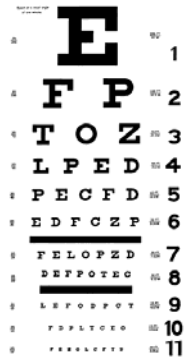


Introduction to

Screening for Vision Mutants in Zebrafish



Stephan Neuhaus

General Behavioral Screen Approaches:

Primary Screen:

robust, efficient

well defined inclusion and exclusion criteria

larval: optokinetic response

optomotor response

adult: escape response

Secondary Screen:

thorough, focused

histology

electroretinography

in depth behavioral analysis

retinotectal projection assays

Further Analysis:

(transmission) electron microscopy

cellular physiology (in tissue, dissociated cells)

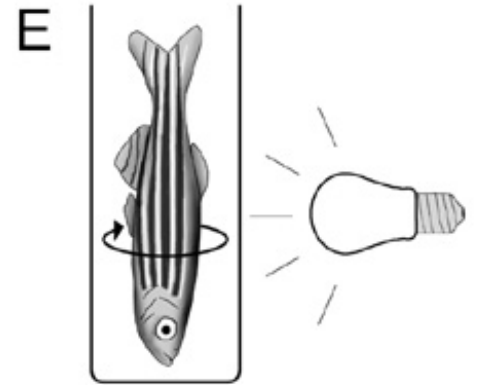
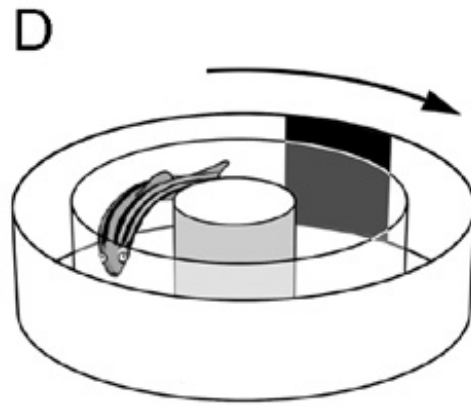
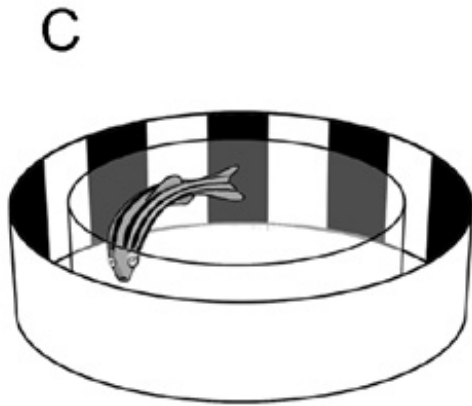
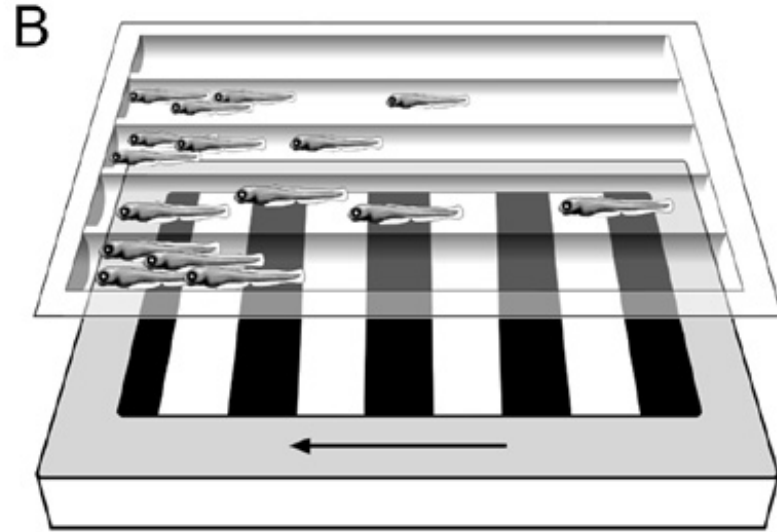
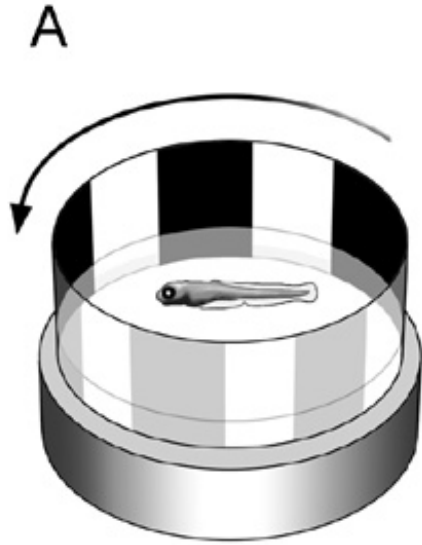
optical recordings

