Optomotor Response
qOMR

PHENOSYS
Technology for Behaviour Analysis

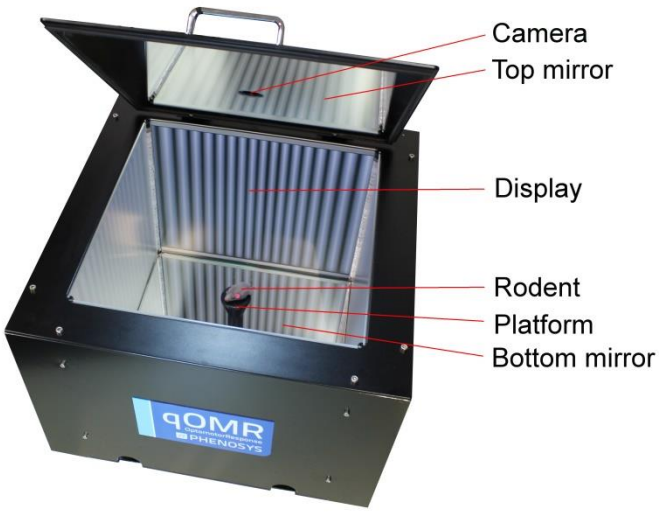
BACKGROUND

Optomotor response (OMR) is a reflex used to assess vision in mice. To evoke OMR a mouse watches a rotating cylinder with a striped pattern. Stimulus correlated head movements are quantified to determine visual thresholds.
The PhenoSys qOMR (quantitative OMR) is a unique system that automatically measures OMR with minimal experimenter effort. It uses a virtual stimulation sphere that constantly aligns with the animal´s head position. Based on real-time head tracking quantitative OMR measurements run fully automatically and objectively [1, 2].

PHENOSYS qOMR SYSTEM SETUP

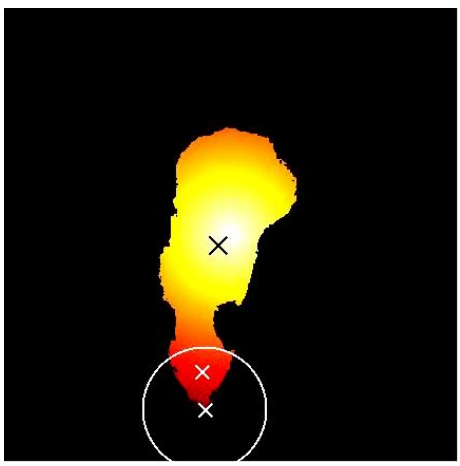
Basic features:

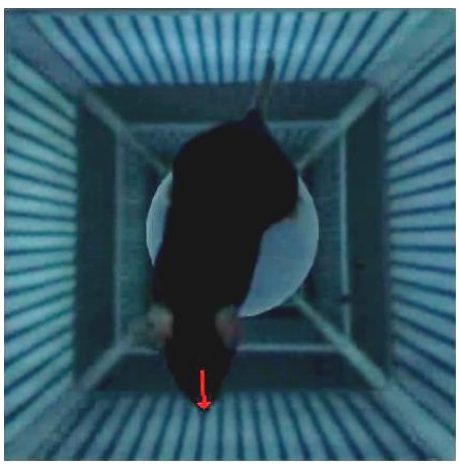
- Calibrated 4 screen environment for presenting the virtual stimulation sphere.
- Elevated central platform for placing the unrestrained animal.
- Top and bottom mirror to create an illusion of infinite depth.
- IR-camera with adjustable IR-illumination for automated head tracking.



SOFTWARE omrStudio

Video-based real-time head tracking





- Key feature: Video-based real-time tracking of head movement is used for both:
  1. continuous automated position-adjustment of the virtual sphere to the animal´s head position.
  2. the evaluation of head movement synchronous to the stimulation for a quantitative measure of the OMR. This analysis is fully automated.

  Batch run option with multiple stimulation protocols.

- Intuitive three step use:
  1. Stimulus design - flexible and easy configuration of experiment (pattern, rotation, repeats, etc.).
  2. Run experiment - place animal on the platform and start the fully automated measurement.
  3. Analyse data - analyse multiple data sets, export to various formats or directly generate publication-ready figures.

