

WEBINAR & TELELEARNING SERIES



KEEPING AN EYE ON MULTIPLE SCLEROSIS

May 9, 2017

Presented by:



Genentech | Novartis | Teva Pharmaceuticals | Acorda Therapeutics | Mallinckrodt Pharmaceuticals

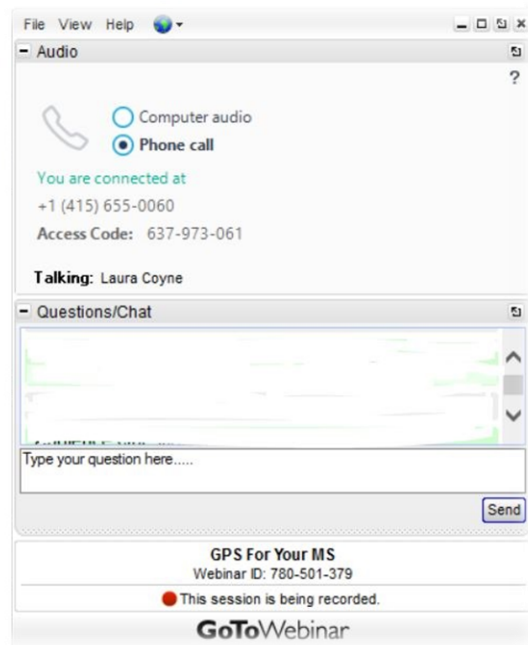


**National
Multiple Sclerosis
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KEEPING AN EYE ON MULTIPLE SCLEROSIS

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M. Tariq Bhatti, MD



**Departments of Ophthalmology, Neurology
and Neurosurgery
Duke Eye Center and Duke University Medical Center**

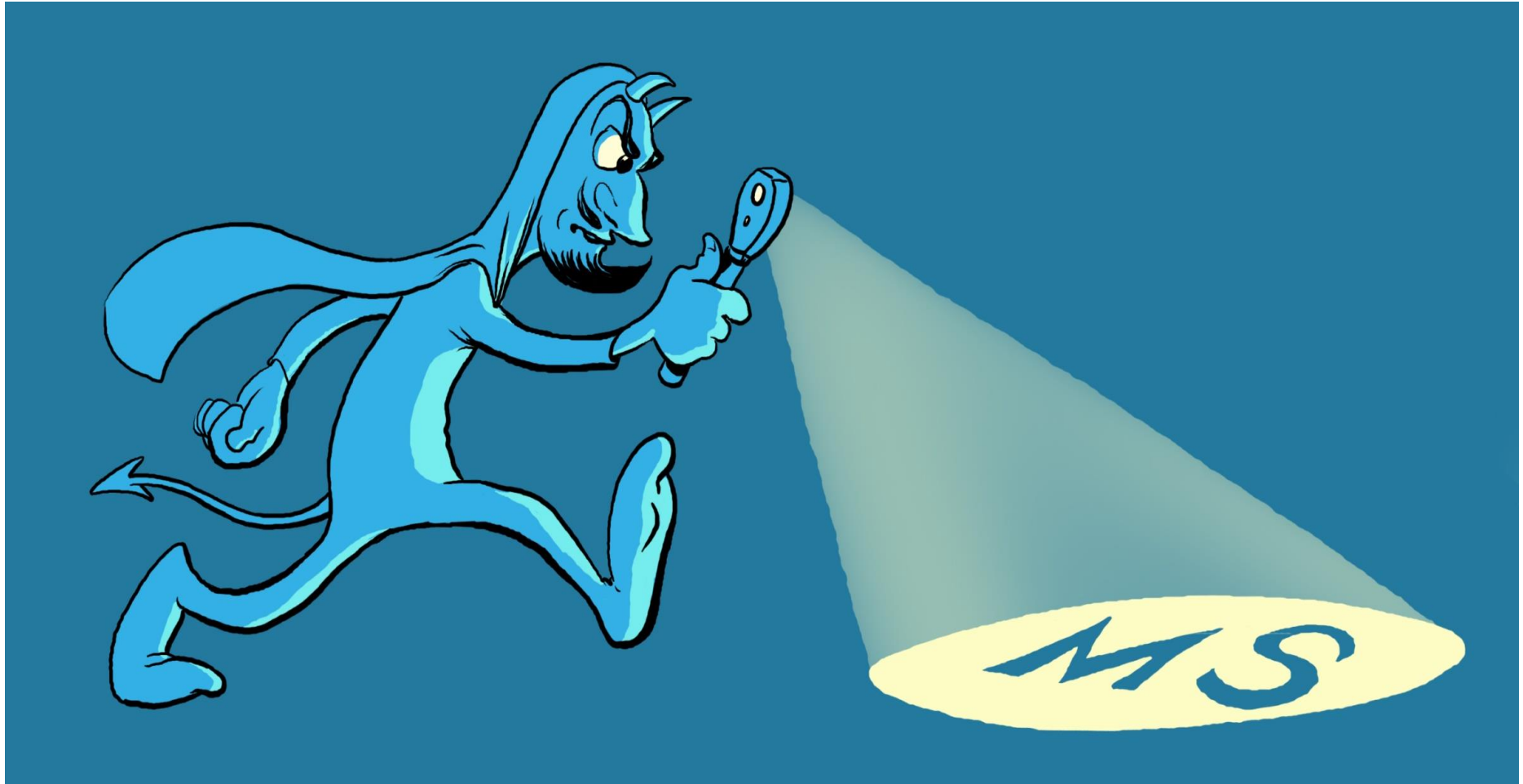
Diane B. Whitaker, OD



**Division Chief, Vision Rehabilitation & Optimization
Duke Eye Center**

