



Special Senses-

THE EYE

Pages 548-569

Accessory Structures

- **Eyebrows**

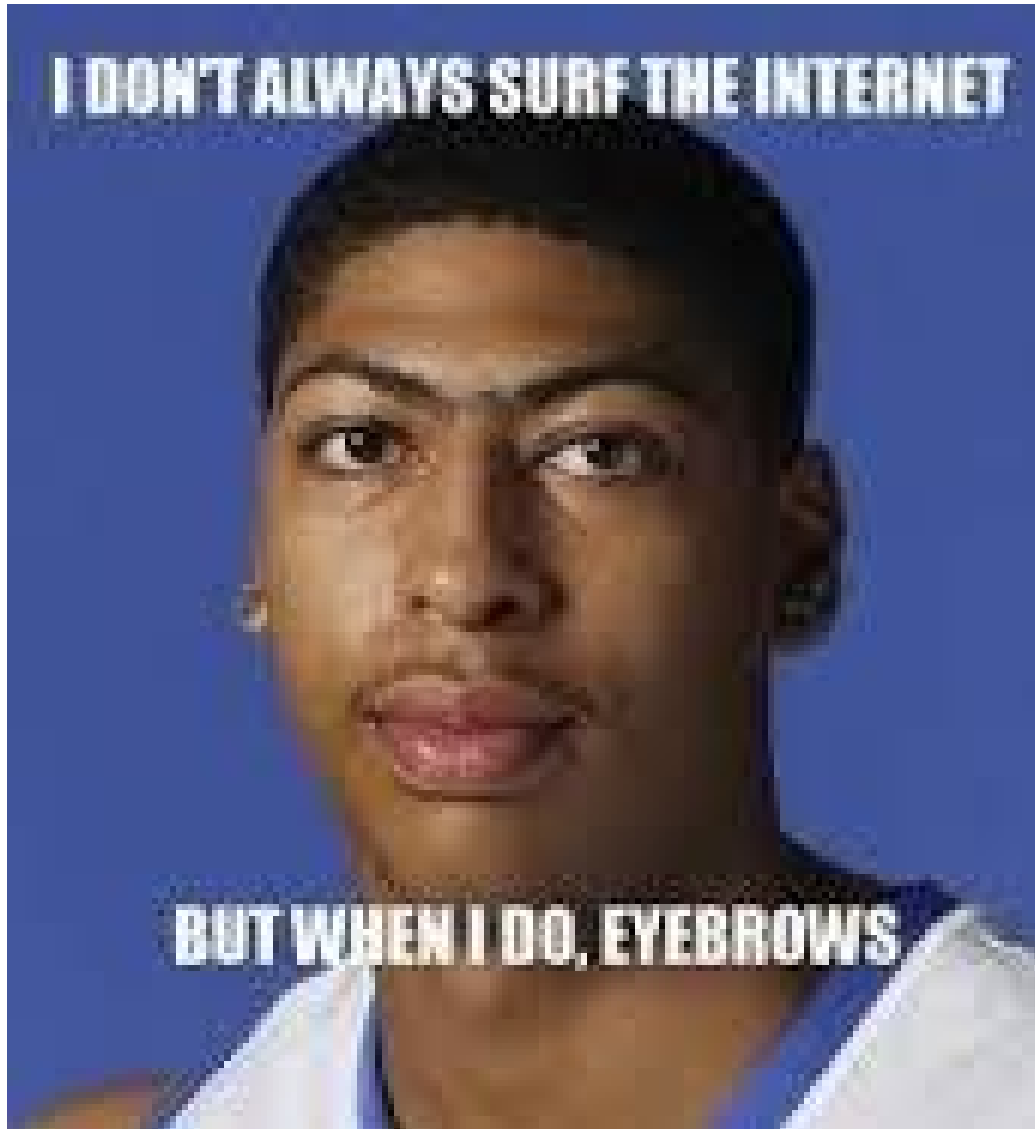
- **Eyelids**

- **Conjunctiva**

- **Lacrimal Apparatus**

- **Extrinsic Eye Muscles**

EYEBROWS



Deflect debris to side of face

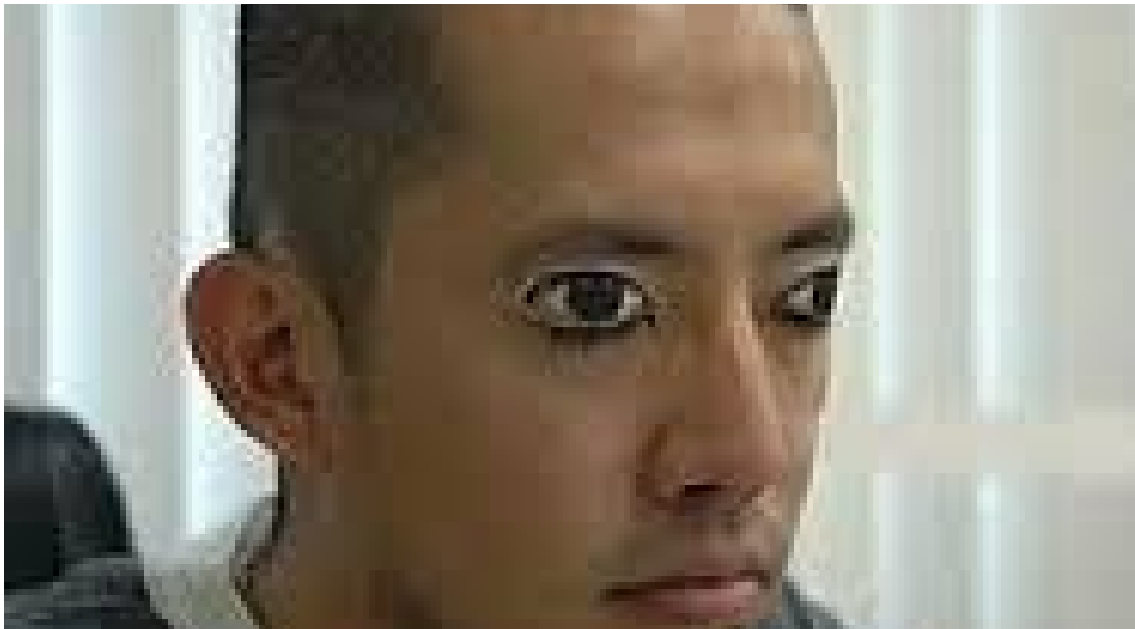
Facial recognition

Nonverbal communication

250 terminal hairs replaced every 4 months

EYELIDS

- AKA Palpebrae
- Protect the internal part of the eye
- Contains lacrimal caruncle (PINK CORNER) that secretes a solution of: oil, mucuos and saline.
- Blinking: 3-7 seconds
- Chalazion: infected tarsal gland creating a cyst (STYE) that is a plugged up oil gland. Treatment- warm compress



CONJUNCTIVA



Transparent membrane that covers over the white part of the eye and inner eyelid

It nourishes the sclera with microscopic vessels

Conjunctivitis
(PINK EYE)
infectious bacteria

LACRIMAL APPARATUS



John Boehner- former Speaker of the House and present crybaby

Lacrimal glands and ducts producing tears that run down into the nasolacrimal duct causing the sniffles.

Solution: mucous, antibodies, lysozyme

Physiology: cleanses and lubricates eye

Watery eyes: w/
colds or nasal
inflammation

Homeostatic Imbalances of the Accessory Structures

- Eyelid: chalazion
- Conjunctiva: conjunctivitis (Pinkeye)
- Lacrimal Apparatus: watery eyes (symptomatic)
- Extrinsic Eye Muscles: diplopia, strabismus

EXTRINSIC EYE MUSCLES

- 6 STRAPLIKE MUSCLES CONTROLLING THE MOVEMENT OF EACH EYEBALL
- Tracks objects with precision
- Keeps eye in place
- 4 rectus muscles: Superior, Inferior, Lateral Medial rectus; moves medially
- 2 oblique muscles: superior and inferior; moves laterally



