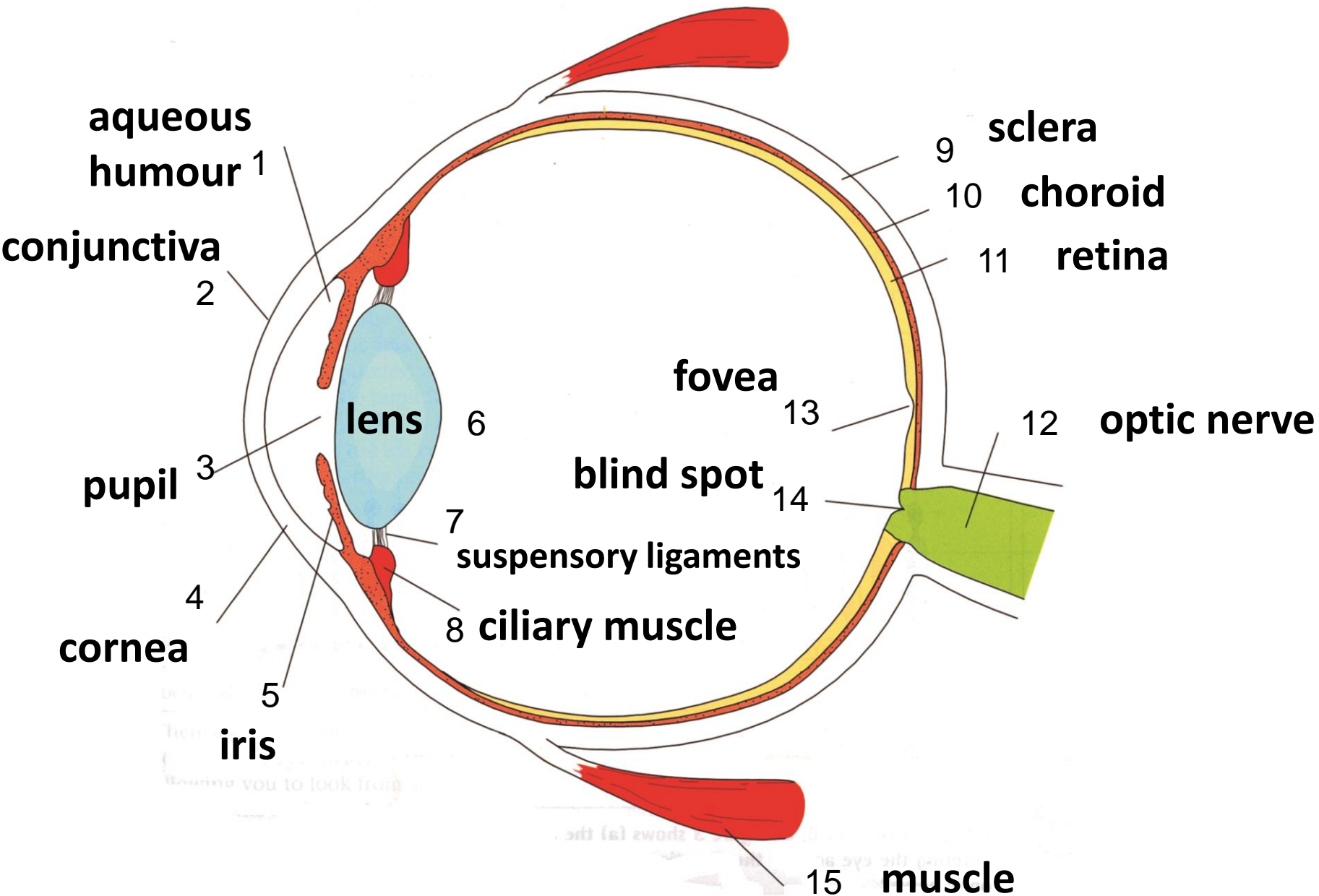
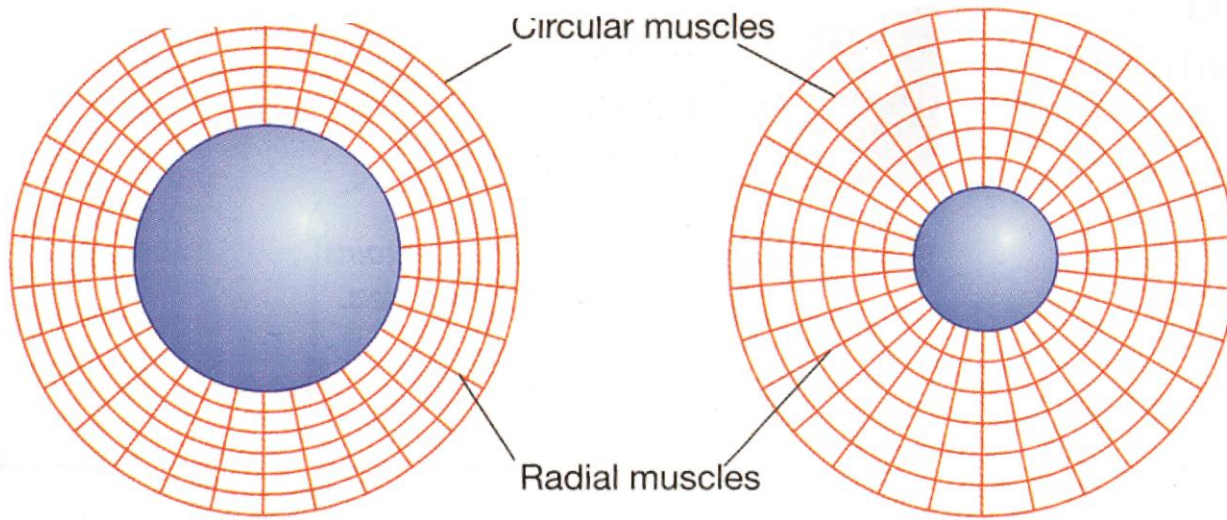


