

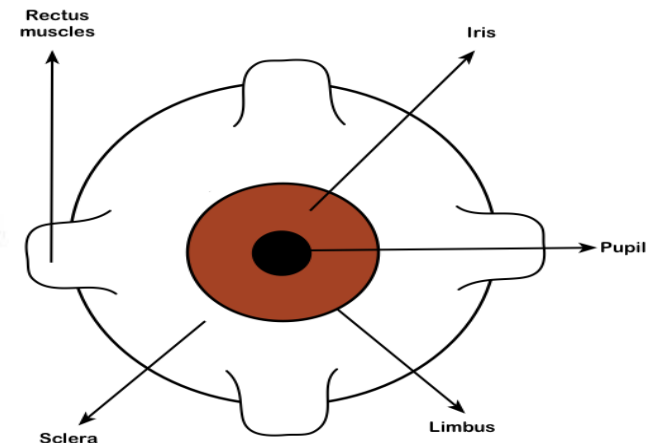
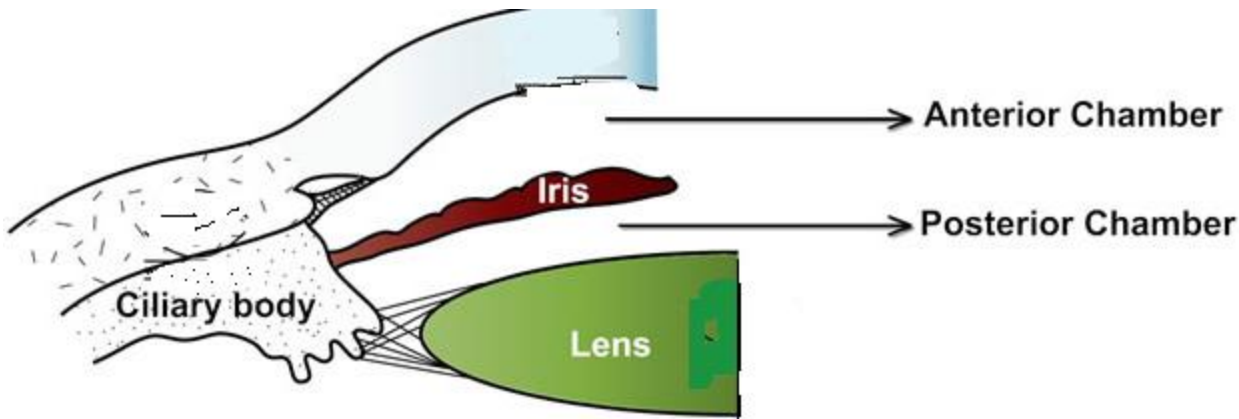
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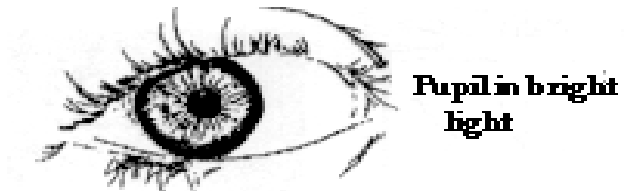
Introduction

- The iris is a **thin, circular** structure located **anterior to the lens**, often compared with a **diaphragm of an optical system**.
- The center aperture, the **pupil**, actually is located slightly **nasal and inferior** to the iris center.
- Pupil size regulates **retinal illumination**.