H.I. of the EXTRINSIC MUSCLE

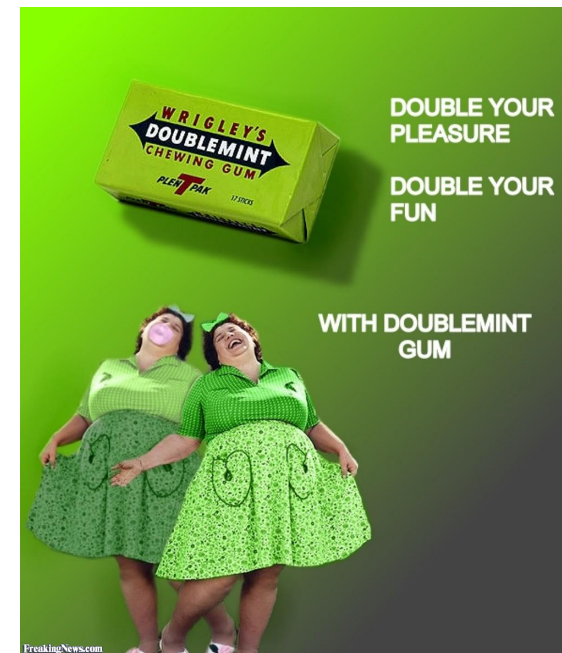
STRABISMUS

- Weak eye muscle forces eye to 'cross-eye'
- Brain focuses on the working eye
- Treatment: eye patch, eye therapy, surgery

