

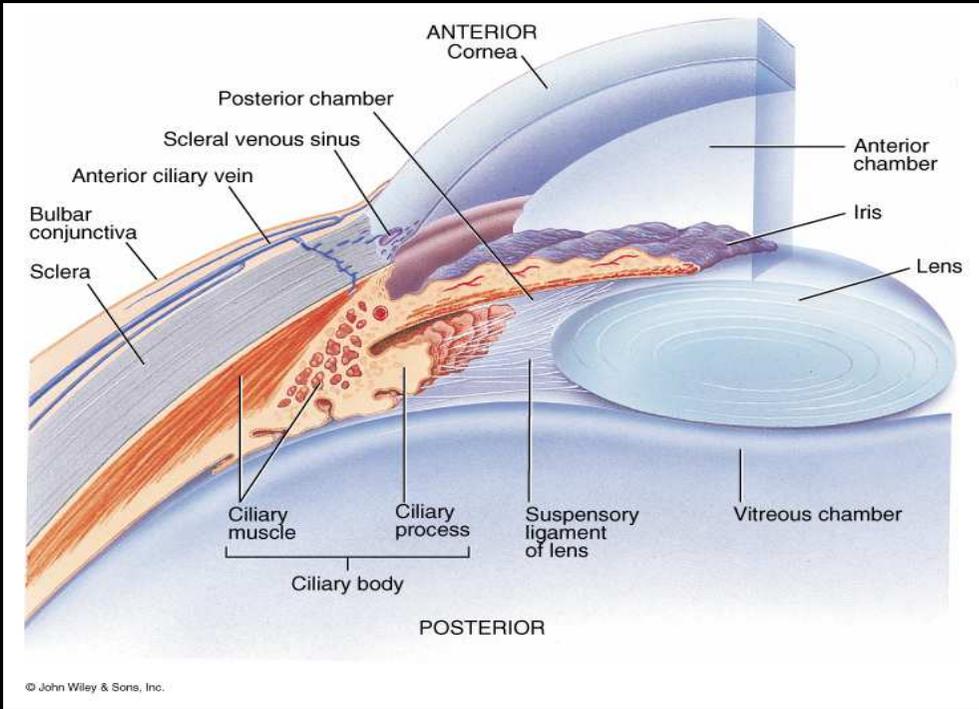


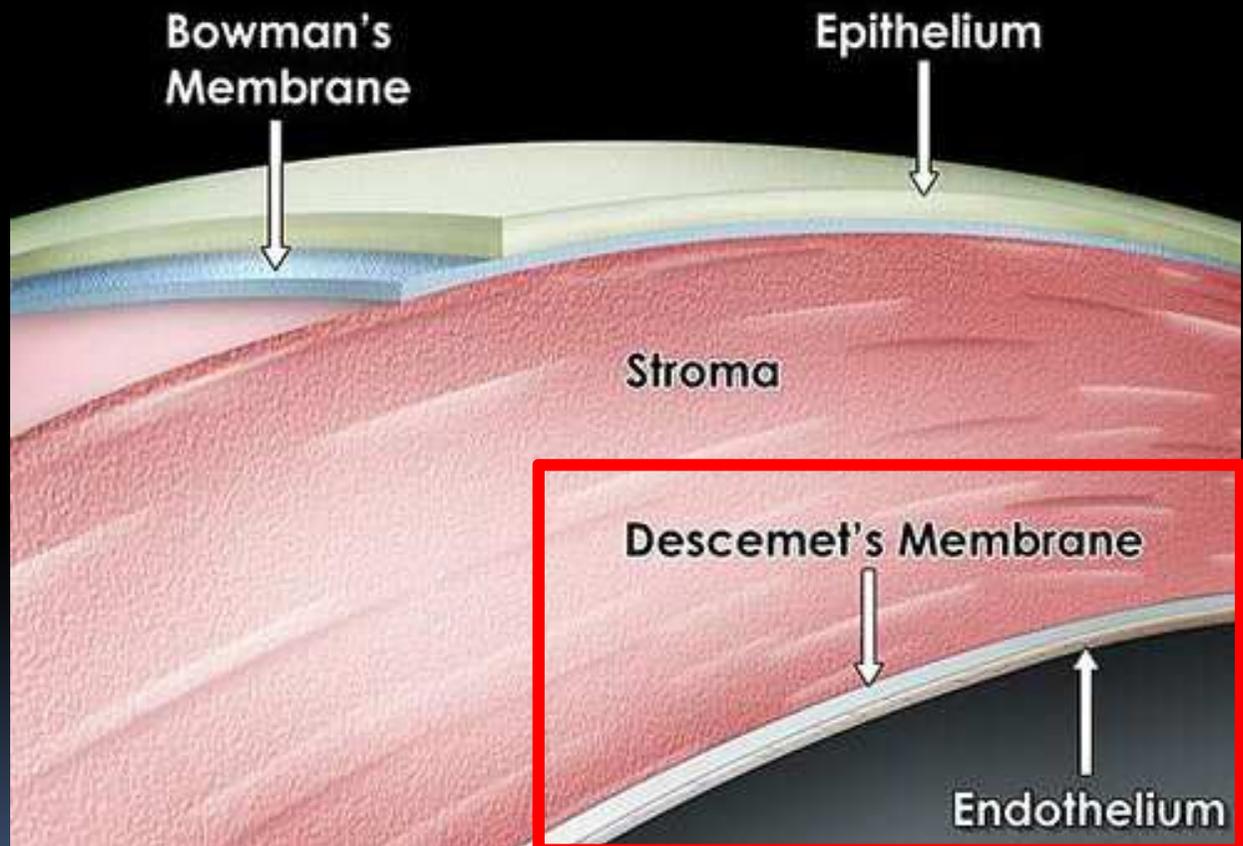
# Anatomia e fisiopatologia di Descemet-Endotelio