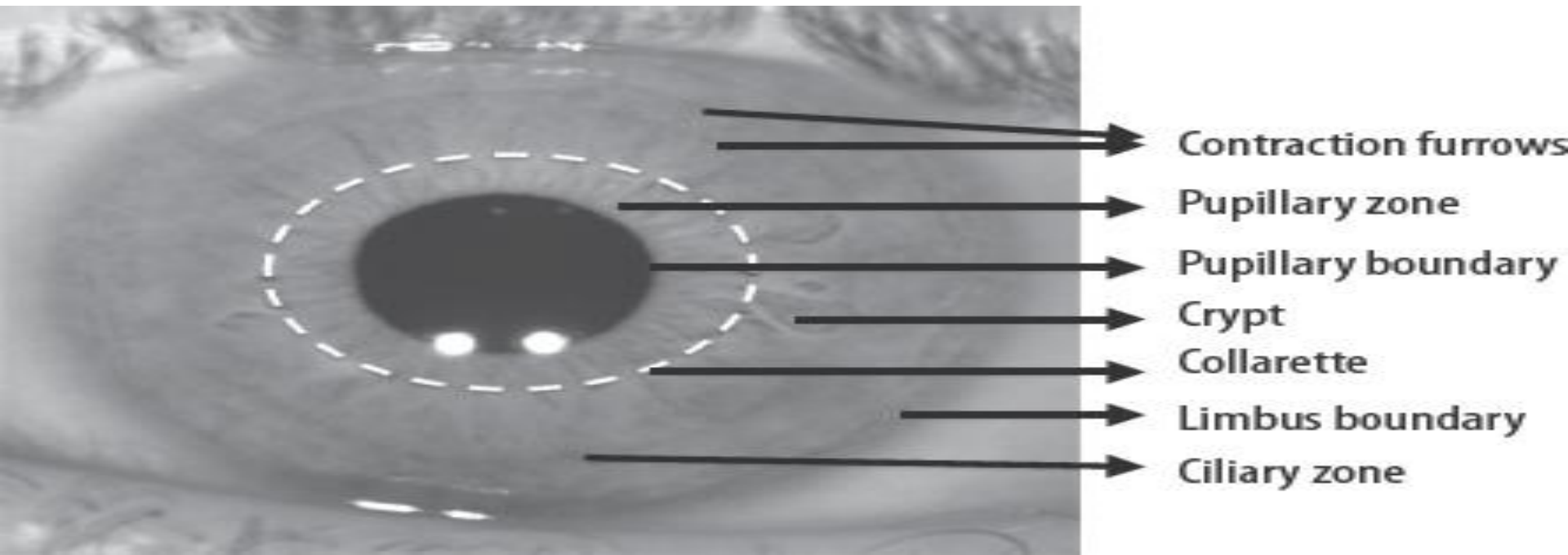
Introduction

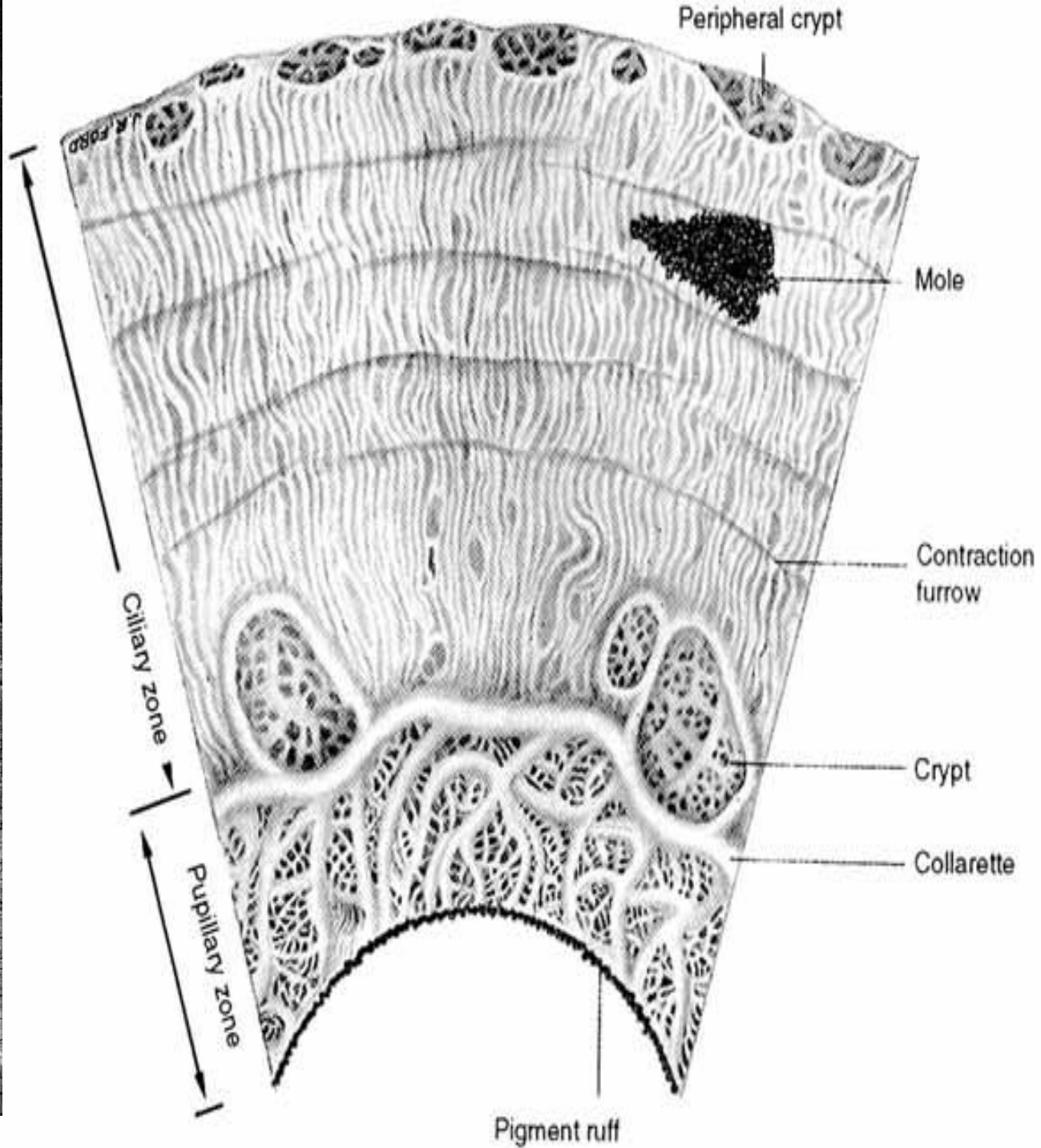
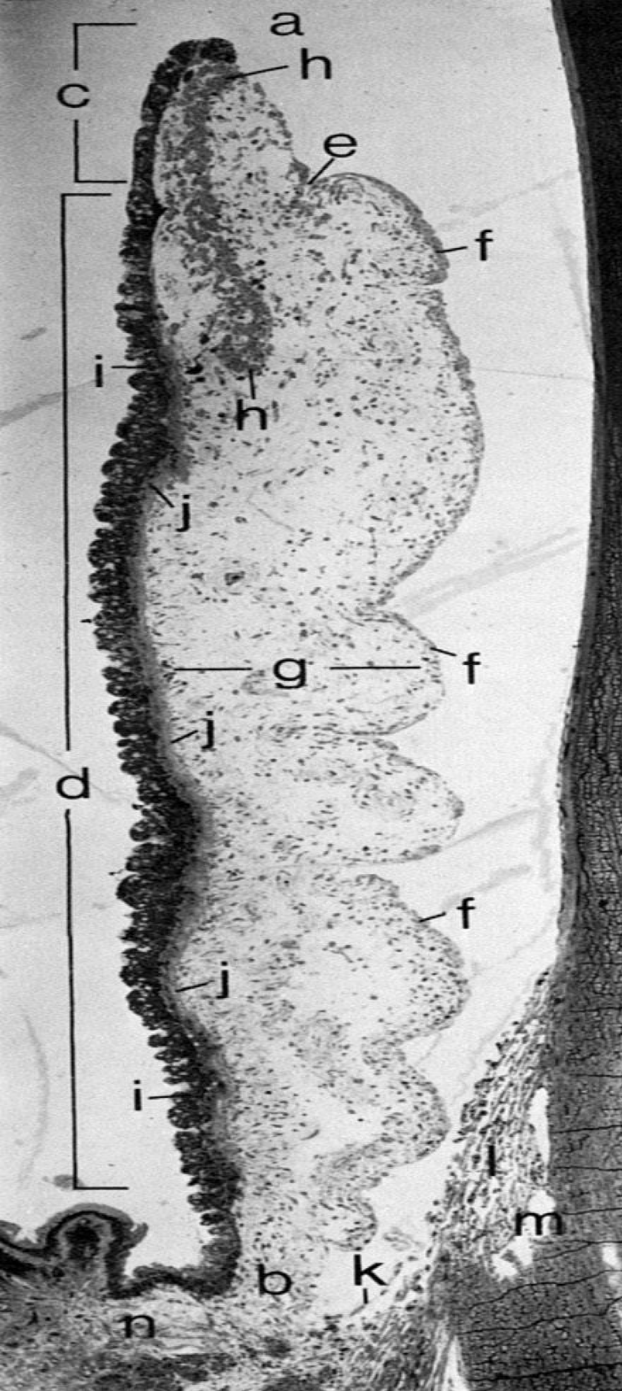
- The diameter can vary from **1 mm to 9 mm** depending on lighting conditions.
- The pupil is very **small (miotic)** in brightly lit conditions and fairly **large (mydriatic)** in dim illumination.
- The average diameter of the iris is **12 mm**, and its thickness varies.