The Eye

# Learning Objectives

- **How the iris controls the amount of light entering the eye.**
- **The role of the cornea, lens, ciliary muscles and suspensory ligaments in focusing an image onto the retina.**
- **The structure of rods and cones and how they function in dim and bright light.**
- **The trichromatic theory of colour vision.**
- **Differences in sensitivity and visual acuity in different parts of the eye.**



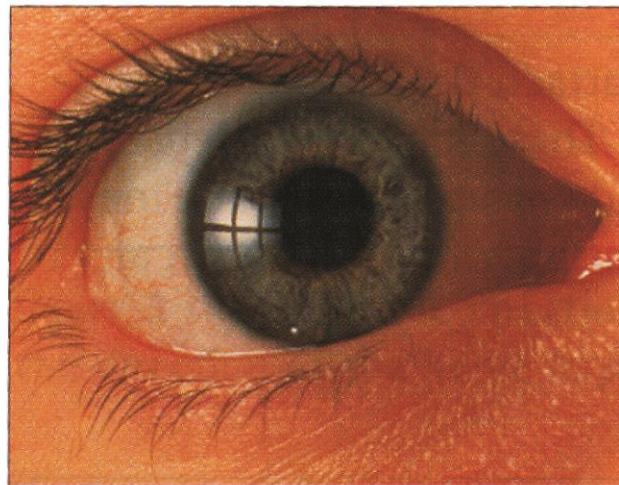
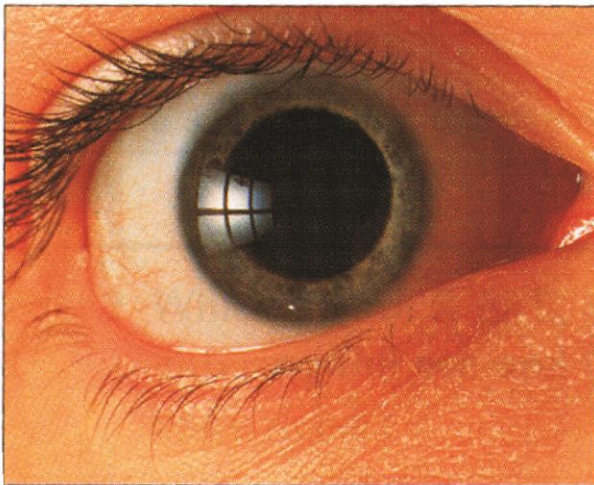


