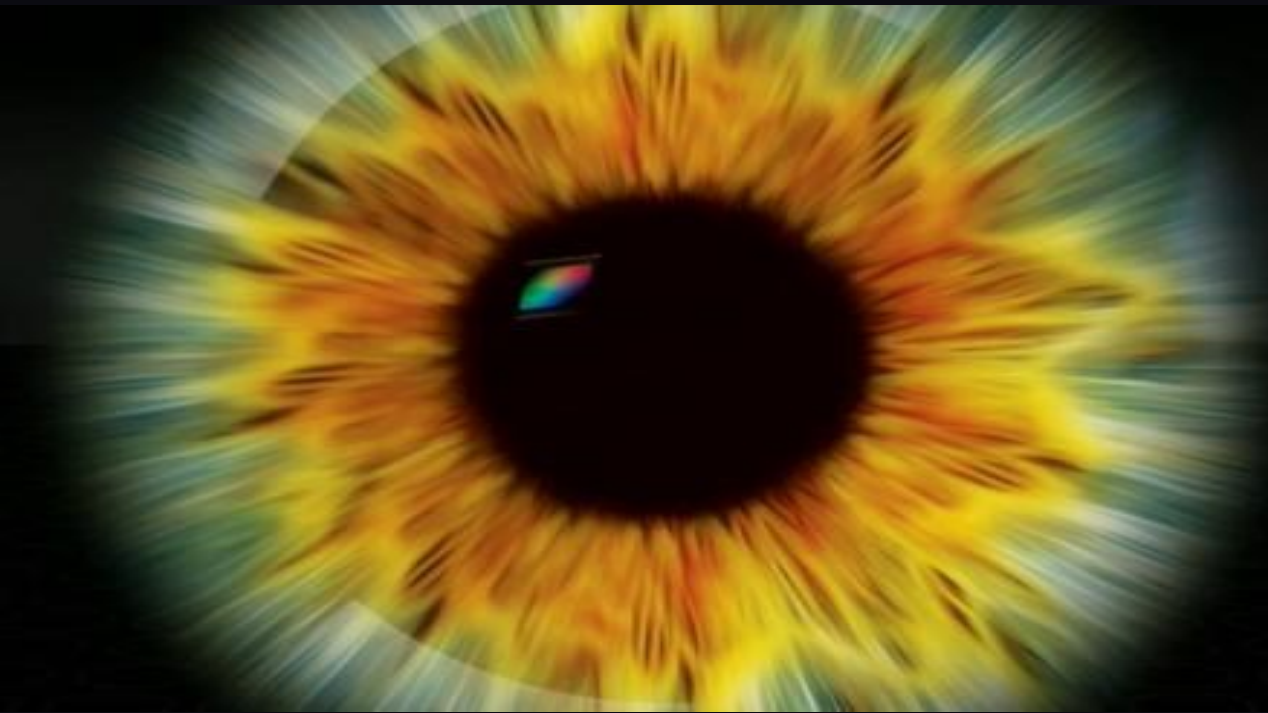
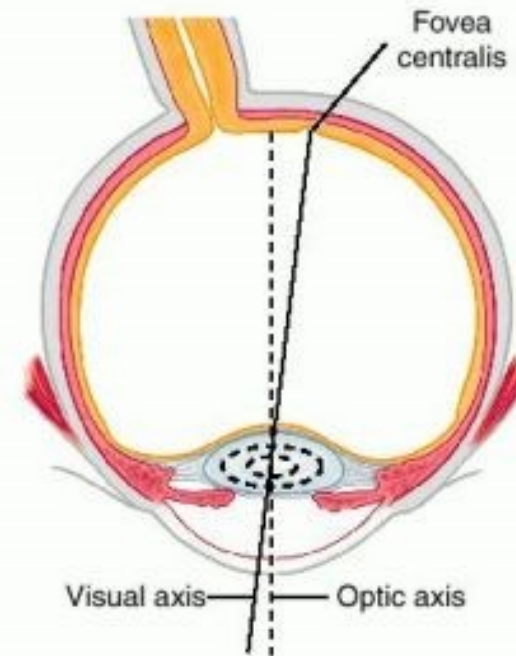
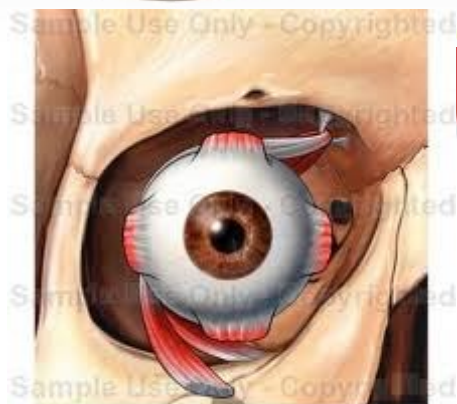


ORGANUM VISUS - OKO



Z. Vatavuk

Klinika za očne bolesti
"Sestre milosrdnice"



promjeri :

sagitalni – 24 mm

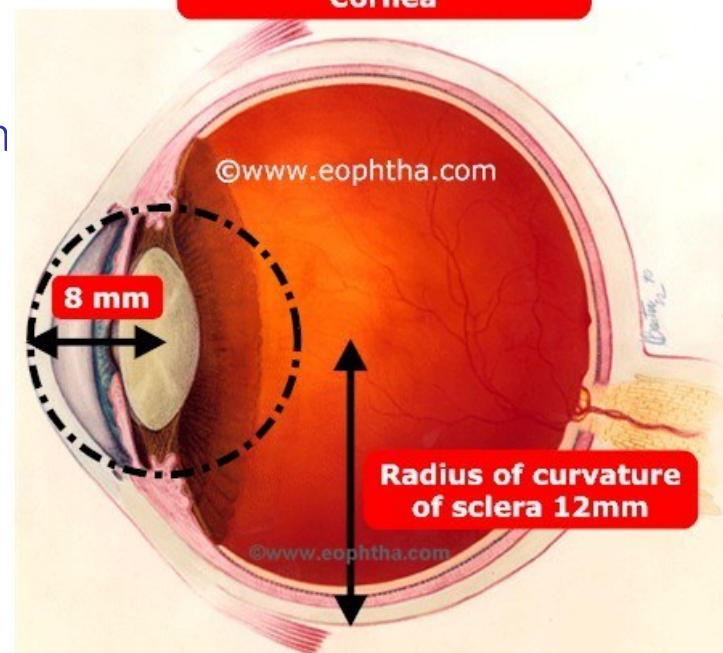
horizontalni – 23,6 mm

vertikalni - 23,3 mm

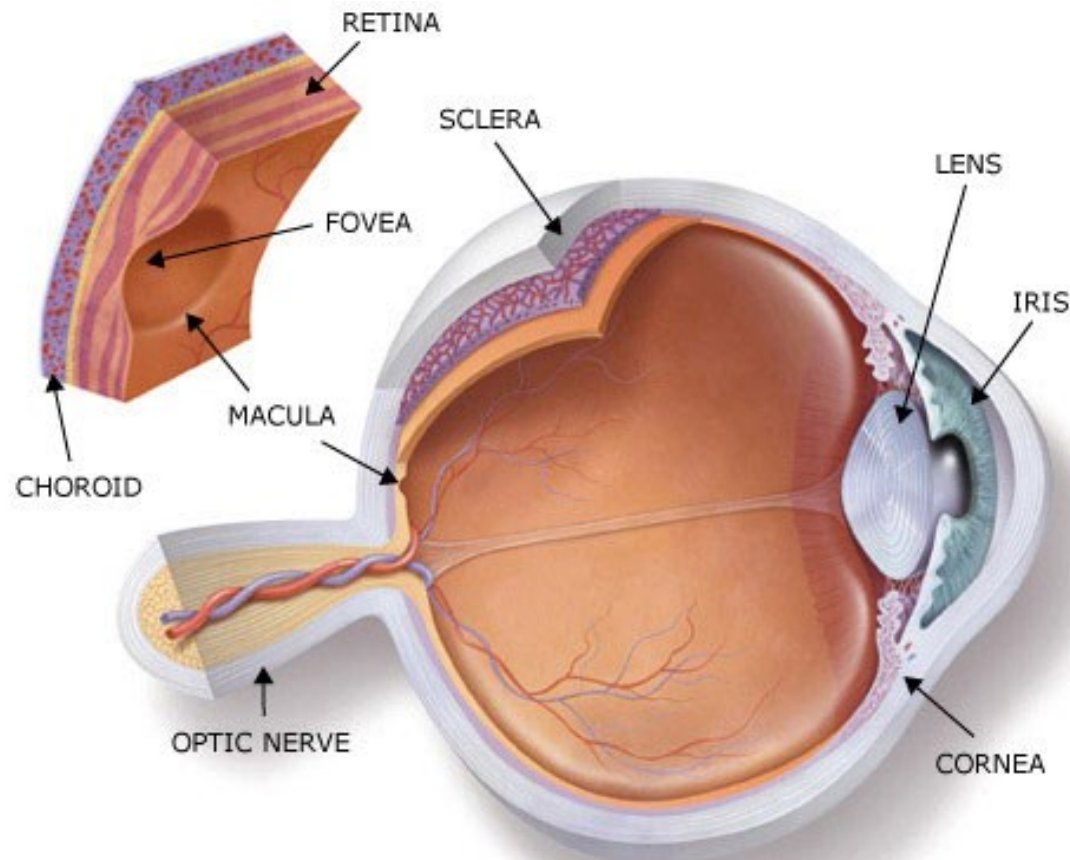
VIDNA OS

BULBARNA OS

Radius of Curvature of Cornea

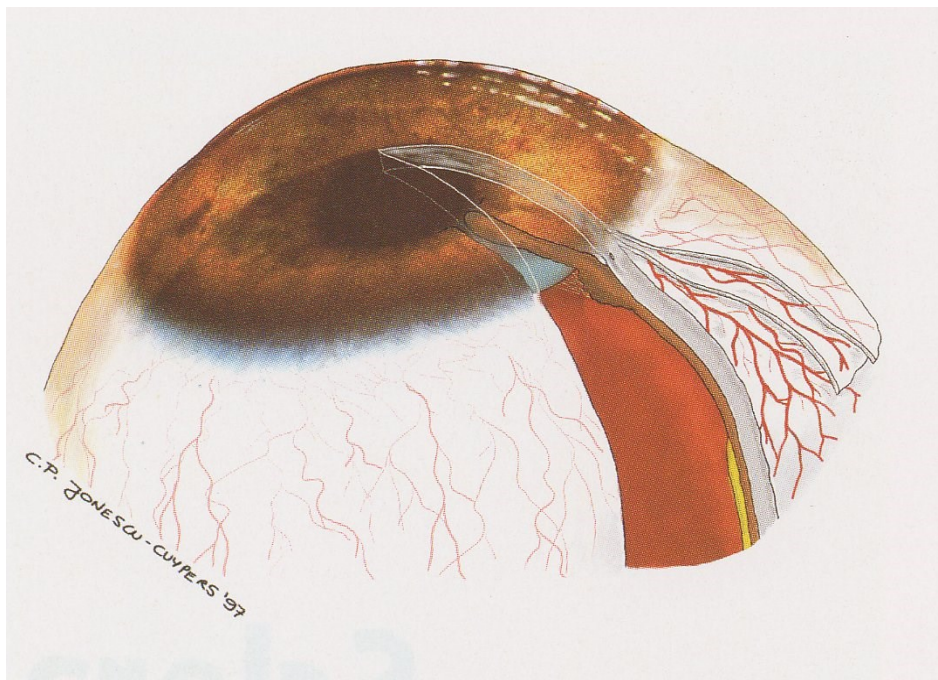


- **TUNICA FIBROSA BULBI** : bjeloočnica i rožnica
 - **TUNICA VASCULOSA BULBI – UVEA** : žilnica, zrakasto tijelo i šarenica
 - **TUNICA NERVOSA BULBI** : mrežnica
- Sadržaj oka : **LEĆA; STAKLOVINA I OČNA VODICA**



BJELOOČNICA



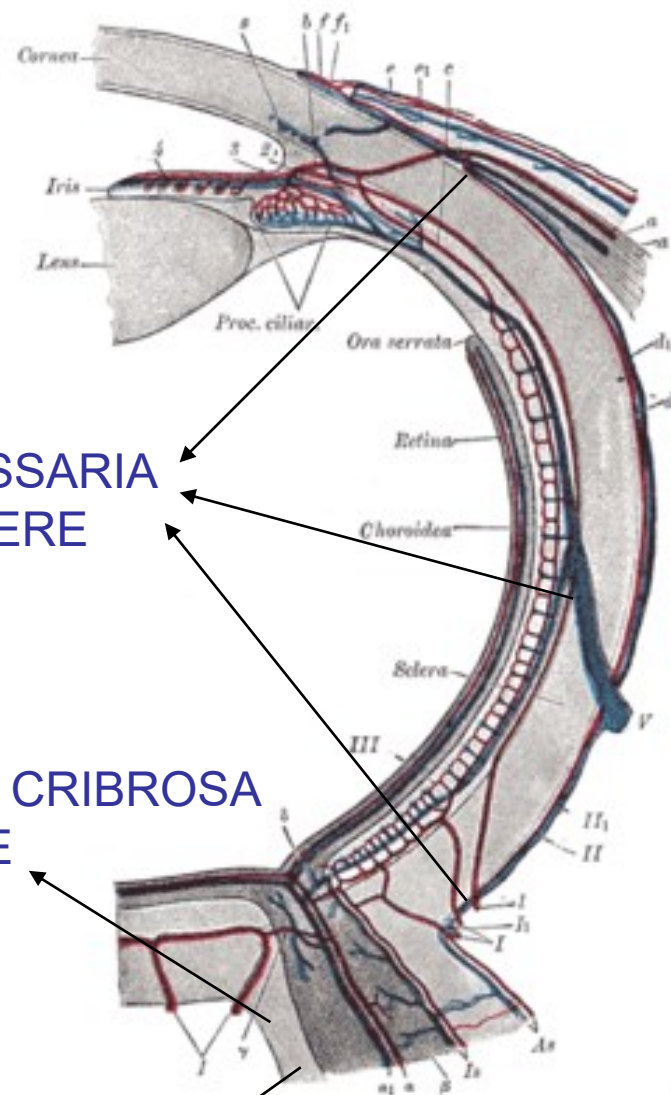


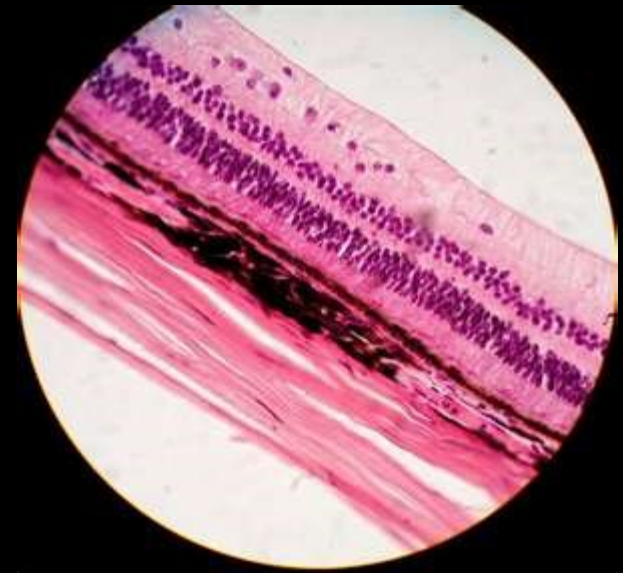
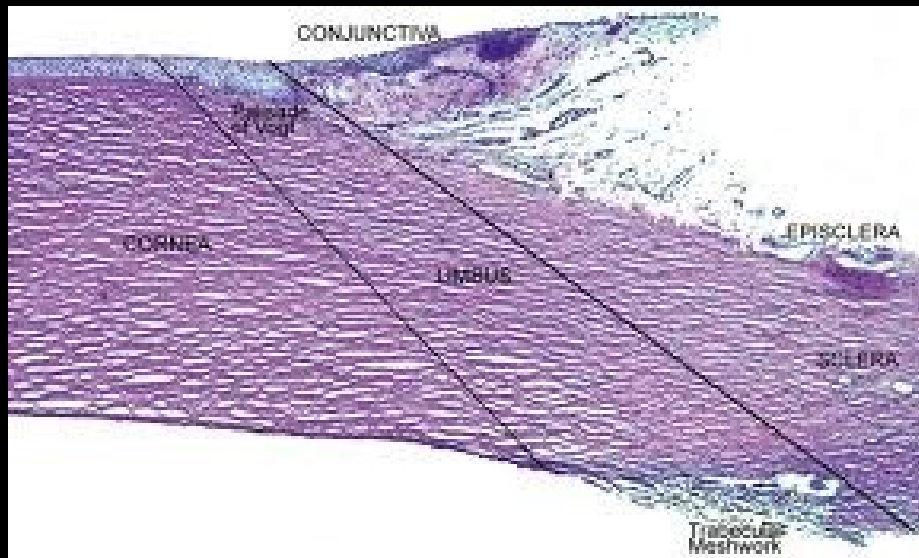
5/6 očne jabučice