Introduction

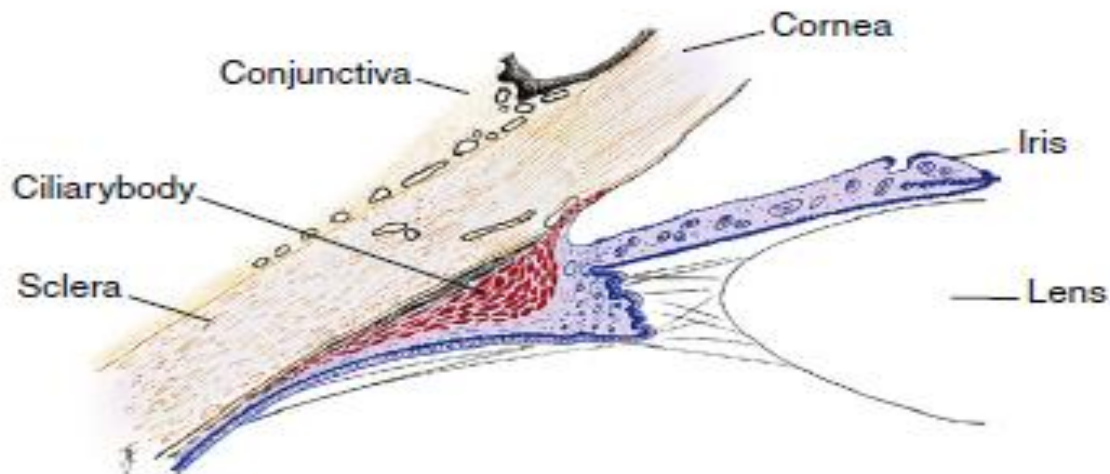
- It is thickest in the region of the collarette, a circular ridge approximately **1.5 mm from the pupillary margin**.
- The collarette divides the iris into **the pupillary zone**, which encircles the pupil,
- **Ciliary zone**, which extends from the collarette to the iris root

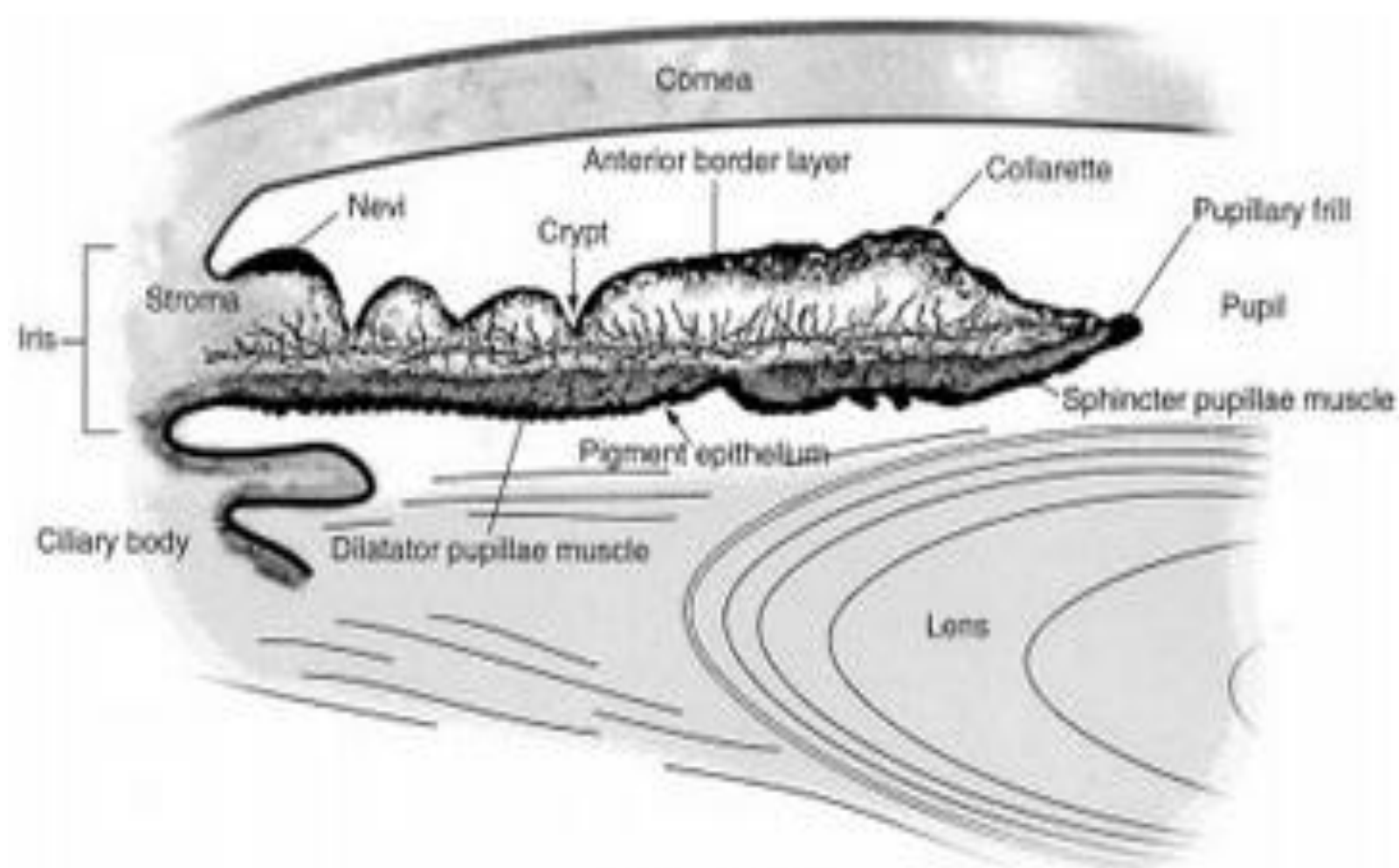




Introduction

- The pupillary margin of the iris rests on the anterior surface of the lens the iris has a truncated cone shape such that the pupillary margin lies anterior to its peripheral termination, **the iris root**.





structure of the iris seen in a transverse section

Introduction

- The root, approximately 0.5 mm thick, is the thinnest part of the iris and joins the iris to the anterior aspect of the ciliary body



The pupillary zone of the iris rests on lens, lens fibers are fragmented, the iris root is evident at its attachment to the ciliary body; remnants of the zonular fibers are seen between lens equator and ciliary process.