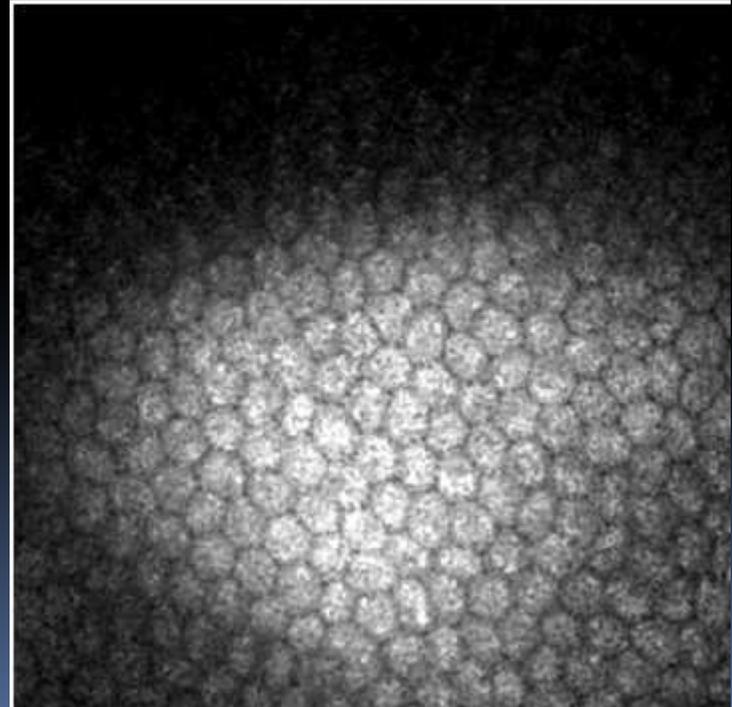
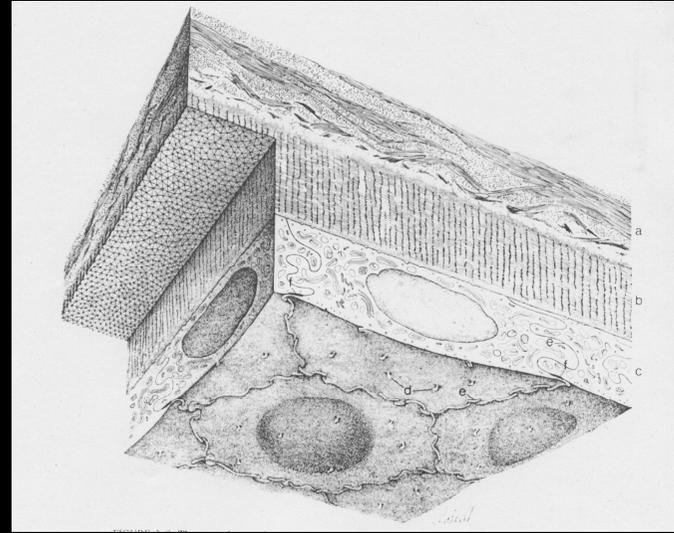
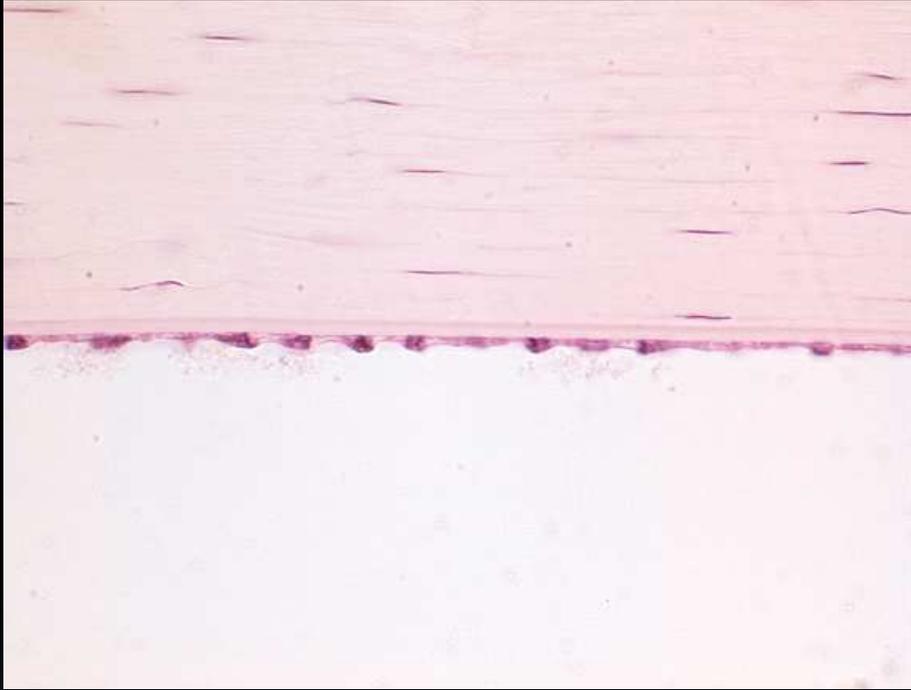
Pietro Maria Donisi

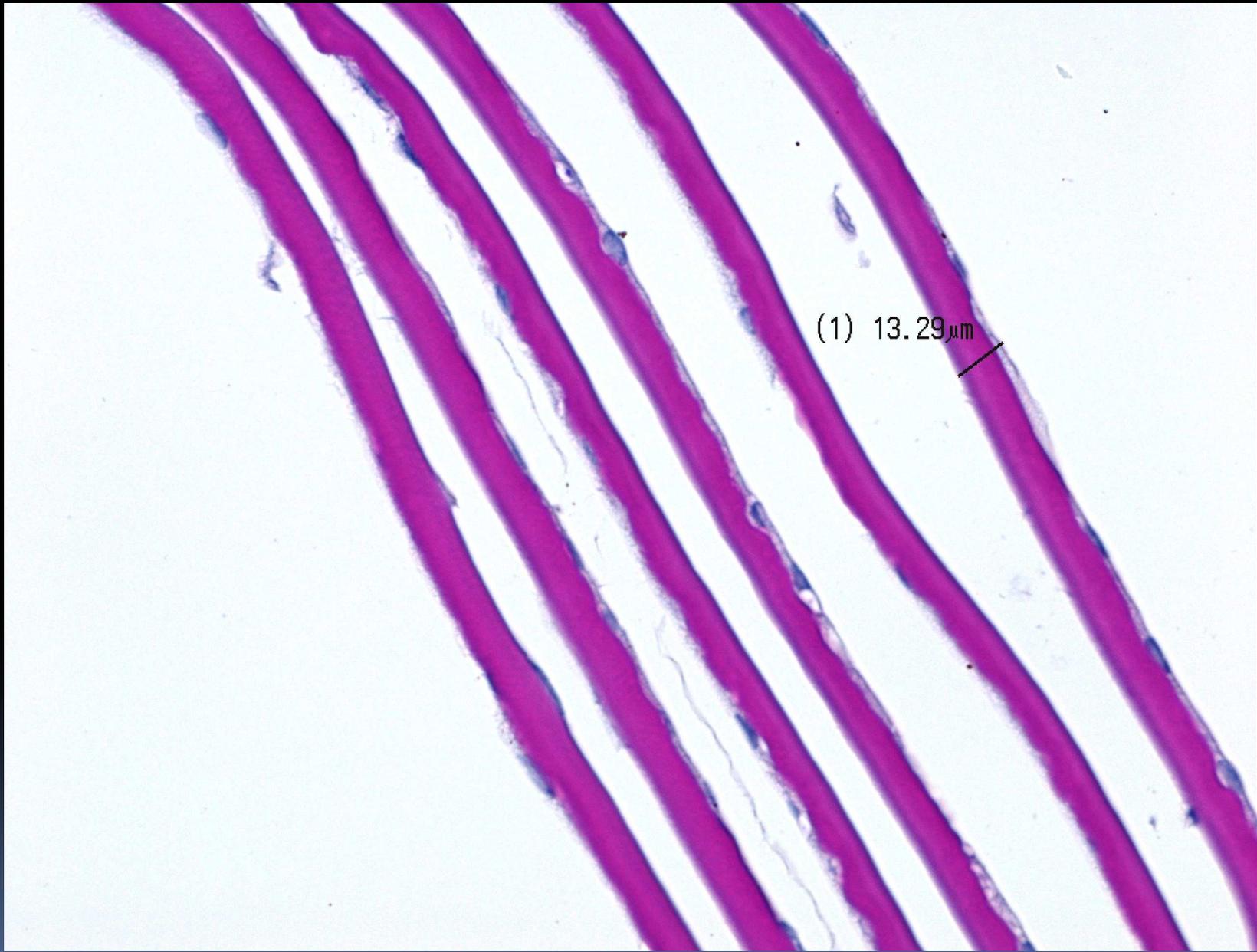
XII CORSO NAZIONALE  
Società Italiana Banche degli Occhi

Pavia, 26 Maggio 2018









(1) 13.29 μm

# Endotelio 1

Singolo strato di cellule esagonali cuboidali adese alla superficie posteriore della DM

Origina dalla cresta neurale

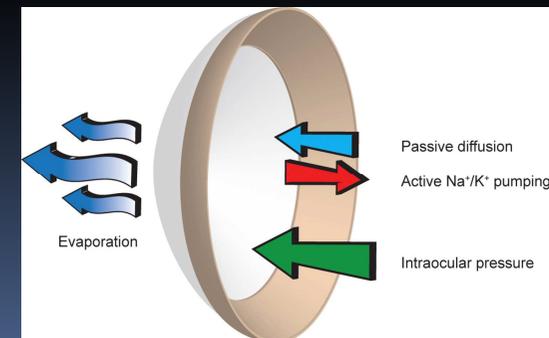
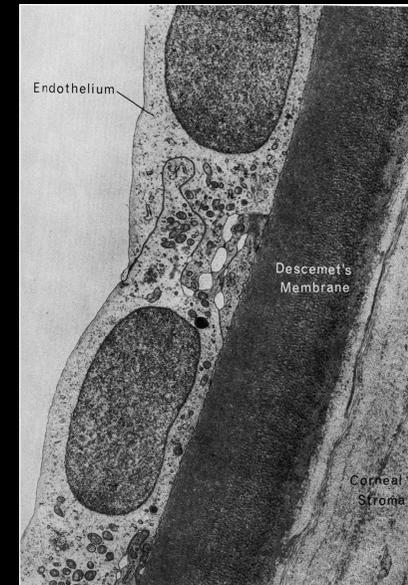
Cellule bloccate in fase G1  
(stato non proliferativo)