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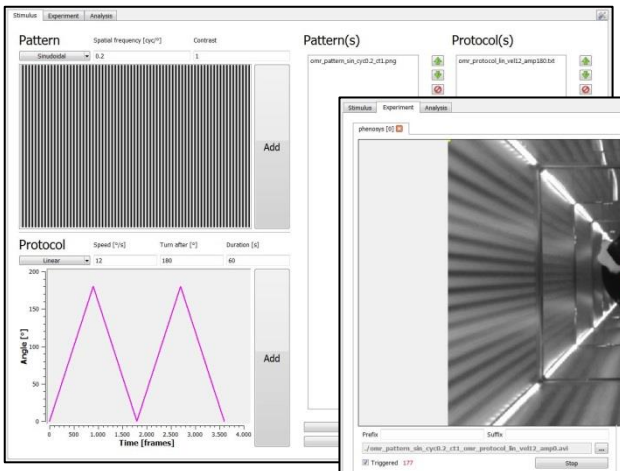
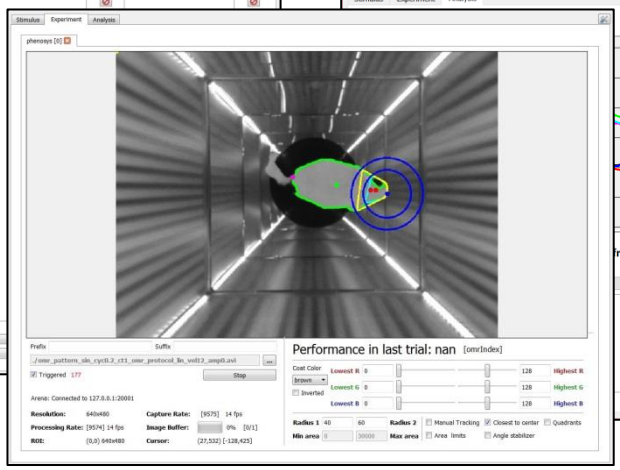
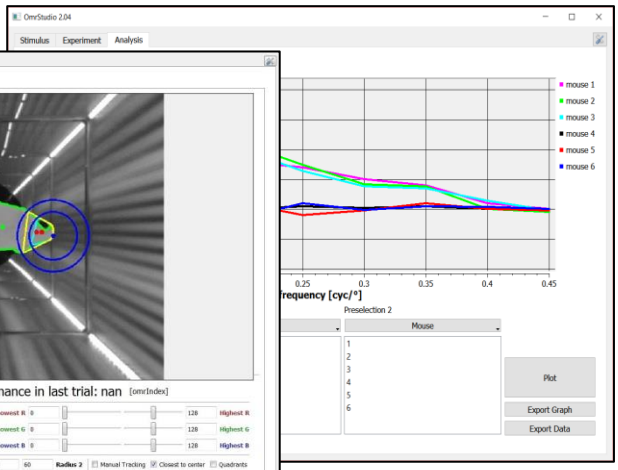
omrStudio – Three step use



Stimulus design



Run experiment



Analyse data

ADVANTAGES

- Simple, robust, and non invasive test to examine vision in rodents.
- Fully automated measurement and analysis: no manual positioning of the stimulus, no specially trained experimenter required, time and cost effective, and unbiased.
- As a reflex, OMR measurements do not require animal training.
- Freely behaving animals, no surgery, no fixation.
- Flexible, user-friendly experimental design and data handling.

APPLICATIONS

- Investigation of various aspects of vision in mice and other rodents:
  - Visual acuity
  - Contrast sensitivity
  - Spectral sensitivity
  - Temporal sensitivity
- Characterisation or preclinical testing in relevant disease models, for example:
  - Glaucoma
  - Retinal degeneration
  - Diabetis
  - Aging
- Examination of axonal regeneration.

PHENOSYS COLLABORATION

The PhenoSys qOMR is a *PhenoSys Collaboration* product. These products are brought to market together with the scientists who developed them.

qOMR is a joint product of Dr. Friedrich Kretschmer and PhenoSys.

REFERENCES

[1] Kretschmer F et al., PLOSone 2013
[2] Kretschmer F et al., J Neurosci Meth 2015

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