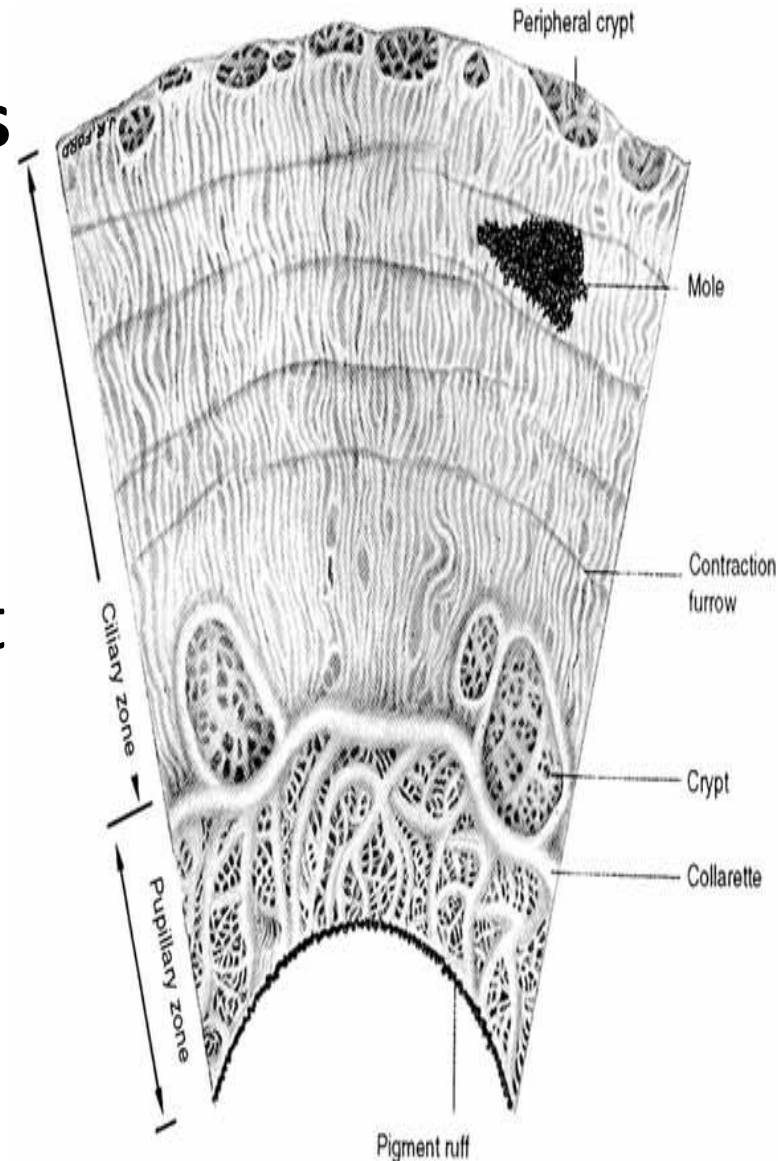
Introduction

- The iris divides the anterior segment of the globe into anterior and posterior chambers,
- and the pupil allows the aqueous humor to flow from the posterior into the anterior chamber with no resistance.

Microscopic appearance

1. Anterior surface of the iris

- It can be divided into a ciliary zone and pupillary zone by zigzag line called collarette.
- Collarette which lies about 2mm from the pupillary margin, is the thickest region of the iris.

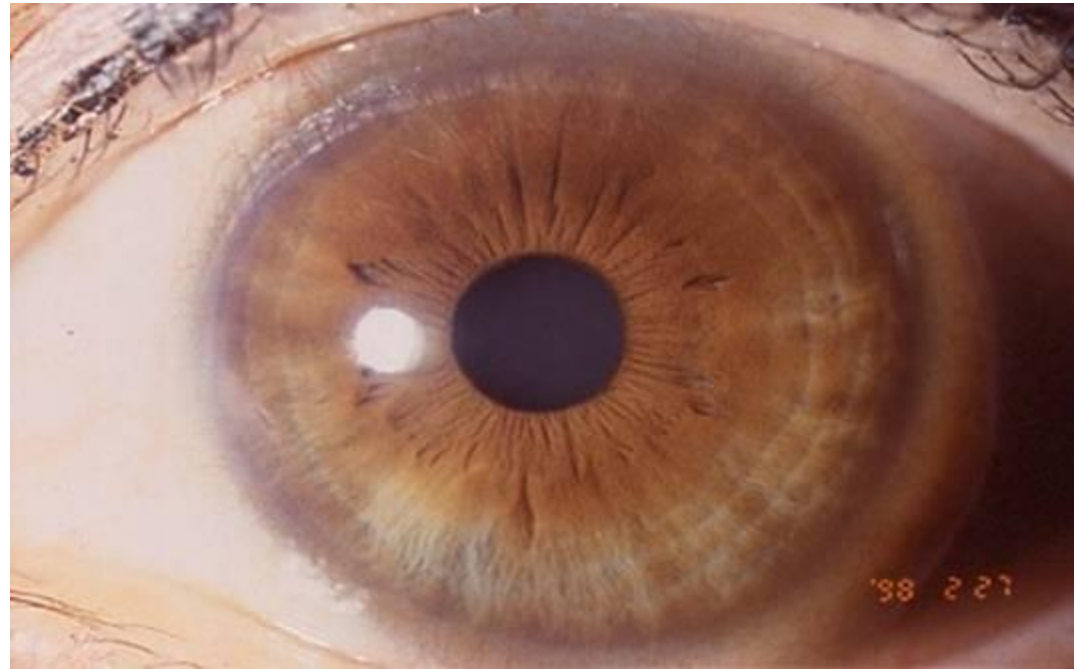


Microscopic appearance

- A. Ciliary zone:** it is characterized by_____
- a) Radial streaks:** which are straight when pupill is small wavy when it is dilated these are due to ___
- b) Crypts** are depression where the superficial layer of iris is missing these are arrange into two rows
- **peripheral crypts** are presents near the iris root
 - **central crypts** are near the collarette.

