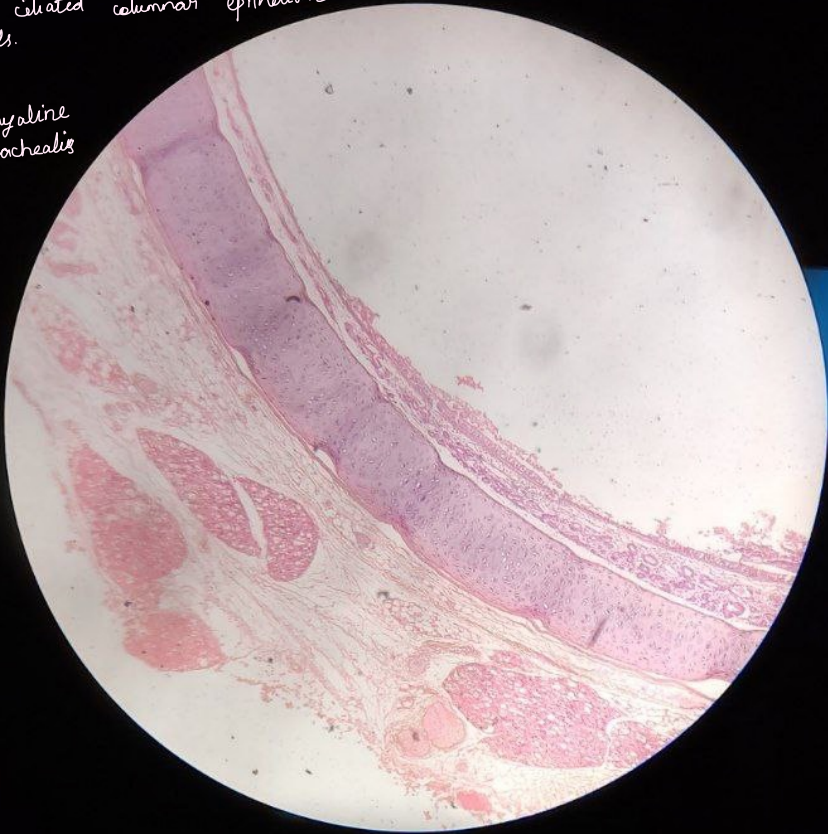


iv) Submucosa with serous and mucous glands

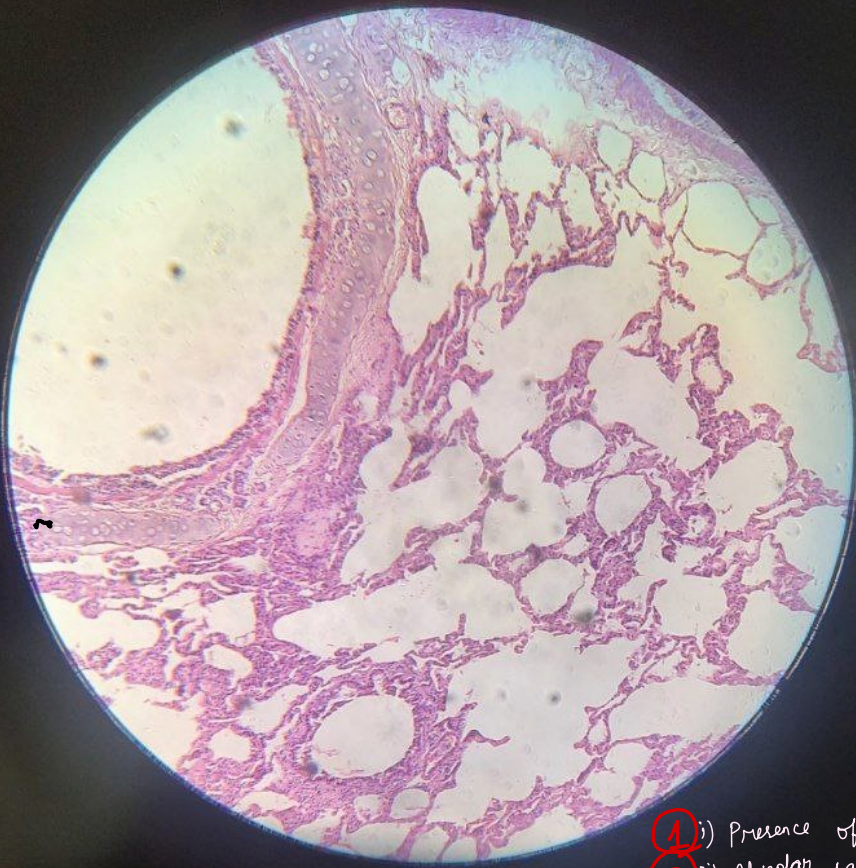
② i) Pseudostratified ciliated columnar epithelium with goblet cells.

ii) Lamina propria

① iii) Presence of hyaline cartilage and trachealis muscle

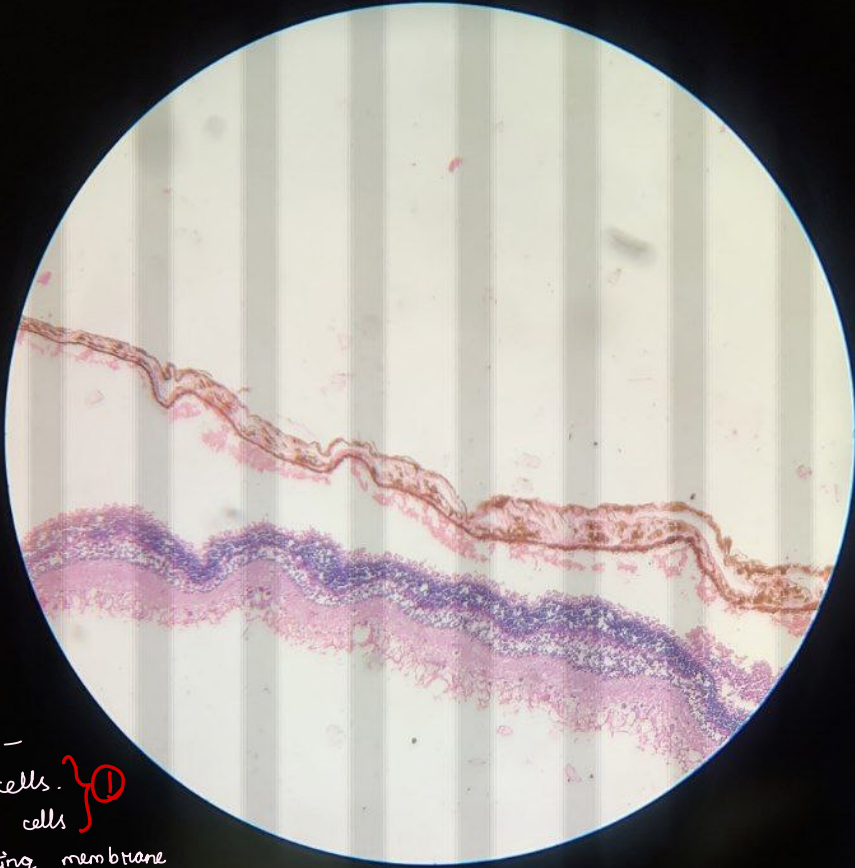


Trachea



- 1) Presence of alveolar duct
- 2) Alveolar sac lined by simple squamous epithelium.
- iii) Presence of intrapulmonary bronchus with varying amounts of islands cartilage and smooth muscle
- iv) Respiratory bronchioles with simple cuboidal epithelial lining lacking cilia and goblet cells.

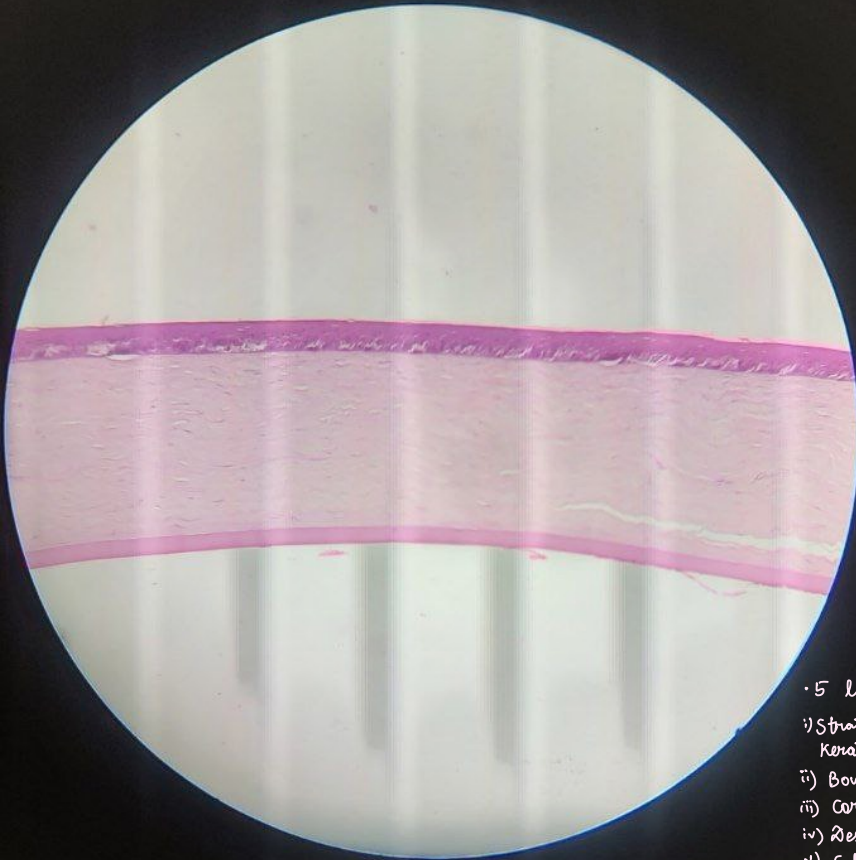
Lung



Ten layers:-

- i) Pigmented cells. } ①
- ii) Photoreceptor cells
- iii) Outer limiting membrane
- iv) Outer nuclear layer
- v) Outer plexiform layer
- vi) Inner nuclear layer
- vii) Inner plexiform layer
- viii) Ganglionic cell layer } ②
- ix) Bipolar cell layer
- x) Inner glial membrane

Retina



- 5 layers
- i) Stratified squamous non-keratinized epithelium ①
- ii) Bowman's membrane ②
- iii) Corneal stroma.
- iv) Descemet's membrane
- v) Cuboidal epithelium

Cornea

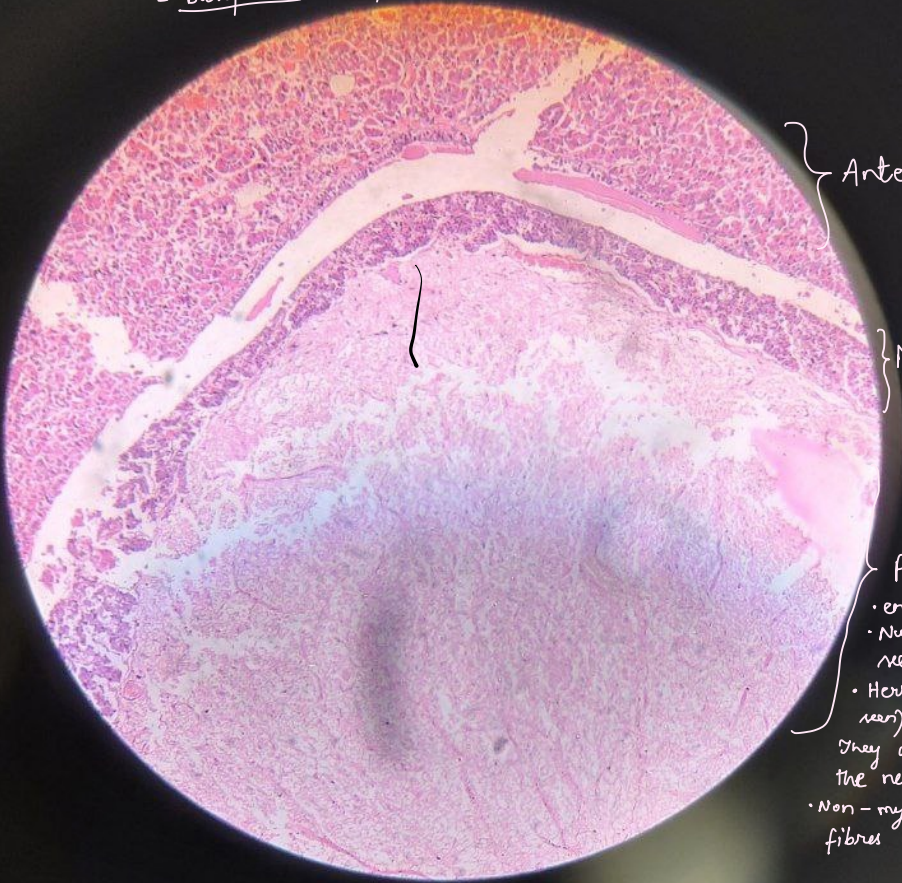
- i) Thyroid follicles filled with colloid (iodinated form of thyroglobulin)
- ii) Capillaries present in between.
- iii) Parafollicular cells (secrete calcitonin) present outside follicles.
- iv) Lining epithelium of follicles is of three types — depending on activity
 - a) Simple squamous — Inactive
 - b) Simple cuboidal — Partially active
 - c) Simple columnar — Fully active



Thyroid 10x

► Anterior pituitary

- Chromophobe cells - Only nucleus is stained with hematoxylin, cytoplasm is not stained.
- Chromophil cells - Acidophils - Cytoplasm → eosin, nucleus → hematoxylin
- Basophils - Cytoplasm, nucleus → hematoxylin stained



Anterior

Middle

Posterior

- ends of axons seen
- Nucleus of pituicytes seen.
- Herring bodies (not seen)
- They are hormones at the nerve endings
- Non-myelinated nerve fibres

Pituitary again

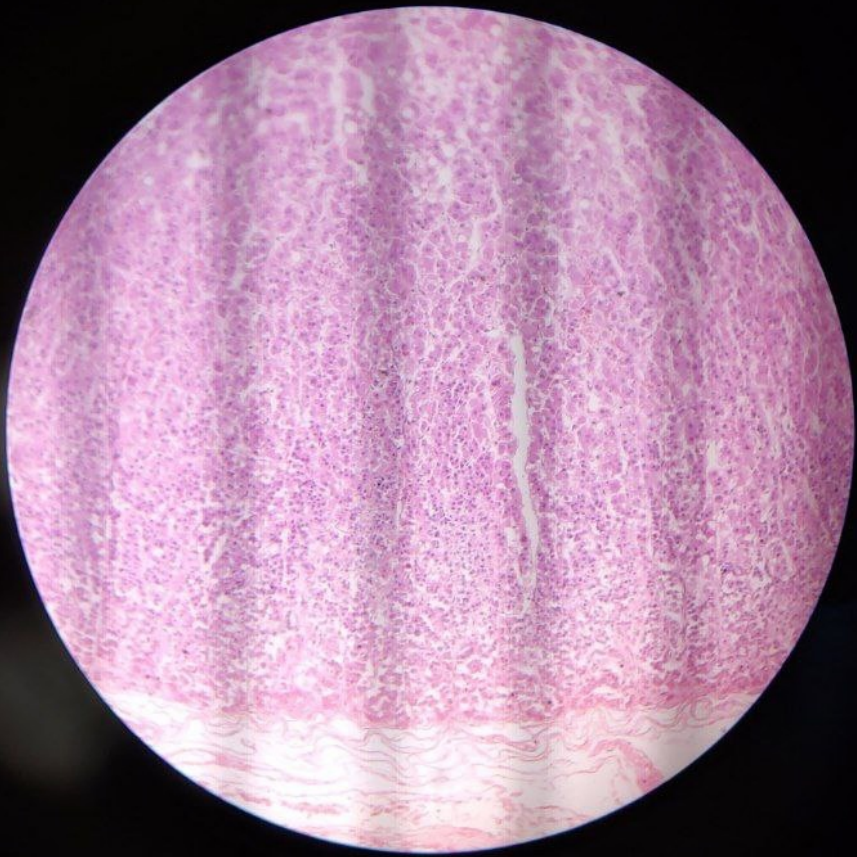


i) Adipocytes seen.

