



Special Senses-

THE EYE

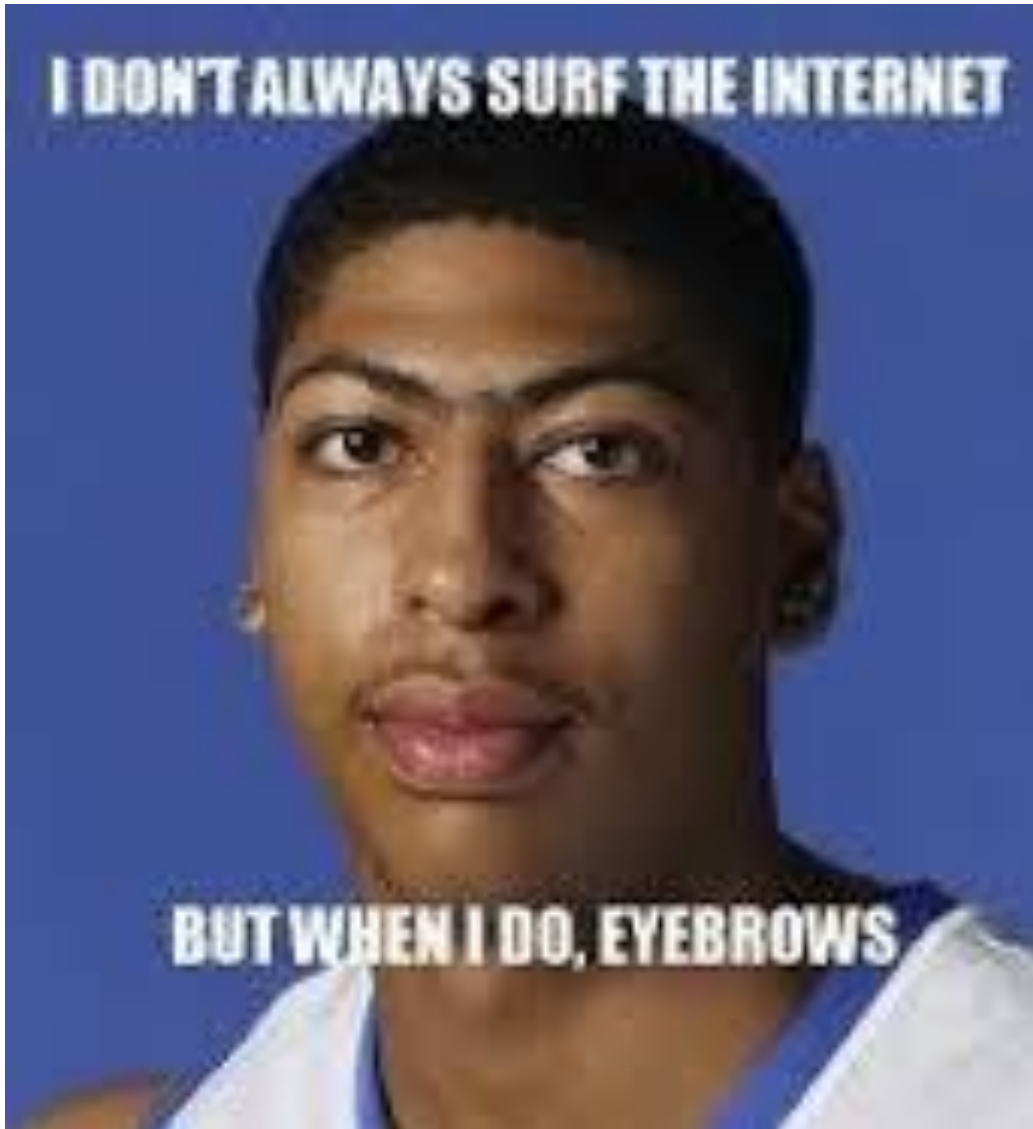
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Accessory Structures