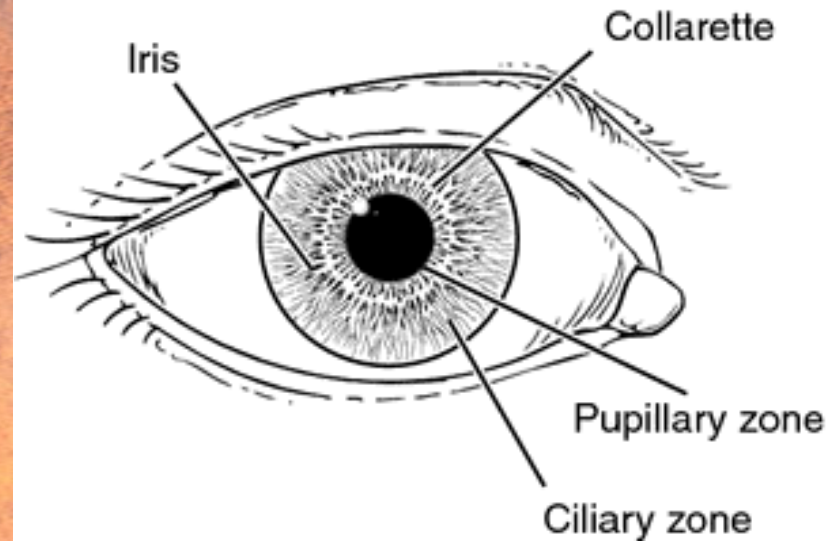
Microscopic appearance

- c. **Contraction furrows** are the faint lines concentric to the collarette. These are more marked on the outer part of the ciliary zone and become prominent when the pupil is dilated.



Microscopic appearance

- B. Pupillary zone:** part of the iris lies between the collarette and pigmented pupillary frill.
- It is relatively smooth and flat.
 - pupillary frill is a fringe of black pigment at pupillary margin.



Microscopic appearance

2. **Posterior iris surface:** The posterior surface of the iris is fairly smooth, but when viewed with magnification, small circular furrows are evident near the pupil.
 - I. **Radial contraction furrows (of Schwalbe)** are located in the pupillary zone, and the deeper which commence 1mm from the pupillary border.

Microscopic appearance

- **II. structural furrows (of Schwalbe):** run throughout the ciliary zone and continue into the ciliary body as the valleys between the ciliary processes.
- Also found on the posterior surface are circular contraction folds similar to those seen on the anterior surface.

Microscopic appearance

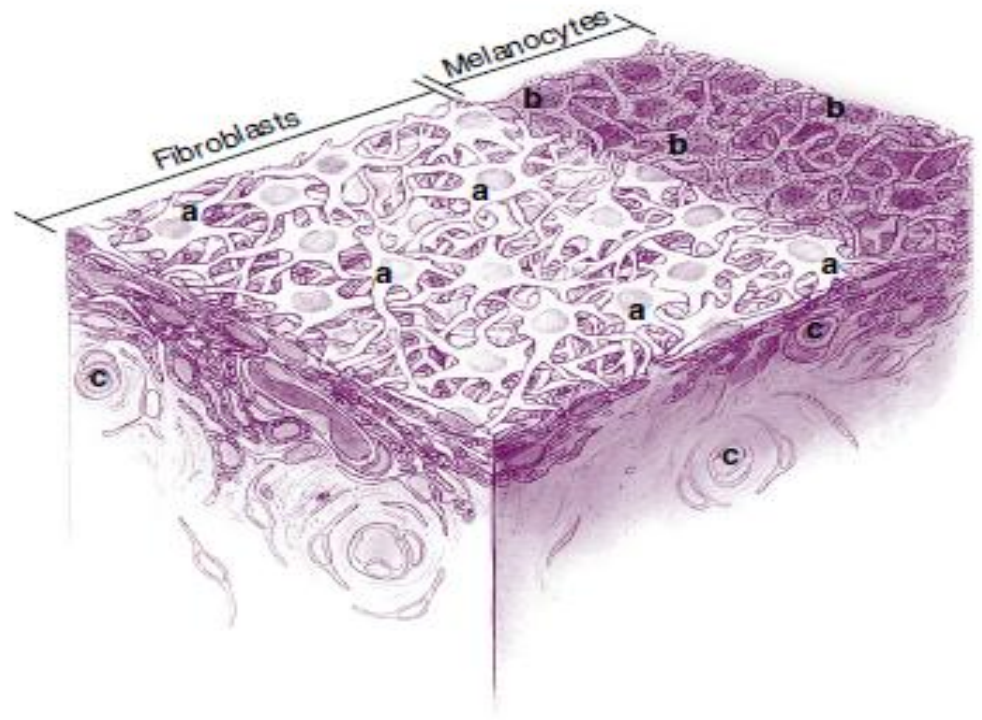
III. Circular furrows: are finer than the radial ones. These cross the structural furrows at regular intervals. These are more marked near the pupil and formed due to difference in the thickness of the pigmented epithelium.

HISTOLOGIC FEATURES OF IRIS

- The iris can be divided into four layers:
 - (1) the anterior border layer,
 - (2) stroma and sphincter muscle,
 - (3) Anterior epithelium and dilator muscle,
 - (4) Posterior epithelium.

Anterior Border Layer

- anterior border layer,
- is a thin condensation of the stroma.
- It is composed of fibroblasts and pigmented melanocytes.

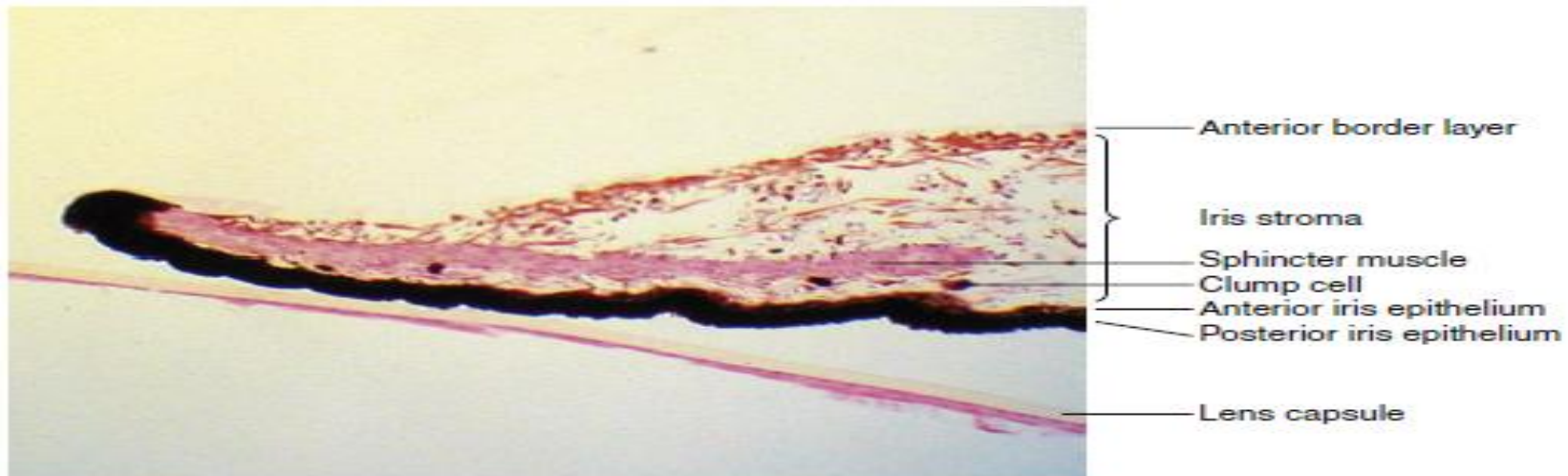


Anterior Border Layer

- The anterior border layer is absent at the oval-shaped iris crypts.
- Near the root, extensions of this layer form finger-shaped iris processes that can attach to the trabecular meshwork.
- The number of these processes varies, but they usually do not impede aqueous outflow. The anterior border layer ends at the root.