Pupil dilated

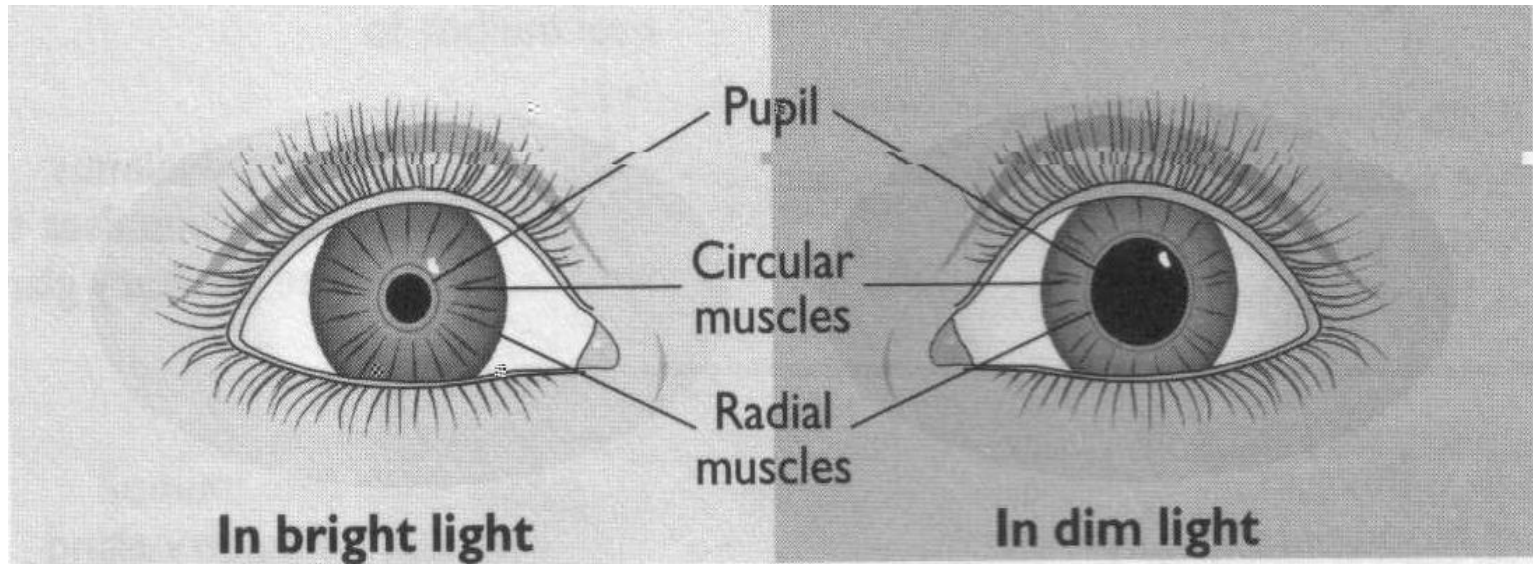
Circular muscles relaxed,  
radial muscles contracted