Inibizione da contatto con “upregulation” di p27kip1 che previene la transizione alla fase S

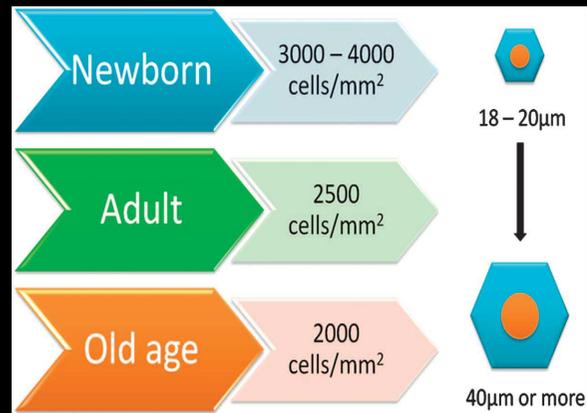
Inibitori della crescita in CA (TGF- $\beta$ )

Preserva la trasparenza corneale mantenendola in uno stato di relativa deidratazione (meccanismo “pump-and-leak”)



# Endotelio 2

Densità cellulare



Riduzione della componente endoteliale per età, trauma/patologia

In età adulta riduzione annuale di circa 0.6% di cellule (apoptosi)

Compensazione per “scivolamento” ed aumento di dimensioni delle CE adiacenti

Ridotta densità cellulare, perdita morfologia esagonale (polimegatismo e polimorfismo cellulare), ridotta capacità di pompa



# Membrana di Descemet

compare nel secondo mese di gestazione

Sintetizzata dalle cellule endoteliali sia durante il periodo pre-natale che post-natale

## Materiale

collagene IV e collagene VIII  
proteine e glicosaminoglicani (PAS+)

## Spessore

1/3 anteriore «banded layer» (ABL)

*prodotto «in utero»*

spessore fisso

3 $\mu$ m

zona con bandeggio irregolare

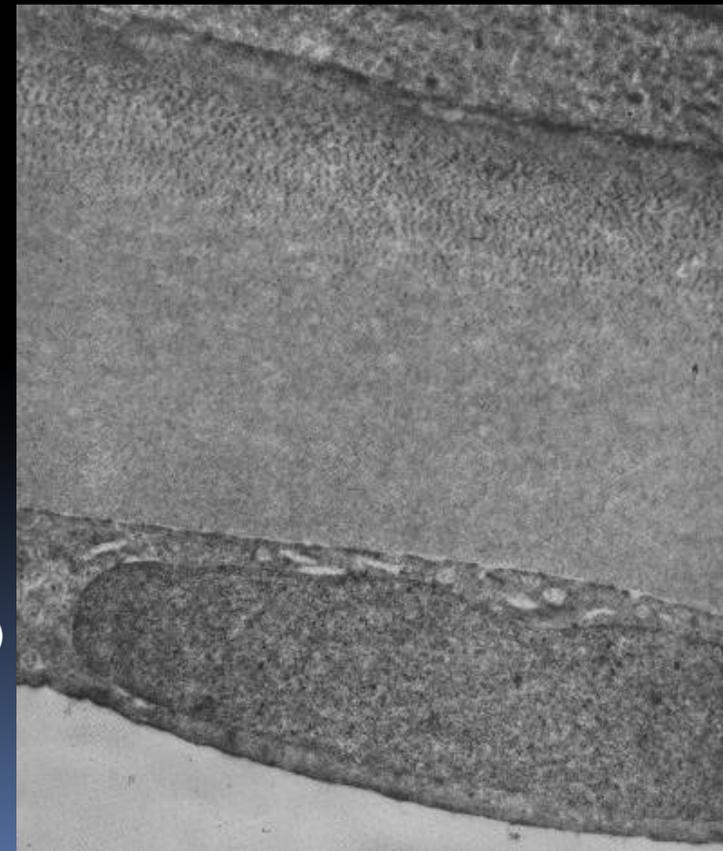
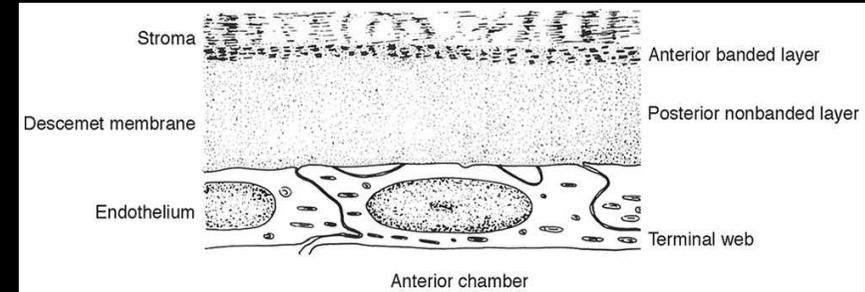
2/3 posteriore «non banded layer» (PNBL)

*prodotto dopo la nascita*

spessore variabile

3 $\mu$ m all'età di 20 anni e 10 $\mu$ m all'età di 80 anni (9 $\mu$ m di media)