EMISSARIA
SCLERE

LAMINA CRIBROSA
SCLERE

VIDNI ŽIVAC





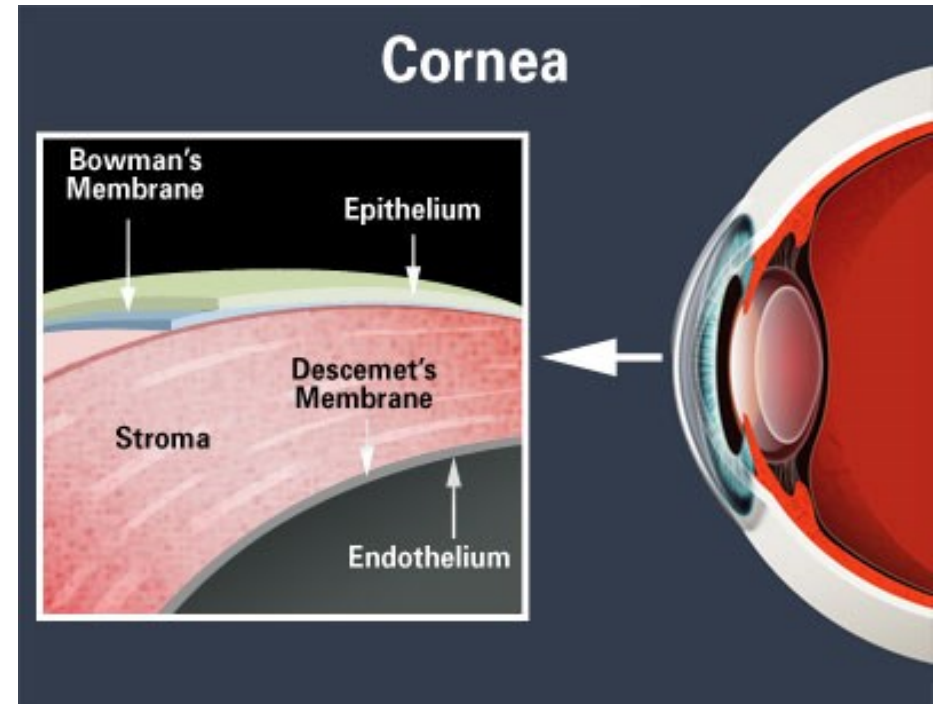
PHD : episklera
stroma
lamina fusca

RIMA CORNEALIS – žljeb u skleri gdje se ona nastavlja u rožnicu



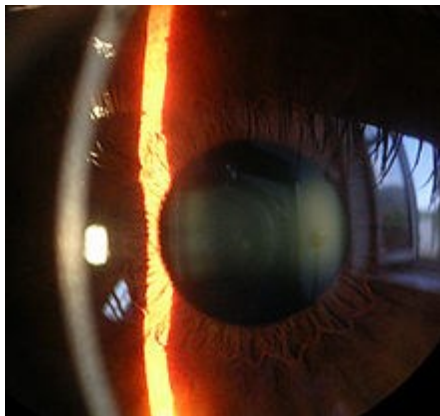
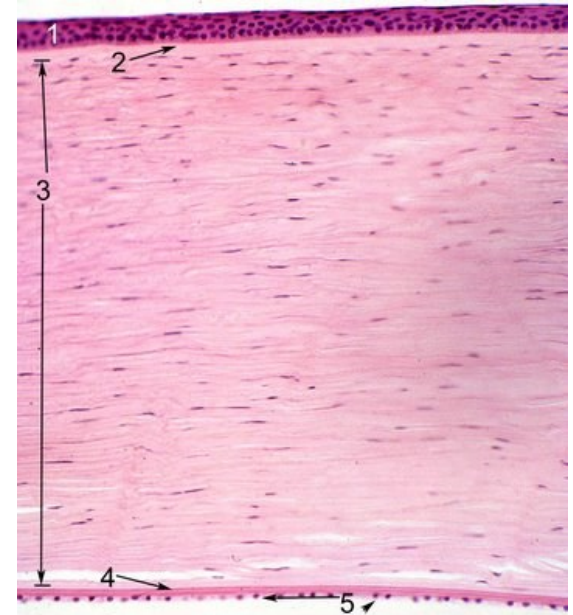
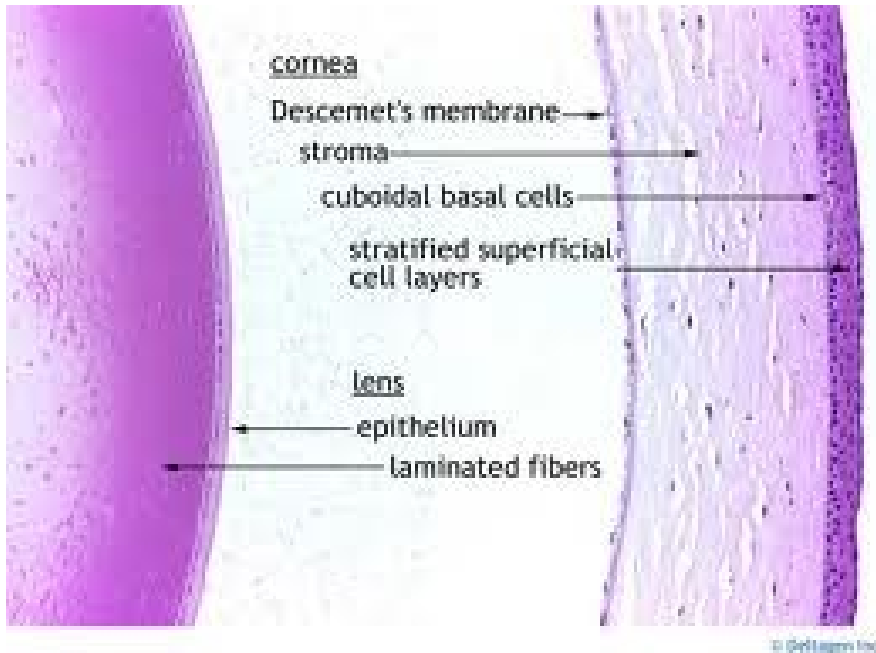
SINUS VENOSUS SCLERE (canalis Schlemmi) – kanal širine 40 mm i dužine 500 mm koji preko mreže (reticulum trabeculare) služi odvodnji očne vodice iz prednje očne sobice.

ROŽNICA

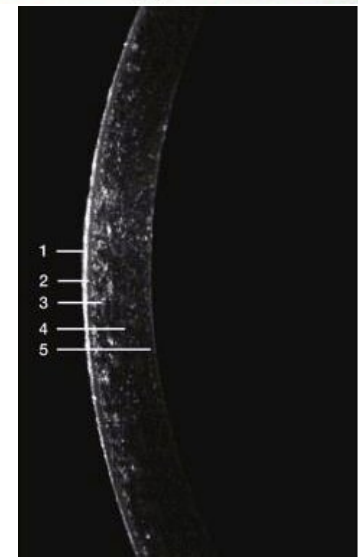


- 1/6 OČNE JABUČICE
- “STAKLO NA SATU”
- KONKAVNOKONVEKSNA LEČA jakosti **43 dpt.**

histologija rožnice



1. EPITEL
2. BOWMANOVA MEMBRANA
3. STROMA
4. DESCEMENTOVA MEMBRANA
5. ENDOTEL



- **Senzitivnost rožnice** je najveća kod apeksa.
- **Inervacija rožnice** - 1. grana n. **Trigeminusa** — n.ophthalmicus — nn.ciliares posteriores longae 70-80 živčanih vlakana ulazi u rožnicu i grana se.

- **Metabolizam rožnice** : difuzijom preko limbalnih arkada, očne vodice u prednjoj očnoj sobici i suza.
- **Prozirnost rožnice** : konstantnom debljinom i udaljenošću snopova kolagenih vlakana koja mora biti manja od valne duljine svjetla.

UVEA

Posterior
Uvea

Choroid
Layer

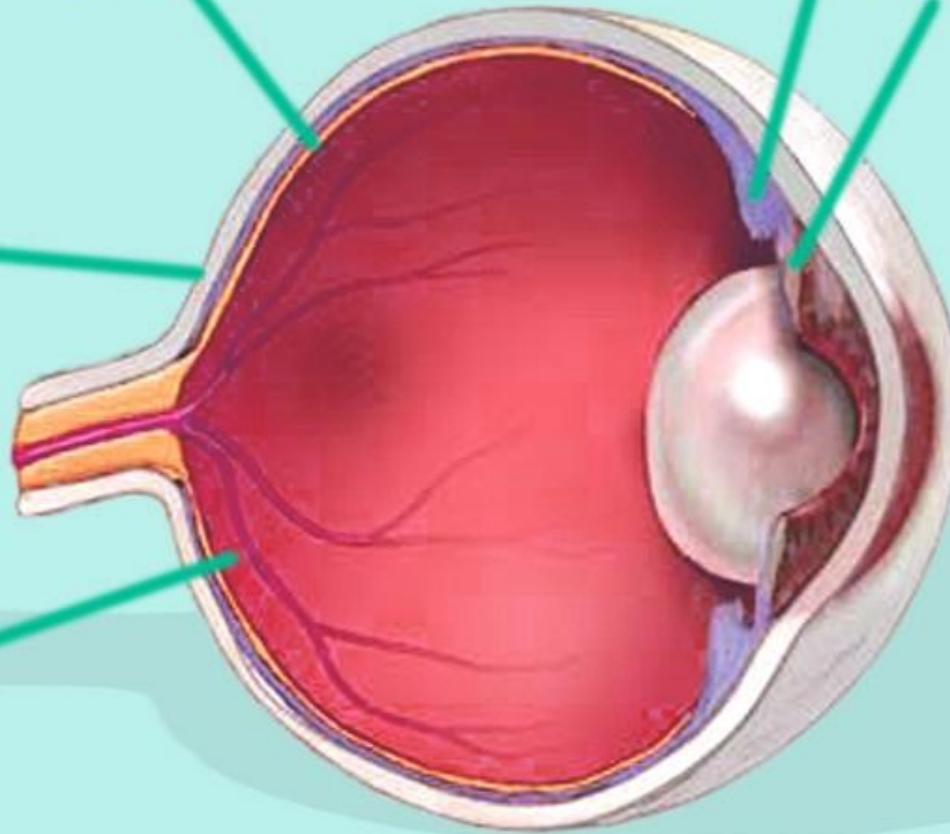
Ciliary
Body

Iris

Anterior
Uvea

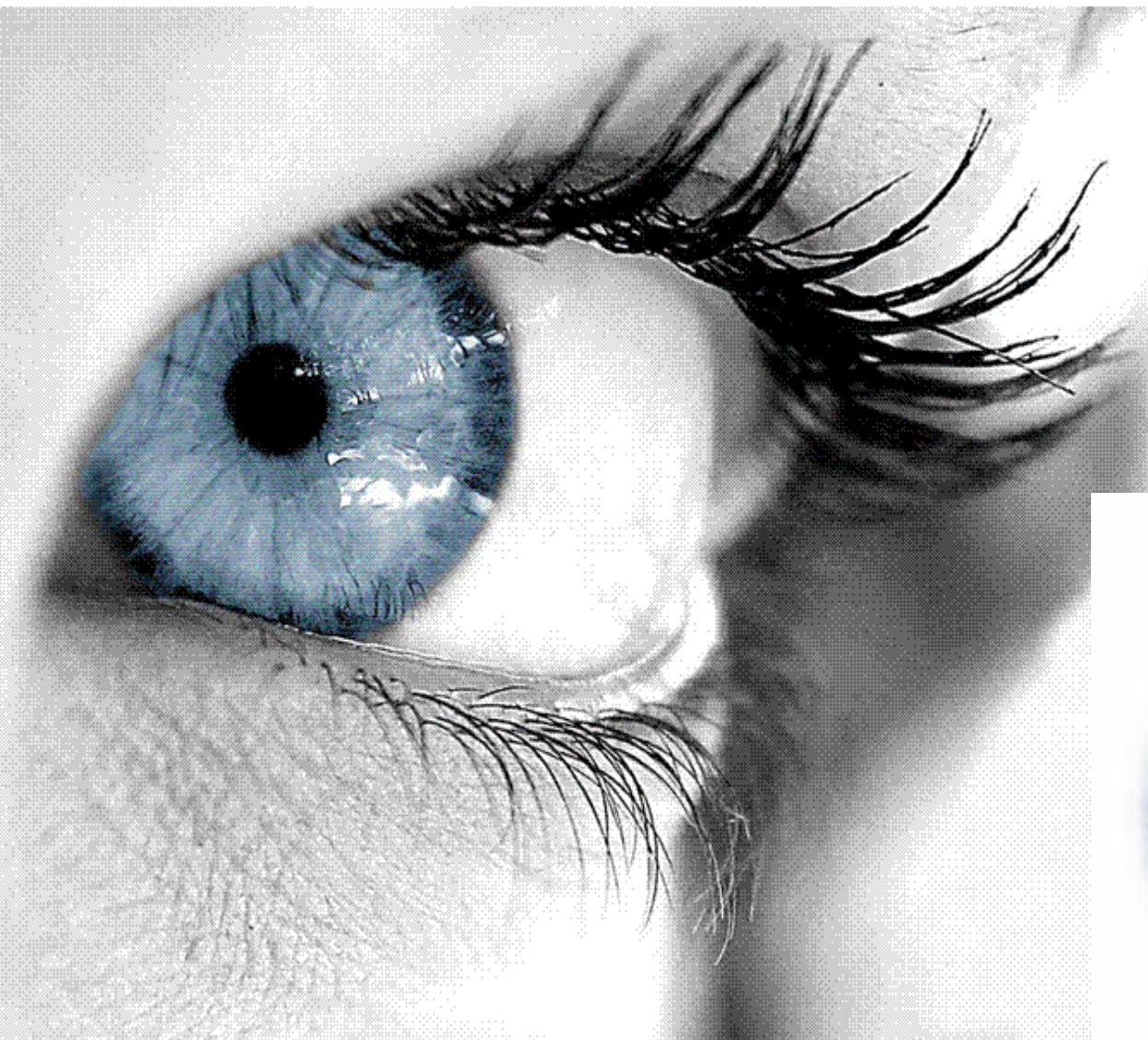
Sclera

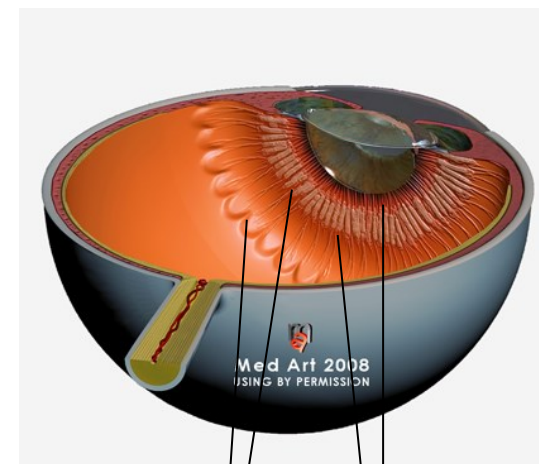
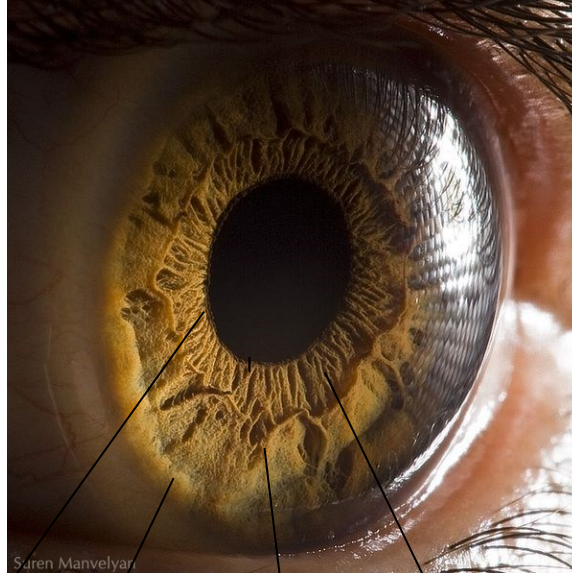
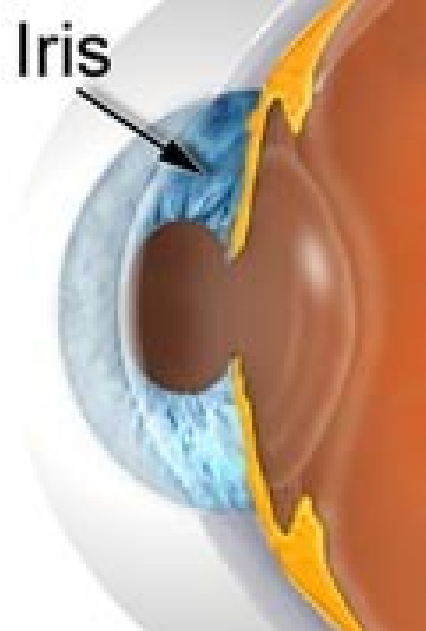
Retina



v šarenica



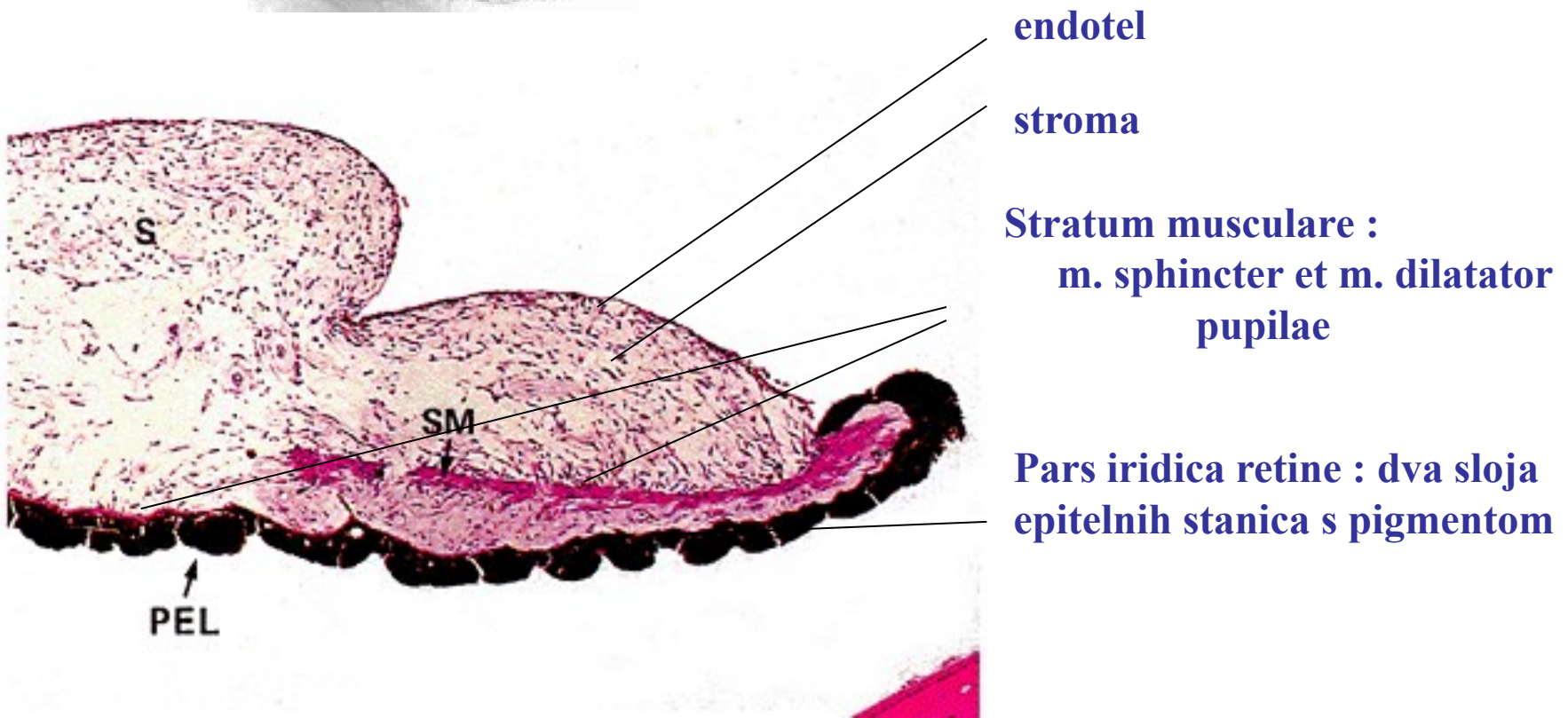


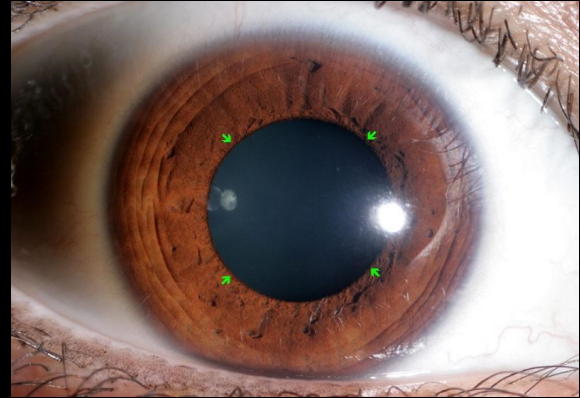
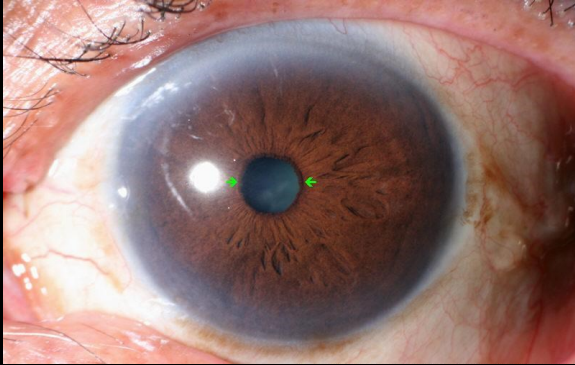
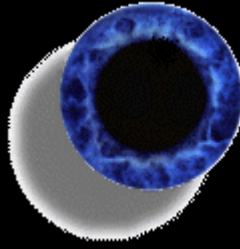


Margo pupillaris
 Margo ciliaris
 Facies anterior
 Anulus Iridis major
 Anulus iridis minor
 Facies posterior
 corpus ciliare
 iris