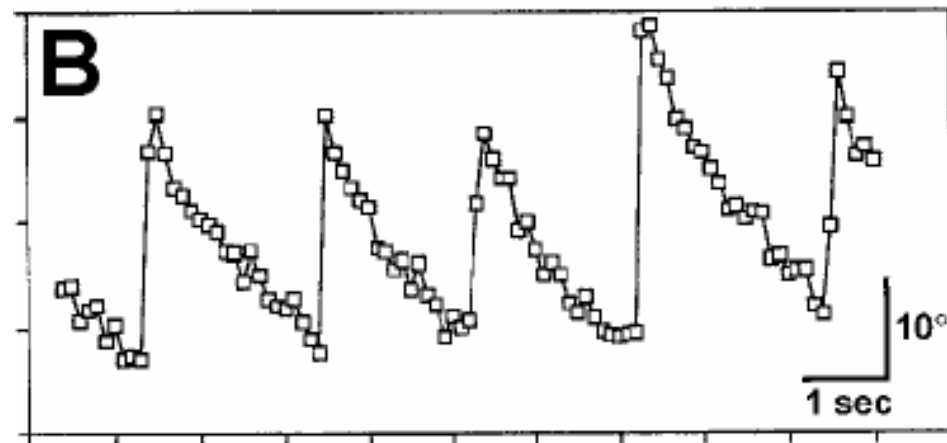
biochemical analysis

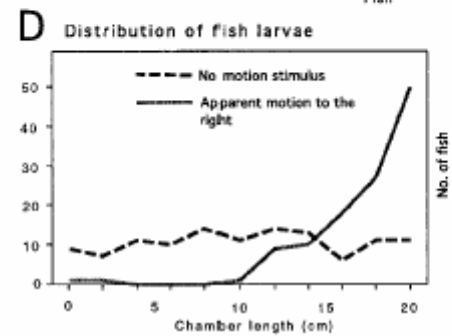
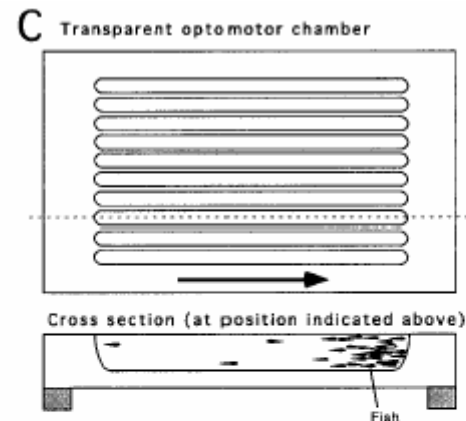
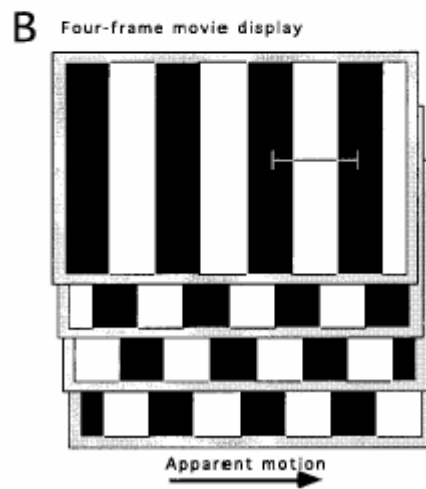
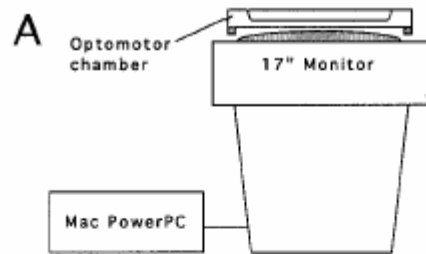
etc.....