ii) Principal cells - cell is stained with eosin and nucleus with hematoxylin

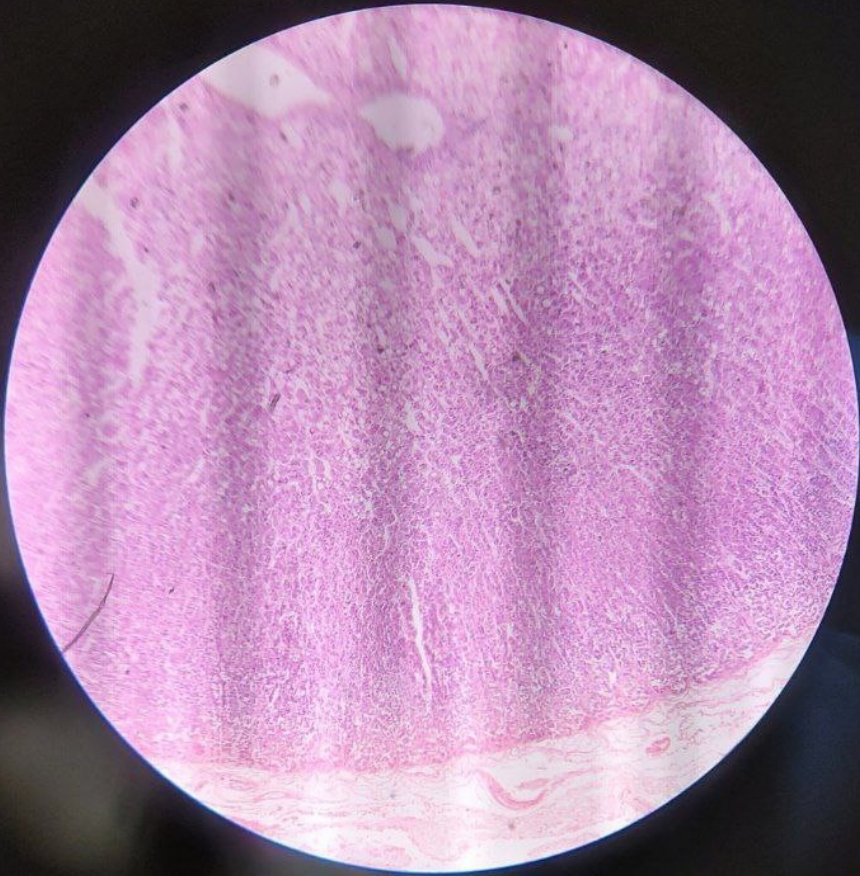
Parathyroid

iii) Oxyphil cells - cytoplasm and nucleus both are stained with eosin
↳ pink cells



Adrenal gland

10x

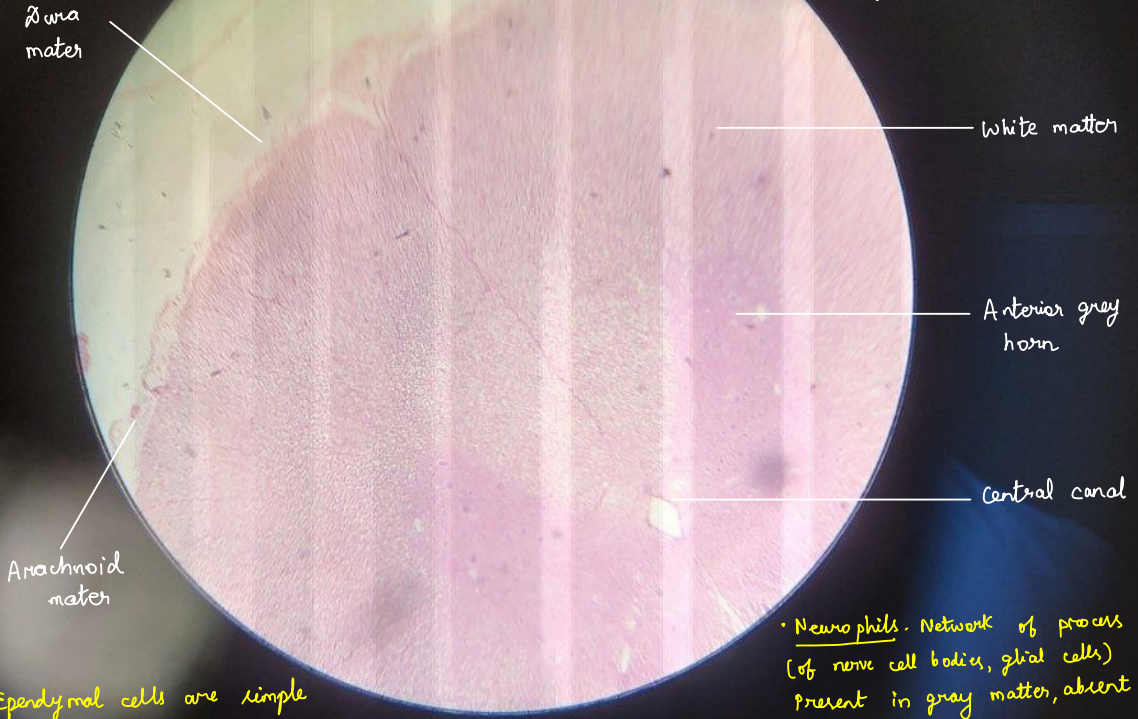


Adrenal

4x

- Ends as conical structure → conus medullaris, continuous with filum terminale.
- Central canal contains cerebrospinal fluid, lined by ependyma. It is continuous with 4th ventricle through central canal of medulla.
- Within conus medullaris it forms terminal ventricle.

- Outer white matter and inner grey matter
- Grey matter consists of anterior horn and posterior horn.
- Central canal is present in the grey commissure
- White matter consists of anterior, lateral and posterior funiculi.



- Ependymal cells are simple ciliated columnar cells.
- Endosteal layer of dura mater is absent in spinal cord. (only meningeal layer is present)

- Neurophils. Network of process (of nerve cell bodies, glial cells) Present in gray matter, absent in white matter.
- Roots of spinal nerves exit from anterolateral/posterolateral sulcus.

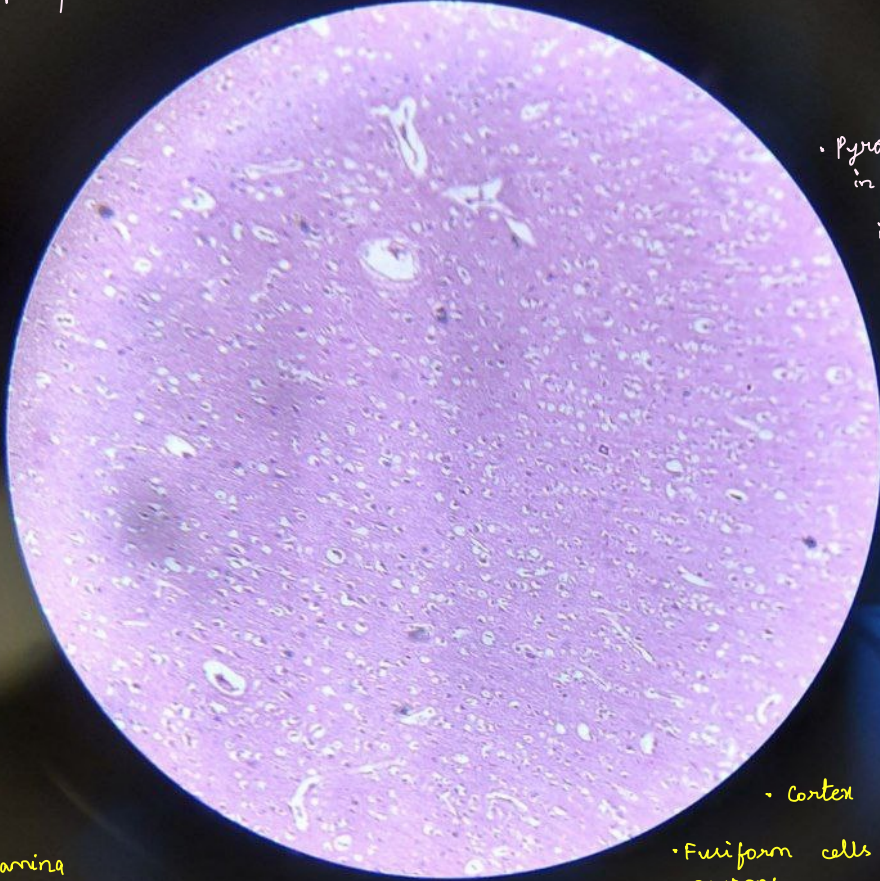
Spinal cord

(T1-L2)

White matter
 ↙ ↓ ↘
 Anterior Lateral Posterior
 Funiculus Funiculus Funiculus

- Lateral horn is present in thoracic and upper two segments of lumbar vertebrae
- Volume of white matter decreases from above downwards.
- Thoracolumbar outflow (T1-L2) is sympathetic outflow

- Outer gray and inner white matter.
- Neuronal cells and blood vessels are present in gray and white matter
- Multipolar neurons are arranged in six different layers.



- Pyramidal cells are present in all layers.

- Pleniform
- Outer granular
- Outer pyramidal
- Inner granular
- Inner pyramidal
- Polymorphic

- Lamination
 - II, IV → Sensory
 - III, V → Motor (Somatic/visceral)
 - I, VI → Sensory and Motor

- Cortex has sulci and gyri.

- Fusiform cells are modified stellate neurons.
- Pyramidal cells have pyramid shaped cell bodies.

- Types of cells:-
 - Stellate neurons/ Granule cells
 - Pyramidal cells
 - Horizontal cells of Cajal
 - Cells of Martinotti.
 - Fusiform cells
 - Basket cells

Cerebrum

- i) Plumiform - Transverse fibres and some scattered neurons.

- ii) External granular - Mainly stellate neurons

- iii) Outer pyramidal - Mainly pyramidal neurons. Some stellate and basket cells.

- iv) Internal granular - Stellate neurons

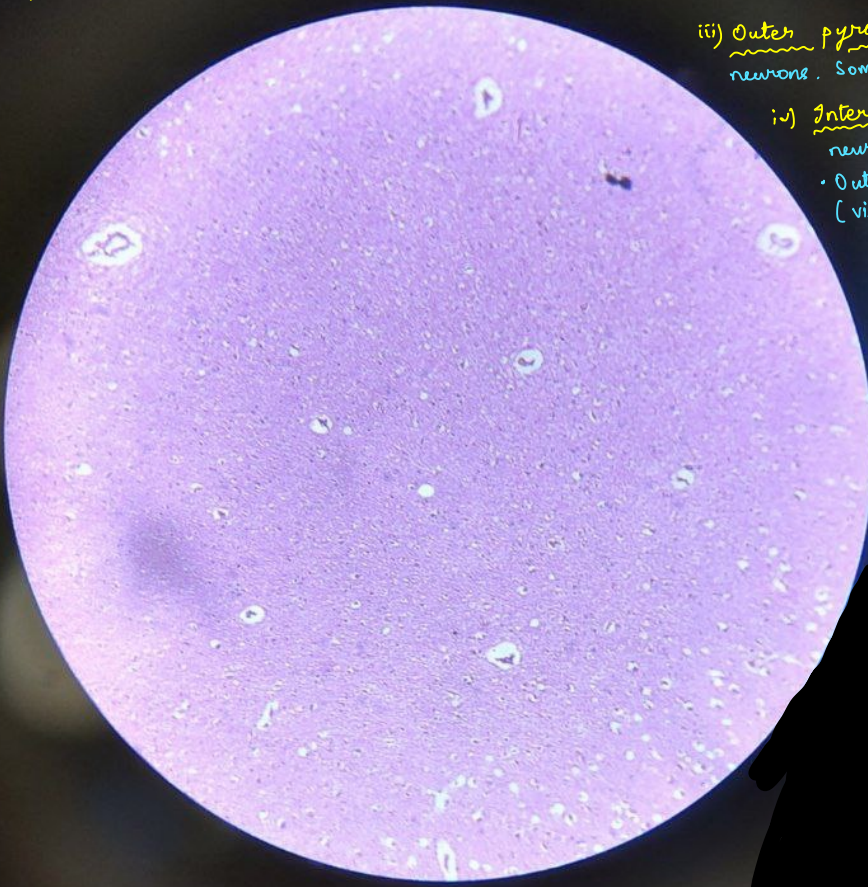
- Outer band of Baillarger (visual cortex of occipital lobe)

- v) Inner pyramidal/ganglionic

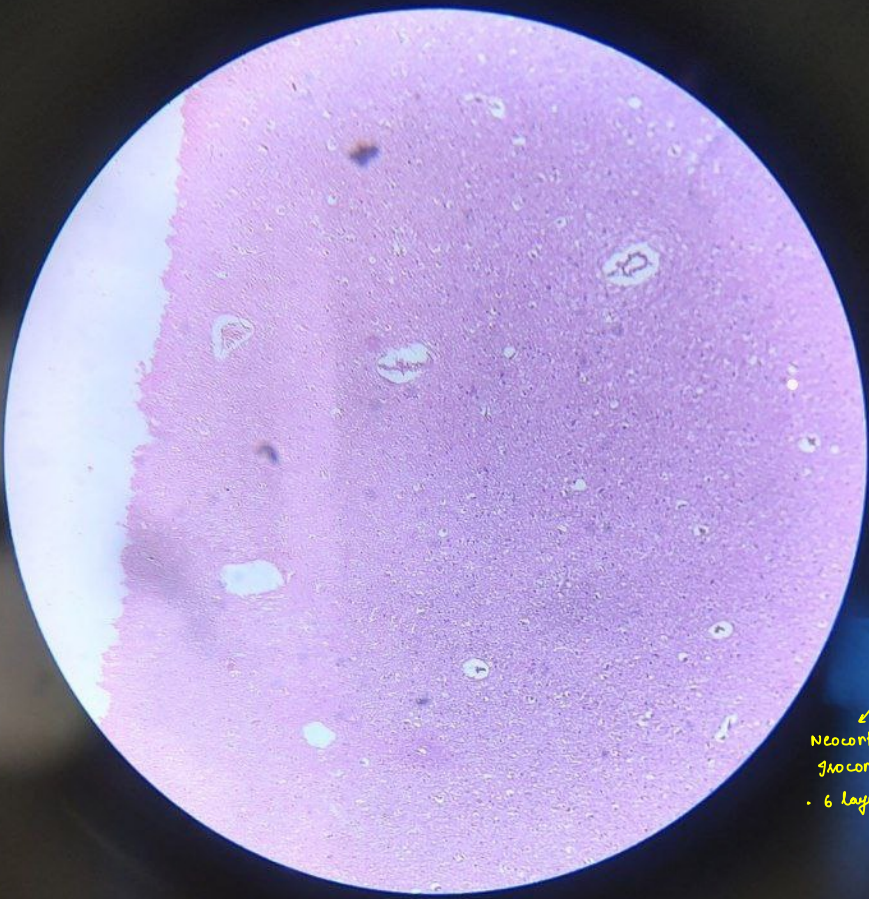
- Giant pyramidal cells
- Inner band of Baillarger

- vi) Plumorphic/multiform

- Neurons of various shapes and sizes
- Merge with white matter.



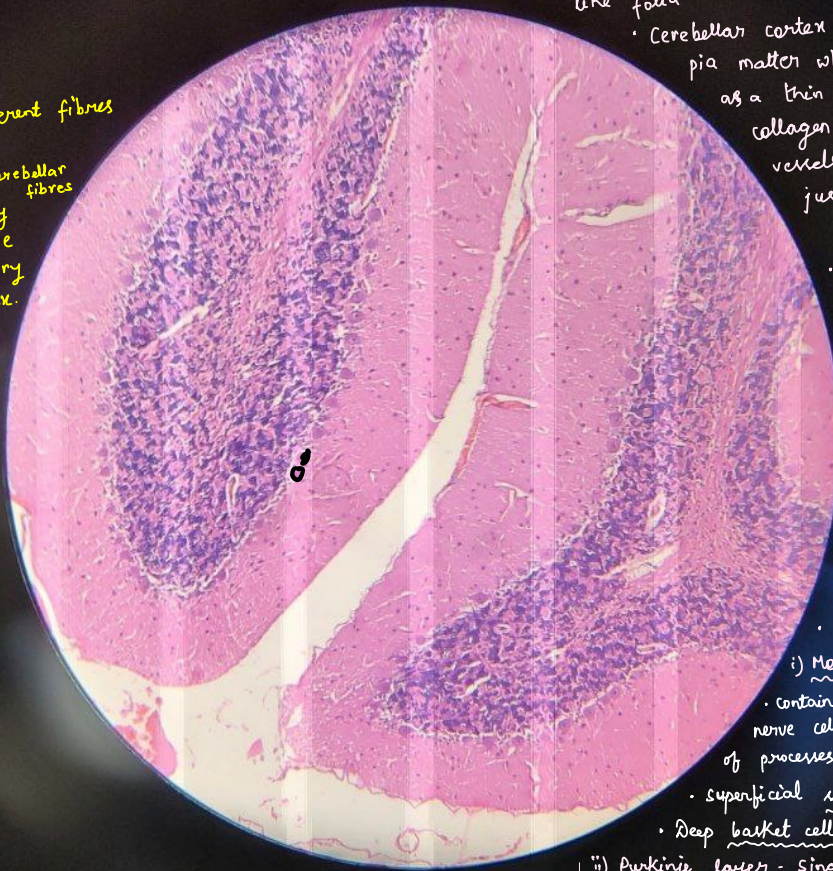
Cerebrum



Cortex
→ Neocortex/
 granocortex
 • 6 layers
→ Old cortex/
 Alloccortex
 • 3 layers

Cerebrum

- 4 nuclei in the white matter:-
 - i) Dentate
 - ii) Emboliform
 - iii) Globose
 - iv) Fastigial
- 2 types of afferent fibres
 - i) Mossy
 - ii) Climbing - Olivocerebellar fibres
- Both are excitatory
- Axons of Purkinje fibres are inhibitory to cerebellar cortex.
- Rosette - Enlarged ending of mossy fibres
- Depression → Fissure
- Elevation → Folia



- Glomeruli - The spaces where cell bodies of granule cells are absent (Cerebellar islands) are occupied by special synapses → axons of Golgi cells, dendrites of Granule cells and fibres of Mossy fibres rosette

- Section of cerebellum appears as leaf like folia
- Cerebellar cortex is covered by pia matter which appears as a thin layer of collagen fibres. Blood vessels may appear just beneath the pia matter.
- Inner white matter shows axons which appear as pink fibres.
- Nuclei of neuroglia are seen in both white matter and gray matter.
- 3 layers:-
 - i) Molecular layer
 - contains less no. of nerve cell bodies, more of processes, appear pale.
 - superficial stellate cells
 - Deep basket cells.
 - ii) Purkinje layer - single layer of flask-shaped pink neurons (Purkinje cells)
 - iii) Granular layer - Deeply stained with hematoxylin.
 - contains → granule cells and Golgi cells.
 - In between darkly stained areas there are lightly stained areas called Glomeruli.

