



## CASE STUDY

# At Work in the Lab:

## Advancing Pharmaceutical Research by Developing Cell-based Electrophysiological Testing

The [NMI - Natural and Medical Sciences Institute at the University of Tübingen](#) is an applied sciences institute under public law, and, as such dedicated to building bridges between academics and industry. Their [electrophysiology group](#), often working with medical device manufacturers, specializes in the development of cell-based and organ-related electrophysiological test procedures to help their partners create cutting-edge solutions to keep up with the rapidly changing demands of pharmaceutical and biotechnology industries.

Using state-of-the-art electrophysiological methods, they investigate mechanisms of cellular signal processing and transmission as well as intercellular communication under physiological and pathophysiological conditions and during cellular differentiation.

Their primary focus for contract research has been on cardiomyocyte drug screening for safety pharmacology research of pre-clinical compounds for side effects. Additionally, for their industrial partners and publicly funded projects they are increasingly working on neurotoxicity studies as well as neuro applications such as stem-cell derived neurons with disease background such as schizophrenia or Autism, testing and optimizing compounds and pinpointing activity patterns to determine whether cells and networks are diseased or a control network. Searching for compounds ideal to treat or heal diseases or give medical doctors opportunity to check in vitro which might be an optimal medication for the respective patient.

“Multiwell in combination with MEA Xpress is the perfect increased throughput tool for cardio and neuro research. From the first experiments we have done the MEA Xpress is going to help us to automate everything much more.”

– *Dr. Udo Kraushaar,*  
*Group Leader*  
*Electrophysiology, NMI*  
*Natural and Medical*  
*Sciences Institute at the*  
*University of Tübingen*

## The Challenge

When this lab started their first stem cell derived project for an industry partner, there were four stem cell providers on the market. The Team was asked to conduct a validation study to determine which source of stem cells would be best suited for the customer’s research.

Tasked with studying 50 compounds on each of the four types of stem cells, they were limited by the then industry standard single- and six-well glass MEAs. Because they had to apply each compound manually or by external pipettor, the process was extremely time consuming and tedious. Additionally, since hardware and software were not allowing automated processes, the experiments were slow and needed a lot of manual steps in between, causing significant lag times between recordings.

## The Solution

To help make the lab more efficient, the Team partnered with Multi Channel Systems (MCS), investing in a 96-well [Multiwell-MEA-System](#). Without requiring much lab footprint, the 96-wells immediately remediated the well limitations of traditional equipment. Once in place, they found that the Multiwell-MEA-System was a major breakthrough for their CRO work in compound screening since it was much faster, saving time and requiring fewer resources. Additionally, state-of-the-art [MEA Express](#) software automated significantly more of the research process.

As an example, the software facilitated advanced compound mixing and test scheduling. This functionality allowed lab members to set up multiple experiments, schedule them to run automatically and then return later to collect multiple sets of data and analysis results. Additionally, they found that the modular software allowed much keener insight into the analysis of single wells and down to a single electrode, for better understanding of the data with a high standard and reproducibility.

Overall, the Multiwell-MEA Xpress solution made this lab's work faster and easier—without compromising data quality.

## The Outcome

The time and resources saved with the MCS lab equipment ultimately translates into cost reductions for this lab's industrial customers. This in turn, ultimately can translate into delivery of better patient care at lower costs.

“For the MEA Xpress there is no real alternative so far. It is a nice all in one system that I like quite a bit and can foresee a good future for. It provides good and reproducible results without impacting the researched cells.”

“I have had quite a good experience working with MCS since 2007 on a number of different publicly funded projects. They are very friendly, very helpful with troubleshooting and responsive as our research often requires equipment modifications...Overall our interaction is pretty neat.”

– *Dr. Udo Kraushaar, Group Leader Electrophysiology, NMI Natural and Medical Sciences Institute at the University of Tübingen*