Pupil constricted

Circular muscles contracted,  
radial muscles relaxed



# Reflex Action and Antagonistic Muscle Action



**Circular muscles contract**

**Radial muscles relax**

**Pupils *constricted***

**Radial muscles contract**

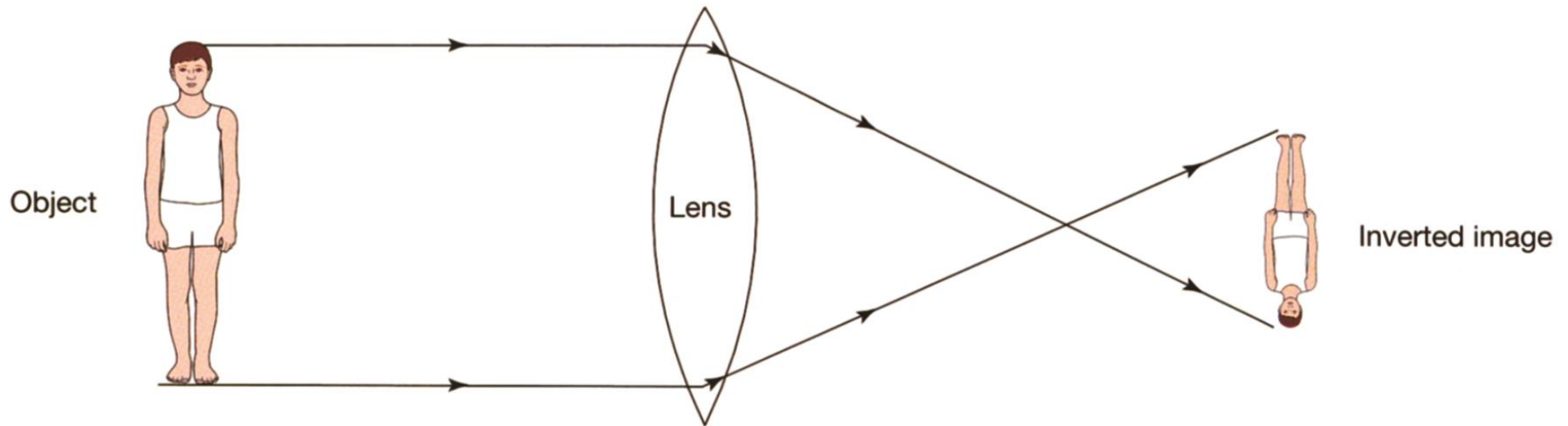
**Circular muscles relax**

**Pupils *dilated***

**Why is it important that the amount of light entering the eye is regulated?**



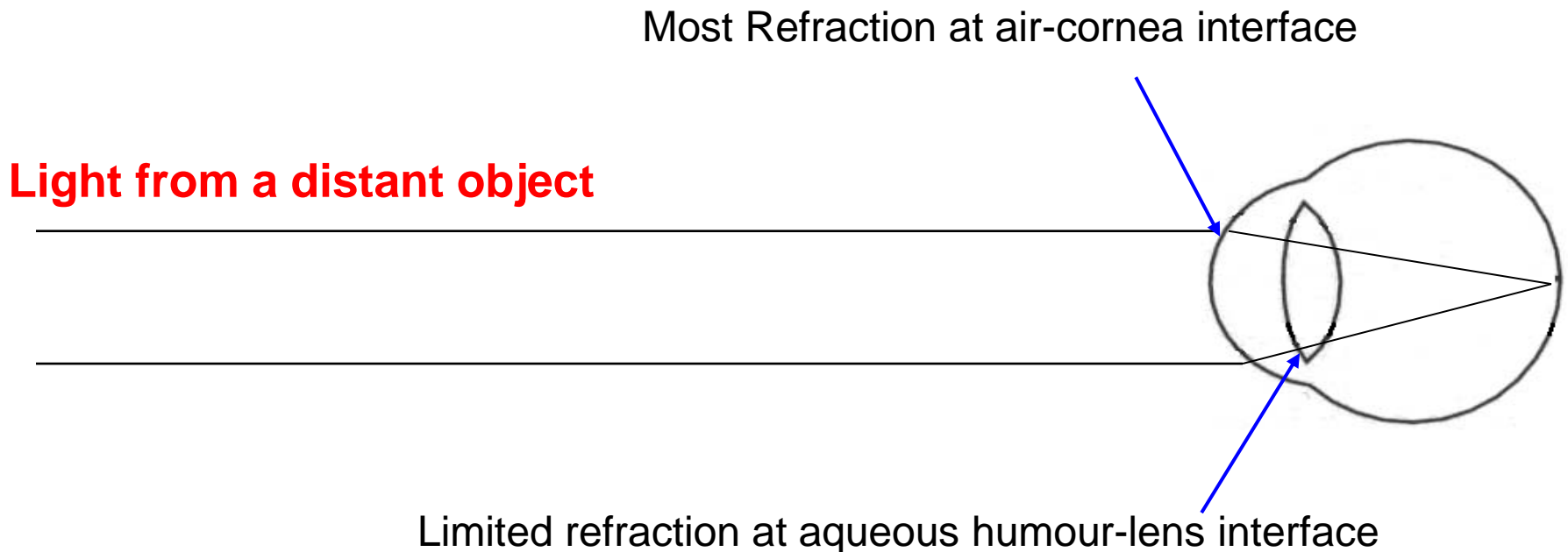