Cerebellum

1) Mucosa

i) Lining epithelium

- Stratified squamous → protective → esophagus, anal canal.
- Columnar → absorptive / secretory → rest GIT.

ii) Lamina propria

- Collagen and reticular fibres in glycosaminoglycan matrix.

iii) Muscularis mucosae

- Outer longitudinal and inner circular muscles.

2) Submucosa

- Dense irregular connective tissue.

◦ Meissner's plexus - Parasympathetic secretomotor fibres

3) Muscularis externa

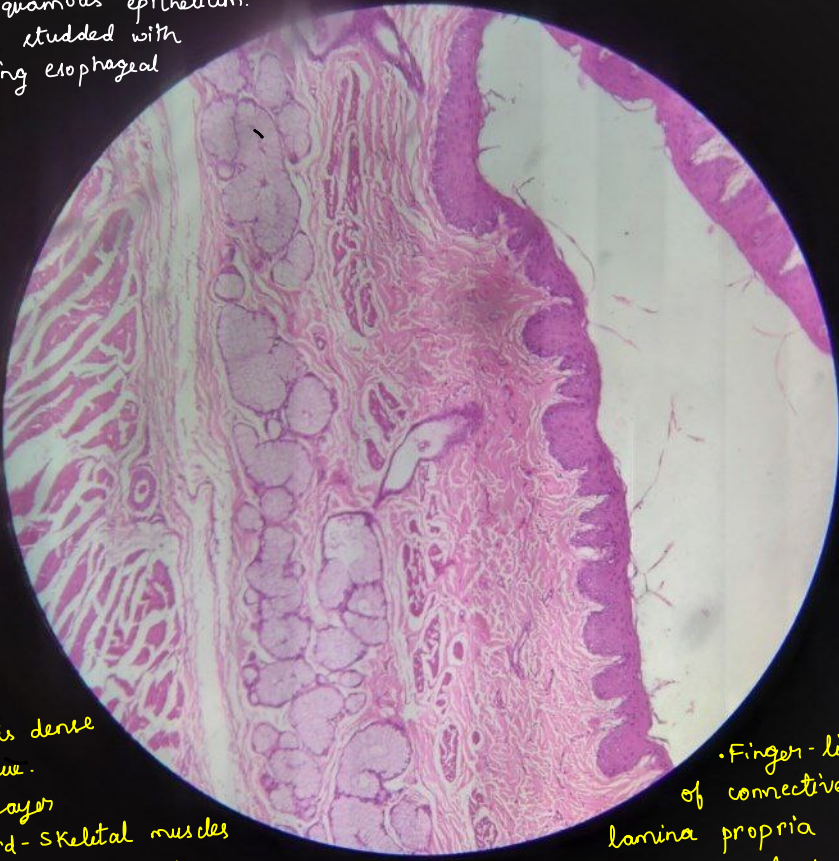
- Smooth muscles, except → skeletal muscles
 ↙ ↘
 esophagus anal canal

- Stomach, additional oblique layer present

◦ Auerbach's plexus - Both sympathetic and parasympathetic fibres.

4) Adventitia

- Four layers of oesophagus (GIT) - mucosa, submucosa, muscularis externa, adventitia.
- The lining epithelium is non-keratinized stratified squamous epithelium.
- Submucosa is studded with mucus-secreting esophageal glands.



- Adventitia is dense fibrous tissue.
- Muscularis layer
 - i) Upper 1/3rd - Skeletal muscles
 - ii) Middle - Skeletal + smooth
 - iii) Lower - Smooth muscles
- Myenteric plexus lies between outer longitudinal and inner circular muscle layers.
 - ↳ produces peristalsis

- Finger-like processes of connective tissue of lamina propria project into the epithelial layer.
- Tubuloalveolar mucous glands are present in the lamina propria → esophageal cardiac glands.

Oesophagus

- Serous covering is absent except in its lower end (over a short end)

- Shallow gastric pits occupying superficial one-fourth or less of the mucosa
- Presence of gastric glands in mucosa
- Gastric glands with numerous oxyntic cells give beaded appearance



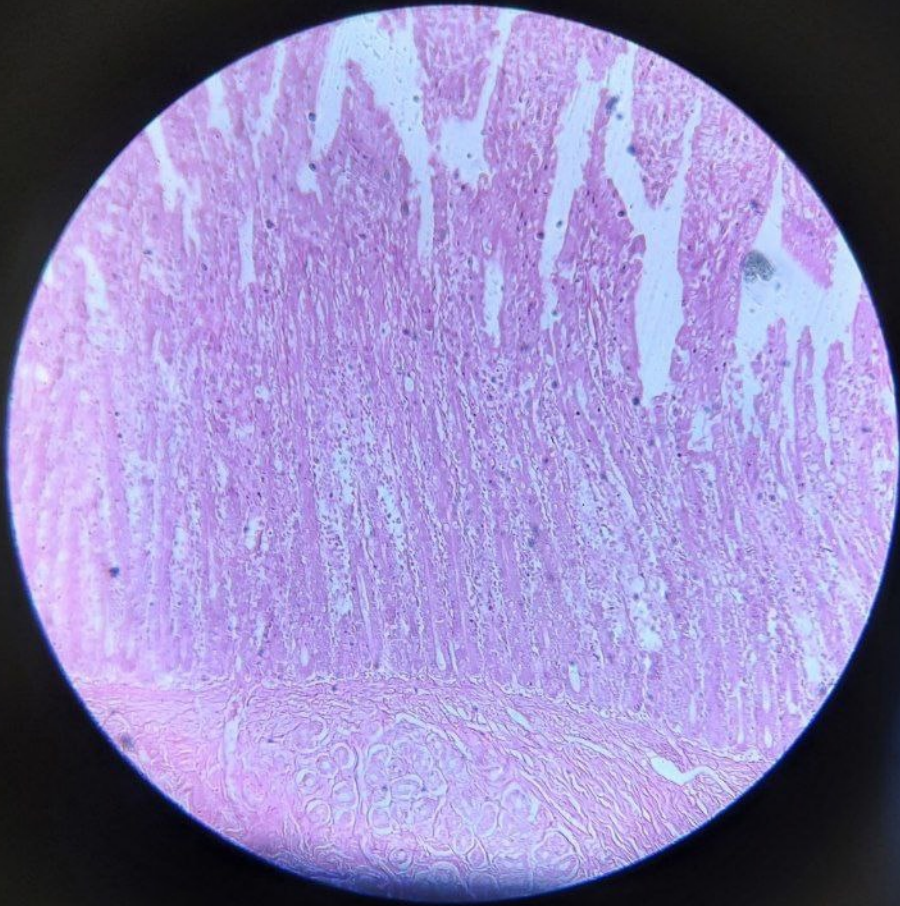
Fundus of and Body Stomach

- ①. Deep gastric pits occupying $\frac{2}{3}$ of the depth of mucosa.
- ②. Presence of pyloric glands in the mucosa that are simple / branched tubular glands which are coiled.



Pylorus

- ① Numerous broad villi.
- ② Brunner's gland are present in submucosa.



Duodenum

- Tall slender villi
- Absence of Brunner's gland

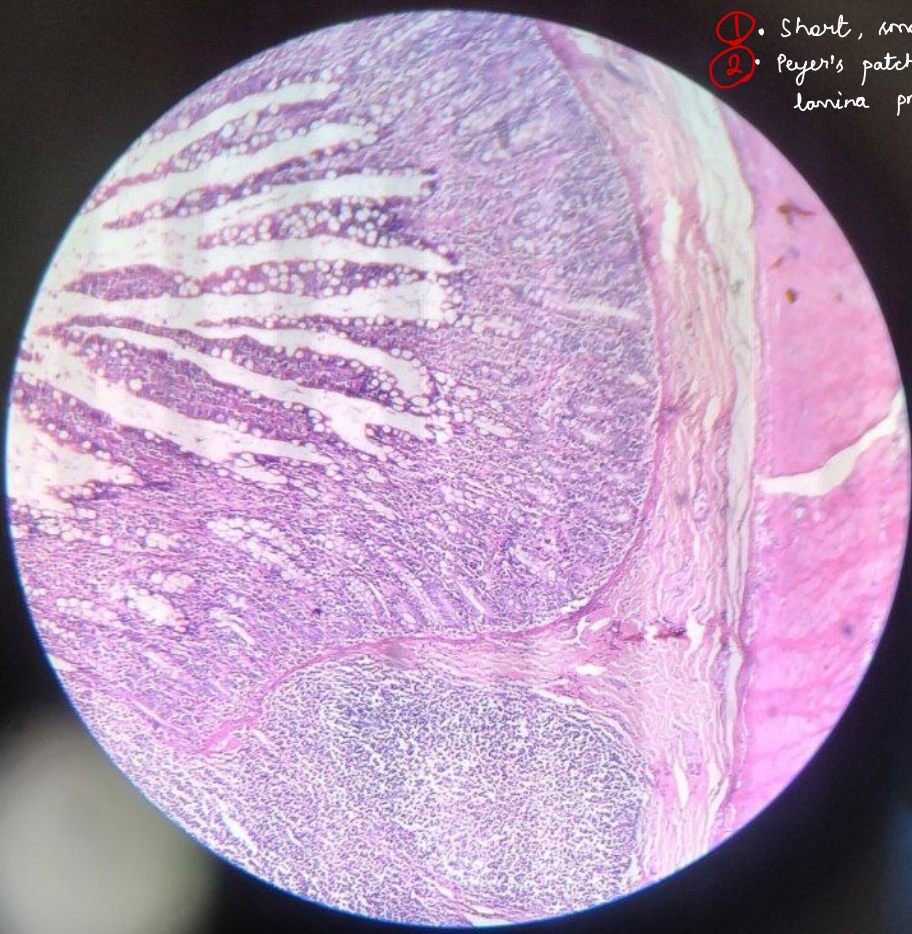
① Columnar epithelial lining with goblet cells.

② Grypts of Lieberkuhn present.



Jejunum

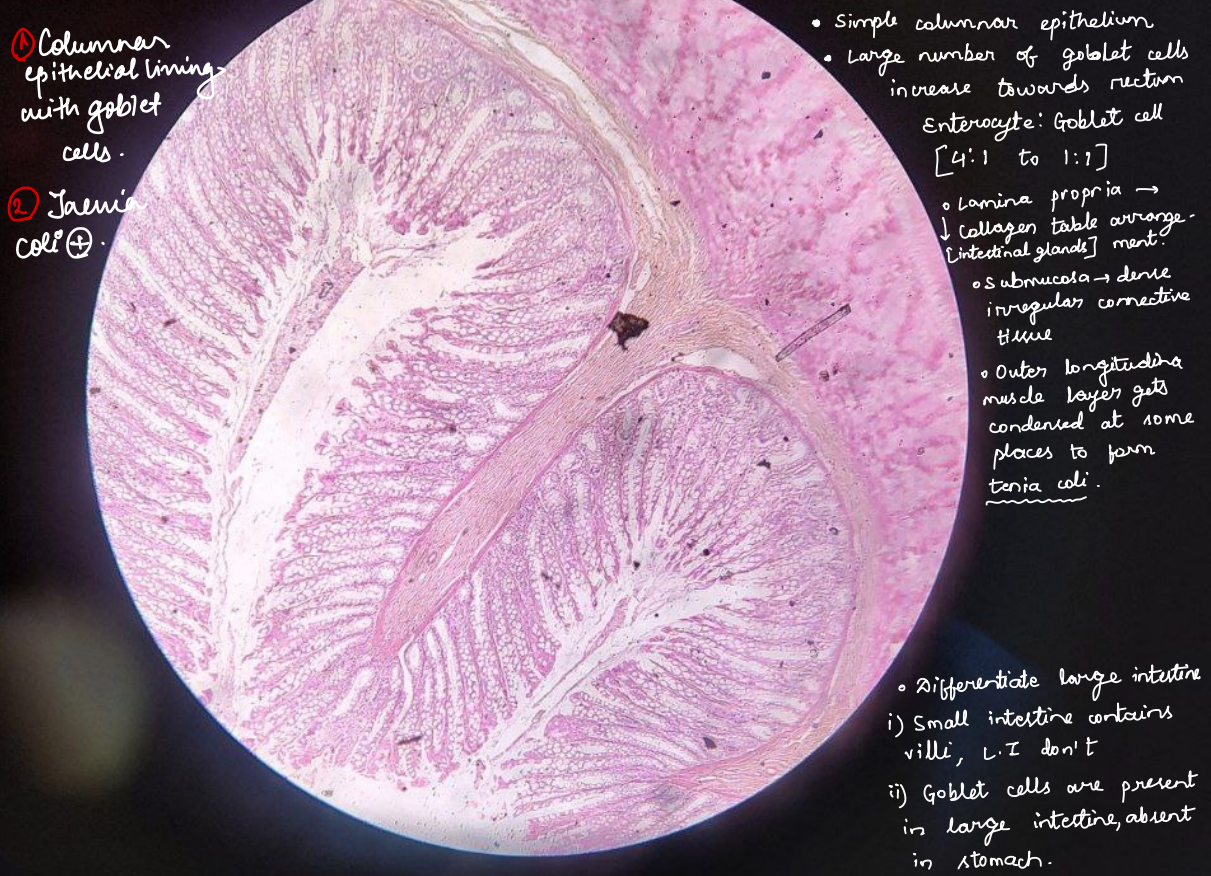
- ①. Short, small, fewer villi.
- ②. Peyer's patches present in the lamina propria (mucosa)



Ileum

Peyer's patch

At the bottom



Large intestine

Abdominal tonsil



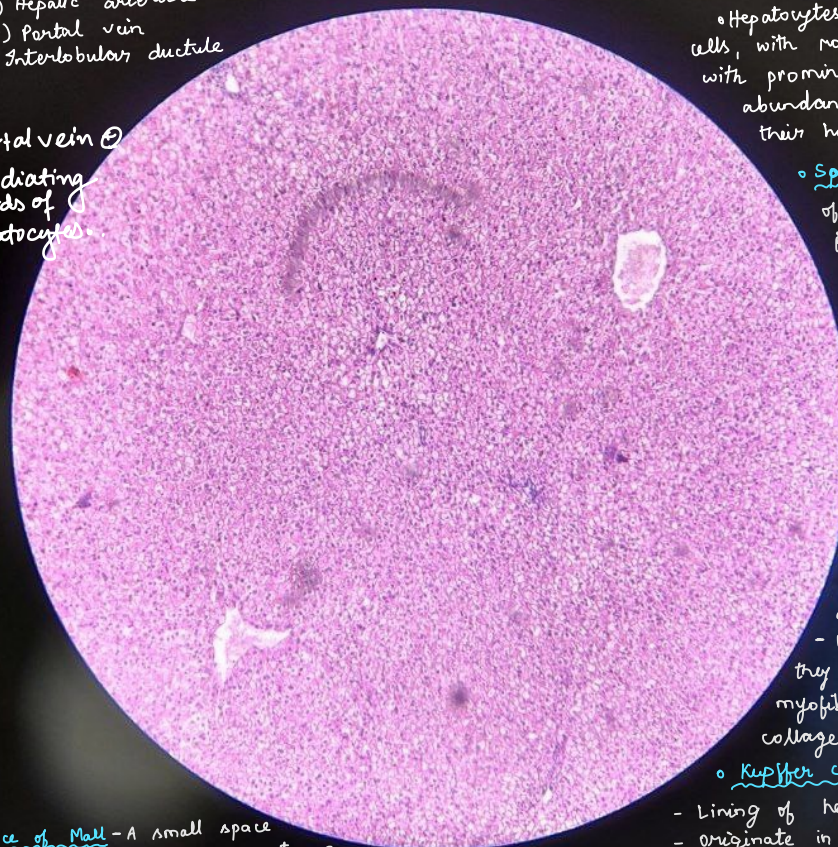
- ① Lymphatic follicles extend from lamina propria to submucosa
- ② Hiatus muscularis ⁺ Discontinuity or gap between inner circular and outer longitudinal muscle layer.
- Verruform appendix is the narrowest part of GIT.