**Assistant Professor of Ophthalmology
Duke School of Medicine**

Keeping an Eye on Multiple Sclerosis

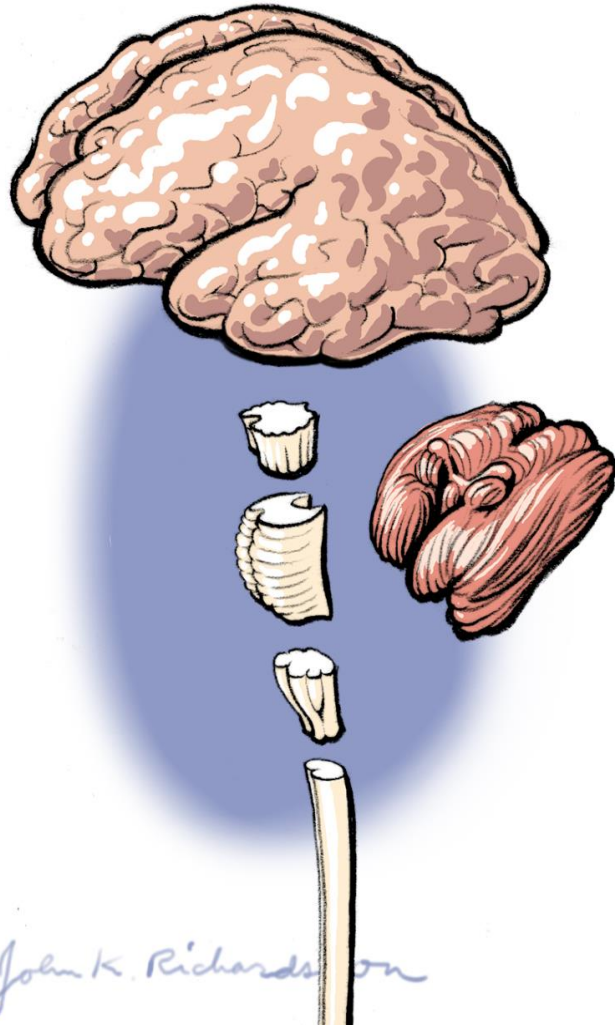


Vision Problems and MS

- **Vision problems are common in MS, but they rarely result in total blindness**
- **They are often the first symptom of MS**
- **Potential vision problems include:**
 - **Optic Neuritis**
 - **Temporary blurred vision (Uhthoff's phenomenon)**
 - **Uncontrolled Eye Movement (nystagmus)**
 - **Double Vision**

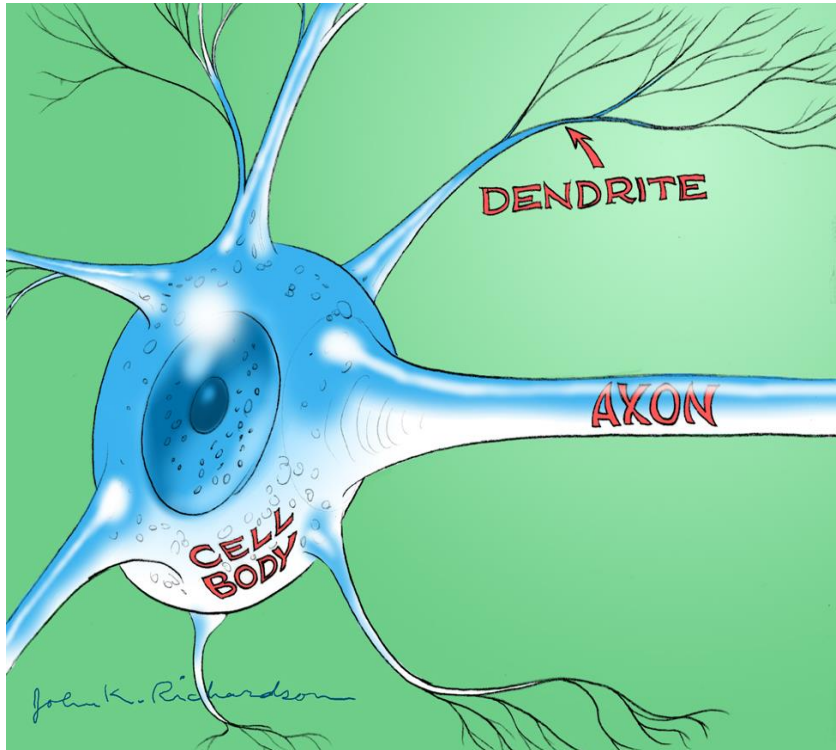


The Central Nervous System



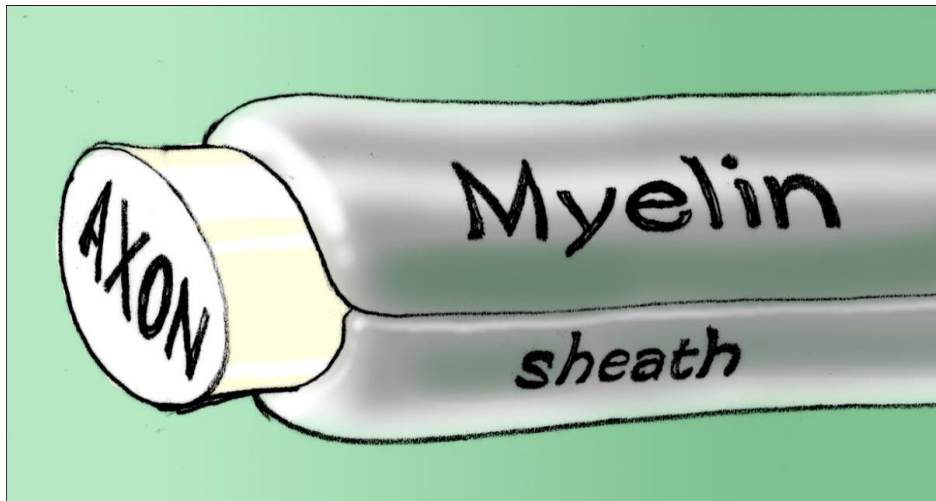
The brain is part of the central nervous system, which is the collective name for the brain and spinal cord