fibrillogranulare omogeneo



## Principali cause di patologia Descemet-Endotelio

Descemet

Procedure chirurgiche  
Trauma  
Cheratocono acuto  
Glaucoma congenito

Endotelio

Distrofia  
Trauma iatrogeno (facoemulsificazione)  
Trauma diretto  
Infezioni

## Aspetti morfologici del danno

Descemet

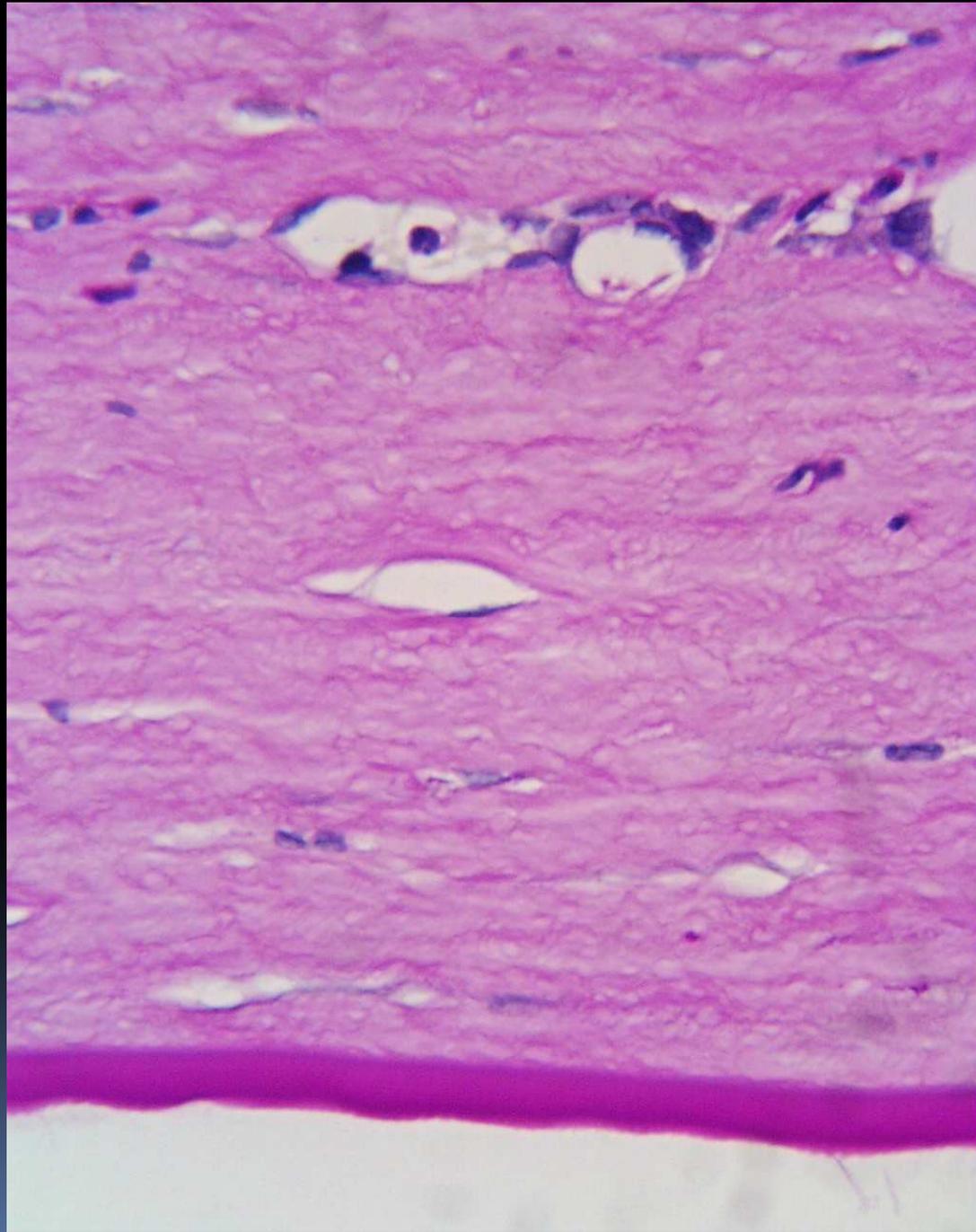
Rottura  
Ispessimento simil-guttato

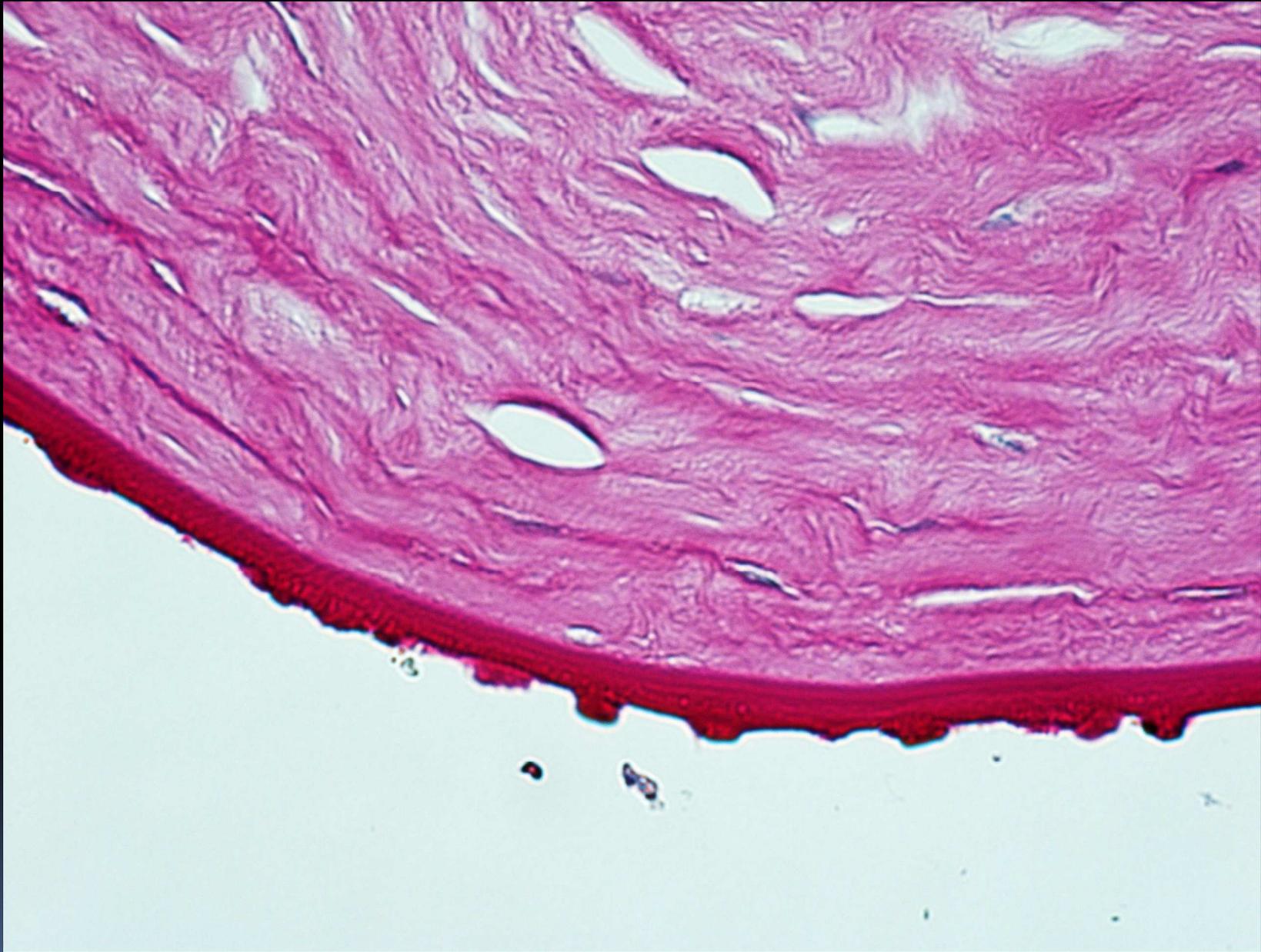
Endotelio

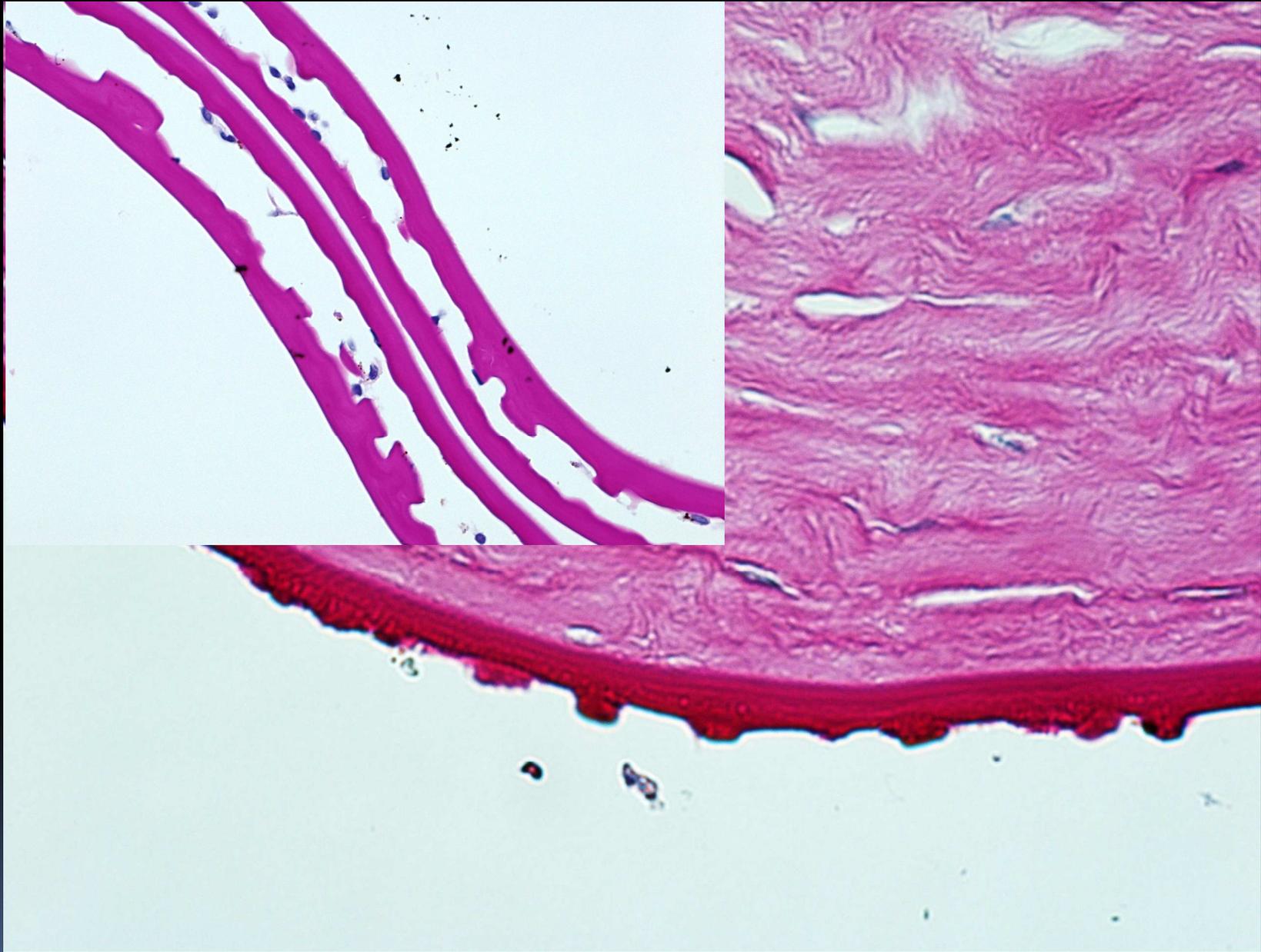
Ridotta densità (rarefazione cellulare)  
Membrana fibrosa retrocorneale  
(strato collagenosico posteriore)

