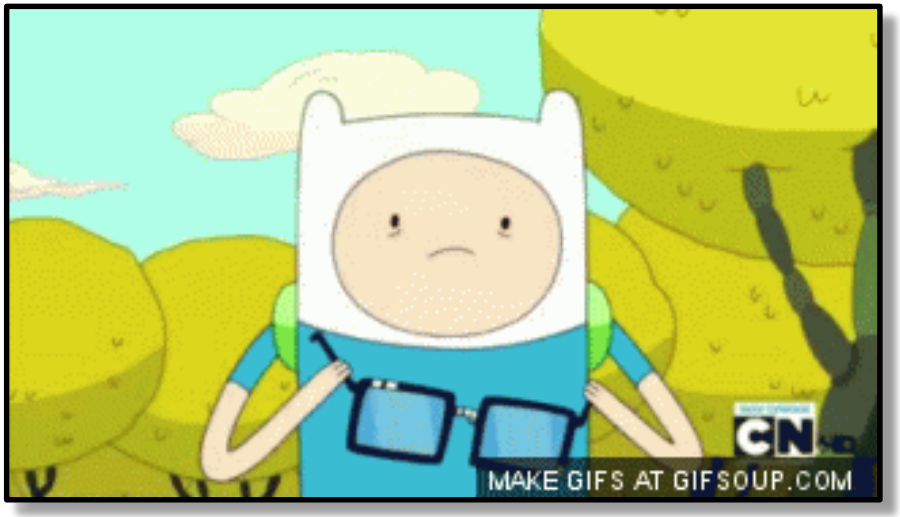
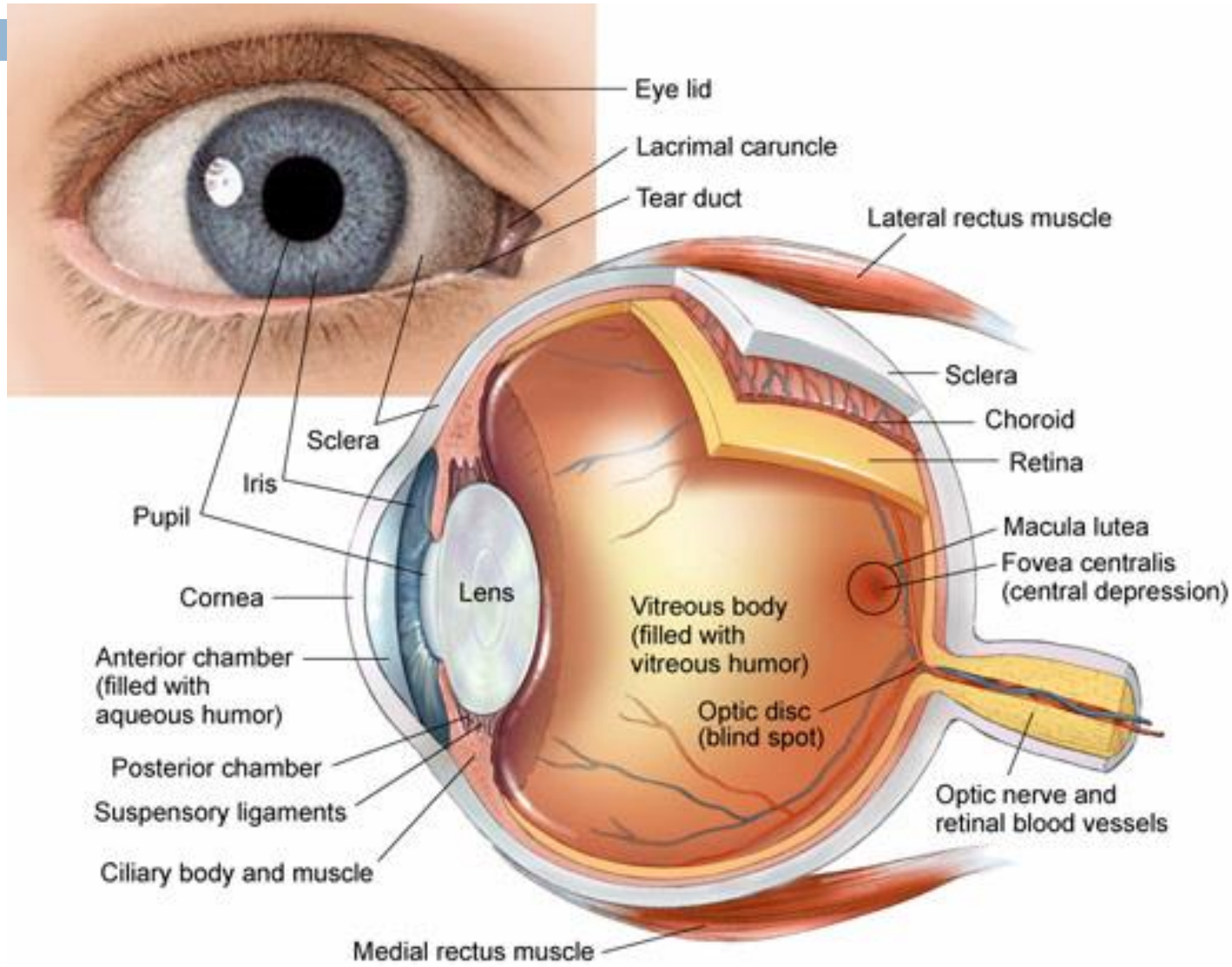
# Sensory System I – Eye Anatomy

# The Eye

- Is the **sensory organ** related to vision
  - Picks up light rays **given off** by light sources or **reflected** by objects
    - This is how we see!

