

Physiology Of The Lens



جامعة ساوة

كلية التقنيات الصحية والطبية

قسم البصريات

المرحلة الثانية

Lec 8
نظري

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The lens

The crystalline lens is a transparent, biconvex structure in the eye that, along with the cornea, helps to refract light to be focused on the retina. The lens, by changing shape, functions to change the focal distance of the eye so that it can focus on objects at various distances, thus allowing a sharp real image of the object of interest to be formed on the retina. This adjustment of the lens is known as **accommodation**

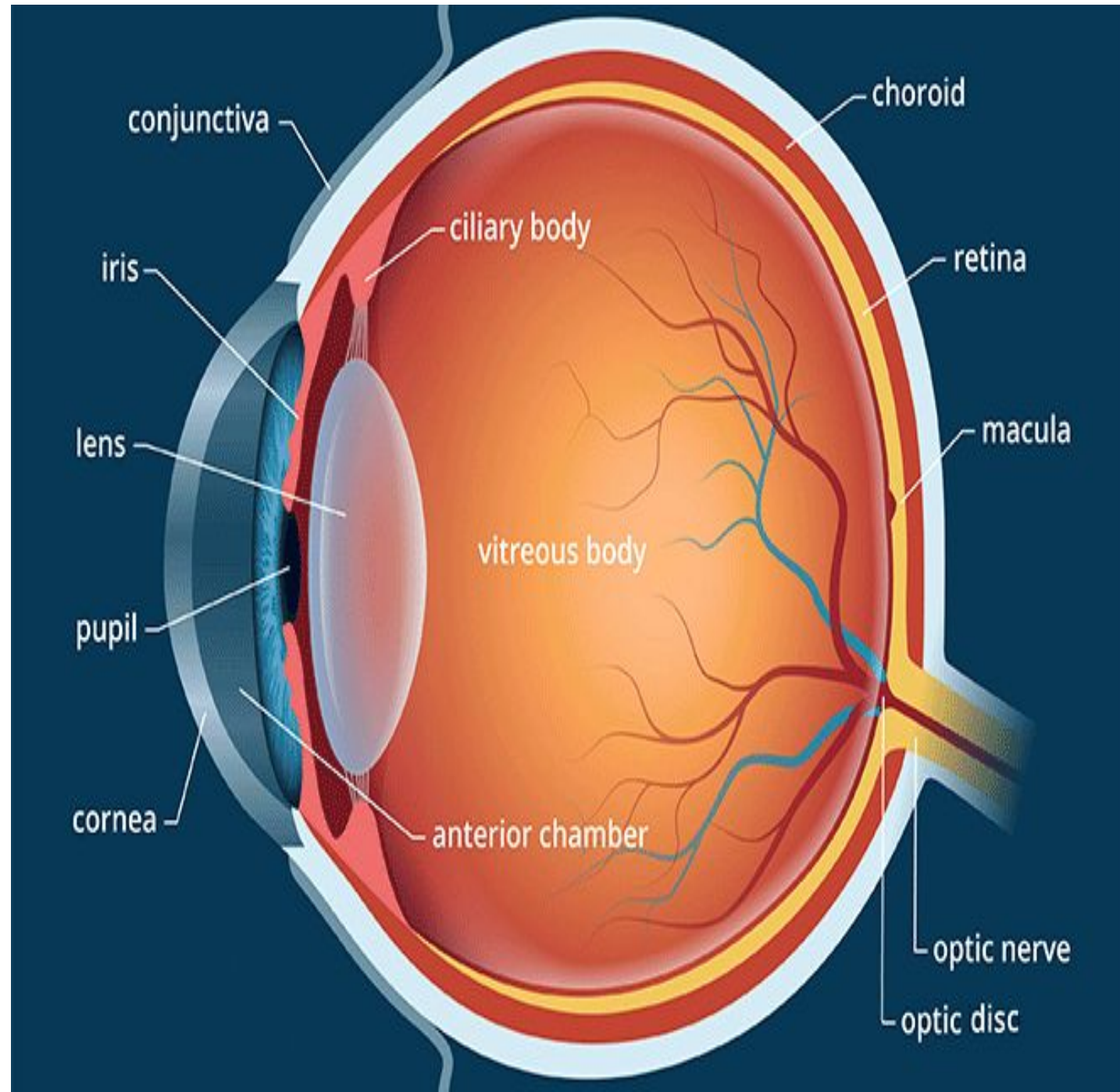
**Accommodation is one of the important functions of-1
the retina**