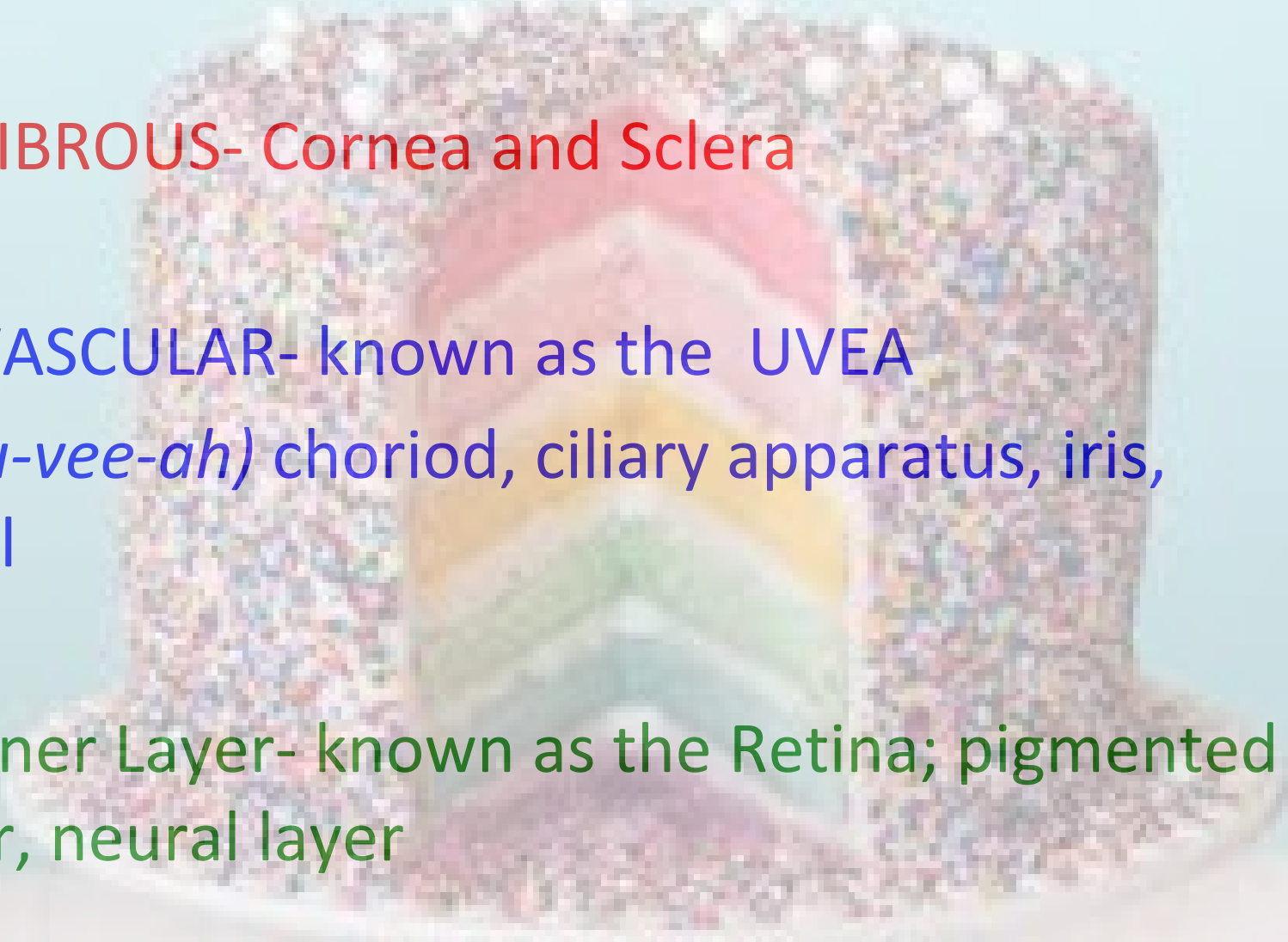


DIPLOPIA

Double vision due to both eyes are uncoordinated



The 3 TUNICS of the EYE

1. FIBROUS- Cornea and Sclera
 2. VASCULAR- known as the UVEA
(*u-vee-ah*) choriod, ciliary apparatus, iris,
pupil
 3. Inner Layer- known as the Retina; pigmented
layer, neural layer
- 

FIBROUS LAYER

- Dense avascular connective tissue
- **SCLERA**: opaque and white protects and shapes the eyeball where the extrinsic eye muscles attach to
- **CORNEA**: transparent window that controls amt. of light; has pain receptors and easiest to transplant

Lasik Surgery



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Homeostatic Imbalances of the Eye

- **Cornea: astigmatism**
- **Ciliary Body: myopia**
- **Retina: retinal detachment, hyperopia, presbyopia**
- **Vitreous Humor: floaters**



Astigmatism

- Cornea is an irregular shape that prevents light from focusing properly on the retina
- Results as blurred vision