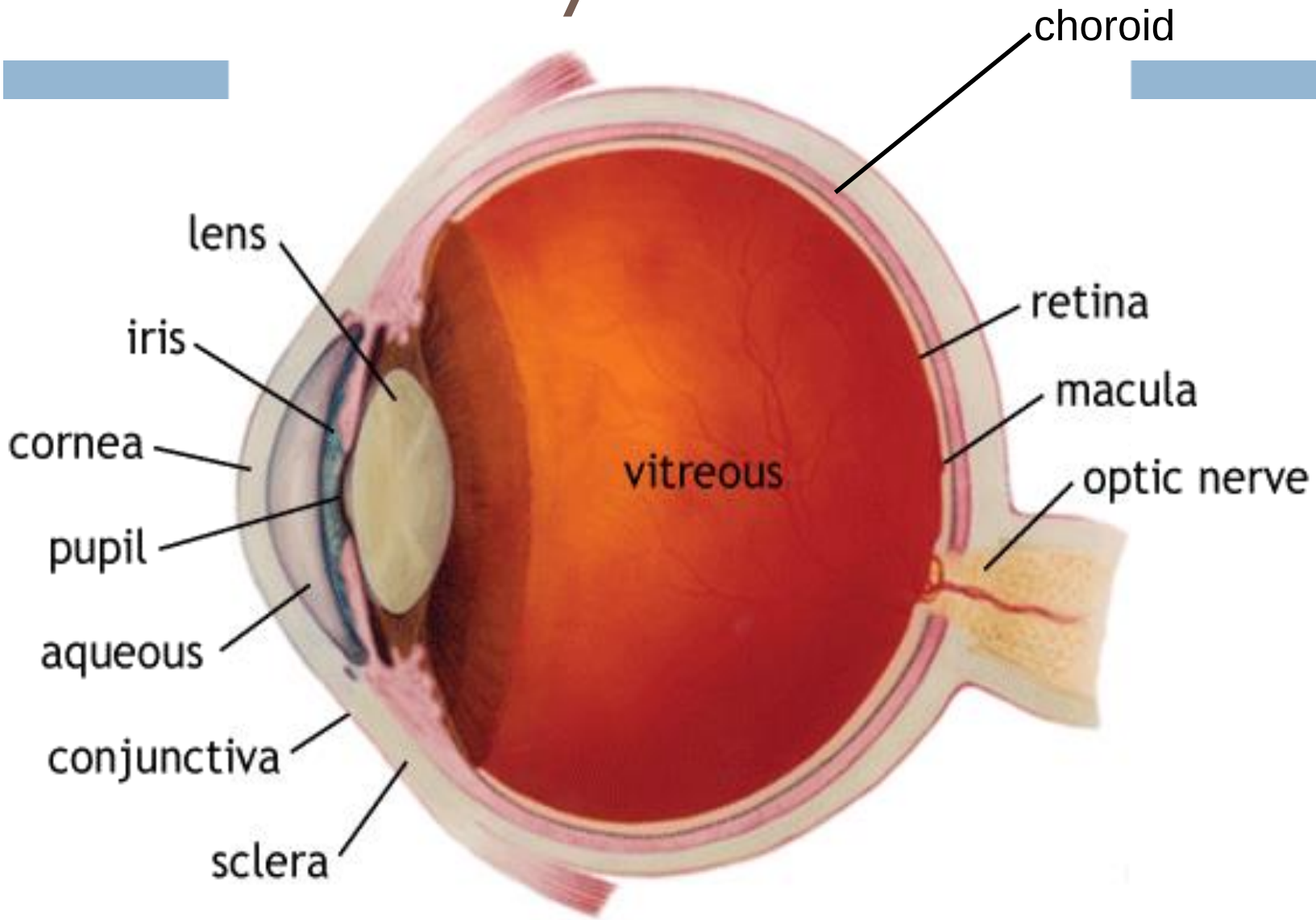


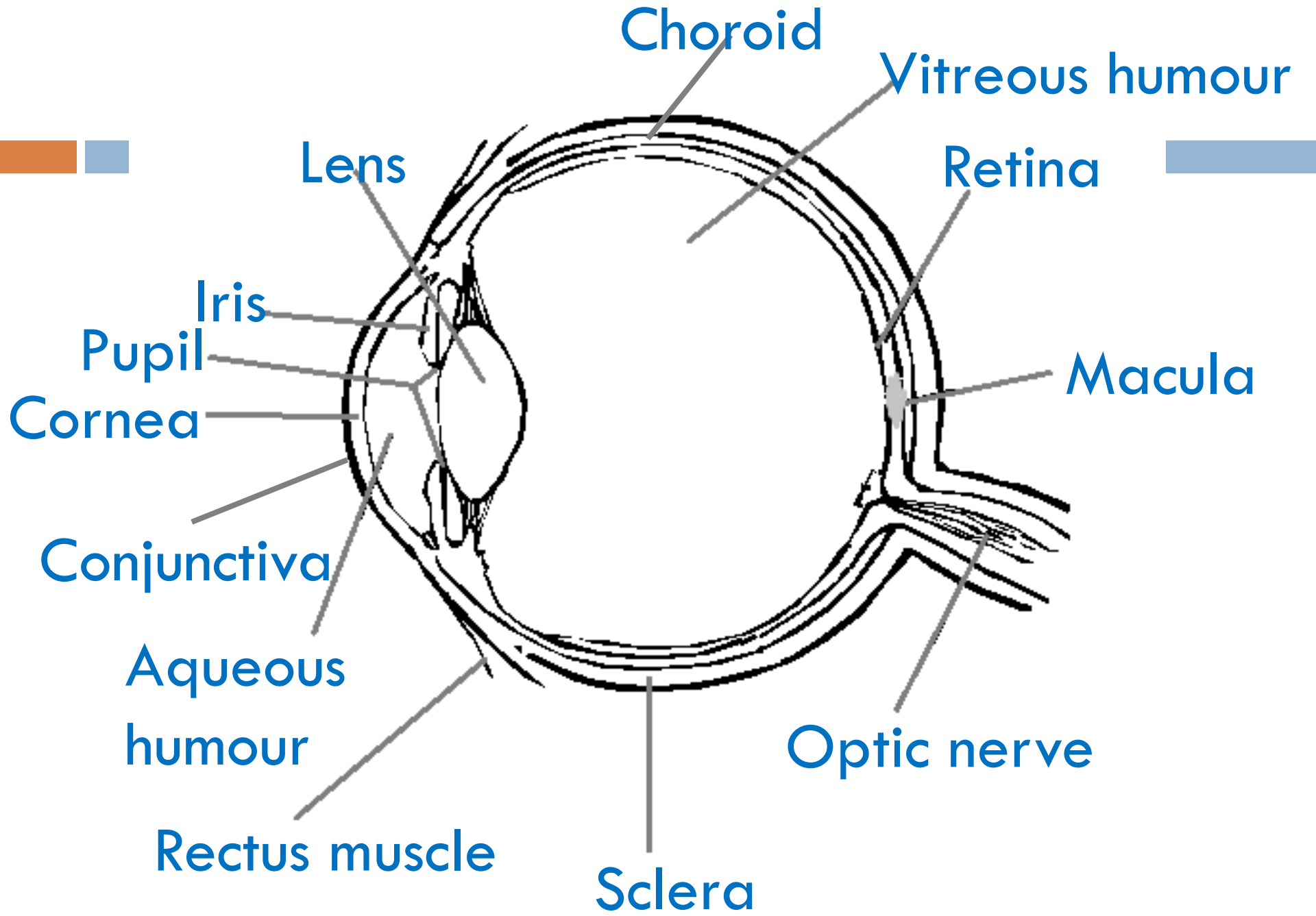
# Inside of the eye




**Right Eye (viewed from above)**

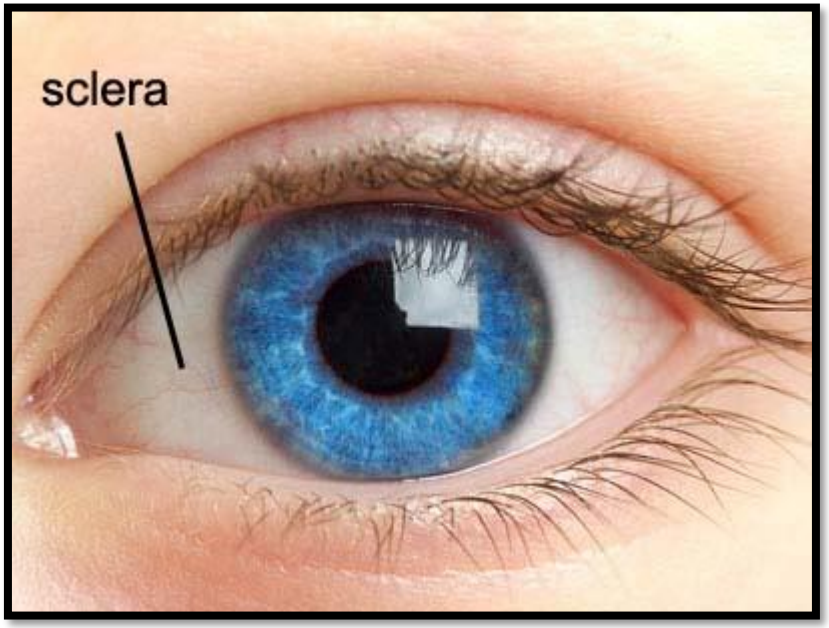
# Inside of the eye




Choroid
Vitreous humour
Lens
Retina
Iris
Pupil
Macula
Cornea
Conjunctiva