Visually mediated behaviors in the zebrafish

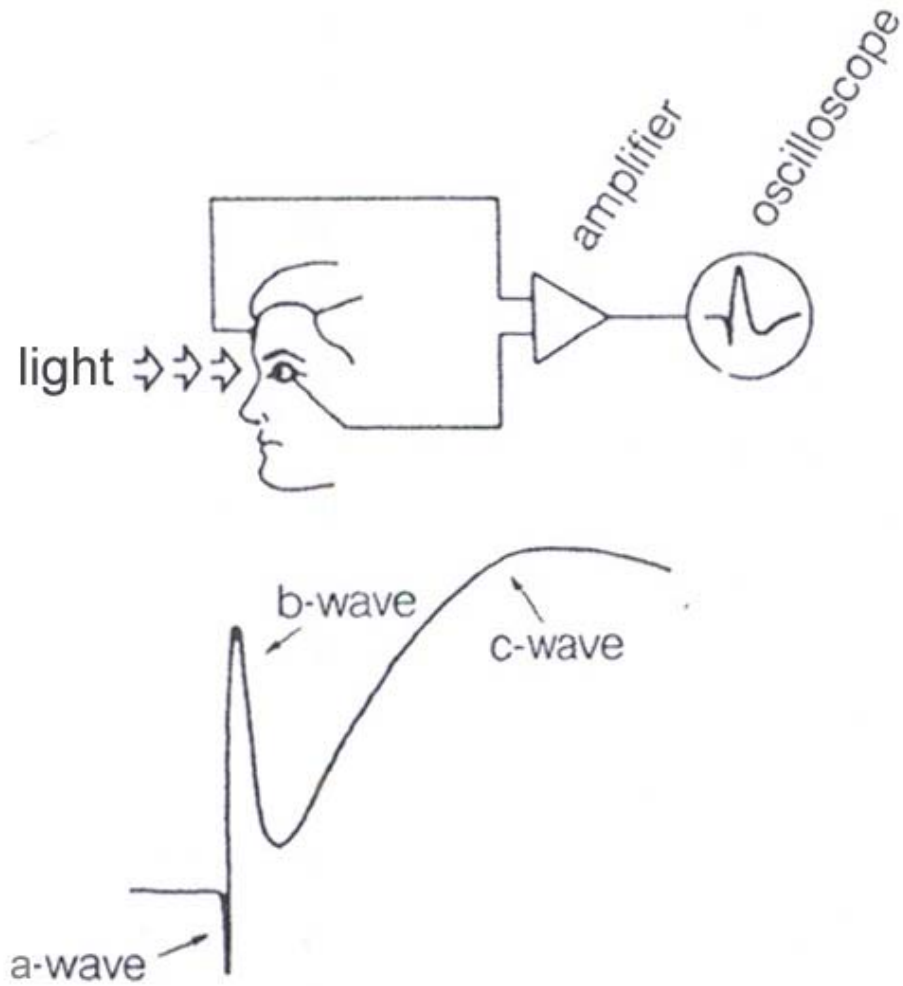
Behavior	Age	Used in screens
Visual startle response	<4 dpf	No
Phototaxis	>3 dpf	No
Optokinetic response	3-7 dpf	Yes
Feeding Assay	>5 dpf	No
Optomotor response	>5 dpf	Yes
Escape response	>2 months	Yes
Dorsal light response	>2 months	No