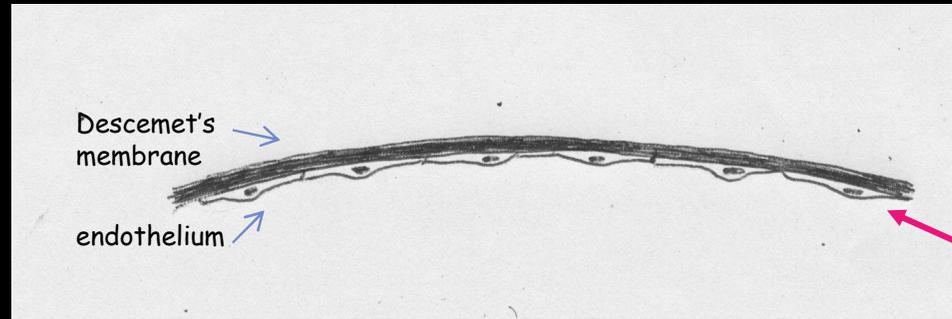








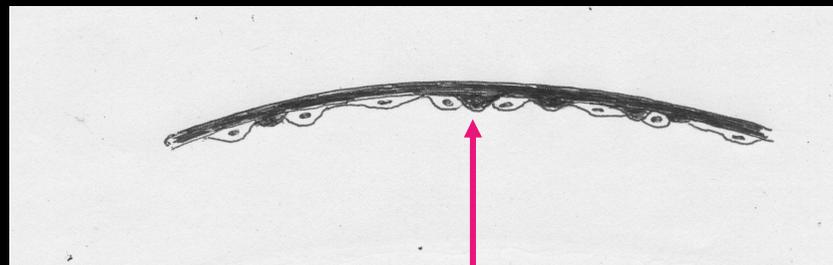




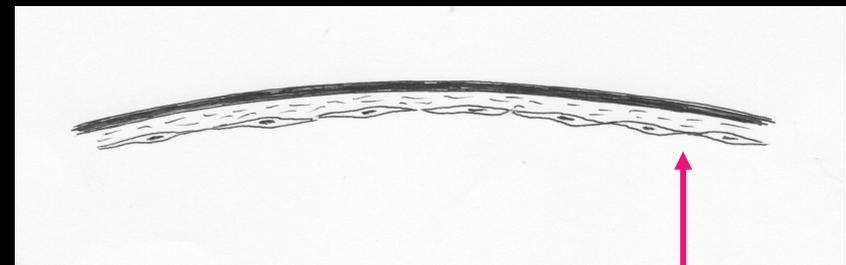
injury

chronic

acute



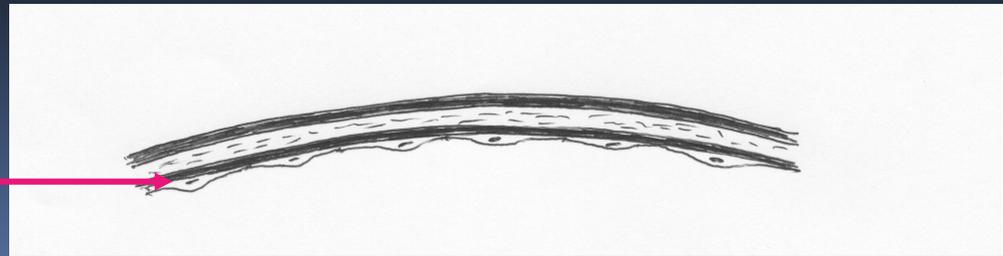
guttae



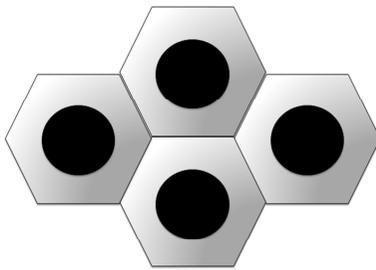
fibroblast metaplasia (EndMT)



reverse to endothelium phenotype (MEndT)



## Endothelial phenotype



### Hallmarks

- Monolayer of polygonal-shaped cells
- Contact inhibited
- Arrested in G1 phase of the cell cycle
- Express ZO-1 and N-Cadherin

### Triggering factors

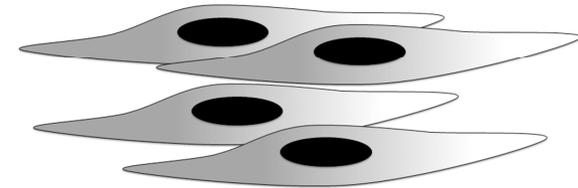
- TGF- $\beta$ <sub>1-2-3</sub>
- FGF-2
- IL-1 $\beta$
- Cx43