# Focusing an image



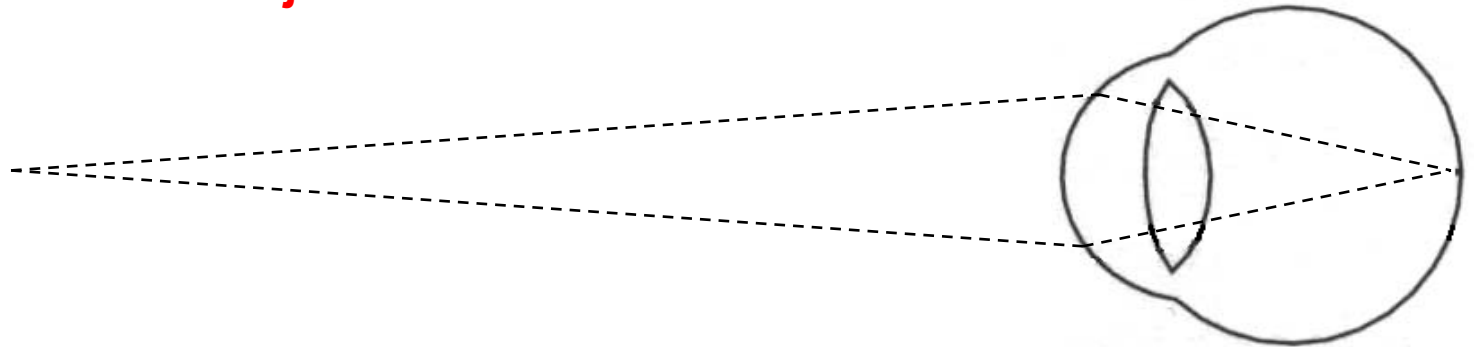
# Accommodation

Accommodation is the ability to focus objects which are at different distances from the eye.

Focusing occurs by refraction – the change in the speed of light as it passes from one medium into another. Most refraction occurs at the interface between air and the cornea. The lens refracts the light only slightly.