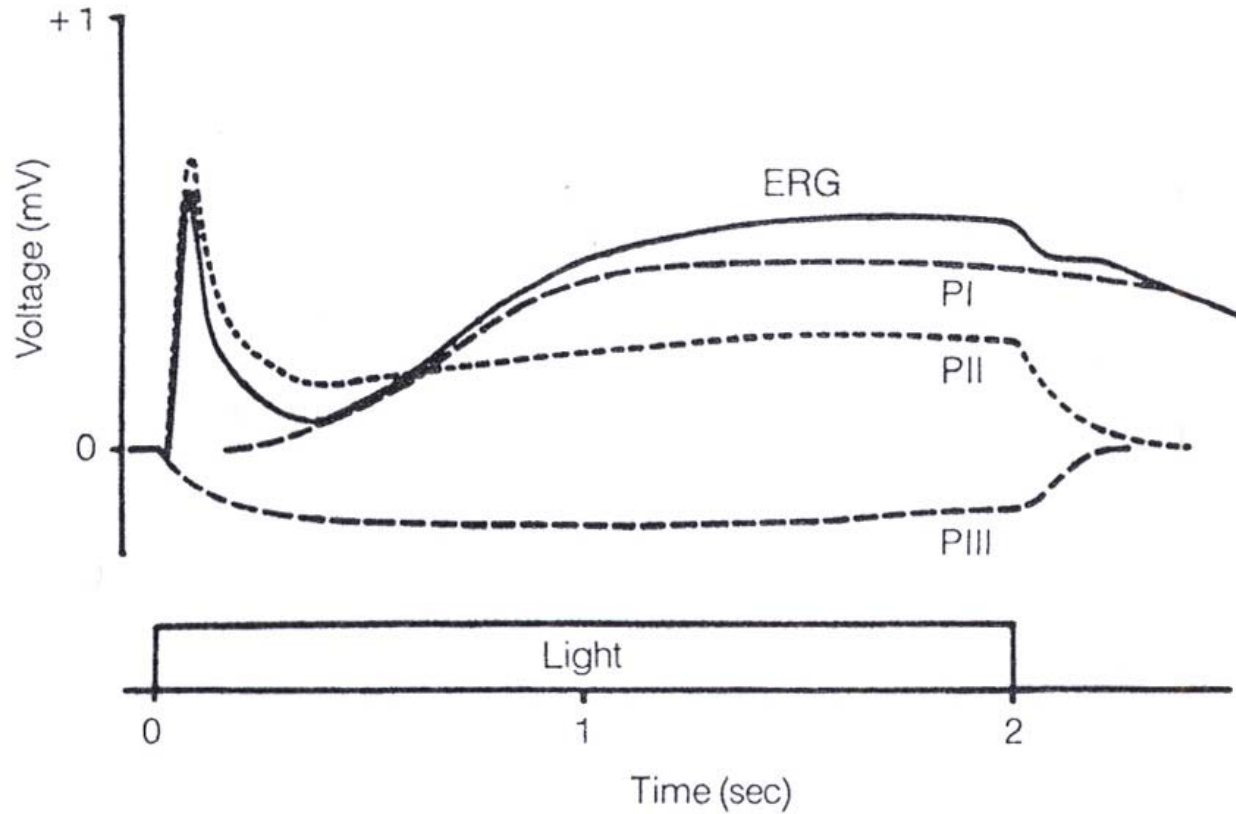
A



The ERG is the field potential of the eye in response to light



The ERG is a composite wave

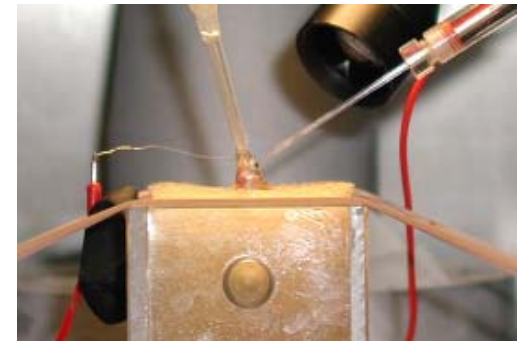
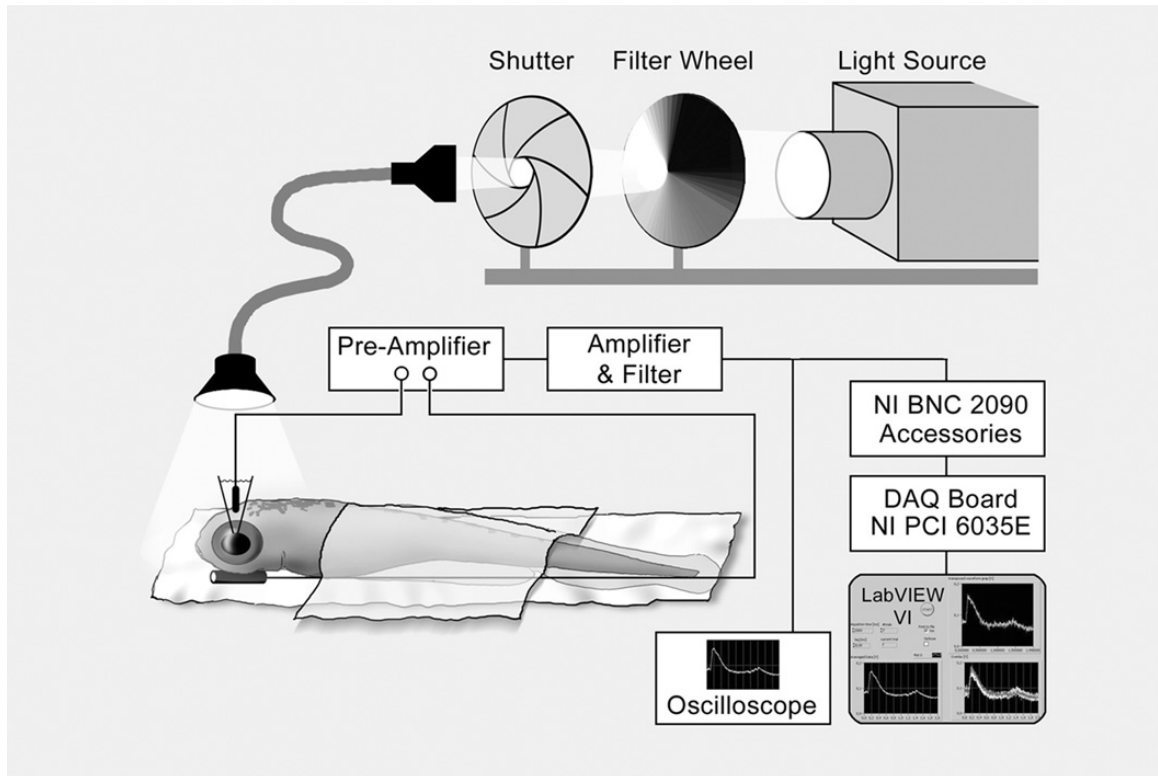
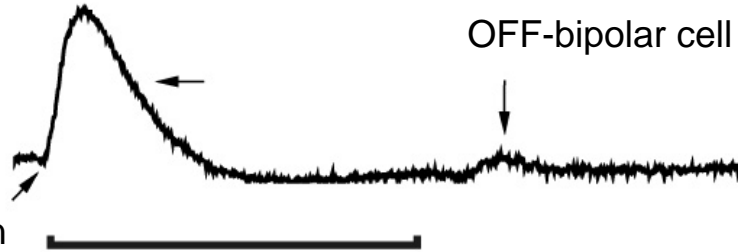


