The **Orbit mini.** Plug and paint.

- Simultaneous recording from four lipid bilayers
- Low noise, high bandwidth recordings
- Temperature control - active cooling and heating
- Cost-efficient experiments with disposable MECA chips

Introducing the **Orbit mini** – Nanion's entry level device for bilayer recordings

Bilayer recordings typically mean tedious waiting for bilayer formation, protein introduction and eventually ion channel activity. The Orbit mini combines the parallel membrane preparation and measurement techniques known from the Orbit 16 with a maximum of portability and ease of use.

Key features of the **Orbit mini**:

- Fast formation of four painted lipid bilayers
- Simultaneous low noise, high bandwidth recordings from four bilayers
- No time consuming disassembly or cleaning

Orbit mini contains a built-in, miniaturized four-channel amplifier, allowing low noise recordings at high bandwidth without the need for any additional equipment – you could virtually conduct experiments while travelling by train! Due to the unique design of the Orbit mini, the measurement chamber temperature can be actively controlled without additional noise generation.

Orbit mini

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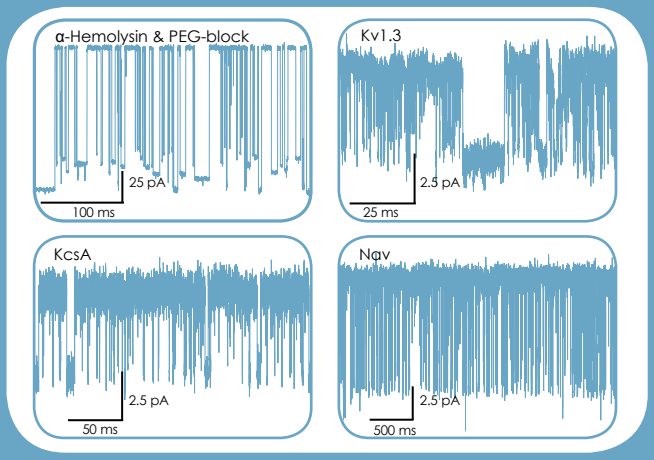
Turn-key device for parallel lipid bilayer recordings

A complete Orbit mini platform consists of the main recording unit with a built-in four channel amplifier (Elements), and an computer-controlled, environmental-control unit for active cooling and heating of the recording chamber. Ionera's √16 MECA disposable chips are used for manual painting of lipid bilayers and parallel recording from four bilayers.



TThe planar lipid bilayers are done on the 4 channel Micro Electrode Cavity Array chip (MECA, Ionera), by manual painting of solvent containing lipids. On the right, the data image shows recordings from 4 different ion channels: Nav sodium channel, α-hemolysin with poly-disperse PEG blocks, Kv1.3 and KcsA potassium channels.

Orbit mini with big brother Orbit 16.

Ionera
Wherever ions flow...

Orbit mini Set-Up and Consumables

Technical details:

- Turn-key system for parallel bilayer recordings
- Four built-in amplifier recording channels
- Temperature control - active cooling and heating
- Computer-controlled temperature regulation
- Small foot print
- USB-computer connection
- Cost-efficient consumables

MECA – Micro Electrode Cavity Array (Ionera)

The MECA recording substrate contains a 2 x 2 array of circular microcavities in a highly inert polymer. Each cavity contains an individual integrated Ag/AgCl-microelectrode. The bilayer is formed by painting, with high success rates for functional bilayers. The MECA-chip has been validat ed with a number of different ion channels including KcsA, gramicidin, α-hemolysin, Kv1.3, Nav *etc.*

Orbit mini. Plug and paint.

The world's smallest patch clamp setup. Providing biggest results.

The Port-a-Patch® NPC®-1

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The Port-a-Patch® Enjoy electrophysiology

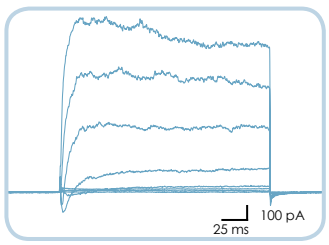
- Increased throughput with high data quality
- Easy-to-use – also for non-experts
- High success rates for stable whole cells
- Versatile liquid handling
- Compatible with most amplifiers
- Whole-cell and single channel recordings
- Successful with primary cells
- Voltage and ligand gated ion channels
- Ultra-low noise bilayer recordings
- External and internal perfusion and temperature control

The Port-a-Patch® is a miniaturized patch clamp system enabling the user, regardless of experience, to rapidly generate high quality data. The system has been successfully validated with numerous ion channels expressed in different cell lines, and in a number of different primary cells. The Port-a-Patch® is a turn-key system, with a quick and easy start up for learning patch clamp. High-quality measurements with giga-seals and high success rates can be performed in whole-cell, cell-attached, perforated patch and bilayer recording configurations.

