

# RETEVET™ PORTABLE ERG

## PROTOCOL GUIDELINES



Item no. 173610

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# 1. PROTOCOL SELECTION GUIDELINES

Protocol	When
<b>Flicker Protocols</b>	
Flicker 3 cd-s/m <sup>2</sup>	Before cataract surgery, fast and easy way to assess the functioning of the cone pathways in the retina.
Flicker 10 cd-s/m <sup>2</sup>	Before cataract surgery, second step, if flicker 3 cd-s/m <sup>2</sup> gives small responses. Fast and easy way to assess the functioning of the cone pathways in the retina.
Flicker 3 cd-s/m <sup>2</sup> , 30 cd/m <sup>2</sup> bg	Before cataract surgery, fast and easy way to assess the functioning of the cone pathways in the retina.
<b>ECVO Protocols</b>	
ECVO 5 step	SARDS, PRA – for sedated and anesthetized animals. Average of 4 flashes. Assess functioning of rods and cones pathways in the retina.
ECVO 5 step single flash	Scotopic single flash + photopic; for non-sedated and non-anesthetized animals. Before cataract surgery, SARDS and PRA. Assess functioning of rods and cones pathways in the retina.
ECVO short yes/no protocol	Only DA test for rods- and mixed rod-cones response. For non-sedated and non-anesthetized animals.
Cone function testing	Only LA test, quick cone-based general assessment of retina functions.
ECVO long protocol for PRA diagnosis	Long ECVO protocol for PRA diagnosis, average of 4 flashed (for sedated and anesthetized animals).
ECVO long protocol for PRA diagnosis single flash	Long ECVO protocol for PRA. single flash to repeat (for non-sedated and non-anesthetized animals).
<b>ISCEV Standard Protocols</b>	
Dog Cat Nonhuman Primate 6 step LA first	Similar to ECVO 5 step with OPs. SARDS, PRA, consider DA first is recommended.
Dog Cat Nonhuman Primate 6 step DA first	Similar to ECVO 5 step with OPs. SARDS, PRA.
<b>Others</b>	
PupilLight Reflex	Red low intensity and blue testing of pupillary response. Before cataract surgery, very general information. Consider the pupil should NOT be dilated!

## 2. RECOMMENDATIONS

### Before Cataract Surgery

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1. For inexperienced users  
Easy, quick fix for retina functionality without degenerative disease information  
**Flicker 3 cd-s/m<sup>2</sup>**  
If responses are strongly decreased, add **Flicker 10 cd-s/m<sup>2</sup>**  
Also **Cone function testing** to get information about photoreceptors function (degenerative diseases)
2. More advanced users:  
**ECVO short yes / no protocol**

### SARDS (Sudden Acquired Retinal Degeneration Syndrome)

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1. For inexperienced users (can be run on non-sedated and non-anesthetized animals)  
**ECVO 5 step single flash** or **ECVO short yes / no protocol**
2. More advanced users  
**ECVO 5 step** or **Dog Cat Nonhuman Primate 6 step DA first**

### PRA (Progressive Retinal Atrophy)

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The test requires some experience with ERG use. Repeat first step every four minutes starting at time 0 min in dark room for 20 minutes (6 times).

You start by switching off light and testing. Dog is dark adapting and you test dark adaptation. If the dog is healthy, each response will be slightly bigger. If there is no difference between first and last response, the dog has probably PRA.

As PRA is a bilateral disease, the evaluating one eye is sufficient (Ekesten et al 2013).

### Eye Rolling and Sedation

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You have to handle the problem of the eye rolling down when the animal is anesthetized/deeply sedated, so you have to bring it back. Pupil must be visible for successful ERG measurement.

#### Option 1

One option is speculum with stoppers, but dogs don't tolerate it well.

Recommended by Ron Ofri et al: a stay suture to be placed in the dorsal conjunctiva to rotate the globe.

#### Option 2

Another option: light sedation, so dog is partially awake.

### Electrodes Instalation in the Dark Room

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To be able to install electrodes in the dark room, please use the red, dim light.

1. For inexperienced users (can be run on non-sedated and non-anesthetized animals) – requires electrodes to be re-installed  
**ECVO long protocol for PRA diagnosis single flash**
2. More advanced users – probably possible to keep electrodes connected during entire test  
**ECVO long protocol for PRA diagnosis** (protocol with 4 flashes per step)

