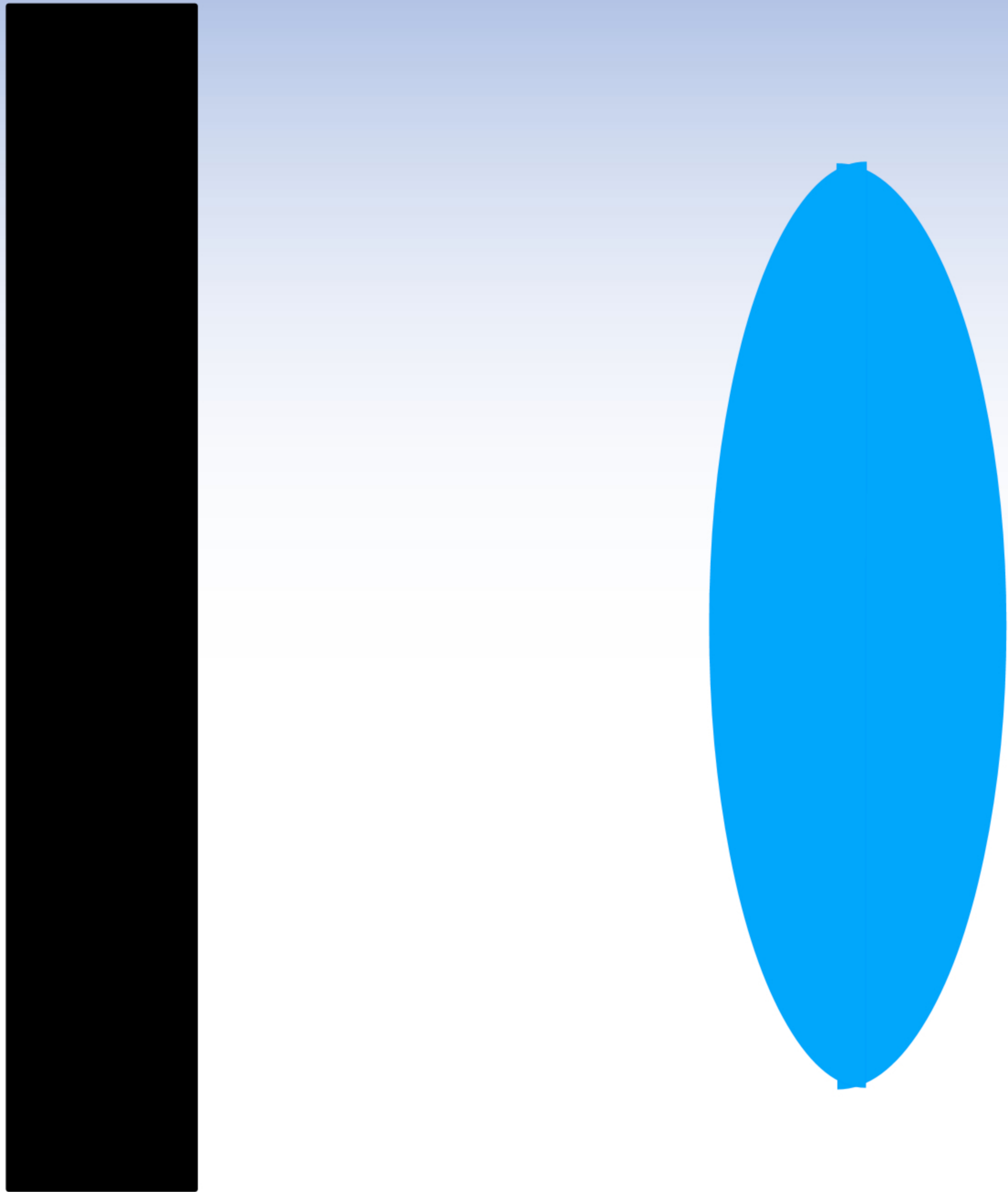


# Announcements

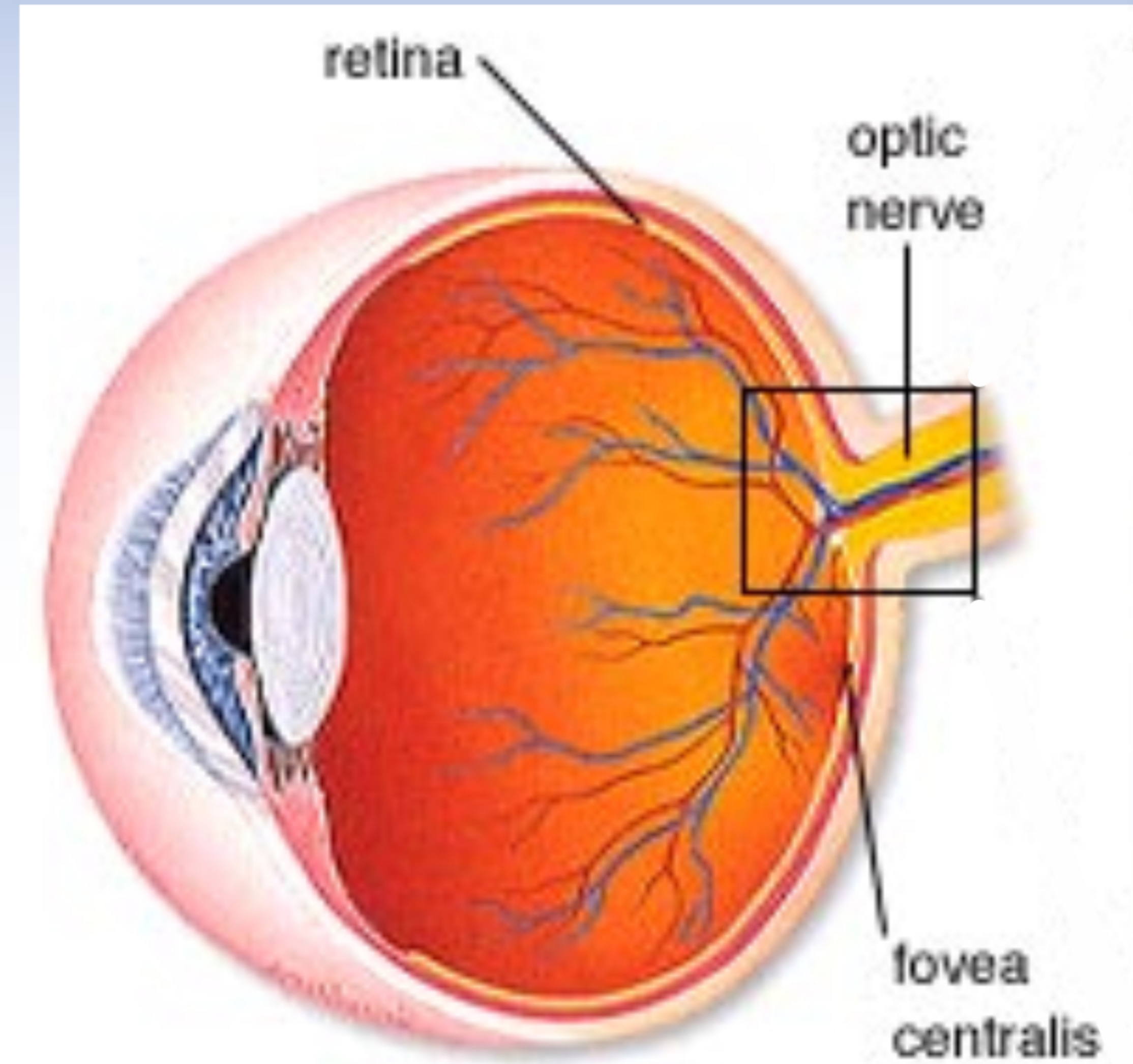
- **MP3** is out today due in two weeks on Oct 22.
- **Exam 1** is coming soon: 10/21/2015 7-9 pm in SIEBL 1404
- New Virtual Reality book by Steven LaValle: 2 chapters ready  
[msl.cs.uiuc.edu/vr](http://msl.cs.uiuc.edu/vr)
- **Projects:** get started!
- Unity Tutorials: Wed Oct 14 6pm , Th Oct 15 6pm

# Imaging System Inside of a Human Eye

output pixels:



input pixels



# How Does Our Brain Pieces Images Together?

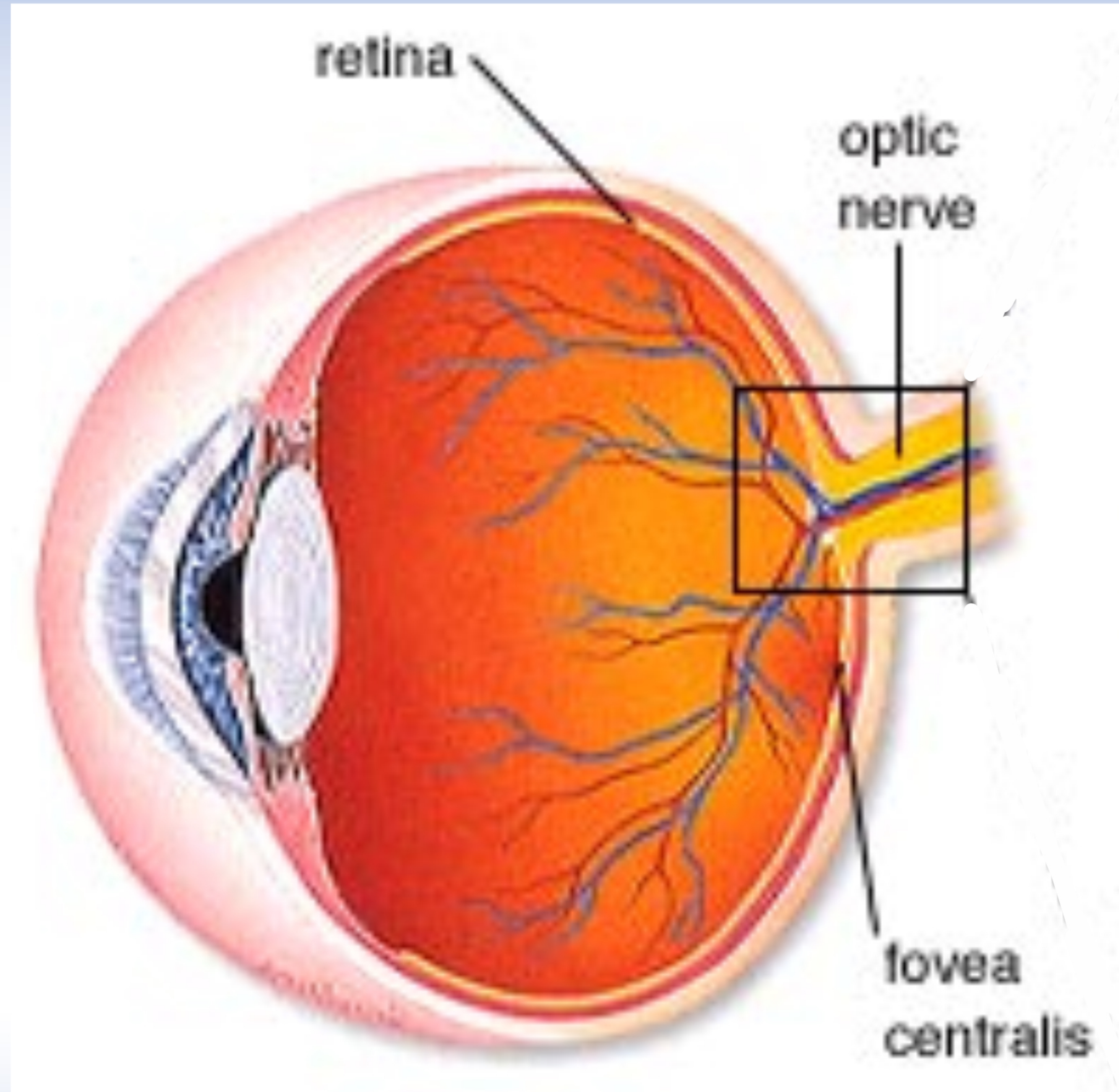


<https://www.youtube.com/watch?v=2NcUkvIX6no>

<https://www.youtube.com/watch?v=eR2j-fh18mk>

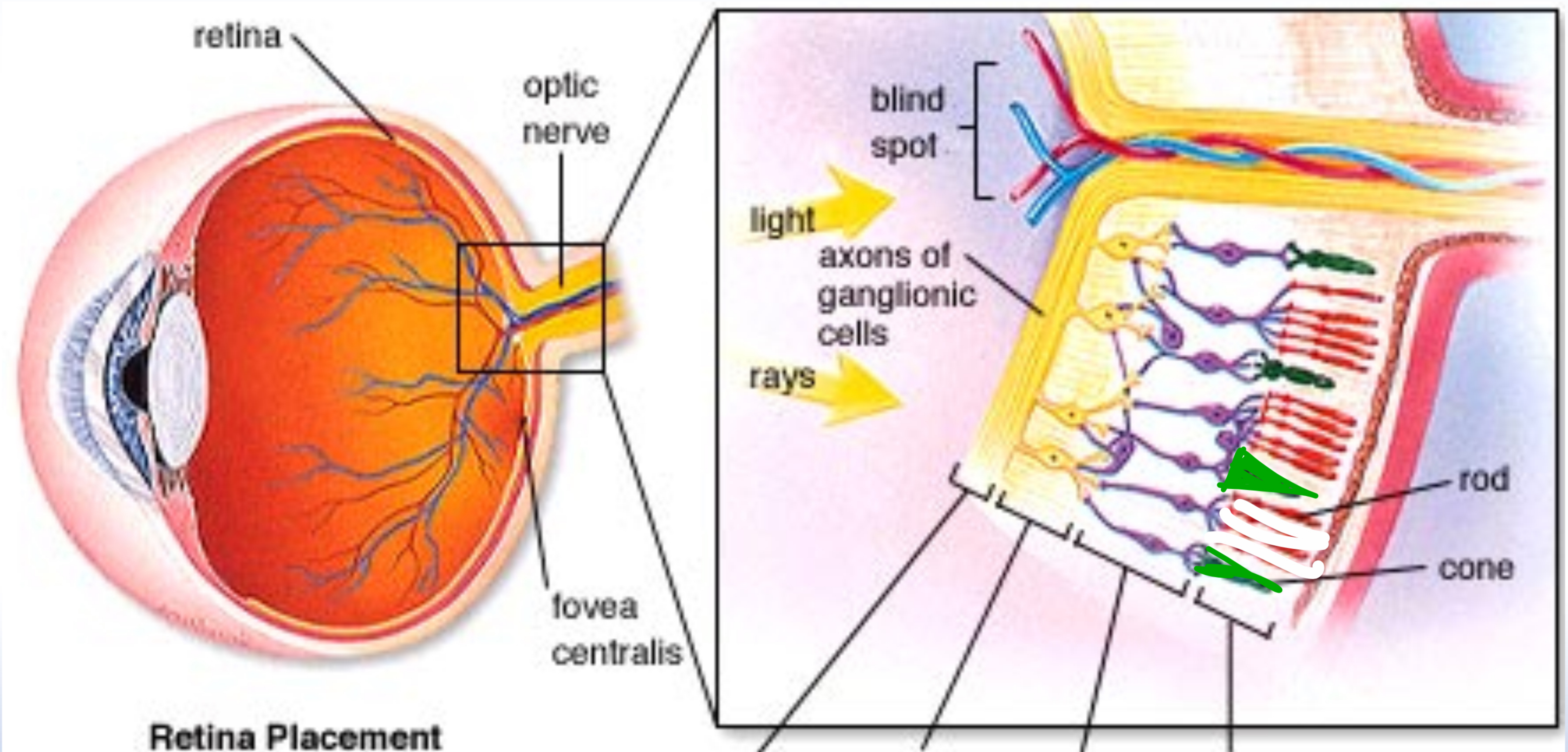
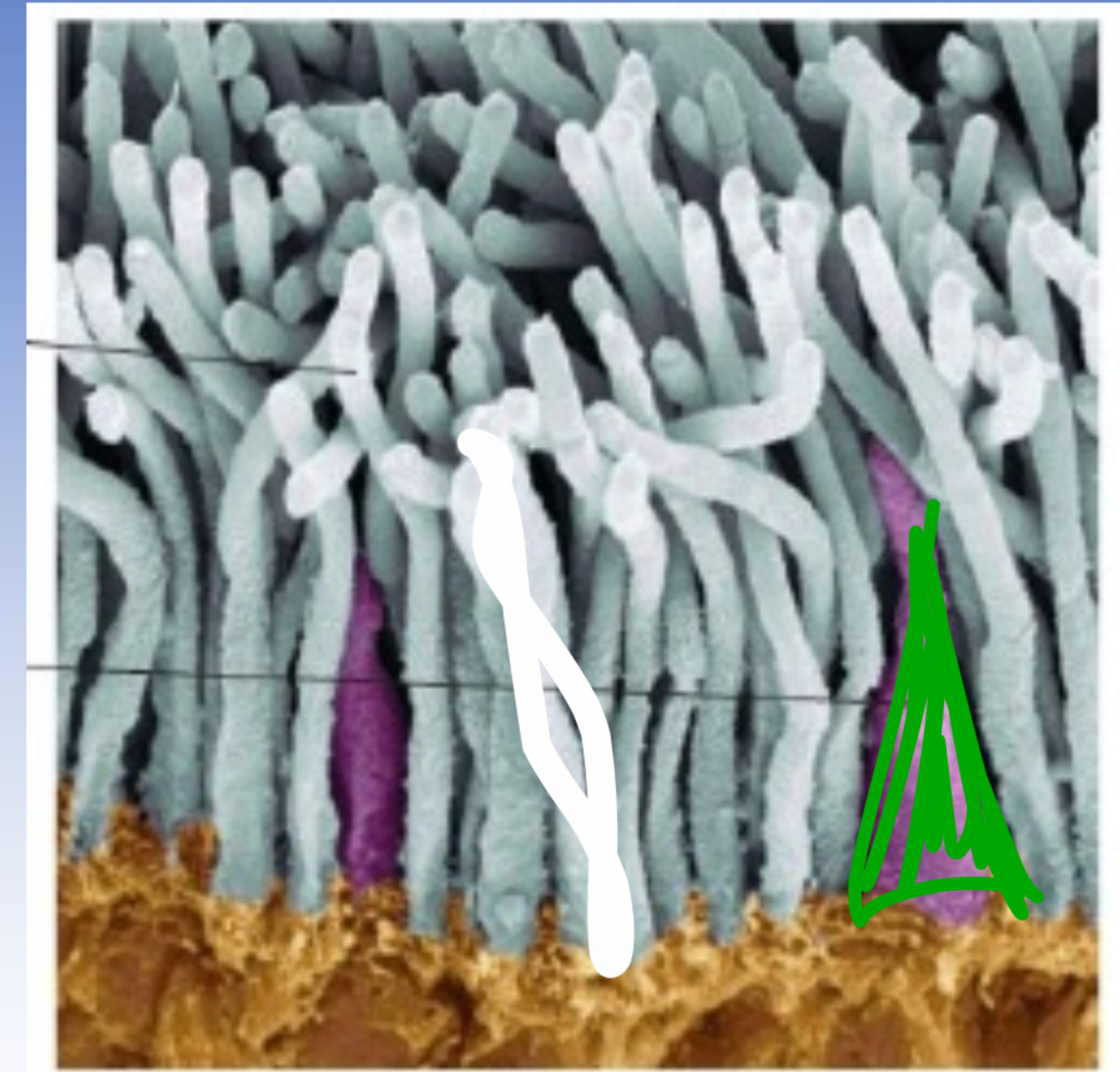
[https://www.youtube.com/watch?v=3\\_dm7jSX4Cw](https://www.youtube.com/watch?v=3_dm7jSX4Cw)

