**INTRODUCTION AND BACKGROUND**

**PATCH CLAMP TECHNOLOGY** The patch clamp technique is an electrophysiological method to detect very small ionic currents through ion channels in the membrane of cells. This technique is extremely sensitive and information-rich with the unique potential to explore a broad spectrum of ion channels. The high data quality is achieved at the expense of very long throughput and the need of an experienced operator. The CytoPatch™ system combines the high data quality known from the manual patch clamp with a complete process and assay automation. This results in an increased throughput required for screening purposes.

**CYTOPATCH™ INSTRUMENT** The CytoPatch™ Instrument is an automated patch clamp platform. It is a modular system with independent units. Each module is equipped with its own patch clamp electronics, gigaseal and advanced perfusion system, and its own cell, buffer and compound supply. The single units work completely independent and asynchronous. Access can easily be adapted to customers’ requirements. The CytoPatch™ modules are organized by the Workflow Manager. With the CytoPatch™ Instrument screening studies can be run under GLP compliance.

**LGIC AND VGIC ASSAYS** The CytoPatch™ Instrument has a unique technique which is well suited for the investigation of ligand gated as well as voltage gated ion channels.

1. Long control phase, long compound application phase (maximum 20 Minutes)
2. No standing system, ongoing perfusion
3. No problems with sticky compounds
4. Through a sealed cell pipette, gigaseals and the whole-cell break through are obtained. The sealed cell is then continuously perfused with extracellular buffer or test compound. Through this patch pipette, gigaseals and the whole-cell break through are obtained. This results in an increased throughput required for screening purposes.

**AUTOMATED WORKFLOW ON THE CYTOPATCH™ MODULES**

**ADVANCED PERFUSION SYSTEM**

The advanced microfluidic systems enable a peristaltic perfusion of the cell with a perfusion buffer (left). This is a prerequisite for stable whole cell recordings over minutes of screening. With a dispensing needle test compounds can be applied in precise priming into the cell perfusion line (right). The compound is transferred by an electrokinetic pump to the perfusion lines running up to 300 nl/min. Two perfusion lines run in parallel, one for the measuring buffer (left) and one for the compound solution (right). The perfusion rate can be adjusted from 50 nl/min to 100 nl/min

**HUMAN NICOTINIC ACETYLCHOLINE RECEPTOR ALPHA 7**

- Single cell trace of human nicotinic acetylcholine receptor alpha 7, strongly expressed in Hek 293 cells, measured with the CytoPatch™ Instrument.
- Concentration response curve for compound measured with the CytoPatch™ Instrument.
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**HUMAN P2RX7**

- Single cell trace of human P2RX7 strongly expressed in Hek 293 cells, measured with the CytoPatch™ Instrument.
- Concentration response curve for compound measured with the CytoPatch™ Instrument.
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**HUMAN Nα 1.5**

- Single cell trace of human Nα 1.5 strongly expressed in Hek 293 cells, measured with the CytoPatch™ Instrument.
- Concentration response curve for compound measured with the CytoPatch™ Instrument.
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In contrast to other planar patch clamp platforms the unique CytoPatch™ CellChip contains a real patch pipette. In contrast to other planar patch clamp platforms the unique CytoPatch™ CellChip contains a real patch pipette. In contrast to other planar patch clamp platforms the unique CytoPatch™ CellChip contains a real patch pipette. In contrast to other planar patch clamp platforms the unique CytoPatch™ CellChip contains a real patch pipette. In contrast to other planar patch clamp platforms the unique CytoPatch™ CellChip contains a real patch pipette. In contrast to other planar patch clamp platforms the unique CytoPatch™ CellChip contains a real patch pipette. In contrast to other planar patch clamp platforms the unique CytoPatch™ CellChip contains a real patch pipette. In contrast to other planar patch clamp platforms the unique CytoPatch™ CellChip contains a real patch pipette.