SyncroPatch 384i.
Patch clamp meets HTS.

The SyncroPatch 384i

nanion

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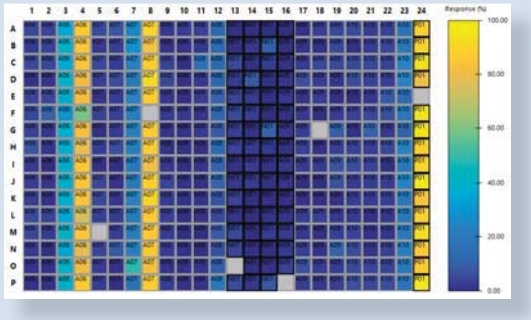
- 384 – 768 cells in parallel (modular approach)
- Giga-seal recordings
- 20,000 data points per day
- Cost-efficient high throughput screening
- 85% success rates (completed recordings)
- Reliable data from diverse ion channel targets
- Single- and multi-hole recording substrates

Heat maps



Get a quick overview - e.g. response (%) to compounds across 384 wells.

Fully HTS-compatible automated patch clamp

The SyncroPatch 384i is a revolutionary automated patch clamp system consisting of a patch clamp module integrated into the state-of-the-art pipetting robot Biomek i5. With 384 amplifier channels and a 384-pipetting head, all 384 cells are recorded in parallel, resulting in a throughput of 20,000 data points per day. Two modules can be integrated per robot allowing recordings of up to 768 cells at once. With its robustness and open design, the SyncroPatch 384i supports full automation and integration into HTS environments, a key factor in the hardware and software implementation of the system. Z prime values and a graphical user interface allowing heat map displays of cell parameters, amongst other features, lets screeners finalize their job fast and effectively.

Reliable and efficient liquid handling with Biomek i5

- Large deck space
- Linear motion control
- Fast pipette dispense speed
- Independent movement of gripper and pipetting head
- Selective tip pipetting
- LED-illuminated deck
- On-board camera

Efficient screening of ligand- and voltage-gated ion channels

The SyncroPatch 384i is fast: a complete run including priming and control additions takes 15 - 20 min. With no limitations to the number of additions, full dose-response curves, including intermittent wash steps, can be obtained. Alternatively, multiple compounds can be sequentially added to the different wells. Solution onset is fast, <50 ms, current responses are highly reproducible and brief compound exposures, <1 s, can be obtained. A fast pipette dispense speed up to 60 µl/s allows for best results even with ligand-gated channels with fast kinetics.

DataControl 384 software suite.
Efficient data handling and export.

PatchControl 384

PatchControl 384 is a powerful graphical user interface for intuitive, quick and easy setup of voltage protocols and experimental parameters. As can be seen from the overview on the right, the recording wells are visualized and color-coded based on user-defined quality criteria, e.g. seal resistance, series resistance, and capacitance. With one mouse click, the view switches to online analysis results, for example I/V curves or concentration-response curves.

DataControl 384

DataControl 384 loads and analyzes the data from PatchControl 384, employing user-defined data analysis templates. Results (IC_{50}, EC_{50}, Z´ values *etc.*), compound information, and quality control parameters are exported together in a user-defined export format, automatically generating pdf-reports, and preparing the data for further database integration. This process is straightforward, intuitive and quickly accomplished.

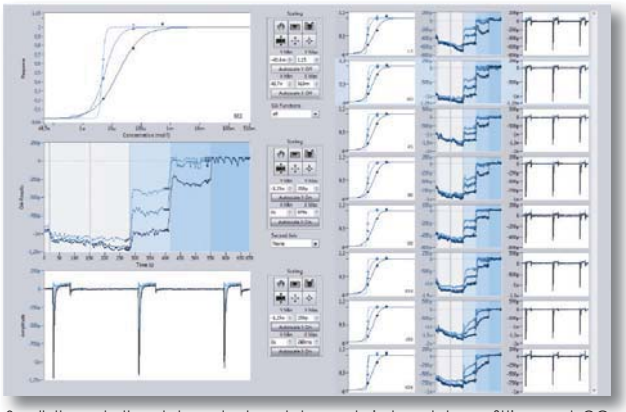
PatchControl 384:

- **Intuitive, quick & easy-to-use setup of experiments**
- **Broad range of QC options**
- **Color-coding of recording wells based on set QC parameters**
- **Raw data and analysis results viewed in the same window**

DataControl 384:

- **Analysis performed with a few mouse clicks**
- **Data analysis templates enabling display of results within seconds**
- **Instant re-calculation upon parameter changes**
- **Customized data export & pdf-reporting**