*Homeostatic Imbalance

- 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



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

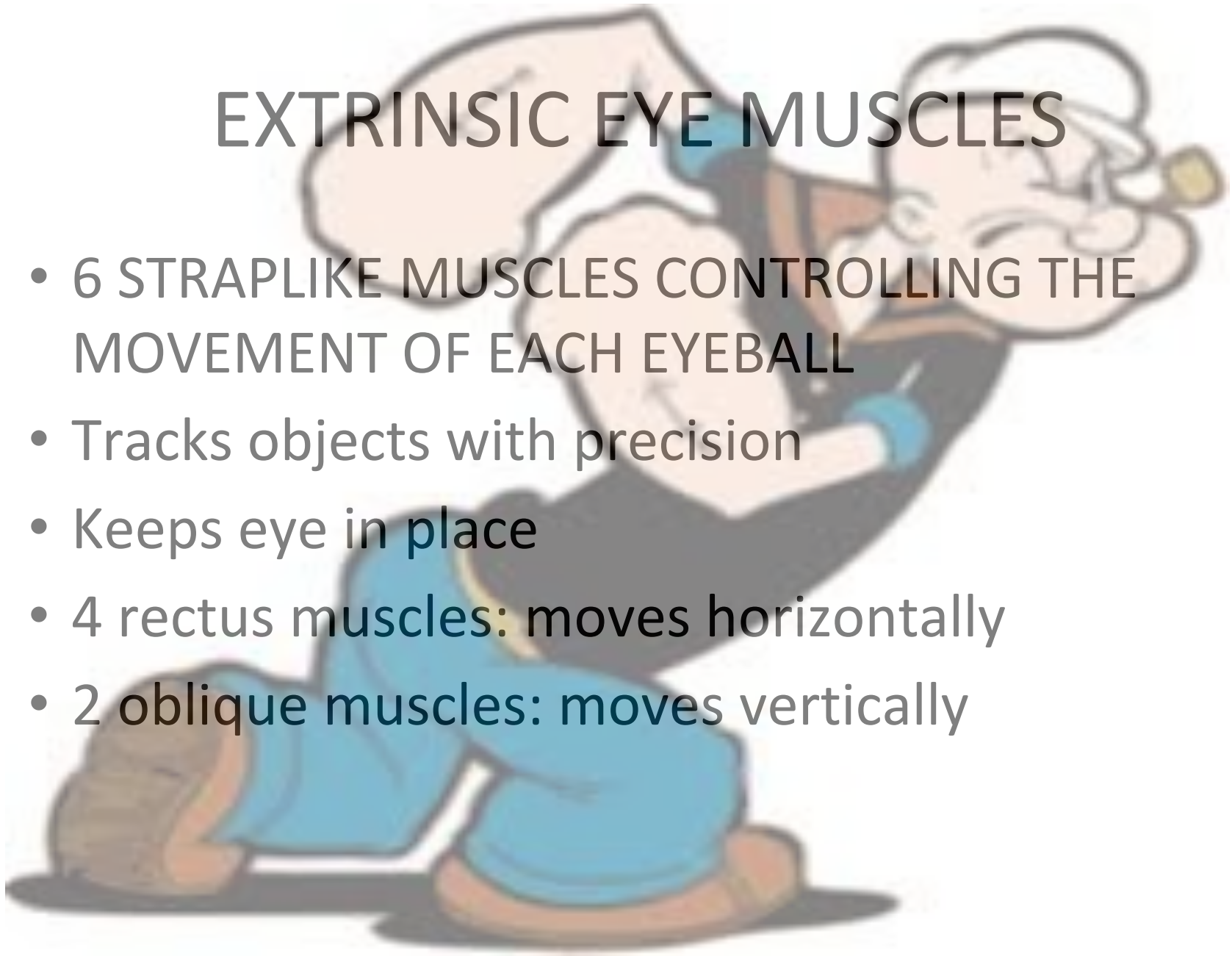
Demodex

<https://www.consumerhealthdigest.com/eyelash-care/eyelash-mites.html>



EXTRINSIC EYE MUSCLES

- 6 STRAPLIKE MUSCLES CONTROLLING THE MOVEMENT OF EACH EYEBALL
- Tracks objects with precision
- Keeps eye in place
- 4 rectus muscles: moves horizontally
- 2 oblique muscles: moves vertically



