

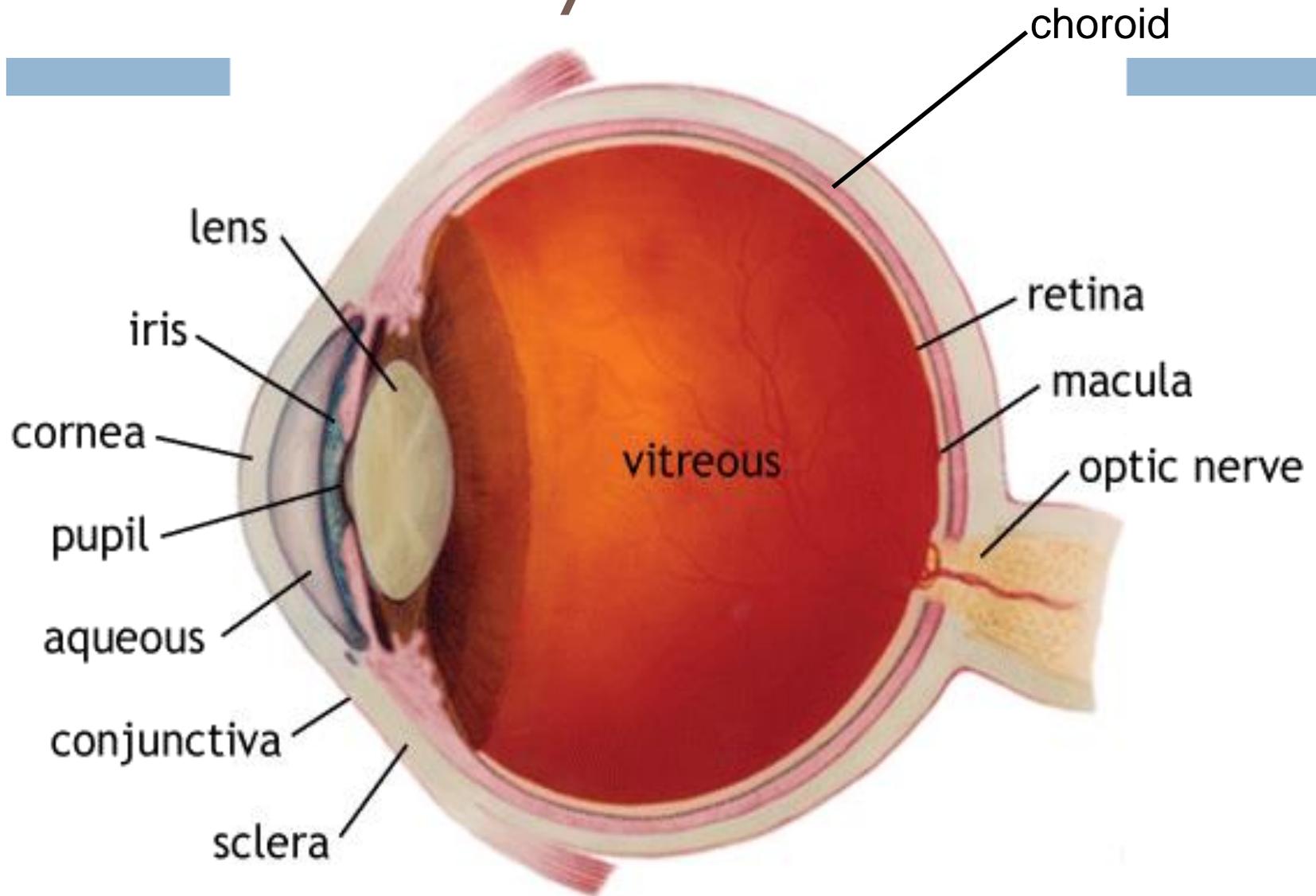
Sensory System III – Eye Reflexes



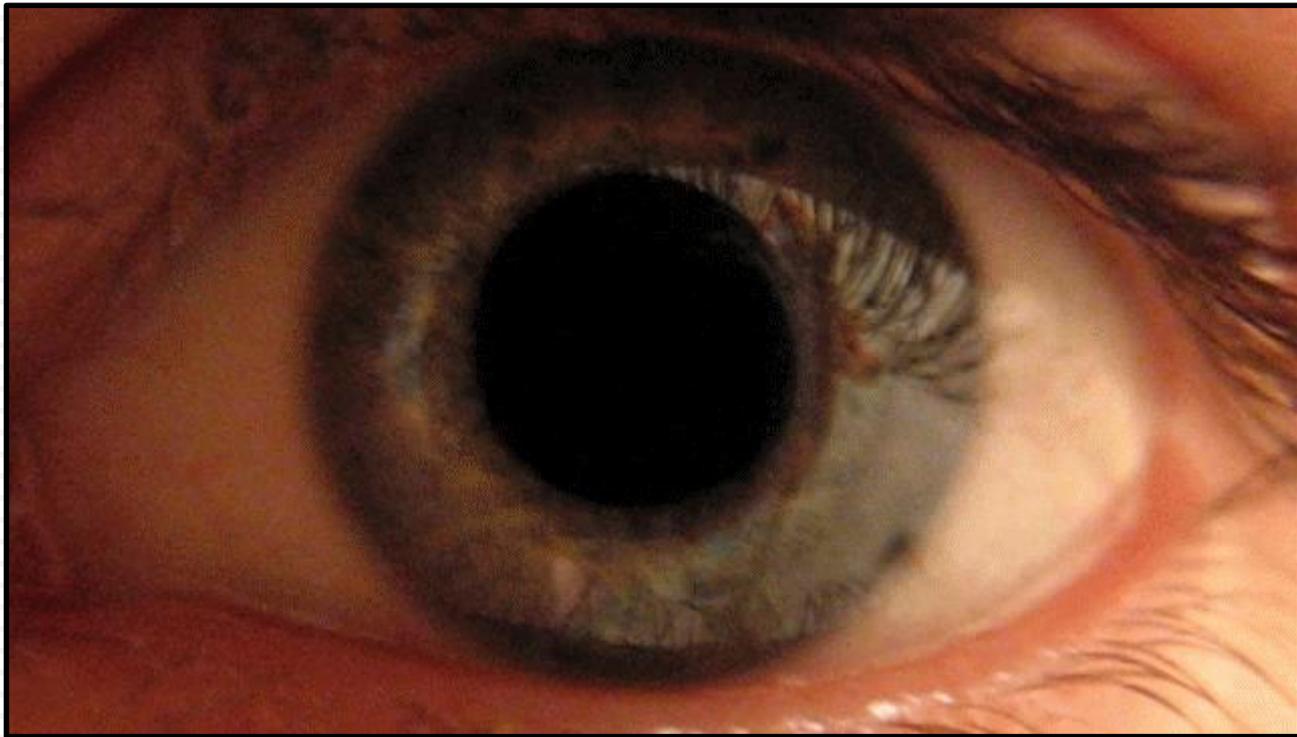
Quick Review from Last Week

Eye Anatomy

Inside of the Eye



Eye Reflexes



Eye Reflexes

- A healthy person has a number of eye reflexes:
 - Pupillary light reflex
 - Vestibulo-ocular reflex
 - Corneal reflex
 - Accommodation reflex

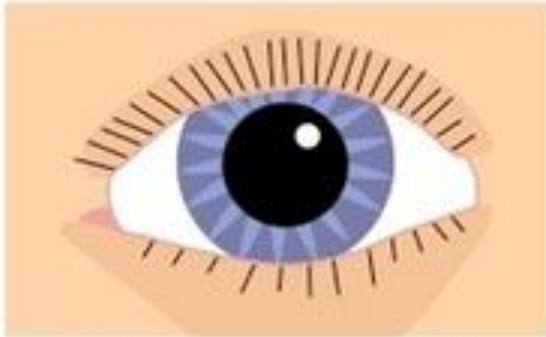