Aqueous humour
Optic nerve
Rectus muscle
Sclera

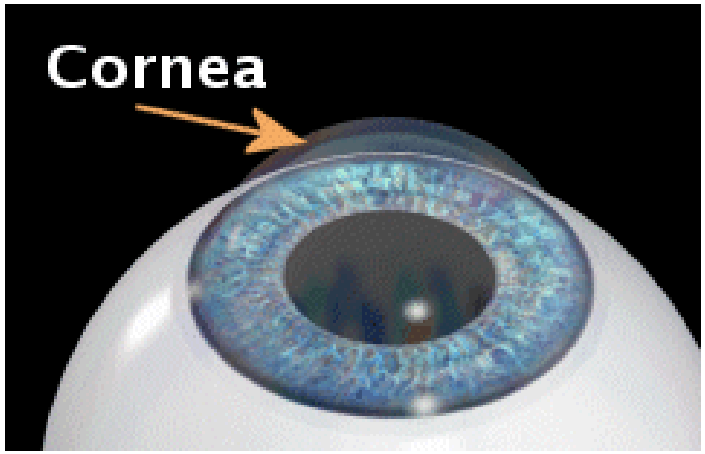
# Layers of the Eye - Sclera

- **Sclera**
  - **Thick, white** & **tough** outer layer
  - Gives the eye a shape
  - **Protects it**
  - Provides a place to attach the muscles