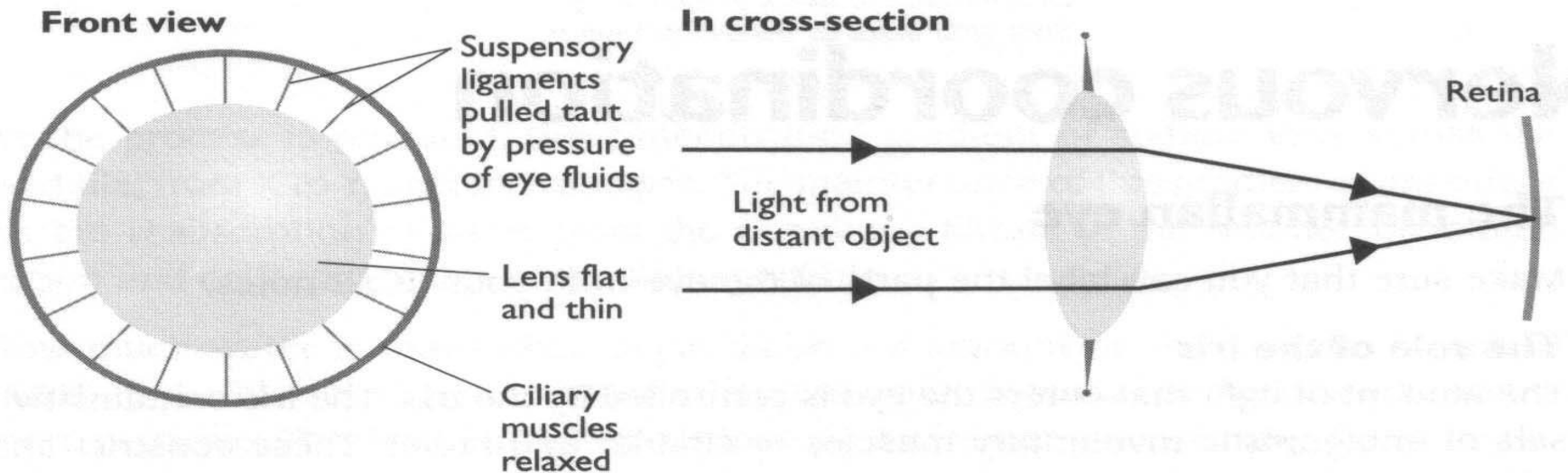


## Light Rays from a near object



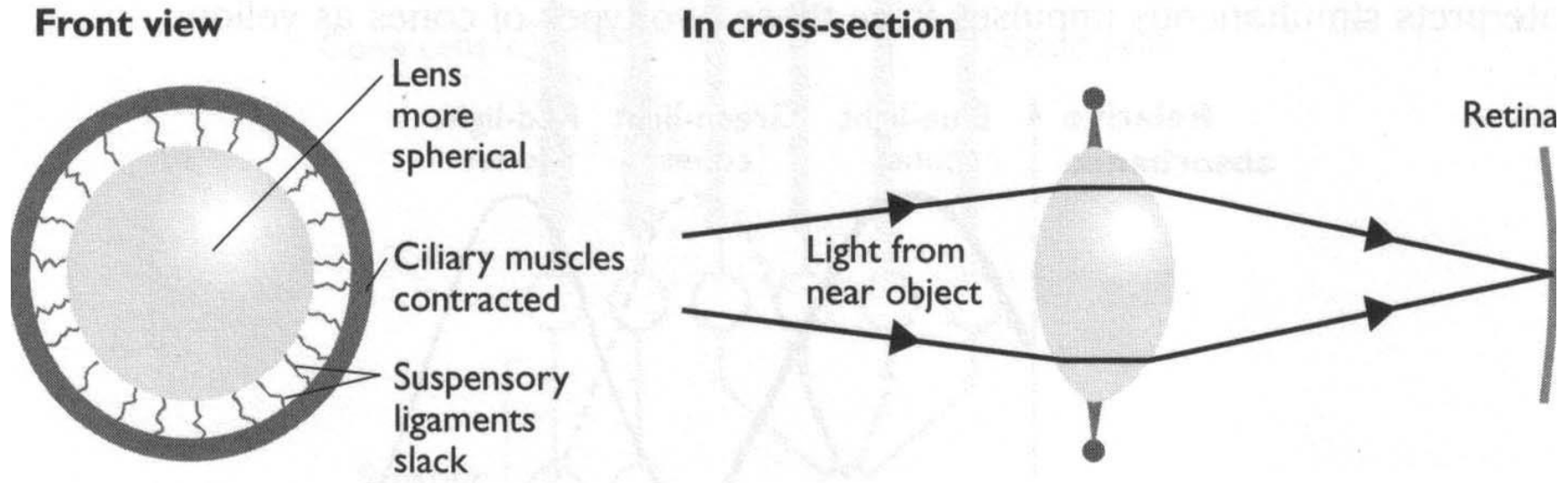
## How does the eye alter the pathways of light rays?