The Central Nervous System



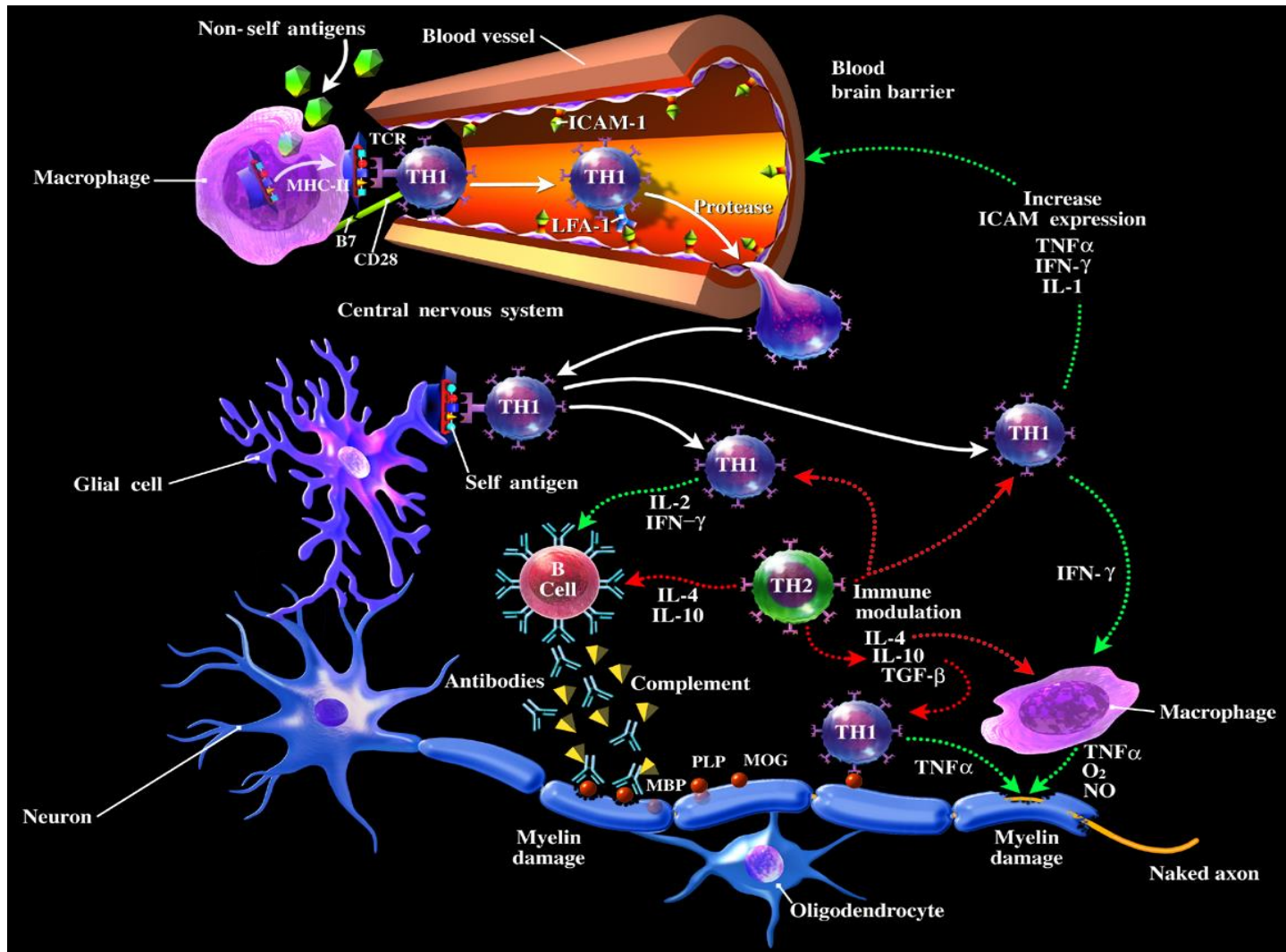
The central nervous system transmits information through cells called neurons and dendrites

The Central Nervous System



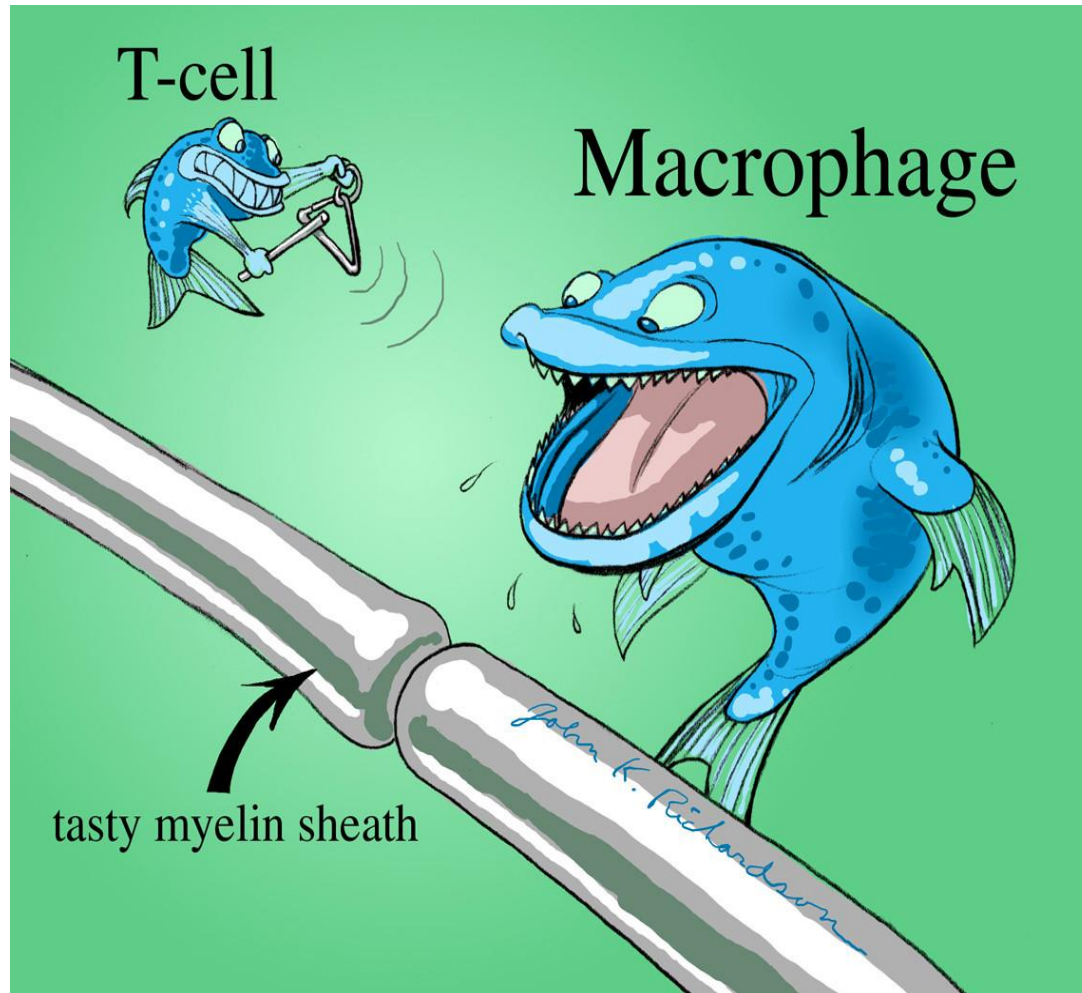
- Axon transmits the information on to other cells
- Axons are surrounded by an insulating layer of fatty tissue called myelin, which protects the axon and helps with the transmission of information

What Happens In Multiple Sclerosis?