• Lymphoid tissue is not present since birth, it increases and is best seen in children about 10 years age. It then decreases gradually. Hence it is called abdominal tonsil.

Appendix
(Lymphoid tissue
Very lightly
coloured here)

- Stroma is formed by extensions of Glisson's capsule.
- Hepatic lobules are hexagonal in shape lined by scanty connective tissue.
- Hepatic laminae - From the central vein cords of hepatocytes radiate outward as plates of cells.
- Hepatocytes are separated by spaces called hepatic lacunae occupied by hepatic sinusoids.
- Portal triad - present at angular intervals at the periphery of each lobule.
 - i) Hepatic arteriole
 - ii) Portal vein
 - iii) Interlobular ductule

- ① Portal vein
- ② Radiating cords of hepatocytes



• Hepatocytes are large polygonal cells, with round open faced nuclei with prominent nucleoli. They contain abundant cell organelles (due to their high metabolic activities)

• Space of Disse - The surface of the liver cell is separated from the endothelial lining of sinusoid by a perisinusoidal space. Some fat cells and Ito cells are present in this space

• Ito cells - star shaped

- Primary store house of vitamin A.

- Helps in remodelling of extracellular matrix during recovery from liver damage.

- Under pathological conditions they differentiate into myofibroblast and synthesise collagen.

• Kupffer cells - star/stellate shaped

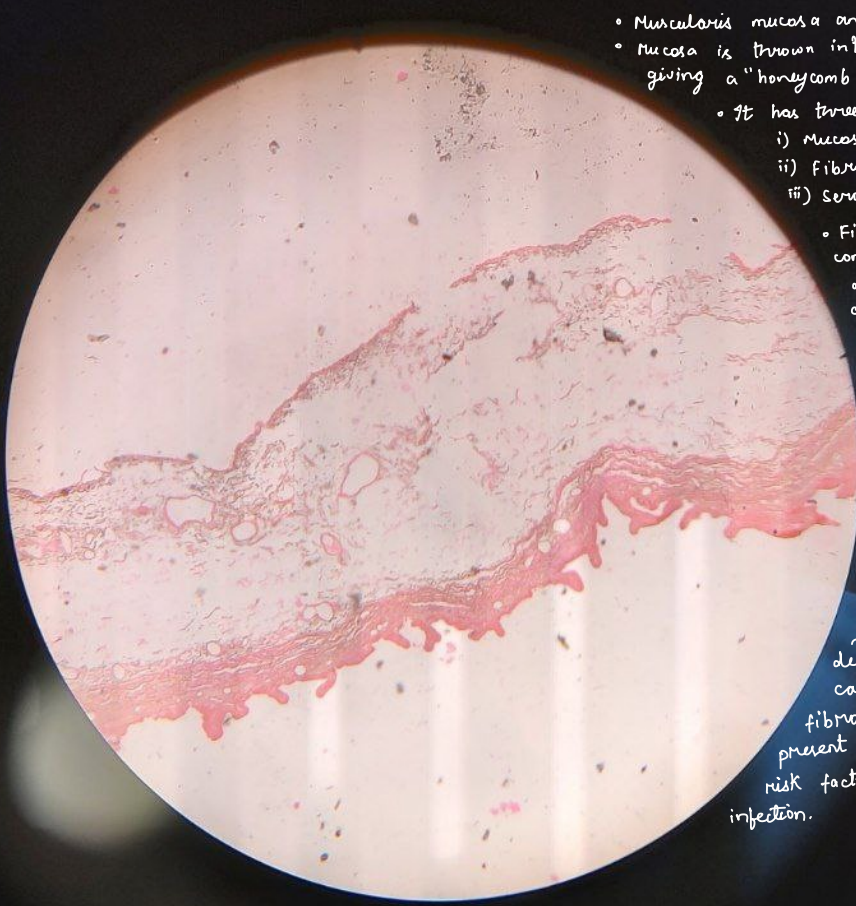
- Lining of hepatic sinusoids.
- Originate in bone marrow
- Part of mononuclear phagocyte system [MPS]

• 3 types of lobules

- i) Hexagonal
- ii) Portal (triangular)
- iii) Acinus

• Natural Killer cells - Protect the liver cells.

Liver

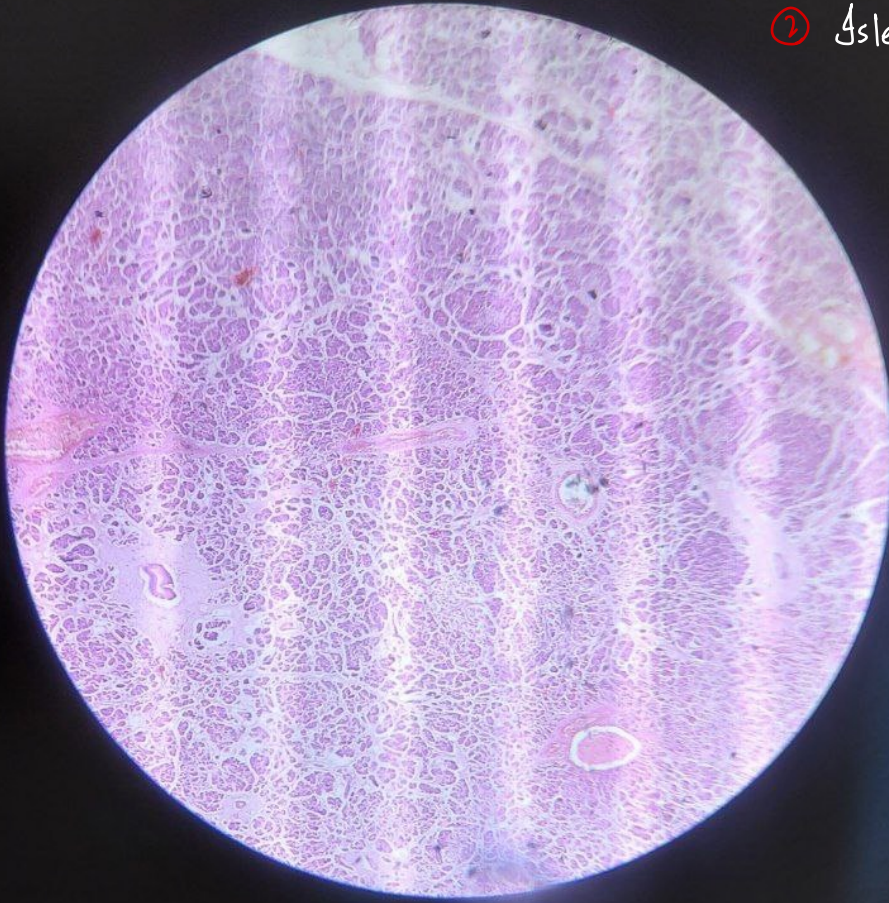


- Muscularis mucosa and submucosa are absent.
- Mucosa is thrown into folds (not villi) giving a "honeycomb" like appearance.
- It has three layers:-
 - i) Mucosa
 - ii) Fibromuscular coat
 - iii) Serosa
- Fibromuscular coat contains connective tissue fibres and smooth muscles arranged in random fashion.
- A serous covering lined by mesothelium can be seen.
- Mucous membrane is lined by tall columnar cells with striated border.
- Rokitansky - Aschoff sinuses: Sometimes deep mucosal diverticula can extend into the fibromuscular coat. If present they increase the risk factor for stone and infection.

Gall bladder

- ① Simple columnar striated epithelium ⊕.
- ② Crypts ⊕ in lamina propria.

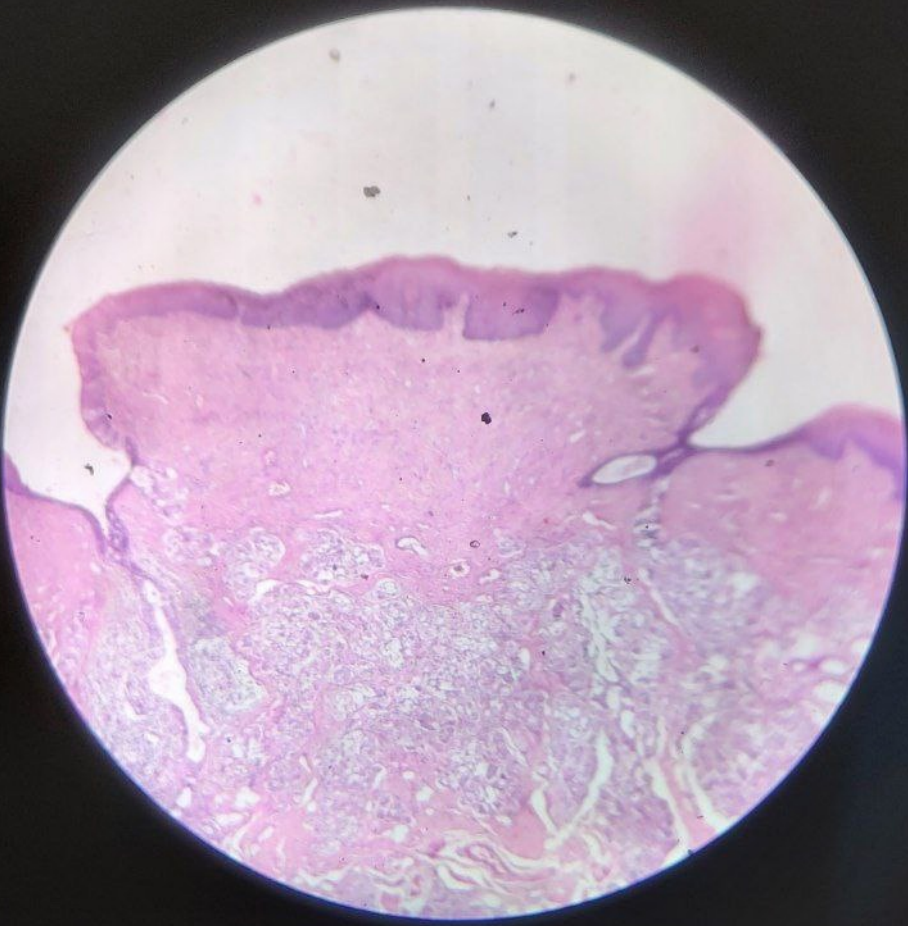
- ① Serous acini inside lobules ⊕
- ② Islets of Langerhans ⊕



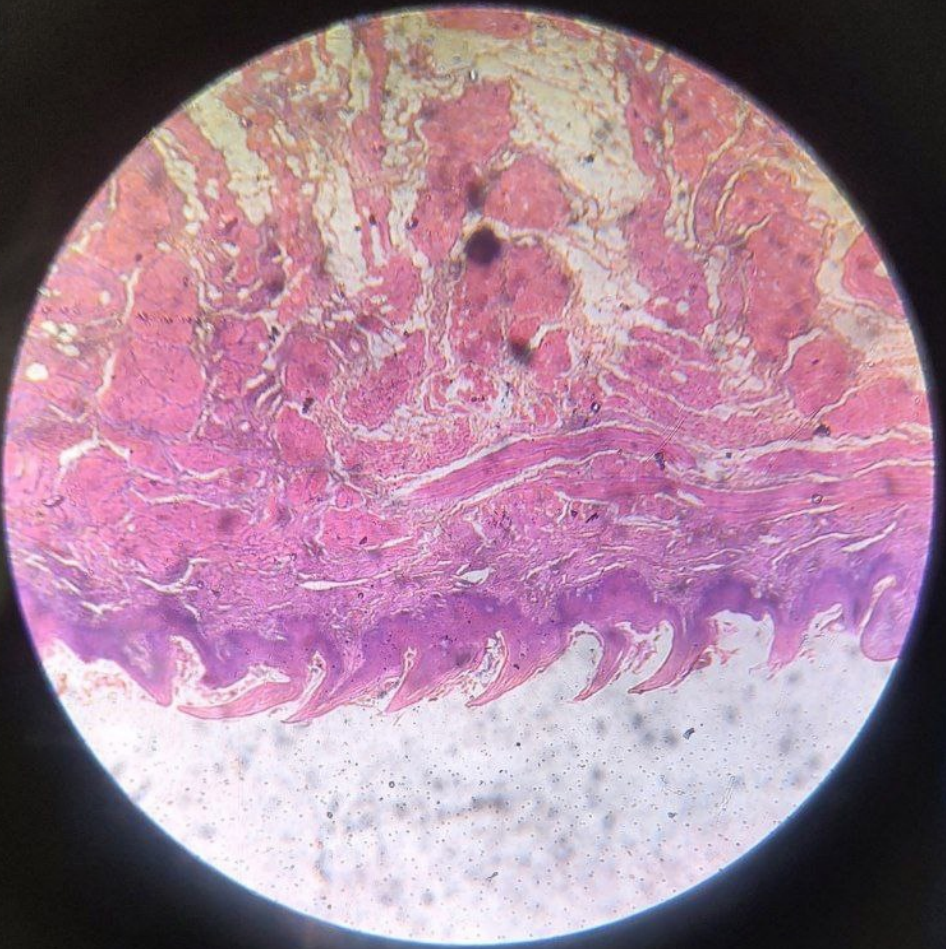
Pancreas



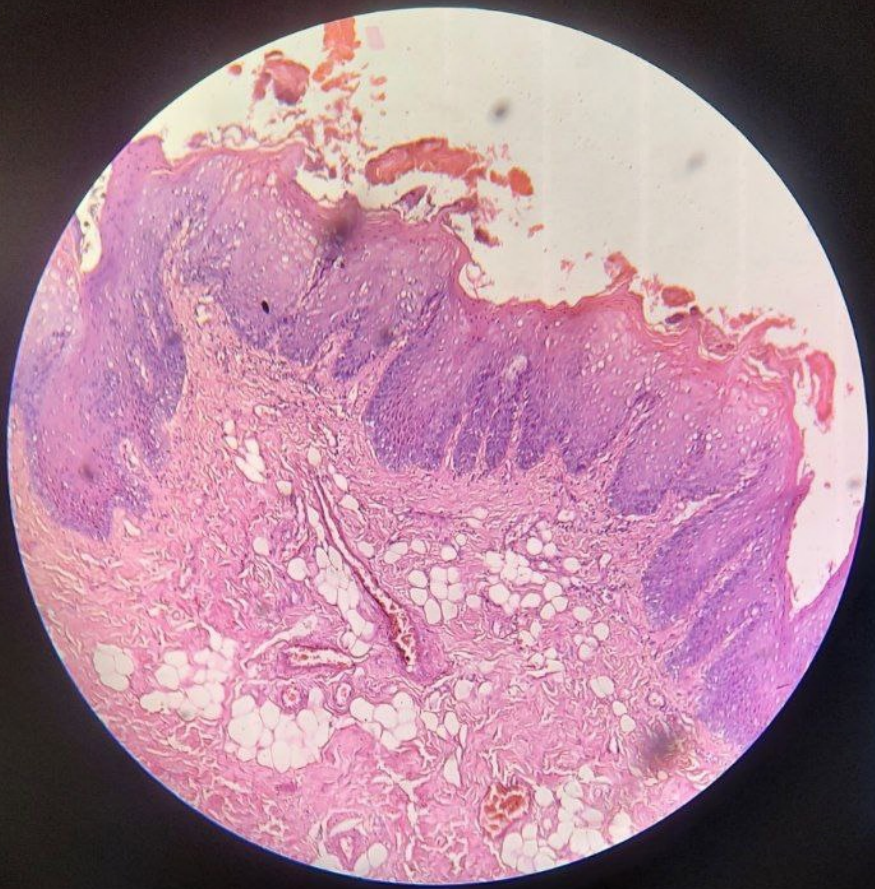
Pancreas
(Eyelet circled)



**Circumvallate
papilla**



Filiform papilla

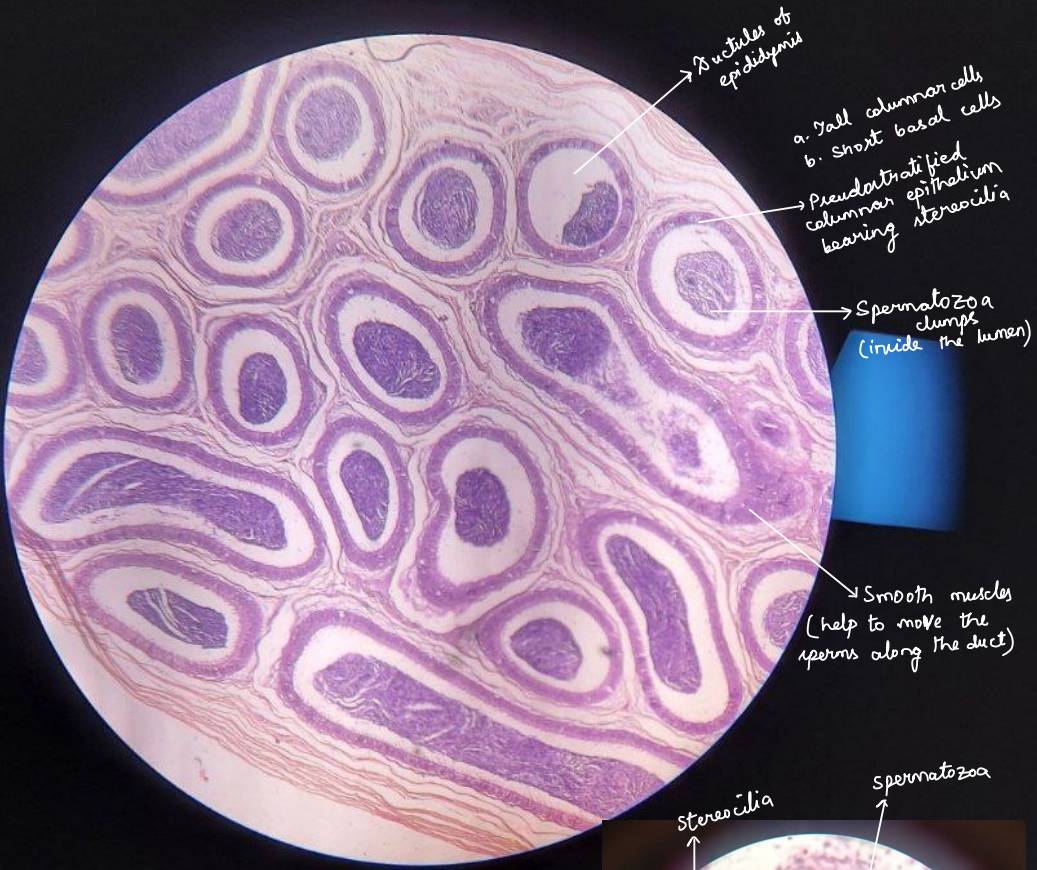


Fungiform 10x

- Basal cells stain dark.
- Principal cells stain light.