H.I. of the EXTRINSIC MUSCLE

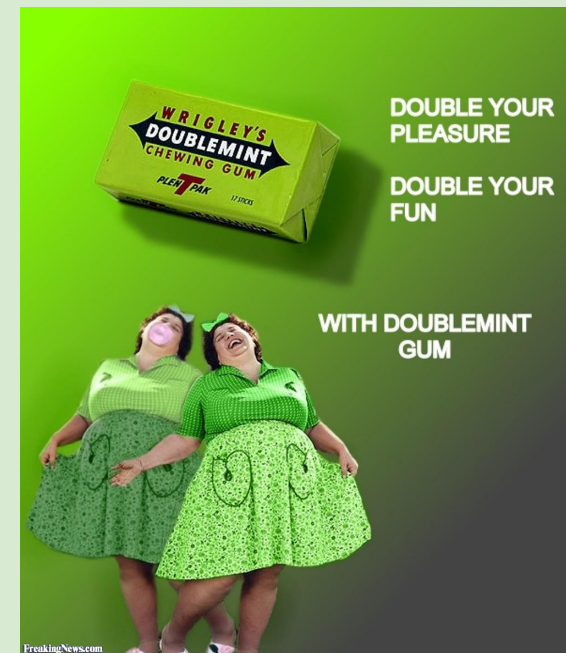
STRABISMUS

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

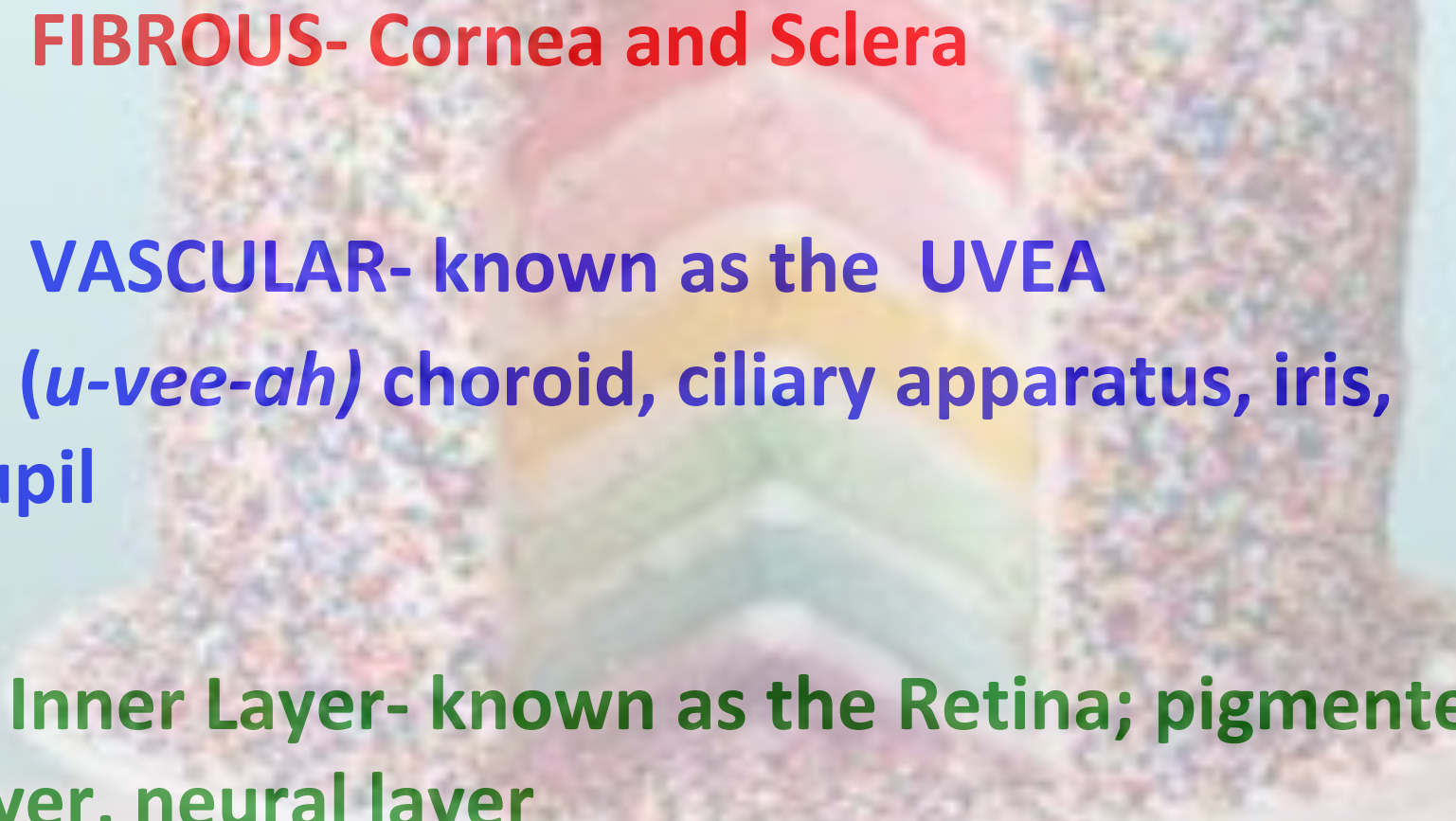


DIPLOPIA

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) choroid, ciliary apparatus, iris,
pupil**
 - 3. Inner Layer- known as the Retina; pigmented
layer, neural layer**
- 

FIBROUS TUNIC

- 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- reshape the cornea to correct your vision



Astigmatism

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



Inner Chambers & Fluids

- **AQUEOUS HUMOR** (pg.555)- clear fluid drains continually and is in constant motion
- **supplies** nutrients & O_2 to lens and cornea and **carries away waste.**



Glaucoma-Damage to the optic nerve

- **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 (to lessen) include:
 - medicines
 - laser
 - conventional surgery

Vision affected by Glaucoma

Normal Vision



Early Glaucoma



Advanced Glaucoma



Extreme Glaucoma



We Help you to See Better...

VASCULAR LAYER

A microscopic cross-section of the eye wall, showing the vascular layer (choroid) and the ciliary apparatus. The choroid is a dark brown, highly vascularized layer. The ciliary apparatus, including the ciliary body and ciliary muscles, is visible as a complex structure surrounding the lens.