Adapted from Donald Goodkin, MD and Craig Smith, MD

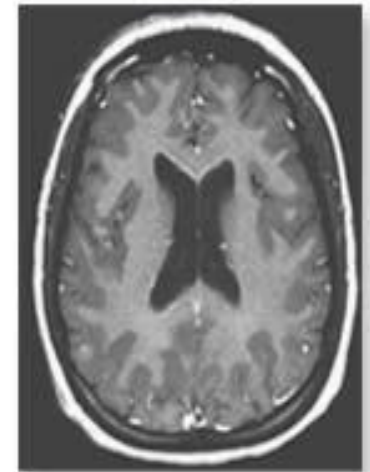
What Happens In Multiple Sclerosis?



Magnetic Resonance Imaging (MRI)

- **Most valuable diagnostic test**
- **Best laboratory marker of disease activity**
- **Prognostic value** (particular at first attack, early years)
- **Evaluates response to therapy**
 - therapeutic trials
 - clinical practice

Magnetic resonance imaging (MRI scan) of the brain



ADAM.

Keeping An Eye On Ms

- 80% with visual impairment
- 50% may present with visual impairment



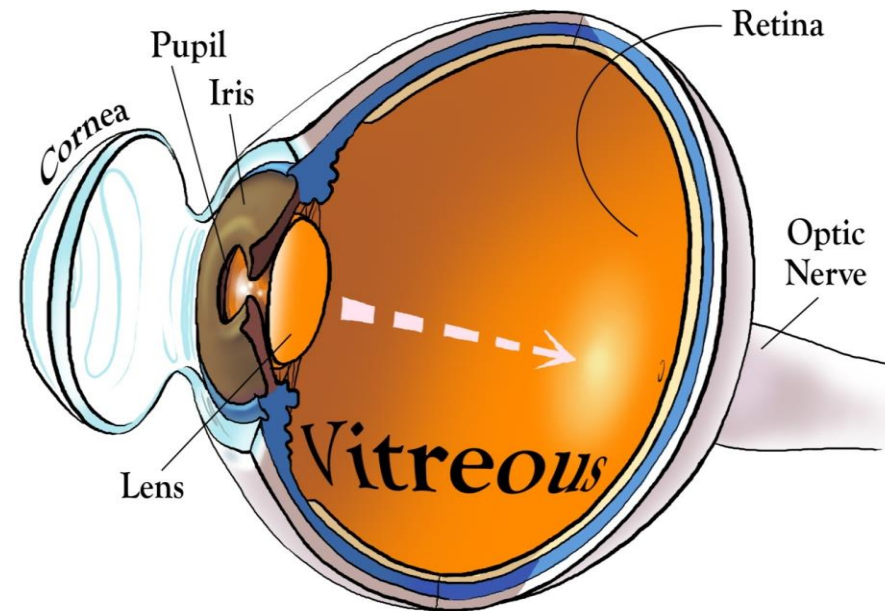
Eye Symptoms

- **Blurred vision**
- **Decrease vision**
- **Black spots in vision**
- **Poor color vision**
- **Poor depth perception**
- **Eye pain**
- **Double vision**
- **Wandering eye “lazy eye”**
- **Jumping vision**

The Eye

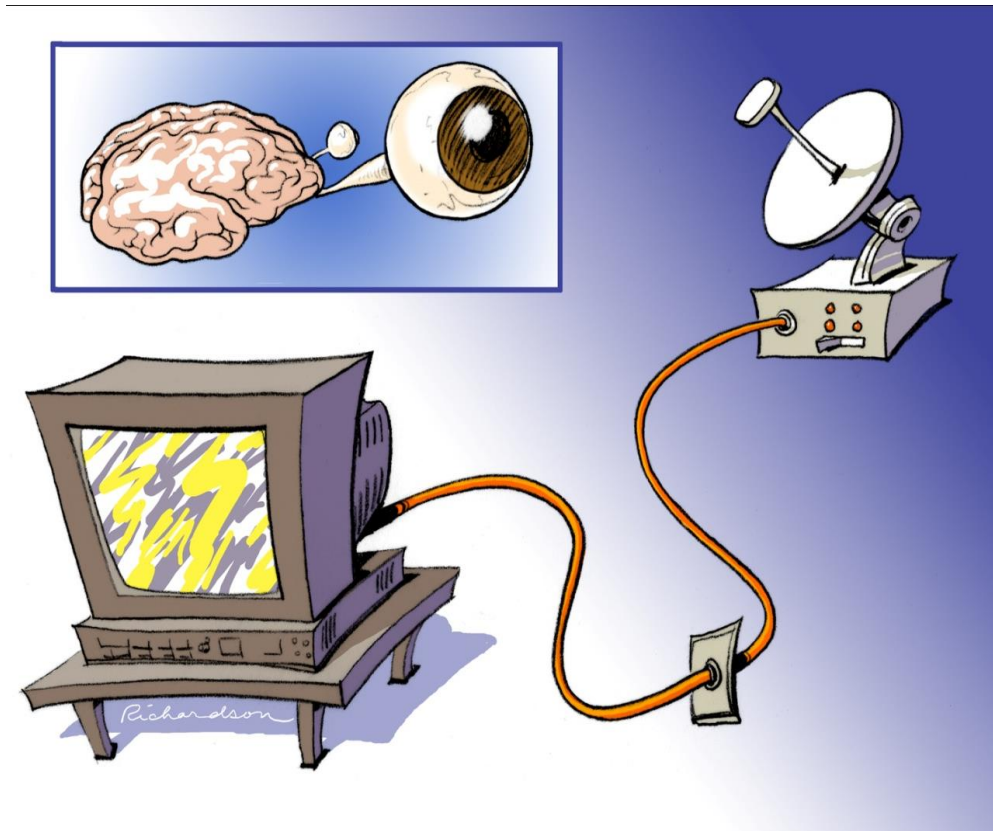
The eye has a number of components

- **Cornea**: Transmits and focuses light
- **Iris**: Gives the eye its color and controls the amount of light entering the eye
- **Pupil**: Opening in the center of the iris that regulates the amount of light entering the eye
- **Crystalline Lens**: Focuses light rays onto the retina
- **Retina**: Senses light and creates impulses
- **Optic nerve**: Connects eye to the brain and carries impulses
- **Vitreous humor**: Fills the middle of the eye with a jelly like substance