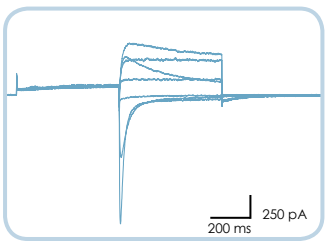
A borosilicate glass chip, NPC®-1, containing a micron sized aperture is used for recordings. A cell is captured from solution, automatically sealed to the chip and the program continues to apply suction pulses until the whole-cell configuration has been reached. Versatile add-ons such as external perfusion, internal perfusion, temperature control and the fluorescence microscope slide make the Port-a-Patch® a very useful and flexible tool for ion channel research.
We offer the Port-a-Patch® with an EPC10 amplifier, but the system is compatible with most amplifiers on the market.

Data Examples

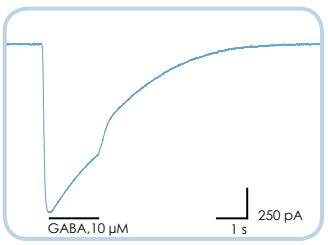
Primary BK / Ca_v



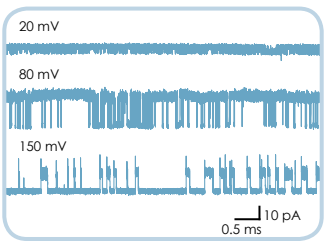
HEK – hERG



HEK – $GABA_A$



Bilayer – IP_3



Successfully tested:

Primary cells (ion channels):

Hippocampal Granule (BK/Ca_v), hSynoviocytes (TRPC)*, rAstrocytes (K^+)*, hNeutrophils (K^+)*, hVascular smooth muscle cells (TRPC)*, hT-lymphoblasts (K^+)*

**Nature Protocols, 2009, 4(2), 244-255*

Other voltage gated channels:

$Na_v1.2$, $Na_v1.5$, $Na_v1.7$ and other Na_v's, hEAG, $K_v1.3$, $K_v1.5$, Shaker, and other K_v's, $Ca_v3.1$ and other Ca_v's

Other ligand gated channels:

$GABA_A$, hGlyRα1, P2X7, CNG, HCN, ASICs, TRPV1, TRPA1, TRPC, TRPM2, TRPM3, TRPM8 *etc.*

Other single channel recordings:

$K_v1.2$, IP_3, OmpF, MscL, bacterial cytolysin, gramicidin, alamethicin, connexins (Cx26, Cx43), NaChBac, KcsA, $K_{Ca}1.1$ *etc.*

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chip resistance:	2 - 3.5 MΩ (customized resistances available)
seal resistance:	> 1 GΩ
whole cell resistance:	> 1 GΩ
series resistance:	< 10 MΩ
liquid consumption:	~ 30 µl/compound
perfusion time constant (Perf. Sys.)	~ 100 ms
internal perfusion time constant:	~ 5 sec
avg. whole cell stability:	~ 20 min
successful whole cell recording:	70 - 90 % (consistent between cell lines)
throughput:	20-50 dp/day

Technical Specifications

A Port-a-Patch® system includes:

- Port-a-Patch® recording station (including Faraday top)
- Port-a-Patch® Suction Control, USB-controlled (no house vacuum needed)
- Maintenance Kit
- Electrophysiological Recording Solutions Kit
- 500 NPC® -1 chips
- PatchControl software (Windows) including sophisticated graphical tools for logging of events
- EPC-10 USB amplifier (HEKA Electronics), system compatible with other amplifiers
- Desktop PC or Notebook
- On-site installation support and training

Add-ons:

- Port-a-Patch® External Perfusion System with laminar flow chamber
- Port-a-Patch® Internal Perfusion System
- Port-a-Patch® Temperature Control
- Port-a-Patch® Microscope Slide for simultaneous fluorescence measurements

Size and weight:

- Port-a-Patch® recording station:
  Size (l x w x h): 17.5 x 9 x 7.5 cm
  Weight: 1.4 kg
- Port-a-Patch® Suction Control:
  Size (l x w x h): 13 x 9 x 7.5 cm
  Weight: 1kg