# Peripheral Vision



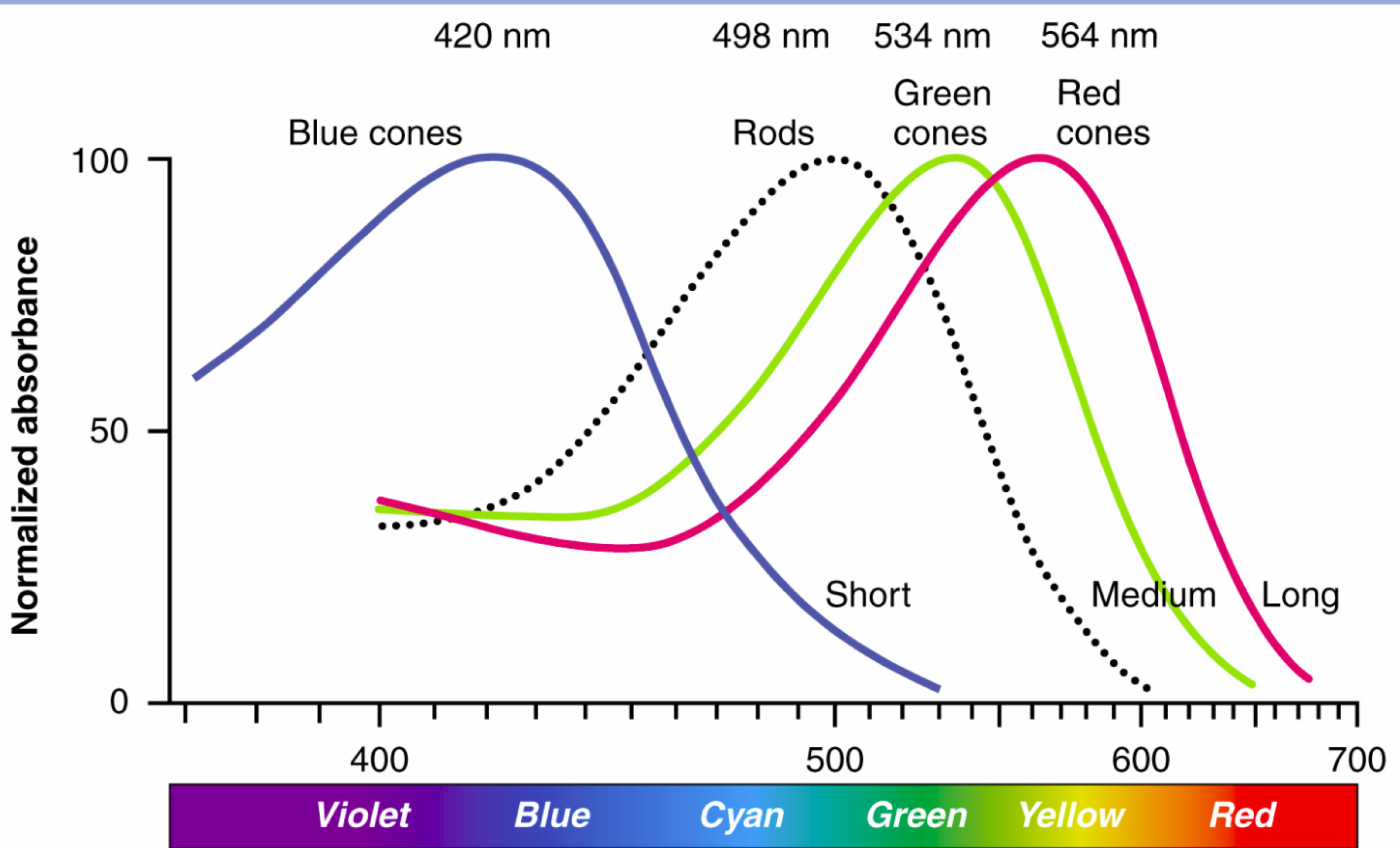
# Photoreceptors

There are two types:



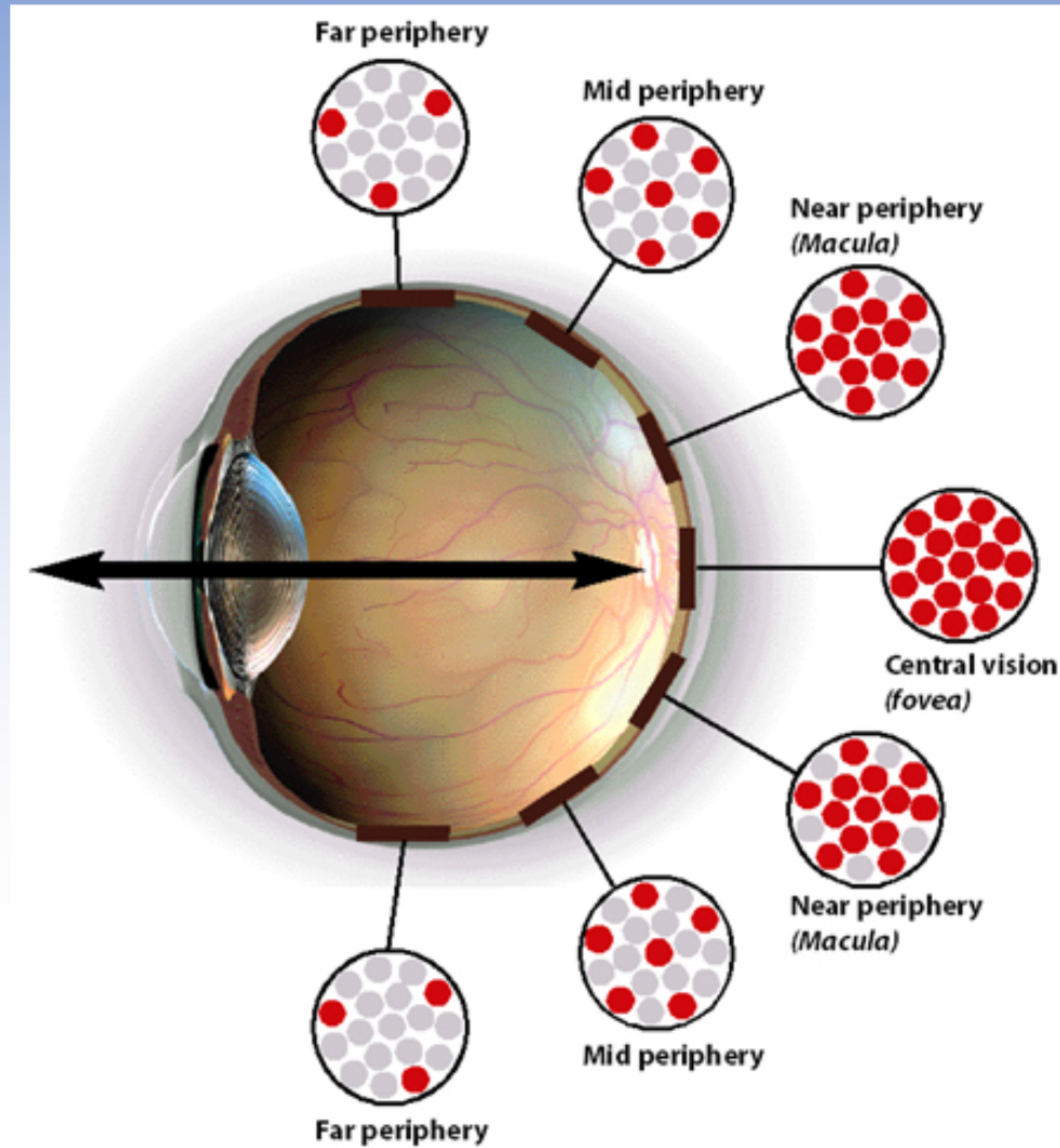
Retina Placement

# Rods And Cones Sensitivity



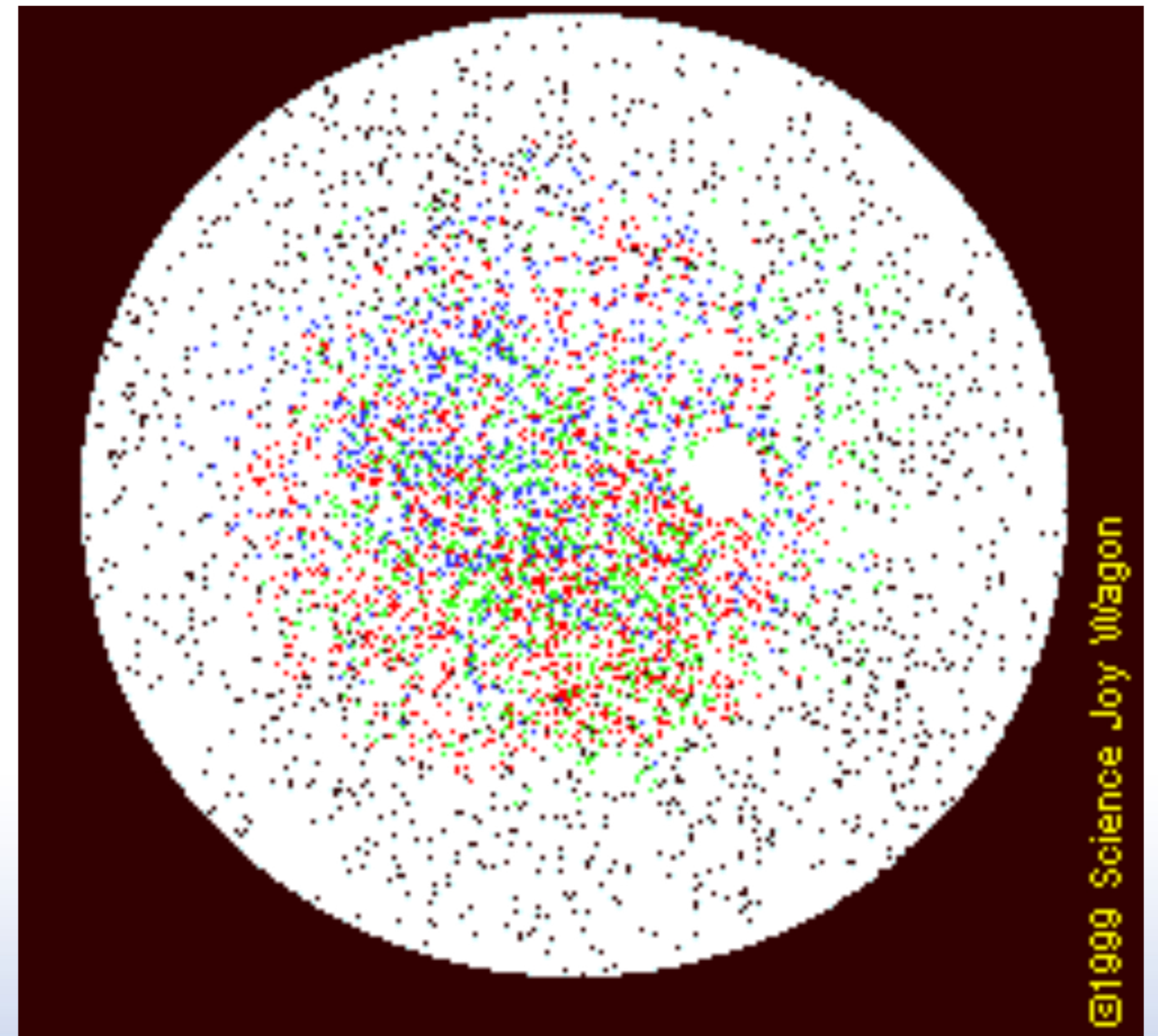
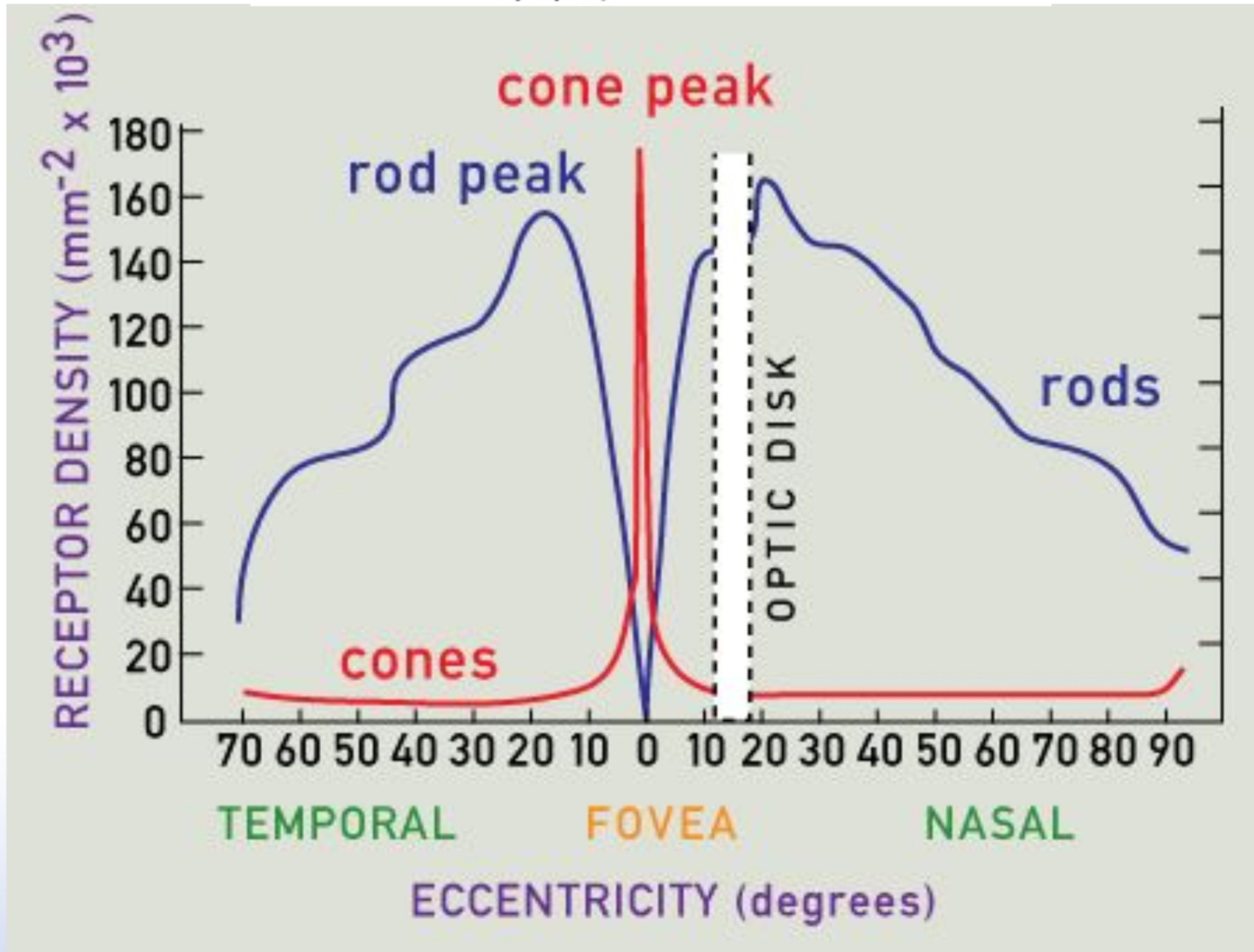
Examples:

# Rods and Cones Placement



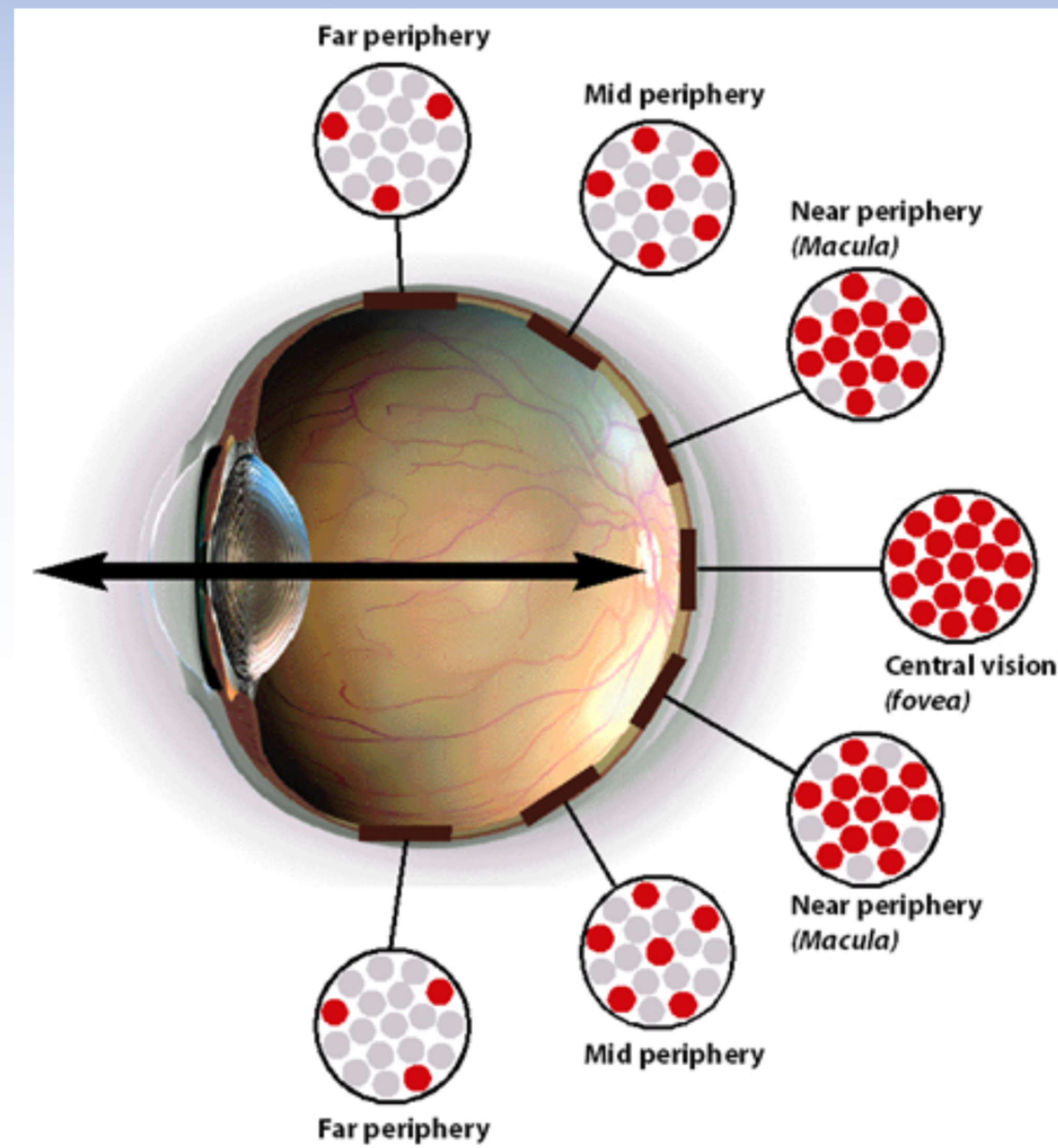
Which eye is this?

Why is there asymmetry?