DataControl 384 - Data output window

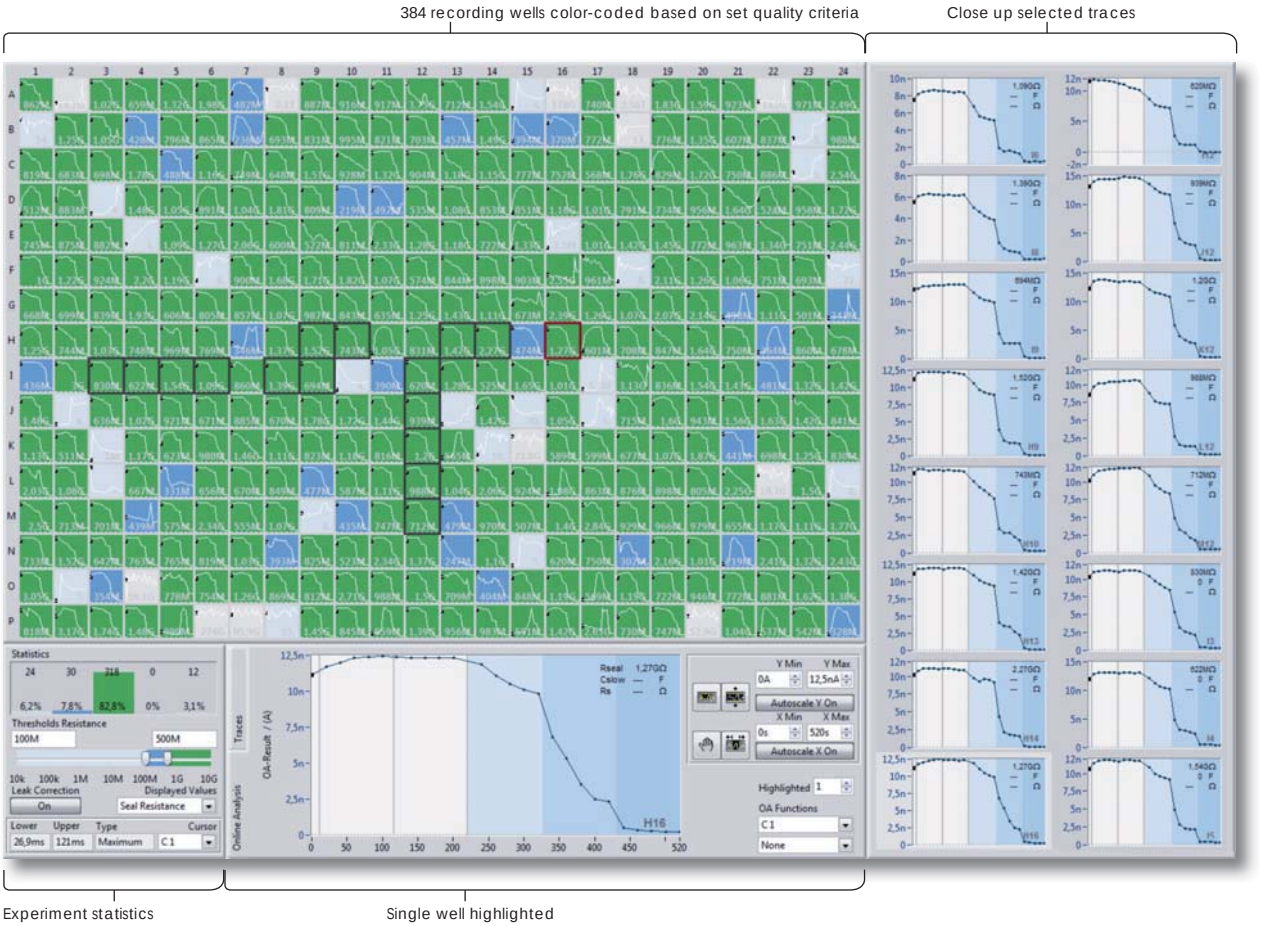


Scroll through the data, select a data analysis template or fitting and QC parameters, and get the pharmacology or compound responses with a few mouse clicks!

Analysis steps:

1. Select your data set
2. Choose an analysis template or enter fit options and decide on QC parameters
3. Exclude failed wells (*post hoc* modification of QC parameters possible)
4. Generate the analyzed data output
5. Get the pdf-report
6. Export the data set in the correct format tor integration into existing databases

PatchControl 384 – an overview



In this data set, one wash addition and three concentrations of quinidine were added to CHO cells expressing hKv1.3. Increasing concentrations of compound are represented by the blue segments. The cells were kindly provided by Evotec.