This is mostly just for fun



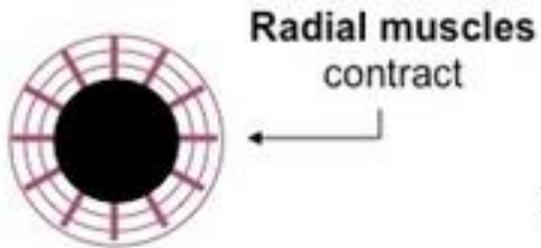
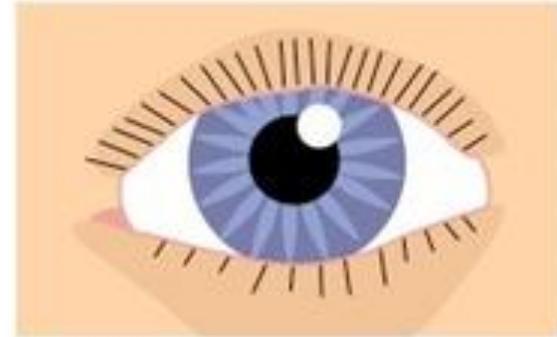
Pupillary Light Reflex

- The reflex that controls the size of the pupil (its diameter)
- This is a response to the intensity of light (brightness)
- Allows us to adapt to different light levels
 - Bright light → pupil constricts
 - Low light → pupil dilates