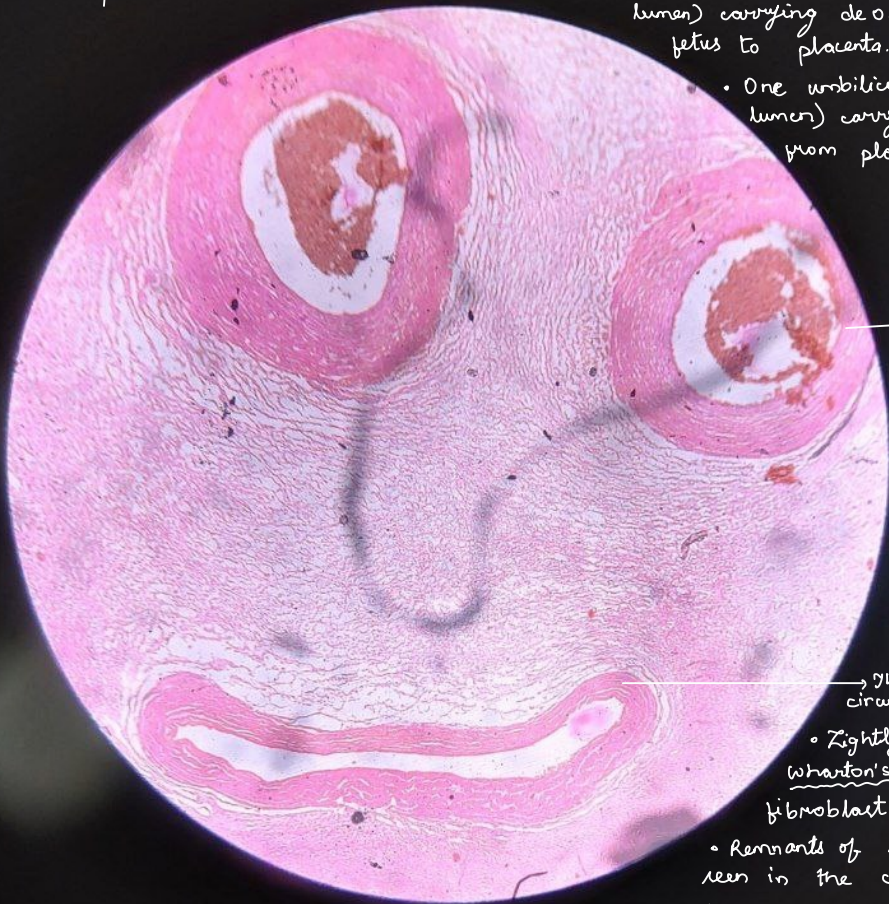
→ Functions:-

- Absorb excess fluid.
- Phagocytose defective spermatozoa.
- Secrete substances for maturation of sperms eg: Sialic acid, glycerolphosphoryl choline



Epididymis

- Covered by single-layered amnion → simple cuboidal epithelium.



- Two umbilical arteries (regular lumen) carrying de O_2 blood from fetus to placenta.
- One umbilical vein (irregular lumen) carrying O_2 blood from placenta to fetus.

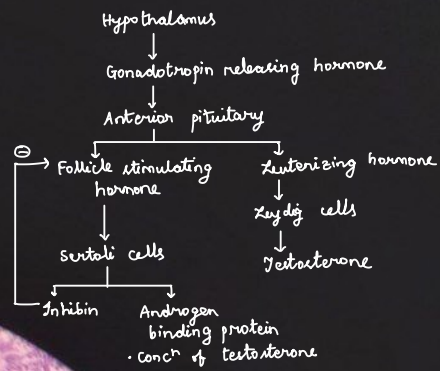
→ Double layered muscular wall without elastic layer

→ Thick layer of circular smooth muscle.

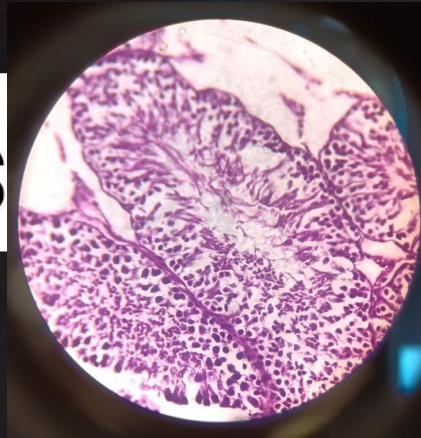
- Lightly-stained area- Wharton's jelly contain fibroblast cells
- Remnants of Allantois may be seen in the centre.
- In early pregnancy, umbilical veins are two in number, later right disappears

Umbilical cord

- Sertoli cells are *stainless*



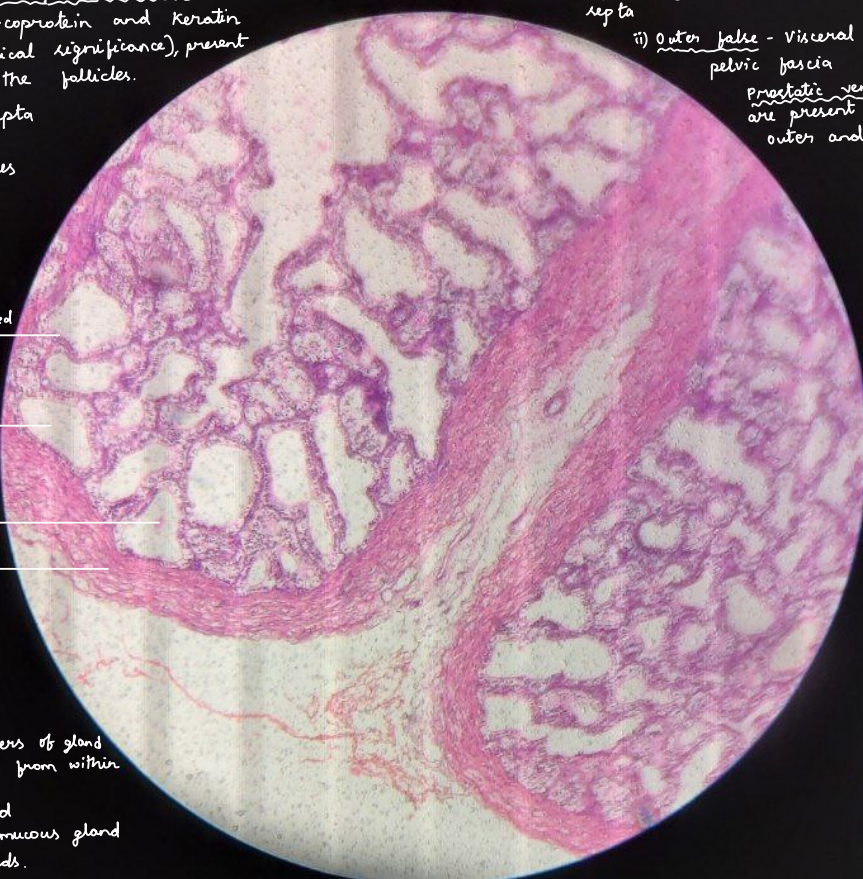
Testis



- Glandular tissue is present in the form of follicles lined by simple to pseudo-stratified columnar epithelium.
- Amyloid bodies or corpora amylacea - Rich in condensed glycoprotein and Keratin sulphate (no clinical significance), present in the lumen of the follicles.
- Fibromuscular septa
 - i) collagen fibres
 - ii) Smooth muscles

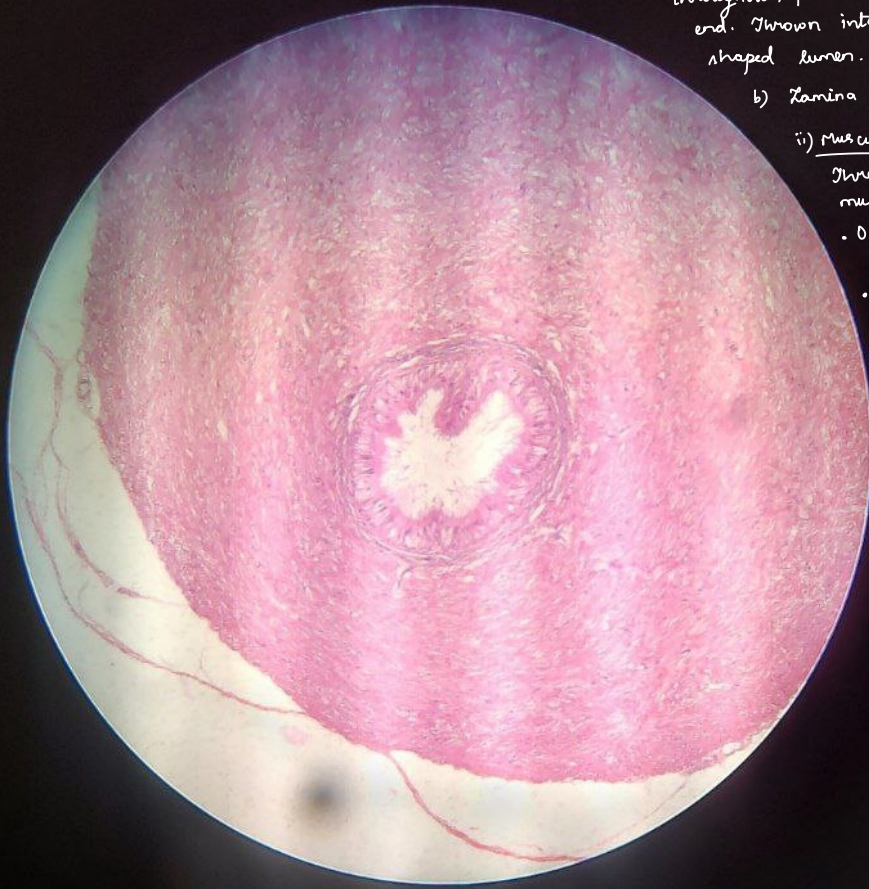
- 30-50 compound tubuloalveolar glands embedded in fibromuscular septa.
- Two capsules
 - i) Inner true - condensation of fibromuscular septa
 - ii) Outer false - Visceral layer of pelvic fascia

Prostatic venous plexuses are present between the outer and inner capsules.

- 
- Simple to pseudostratified columnar epithelium
 - Follicle of compound tubuloalveolar gland
 - (or) Corpora amylacea
Amyloid body
 - Fibromuscular septa

- Three concentric layers of gland around the urethra from within outward:-
- i) Inner mucous gland
 - ii) Intermediate submucous gland
 - iii) Outer main glands.
- Four zones of gland:-
 - i) Transition zone
 - ii) Central zone
 - iii) Peripheral zone
 - iv) Fibromuscular zone

Prostate

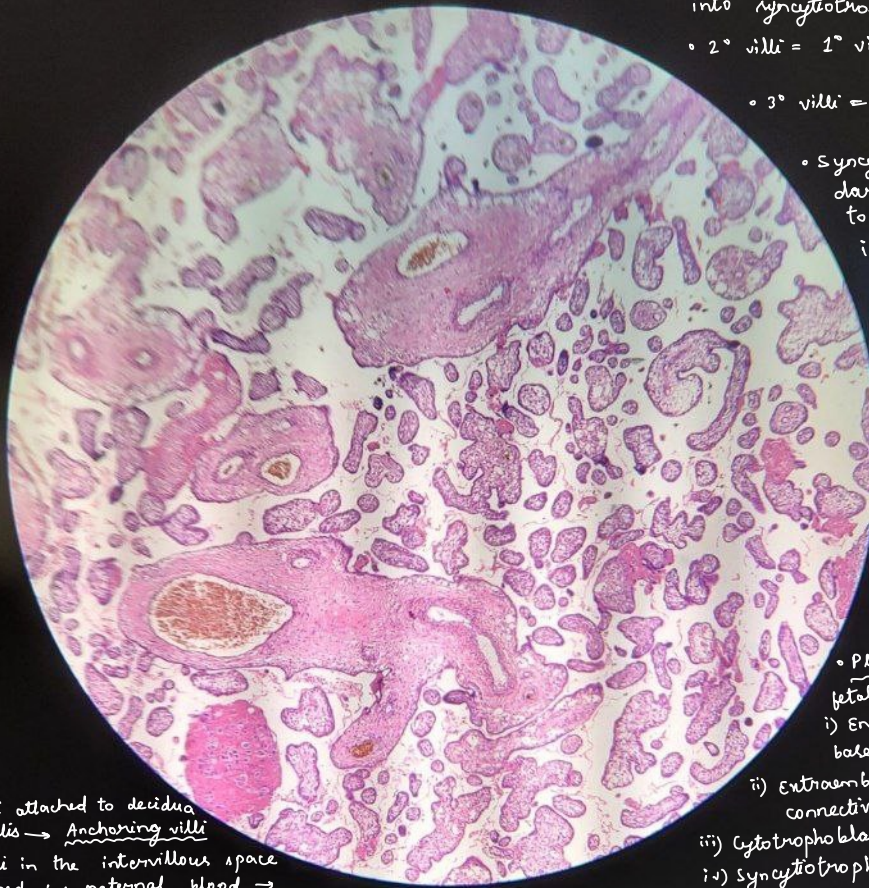


- i) Mucous membrane
 - a) Epithelium: simple columnar throughout, pseudostratified in distal end. Thrown into folds → stellate shaped lumen.
 - b) Lamina propria
- ii) Muscular coat
 - Three layers of smooth muscle.
 - Outer and inner longitudinal
 - Middle circular
- iii) Adventitia
 - composed of collagen fibres, containing blood vessels

Vas deferens

- Decidua basalis - Maternal part contributing for placenta.
- Chorion frondosum - Fetal part of placenta.

- Mother's side → basal plate, fetal side → chorionic plate.
- Primary villi → projection of cytotrophoblast into syncytiotrophoblast.
 - 2° villi = 1° villi + extra embryonic mesoderm.
 - 3° villi = 2° villi + fetal blood vessels.
- syncytiotrophoblast (outer) is darkly stained as compared to cytotrophoblast, because it mainly has secretory functions (hCG, hPL, relaxin etc.)
 - It has numerous RER and golgi bodies, hence darkly stained
- Intervillous space = Maternal blood.
- Mesodermal core has macrophages → Hofbauer cells.



- Villi attached to decidua basalis → Anchoring villi
- Villi in the intervillous space bathed by maternal blood → Floating villi.