# Layers of the Eye - Cornea

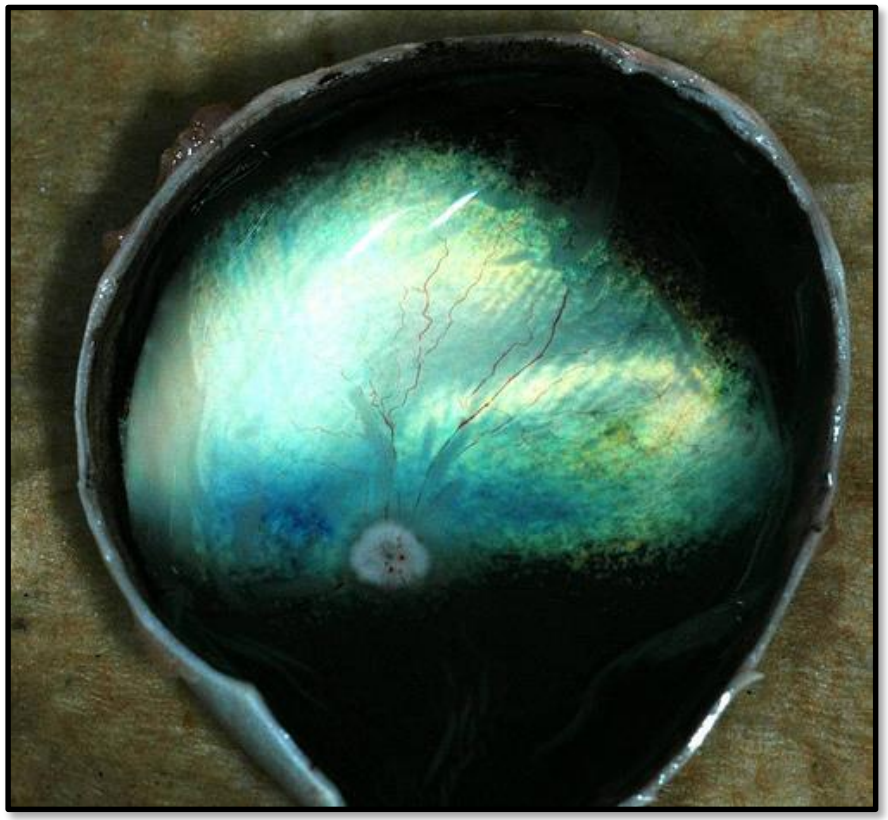
- **Cornea**
  - Here the sclera becomes **clear** like a window
    - It bulges out slightly in front
  - The anterior (front) chamber is filled with a liquid called **Aqueous fluid**
    - It's clear and watery and **nourishes** the cornea



# Layers of the Eye - Cornea

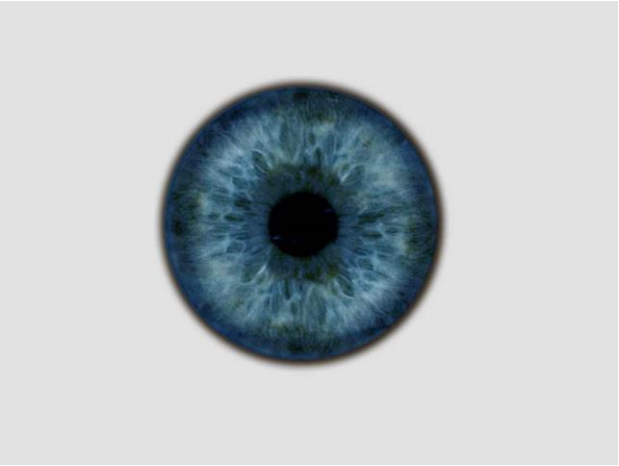
- **Choroid**
  - Dark and pigmented **middle layer** of the eye
    - Very thin
  - Contains lots of **blood vessels** that nourish the eye
  - Prevents light from **reflecting** inside the eye
  - In some animals there is a bright strip called the **tapetum**.
    - It's found in nocturnal animals. It catches the light and shines it back through the retina.
      - That's why animals eyes glow in your headlights