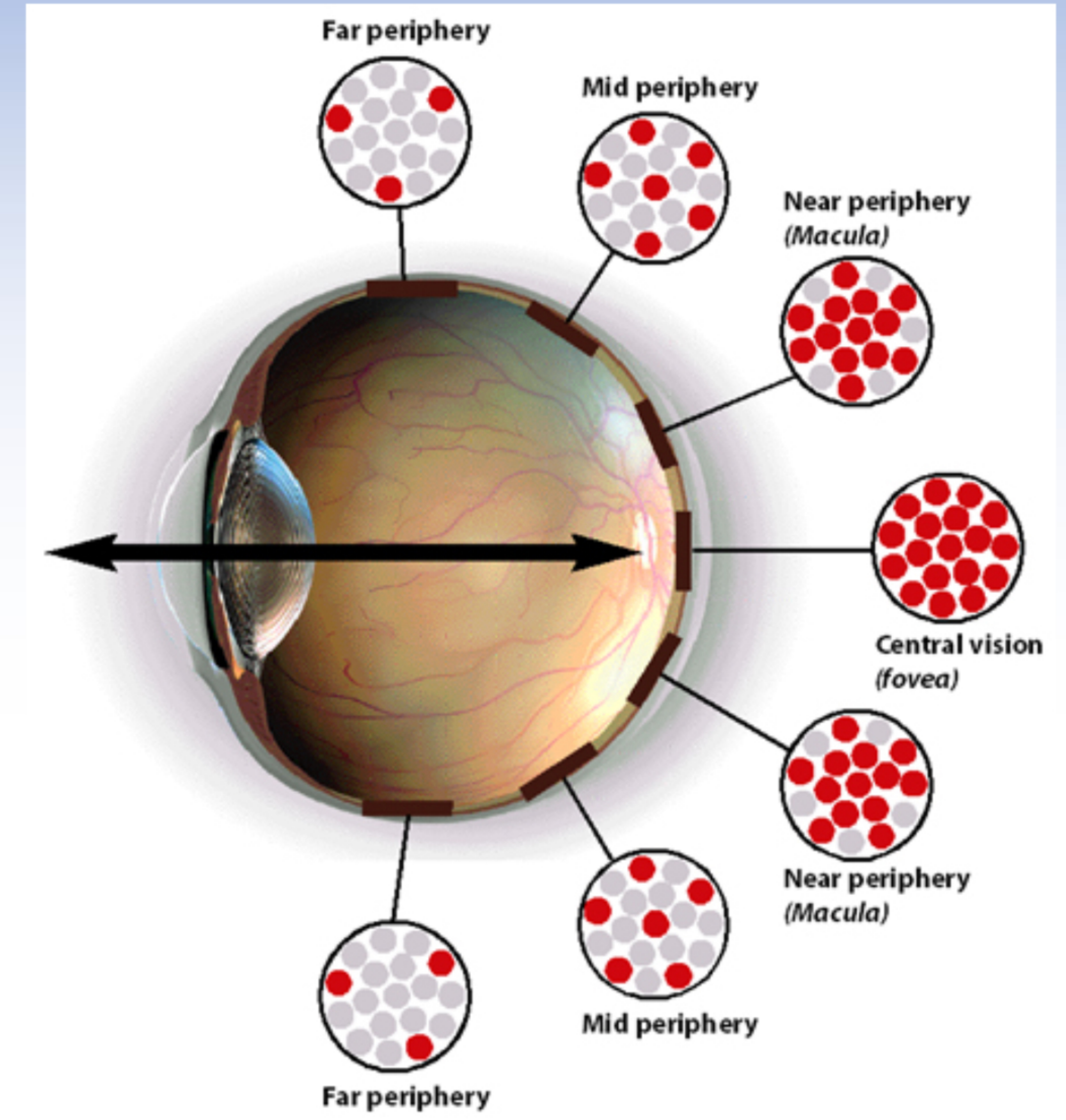


# Examples

bright light

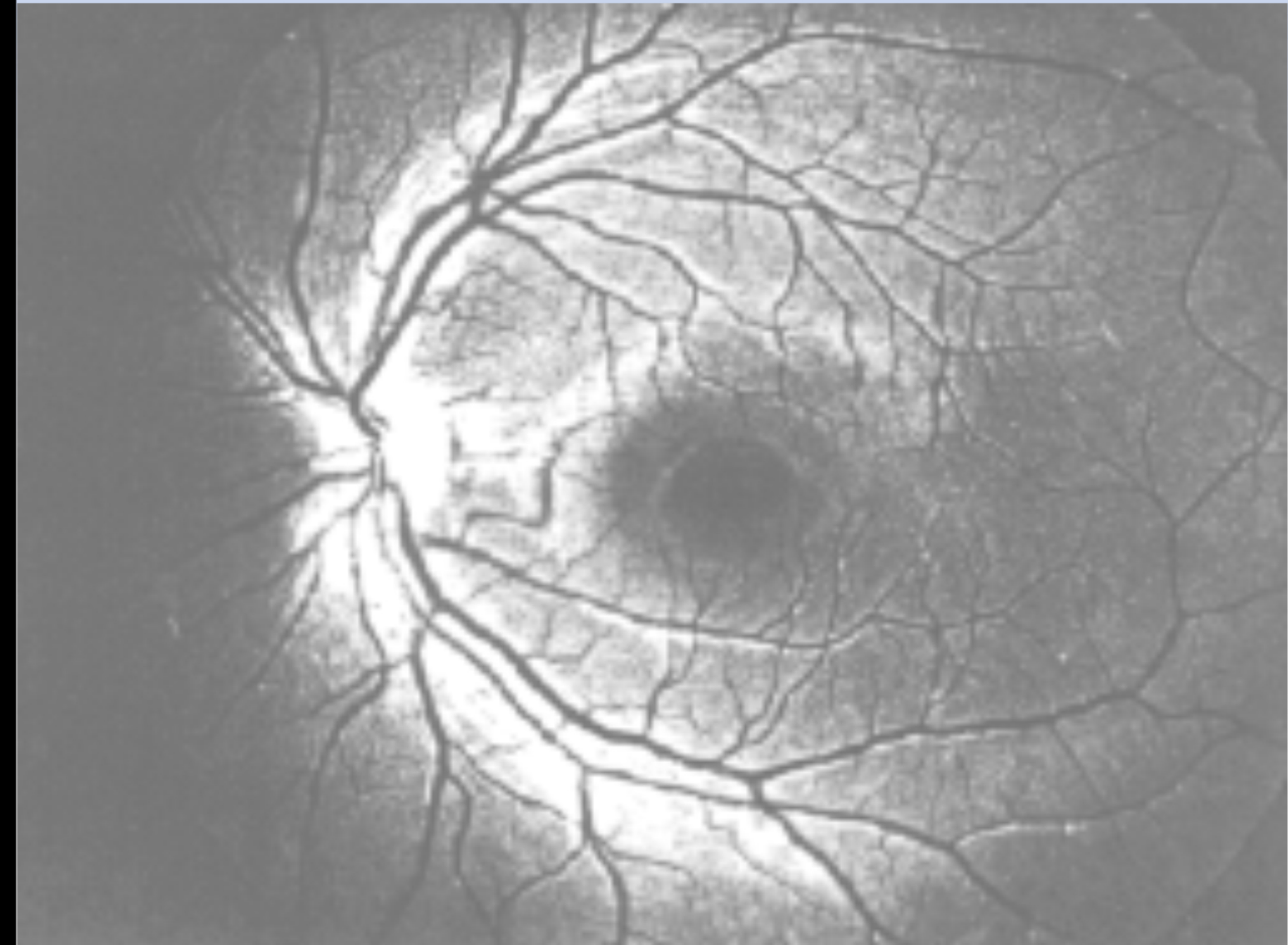
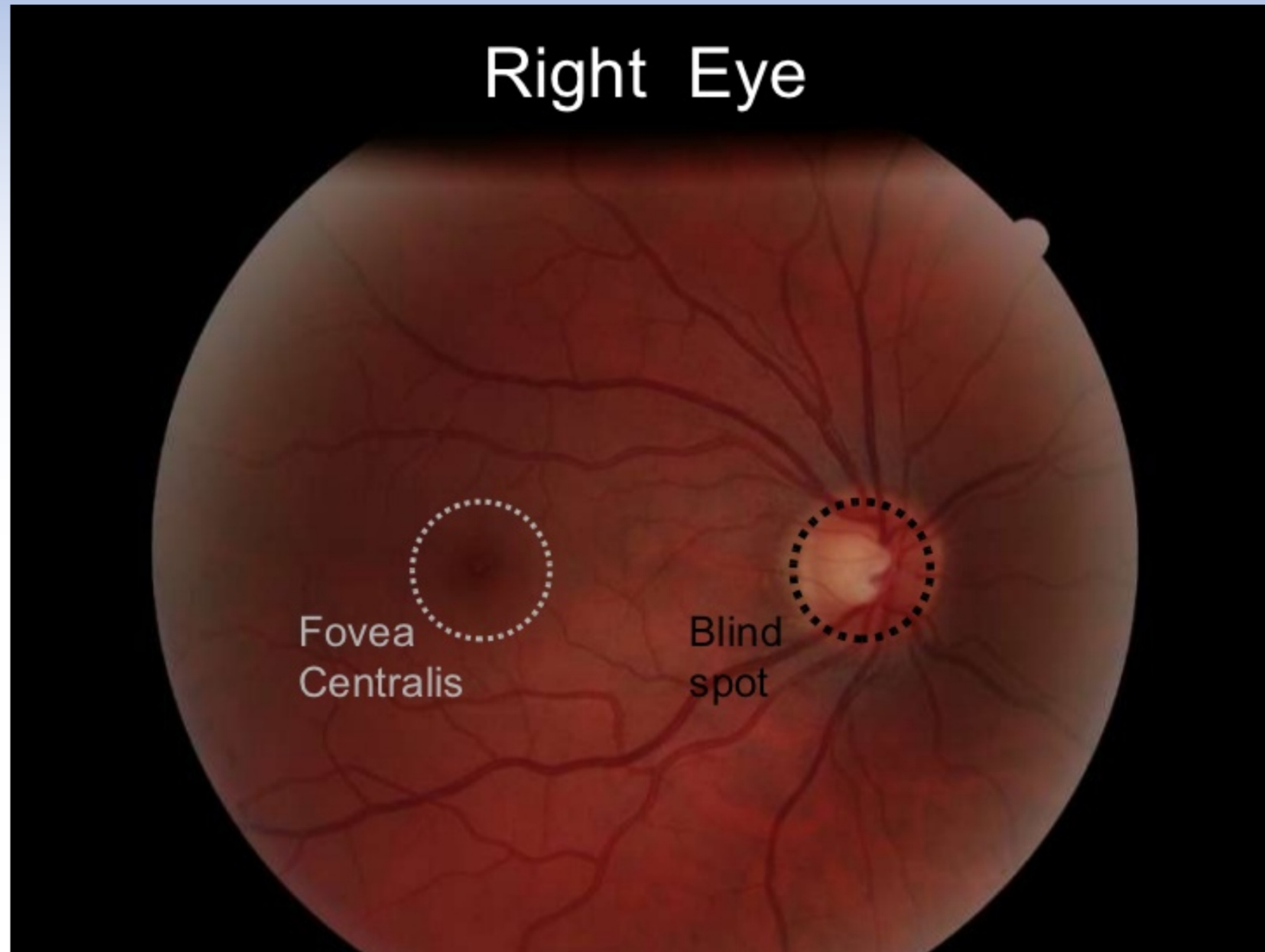


low light

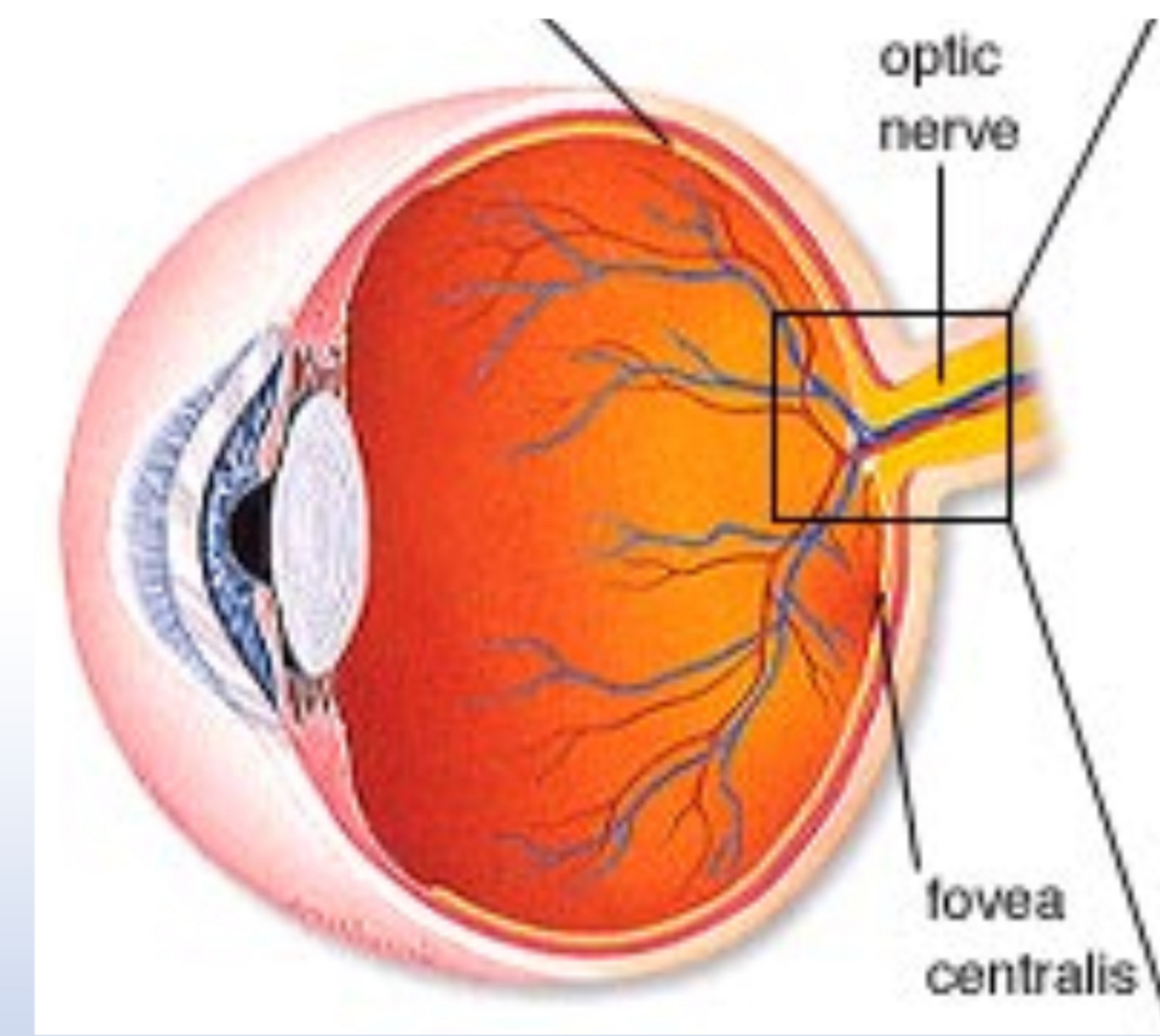




# How to See "Stuff" Blocking Photoreceptors



[https://www.youtube.com/watch?v=L\\_W-IXqoxHA](https://www.youtube.com/watch?v=L_W-IXqoxHA)



Would astigmatism affect seeing eye blood vessels?