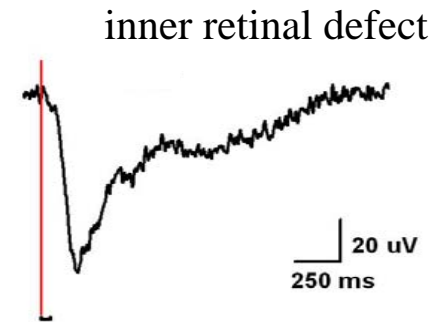
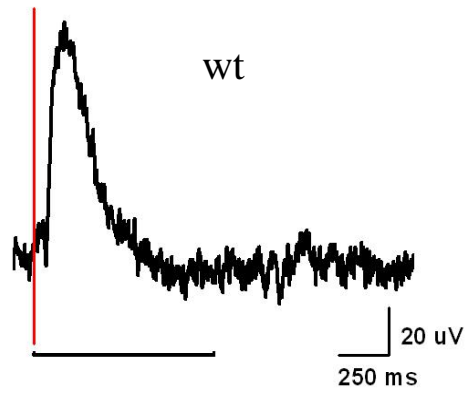
Granit, 1933

ON-bipolar cell activation

OFF-bipolar cell activation

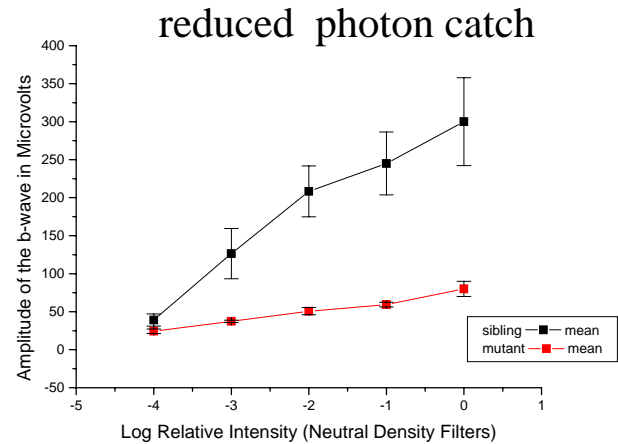
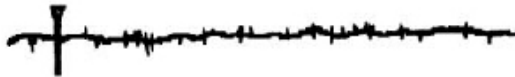
Photoreceptor activation