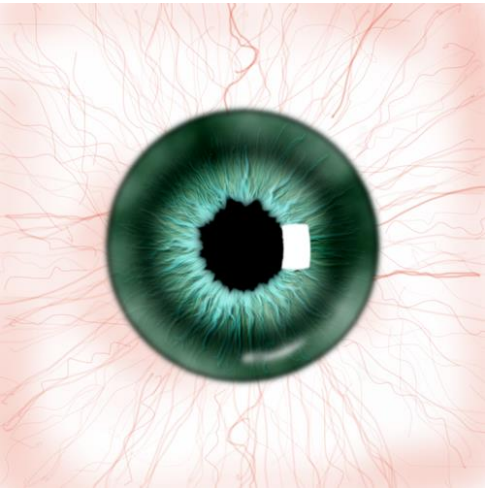
# *Tapetum lucidum*



# Iris

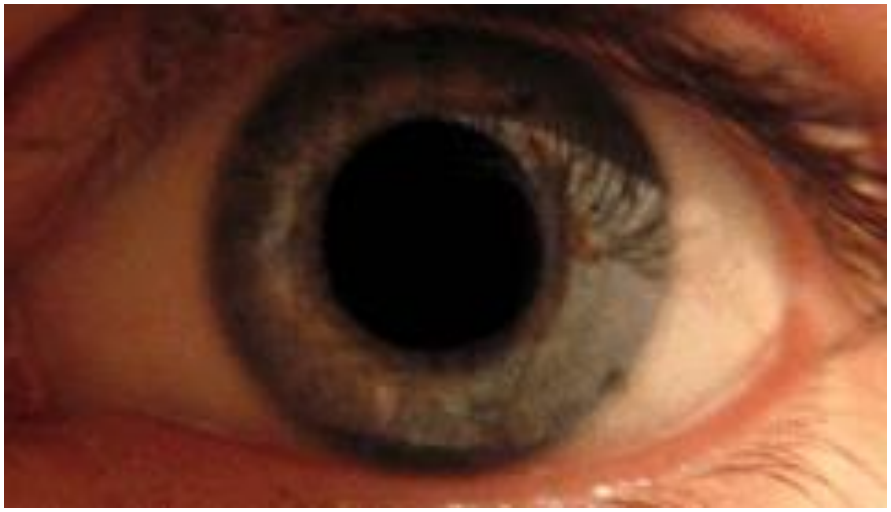
- The **coloured part** of your eye
  - It's derived from the **choroid layer**
- It controls the **amount of light** entering the eye
- It has two sets of **smooth muscles**
  - One **opens** the inner ring of the iris
  - One **closes** the inner ring





# Pupil

- The pupil is the **opening of the eye**
  - This is where **light enters the eye**
  - It appears **black** because the inside of the eye **does not reflect light**
    - Like looking inside **a cave**



# Lens

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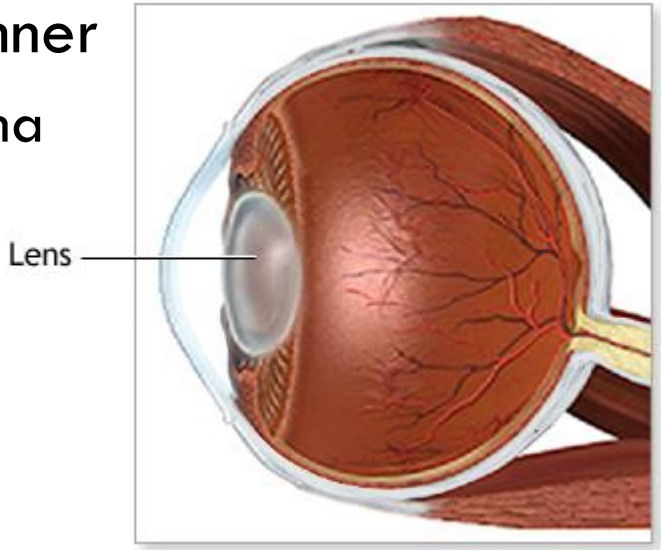
- Is **bi–convex**
- It is behind the pupil
- It is held by **ligaments**
- Controlled by **ciliary muscles**
  - They make the lens fatter or thinner
    - This focuses the image on the retina



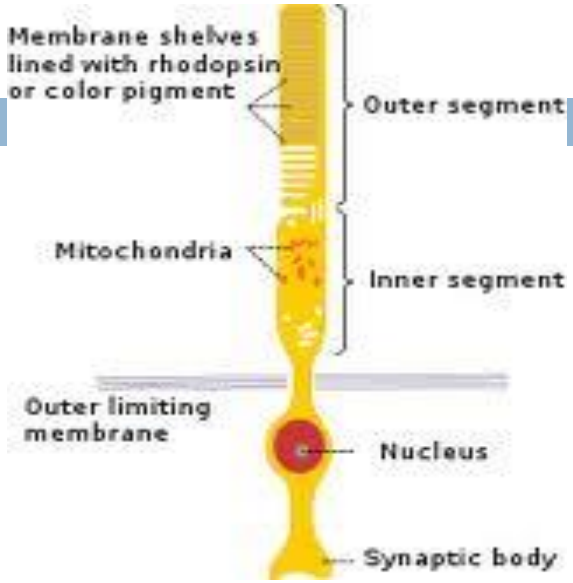

ADAM.

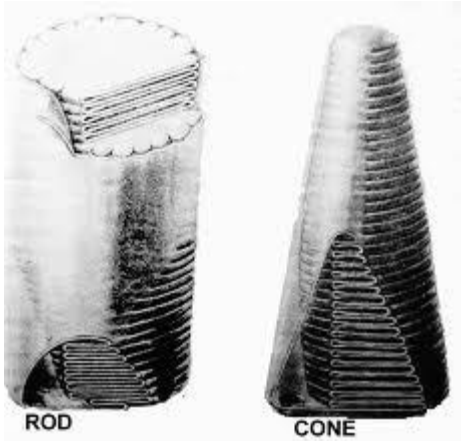
# Retina

- Retina
  - Innermost layer
  - Very **thin**, like wet tissue paper
  - Contains **nerve receptor cells**
    - They respond to light (convert light to **electrical stimulus**)
    - Transmit a **nerve impulse** to the sensory neurons
    - Two types of photoreceptor cells:
      - **rods** and **cones**