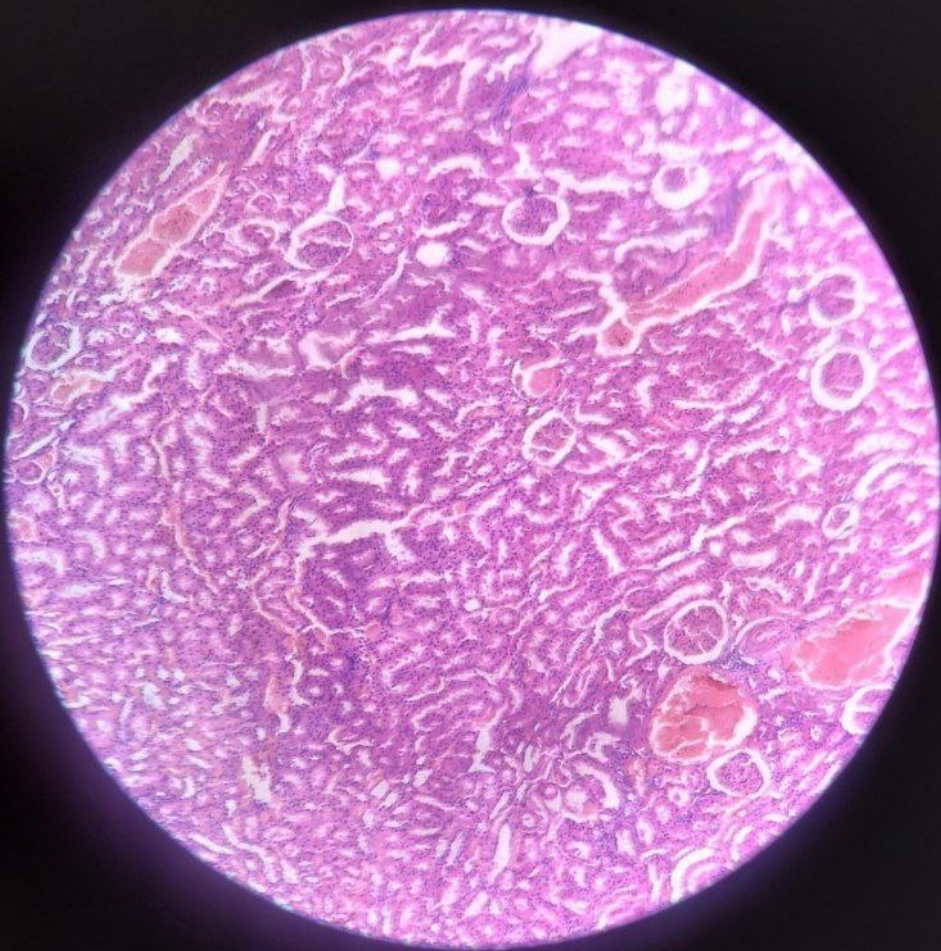
- Placental barrier: Barrier b/w fetal and maternal blood.
 - Endothelium resting on basement membrane.
 - Extraembryonic mesoderm (nucoid connective tissue)
 - Cytotrophoblast
 - Syncytiotrophoblast
 - Endothelium resting on basement membrane

- On later stages of pregnancy it changes :-
 - Cytotrophoblast disappears
 - Thinning of syncytiotrophoblast
 - Extraembryonic mesoderm becomes edematous.
 Thus fetal blood vessels are pushed to the periphery.

Placental barrier:-

 - Endothelium + B.M
 - Syncytiotrophoblast
 - Endothelium + B.M.

Placenta

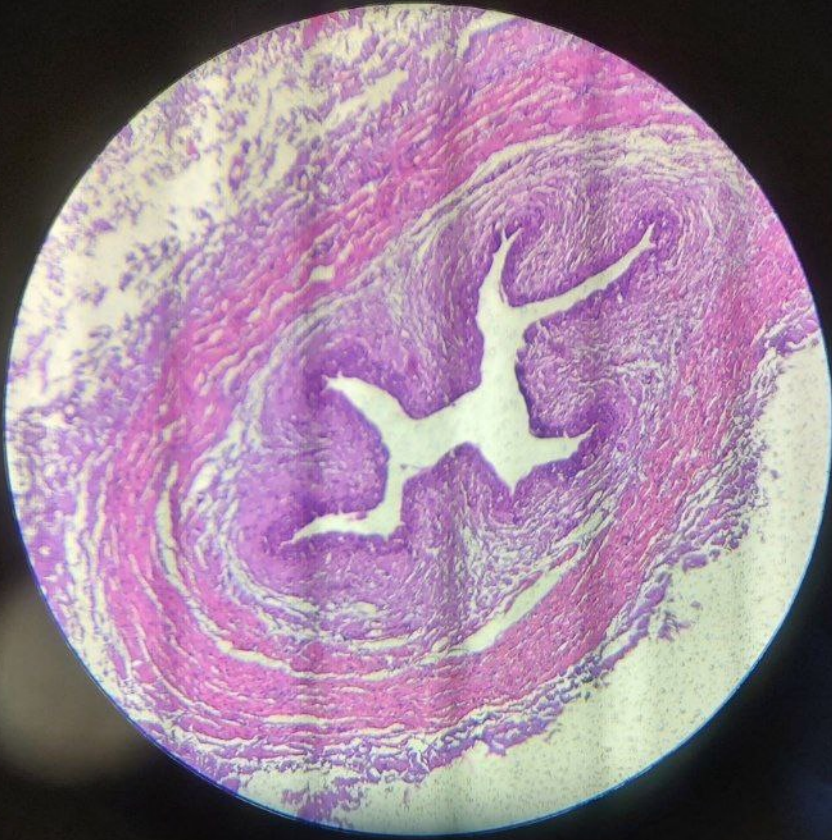


Kidney



Urinary bladder

- ① Star shaped lumen
- ② mucosal lining made up of transitional epithelium.



Ureter

• Zona protein 3 is important for fertilisation.

• Diameter:

i) Oocyte = 125 μ m

ii) Graafian follicle = 10 mm

i) Surface is covered by simple cuboidal epithelium

(germinal epithelium)

ii) Tunica albuginea - Connective tissue layer.

iii) Cortex - contains follicles of different sizes.

Follicular cells

Theca cells

Follicles: Primordial (aquamous) → Primary (early) (cuboidal)

Oocyte is present in centre

late primary (stratified epithelium) ⇒ Stratum granulosum

Secondary (cavity = Antrum appears within granulosa cells)

↓
Graafian follicle or Mature

• Oocyte and follicle increases in size [due to enlargement of antrum]

i) Corona radiata

ii) Cumulus oophorus

iii) Theca interna

(endocrine ⇒ LH receptor)

iv) Theca externa

(supportive functions)

Androgen granulosa cells → Estrogen

Ruptured follicles

After ovulation :-

i) Corpus hemorrhagicum

ii) Corpus luteum

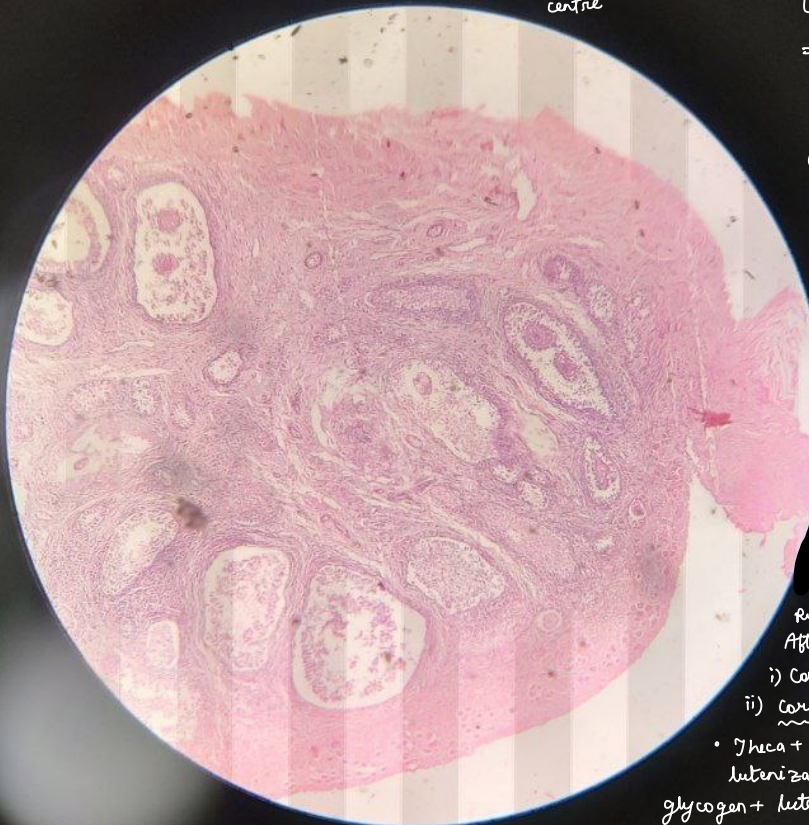
• Theca + granulosa cells → luteinization (deposition of glycogen + lutein) • Blood vessels disappear.

iii) Corpus albicans

• cells undergo regression.

• Theca lutein & granulosa lutein cells.

• Follicular stigma - when follicle is about to rupture



Ovary



Ovary again



Lymphatic
channels
(lined by
simple
squamous
epithelium)

Fallopian tube

10x

- i) Mucosa
- ii) Muscularis → Inner circular
→ Outer longitudinal
- iii) Serosa

↓
Not well demarcated.

- Epithelium - simple columnar ciliated
- Some non-ciliated cells are present →
"peg cells"

cells which have narrow bottom, wide apical part and nucleus is basal.

- Ciliogenesis - cilia are synthesised in response to estrogen (upto ovulation)

• Tubal pregnancy:

- If cilia are less
- If peg cells secrete viscous fluid, ovum will stick to tube.



Mesosalpinx
(peritoneal fold holding the tube)

- Peg cells dominate after ovulation, it gives nutrition to ovum (in response to progesterone)

Fallopian tube 4x

- Ductal epithelium undergoes changes to form cancer.

• Lactiferous duct → Intralobular duct
↓
Terminal ductule

• Connective tissue
↓
Intralobular - Loose C.T.
(accommodate changes during pregnancy, lactation)
Interlobular - Dense C.T. (support gland)

→ Terminal ductule
Inactive gland (stratified columnar)
↓

Active / lactating (simple cuboidal)

• Myoepithelial cells
help in contraction of milk. It lines the epithelium of terminal ductules



- Apocrine
- Compound tubuloalveolar
- Modified sweat

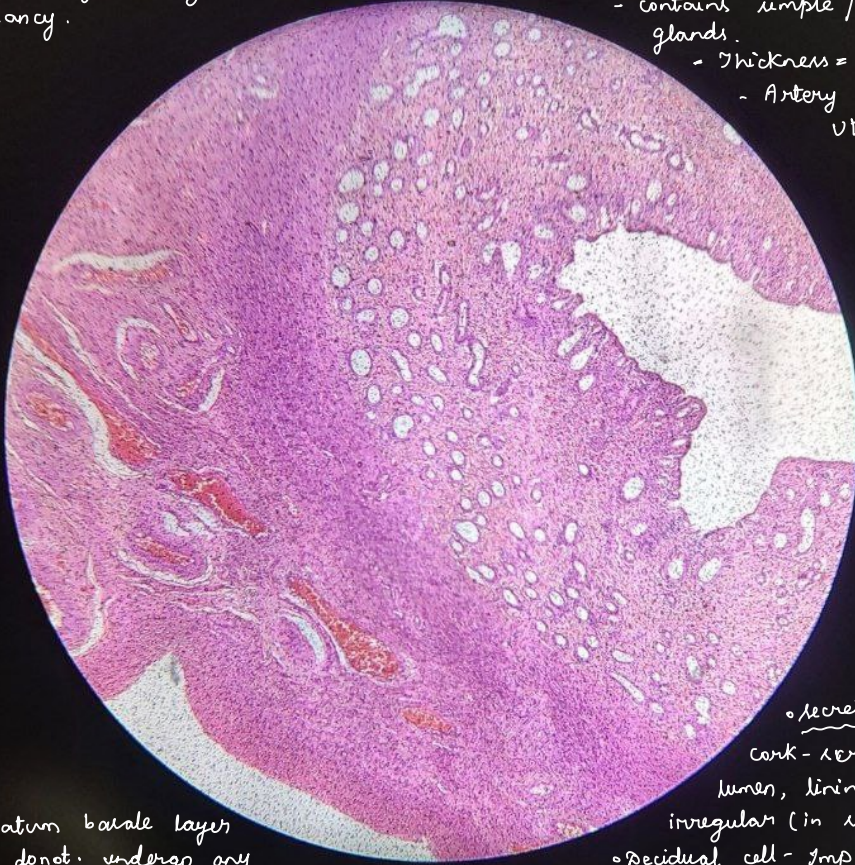
MAMMARY GLAND

Age Changes

S No	Age	Size	Stroma	Ducts & Glands	Hormones
1	At birth	Small	+++	Rudimentary ducts	Maternal Oest
2	Puberty	Large	fat ++	Ducts, alveoli	Oest, Progest
3	Preg 1 st	Larger	compressed	Alveoli formed	-do-
4	Preg 3 rd	↑↑	-do-	Alveoli colostrum	Prolactin
5	Lactation	Largest	-do-	Alveoli milk	Prolactin + Oxytocin
6	Old age	Small	↓	Alveoli disappear	

- Myometrium
 - Inner and outer → parallel to long axis
 - Middle → circular / spiral
 - In section seen as randomly arranged.
 - Undergoes hypertrophy upto 10 times during pregnancy.

- Endometrium - Two layers
 - i) Stratum basale
 - ii) Stratum functionale - Undergoes change
 - Epithelium → simple columnar.
 - contains simple / branched tubular glands.
 - Thickness = 1-6 mm
 - Artery



uterine
↓
Arteries
↓
Radial (basal)
↓
Spiral (functional)

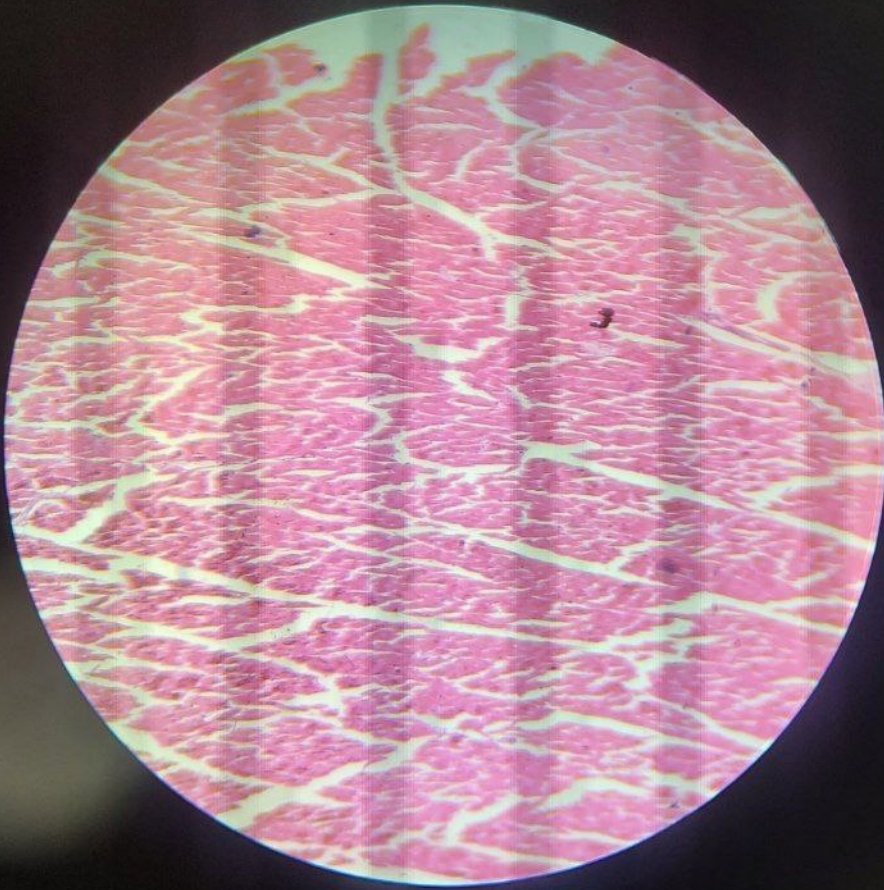
- In stratum basale layer glands don't undergo any change in different phases of menstruation.