### 3. ECVO-BASED ERG PROTOCOLS FOR VETERINARY USE

ECVO 5-step				
Description	Eye	Flash luminance energy (0.33, 0.33 white)	Background luminance (0.33, 0.33 white)	# flashes
Dark adaptation timer	Both	Off	Off	
Dark adapted 0.01	Right	0.01 cd·s/m <sup>2</sup> @ 0.2 Hz	Off	4
Dark adapted 3.0	Right	3 cd·s/m <sup>2</sup> @ 1/15 Hz	Off	4
Dark adapted 10.0	Right	10 cd·s/m <sup>2</sup> @ 0.05 Hz	Off	1
Dark adapted 0.01	Left	0.01 cd·s/m <sup>2</sup> @ 0.2 Hz	Off	4
Dark adapted 3.0	Left	3 cd·s/m <sup>2</sup> @ 1/15 Hz	Off	4
Dark adapted 10.0	Left	10 cd·s/m <sup>2</sup> @ 0.05 Hz	Off	1
Light adaptation timer	Right	Off	30 cd/m <sup>2</sup>	
Light adapted 3.0	Right	3 cd·s/m <sup>2</sup> @ 2 Hz	30 cd/m <sup>2</sup>	20
Light adapted 3.0 flicker	Right	3 cd·s/m <sup>2</sup> @ 28.3 Hz	30 cd/m <sup>2</sup>	141 – 424
Light adaptation timer	Left	Off	30 cd/m <sup>2</sup>	
Light adapted 3.0	Left	3 cd·s/m <sup>2</sup> @ 2 Hz	30 cd/m <sup>2</sup>	20
Light adapted 3.0 flicker	Left	3 cd·s/m <sup>2</sup> @ 28.3 Hz	30 cd/m <sup>2</sup>	141 – 424

ECVO 5-step single flash				
Description	Eye	Flash luminance energy (0.33, 0.33 white)	Background luminance (0.33, 0.33 white)	# flashes
Dark adaptation timer	Both	Off	Off	
Dark adapted 0.01	Right	0.01 cd·s/m <sup>2</sup> @ 0.2 Hz	Off	1
Dark adapted 3.0	Right	3 cd·s/m <sup>2</sup> @ 1/15 Hz	Off	1
Dark adapted 10.0	Right	10 cd·s/m <sup>2</sup> @ 0.05 Hz	Off	1
Dark adapted 0.01	Left	0.01 cd·s/m <sup>2</sup> @ 0.2 Hz	Off	1
Dark adapted 3.0	Left	3 cd·s/m <sup>2</sup> @ 1/15 Hz	Off	1
Dark adapted 10.0	Left	10 cd·s/m <sup>2</sup> @ 0.05 Hz	Off	1
Light adaptation timer	Right	Off	30 cd/m <sup>2</sup>	
Light adapted 3.0	Right	3 cd·s/m <sup>2</sup> @ 2 Hz	30 cd/m <sup>2</sup>	20
Light adapted 3.0 flicker	Right	3 cd·s/m <sup>2</sup> @ 28.3 Hz	30 cd/m <sup>2</sup>	141 – 424
Light adaptation timer	Left	Off	30 cd/m <sup>2</sup>	
Light adapted 3.0	Left	3 cd·s/m <sup>2</sup> @ 2 Hz	30 cd/m <sup>2</sup>	20
Light adapted 3.0 flicker	Left	3 cd·s/m <sup>2</sup> @ 28.3 Hz	30 cd/m <sup>2</sup>	141 – 424

## PROTOCOL GUIDELINES RETEVET™ PORTABLE ERG

ECVO short, yes / no protocol				
Description	Eye	Flash luminance energy (0.33, 0.33 white)	Background luminance (0.33, 0.33 white)	# flashes
Dark adaptation timer	Both	Off	Off	
Dark adapted 0.01	Right	0.01 cd·s/m <sup>2</sup> @ 0.2 Hz	Off	1
Dark adapted 3.0	Right	3 cd·s/m <sup>2</sup> @ 1/15 Hz	Off	1
Dark adapted 10.0	Right	10 cd·s/m <sup>2</sup> @ 0.05 Hz	Off	1
Dark adapted 0.01	Left	0.01 cd·s/m <sup>2</sup> @ 0.2 Hz	Off	1
Dark adapted 3.0	Left	3 cd·s/m <sup>2</sup> @ 1/15 Hz	Off	1
Dark adapted 10.0	Left	10 cd·s/m <sup>2</sup> @ 0.05 Hz	Off	1

Cone function testing				
Description	Eye	Flash luminance energy (0.33, 0.33 white)	Background luminance (0.33, 0.33 white)	# flashes
Light adaptation timer	Right	Off	30 cd/m <sup>2</sup>	
Light adapted 3.0	Right	3 cd·s/m <sup>2</sup> @ 2 Hz	30 cd/m <sup>2</sup>	20
Light adapted 3.0 flicker	Right	3 cd·s/m <sup>2</sup> @ 28.3 Hz	30 cd/m <sup>2</sup>	141 – 424
Light adaptation timer	Left	Off	30 cd/m <sup>2</sup>	
Light adapted 3.0	Left	3 cd·s/m <sup>2</sup> @ 2 Hz	30 cd/m <sup>2</sup>	20
Light adapted 3.0 flicker	Left	3 cd·s/m <sup>2</sup> @ 28.3 Hz	30 cd/m <sup>2</sup>	141 – 424