# Rods & Cones

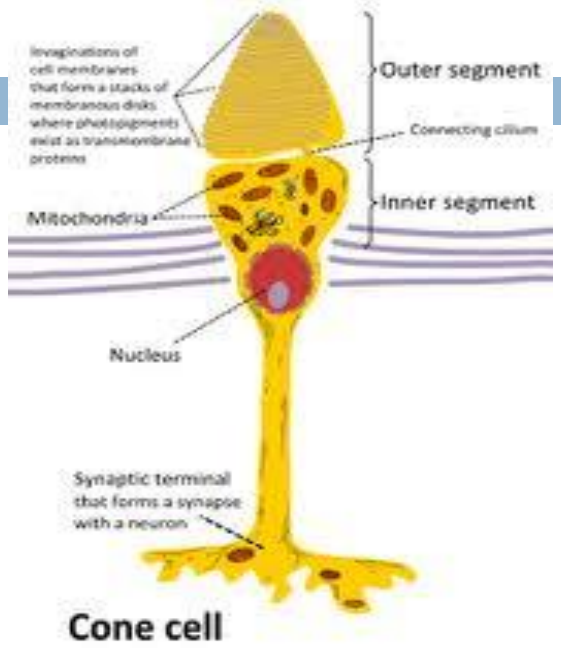
- **Rods**
  - Sensitive to **low light** and **movement**
    - Important for **night vision**
  - Contain **rhodopsin** (pigment)
    - Rhodopsin is made from vitamin A (eat your carrots!)
  - 125,000,000 rods in each eye