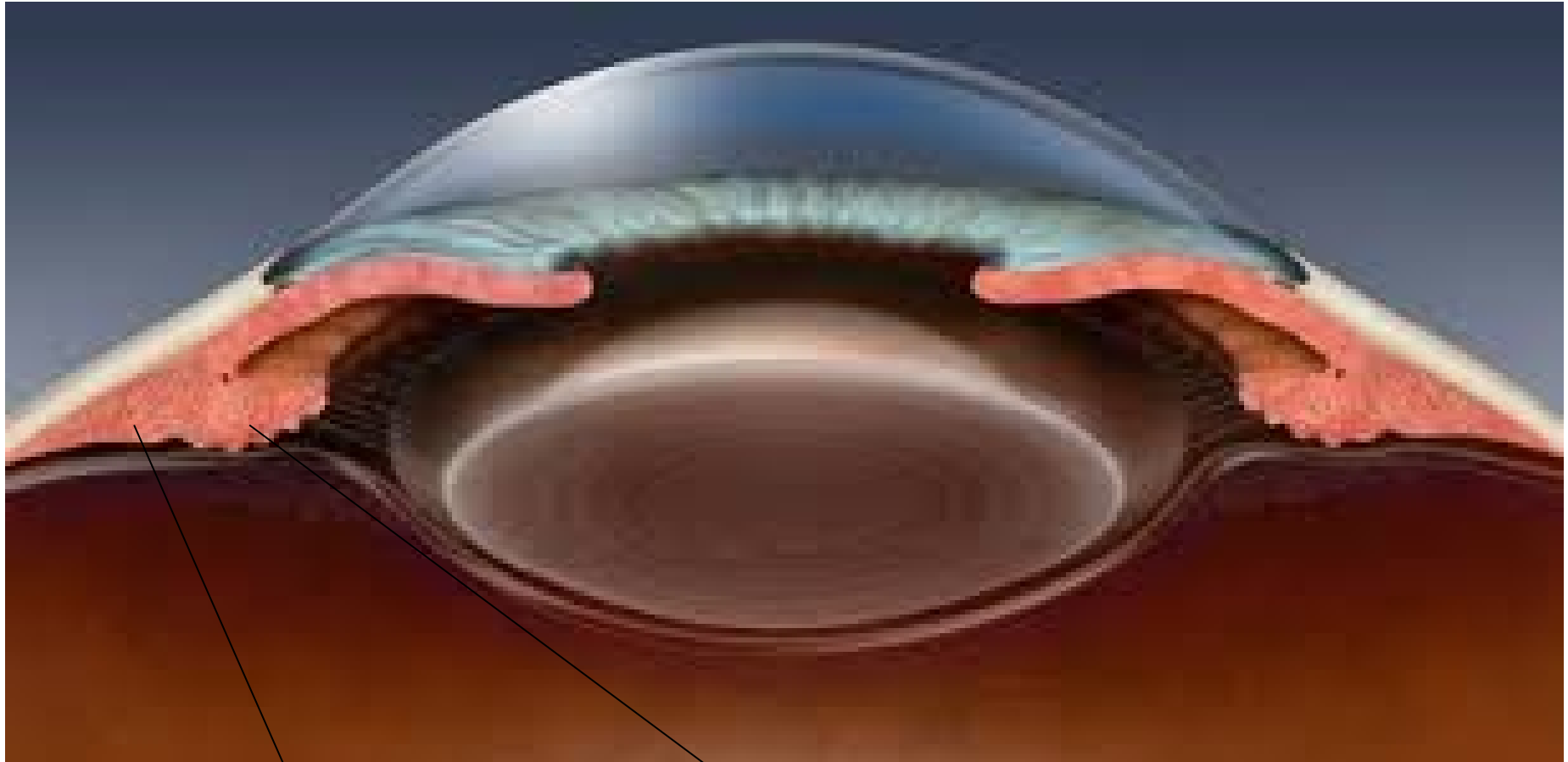
FUNKCIJA ŠARENICE - regulacija količine svjetlosti koja ulazi u oko

histologija šarenice





Zrakasto tijelo

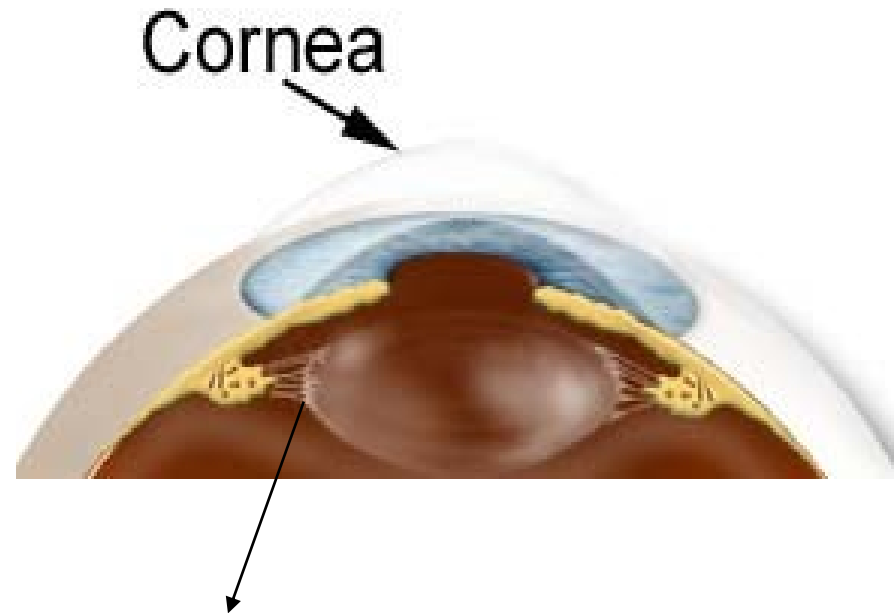
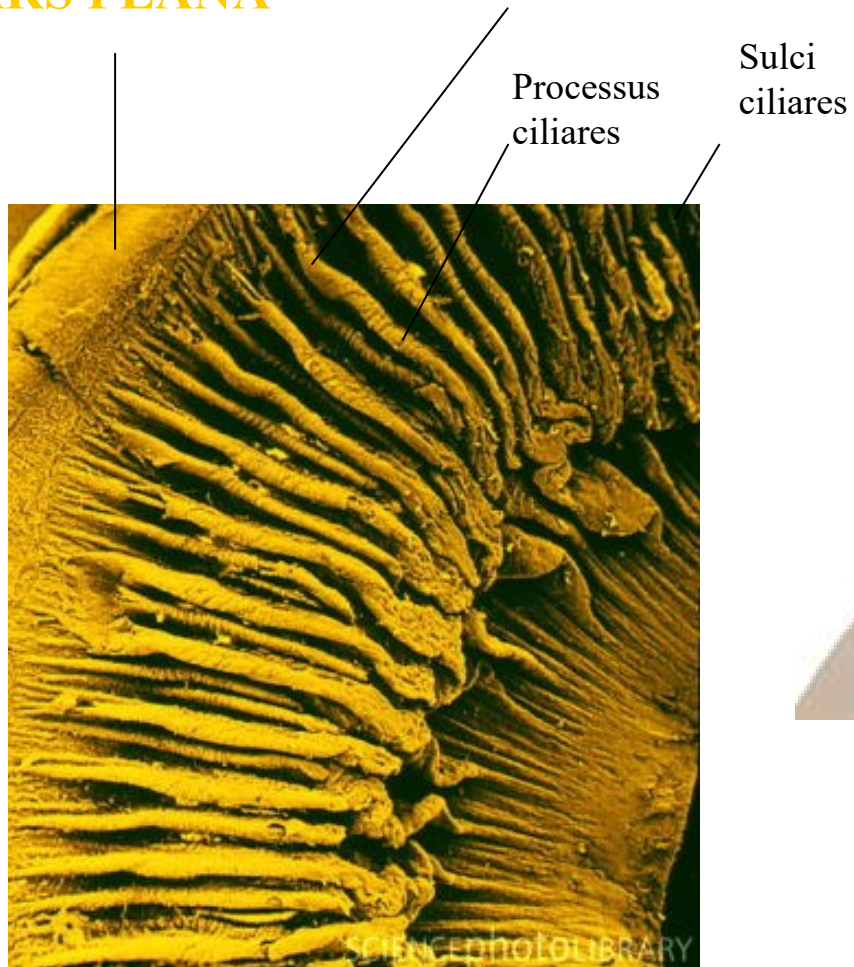


m. ciliaris

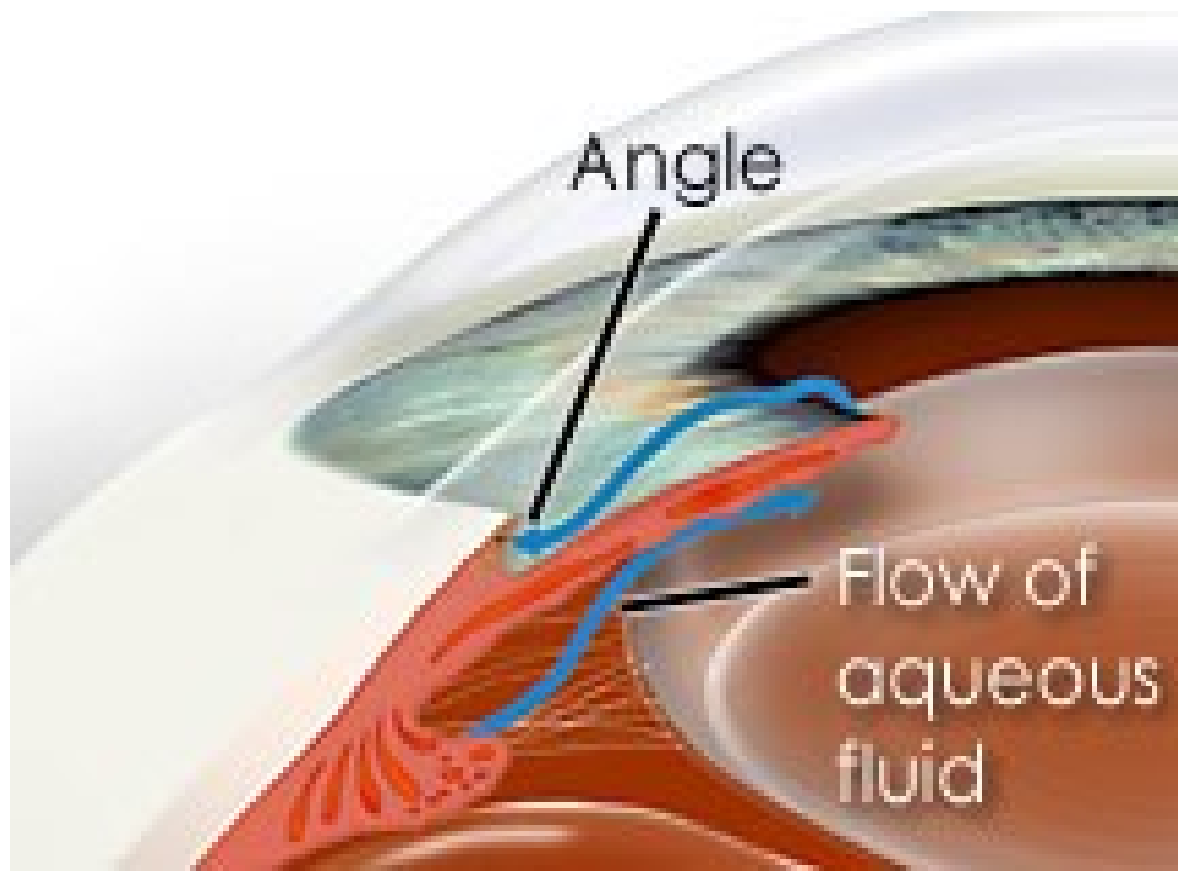
Processus ciliares

PARS PLICATA

PARS PLANA

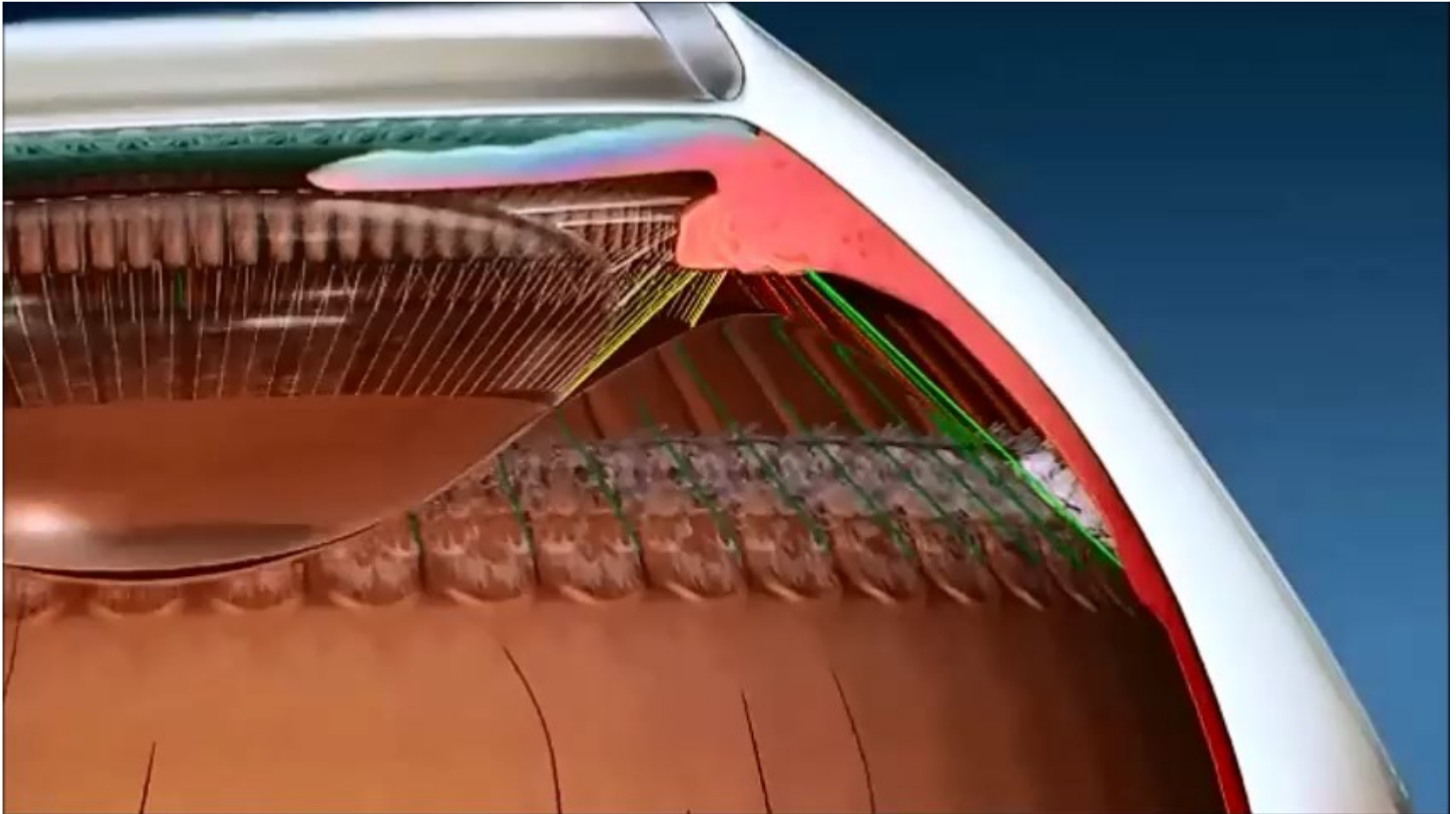


Zonula ciliaris Zinni



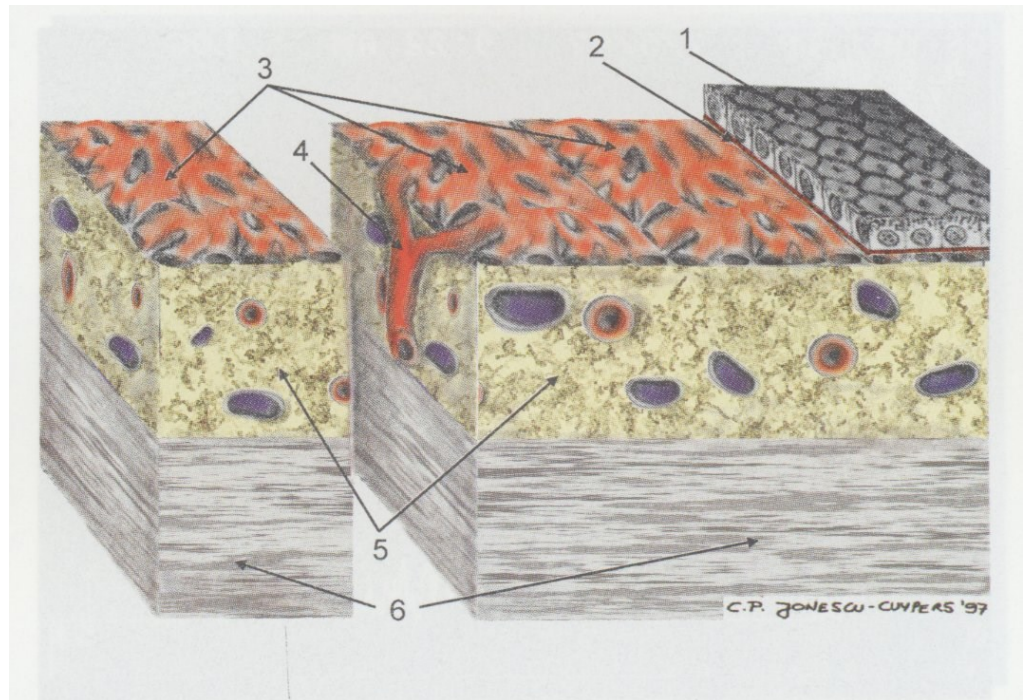
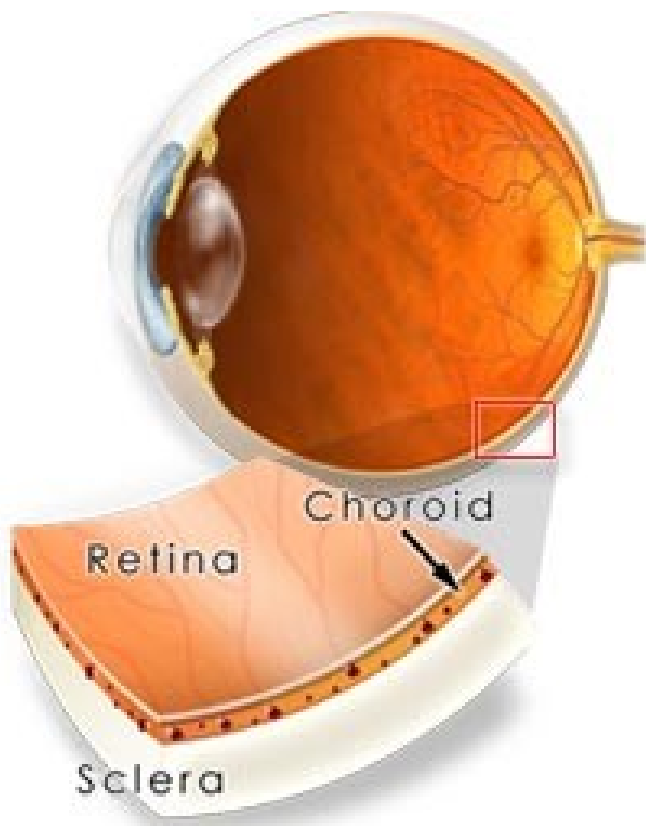
- cilijarni nastavci luče **očnu vodicu** u **stražnju očnu sobicu** odakle ona prolazi kroz prostor između prednje plohe leće i stražnje plohe šarenice prema **prednjoj očnoj sobici**.
- Iz prednje očne sobice očna vodica istječe u iridokornealnom kutu gdje kroz trabekulum odlazi u **Schlemmov kanal** te nadalje u **episkleralne vene**.
- Takav tijek očne vodice je neophodan za očuvanje intraokularnog tlaka.