### Signaling pathways

- Smad
- p38
- Erk1/2
- Wnt/ $\beta$ -cat
- NF-kB
- p27Kip1

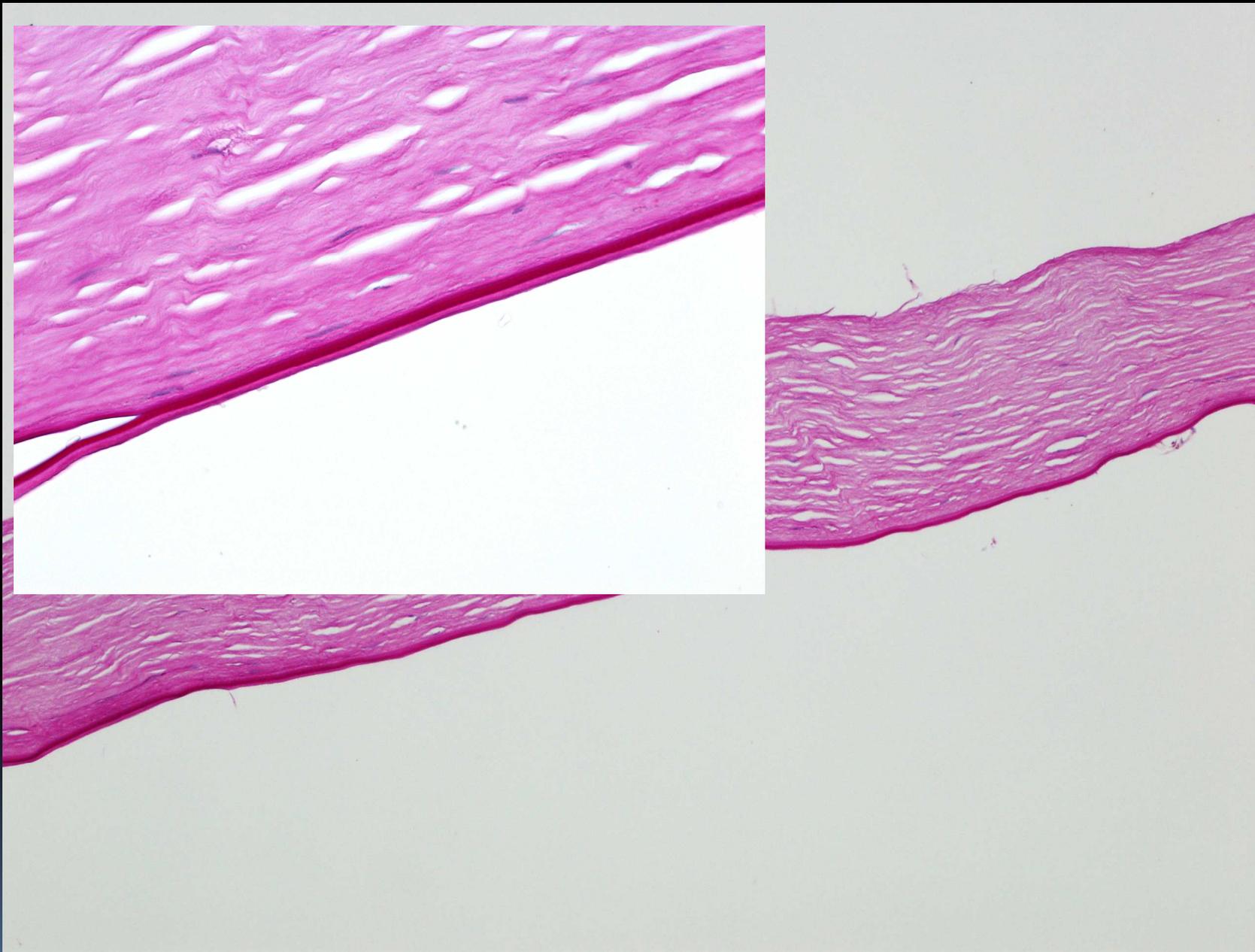
## Fibroblastic phenotype

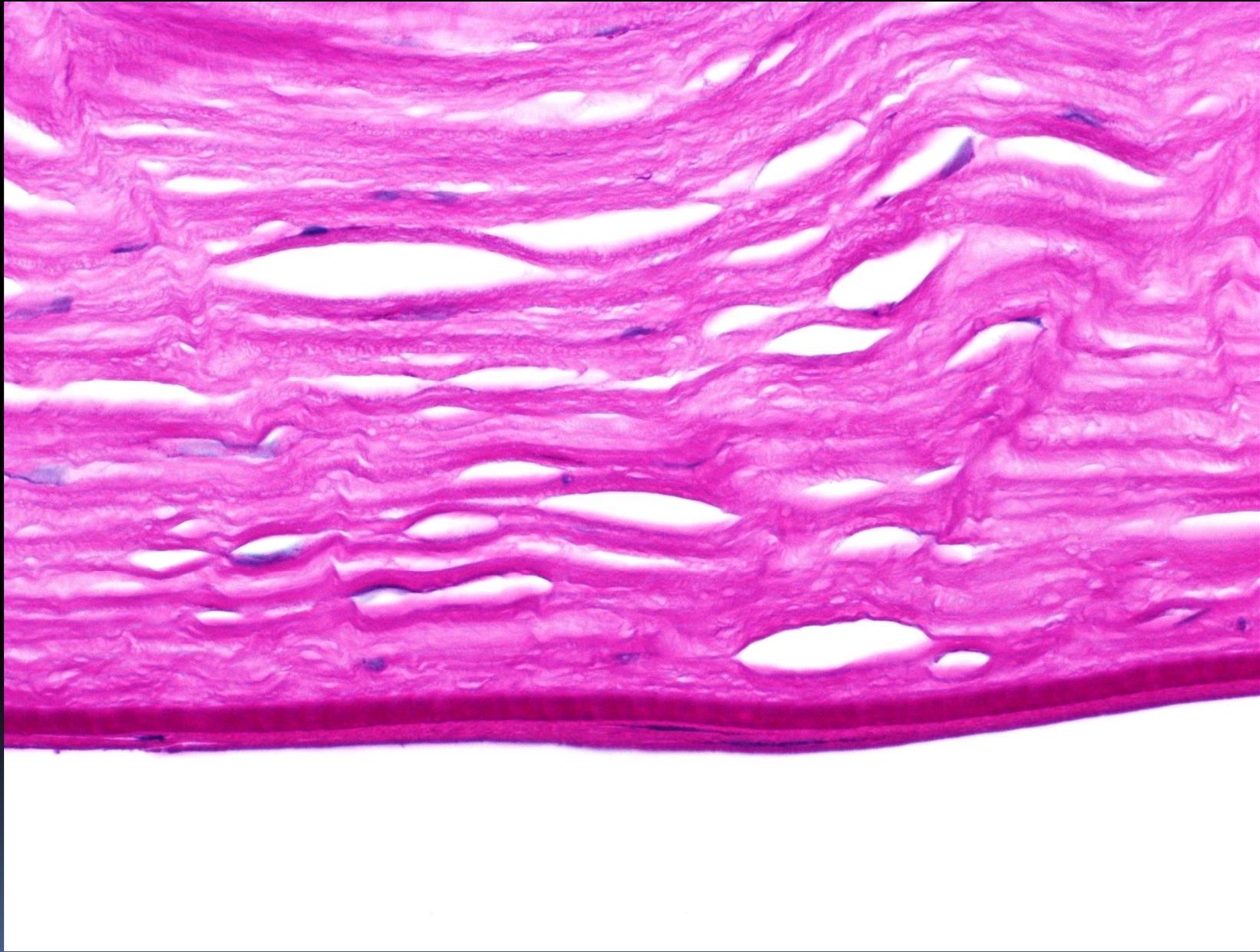


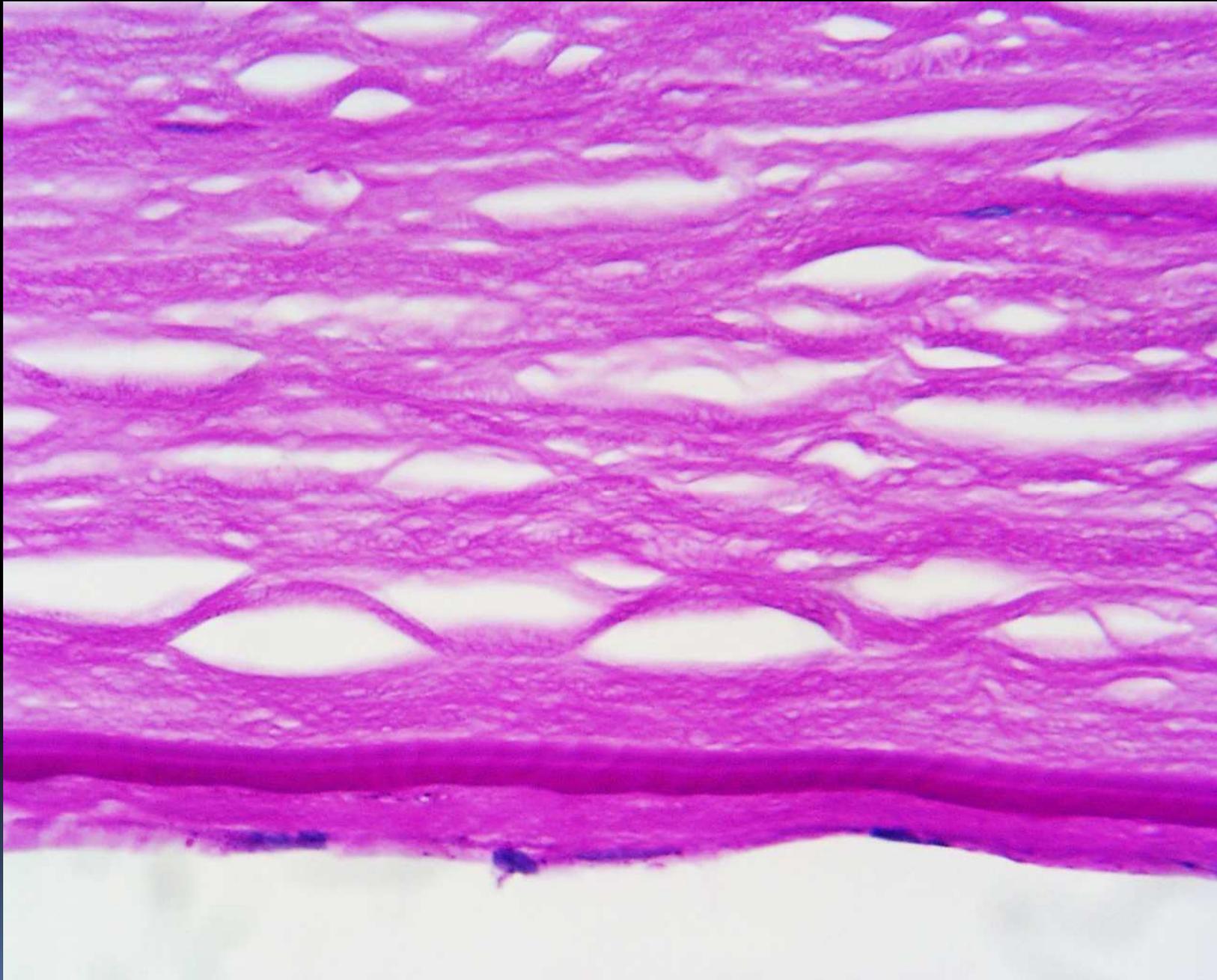