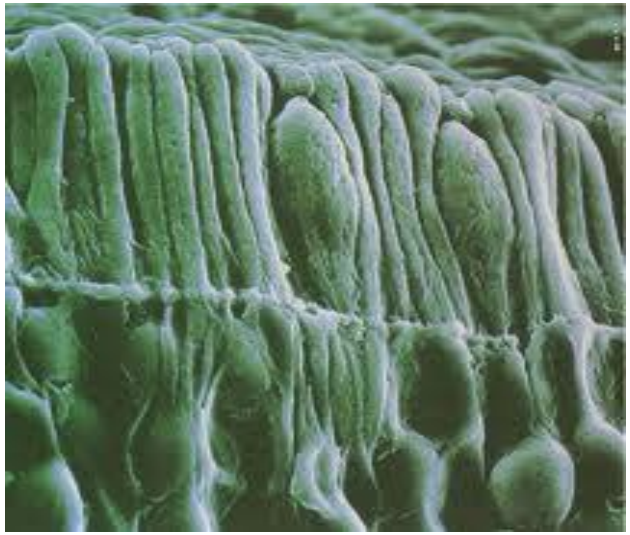


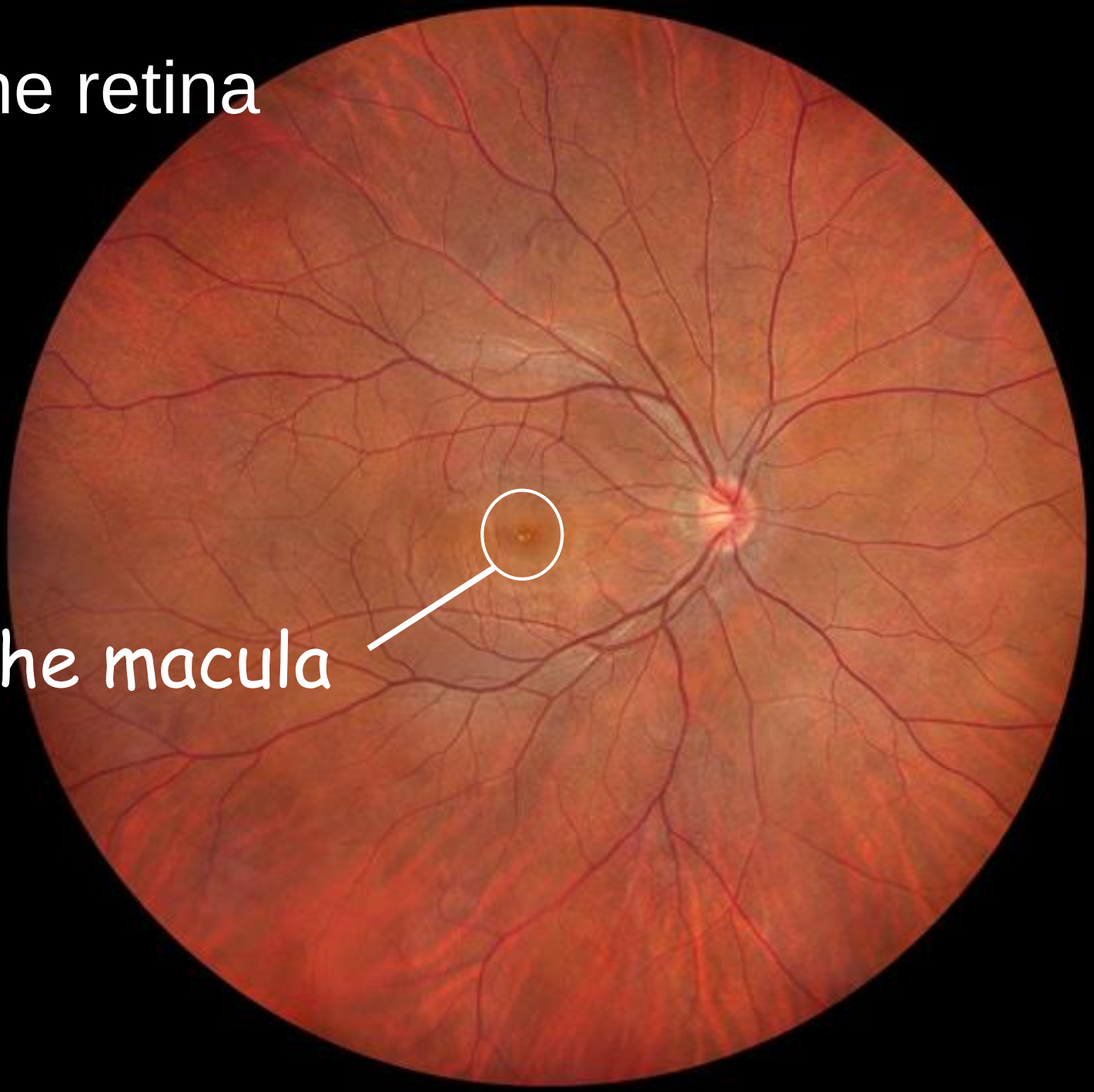
# Rods & Cones

- **Cones**
  - Sensitive in **bright light**
  - Detect **colour, detail of image**
  - Three kinds of cones: **cyan, green, magenta**
  - Concentrated behind the pupil in an area called the **Macula**.
    - This is where your vision is most **acute**.



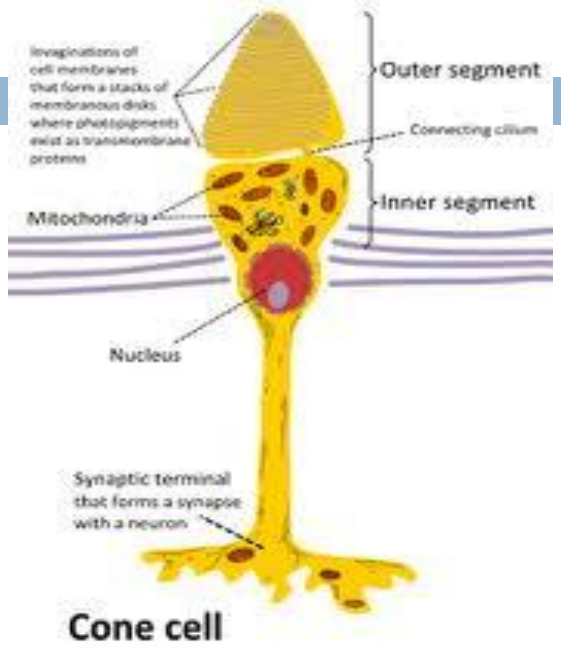



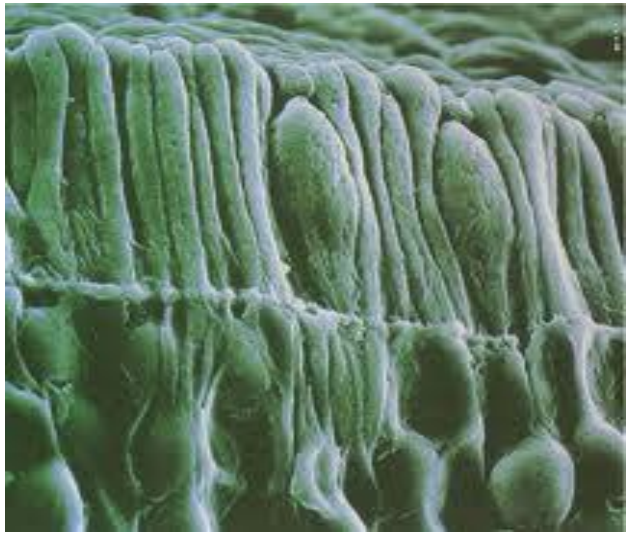
# The retina



# Rods & Cones

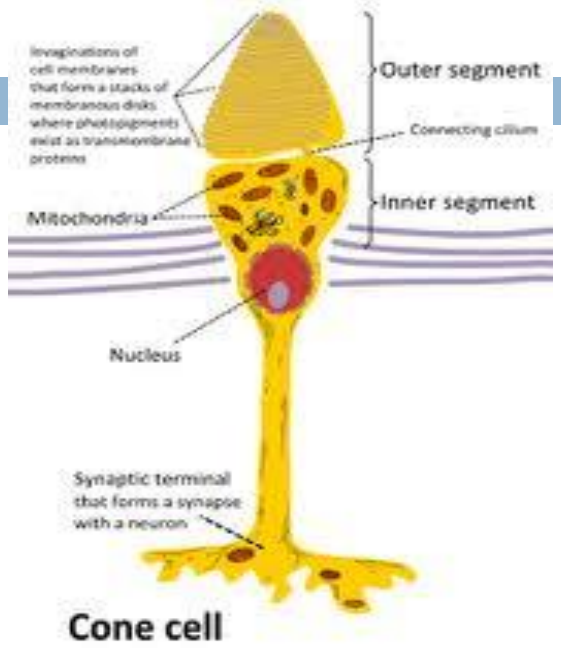
- **Cones and Rods**
  - We have many **more rods** than cones (about 20x!)
  - The **rods** are relatively **spread out** across the retina but the **cones** are really concentrated in the **macula**