AKOMODACIJA



akomodacija oka na blizinu – uloga m. ciliaris.

ŽILNICA

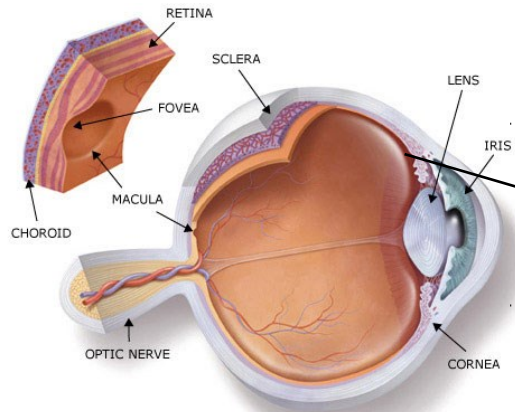


Histološki 4 sloja (od sklere prema mrežnici)

- **lamina suprachoroidea**
- **lamina vasculosa** (ogranci aa. ciliares posteriores breves et longae, vene vorticosae)
- **lamina choriocapilaris** (prehranjuje pigmentni epitel retine i sloj čunjića i šepića)
- **lamina basalis (Bruchova membrana)**

mrežnica

RETINA



ORA SERRATA

PARS CAECA

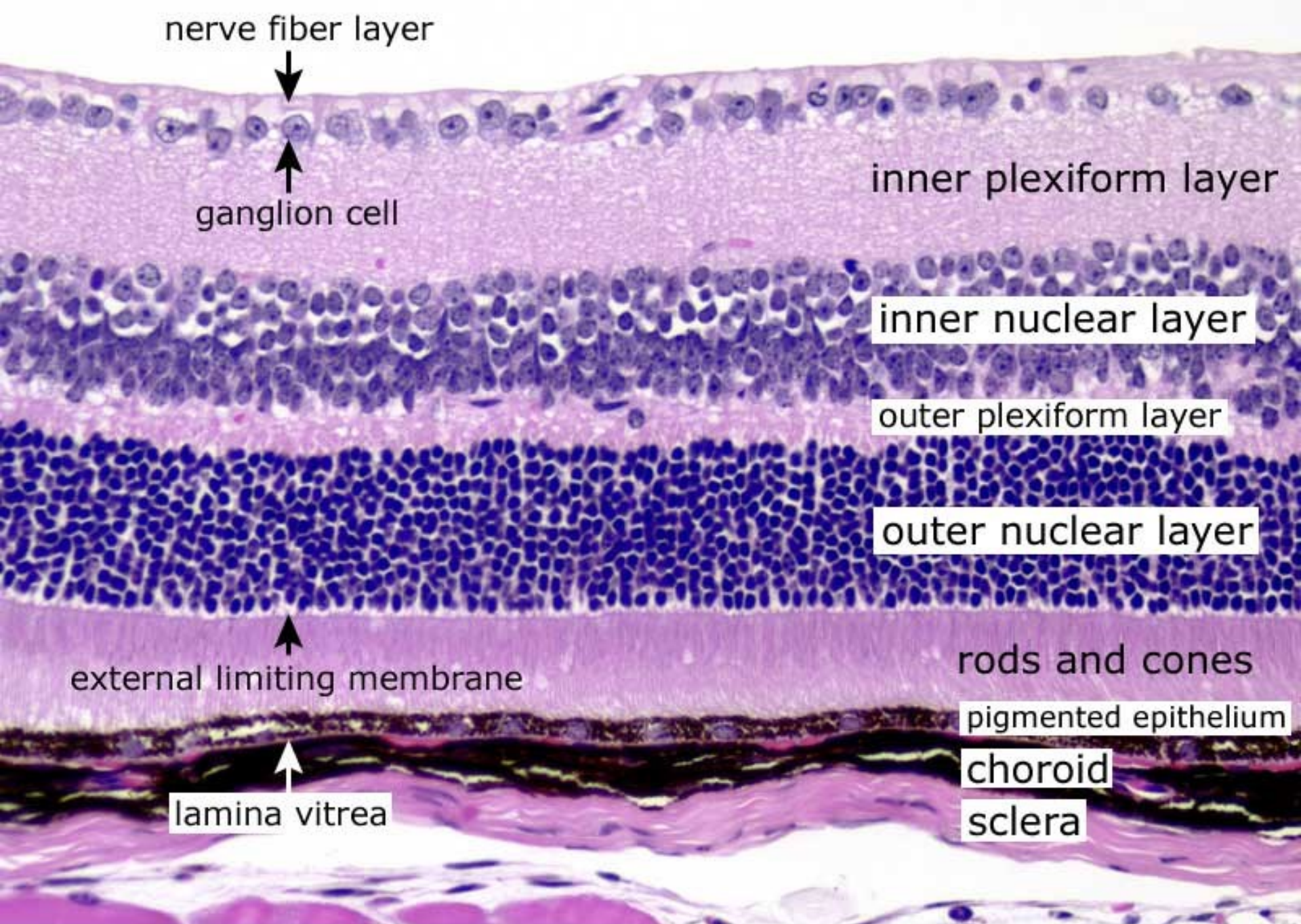
PARS OPTICA

Fig. 2 The cornea occupies the front center part of the outer wall of the eye.

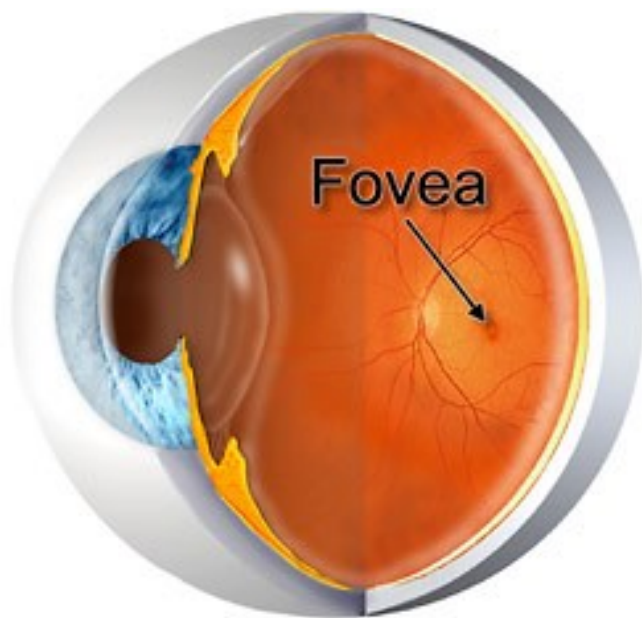
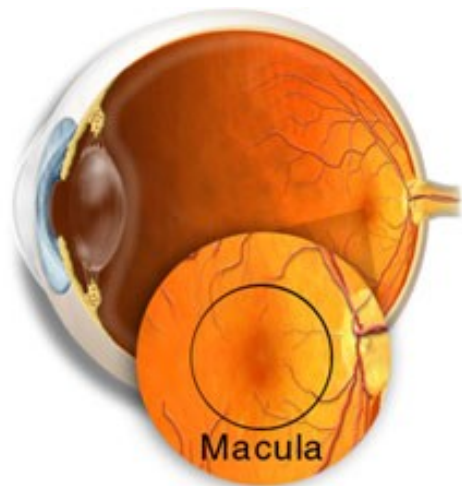


neuralna retina

pigmentni epitel



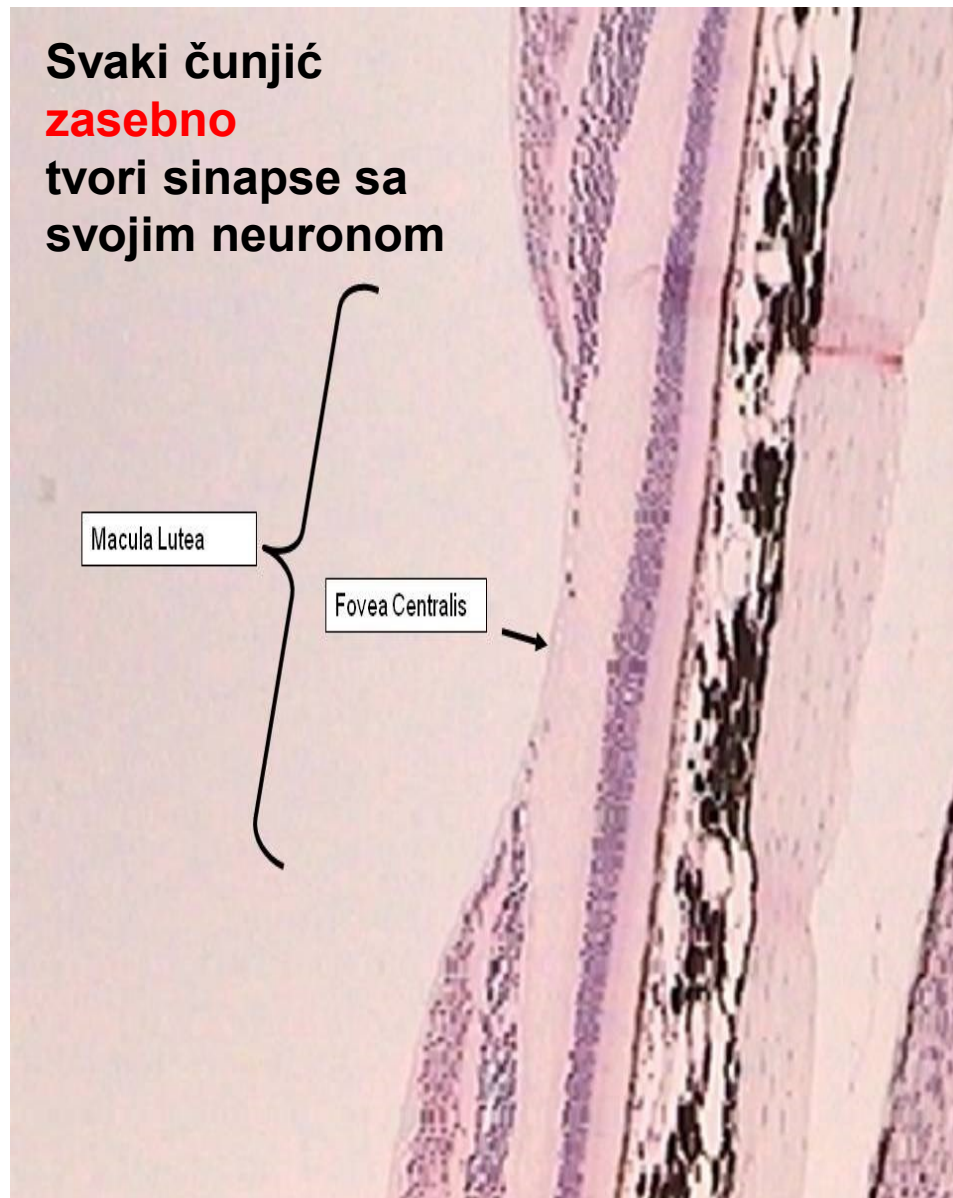
ŽUTA PJEKA



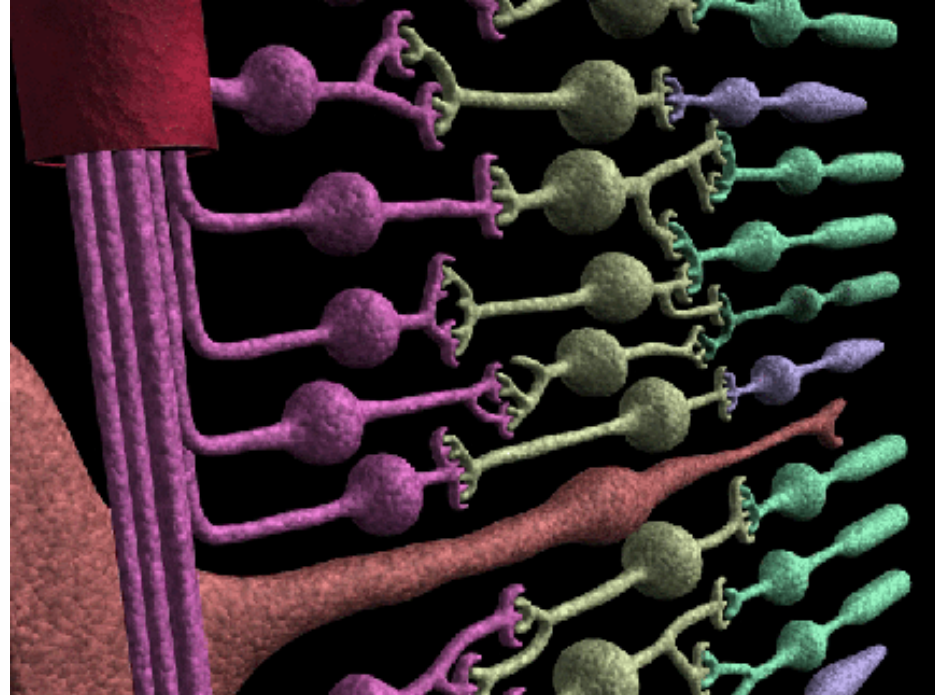
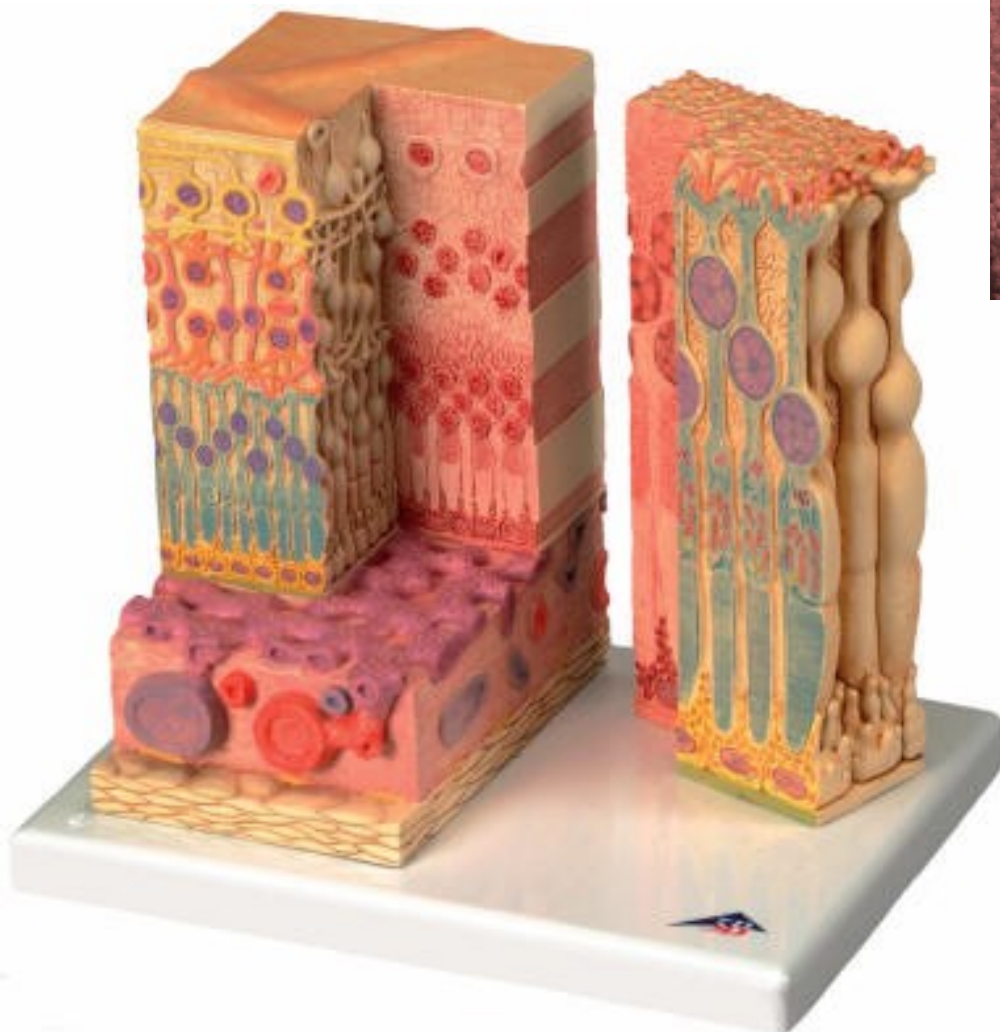
Svaki čunjić
zasebno
tvori sinapse sa
svojim neuronom

