

**INNOVECTIS**Ein Unternehmen der
Johann Wolfgang Goethe-Universität
Frankfurt am Main**Technology Offer**

optogenetic voltage clamp

Benefits

- **Game changing method for high-throughput drug screening**
- **Contactless all-optical screening of compounds, no need for electrode-based patch-clamp electrophysiology**
- **Focus on compounds that affect ions channels**
- **Mutagenesis screening of ion channels facilitated enormously**

Project Status

- **Very successful first experiments and data sets**
- **Further development ongoing**

Patents

- **Europ. priority patent application: EP21162331**
- **Filed on 12.Mar.2021 by Goethe-University**

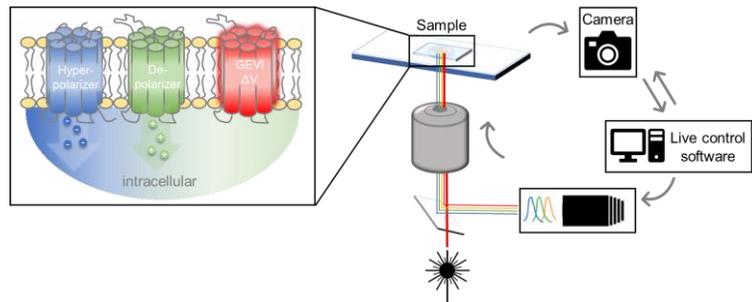
Offer

- **Technology can be licensed or assigned**
- **Collaborations for further development welcome**

Scientists at Goethe-University Frankfurt am Main (Germany) have developed a novel technology, the **optogenetic voltage clamp** – OVC. Besides its great value for basic research (e.g., cell biology) the OVC technology could open up a game changing application in the area of high-throughput screening of drugs and / or ion channels. Using the OVC, millions of substances as potential lead compounds for specific interactions with certain ion channels could be screened far easier compared to conventional patch-clamp systems.

Embedded in a computerized closed-loop feedback system, the OVC technology combines a genetically encoded voltage indicator (GEVI) protein with counteracting optogenetic tools for de- and hyperpolarization, which enables all-optical voltage clamp experiments in various cell types. The method provides the use of this cell for screening of drugs that affect intrinsic or ectopically expressed ion channels. Allowing tight control of a target cell's membrane potential, the OVC technique is predestined to uncover interactions between test compounds and the ion channels to be examined.

Hardware requirements include a camera or photomultiplier, as well as light sources for excitation of the expressed optogenetic tools, that could be integrated into a high-throughput plate reader (e.g., in 384-well format) as is already common praxis for comparable fluorescence-based calcium imaging systems.



With a measurement duration in the range of seconds, 384 compounds could be screened within a few minutes. Due to the OVC's purely optical character, this technology is resource-saving and outperforms automated patch-clamp systems in terms of efficiency (time, costs): Lower volumes are required, and the procedure works contactless. Furthermore, cell-to-cell variability might be negligible, since the optical measurement could average the effect of hundreds of cells per substance, unlike the patch-clamp method, where only a single cell can be observed (patched).

In addition, OVC can also greatly facilitate mutagenesis screening of ion channels. It allows to identify interesting variants (mutants) of the ion channel, which can subsequently be isolated and sequenced.

The Frankfurt University team would look forward to cooperating with commercial partners to transfer the invention towards industry and market exploitation.

INNOVECTIS
Gesellschaft für Innovations-
dienstleistungen mbH
Altenhöferallee 3
60438 Frankfurt am Main, Germany
Tel +49 69 25 61 632-0
matthias.goetz@innovectis.de