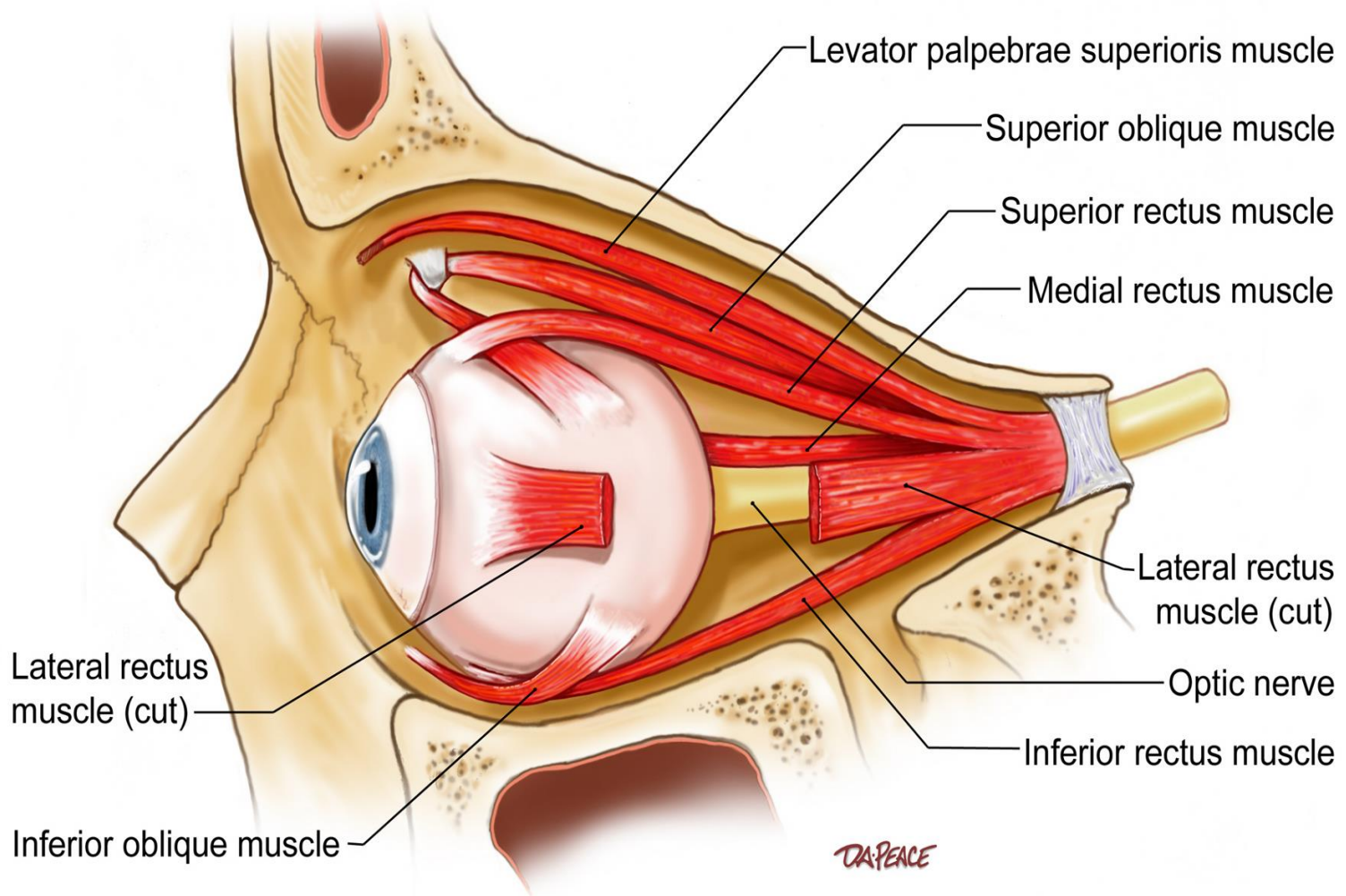


The Eye and the Brain

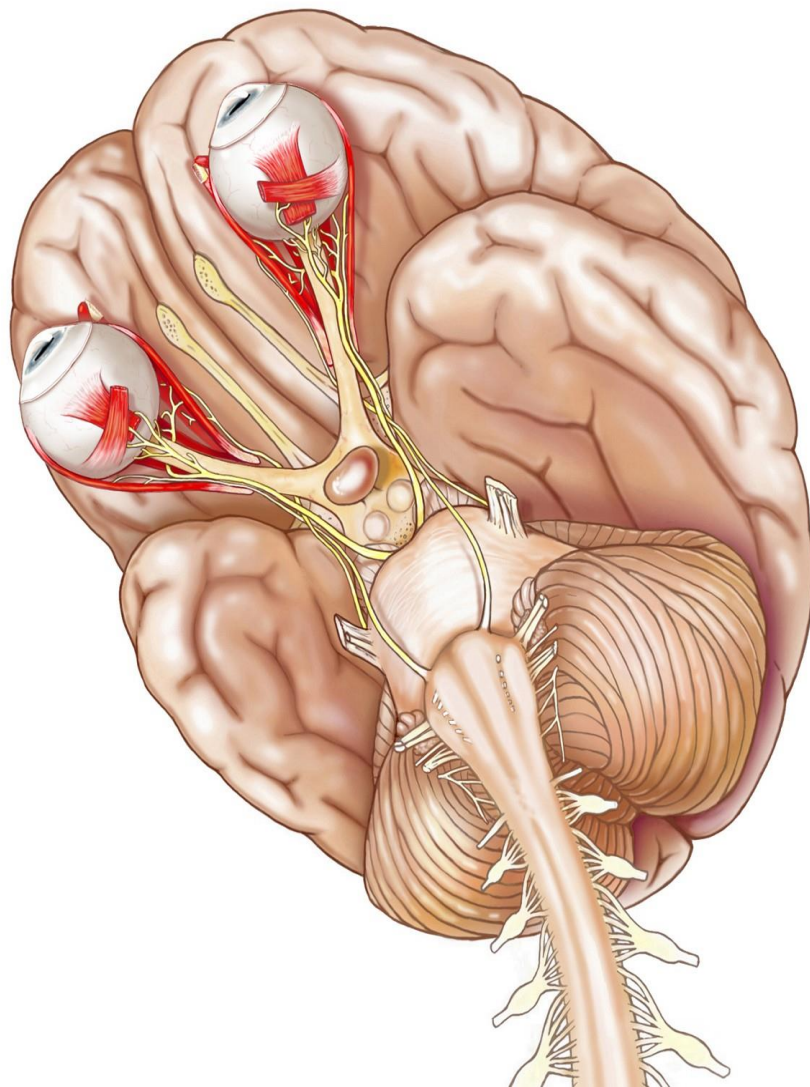
- The eyes capture information from your environment in the form of light waves
- This light is focused onto the retina in the back of the eye
- The retina then converts the light waves into electrical impulses and the optic nerve transmits these impulses to the brain for processing