### Hallmarks

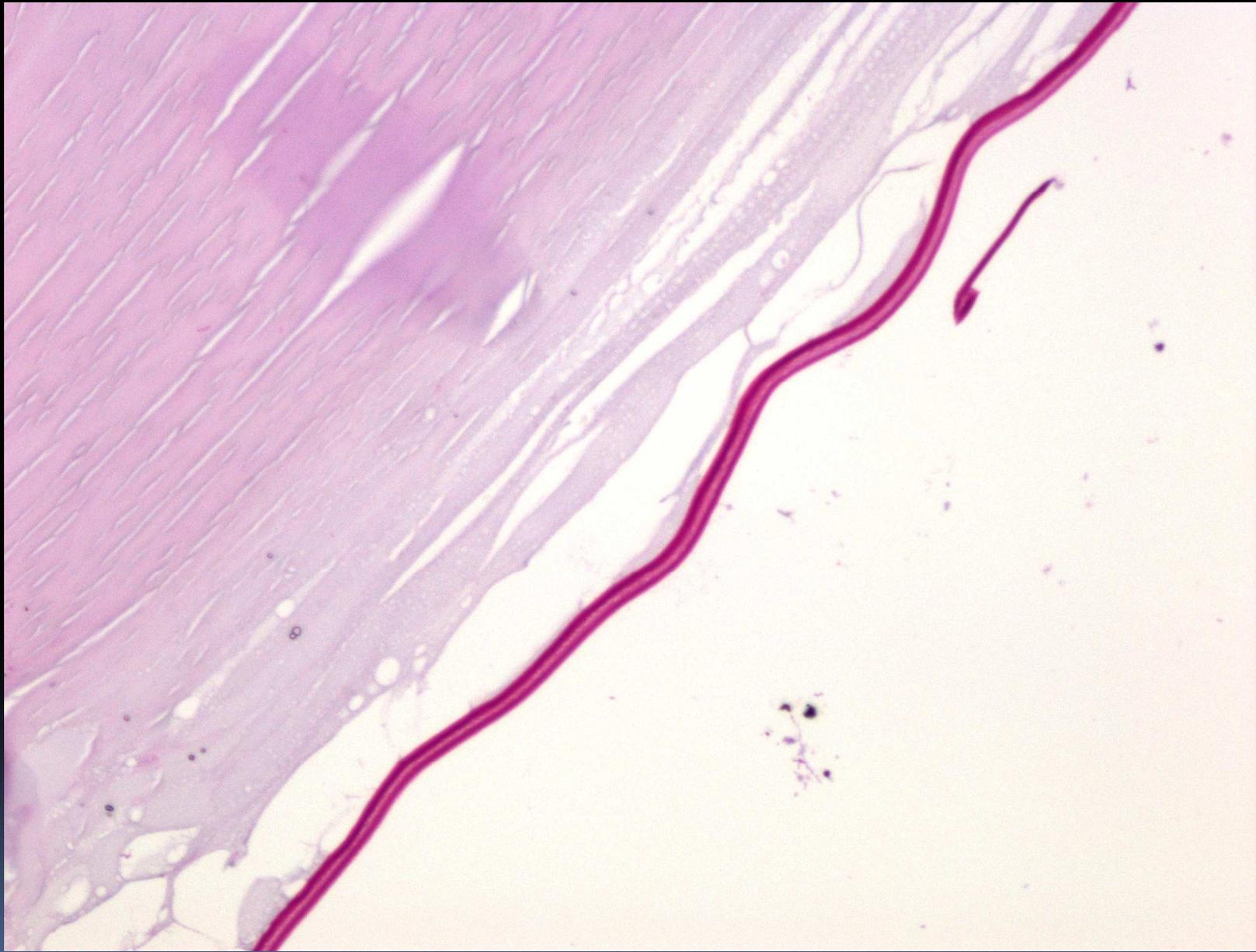
- Changes in cell shape
- Loss of contact-inhibition
- Actin cytoskeleton reorganization
- Increased cell motility
- Increased ECM production
- Changes in gene expression
- Disassembly of cell-cell junctions