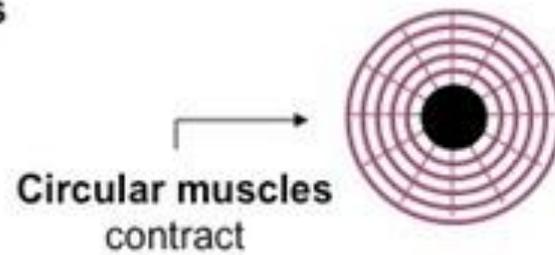
DIM LIGHT



BRIGHT LIGHT



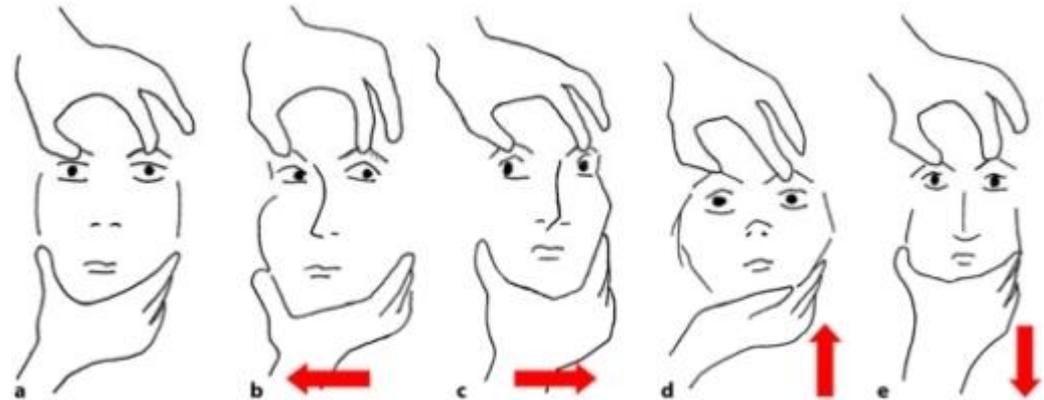
Pupil Dilation



Pupil Contraction

Vestibulo-ocular Reflex

- Sometime called the “doll’s head reflex”
- Links eye movement with the vestibular system
 - The system that controls balance and spatial orientation
- Trying to stabilize image on the retina during head movement by moving the eyes in the opposite direction of head movement
 - This way the image stays in the centre of the field of vision

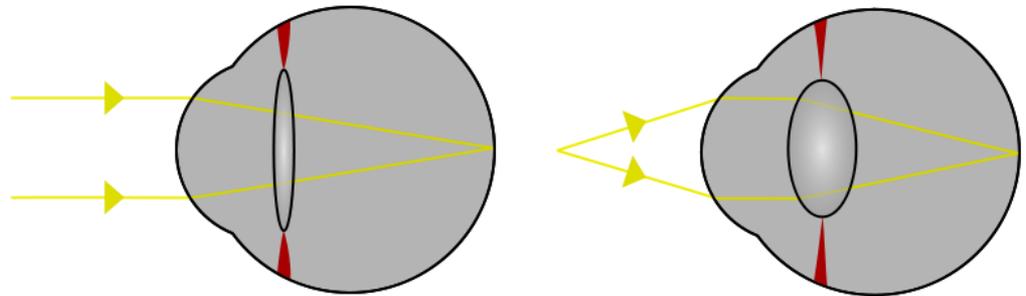
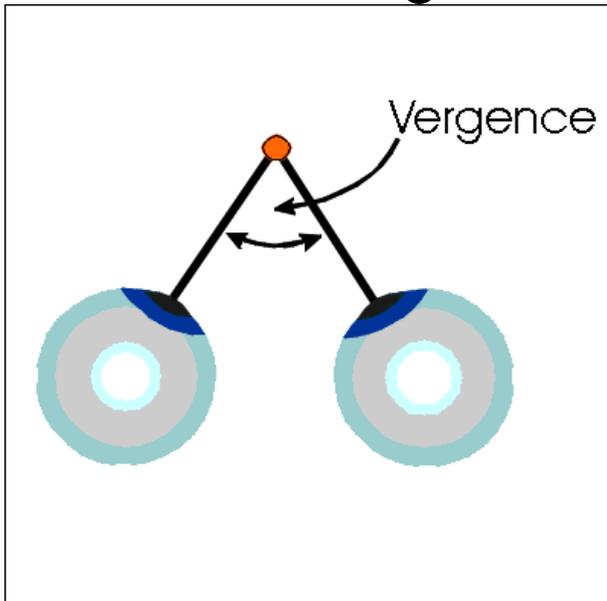


Corneal Reflex

- Also known as the blink reflex
- Caused by the stimulation of the cornea
 - Example: when something touches your eye or bright light
 - Can also happen with really loud sounds
- Trying to protect the eye from foreign bodies and bright light

Accommodation Reflex

- How the eye **focuses** on near and far objects
 - Changes in **vergence**, lens **shape** and pupil



Pupillary reflex

Type of reflex

- **Near /Far**
 - You look far away pupil is big
 - You look up close the pupil is small
- **Light/ Dark**
 - In bright light your pupils get smaller, so less light will get in
 - In dim light your pupils get bigger to let in more light.

