

Speedier patch clamp screenings

By Anders Lindgren

With cell lines ready to use in less than 15 minutes after thawing, and an automated patch clamp technique that resembles manual patch clamp, Cytocentrics speeds up patch clamp screenings without compromising with quality.

PATCH CLAMP In the late 1970s and early 1980s Erwin Neher and Bert Sakmann developed the patch clamp technique, which is a refinement of the voltage clamp. In 1991, they received the Nobel Prize in Physiology or Medicine for this work. Patch clamp is a technique in electrophysiology that allows the study of individual ion channels in cells.

Since they figure in a wide variety of biological processes that involve rapid changes in cells, such as cardiac, skeletal, and smooth muscle contraction, epithelial transport of nutrients and ions, T-cell activation and pancreatic beta-cell insulin release, ion channels are favourite targets when searching for new drugs.

Among his many honorary titles and awards, Professor Erwin Neher is scientific advisor of the German company Cytocentrics, founded by Dr. Thomas Knott in 2001. Patch clamp became automated in the 1990s and Dr. Knott came across the technology as he did research in the boundary between neurobiology and micro systems at the NMI (Natural and Medical Sciences Institute) at the University of Tübingen, Germany.

"We wanted automated patch clamp to resemble manual patch clamp as much as possible. We saw many compromises being made when automating the procedure. All these compromises were detrimental to the quality of the patch clamp," says Dr. Thomas Knott, CEO of Cytocentrics.

Dr. Knott graduated in biology at the University of Tübingen and holds a doctorate in neurobiology from the same university with an emphasis in electrophysiology and microelectrode array application.

When performing a screening with the CytoPatch™ instrument, needles puncture through the plastic packaging of the CytoPatch™ chip, developed by Dr. Knott, and fill in the necessary buffer into microfluidic channels. Then, suspended single cells (provided in MTPs or cups) are injected into the chip. During measurements, on-

line results are displayed on the monitor of the workstation. After a run, the chip holder block moves down, disconnects the chip and drops it into a waste bottle. Waste fluids are also collected in waste bottles (see figure 1). The CytoPatch instrument will be released on the market in the second half of 2008.

Cell reservoir

The quality of the cells is very important in patch clamp screenings and defines the daily quality of the measurements. The CytoPAQ™ Instant Cells Kit, developed by Cytocentrics, consists of certified HEK 293 cells stably transfected with hERG (human ether-a-go-go related gene) channel, intracellular and extracellular solution, and Cell Reservoir.

"The Cell Reservoir is an optional accessory, but storing the cells in the reservoir prior to usage preserves the suspended cells in a non-clustered state at high vitality for at least four hours. The Instant Cells are ready to use in less than 15 minutes after thawing, and are optimised for manual and automated patch clamp and comply with high pharmacology safety standards. Being able to use the cells in so short a time is unique in the world. It makes the workflow more flexible and cost-effective," says Dr. Knott.

All pharma companies doing pre-clinical research are potential clients of Cytocentrics' and the Instant Cells Kits are shipped all over the world. Many companies outsource their patch clamp screenings to Cytocentrics, as well.

"In Europe, our biggest market is the UK, but we're also strong in southern Europe and Scandinavia. However, we have five times more customers in the US than in the EU, most of them located in the East Coast Area, where we have a representative office. Our total revenue is estimated to reach EUR one million in 2008," says Dr. Christa Nutzhorn, who was employed as President in July 2003.

She has executive responsibility for global sales and marketing activities. Before joining Cytocentrics, she was the general manager of Zymark for four years, with responsibility for Central Europe. She received her PhD in Organic Chemistry and Spectroscopy (NMR, MS) from the University of Hannover in 1980 and has over 20 years of experience in business development for the life science marketplace.

"Having divided the responsibility of the science and the business between Dr. Thomas Knott and myself, respectively, is one of the major reasons why this company still exists and is doing so well," Dr. Christa Nutzhorn concludes. ♦

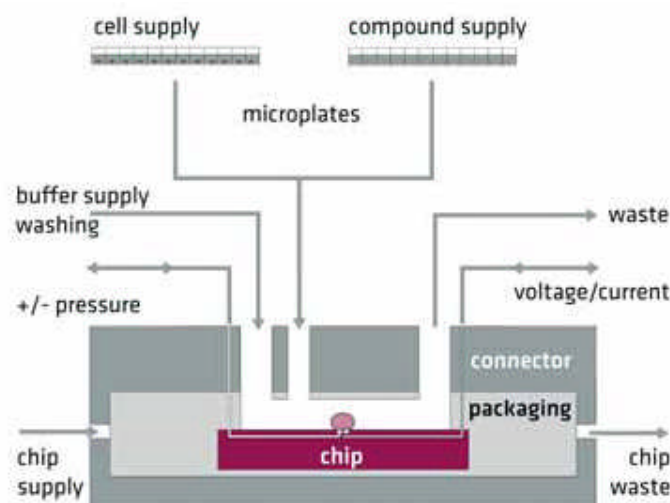


Figure 1.