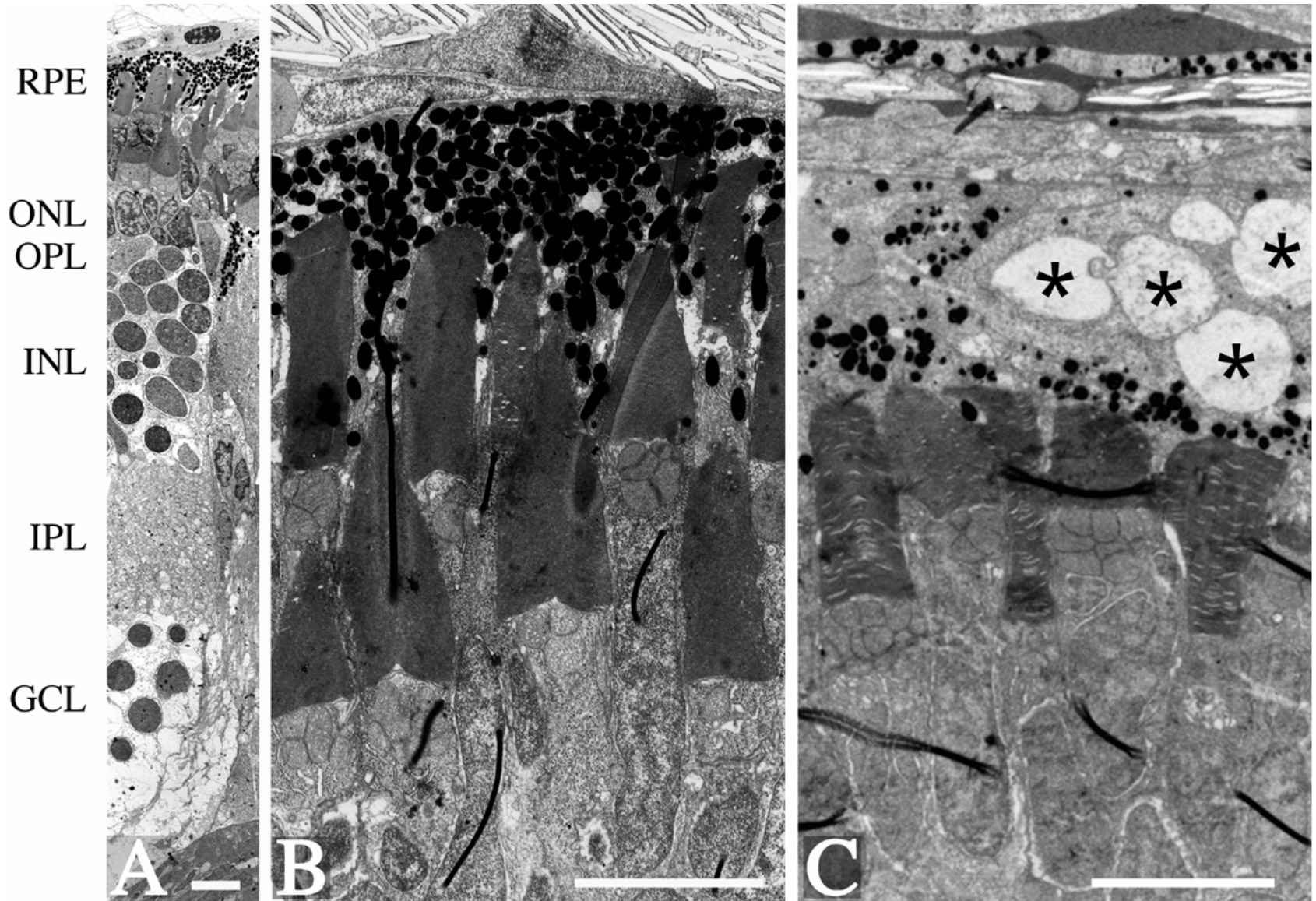


Electroretinography as a tool to locate the visual defect In the visual pathway

photoreceptor defect



elipsa – outer retina degeneration



macho – failure to generate action potentials in retinal ganglion cells