Macula Lutea

Fovea Centralis



SINAPSE NEURONA



Štapići

vid u sumrak i po noći

Čunjići

centralni vid po danu i vid u boji

2. Chemical reaction in turn activates bipolar cells.

1. Light entering eye triggers photochemical reaction in rods and cones at back of retina.

Light

Cross section of retina

Cone

Neural impulse

Rod

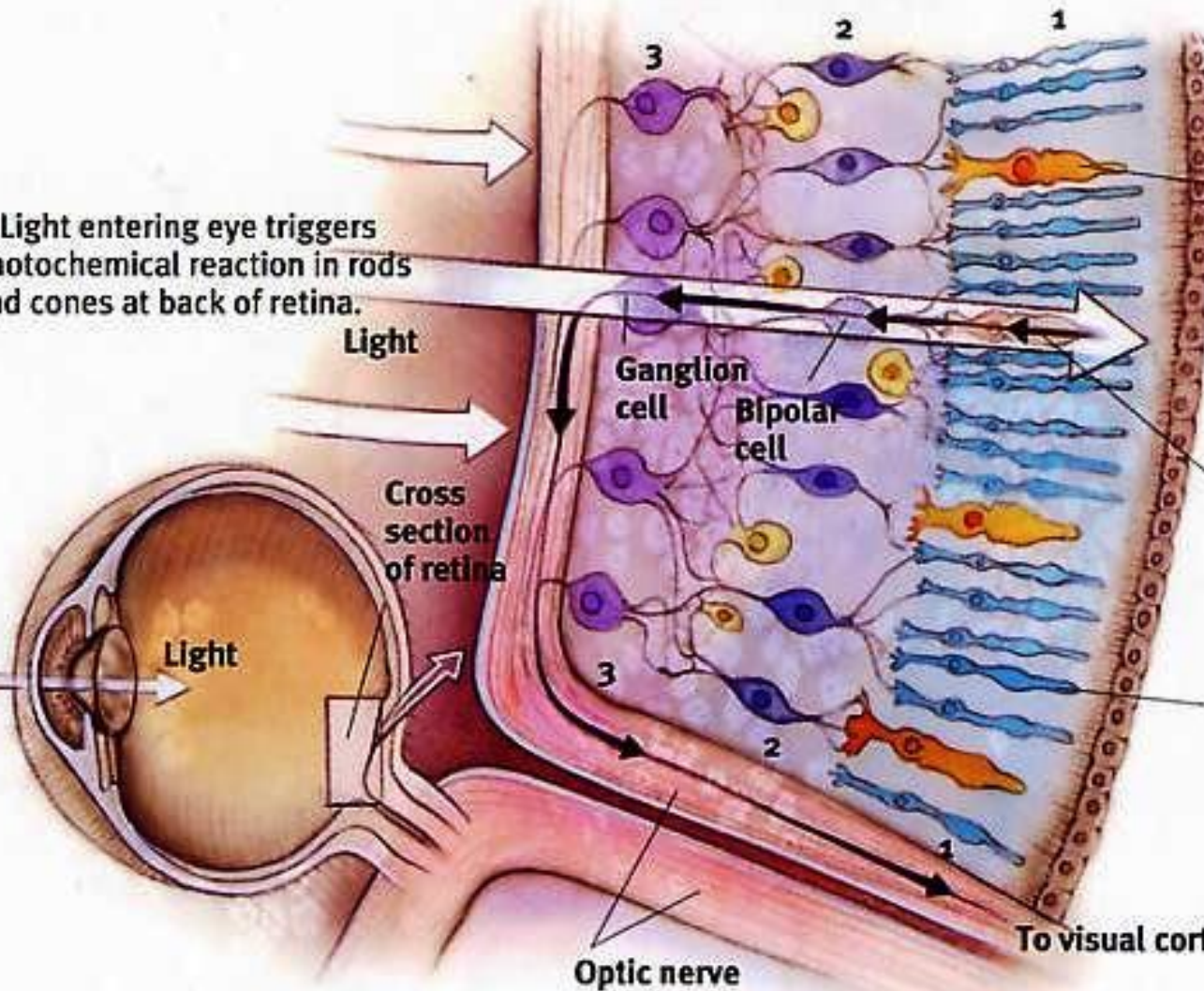
To visual cortex

Optic nerve

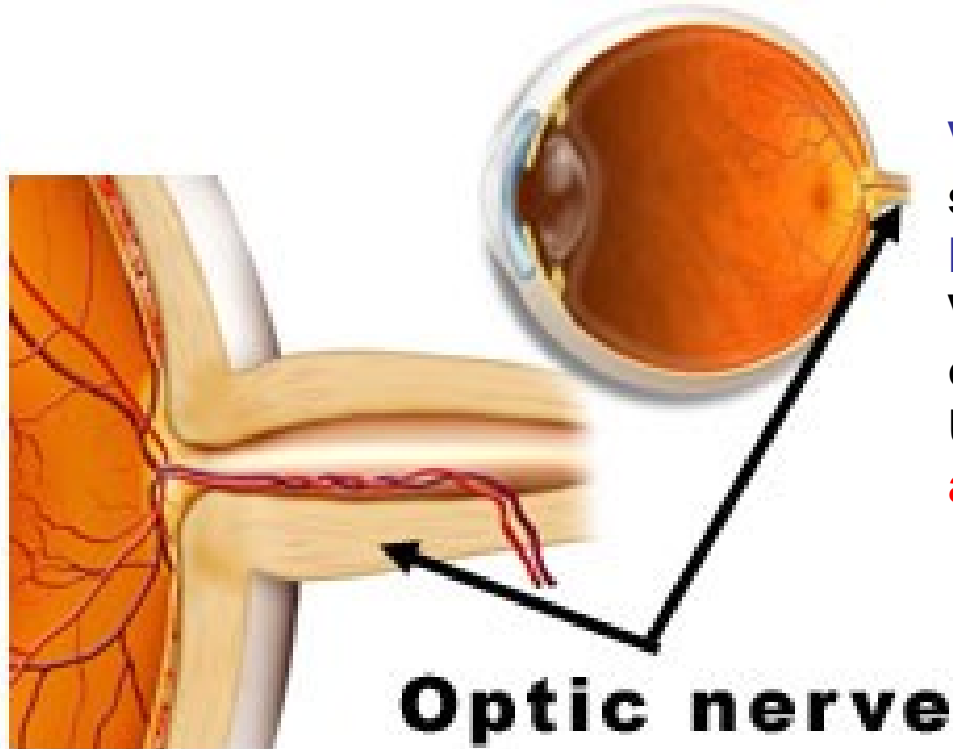
3. Bipolar cells then activate the ganglion cells, the axons of which converge to form the optic nerve. This nerve transmits information to the visual cortex in the brain's occipital lobe.

380-760 nm

Light







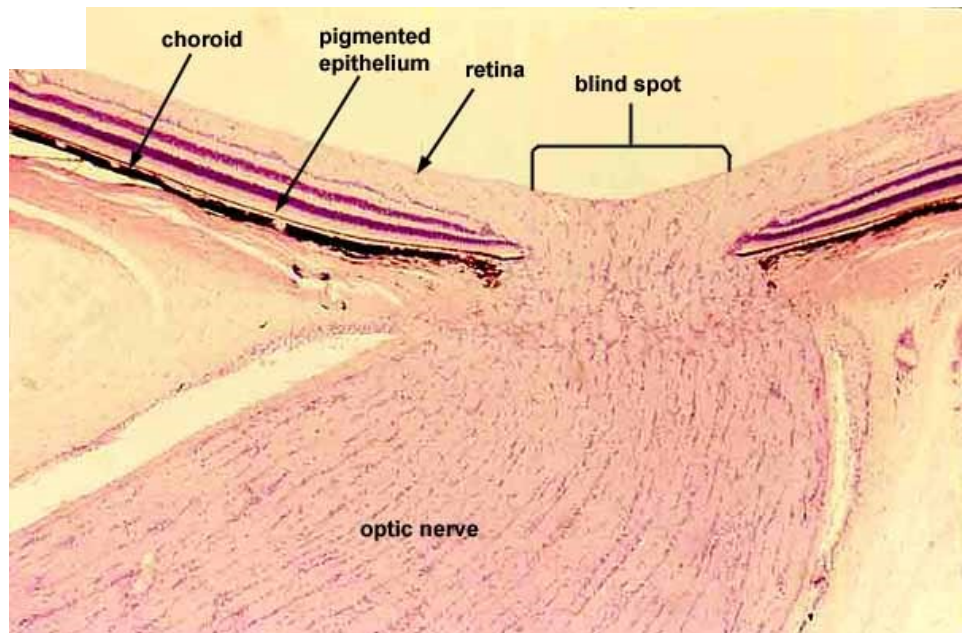
VIDNI ŽIVAC - aksoni ganglijskih stanica mrežnice konvergiraju u **PAPILU n. OPTICI**

Vidni živac obavijaju sve tri moždane ovojnice.

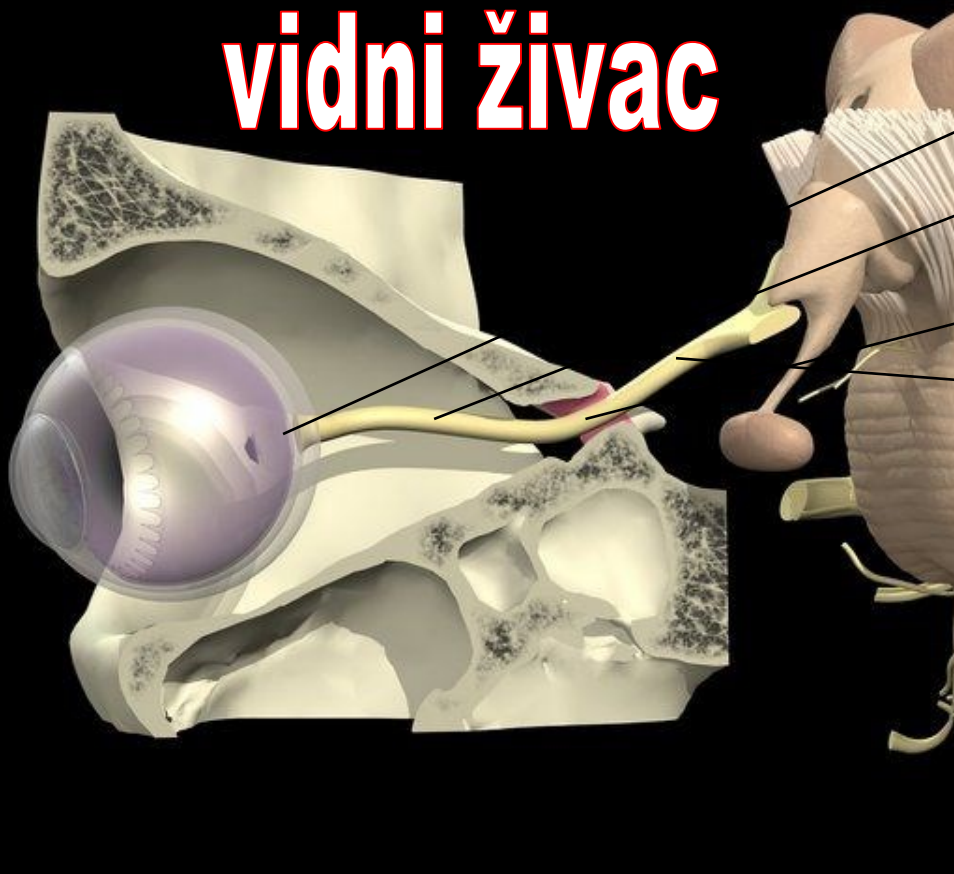
Uz živac kroz laminu cribrosu prolaze **a. i v. centralis retine**

U papili vidnog živca nema ostalih slojeva retine zbog čega se ona naziva

SLIJEPA PJEGA



vidni živac



Intraokularni dio – 1mm

Intraorbitalni dio – 25 mm

Intrakanalikularni dio – 9 mm

Intrakranijalni dio – 16mm

vidni put čine:

Vidni živac

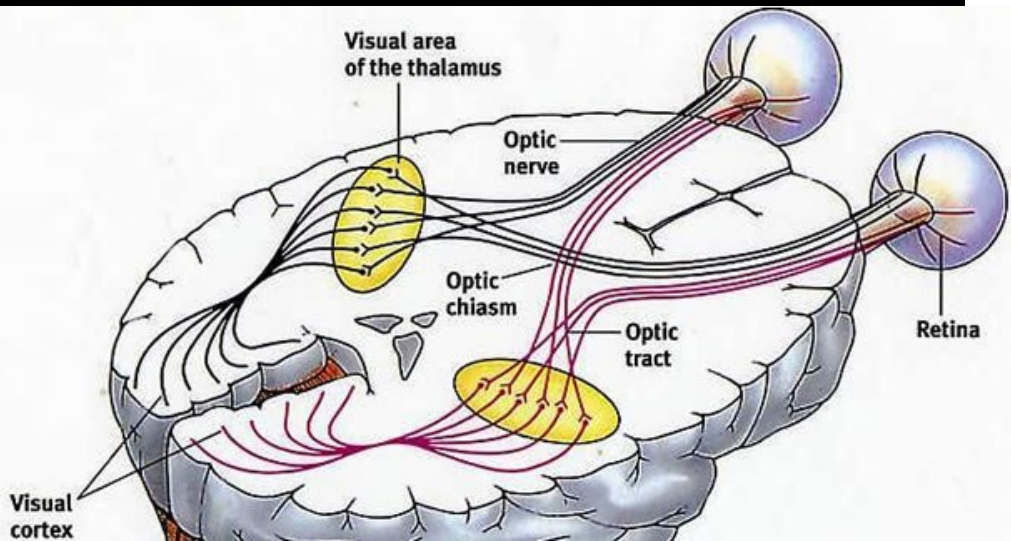
Optičku kijazmu

Tractus opticus

Corpus geniculatum laterale

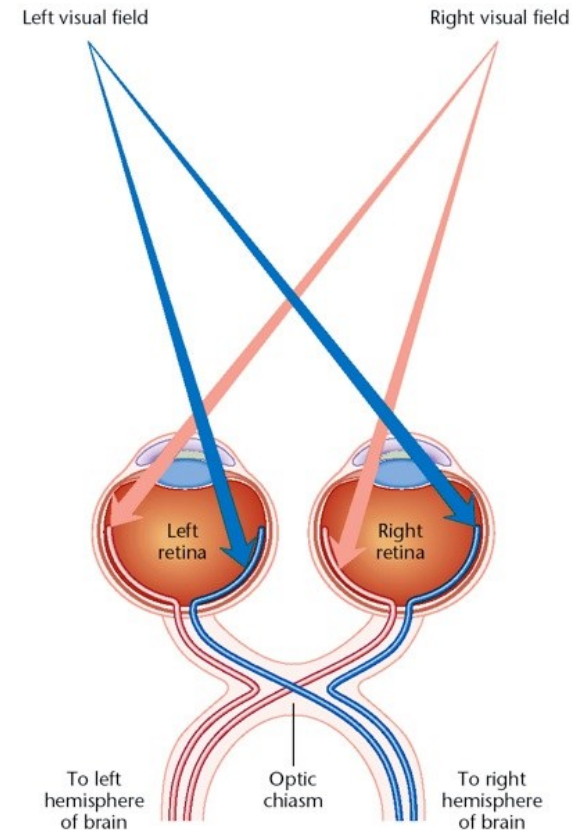
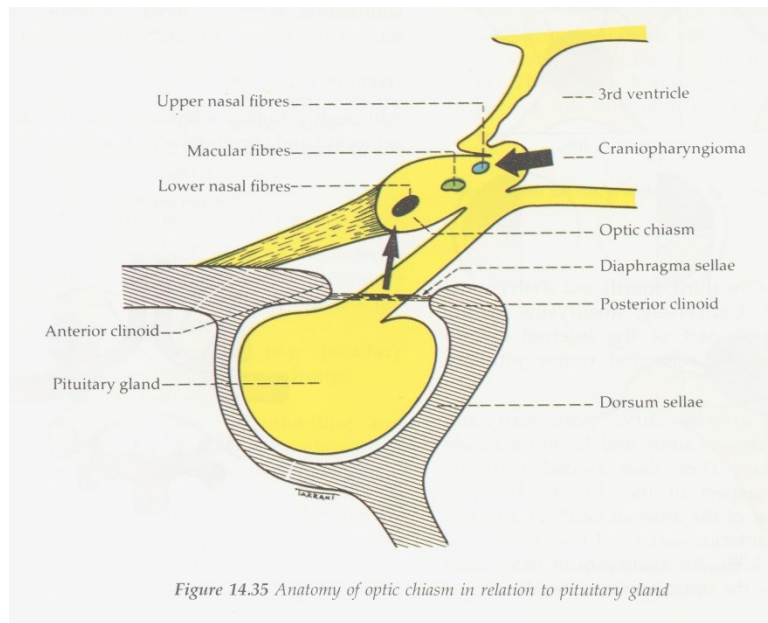
Radioatio optica

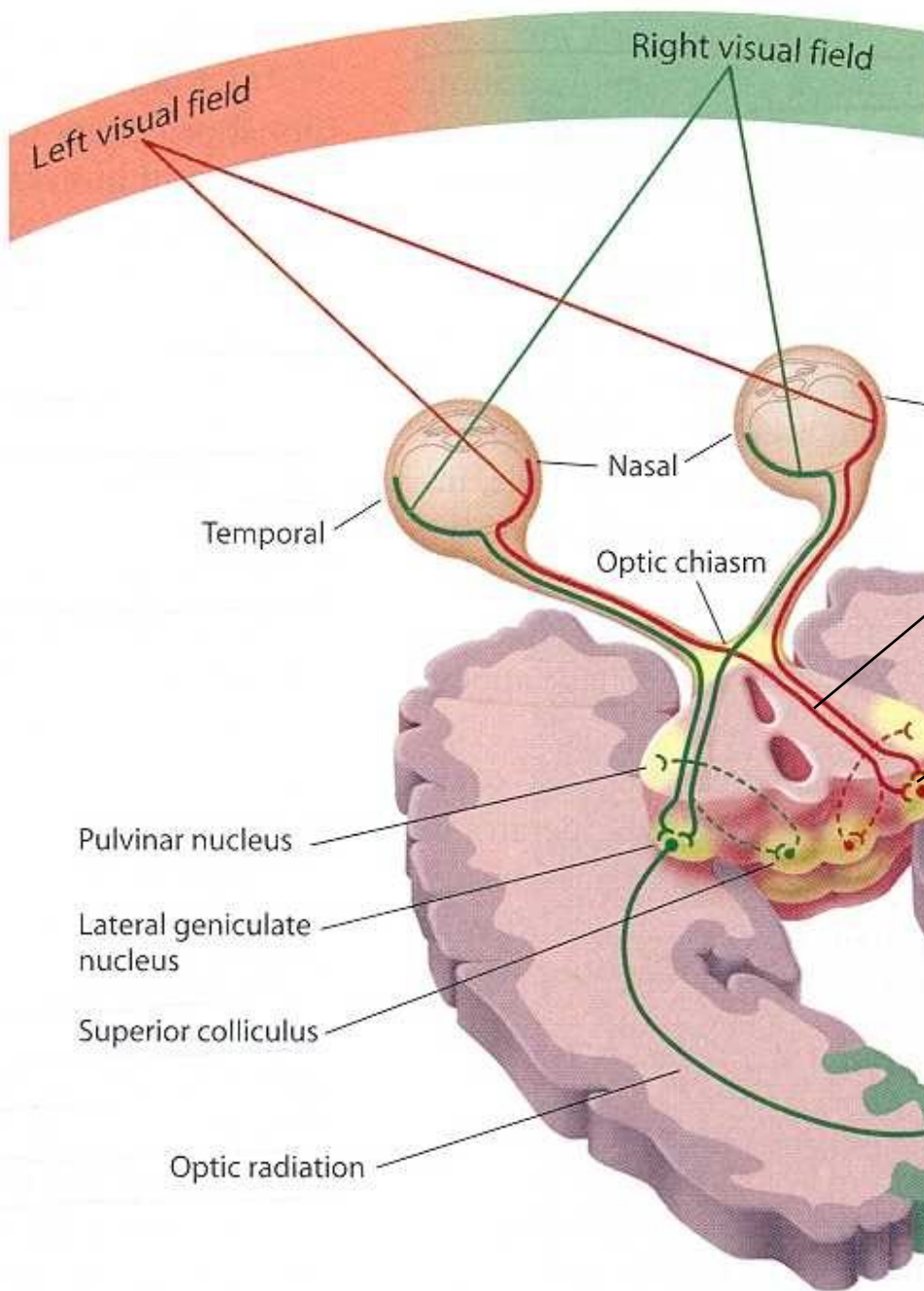
Area striata u vidnom
korteksu



OPTIČKA HIJAZMA

- nalazi se gore i ispred hipofize u srednjoj lubanjskoj jami.
- tu se vlakna vidnog živca koja prenose impulse iz **nazalnih dijelova retine križaju**, a vlakna iz **temporalnih dijelova retine prolaze neukrižena**.