Muscle action and lens shape in focusing distant objects:

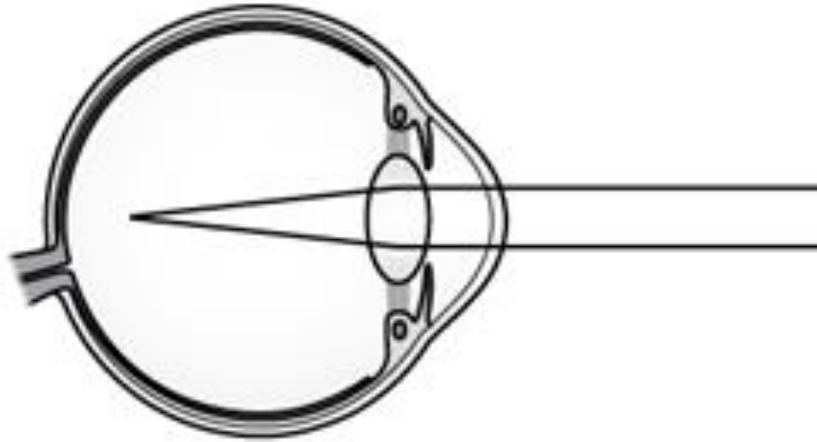




## Muscle action and lens shape in focusing near objects:

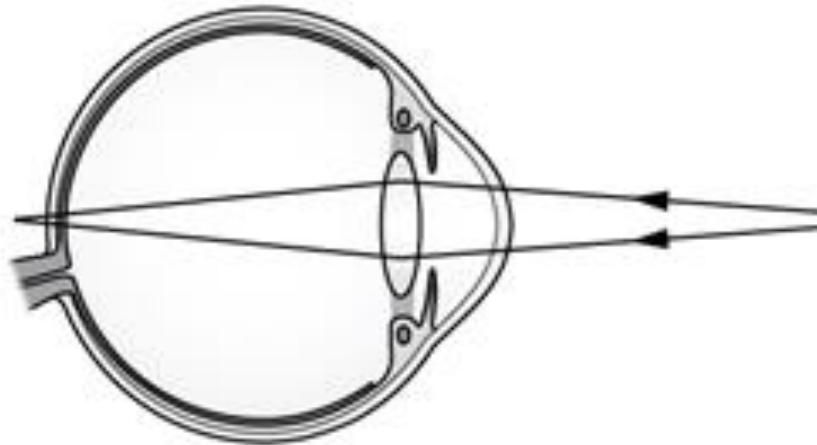


- Cornea refracts most light
- Lens is elastic and changes its shape, altering the degree to which the light is refracted.
- Ciliary muscles and suspensory ligaments bring about the change in shape of the lens
- As we age the elasticity of the lens decreases