- Secretory phase
Coiled - sawtooth pattern, → wide lumen, lining epithelium is irregular (in stratum functionale)
- Decidual cell - Imp for implantation, situated surrounding the glands.
- Proliferative phase

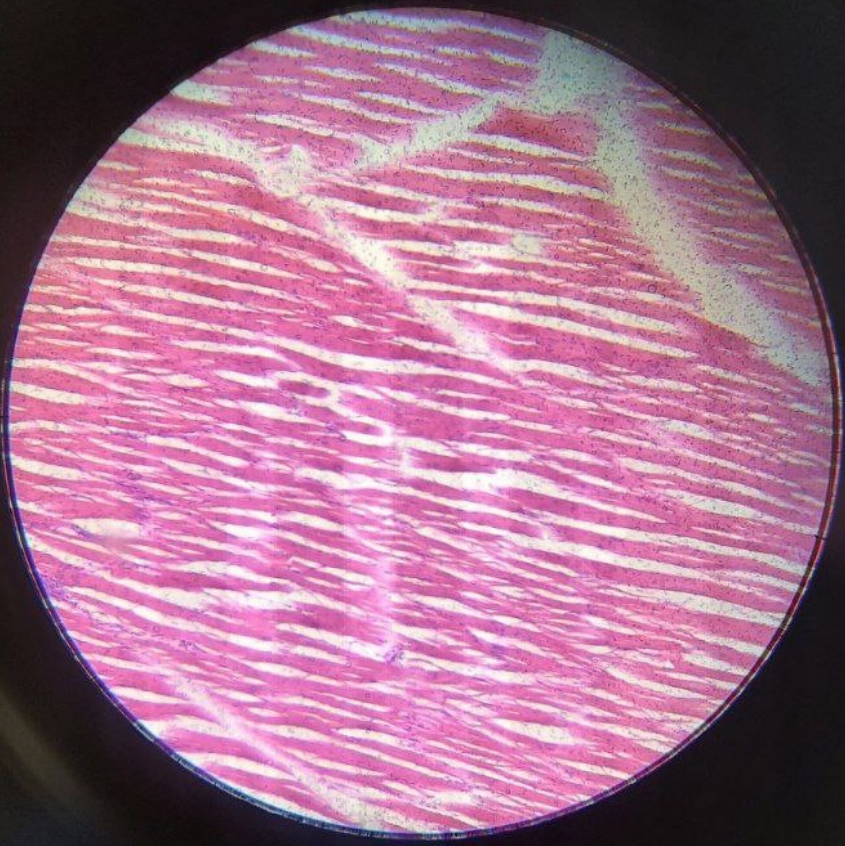
Uterus 4x

- Perimetrium - serosa (flattened squamous epithelium)

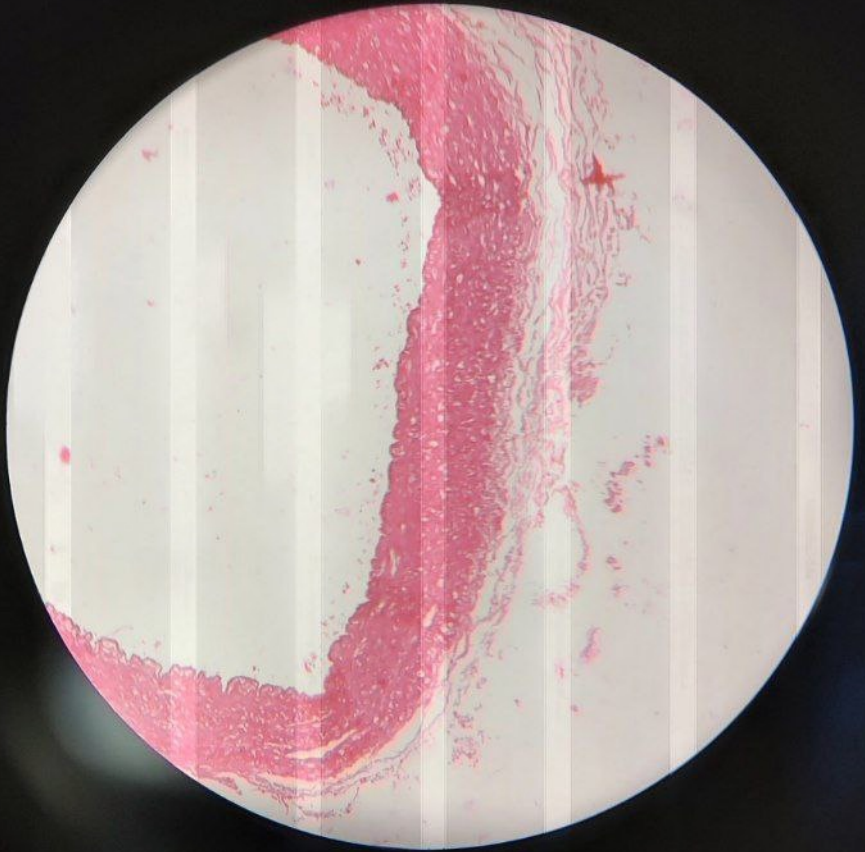
General histology



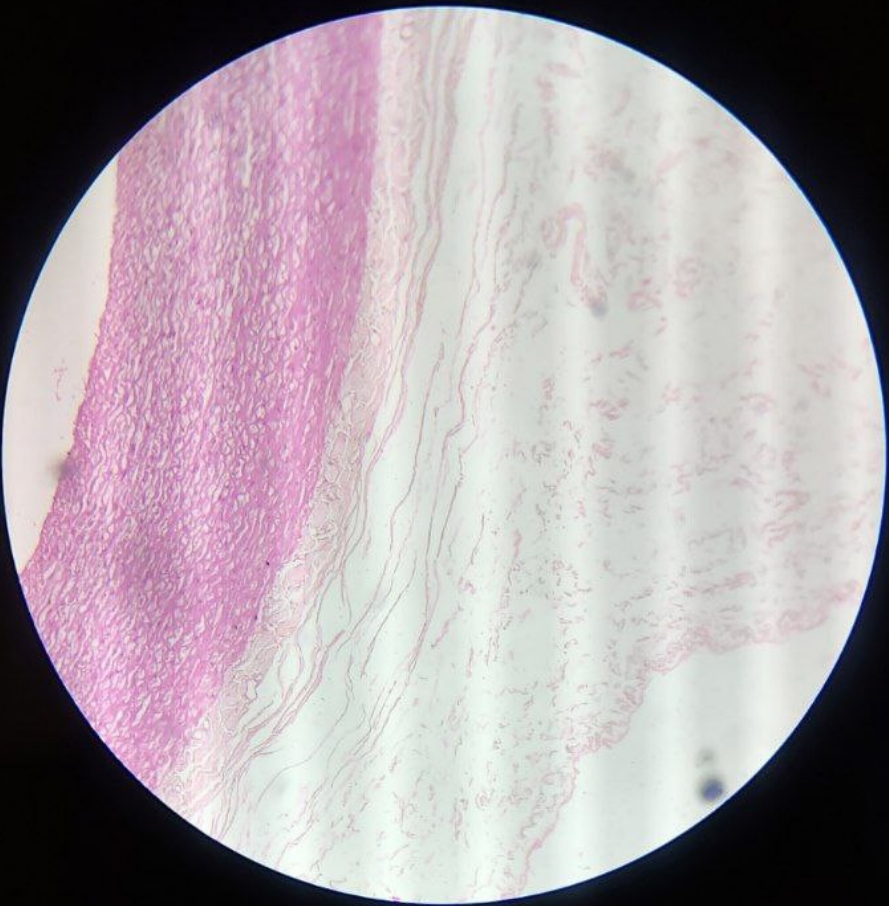
Cardiac muscle



Skeletal muscle



**Medium sized
artery**

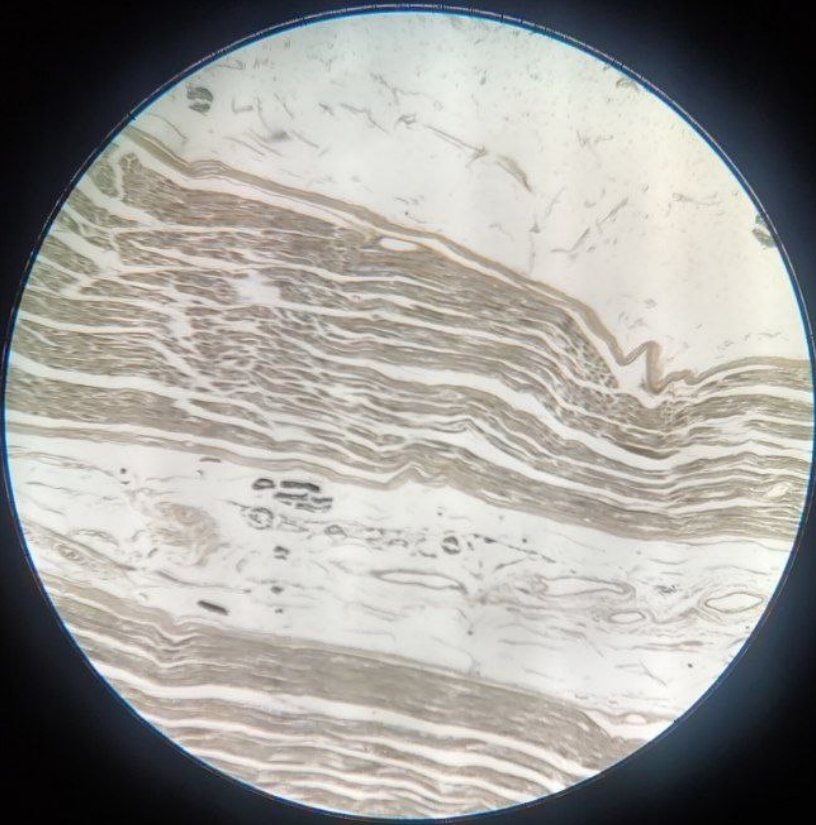


Large artery





Bone TS



Nerve fiber LS



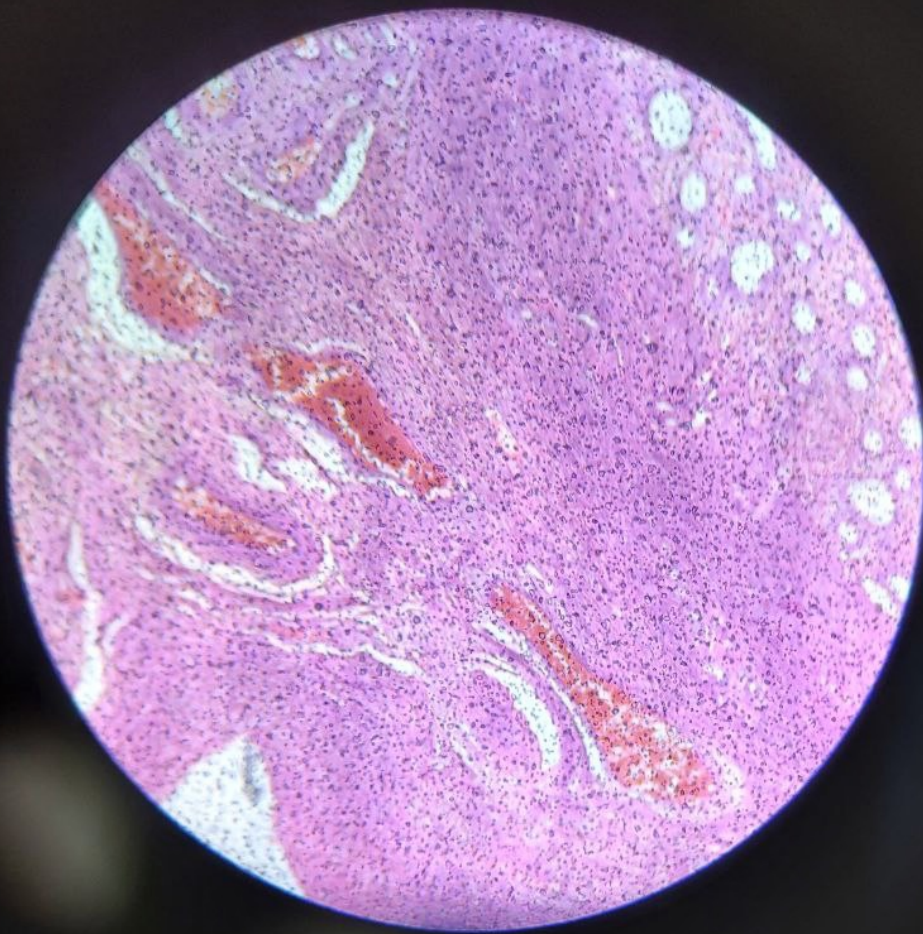
Spinal ganglion



Optic nerve



Lymph node



Eg: i) Meniscus of Knee joint
ii) Intervertebral disc
iii) Symphysis pubis



Row of
chondrocytes

Prominent collagen
fibers (type I and II)

- No perichondrium
- Bundles of collagen fibres with little ground substance.
- Chondrocytes arranged in rows between the fibres

Perichondrium

. Glass-like appearance

Outer fibrous
Inner cellular



• It undergoes calcification.

Isogenous group of chondrocytes — cell nest

Homogenous basophilic matrix separating the chondrocytes

• Ground substance

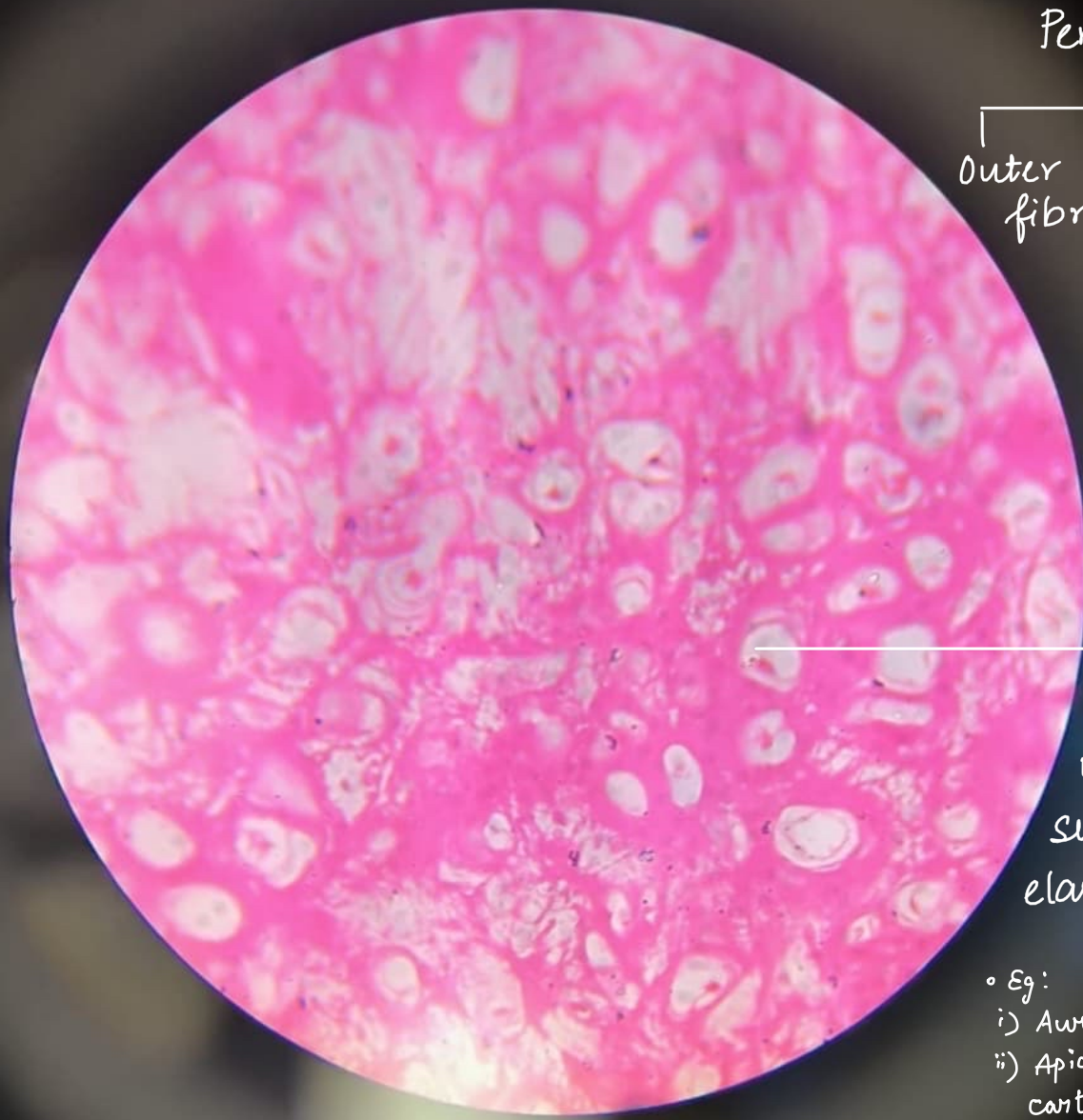
Type II collagen fibres

GAGs

- chondroitin sulphate
- Keratin sulfate
- Hyaluronic acid

• Eg:- Costal cartilage

- Articular cartilage
- Thyroid cartilage
- Tracheal rings
- Cricoid cartilage
- Arytenoid cartilage
- Large and smaller bronchi