- 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

UVEA- Iris & Pupil

- **IRIS**

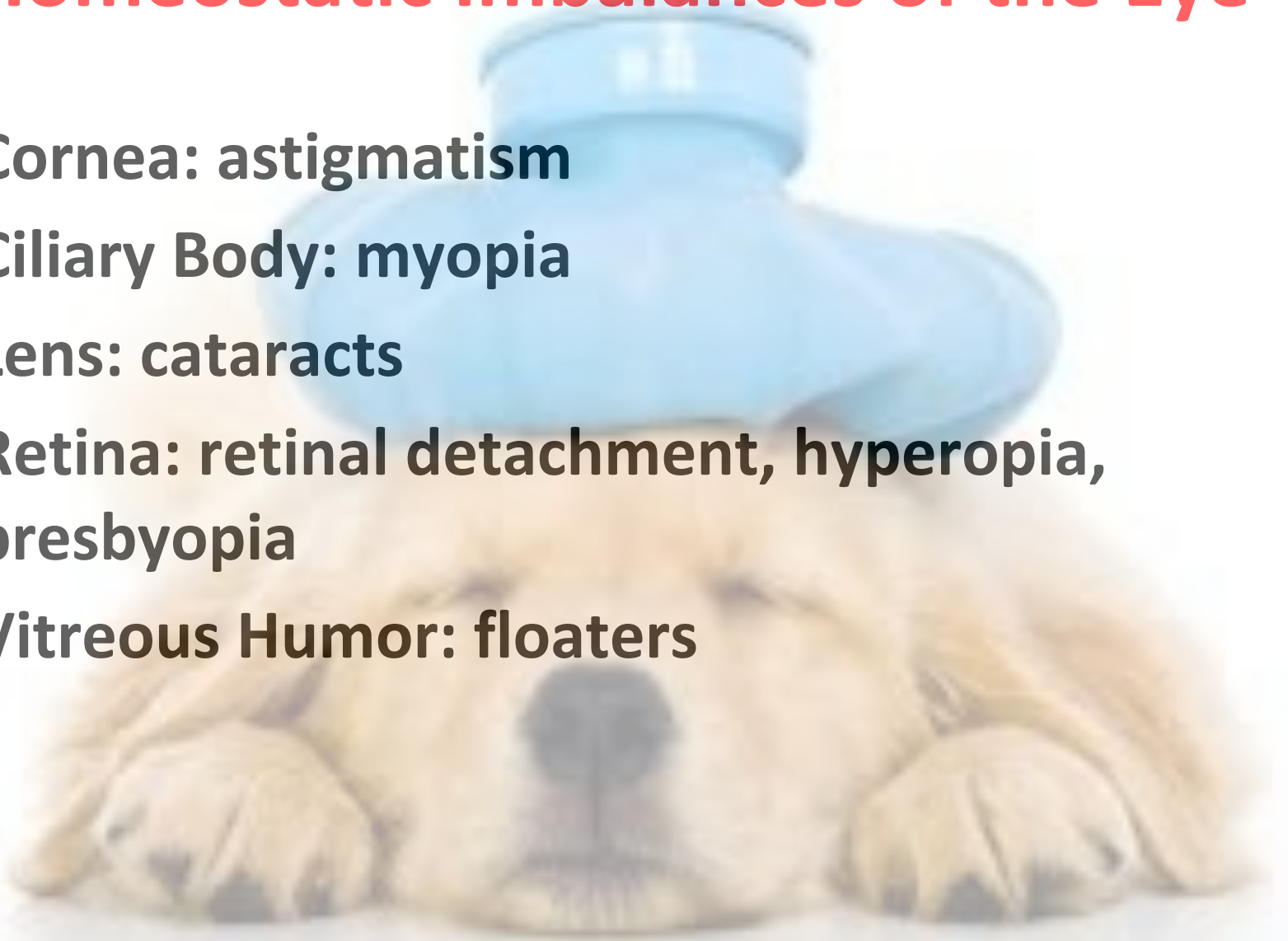
- flattened, doughnut shape between cornea & lens connected to the ciliary body posteriorly
- made up of smooth muscles to change shape of the Pupil