# A Lot is Not Known About Human Eye



Concentrate on the 4 dots for 30 secs.  
Then, shift your eyes to the wall and blink.  
Who do you see???

# How Much Display Resolution is Enough in VR?

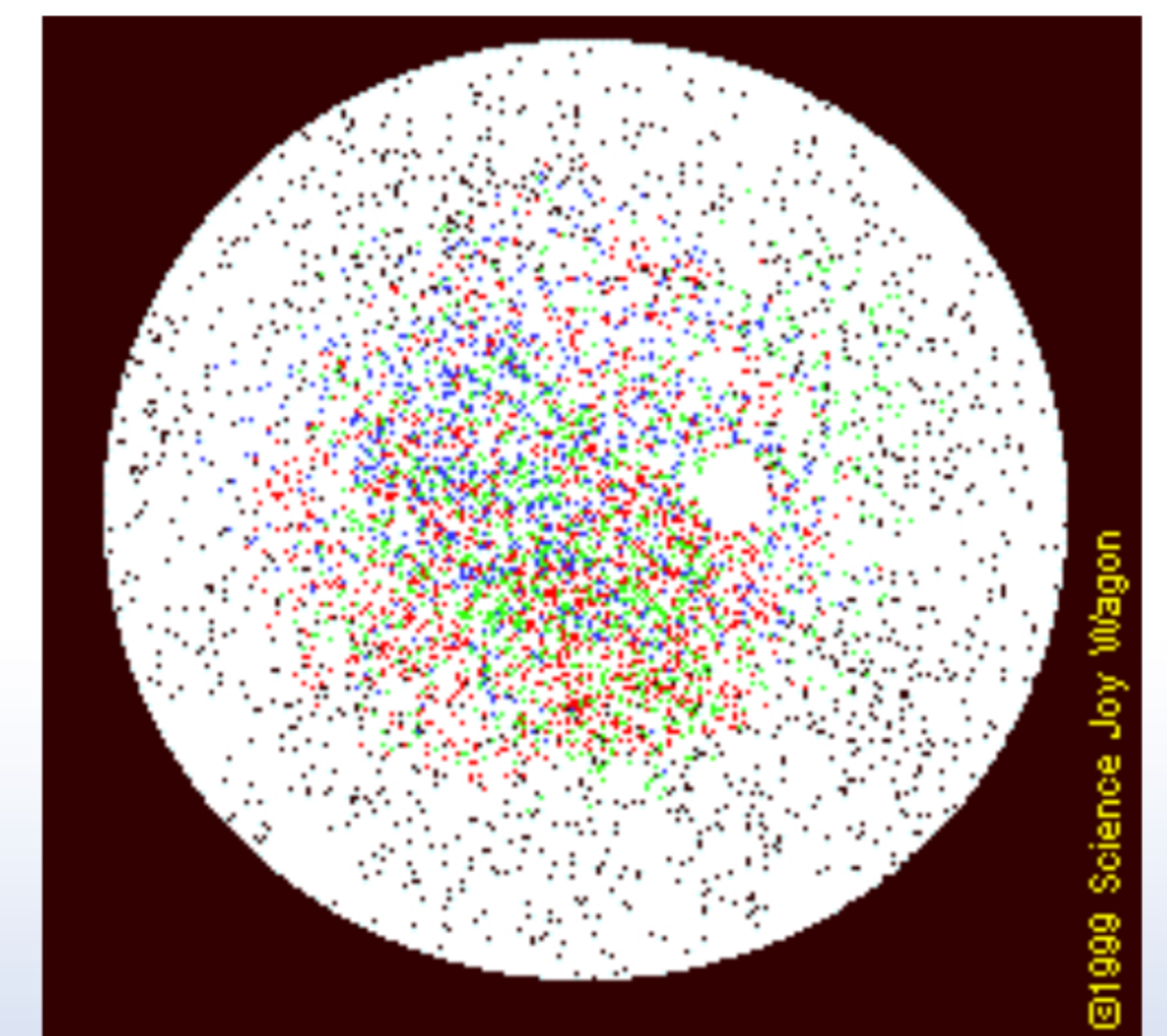
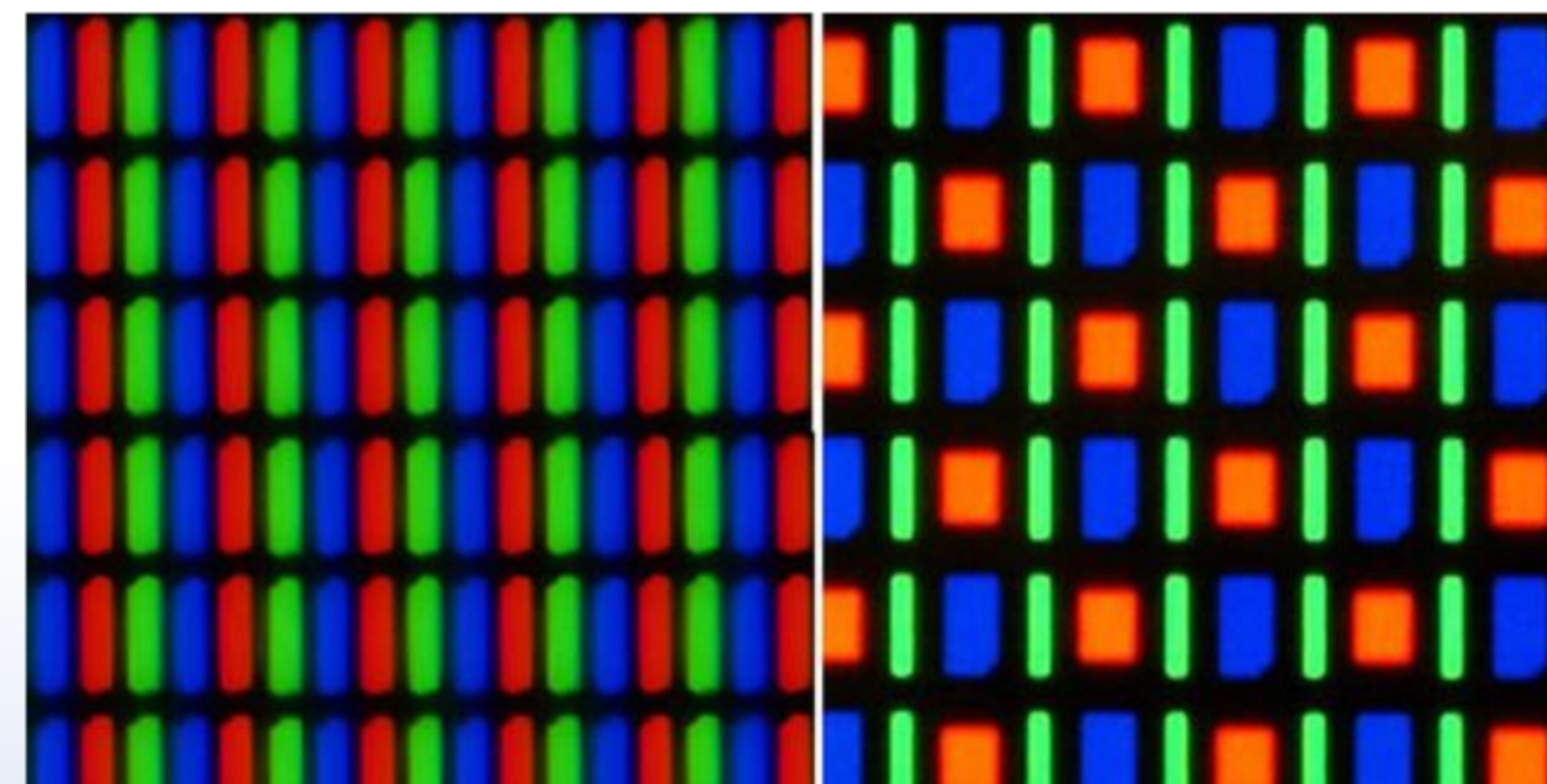
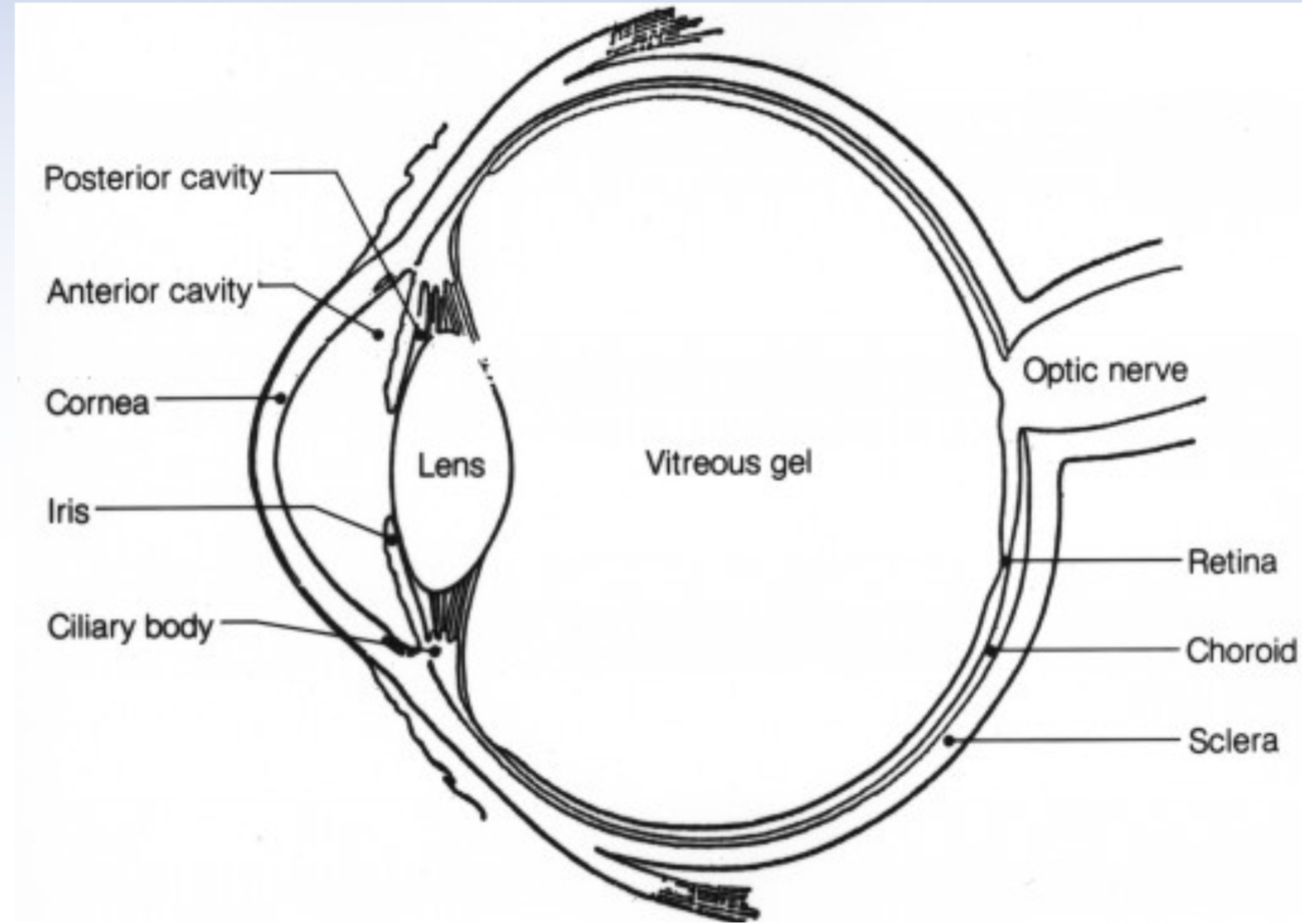
output pixels: RGB



