

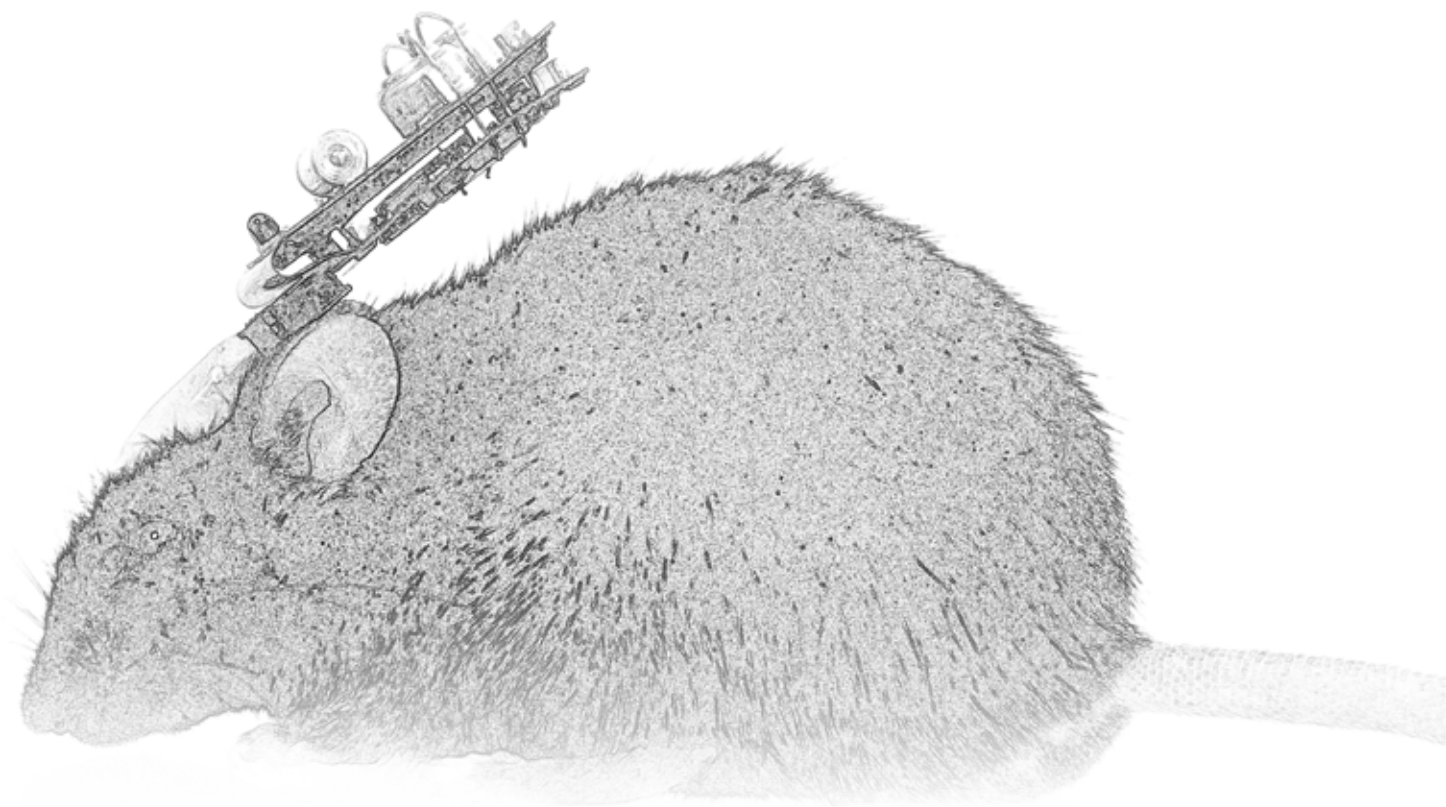


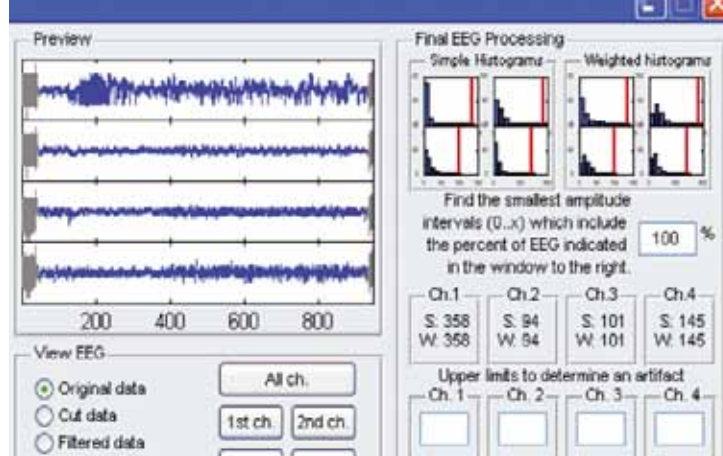
Sophisticated Life Science Research Instrumentation

 **NewBehavior**

NeuroLogger

Wireless EEG / EMG Recording





Field Proven Technology

Cutting-edge and field-proven technology developed at the University of Zurich on flying homing pigeons and adapted and industrialized to the needs of small laboratory animal EEG endophenotyping by NewBehavior AG

BENEFITS

- Long-term recording
- No telemetry: No frequency interference
- Suitable for EEG recording during behavioral testing
- Freely moving animals
- Recording in social settings
- Wireless technology
- Movement sensor
- Infrared communication with external event recorder