TRI SU NEURONA VIDNOG PUTA :

1. Ganglijske stanice retine
2. Neuroni u CGL
3. Neuroni vidnog korteksa

TRACTUS OPTICUS – prenosi ukrižena kao i neukrižena vlakna do

CORPUS GENICULATUM LATERALE

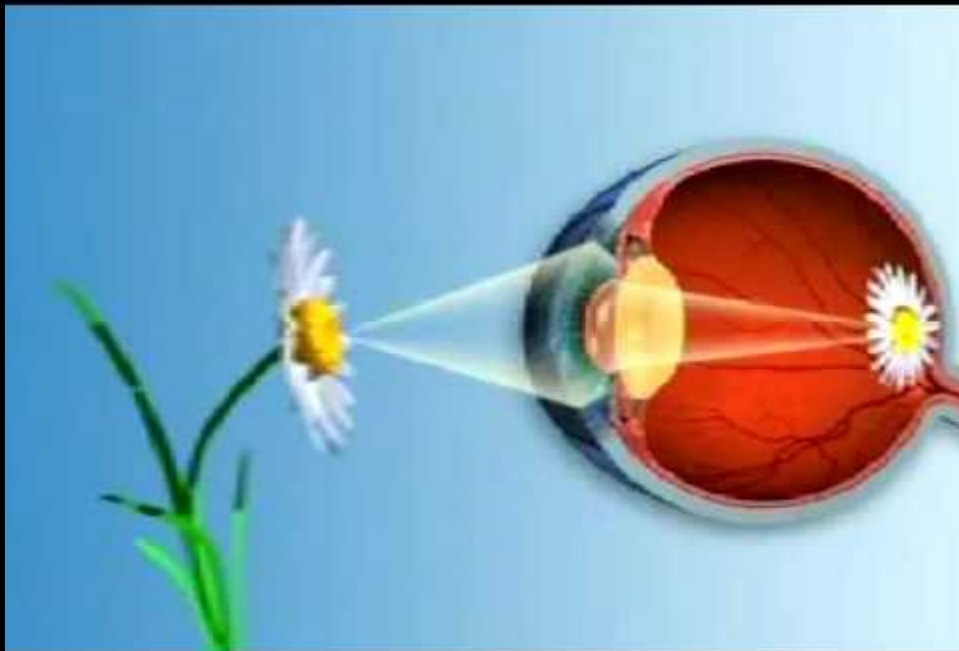
Sastoji se od sive i bijele tvari poredanih u 6 slojeva

RADIATIO OPTICA

VIDNI KORTEKS

Broadmannova area 17
Area 18 i 19

DIOPTRIJSKI UREĐAJ OKA



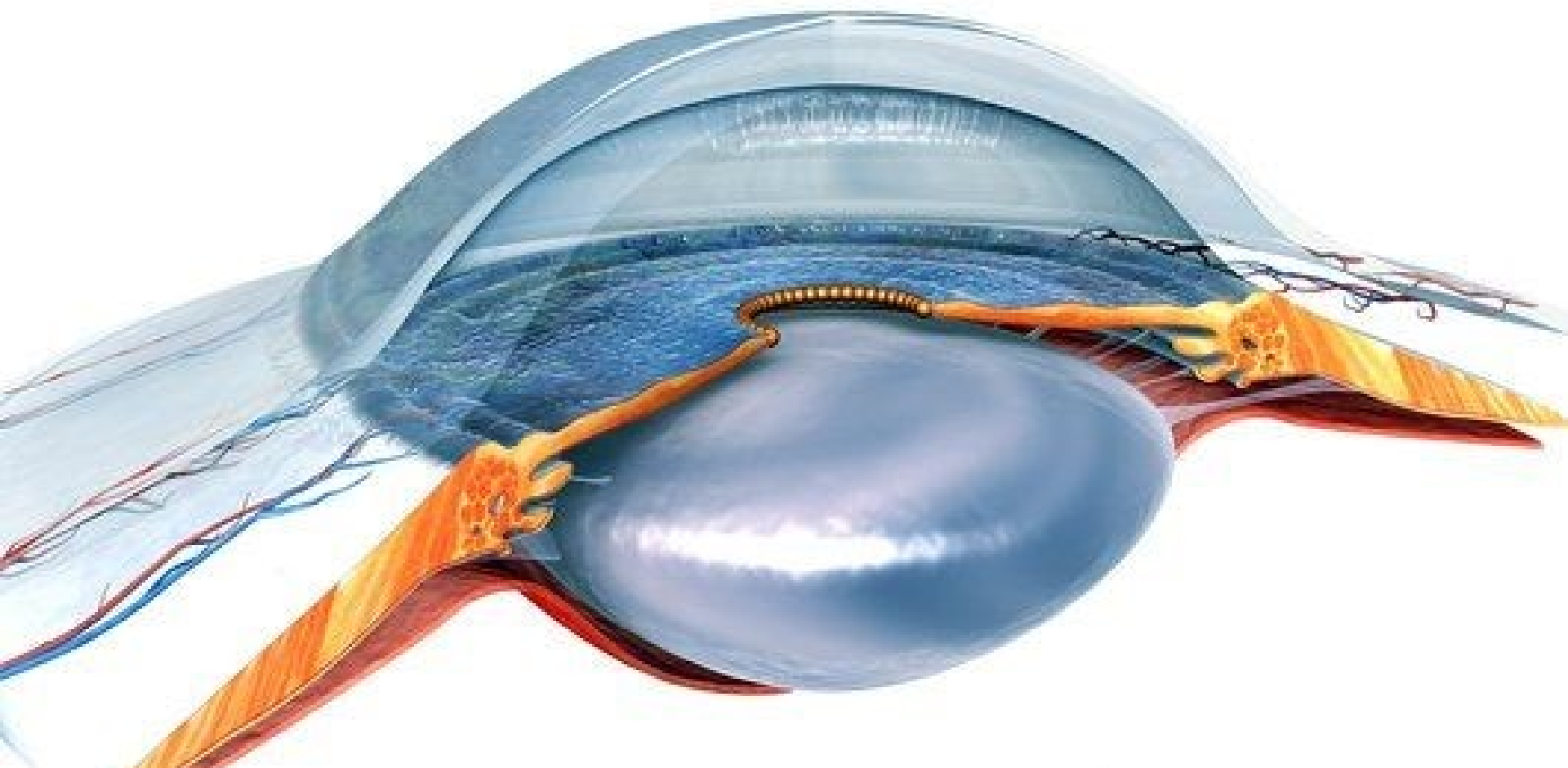
1. ROŽNICA

2. HUMOR AQUOSUS

3. LEĆA

4. STAKLOVINA

LEĆA (LENS CRYSTALLINA)

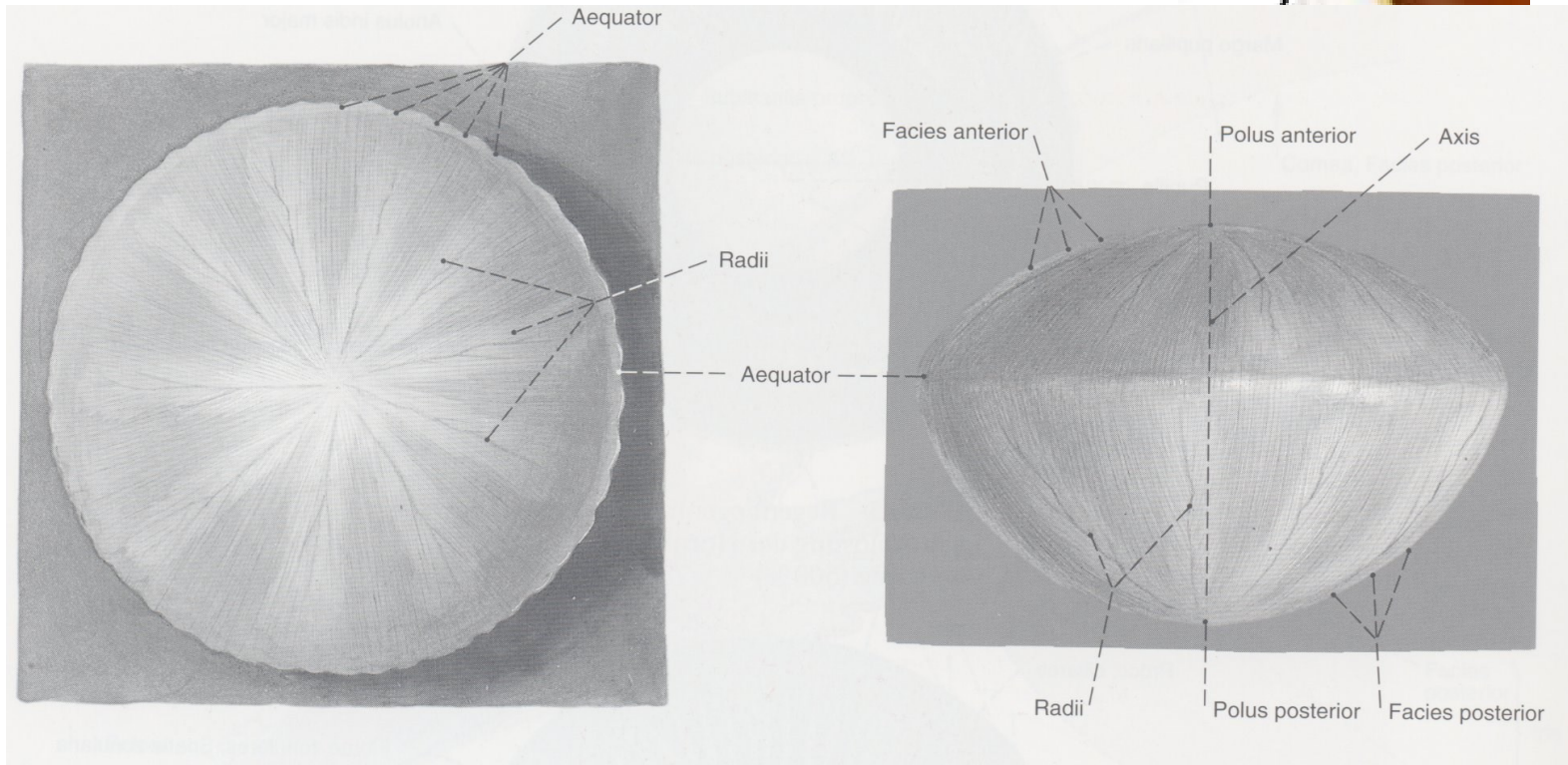
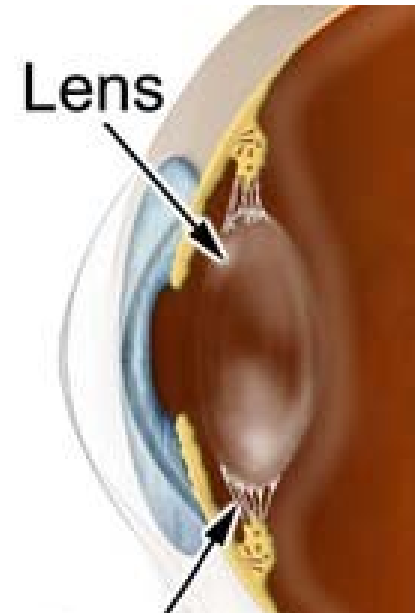


SMJEŠTAJ : u stražnjoj očnoj sobici, između stražnje površine šarenice i staklastog tijela u tzv. fossi hyaloidei, učvršćena zonulama Zinni.

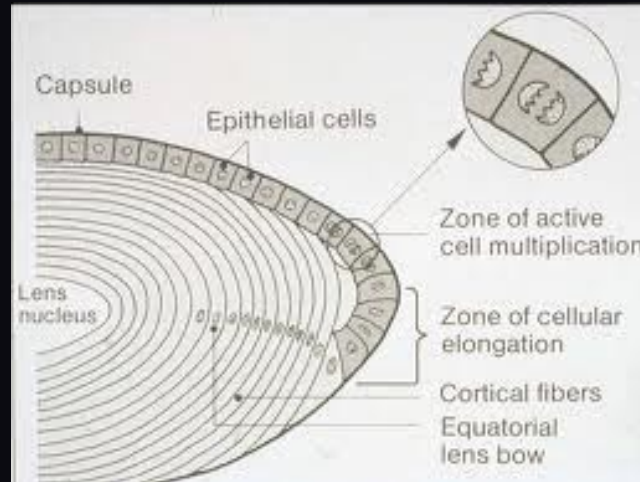
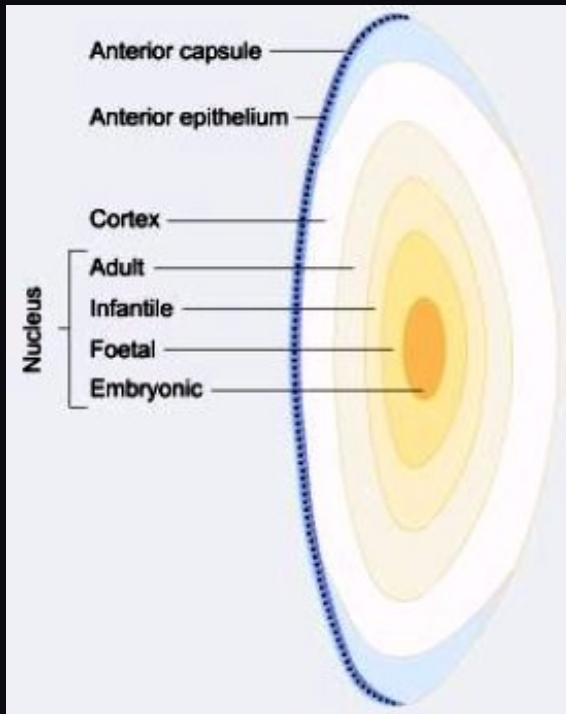
BIKONVEKSNA LEĆA,

funkcija da fokusira zrake svjetla u foveu centralis.

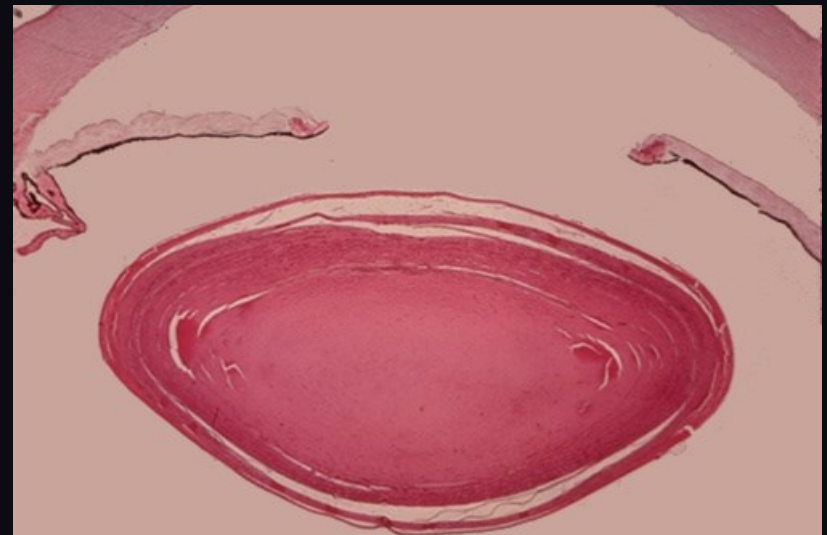
Varijabilni element u totalnoj refraktivnoj sposobnosti oka



histologija leće



Capsula lentis potpuno obavija leću. Prema ekvadoru se epitelne stanice produžuju i stvaraju **fibrae lentis** koja izgrađuju **substantiu lentis** (cortex i nucleus).



STAKLASTO TIJELO

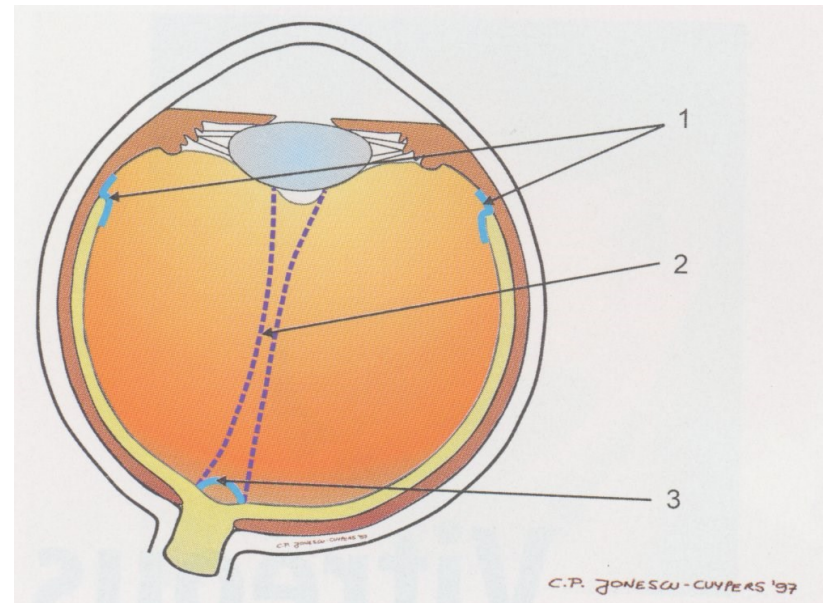
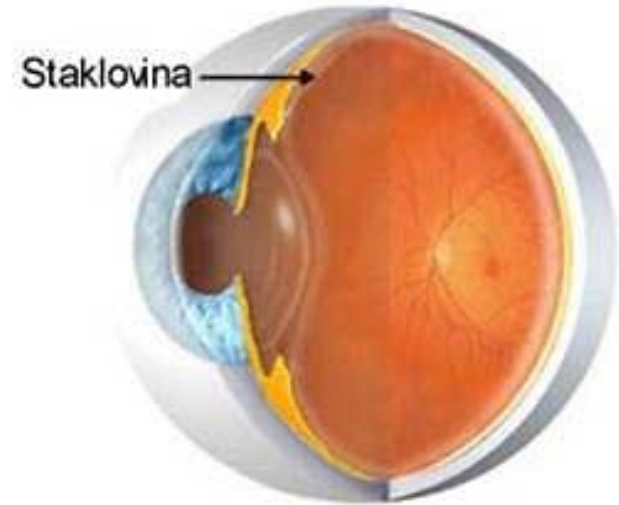
Sastav :

- 98% vode, 2% kolagena i hijaluronske kiseline
- kolagene niti su na periferiji gušće i tvore **hijaloidnu membranu** koja je spojena sa okolnim strukturama na sljedećim mjestima :
 - Wiegertov ligament** – stražnja kapsula leće
 - Baza staklastog tijela – **ora serrata**
 - Martegianijev ljevak** – oko papile vidnog živca

Staklasto tijelo ne sadrži krvne žile i živce.

Funkcija :

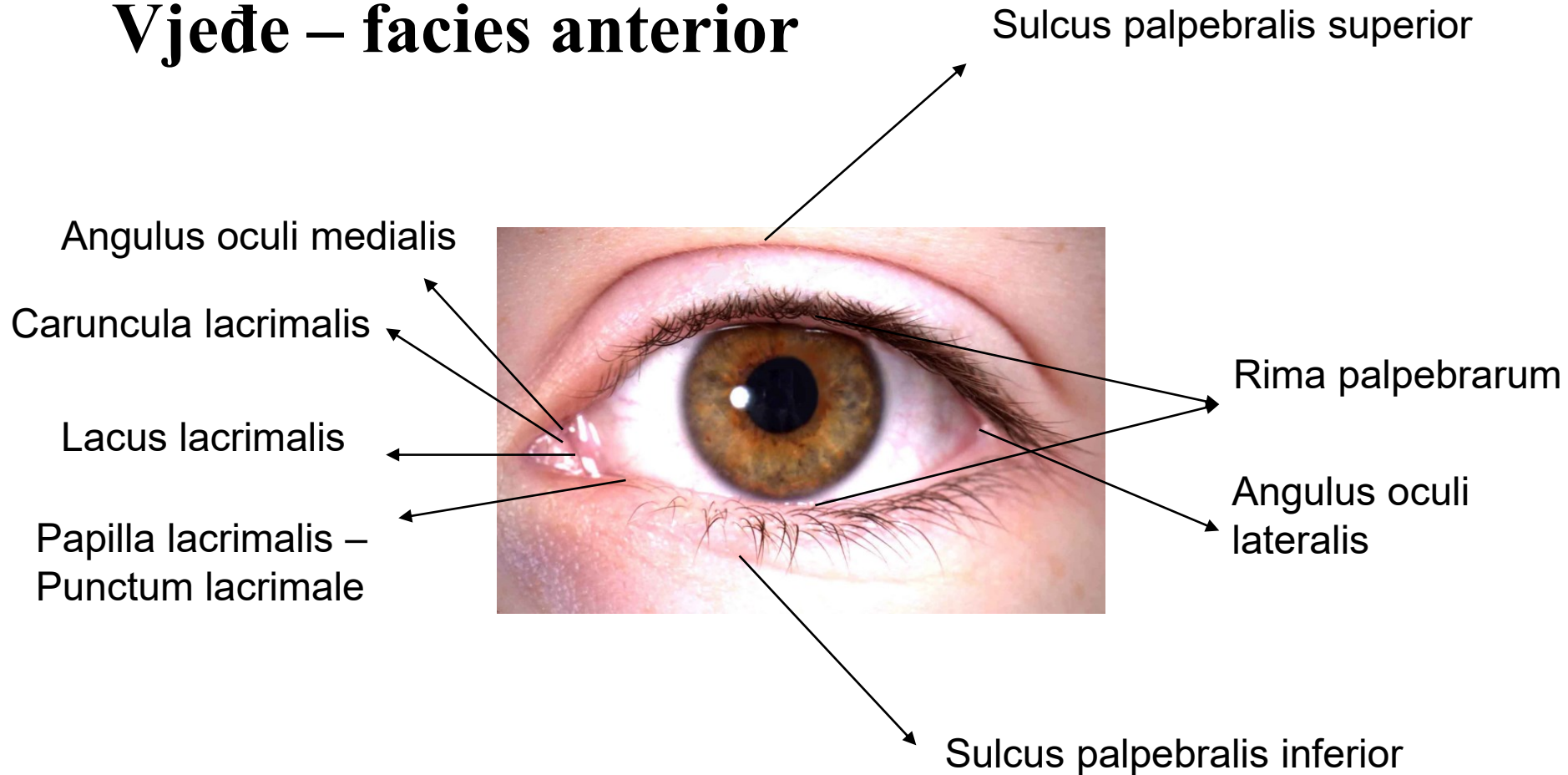
- stabilizira očnu jabučicu
- sprečava ablaciju mrežnice

