Tim Salditt, Director of the Institute of X-ray Physics at the University of Göttingen, both members of the Cluster of Excellence "Multiscale Bioimaging: From Molecular Machines to Networks of Excitable Cells" (MBExC), have now developed a way to keep fresh slices of intact heart tissue in culture for several days while demonstrably preserving vitality and functionality. This enables to more efficiently screen and detect the effects of new potential drugs on the electrical and contractile properties of heart muscle cells and on the general tissue architecture before the active substances are used for analyses in living organisms.

### About the method

The scientists first prepare thin (300 µm) tissue slices from pig hearts. Pig hearts are very similar to human hearts, from which there are hardly any opportunities to obtain samples for drug studies. Using a newly developed approach of cultivation, the scientists succeeded for the first time in keeping the tissue slices, which consist of intact heart muscle tissue, for up to two weeks in an incubator. As the scientists demonstrated, not only the typical shape of the heart muscle cells is preserved over the entire period, but also their vitality and functionality. This is an absolute prerequisite in order to comprehensively analyze the effects of various substances, such as new potential drugs or therapeutic approaches. The general suitability of the test procedure was first tested with drugs with known and well described effects on the heart. The scientists then tested whether they could reliably identify those substances with side effects on the heart among several, which was successful in every respect. "Identifying undesirable side effects on the heart as early and efficiently as possible is crucial to lower the health risk for patients in clinical trials later on. Moreover, this will also help to reduce the costs of drug development," explains Prof. Dr. Brüggemann. We are now in a position to test potential new drugs and new therapeutic approaches much more comprehensively in advance concerning their suitability for later use in clinical trials," says Brüggemann.

The Göttingen Cluster of Excellence 2067 Multiscale Bioimaging: From Molecular Machines to Networks of Excitable Cells (MBExC) has been funded since January 2019 as part of the Excellence Strategy of the German federal and state governments. With a unique interdisciplinary research approach, MBExC investigates the disease-relevant functional units of electrically active heart and nerve cells, from the molecular to the organ level. To this end, MBExC brings together numerous university and non-university partners on the Göttingen Campus. The overarching goal is to understand the connection between heart and brain diseases, to link basic and clinical research and thus to develop new therapeutic and diagnostic approaches with social implications.

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Contractility measurements for cardiotoxicity screening with ventricular myocardial slices of pigs. Cardiovascular Research, Volume 119, Issue 14, October 2023, Pages 2469–2481. DOI: 10.1093/cvr/cvad141

URL for press release: <https://mbexc.de/> - about MBExC

URL for press release: <https://hkp.umg.eu/en/research/vegetative-optogenetics/> - about Brügmann Lab