Explorer Slide

Bilayer Technical Note 02

Bilayer Recording & Microscopy

Lipid bilayers are a key research tool to investigate membrane proteins in a tailorable lipid environment. Compared to conventional methods the bilayer technique is not limited to cellular systems and extends the scope to subcellular membrane vesicles and pore forming proteins like synucleins or toxins.

With the invention of the Ionovation Bilayer Explorer high quality imaging and Single-Molecule-Detection, especially fluorescence techniques are inimitably combined with state-of-the-art bilayer recordings. With its consolidated design the Ionovation Bilayer Explorer fits any inverted microscope to provide a versatile solution that suits the needs in basic as well as in industrial research.

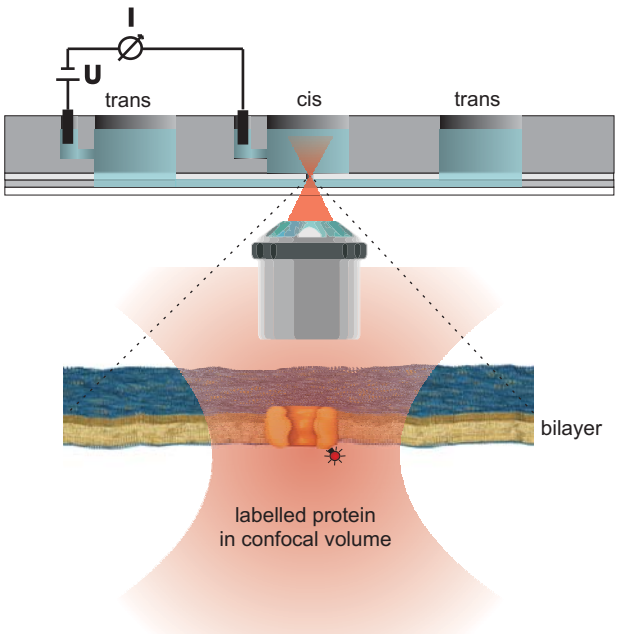
This opens up new vistas for a countless number of experiments

- ligand binding directly related to ion flux
- binding studies under pre-defined membrane potentials
- membrane associated protein oligomerization, aggregation & tracking
- various lipid compositions in user controlled model membranes
- and many more

Single-Molecule-Microscopy is the high-end field of todays imaging techniques. It helps for instance to understand the role of the vast number of proteins involved in cellular processes. Besides high-end requirements for the microscope it is most important to provide a micro-environment that keeps the target molecules under natural or well defined conditions. The Ionovation Explorer Slide concept - to merge the place for electrophysiological recordings and imaging - is the ideal base for multifunctional and outstanding measurements.

A frequent use of Single-Molecule-Microscopy is the determination of biophysical and biochemical characteristics. The high optical quality of the Ionovation Explorer Slide allows the direct analysis of these parameters. Therefore, Ionovation Explorer Slides can be used for routine testing as well as for high content data acquisition.

Furthermore, the concurrent recording of optical and electrophysiological signals allows to analyze structural and functional relations of cellular processes on a molecular level in real-time.



Schematic diagram of the chamber principle
Electrophysiological measurements and confocal observation of the bilayer can be conducted simultaneously.

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Explorer Slide

General aspects of Ionovation Explorer Slides

- Designed for automated bilayer production and validation with the Ionovation Bilayer Explorer
- Bilayer within the working distance of a high numerical aperture objective (100µm)
- Low sample volumes (100µl)
- Integrated micro-channels providing fast fluid exchange of *cis* and *trans* compartments
- Bilayer apertures available from 10 - 400µm
- Highest optical grade glass bottom; clear borosilicate
- Suitable for all objective lenses and magnifications; air, water, and oil immersion
- No autofluorescence
- Biocompatible and chemically robust composite slide material

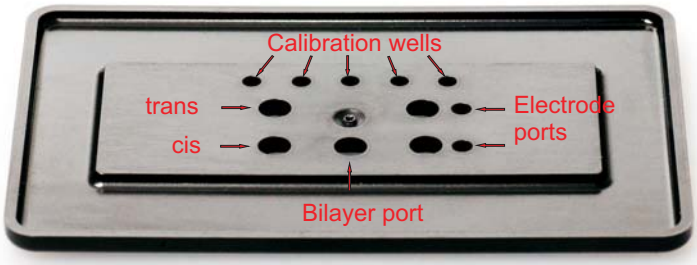
Direct microscopy access

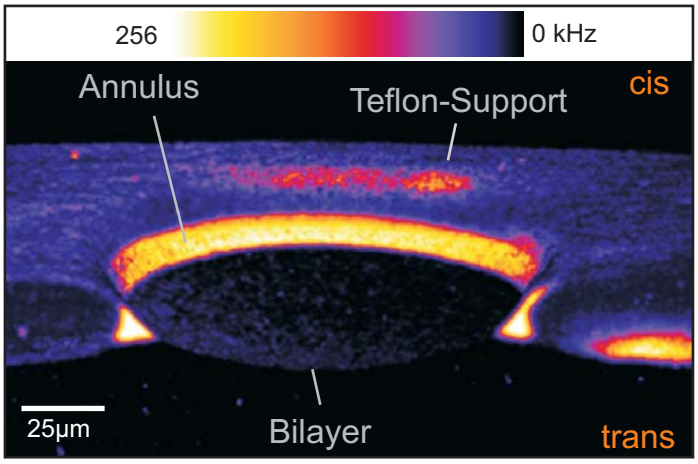
No parts to be removed or assembled for observation

Fast fluid exchange with integrated micro-channels

5 extra-wells for calibration or test purposes

To be used with standard pipettes and equipment





3D Laser Scanning Micrograph of an automatically painted bilayer

Bilayer apertures produced by laser drilling or plasma-arc-welding can be precisely adjusted from a few to several hundreds of microns

Biocompatible and chemically resistant support materials

Free access to both sides of the bilayer membrane

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