ECVO long protocol for PRA diagnosis single flash				
Description	Eye	Flash luminance energy (0.33, 0.33 white)	Background luminance (0.33, 0.33 white)	# flashes
Dark adapted 0.01	Operator's choice	0.01 cd·s/m <sup>2</sup> @ 0.2 Hz	Off	1
Wait remainder of 4 minutes, observe count-down timer, press "Start Test" to continue				
Dark adapted 0.01		0.01 cd·s/m <sup>2</sup> @ 0.2 Hz	Off	1
Wait remainder of 4 minutes, observe count-down timer, press "Start Test" to continue				
Dark adapted 0.01		0.01 cd·s/m <sup>2</sup> @ 0.2 Hz	Off	1
Wait remainder of 4 minutes, observe count-down timer, press "Start Test" to continue				
Dark adapted 0.01		0.01 cd·s/m <sup>2</sup> @ 0.2 Hz	Off	1
Wait remainder of 4 minutes, observe count-down timer, press "Start Test" to continue				
Dark adapted 0.01		0.01 cd·s/m <sup>2</sup> @ 0.2 Hz	Off	1
Dark adapted 3.0		3 cd·s/m <sup>2</sup> @ 1/15 Hz	Off	1
Dark adapted 10.0		10 cd·s/m <sup>2</sup> @ 0.05 Hz	Off	1
Light adaptation timer		Off	30 cd/m <sup>2</sup>	
Light adapted 3.0		3 cd·s/m <sup>2</sup> @ 2 Hz	30 cd/m <sup>2</sup>	20
Light adapted 3.0 flicker		3 cd·s/m <sup>2</sup> @ 28.3 Hz	30 cd/m <sup>2</sup>	141 – 424

## 4. ISCEV-BASED ERG PROTOCOLS FOR ANIMAL USE

Dog, Cat, Nonhuman Primate, 6 step, light adapted first				
Description	Eye	Flash luminance energy (0.33, 0.33 white)	Background luminance (0.33, 0.33 white)	# flashes
Light adapted 3.0	Right	3 cd·s/m <sup>2</sup> @ 2 Hz	30 cd/m <sup>2</sup>	20
Light adapted 3.0 flicker	Right	3 cd·s/m <sup>2</sup> @ 28.3 Hz	30 cd/m <sup>2</sup>	141 – 424
Light adapted 3.0	Left	3 cd·s/m <sup>2</sup> @ 2 Hz	30 cd/m <sup>2</sup>	20
Light adapted 3.0 flicker	Left	3 cd·s/m <sup>2</sup> @ 28.3 Hz	30 cd/m <sup>2</sup>	141 – 424
Dark adaptation timer	Both	Off	Off	
Dark adapted 0.01	Right	0.01 cd·s/m <sup>2</sup> @ 0.5 Hz	Off	3
Dark adapted 3.0	Right	3 cd·s/m <sup>2</sup> @ 0.1 Hz	Off	3
Dark adapted 10.0	Right	10 cd·s/m <sup>2</sup> @ 0.05 Hz	Off	3
Dark adapted 0.01	Left	0.01 cd·s/m <sup>2</sup> @ 0.5 Hz	Off	3
Dark adapted 3.0	Left	3 cd·s/m <sup>2</sup> @ 0.1 Hz	Off	3
Dark adapted 10.0	Left	10 cd·s/m <sup>2</sup> @ 0.05 Hz	Off	3

Dog, Cat, Nonhuman Primate, 6 step, dark adapted first				
Description	Eye	Flash luminance energy (0.33, 0.33 white)	Background luminance (0.33, 0.33 white)	# flashes
Dark adaptation timer	Both	Off	Off	
Dark adapted 0.01	Right	0.01 cd·s/m <sup>2</sup> @ 0.5 Hz	Off	3
Dark adapted 3.0	Right	3 cd·s/m <sup>2</sup> @ 0.1 Hz	Off	3
Dark adapted 10.0	Right	10 cd·s/m <sup>2</sup> @ 0.05 Hz	Off	3
Dark adapted 0.01	Left	0.01 cd·s/m <sup>2</sup> @ 0.5 Hz	Off	3
Dark adapted 3.0	Left	3 cd·s/m <sup>2</sup> @ 0.1 Hz	Off	3
Dark adapted 10.0	Left	10 cd·s/m <sup>2</sup> @ 0.05 Hz	Off	3
Light adaptation timer	Right	Off	30 cd/m <sup>2</sup>	
Light adapted 3.0	Right	3 cd·s/m <sup>2</sup> @ 2 Hz	30 cd/m <sup>2</sup>	20
Light adapted 3.0 flicker	Right	3 cd·s/m <sup>2</sup> @ 28.3 Hz	30 cd/m <sup>2</sup>	141 – 424
Light adaptation timer	Left	Off	30 cd/m <sup>2</sup>	
Light adapted 3.0	Left	3 cd·s/m <sup>2</sup> @ 2 Hz	30 cd/m <sup>2</sup>	20
Light adapted 3.0 flicker	Left	3 cd·s/m <sup>2</sup> @ 28.3 Hz	30 cd/m <sup>2</sup>	141 – 424

**Disclaimer:** This document includes the considerations for using the RETevet at a veterinary clinic. These considerations are not binding recommendations and each physician must make a decision based on condition of the patient and possible diagnosis when choosing the proper protocol. For detailed description of the protocols and their application, please read the manual.

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