Iris Stroma

- The connective tissue stroma is composed of
 1. pigmented and nonpigmented cells,
 2. collagen fibrils
 3. extensive ground substance.
- The iris arteries are branches of a circular vessel, the **major circle of the iris**, located in the ciliary body near the iris root.

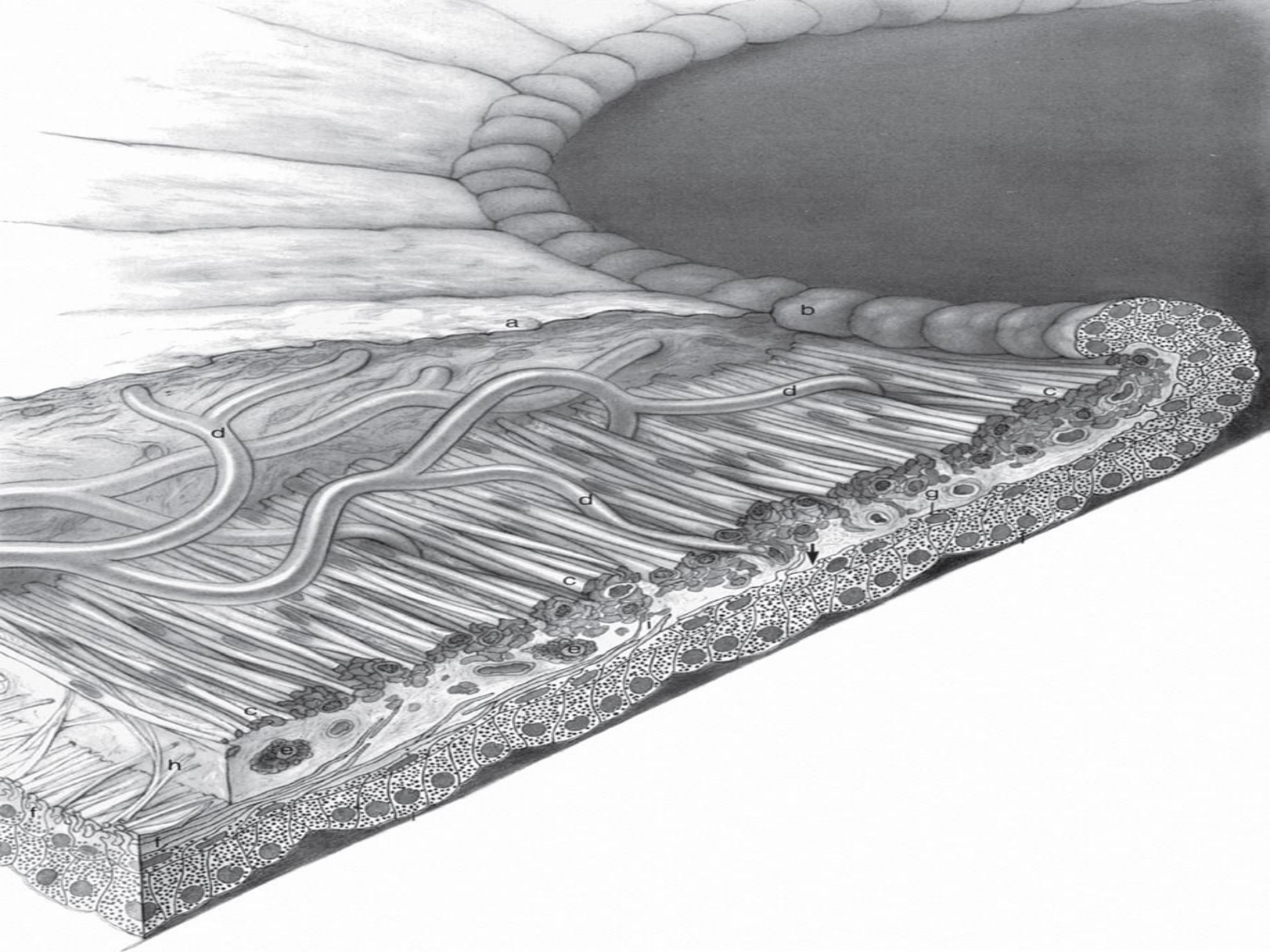


Iris Stroma

- the minor circle of the iris, is located in the iris stroma inferior to the collarette and is a remnant of embryologic development.
- The iris capillaries are not fenestrated and form part of the ***blood-aqueous barrier***.
- *The iris stroma is continuous* with the stroma of the ciliary body.

