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The Eye and the Brain: Are They on the Same Page?

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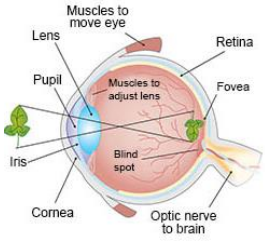
How Do We See?

- Take a look around you.
- While you look at these objects with your eyes, your brain is what is recognizing the objects.



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Occipital Lobe

To produce vision, the eyes record details and send it through the optic nerve to be processed by the occipital lobe. The brain also integrates other information, such as sensory stimuli, to result in the application of sight, such as picking up an item

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What Is Visual Processing?

Visual processing is a term that is used to refer to the brain's ability to use and interpret visual information from the world around us.

The process of converting light energy into a meaningful image is a complex process that is facilitated by numerous brain structures and higher level cognitive processes.

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Visual processing allows us to identify what we see and derive meaning.

The brain should be able to correctly interpret size, perception, and distance, and be able to discriminate between differences and similarities among shapes.

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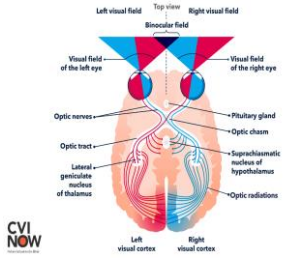

Following the Early Visual Pathway

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Visual Perception

The brain plays a crucial role in processing visual information. It translates the electrical impulses received from the optic nerve into meaningful images that we can understand.

It also combines images from both eyes to create a unified visual perception.

Interestingly, the images focused on the retina are actually upside down, but our brain automatically flips them right side up

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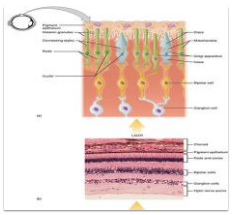
Rods and Cones



There are currently three known types of photoreceptor cells in mammalian eyes: rods, cones and intrinsically photosensitive retinal ganglion cells.

The two classic photoreceptor cells are rods and cones, each contributing information used by the visual system to form an image of the environment, sight.

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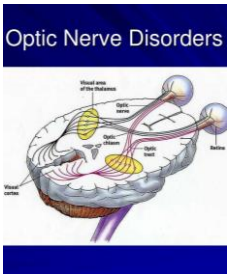

Optic-nerve-disorders-

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The Four Major Types of Optic Nerve Disorders

- Ischemic optic neuropathy
- Optic neuritis
- Papilledema
- Toxic amblyopia

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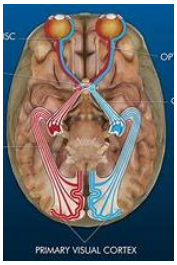
Optic Chiasm

- The optic chiasm is located at the base of the brain, just anterior and superior to the location of the pituitary gland.
- It is formed by merging fibers from the optic nerves.
- The optic chiasm contributes in conveying visual information from the eye to the cortex.



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Visual Cortex

- Visual cortex: This is where images received from your retina begin to get processed. The visual cortex has six layers and is the very beginning of your brain's process of interpreting and recognizing what you see.
- Within these layers, depth perception is processed, and form, color, and motion are perceived.

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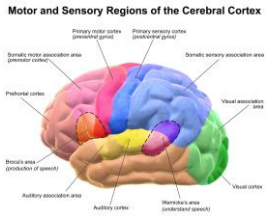

What is Phototransduction?

- Phototransduction is the process through which photons,elementary particles of light, are converted into electrical signals.
- Visual phototransduction occurs in the retina through photoreceptors, cells that are sensitive to light.

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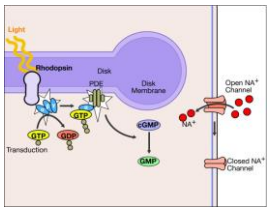

Average Axial Length of the Eye?

- AT Birth?
- Adulthood?

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8 Visual Processsing Disorders

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Introduction

- Defects in eye development happen when this complex process is paused or halted. The earlier these interruptions occur in the infant's development, the more severe eye problems will be.

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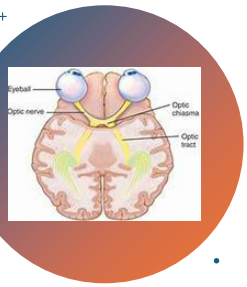

Week 4

- During week 4 of pregnancy, cells from the developing brain tissue begin to form two optic nerves, one on each side Embryogenesis of the head. Around the same time, other cells start developing into what will eventually become the lens of the eye, which will help your baby focus on objects both near and far

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The eyes see but:

- A visual processing disorder is not a physical disability of the eye, but a deficit in the brain's ability to identify, organize, and process visual information.

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What Is Charles Bonnet Syndrome?

Charles Bonnet Syndrome (CBS) is a condition that some people get when they lose some or all their vision. It causes them to have visual hallucinations (seeing things that aren't really there).

A new study suggests this condition is surprisingly common among people with certain types of vision loss.

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Epilepsy and Seizures

Epilepsy is a condition in which sudden bursts of electrical activity in the brain.

The condition can begin at any age, but typically begins in childhood or in people over the age of 60.

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Alzheimer's disease and Dementia

The term "dementia" refers to a group of symptoms associated with a progressive decline in brain function. There are various forms of dementia. Alzheimer's disease (AD) is the most common.

The most significant risk factor for AD is advancing age. The majority of people with AD are age 65 or older.

Can Include Vision Problems

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Parkinson's disease

Parkinson's disease (PD) is a disease caused by a loss of nerve cells within the part of the brain that controls movement and coordination. This can lead to the following symptoms:

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Parkinson and the Eye

- **Double vision can often occur because the eye muscles have trouble working together, especially to see up close (convergence insufficiency). Special prism glasses can often correct this.**
- **Dry eye due to decreased blinking is associated with PD and can cause blurry vision.**
- **Blurry vision can also be caused by PD medication, especially anticholinergics (such as trihexyphenidyl/Artane® or benzotropine/Cogentin®).**

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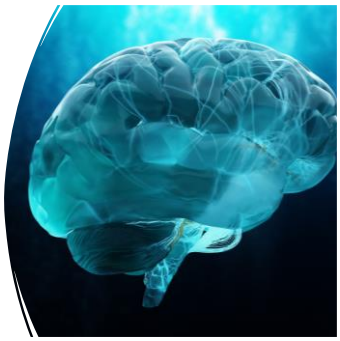
Stroke

Stroke is the medical term for when the blood supply to part of the brain is cut off. Without an appropriate supply of blood, the brain cells within the affected area lack the vital oxygen and nutrients they need to function and survive.



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Visual Impairment

- Is vision loss (of a person) to such a degree as to qualify as an additional support need through a significant limitation of visual capability resulting from either disease, trauma, or congenital or degenerative conditions that cannot be corrected by conventional means, such as refractive correction, medication, or surgery.

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Who is at Risk?

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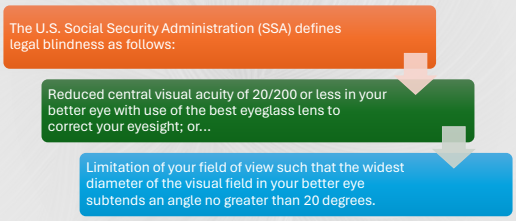
WHAT IS LEGALLY BLIND?



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