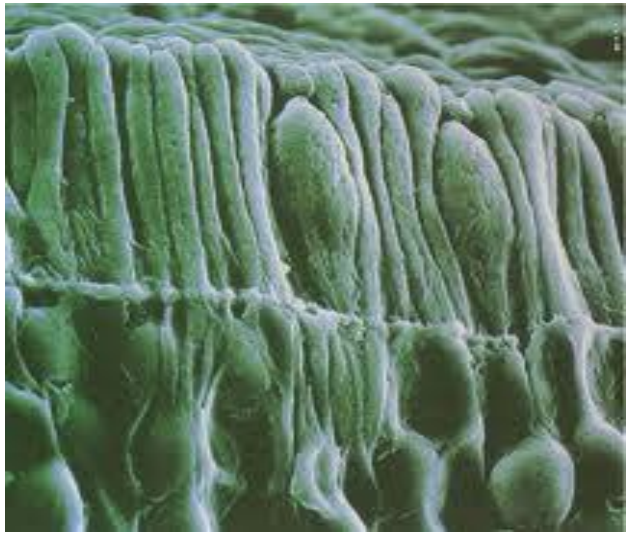


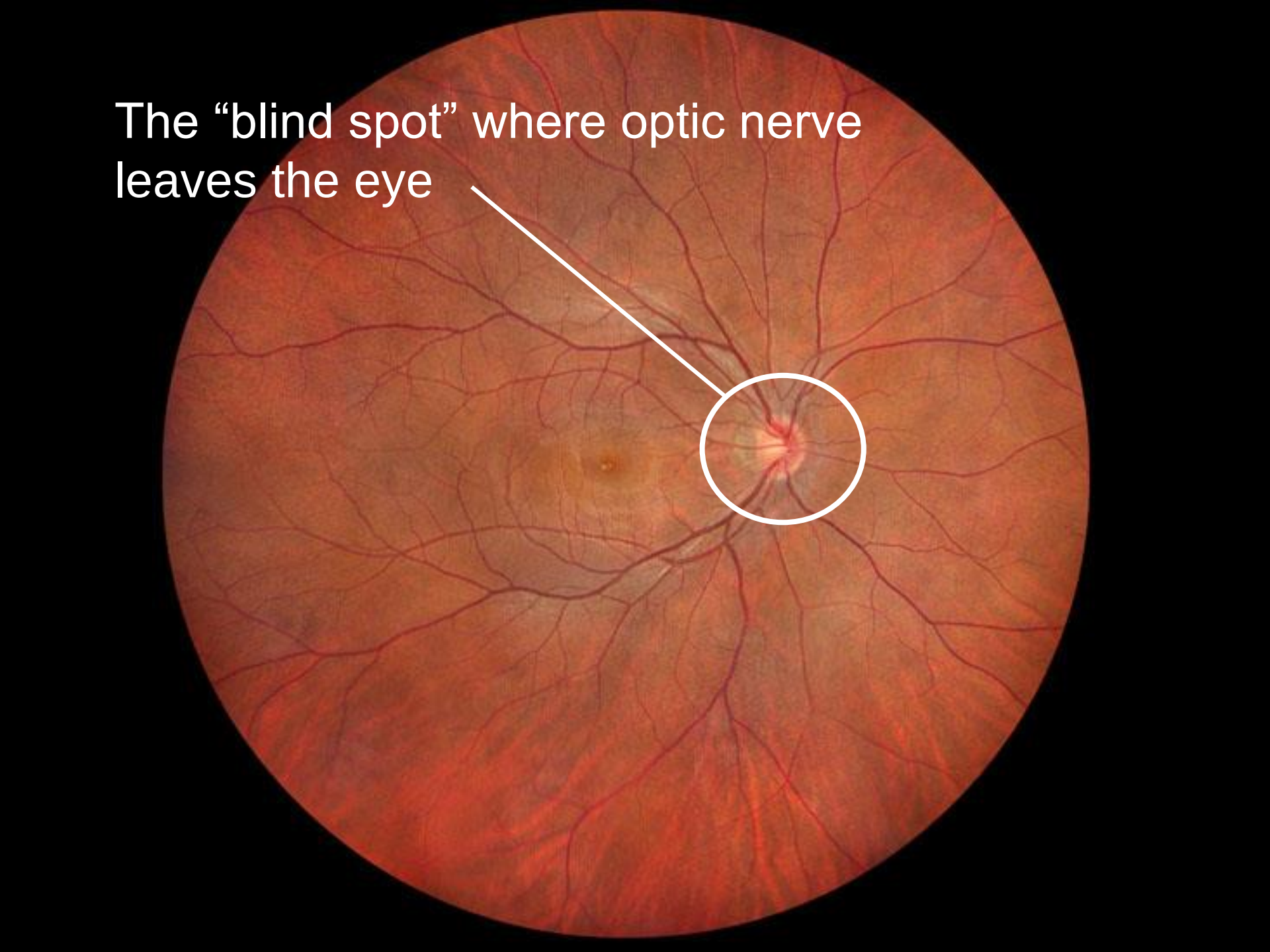



# Rods & Cones

- **Blind spot**
- there is also a part of the retina that has **no photoreceptors**
  - This is where the **optic nerve** is attached to the **retina**
  - Because there are **NO photoreceptors** there, if light hits this part of the retina you **don't actually see anything**




The “blind spot” where optic nerve leaves the eye