**Common diseases of the lens include cataracts,-2
astigmatism**

**At short focal distance The Ciliary muscle relax,-3
zonule fibers tension**

**At a greater distance requires the relaxation of the-4
ciliary muscle, which in turn increases the tension on
the zonules**

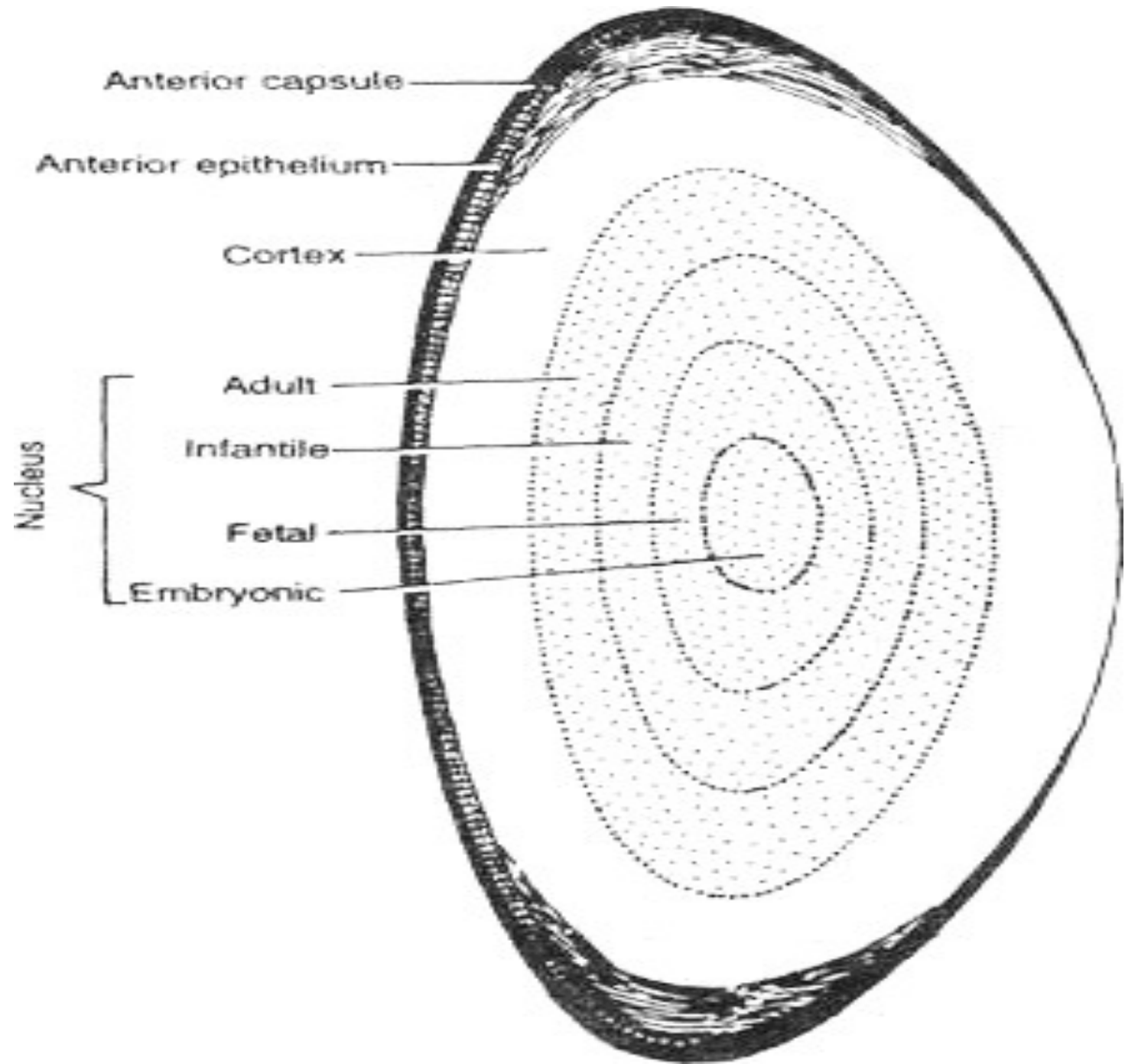
Accommodation is similar to the focusing of a photographic camera via movement of its lenses. The lens is more flat on its anterior side than on its .posterior side



Lens Structure

The lens consists of

- ,the lens capsule -1
- ,the lens epithelium -2
- .the lens fibers -3



The lens capsule

The lens capsule is the smooth, transparent outermost layer of the lens, while the lens fibers are long, thin, transparent cells that form the bulk of the lens. The lens epithelium lies between these two and is responsible for the stable functioning of the lens. It also creates lens fibers for the lifelong growth of the lens.