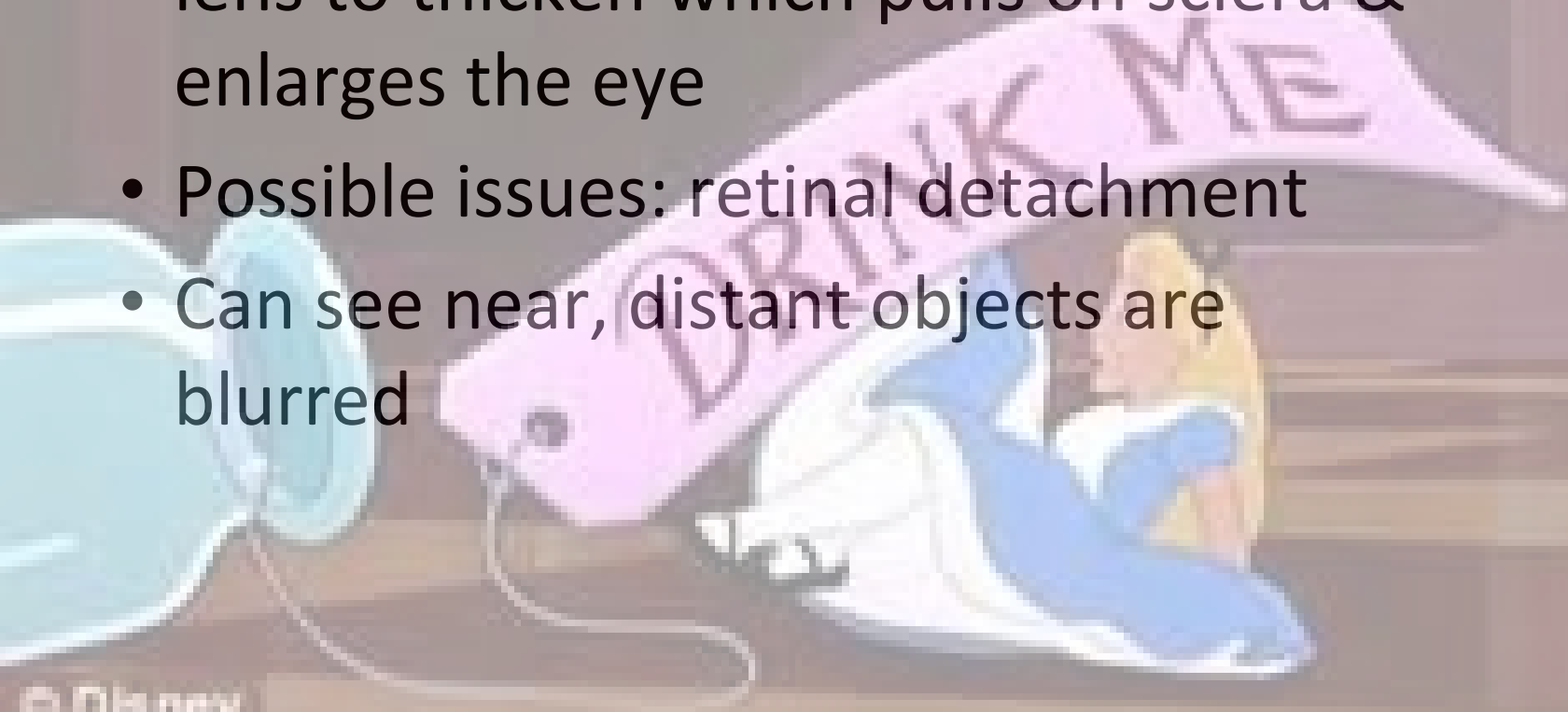
VASCULAR LAYER



- Pigmented layer AKA Uvea
- **CHOROID:** blood vessel-rich, dark brown (melanocytes) membrane
 - provides nutrients to all tunics
 - Absorbs light to create a sharp image
- **CILIARY APPARATUS:** ciliary body surrounds the lens connecting to the ciliary muscles that control lens shape and attaches the ciliary zonule to hold the suspending lens in place

Myopia

- Eyes are elongated from prolonged close work
- Constant tugging on ciliary muscles causes lens to thicken which pulls on sclera & enlarges the eye
- Possible issues: retinal detachment
- Can see near, distant objects are blurred



Farsightedness

Hyperopia

- The eyeball is shorter than average, weakening the eye's power
- Images from a distance are clear

Presbyopia

- As we age, objects that are close are blurry



UVEA

- IRIS
 - Visible colored part of the eye
 - Initiates the focusing process
- Pupil
 - related to emotions
 - Dilates: highly interested , fearful & problem solving
 - Constricts: repulsed or bored



INNER LAYER

- **RETINA-** innermost delicate layer
- **Pigmented layer**
 - same function of the choroid
 - Phagocytic to remove dead photoreceptors
 - Stores vita A needed by the photoreceptors
- *****Neural layer**
 - Bordered by the **Ora Serrata** which attaches to the ciliary body.
 - It is how vision makes sense as the image is processed in our brains by rods & cones

Neural Layer

- **Optic Disc:** optic nerve exits the eye creating a 'blind spot' but the brain does an excellent job in masquerading it with the process of *filling in*
- **Photoreceptors:** 25 billion of **rods** and **cones**
 - **RODS:** more of that allow us to see in dim light and the use of peripheral vision
 - **CONES:** work in bright light that sharpens colorful images

Retinal Detachment

- Both layers separate being filled in with vitreous humor
- A retinal detachment is also more likely to occur in people who:
 - Are extremely nearsighted
 - Have had a retinal detachment in the other eye
 - Have a family history of retinal detachment
 - Have had cataract surgery
 - Have other eye diseases or disorders
 - Have had an eye injury

TREATMENT: Small holes and tears are treated with laser surgery or a freeze treatment

Glaucoma

- **Clogged duct due to pressure built up from aqueous humor not being able to drain**
- **Retina is pushed up against the optic nerve**
- **There is no cure for glaucoma. Vision lost from the disease cannot be restored.**
- **Glaucoma treatments include medicines, laser or conventional surgery, or a combination of any of these. While these treatments may save remaining vision, they do not improve sight already lost from glaucoma.**