Chief Novelties & Advantages

- A complete EEG* recording data logger with 4 channels
- Pre-amplifiers and raw data storage plugs directly into an electrode connector on the head of the animal
- Plug-in – record – plug-out – download data and analyze
- Recording in the home cage or in testing equipment of any complexity, thus suitable for the synchronization of EEG recordings with behavioral paradigms (see picture above right)
- Recording from multiple animals in social settings
- Wireless synchronization with IR trigger signals for precise analysis and event marking
- Timing signals for matching with external events can be added to data set
- Built-in movement sensor registering whether animal rests or moves
- Analysis of sleep stages. A complete 62 h staging analysis is shown on the opposite page, left picture. EEG recordings of transitions from REM and Non-REM sleep to waking can be seen on the opposite page, right graph
- Surface and deep recordings possible

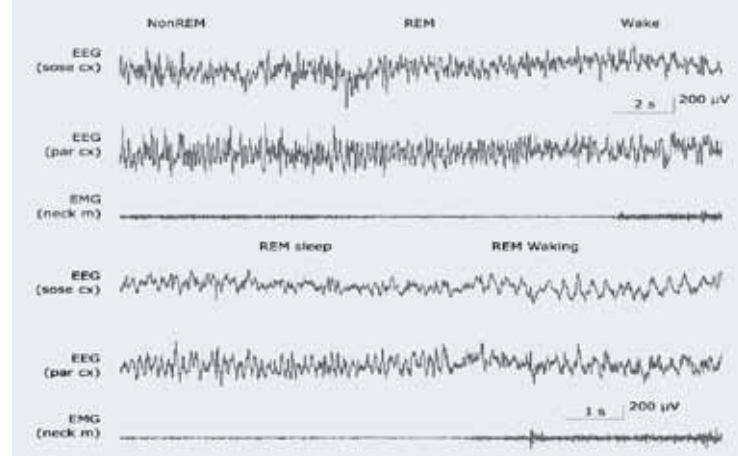
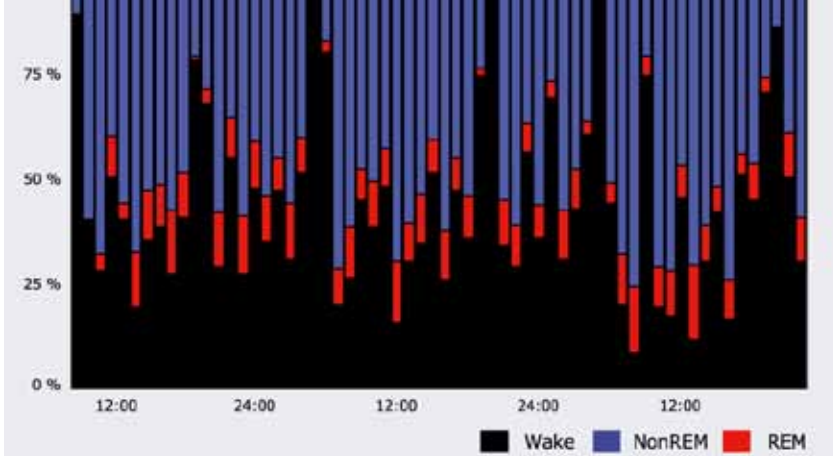
Applications

- Screening for sleep disorders and epilepsy in large samples of mice
- Analysis of evoked and event-related field potentials
- Selective attention and hippocampal activity
- Monitoring drug effects
- And much more, depending on your creativity

Data Structure

- EEG raw data in hexadecimal code
- Translation script provided
- Analysis programs include MatLab (see picture above center), SleepSign, Spike2, etc.

* Electroencephalogram, a technique for studying the electrical current within the brain



System Comparison

NeuroLogger is a truly unique and elegant solution for wireless recording of EEG activity in animals as small as mice

NeuroLogger vs. Cabled Systems

- No more twisting wires – animals can move freely
- No more restricted test arenas
- Much reduced artifacts
- Recording from inside home cage or in behavioral test equipment of any complexity
- Precise tracking of animal movements by video camera is possible
- Measurement in a social environment

NeuroLogger vs. Telemetry

- Animals can move indoors or outdoors
- No limitations by distance to a receiver
- No more implantation of senders and exchange of bulky batteries
- No more bulky and expensive receiver plates under cages
- No more electronic frequency interference problems: keep dozens of loggers in one room
- Recording from multiple animals in social settings
- Wireless synchronization with trigger signals for precise analysis and event making
- Integrated movement sensor informs whether animal rests or moves
- Add timing signals for matching with external events

LITERATURE EXAMPLE

Seizure Logging

Etholm et al., J Neurosci Methods 2010
The study describes a new cable-free, non-telemetric method for synchronized electrophysiological and video recordings of seizure activity in freely moving mice. The 4-channel data logging device allows the mouse to move freely in its cage and even to be moved from cage to cage under ongoing recording. This data-logging device offers more varied electrophysiological studies than other available cable-free systems.

LITERATURE EXAMPLE

EEG, activity, and sleep

Jyoti et al., J Alzheimers Dis. 2010
The study has discovered that sleep and electroencephalogram (EEG) disturbances are endophenotypes of Alzheimer's disease (AD) patients alongside cognitive dysfunction. EEG disturbance parameters have been characterized in transgenic mice carrying transgenes for amyloid- β protein precursor (A β PP_{swe}) and presenilin 1 (PSEN1A246E) at 5 (pre-plaque) and 20 months, relative to PSEN1 and wild-type (WT) mice, using a novel wireless microchip device.

Technical Information

- Length: 17mm (22 mm with connector)
- Width: 15mm
- Height: 5 mm (with batteries 8 mm)
- Weight: <2.5g including batteries
- 4 EEG channels, 2 reference channels, 1 movement channel, 1 event channel
- Sampling rate: up to 500 Hz
- Wireless external triggering
- 92 h of uninterrupted recording (4 channels) depending on frequency
- Software for setup and download
- Hexadecimal code file translation script

Specifications subject to change without notice

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