Hardware and software work hand in hand

A complete run on the SyncroPatch 384i takes 15-20 minutes for four additions, e.g. one control and three concentrations. Data is analyzed as the next experiment proceeds. This means, per hour and patch clamp module, you can collect and analyze more than 3500 data points, and even hold a detailed pdf-report in your hand!

Chip load & Priming — 5 minutes

1–2 control washes + 3 compound concentrations — 8 – 12 minutes

Exp end & Chip unload — 2 minutes

1 min

Analysis

Total experiment length: 15 – 20 minutes (exposure time dependent)

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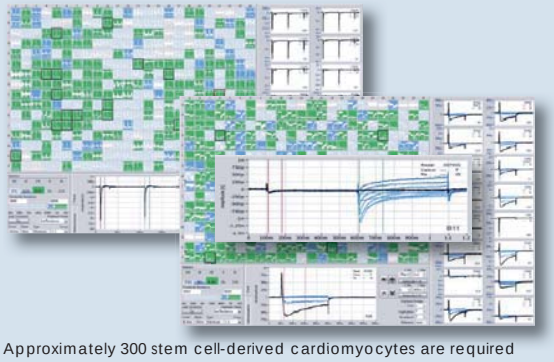
SyncroPatch 384i Technical Specifications:

average whole cell-stability	>30 minutes
successful whole-cell recordings	85%
throughput per patch clamp-module	20,000 data points per day
seal resistance	>1 GΩ
series resistance	<10 MΩ
chip resistance	~3 MΩ (different ranges available)
perfusion time constant	<50 ms
minimum exposure time	<1 s
compatible liquid handling robots	Biomek i5 (Beckman-Coulter)
amplifier channels	384 or 768
number of pipettes	384

HTS screening of stem cell-derived cardiomyocytes



Approximately 300 stem cell-derived cardiomyocytes are required per recording well (Cor.4U, Ncardia). Just 1.5 million stem cells are sufficient for 3840 recordings.

Benefit from our experience

The SyncroPatch 384i is based on proven, successful technology and more than 10 years experience in development of automated patch clamp (APC) systems. Recordings are stable and success rates are high (>85%) for diverse cells and targets. Assay development is straightforward, and directly adaptable from other APC platforms, also for special applications such as stem cell-derived cardiomyocytes. The option for partial plate recordings (down to 1/12 of a plate) are of great value here. Furthermore, Nanion works closely together with Beckman-Coulter for a swift and seamless integration into your HTS facilities and to promptly respond to customer request.

Contact us – schedule your demo today!

The SyncroPatch 384/768i includes:

- Biomek i5 with a 384-pipettor arm and gripper
- 1-2 Patch Clamp Modules
- 1-2 amplifiers (384-channels)
- Windows 10 OS with PatchControl 384 and DataControl 384 software suite
- Guided Labware Setup and Method Launcher
- Temperature-controlled cell hotel
- Barcode scanner
- NPC-384 borosilicate recording plates
- Optional service plans for unmatched support

Welcome to the next level of automated patch clamp

The Biomek i5 liquid handler greatly improves experimental flexibility, ease-of-use and reliability and is the perfect environment for Nanion's proprietary hardware and software. The SyncroPatch 384i includes valuable features such as on-deck compound plate preparation and optimized handling for sticky compounds. With the onboard camera and 360° status light bars you maintain control throughout your experiment.

„The field of ion channel screening is challenged by an increasing demand for high throughput by Big Pharma and CROs, who need to reliably screen more compounds on diverse targets. On the other hand, researchers have smaller, more diverse development projects that need higher flexibility. The SyncroPatch 384i is ideally suited for both purposes."

Dr. Niels Fertig, CEO of Nanion Technologies

"With the SyncroPatch 384i we can yet again offer a simpler, more efficient and more reliable HTS automated patch clamp system."

Dr. Claudia Haarmann, Product Manager of SyncroPatch 384i and Nanion´s Director of Product Implementation (APC)

"The new SyncroPatch 384i layout allows you to really save time. For example, the gripper and pipette head can move independently now. Furthermore, tips don´t have to be unloaded as often which again speeds up the whole workflow. And the large deck capacity allows for longer unattended operation."

Nina Brinkwirth, Application Scientist at Nanion Technologies

"In development, we have carefully listened to key customers from industrial high throughput screening laboratories to fulfil their requirements of HTS-settings."

Marius Vogel, Engineer at Nanion Technologies

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