### Myopia.

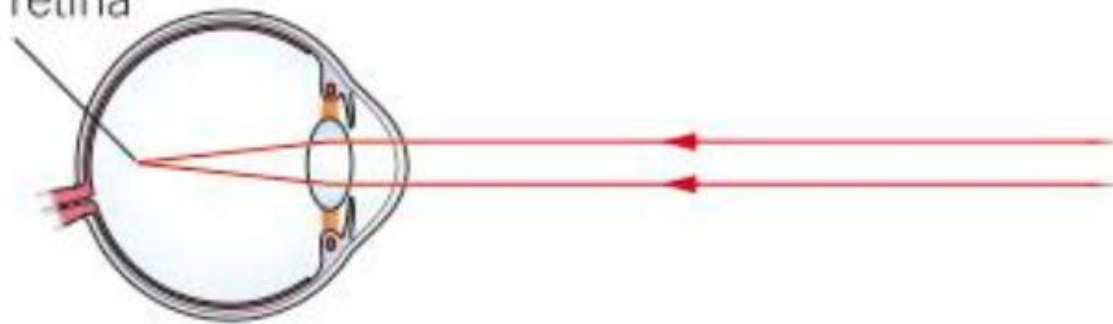
- Short sightedness
- Light focussed in front of retina
- Lens too curved or eyeball too long – too much refraction
- Concave lens – spreads out light before reaching the eye



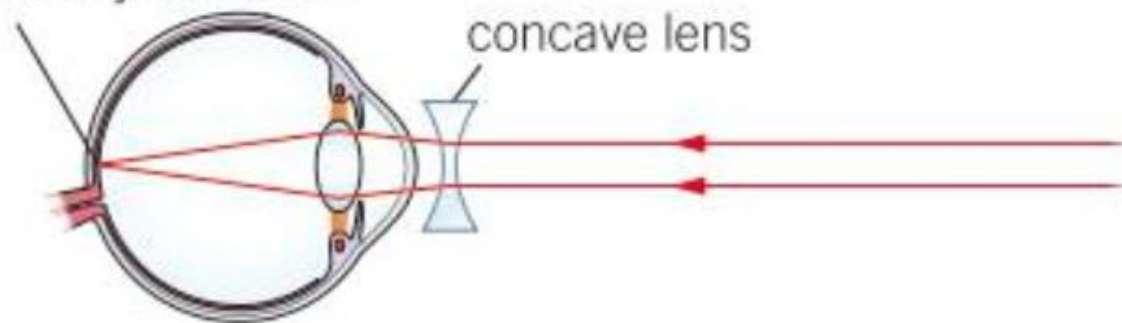
### Hyperopia.

- Long sightedness
- Lens too flat/thin or eyeball too short – not enough refraction
- Light focussed behind the retina
- Convex lens – brings light rays together before reaching the eye

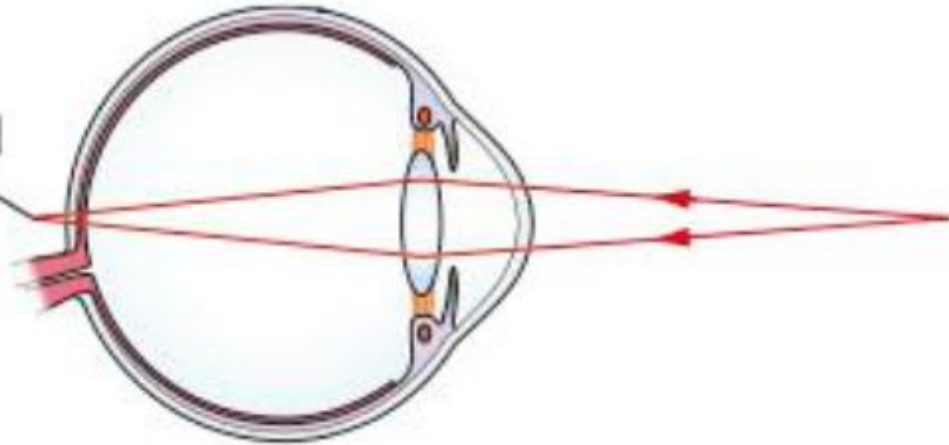
rays not focussed  
on retina



rays now  
correctly focussed



rays not focussed  
on retina



rays now  
correctly focussed