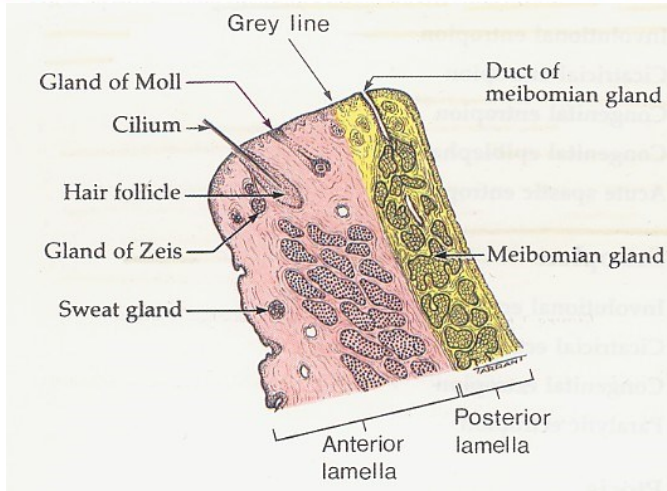
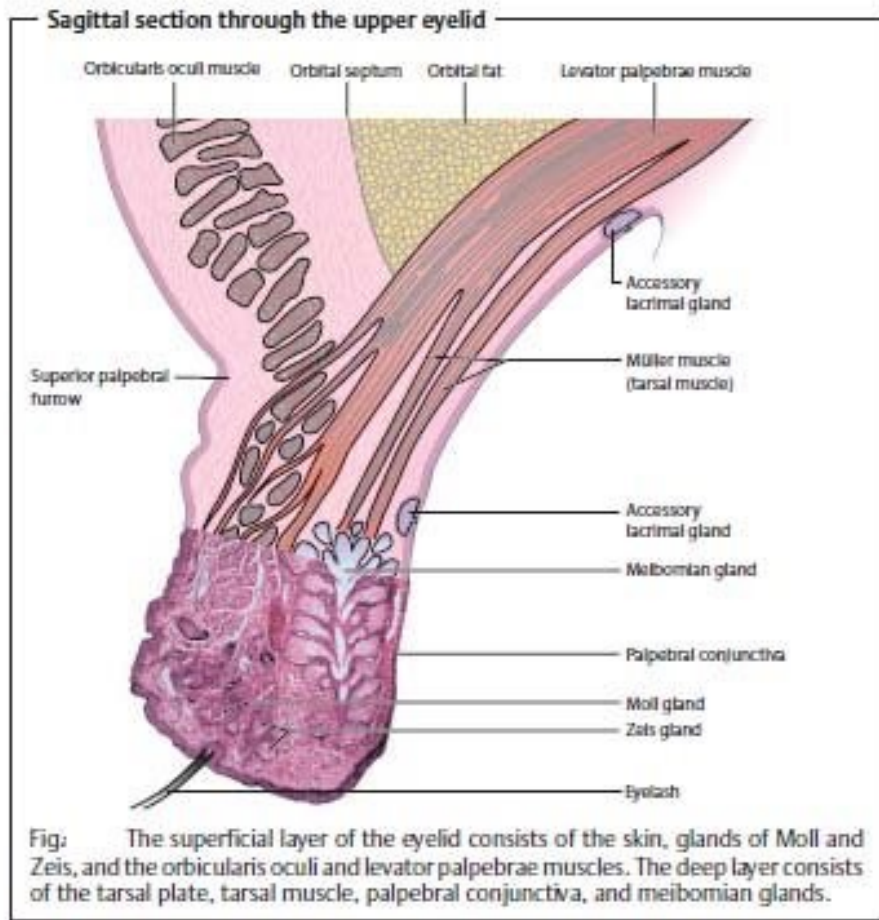


ZAŠTITNI UREĐAJ OKA

- OBRVA – SUPERCILIUM
- VJEĐE – PALPABRAE
- SPOJNICA – CONJUCTIVA
- SUZNI APARAT – GLANDULA LACRIMALIS

Vjeđe – facies anterior





PREDNJA I STRAŽNJA lamela :

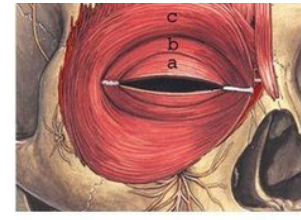
KOŽA

m. ORBICULARIS OCULI –

Inervacija: n.facialis

funkcija: palpebralni dio - nevoljno zatvaranje vjeđe (treptanje)

orbitalni dio- forsirano zatvaranje



SEPTUM ORBITALE

TARZUS - fibroelastično tkivo

sadrži **Meibomove žljezde** –

lojnice, koje proizvode

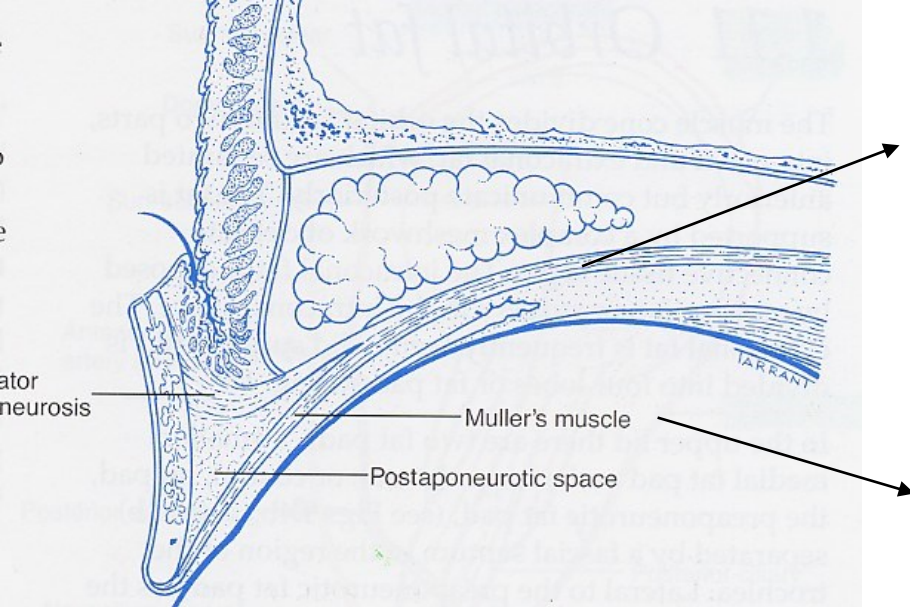
palpebralni loj – sprečava

prelijevanje suza preko ruba

m. LEVATOR PALPEBRE SUPERIORIS

m. TARZALIS

SPOJNICA – tunica conjunctiva palpebre



m. LEVATOR PALPEBRE SUPERIORIS

polazište: apex orbite

hvatište: tarsus

Lateralno dijeli suznu žlijezdu

Inervacija : n. Oculomotorius

Funkcija : retrakcija gornje vjeđe

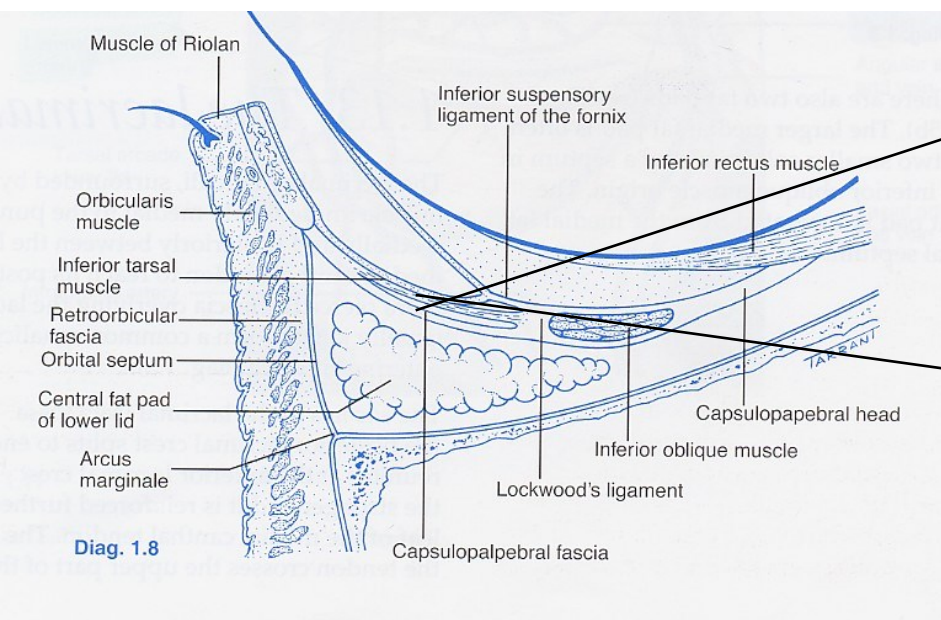
RETRAKTORI

M. Müller

smješten iza aponeuroze levatora

Inervacija : simpatikus

omogućuje dizanje gornje vjeđe za oko 2 mm

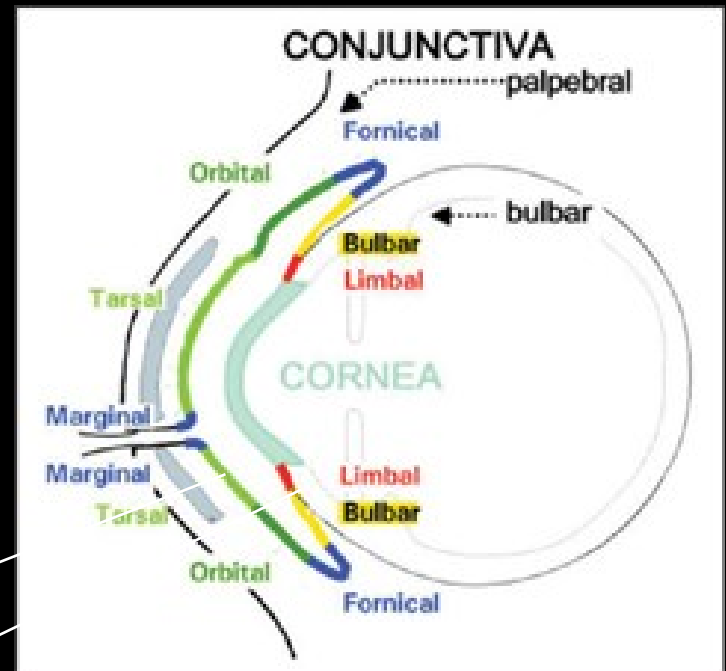


Kapsulopalpebralna fascija :

analog aponeurozi levatora, tvore ju niti m.rectus inf.

M. Müller (donji tarzalni mišić)

analog mišiću gornje vjeđe

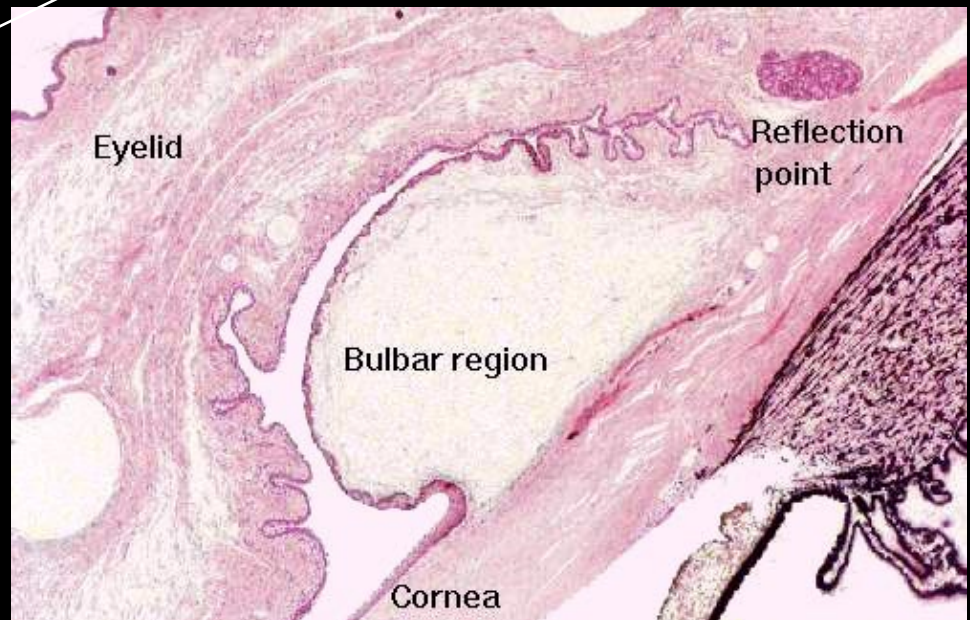


SPOJNICA

PALPEBRALNA

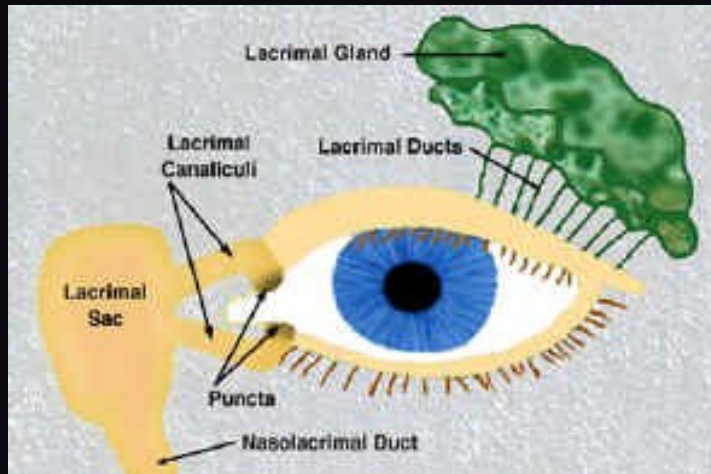
BULBARNA

Višeslojni pločasti i cilindrični epitel s vrčastim stanicama: produkcija mucina (sastavni dio suznog filma)
akcesorne suzne žlijezde: g.Wolfring
g.Krause



SEKRETORNI DIO

suzna žlijezda – parasimpatička
inervacija
akcesorne suzne
žlijezde (Krause, Wolfring)

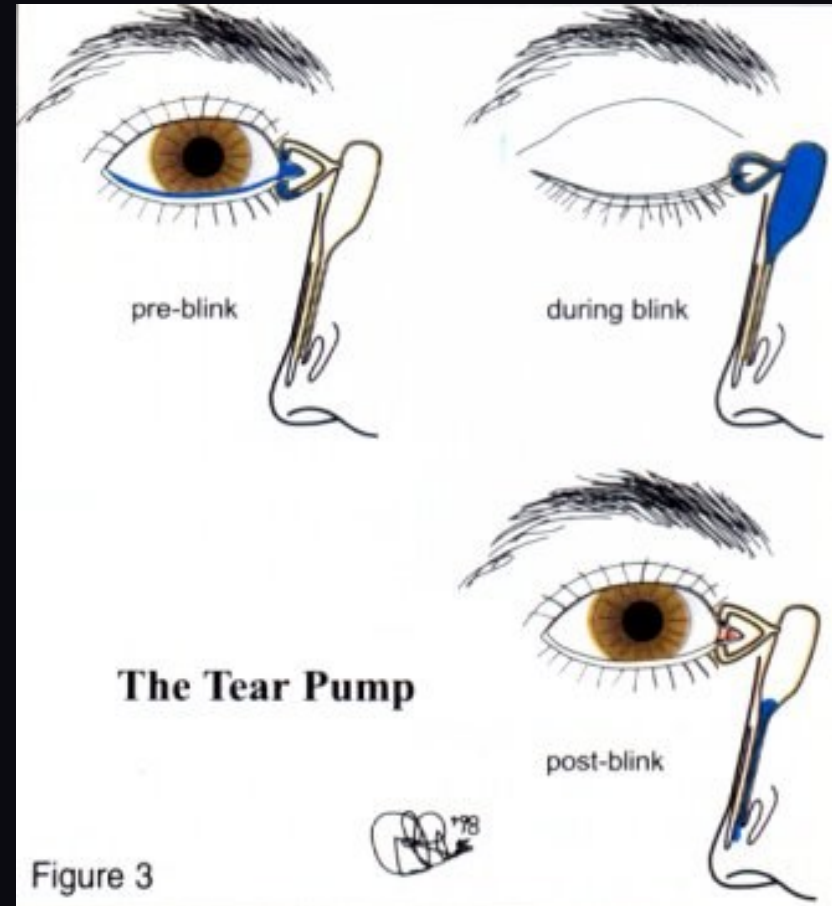


EKSKRETORNI DIO

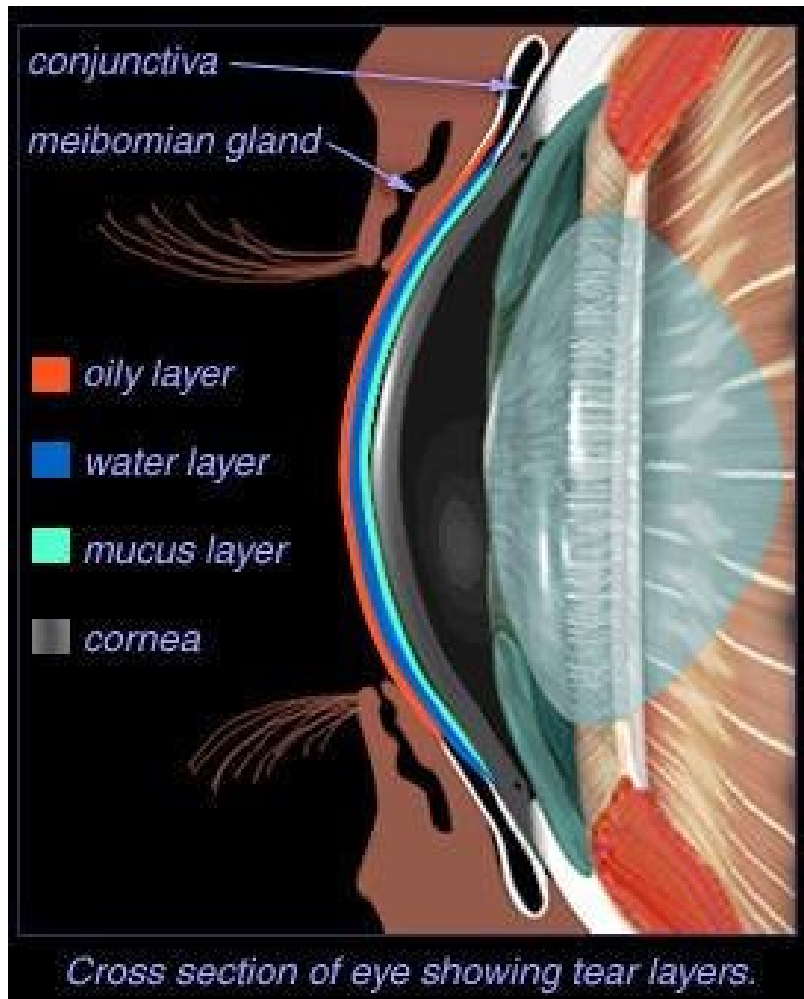
LACUS LACRIMALIS
PUNCTA LACRIMALIA
CANALICULI LACRIMALES
SACCUS LACRIMALIS
DUCTUS NASOLACRIMALIS