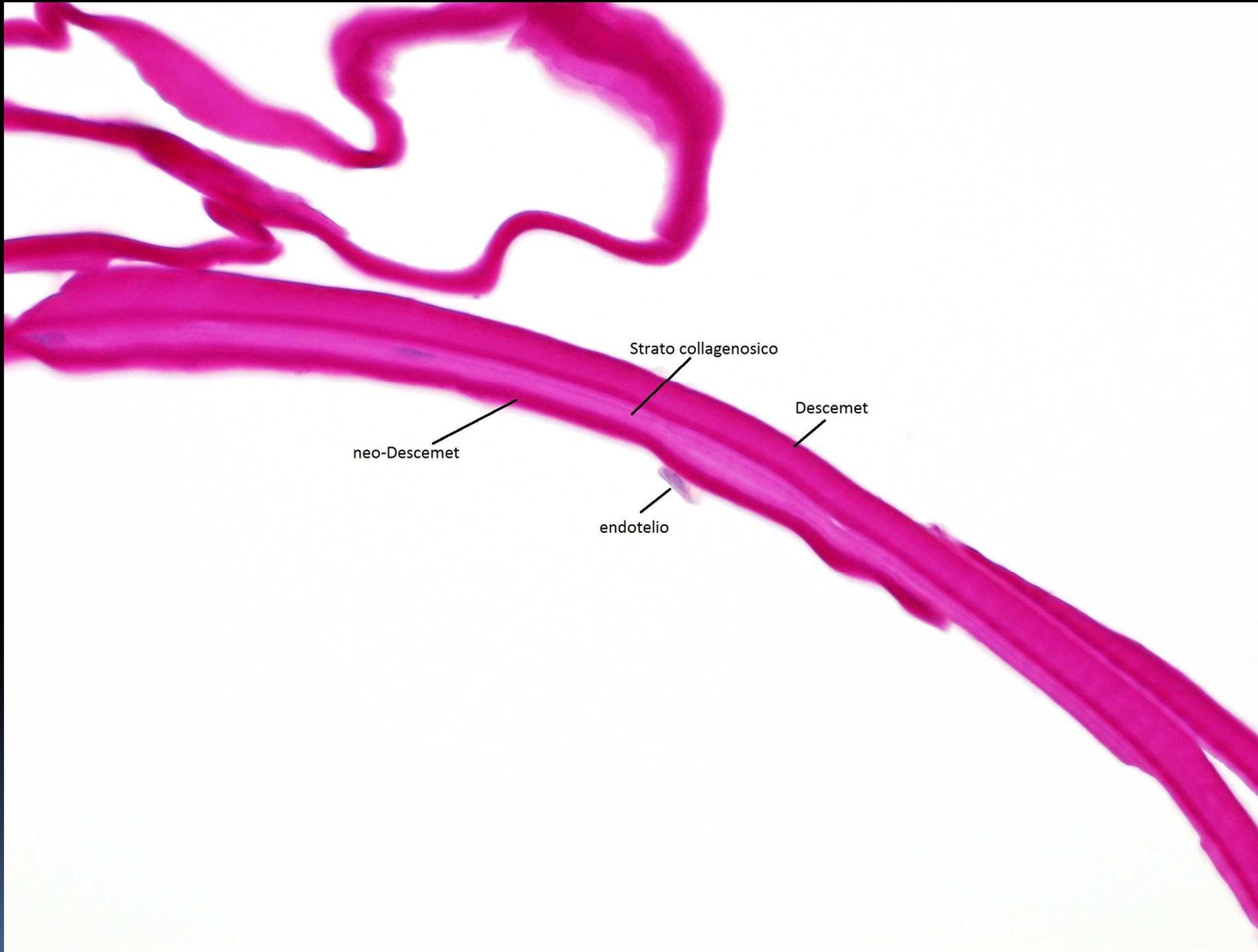


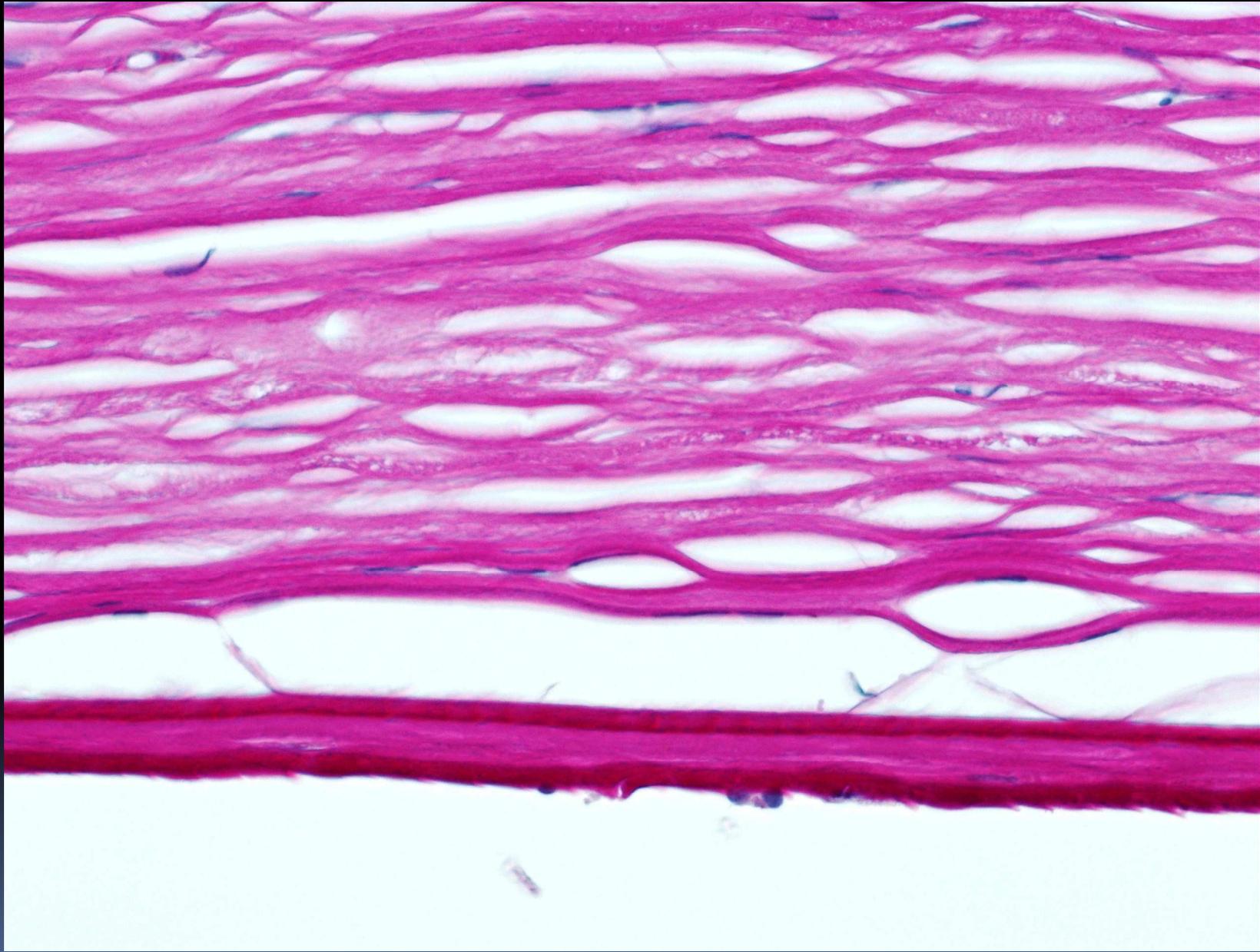


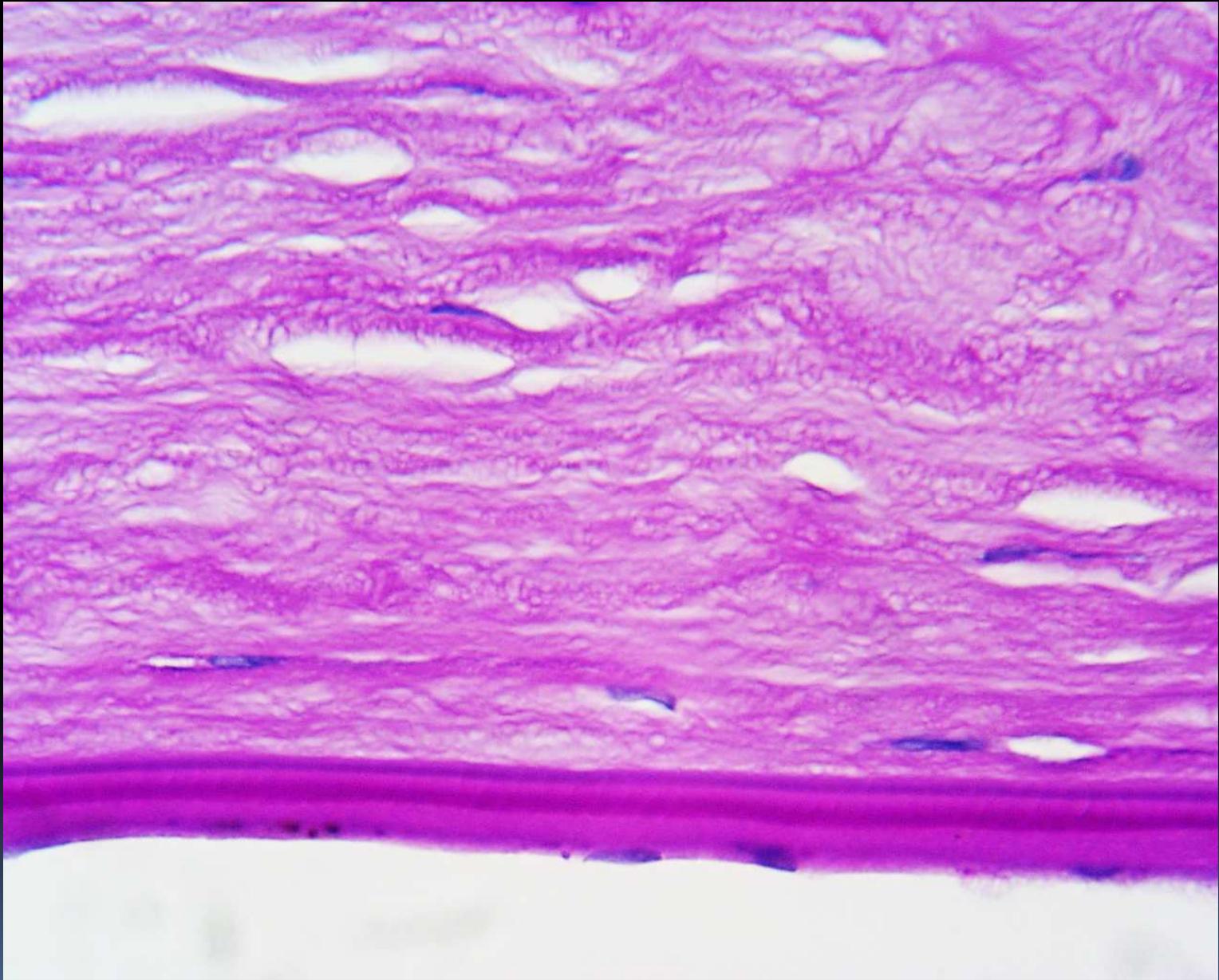












**Grazie per l'attenzione!**