interface

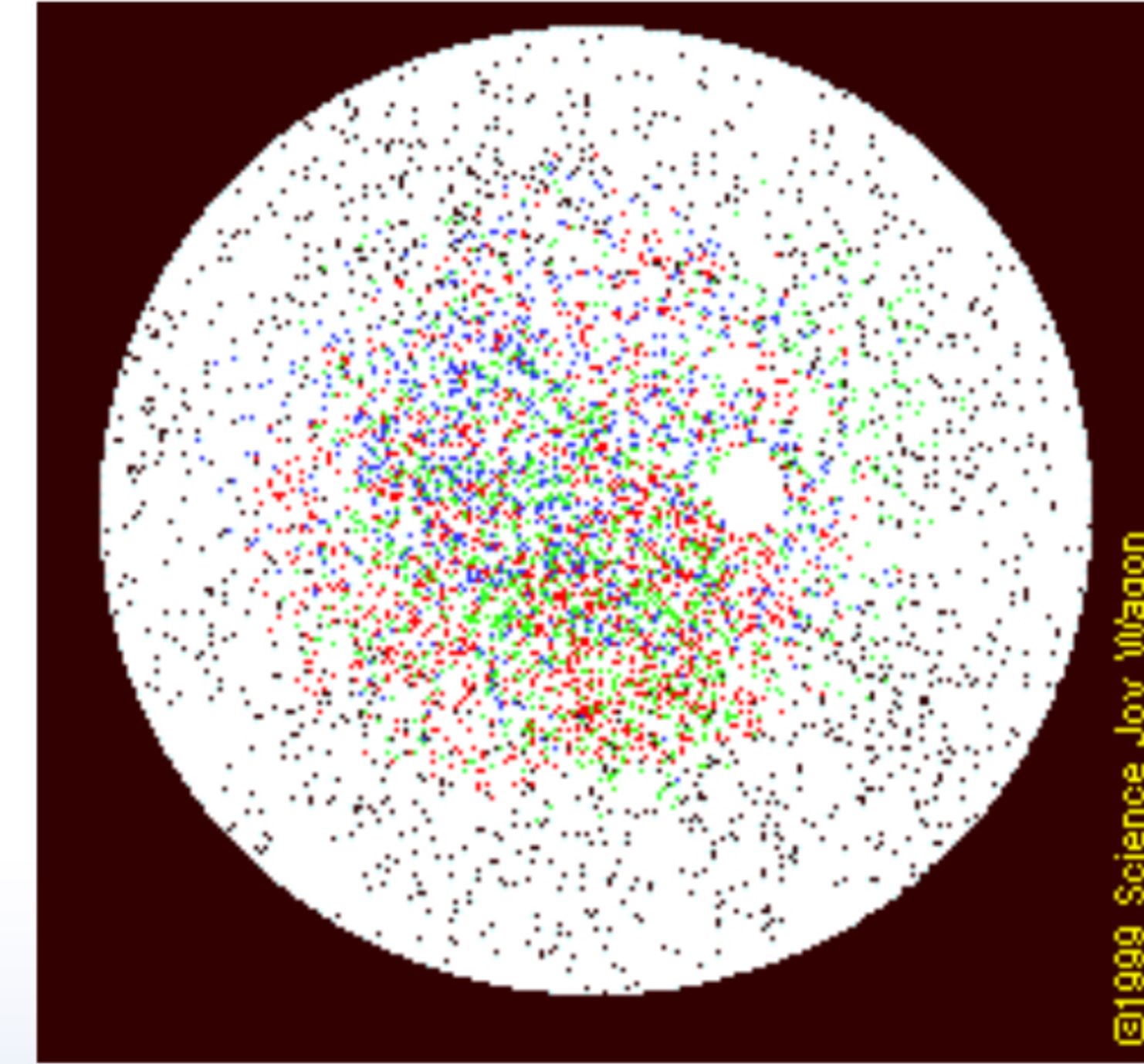
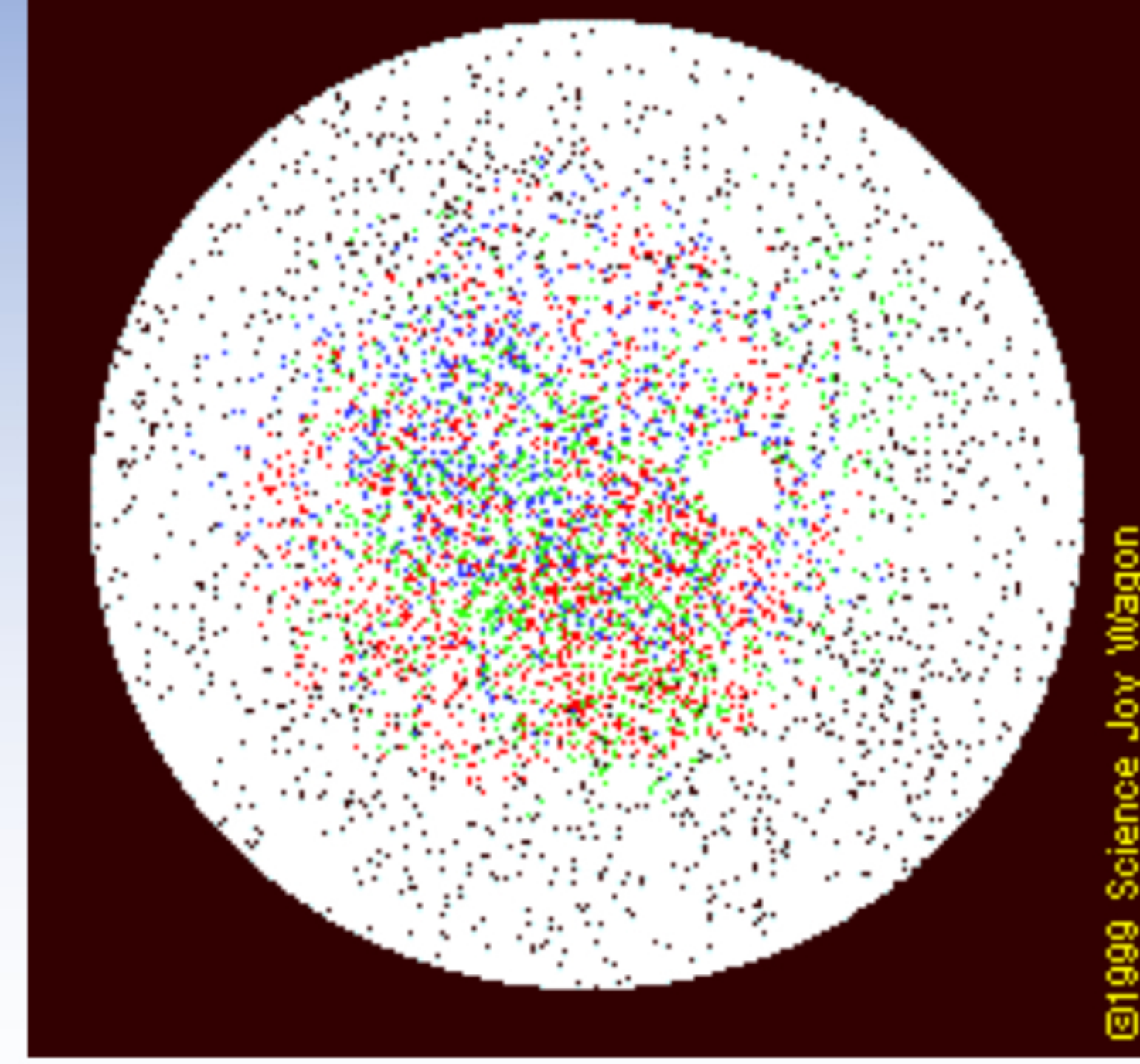