Eye Muscles

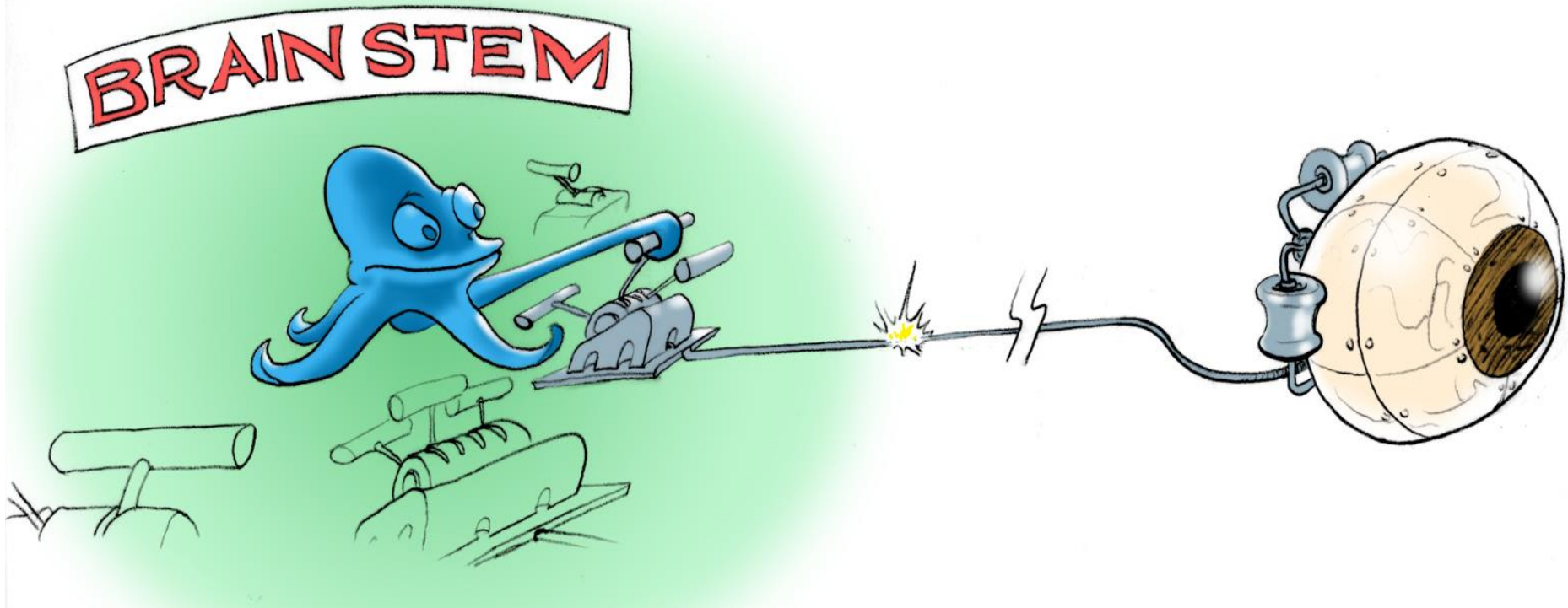


Nerves To The Eye Muscles



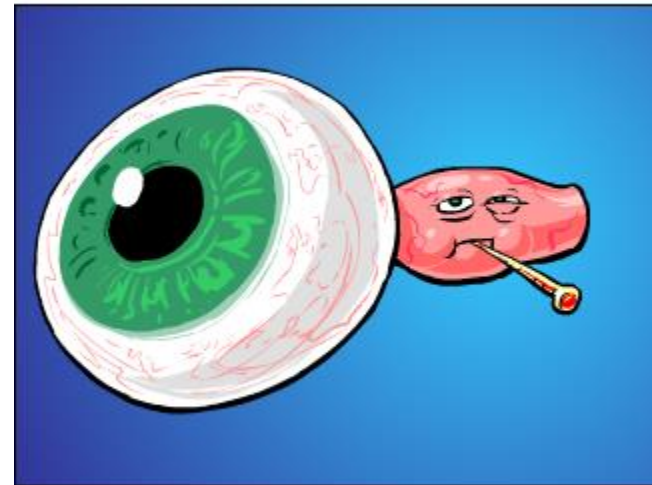
Abnormal Eye Movements

- Double vision
- Nystagmus (dancing eyes)



Optic Neuritis

- **Optic neuritis (20-25% presenting manifestation)**
- **Demyelinating inflammation of the optic nerve**
- **Most common cause of visual loss from optic nerve disease in the young and middle age**
- **Clinical characteristics**
 - rapid, unilateral, painful loss of vision
- **Vision usually recovers within 6-8 wks**
- **Vision recovers very well in most patients**
- **Often there is a visual problem recovery from optic neuritis**



Other Possibilities



▲ Infectious:

Cat Scratch disease
Syphilis
Lyme
Herpes zoster virus

▲ Inflammatory:

Neuromyelitis optica
Sarcoidosis
Lupus

▲ Vascular: Ischemia

▲ Tumors: brain or optic nerve

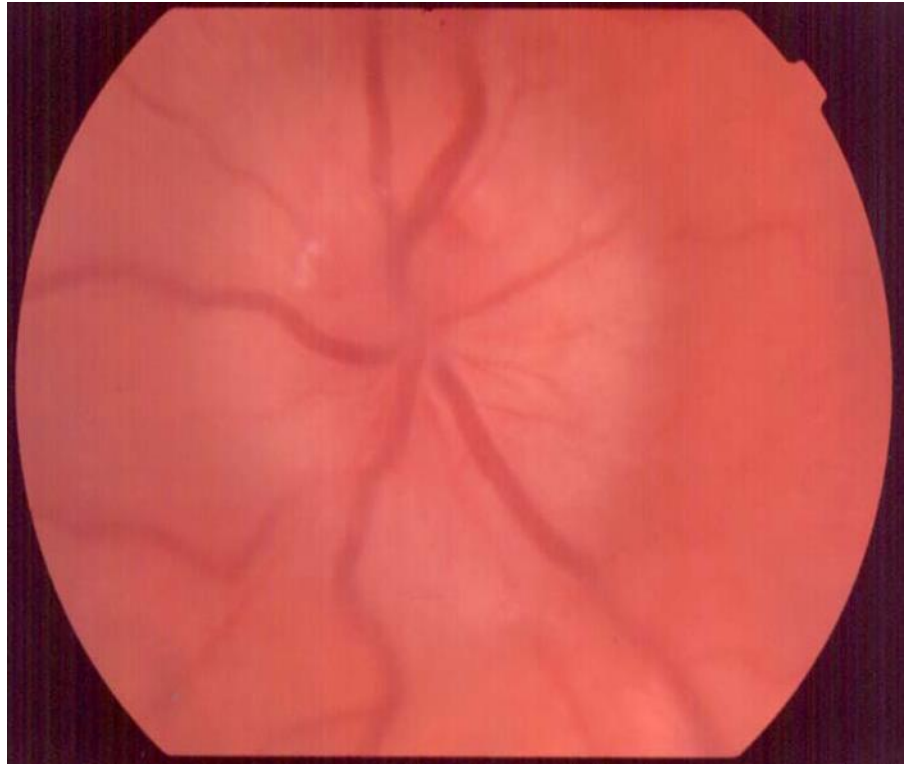
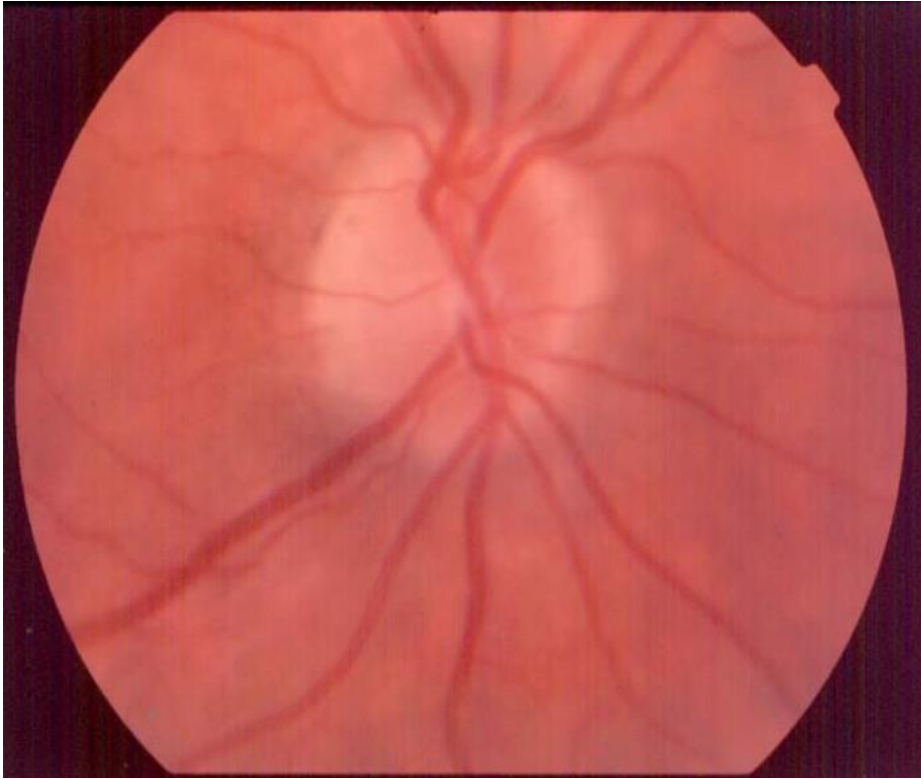
▲ Toxic: medication

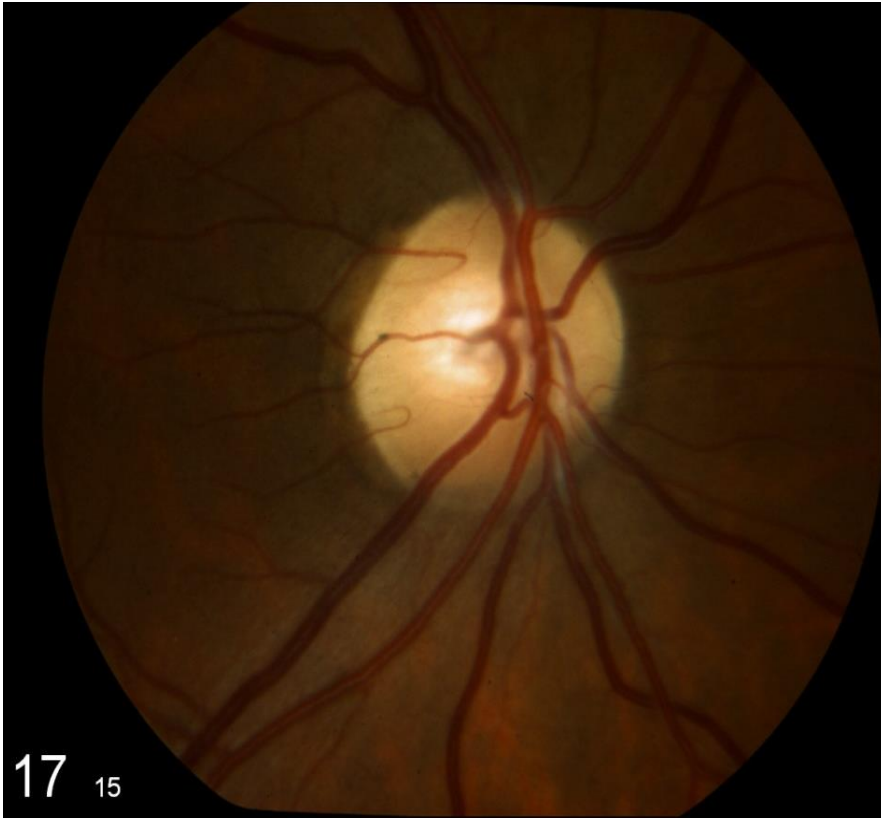
▲ Hereditary: LHON

▲ Trauma









Optic Neuritis Treatment Trial ONTT

- 1. Risk of MS based on the number of lesions on MRI**
- 2. Treatment with IV steroids speeds up the recovery of vision but does not have any long term benefit**
- 3. Treatment with oral steroids is associated with a greater chance of another bout of optic neuritis.**

Uhthoff's Symptom

Vision worsens with increase in body temperature:

Hot shower

Hot bath

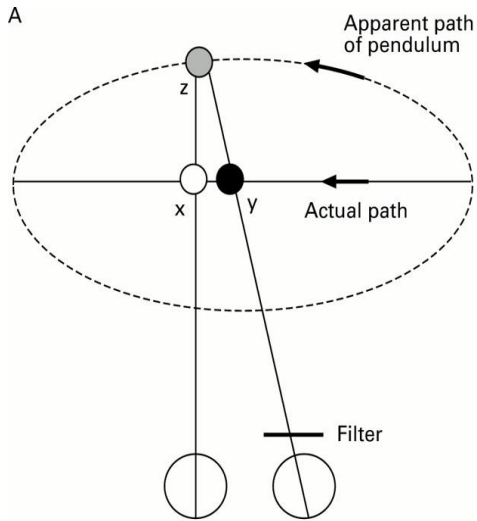
Hot day

Exercise

Angry or aggravated

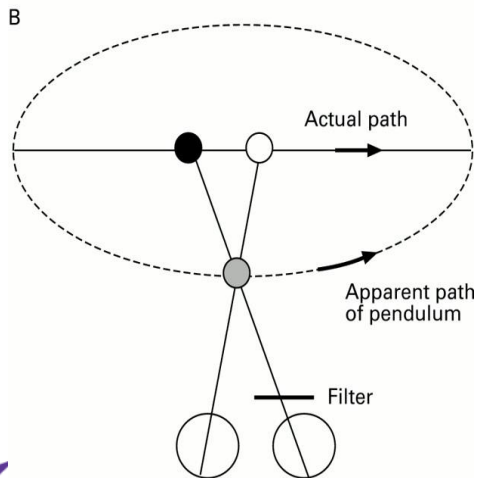


Pulfrich Phenomenon



Difficulty driving

Difficulty walking over uneven paths



Difficulty with recreational activities

tennis

volleyball

baseball

Conclusion

- **The ability to see and move the eye is very complex**
- **Because the eye is intimately connected to the brain, it is often affected in MS**
- **MS can cause optic neuritis, double vision or nystagmus**
- **Steroids and the MS drugs are very helpful in the treatment of vision problems due to MS**

Practical Strategies for Vision Loss From Optic Neuritis in MS



Oculomotor Problems in MS

- Diplopia (double vision)
 - Prism
 - Patching/occlusion
- Nystagmus (moving eyes)
 - Head/face postures
 - Motion perception

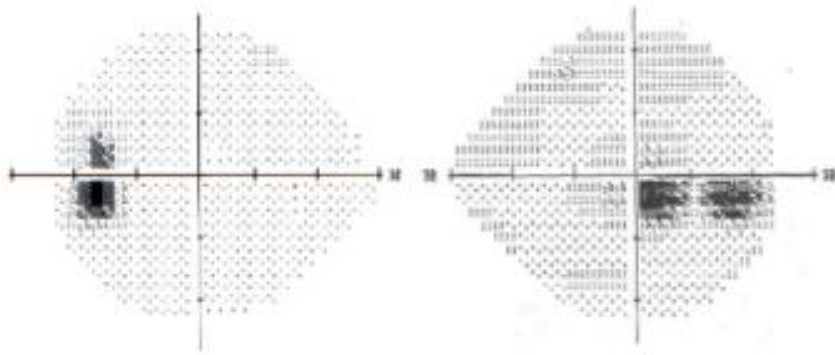


Fresnel Prism



Opsillopsia

Central Vision Loss From ON



Visual field test



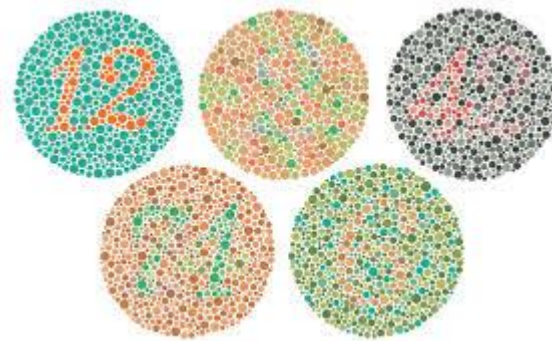
- Difficulty seeing:
 - Faces
 - Last step or curb
 - Words or numerals
 - Small details
- Magnification improves ability to see details
- Contrast enhancement make objects more obvious against their background

Color vision loss from ON

- Desaturation means colors look duller than usual
- Color loss causes color confusion with similar hues
 - Medication ID
 - Dressing/matching clothes
 - Preparing food



Desaturation to red



Ishihara Color Vision Test

Altered Depth Perception From ON

- Driving challenges
- Difficulty with uneven flooring, steps, curbs, etc.
- Reaching & grasping errors
- Unable to accurately judge distances
 - Pulfrich phenomenon
 - Worse in low light situations (night driving)



Central Vision Loss Interventions

Magnification

- Cell phone apps
- Hand-held magnifiers
- Larger screen size
- Closer viewing distance
- Telescopic lenses



Bioptic telescope

Maximized Contrast

- 100% contrast screens
- Full spectrum or daylight task light
- Filters and tints
- Apps that magnify and create 100% contrast



iPhone accessibility

Color Vision Loss Interventions

- **Color ID apps and devices**
- **Full spectrum lighting**
- **Filters and tints**



Altered depth perception

- **Proprioception and hand-eye coordination retraining**
- **Functional mobility training**
- **Increased lighting and contrast**
- **Monocular depth perception cues**
 - Motion parallax
 - Linear perspective



Closing

- **Approximately 1/3 of individuals with ON secondary to MS have persistent visual symptoms that adversely affect quality of life**
 - Deficits in low contrast acuity
 - Color vision challenges
 - Vision worse than 20/40
 - Central visual field deficit
- **Vision rehabilitation strategies and technologies can improve quality of life by improving ability to function in everyday life**
- **Individuals with progressive or relapsing ON should ask their doctor to refer them to a vision rehabilitation specialist to avoid unnecessary frustration and visual limitations**

Questions/Comments



M. Tariq Bhatti, MD



Diane B. Whitaker, OD

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People affected by MS can live their best lives as we stop MS in its tracks, restore what has been lost and end MS forever.

Vision Problems IN MULTIPLE SCLEROSIS



Optic Neuritis

People living with multiple sclerosis share their experiences with optic neuritis, and neuro-ophthamologist Tariq Bhatti, MD from Duke University Medicine discusses management and treatment options.

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