- **Dilates**

- **Constricts**

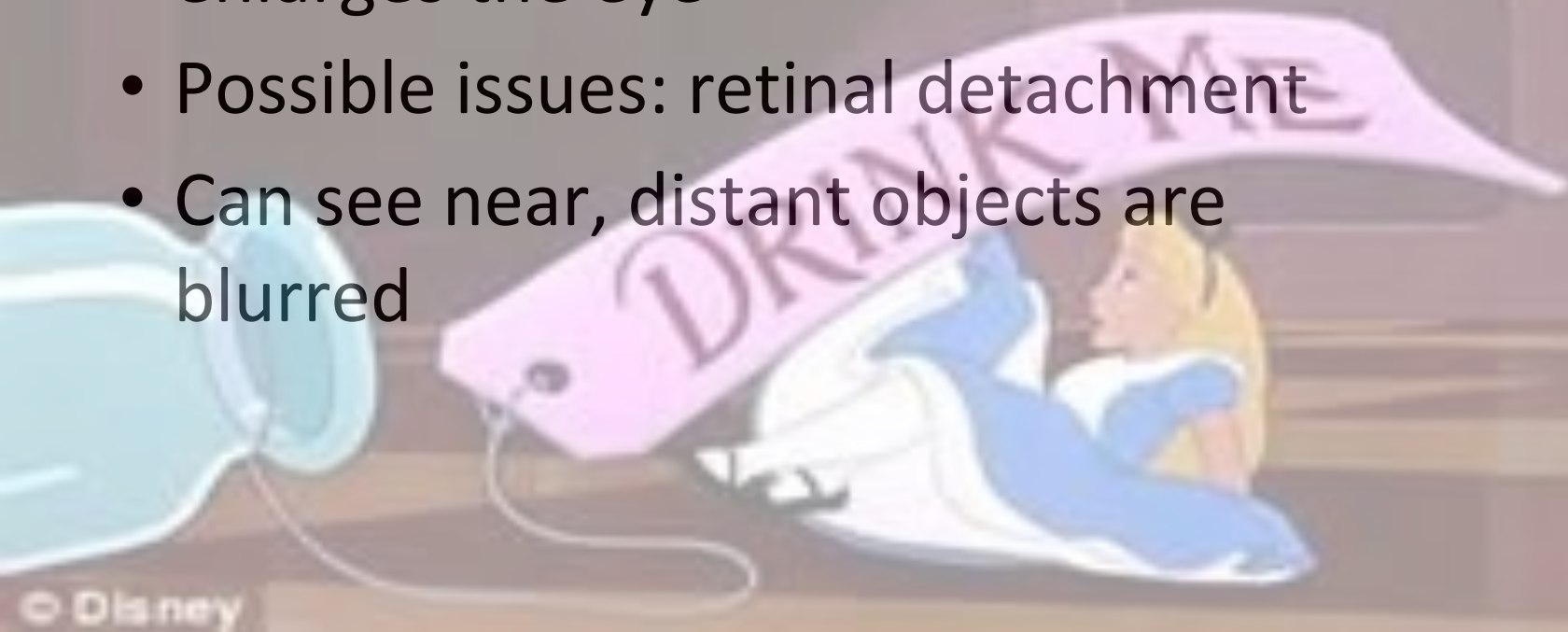
Homeostatic Imbalances of the Eye

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



Myopia- nearsightedness

- 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

- Around 40, objects that are close are blurry & can be seen at a distance



INNER TUNIC- Retina pg554, fig15.6

Contains 2 layers:

Pigmented layer - epithelial cells

- absorb light (choroid)
- Phagocyte: Removes dead photoreceptors
- Stores vita A needed by the photoreceptors

*****Neural layer** Makes sense as the image is processed in our brains by rods & cones

- Bordered by the **Ora Serrata** which attaches to the ciliary body.
- 3 neurons: photoreceptors → bipolar → ganglion → action potentials

Colorblindness Types

**Protan: red-blind;
most common**

Deutan: green-blind

**Tritan: blue-blind;
least common**

**Achromat: all color-
blind**



Normal vision



Red-Blind/ Protanopia



Green-Blind/
Deuteranopia



Blue-Blind/Tritanopia



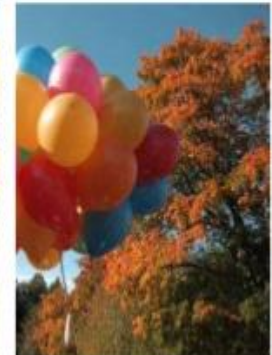
Monochromacy/
Achromatopsia



Red-Weak/
Protanomaly



Green-Weak/
Deuteranomaly



Blue-Weak/
Tritanomaly

Retinal Detachment

- Vitreous humor sandwiched in between uvea & neural tunics
- Likely to occur in people who:
 - Extremely nearsighted
 - Retinal detachment in other eye
 - Family history
 - Cataract surgery
 - Eye diseases or disorders/ eye injury