input pixels - photoreceptors



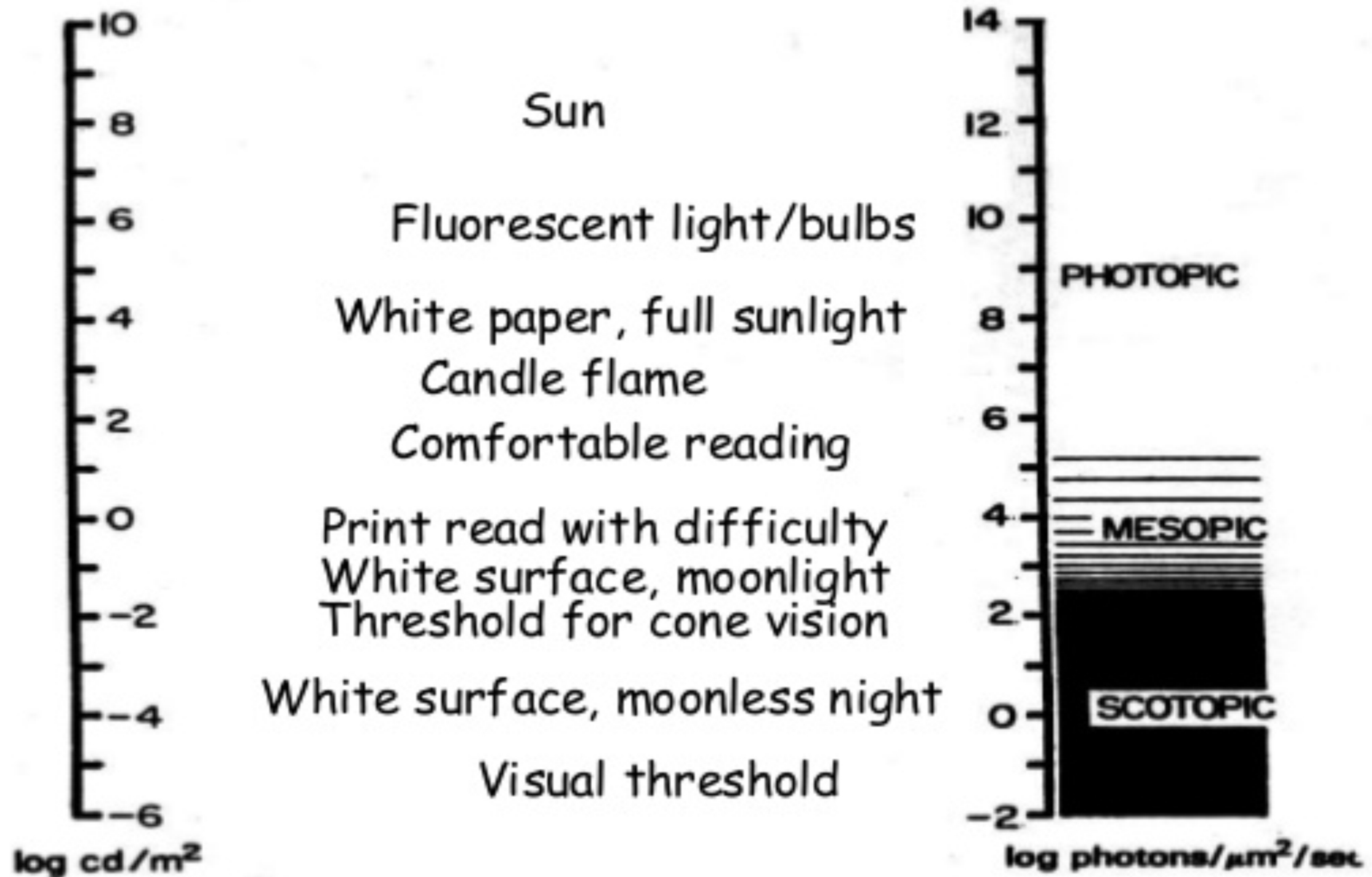
Is 1080p per eye enough?

# How Much Display Resolution is Enough in VR?



# Light Intensity

## Luminance and retinal illumination



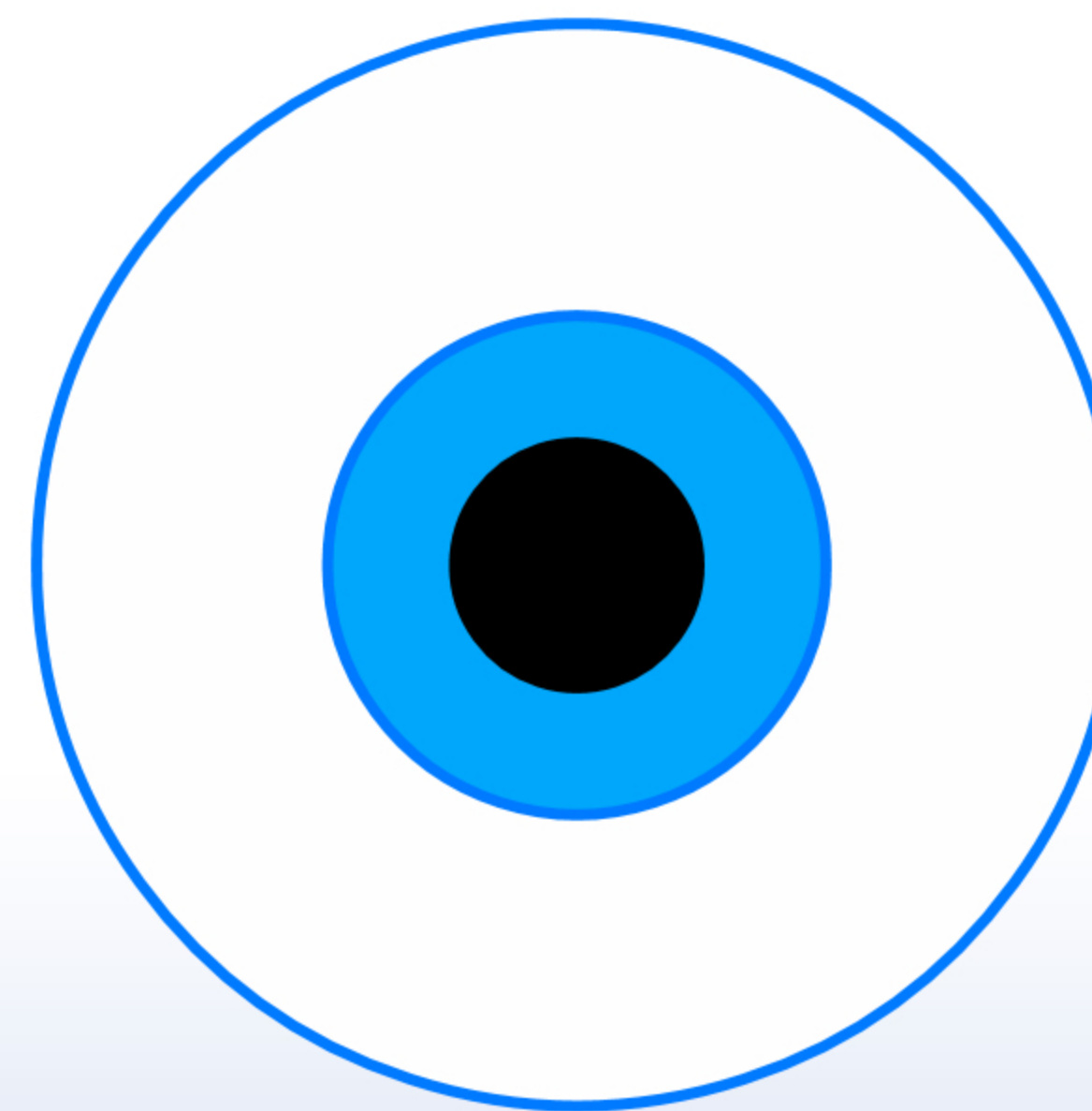
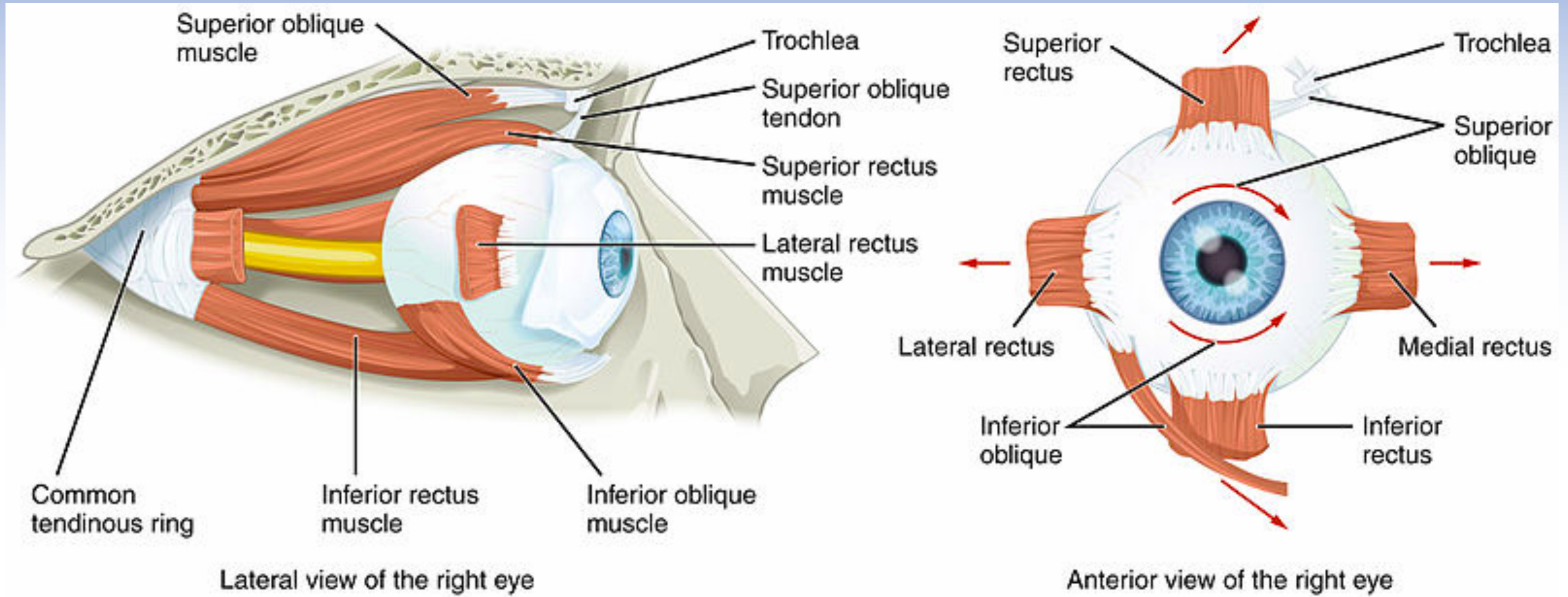
The range of luminances (left) and retinal illumination (right) found in the natural world

# Scotopic vs Photopic Vision

	Scotopic vision	Photopic vision
Photo receptors		
Light levels		
Color		
Adaptation		

Example:

# Eye Muscles



# Types of Eye Movements

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