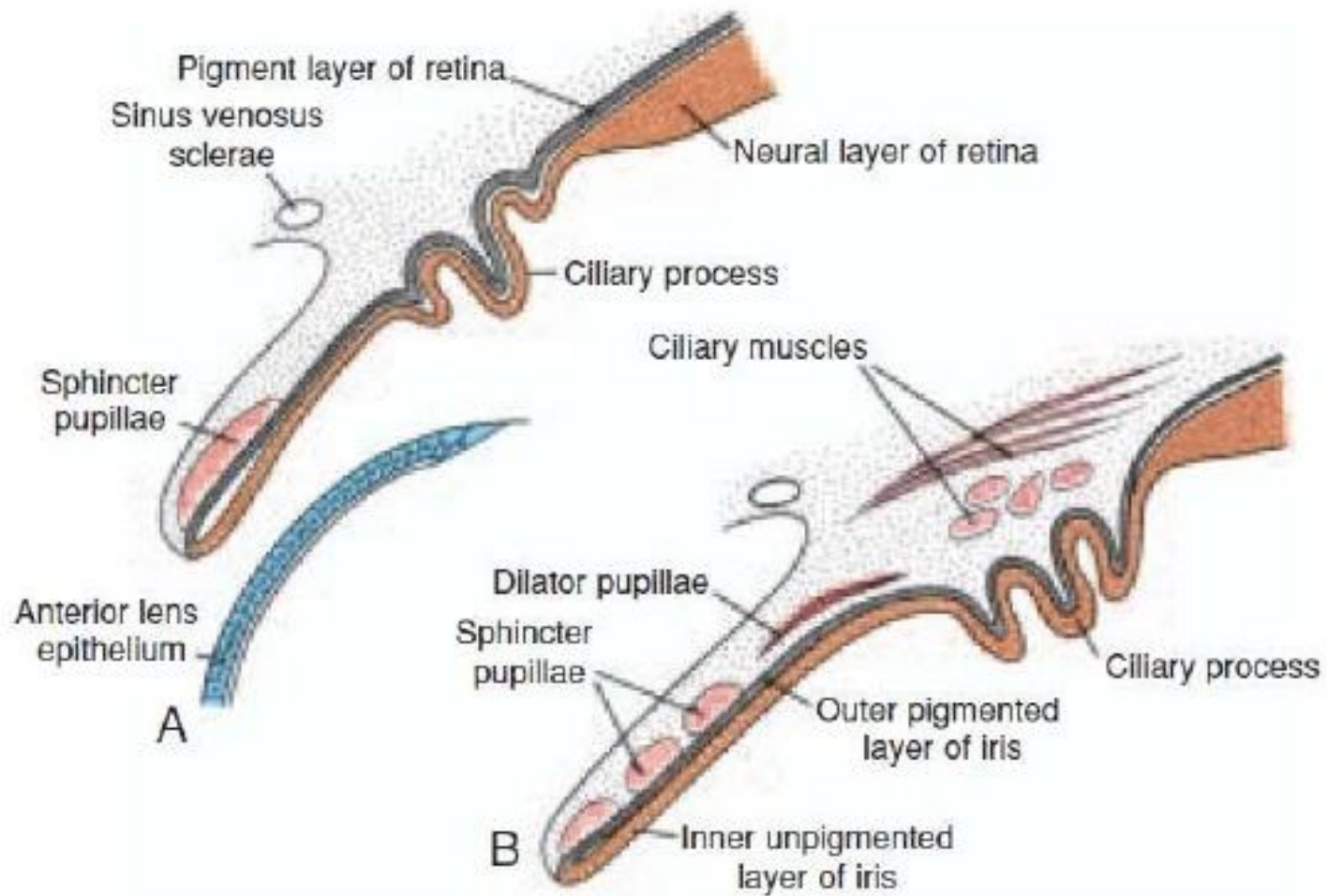
The sphincter muscle

- The sphincter muscle lies within the stroma and is composed of smooth-muscle cells joined by tight junctions.
- As its name implies, the sphincter is a circular muscle 0.75 to 1 mm wide, encircling the pupil and located in the pupillary zone of the stroma



The sphincter muscle

- The sphincter muscle is anchored firmly to adjacent stroma and retains its function even if severed radially.
- Contraction of the sphincter causes the pupil to constrict in *miosis*.
- *The muscle is innervated* by the parasympathetic system.



Development of the iris and ciliary body. The rim of the optic cup is covered by mesenchyme, in which the sphincter and dilator pupillae develop from the underlying ectoderm

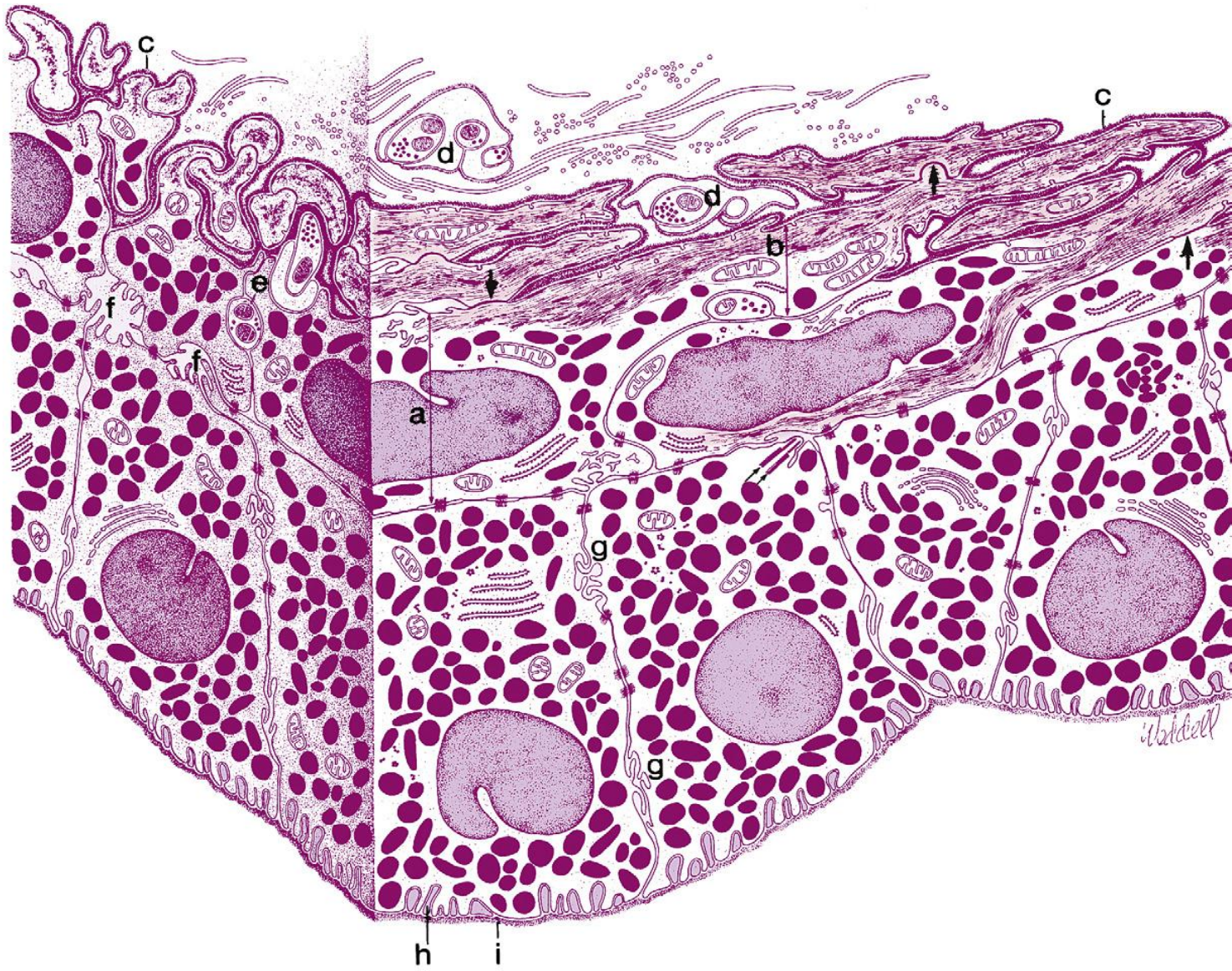
Anterior Epithelium

- Posterior to the stroma are two layers of epithelium.
- The first of these, the epithelial layer lying nearest to the stroma, is the anterior iris epithelium, which is composed of the unique *myoepithelial cell*.

