

## Electroretinogram flicker photometry

Brent Marsden

ELE482 Biomedical Engineering

Seminar III

University of Rhode Island

02/16/04

Currently, there are many optical neurodegenerative diseases plaguing people. Two of the most common optical neurodegenerative diseases are Glaucoma and Neuronal Ceroid Lipofuscinosis. These diseases are sight-impairing, leading to blindness if not treated early. The main problem is that each of these diseases creates retinal damage, and the extent of the progression of damage is extremely hard to diagnose and treat properly.

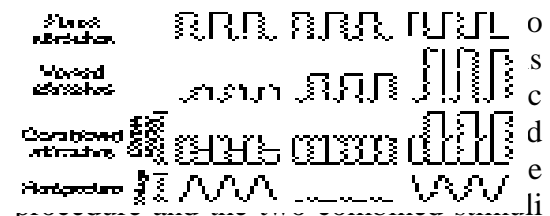
Glaucoma is a problem where damage is done to both the retina and optic nerve due to very high pressure in the eye. This pressure is usually caused by a clogging of the drainage channels in the eye. If not treated quickly, the intraocular fluid pressure will continue to increase and eventually lead to blindness. This disease can occur due to a genetic predisposition or physical harm done to the eye.

Neuronal Ceroid Lipofuscinosis is a genetic disorder of the nervous system that leads to blindness, motor function breakdown and eventually death. Better known as Batten's Disease, this disease initially affects the vision of the patient, due to lipopigments building up on the optic nerve and inner eye cavity. This build up restricts information flow while deteriorating the nerve and cavity.

Both of these diseases directly affect the vision of the patient by damaging the retina and optic nerve. Used most often in simple eye exams, an

ophthalmoscope is a device which allows doctors to view the retina and look for any obvious damage. If any obvious damage is found, an Electroretinogram may be used to further diagnose the problem.

An Electroretinogram (ERG) is a recording of the eye's electrical response to a flickering of light created by a Ganzfeld stimulator. This response is recorded through a small electrode placed on the surface of the eye. The ERG is produced by the action of the photoreceptors in parallel with the flickering ERG. The ERG is normally measured in a Ganzfeld stimulator, and reflects the state of the entire retina.



will warrant different responses based on rod and cone function inside the retina.

Using ERG photometry recordings, doctors may better treat patients with both Glaucoma and Batten's Disease by knowing more fully the extent of damage and prescribing the correct amount of medicine accordingly.

*Stiefelmeyer, Neubauer. Et al. The multifocal pattern electroretinogram in glaucoma. Vision Research, Vol., 44, NO. 1, January 2004*

*Weleber. Et al. The dystrophic retina in multisystem disorders: the electroretinogram in neuronal ceroid lipofuscinoses. Eye Magazine, Vol., 12, NO. 3B, October 2003*