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

Vision affected by severe Retinal Detachment



Neural Layer

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

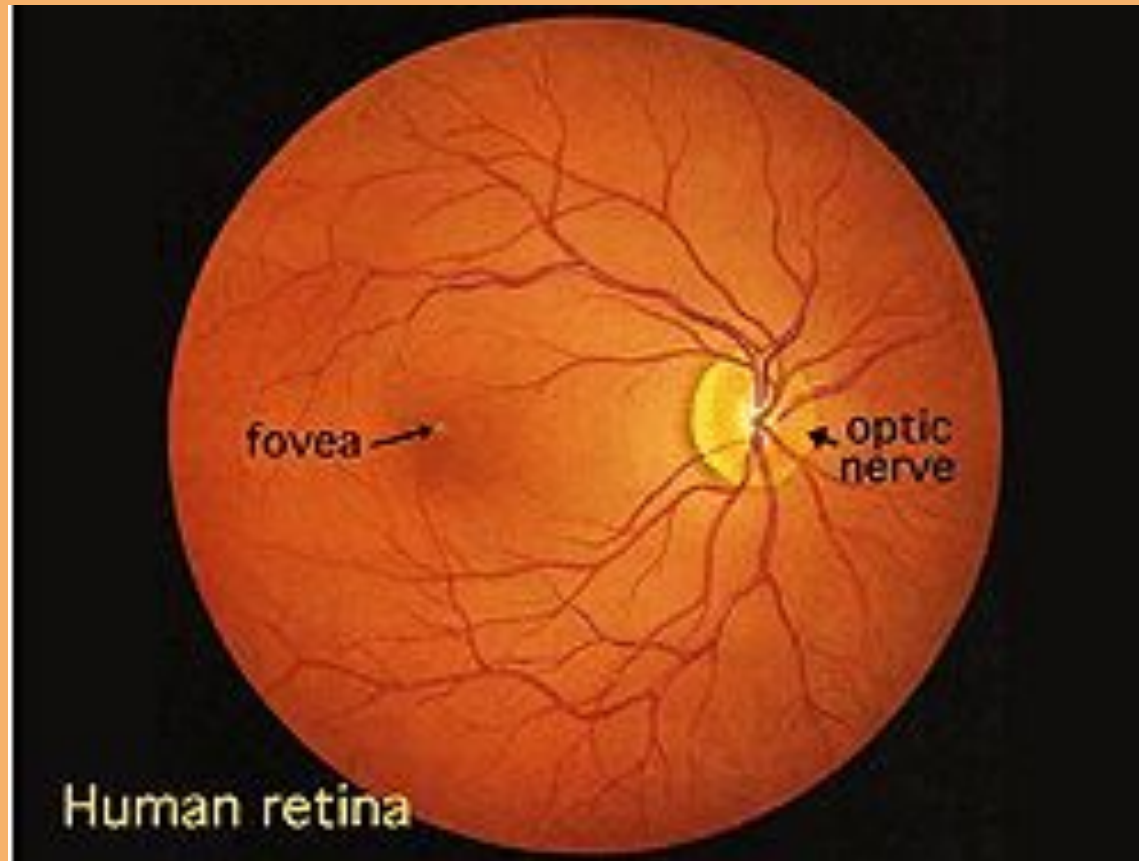
Macula Lutea & Fovea Centralis

- **Macula Lutea** is the area that contains the **Fovea Centralis** posterior&superior to the optic disc.
 - **Teensy yellow spot allows for light**
 - directly to the photoreceptors.
 - Made up of mainly 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

- **LENS** (pg. 556) transparent, **flexible structure that changes shape to focus**
- **VITREOUS HUMOR** (pg. 554) gelatinous fluid that
 - made up of collagen, protein, NaCl, glucose
 - transmits light and supports the posterior surface** of the lens
 - supports the retina
 - Vitrectomy



Floaters

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

Image affected by Floaters