Anterior Epithelium

- The apical portion is pigmented cuboidal epithelium joined by tight junctions and desmosomes, whereas the basal portion is composed of elongated, contractile, smooth muscle processes.
- The muscle fibers extend into the stroma, forming three to five layers of dilator muscle fibers joined by tight junctions

Posterior epithelial layers



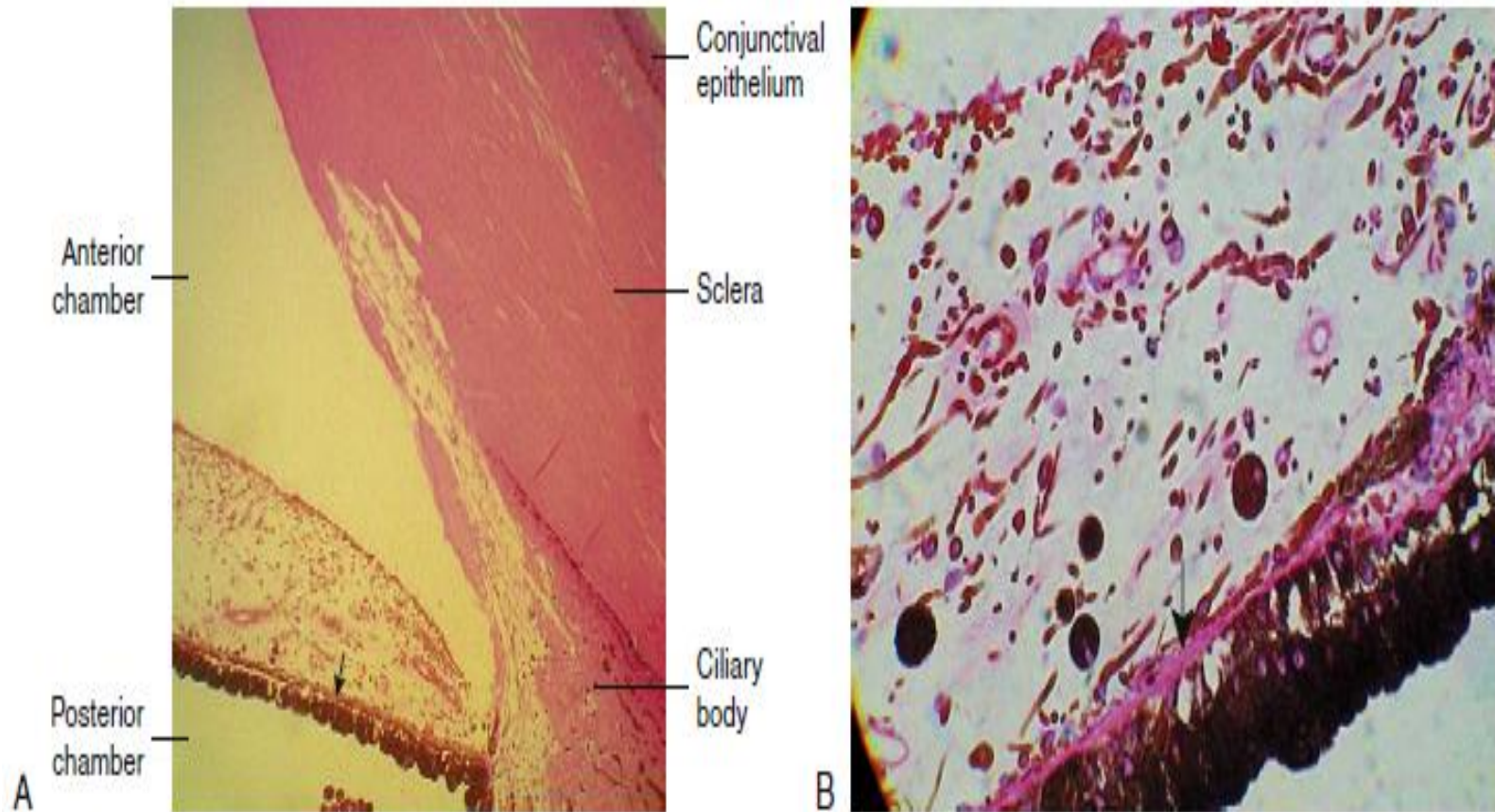


FIGURE 3-8

A, Light micrograph of ciliary portion of iris. Dilator muscle is evident as pink band (*arrow*) anterior to pigmented epithelium. **B**, Light micrograph of epithelial iris layers, strands of dilator (*arrow*) evident above pigmented portion of anterior iris epithelium. In this iris, the anterior iris epithelium is less pigmented than the posterior iris epithelium.

Dilator Muscle

- The dilator muscle is present from the iris root to a point in the stroma below the midpoint of the sphincter.
- The stroma separating the sphincter and dilator muscles is a particularly dense band of connective tissue.
- Near the termination of the dilator muscle, small projections insert into the stroma or, more accurately, into the sphincter.

Dilator Muscle

- Because the fibers are arranged radially, contraction of the dilator muscle pulls the pupillary portion toward the root, thereby enlarging the pupil in *mydriasis*.

The vessels

- These from the bulk of iris stroma. The radial vessels of the iris are branches of circulus arteriosus major and responsible for the radial streaks seen on the anterior surface of the iris.
- These radial vessels are straight when the pupil constricts and become wavy when the pupil dilates.

Posterior Epithelium

- The second epithelial layer posterior to the stroma is the posterior iris epithelium, a single layer of heavily pigmented.
- In the periphery, the posterior iris epithelium begins to lose its pigment as it continues into the ciliary body as the non-pigmented epithelium.

Posterior Epithelium

- This layer is derived from internal layer of the optic cup.
- At the pupillary margin, it forms the pigmented frill and become continues with the anterior pigmented epithelial layer.
- The pigment cells are of columnar type and contain round dark brown pigment granules.