Common diseases of the lens include cataracts, which cause opacity, or cloudiness, in the lens. Other common ailments are presbyopia, ectopia lentis, aphakia, and nuclear sclerosis.

Anatomical Layers of the Lens: From Embryonic to Adult Nucleus

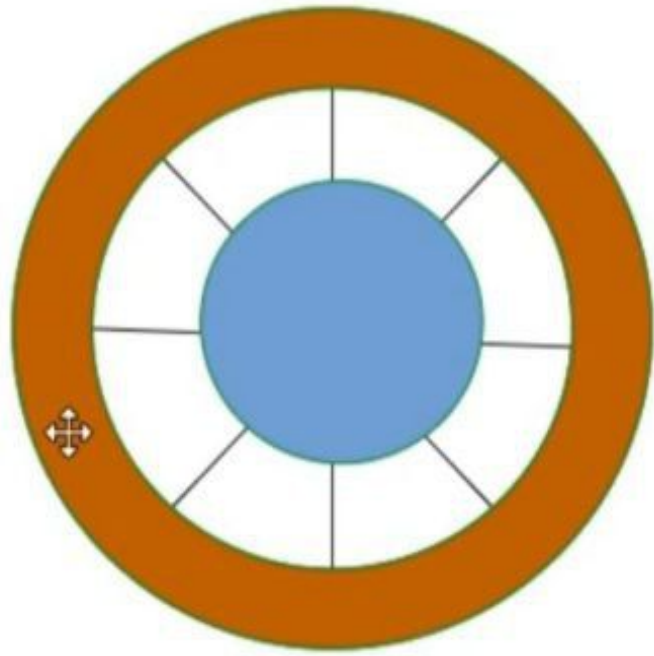
The lens is split into regions depending on the age of the lens fibers of a particular layer. Moving outwards from the central, oldest layer, the lens is split into an **embryonic nucleus**, the **fetal nucleus**, the **adult nucleus**, and the **outer cortex**. New lens fibers, generated from the lens epithelium, are added to the outer cortex. .Mature lens fibers have no organelles or nuclei

Function of the lens

.Along with the cornea, helps to **refract light** to be focused on the retina.1 .1

Accommodation: The lens is flexible and its curvature is controlled by.2
ciliary muscles through **the zonules (suspensory ligaments)**. By changing the curvature of the lens, one can focus the eye on objects at different
.distances from it. This process is called **accommodation**

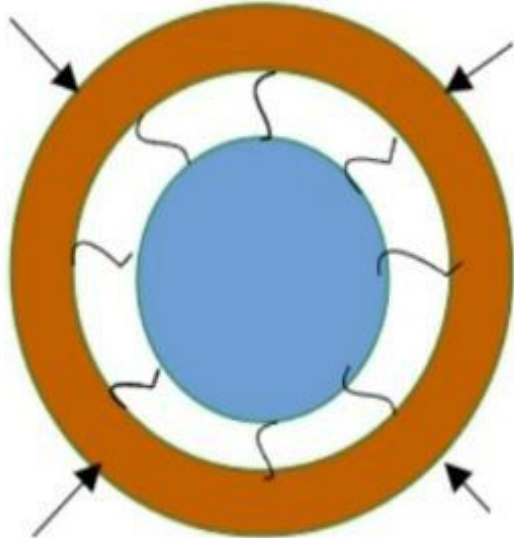
At **short focal distance** The Ciliary muscle **contracts**, zonule fibers **loosen**, and the **lens thickens**, resulting in a rounder shape and thus high refractive power.
Changing focus to an object



العضلة الهدبيّة مسترخية

الأربطة المعلقة مشدودة

العدسة قليلة التحدّب مقارنة
مع الحالة السفلية



العضلة الهدبيّة متقلّصة

الأربطة المعلقة مسترخية

العدسة أكثر تحدّبًا

at a greater distance requires the **relaxation** of the ciliary muscle,* which in turn increases the **tension** on the zonules, **flattening** the lens .and thus increasing the focal distance

The refractive index of the lens varies from approximately 1.406 in the central layers down to 1.386 in less dense layers of the lens. This .index gradient enhances the optical power of the lens

Review

transparent outermost layer of the lens is the lens fibers (true or false)-1

Mature lens fibers have no organelles or nuclei. (true or false)-2

At short focal distance requires the relaxation of the ciliary muscle, which in turn increases the tension on the zonules. (true or false)-3

Thanks for listening