Floater

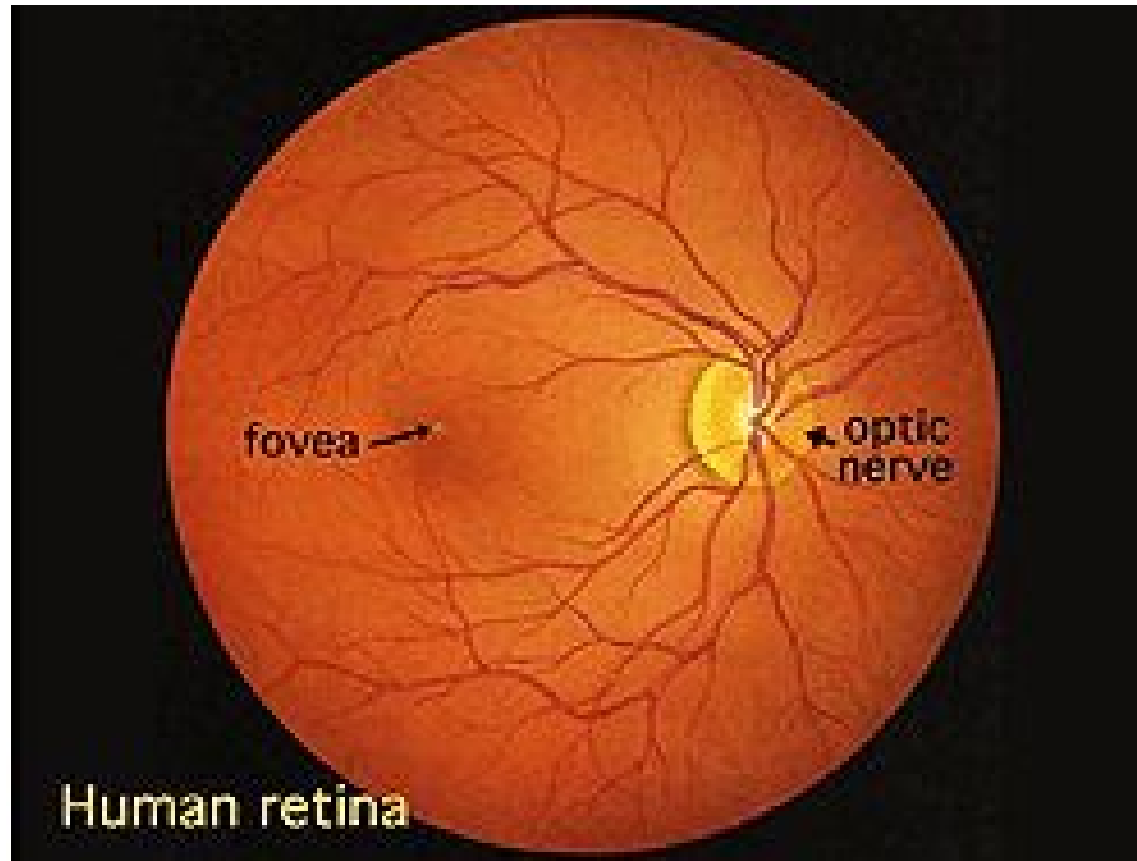
- When capillaries break off, the shadows cast the wafty images
- As we age, the gel gets watery
 - Posterior vitreous detachment
 - Torn retina

Macula Lutea & Fovea Centralis

- **Macula Lutea** is the area that contains the **Fovea Centralis** posterior and superior to the optic disc.
- This teeny yellow spot allows for light to bypass the retinal tunics directly to the photoreceptors.
- This region is primarily made up of cones, permitting for the most detailed color vision

Central Artery and Vein of the Retina

- Two-thirds of blood supply are supplied through the center of the optic nerve



Inner Chambers & Fluids

- **AQUEOUS HUMOR (pg.555)**- clear fluid drains continually and is in constant motion. It supplies nutrients and oxygen to the lens and cornea and carries away waste
- **LENS (pg. 556)** transparent, flexible structure that changes shape to focus
- **VITREOUS HUMOR (pg. 554)** water that transmits light and supports the posterior surface of the lens, supporting the two retinal layers

Wavelength and Color

- **Visible light** is the wave length respond to
- **Light** are particles called **PHOTONS** or **QUANTA**
- Light either **refract (absorbs)** or **reflects (bounce)**
- Each color is measured by length, red is the longest to violet being the shortest wavelength in the order: ROYGBIV

Refraction

- Light travels in straight lines- depending on its transparency, it continues on its pattern or **REFLECTS** (bounces off a surface)
- The speed of light is contingent to the density of the object it is travelling in (less= super fast vs more= super slow)

How Vision Works

<https://www.youtube.com/watch?v=cFVbLnXWn6A>