Personal example

- **Near/Far**
 - You look at the board pupil is big.
 - You look at you paper, pupil is small
- **Light/ Dark**

Pupillary reflex

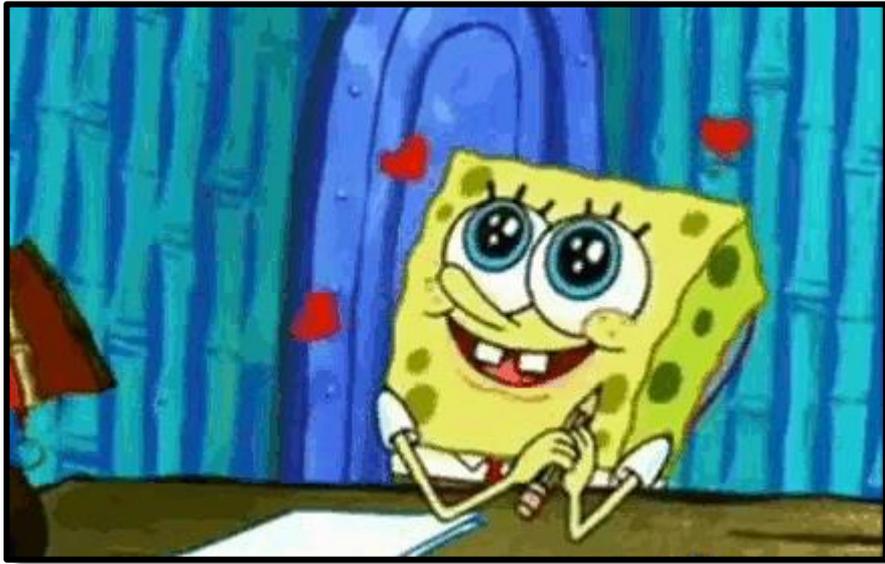
Type of reflex

□ Love/Hate

- Your pupils get **big** when you look at someone you **love** (or have a crush on).
- They get **small** when you look at someone you **dislike**

Personal example

□ Love/Hate



Retinal reflex

Adaptation

- ❑ In bright light your retina uses the cones
- ❑ In dim light your retina uses the **rods**
- ❑ It takes about ten seconds to switch from one to the other

Personal example

- ❑ You were outside in the snow and you come inside and it's so dark it's hard to see but after a few seconds it seems normal again.
- ❑ You are at a matinee movie and you come outside into the sun. It's so bright it hurts your eyes. But then you get used to it.

After Images

Negative after images

- Look at a bright colour that cone bleaches out.
- When you look at a paper you see the opposite colour.

Personal example

- Look at red for a long time then look at a white paper. You see green

After Images

Positive after images

- Look at a bright light
- Close your eyes and you can still see them. Your retina is overstimulated and keeps firing

Personal example

- Look at red for a long time then look at a white paper. You see green

Peripheral Vision

Peripheral Vision

- ▣ If you are looking straight ahead but can still see something beside you.

Personal Example

Peripheral Vision

Movement vs Colour

- ▣ Most of your retina is covered with rods so you can see movement first.
- ▣ Your cones are only in the middle. You can see movement before colour

Personal Example

Reflexes with 2 Eyes

Binocular Vision

- your left eye sees a slightly different picture from your right eye.
- Your brain sees these two images and interprets them as 3D

Personal Example

- It's hard to thread a needle with just one eye.

Reflexes with 2 Eyes

Blind Spot

- ▣ Each eye has a blind spot where the optic nerves leave the eyes.
- ▣ They're in different places in each eye. As long as you have two eyes one sees what the other misses

Personal Example

- ▣ It's hard to thread a needle with just one eye.

Near point accommodation

Convergence

- When you look at something up close your medial rectus muscles bend your eyeballs together.
- When you look far away the muscles relax and your eyeballs are parallel

Personal Example

- You can hold your arm up and cover the moon with your thumb.
- But the brain knows one is close and the other is far because it feels the muscles move.