

Electroretinogram recordings to screen for modifiers of Neuronal Communication defects in fruit flies

Created on: 30-05-2025 - Last modified on: 02-06-2025

Contact person

Valerie Uytterhoeven

Organisation

Name of the organisation VIB - KU Leuven

Department Center for Brain and Disease Research

Specific Research Group or Service Laboratory of Neuronal Communication

Country Belgium

Geographical Area Flemish Region

Name of the organisation Neurosciences - KU Leuven

Department Department of Neurosciences

Specific Research Group or Service

Laboratory of Neuronal Communication (VIB-KU Leuven)

Country Belgium

Geographical Area Flemish Region

Name of the organisation Katholieke Universiteit Leuven (KUL)

Department Department of Neurosciences

Specific Research Group or Service

Laboratory of Neuronal Communication (VIB-KU Leuven)

Country Belgium

Geographical Area Flemish Region

SCOPE OF THE METHOD

The Method relates to	Human health, Other
The Method is situated in	Basic Research
Type of method	In vivo
Used species	Fruit flies
Targeted organ system or type of research	Neuroscience

DESCRIPTION

Method keywords

Neuronal communication
brain

neuronal health
electrical field potentials
eye
genetic screen
electrophysiology
Drosophila melanogaster
mutations

Scientific area keywords

molecular biology
Life science
Biomedicine
cell biology
biomolecular chemistry
neuroscience
biotechnology

Method description

The most commonly used readout for eye function in fruit flies is the electroretinogram (ERG). While ERGs are applied to study phototransduction, they also constitute a robust assay to assess neuronal communication between photoreceptors and second-order brain neurons. Using glass electrodes placed on the eye, the response of the eye and the brain on a light pulse is recorded. The electrical field potential that is recorded during a light flash consists of an ON and OFF transient when the light is turned on and off respectively, and a depolarization of the photoreceptors. In flies expressing for example human mutant Tau, these on and off transient are reduced indicating defects in neuronal communication between the eye and the brain. This ERG readout in Tau mutant flies is used to screen for modifiers that can rescue neuronal communication defects in Tau mutant flies.

Lab equipment

Electroretinogram set up

Method status

Published in peer reviewed journal

PROS, CONS & FUTURE POTENTIAL

Advantages

Easy to learn, quick method: hundred flies can be easily screened daily.

Future & Other applications

We use the method to study defects in neuronal communication but the assay can also be used in eye research.

REFERENCES, ASSOCIATED DOCUMENTS AND OTHER INFORMATION

References

-Assaying Mutants of Clathrin-Mediated Endocytosis in the Fly Eye Lauwers, Elsa; Verstreken, Patrik; Swan, LE (Editor) CLATHRIN-MEDIATED ENDOCYTOSIS: METHODS AND PROTOCOLS; 2018; Vol. 1847; pp. 109 - 119

- Reduced synaptic vesicle protein degradation at lysosomes curbs TBC1D24/sky-induced neurodegeneration Ana Clara Fernandes, Valerie Uytterhoeven, Sabine Kuenen, Yu-Chun Wang, Jan R Slabbaert, Jef Swerts, Jaroslaw Kasprowicz, Stein Aerts, Patrik Verstreken J Cell Biol 2014 Nov 24;207(4):453-62. doi: 10.1083/jcb.201406026.
- Shawn, the Drosophila Homolog of SLC25A39/40, Is a Mitochondrial Carrier That Promotes Neuronal Survival Jan R Slabbaert , Sabine Kuenen , Jef Swerts , Ine Maes, Valerie Uytterhoeven, Jaroslaw Kasprowicz, Ana Clara Fernandes, Ronny Blust, Patrik Verstreken J Neurosci. 2016 Feb 10;36(6):1914-29. doi: 10.1523/JNEUROSCI.3432-15.2016.
- Loss of skywalker reveals synaptic endosomes as sorting stations for synaptic vesicle proteins Valerie Uytterhoeven, Sabine Kuenen, Jaroslaw Kasprowicz, Katarzyna Miskiewicz, Patrik Verstreken Cell. 2011 Apr 1;145(1):117-32. doi: 10.1016/j.cell.2011.02.039.
- Neuronal identity defines α -synuclein and tau toxicity Roman Praschberger, Sabine Kuenen, Nils Schoovaerts, Natalie Kaempf, Jeevanjot Singh, Jasper Janssens, Jef Swerts, Eliana Nachman, Carles Calatayud, Stein Aerts, Suresh Poovathingal, Patrik Verstreken Neuron. 2023 May 17;111(10):1577-1590.e11. doi: 10.1016/j.neuron.2023.02.033. Epub 2023 Mar 21.

Associated documents

[2018_Book_Clathrin-MediatedEndocytosis.pdf](#)

Coordinated by



Financed by



Vlaanderen
verbeelding werkt