(Valvula Hasneri)

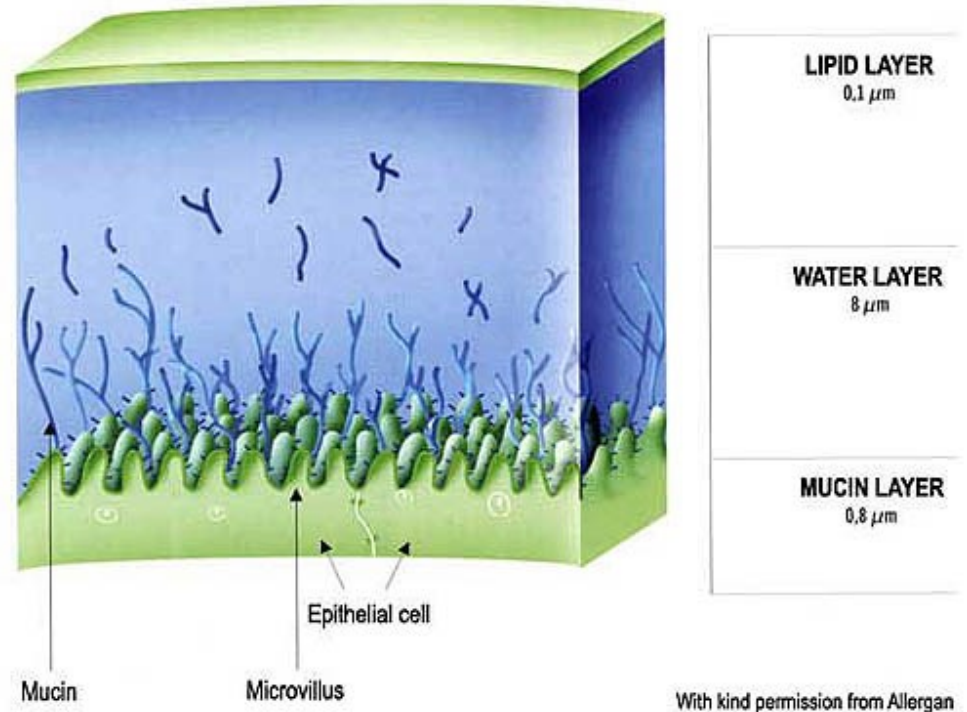
Fiziologija – suzna
pumpa



suzni film



TEAR FILM



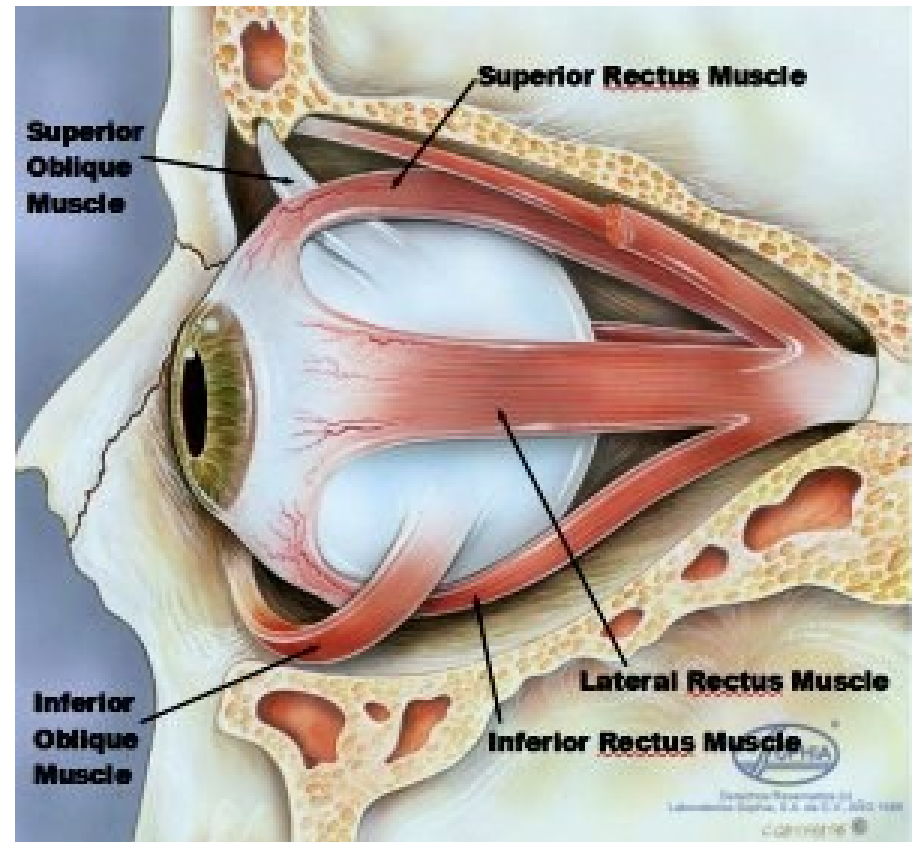
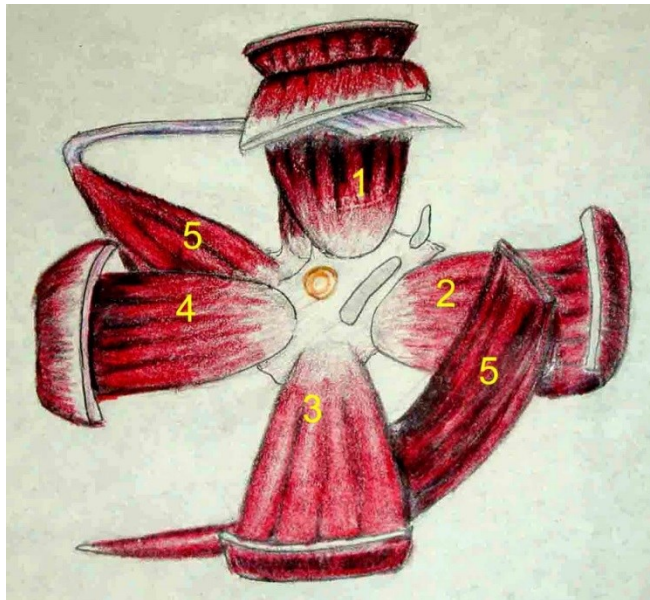
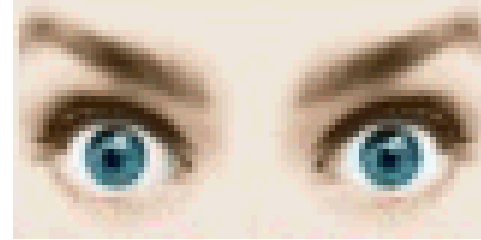
MUKOZNI SLOJ
VODENI SLOJ
LIPIDNI SLOJ

6 vanjskih očnih mišića

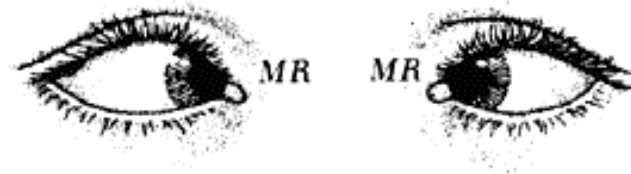
n. oculomotorius inervira - m. rectus superior
m. rectus inferior
m. rectus medialis
m. obliquus inferior
m. levator palpebre sup.

n. trochlearis inervira - m. obliquus superior

n. abducens inervira - m. rectus lateralis



fiziologija



Convergence



Divergence



Positive vertical vergence

m. rectus medialis

m. rectus lateralis

**m. rectus inferior
+
m. obliquus superior**

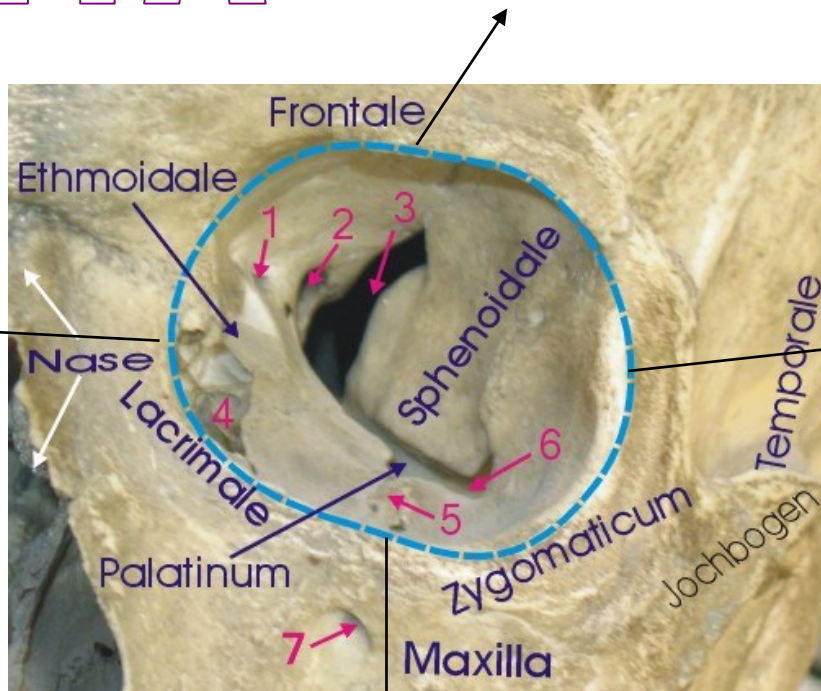
**m. rectus superior
+
m. obliquus inferior**

ORBITA

KROV ORBITE čine ga :
Frontalna kost
Malo krilo sfenoidne kosti

MEDIJALNI ZID

čine ga:
Maxilla
Lakrimalna kost
Etmoidna kost

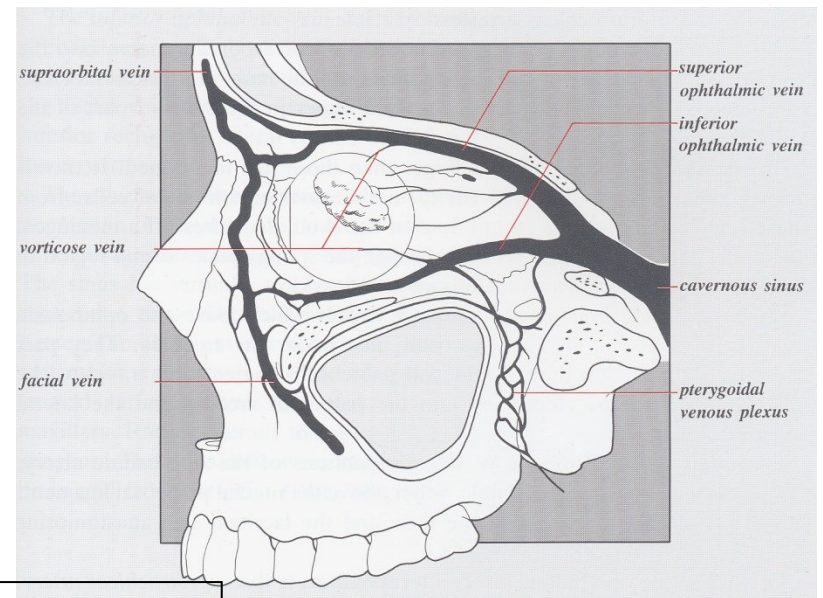
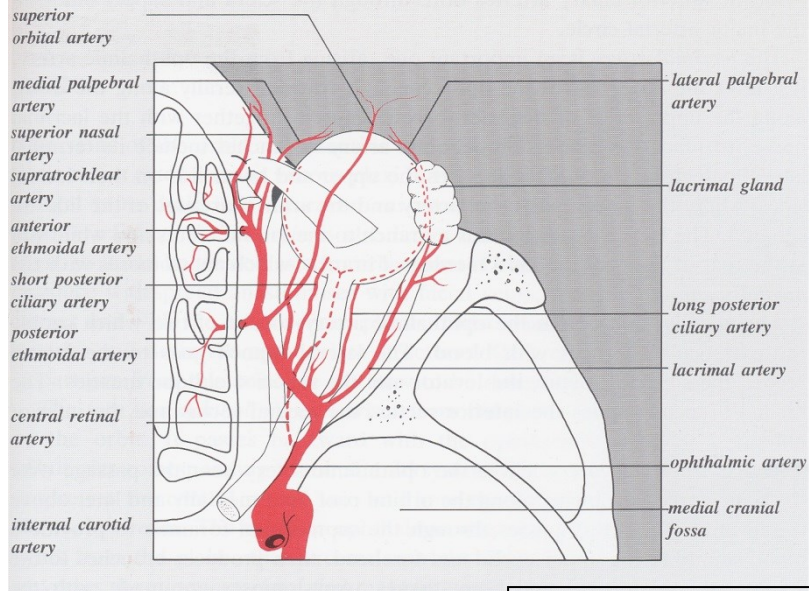


LATERALNI ZID

Čine ga:
Zigomatična kost
Veliko krilo sfenoidne kosti

DNO ORBITE

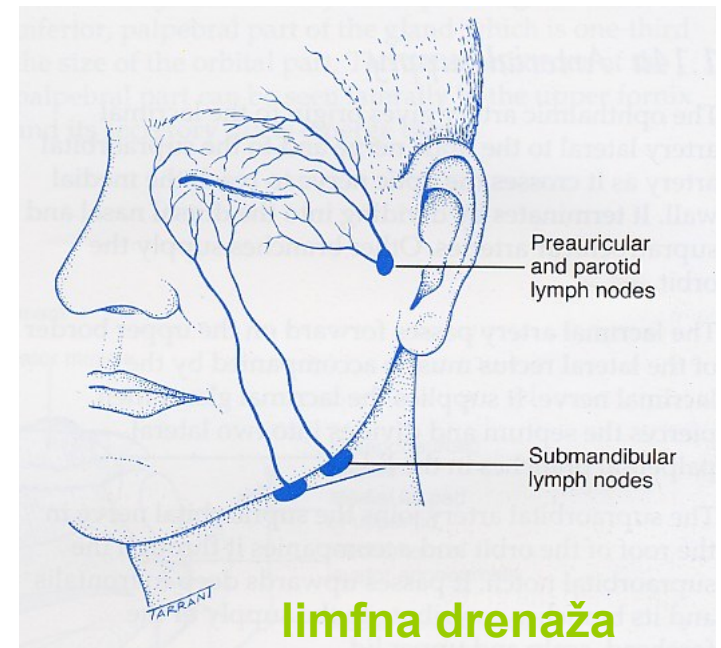
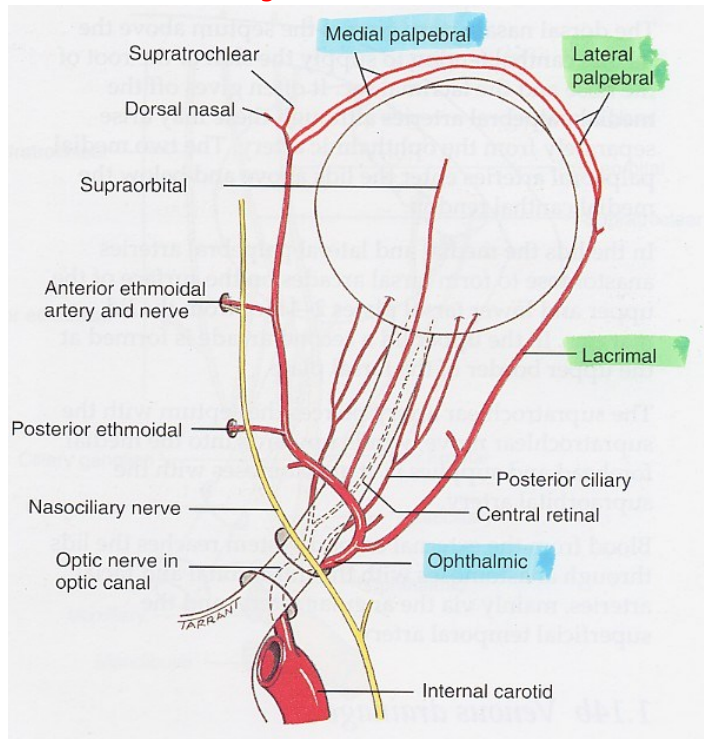
čine ga:
Maxilla
Zigomatična kost
Os palatinum



arterijska

VASKULARIZACIJA ORBITE

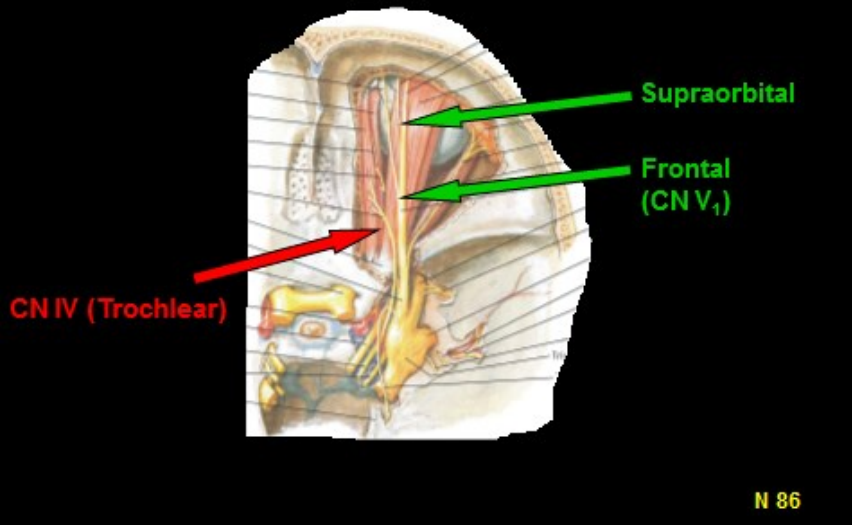
venska



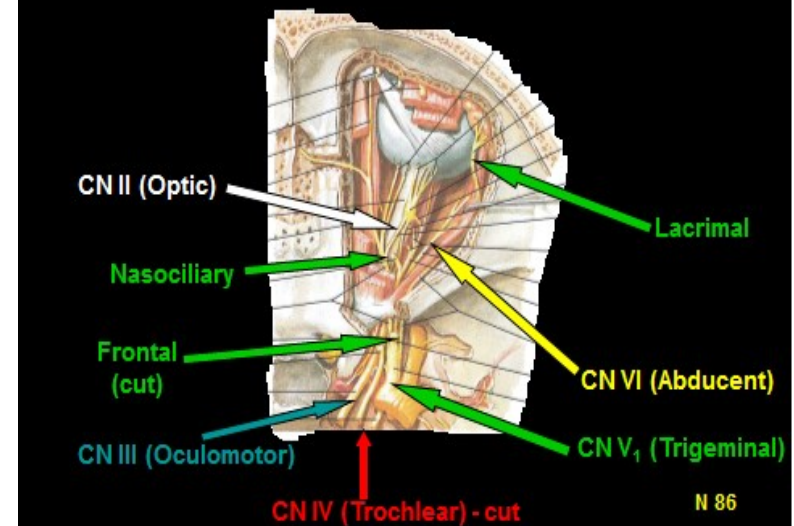
limfna drenaža

inervacija orbite

Nerve Supply of Orbit (Superficial)



Nerve Supply of Orbit (Deep)



N.trigeminus (ramus I – n.opthalmicus), N.lacrimalis, N.frontalis, N.nasociliaris ; N.trigeminus (ramus II – n.maxillaris), N.infraorbitalis, N.zygomaticus – n.lacrimalis;
N.abducens - m.rectus lateralis,
N.facialis .

HVALA NA PAŽNJI



.....pitanja?