Perichondrium

Outer
fibrous

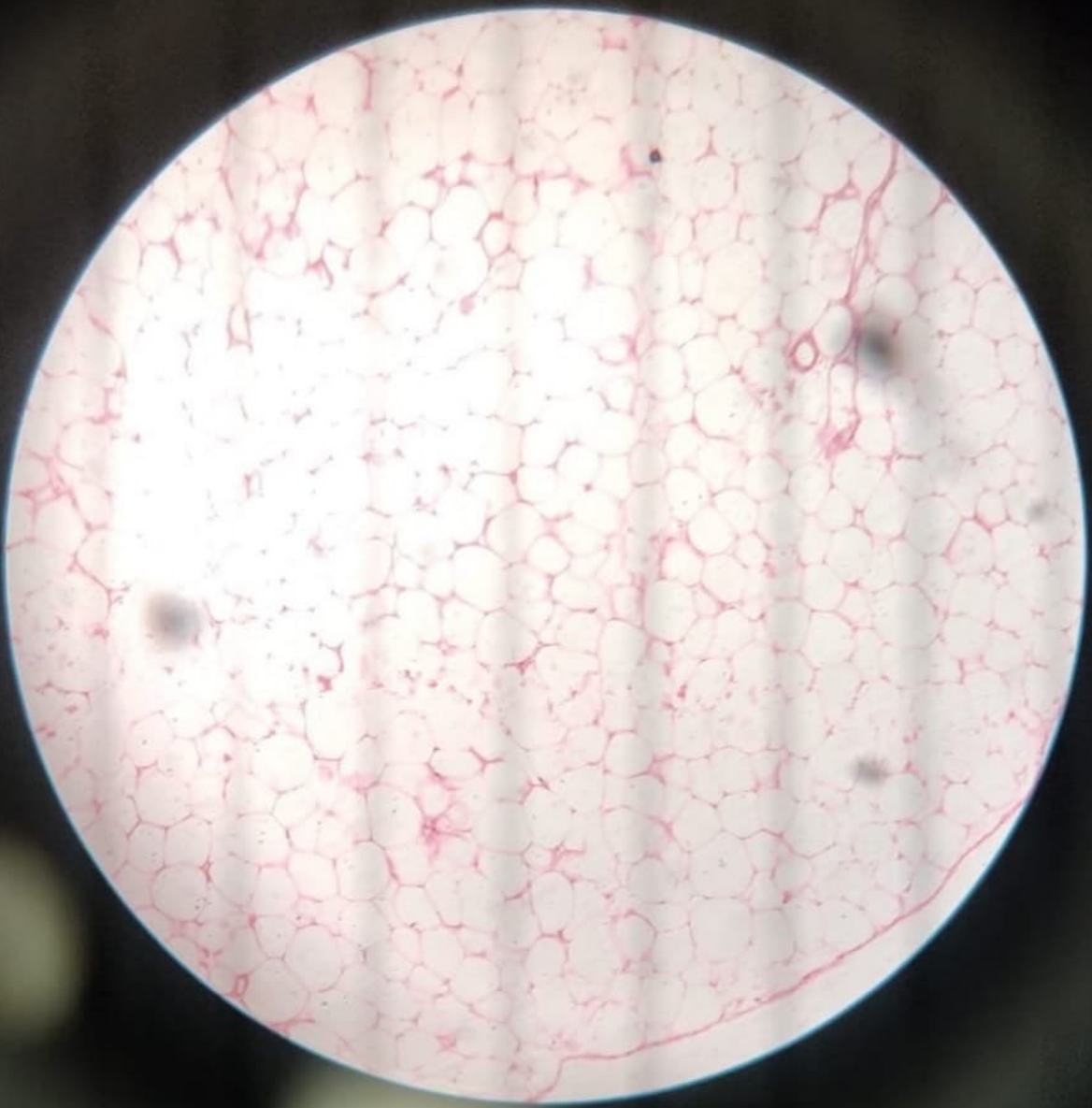
Inner
cellular

Single
chondrocyte
within lacunae
surrounded by
elastic fibers

- closely packed chondrocytes surrounded by amorphous ground substance.
- Branching and anastomosing elastic fibres in all directions
- It does not undergo calcification.

• Eg:

- i) Auricle (pinna)
- ii) Apical part of arytenoid cartilage
- iii) Epiglottis
- iv) Lateral part of external acoustic meatus



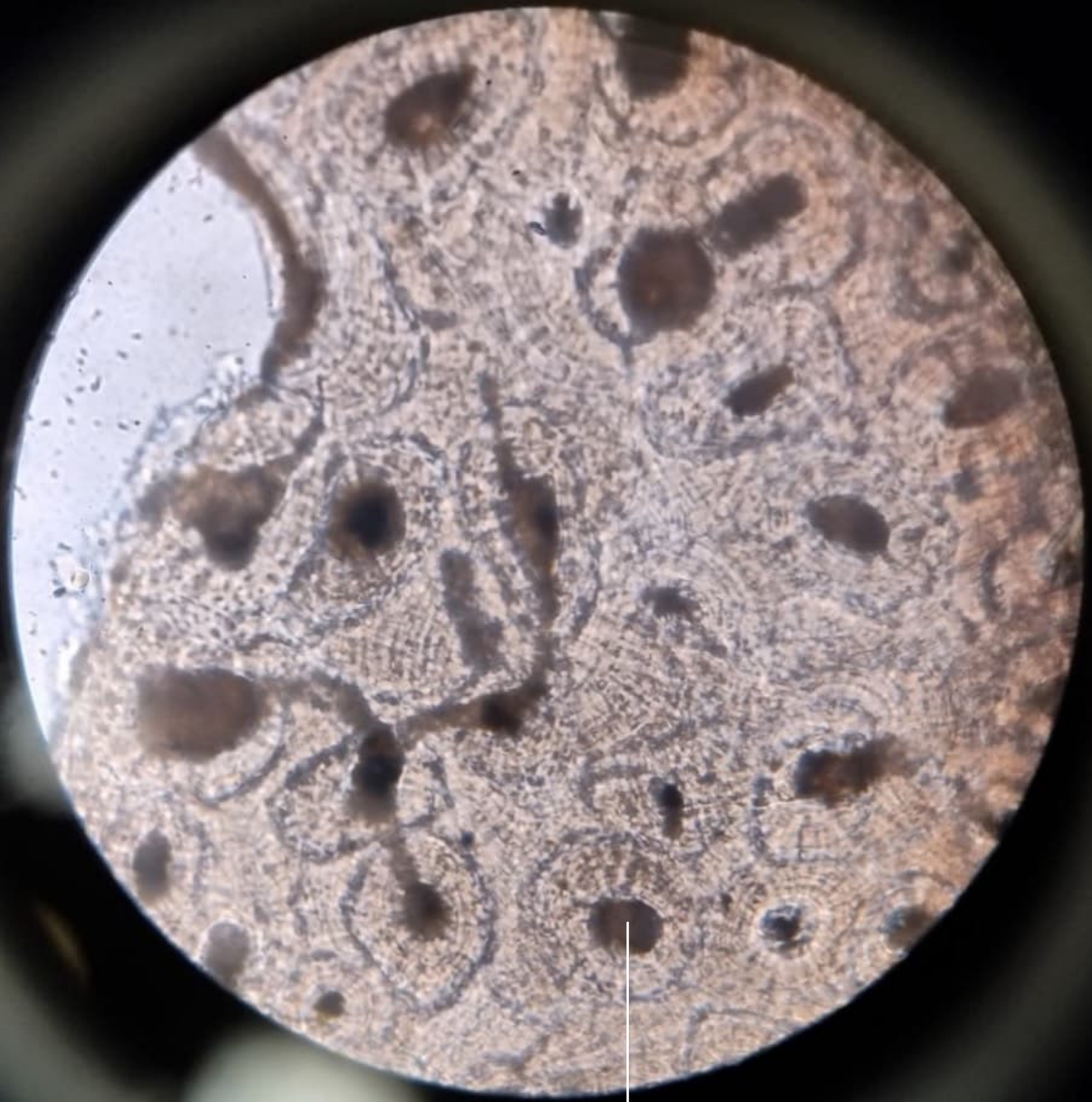
- Signet - ring shaped cells.
- Blood vessels seen.
- Cells in group with thin rim of cytoplasm

- Irregularly arranged bundles of fibres seen in wavy bundles.
- Few cells and less ground substance



- Irregularly arranged bundles of fibres.
- Nuclei of different cells seen in between fibres.





Haversian canal

Haversian system = Concentric lamellae + Lacunae with osteocytes + Haversian canal containing blood vessels and nerves

Three types of lamellae { Circumferential
Concentric
Interstitial

Canalculi radiate from lacunae

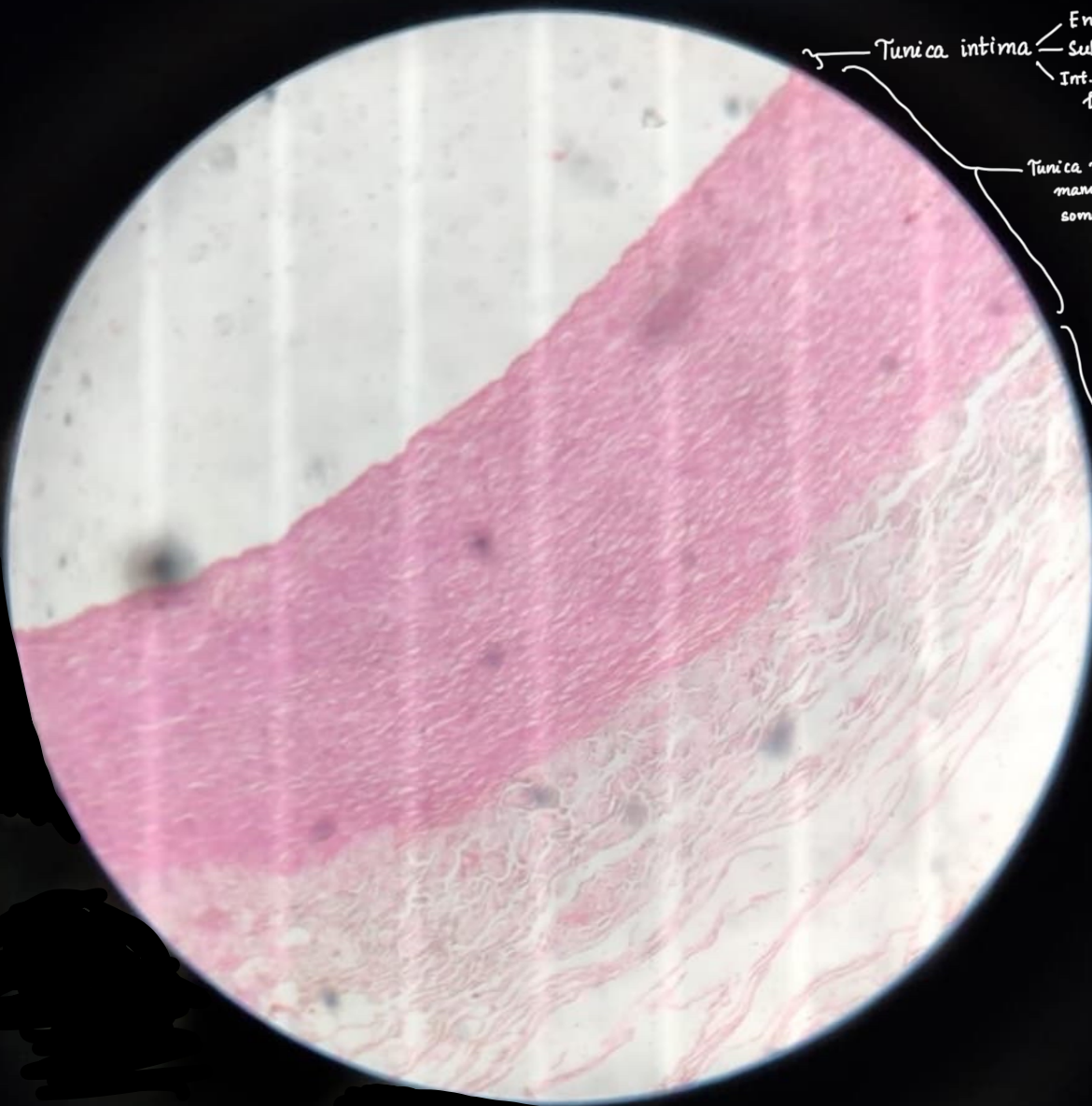
Lacunae $\bar{c}$ osteocytes.



*Volkmann's canal innerconnecting Haversian system is seen.
Lacunae with osteocyte.*

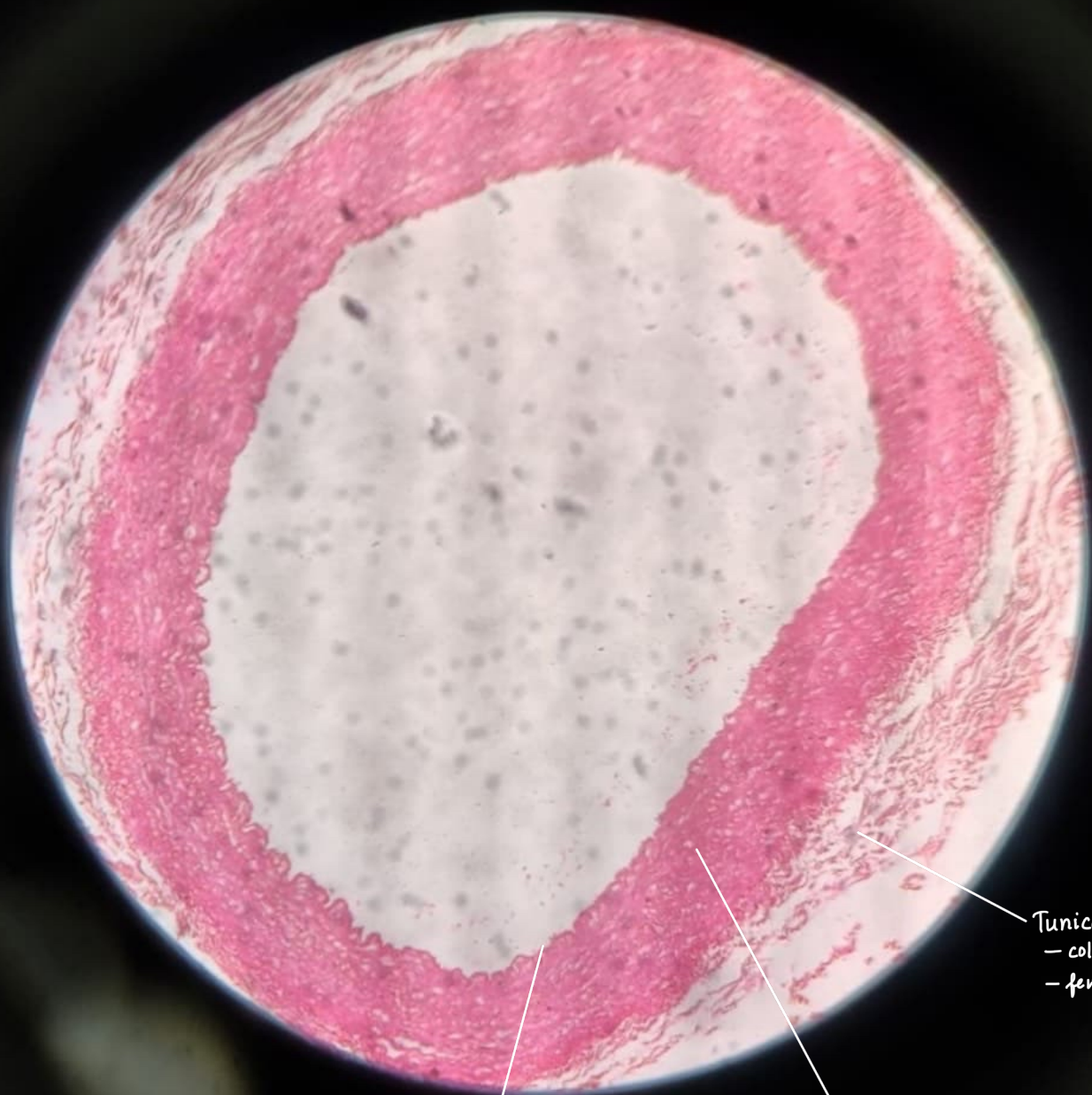
Vasa vasorum:- Small vessels supplying walls of large arteries/veins.

Large artery /
Elastic artery



- Tunica intima
 - Endothelium
 - Subendothelial connective tissue
 - Int. elastic lamina (1st layer of elastic fibers)
- Tunica media
 - many elastic fibers & some smooth muscles
- Tunica adventitia
 - collagen fibers & several elastic fibers
 - Vasa vasorum

well-developed



Tunica adventitia
- collagen fiber
- few elastic fibers

Tunica media with smooth muscles
arranged concentrically

Tunica intima

- Endothelium

- Int. elastic lamina which is thrown into wavy folds due to contraction of smooth muscle fibers

- Vein has a thinner wall and a larger lumen than the artery.
- The media is thin and contains a much larger quantity of collagen fibres than arteries. The amount of elastic tissue is less.

Tunica intima

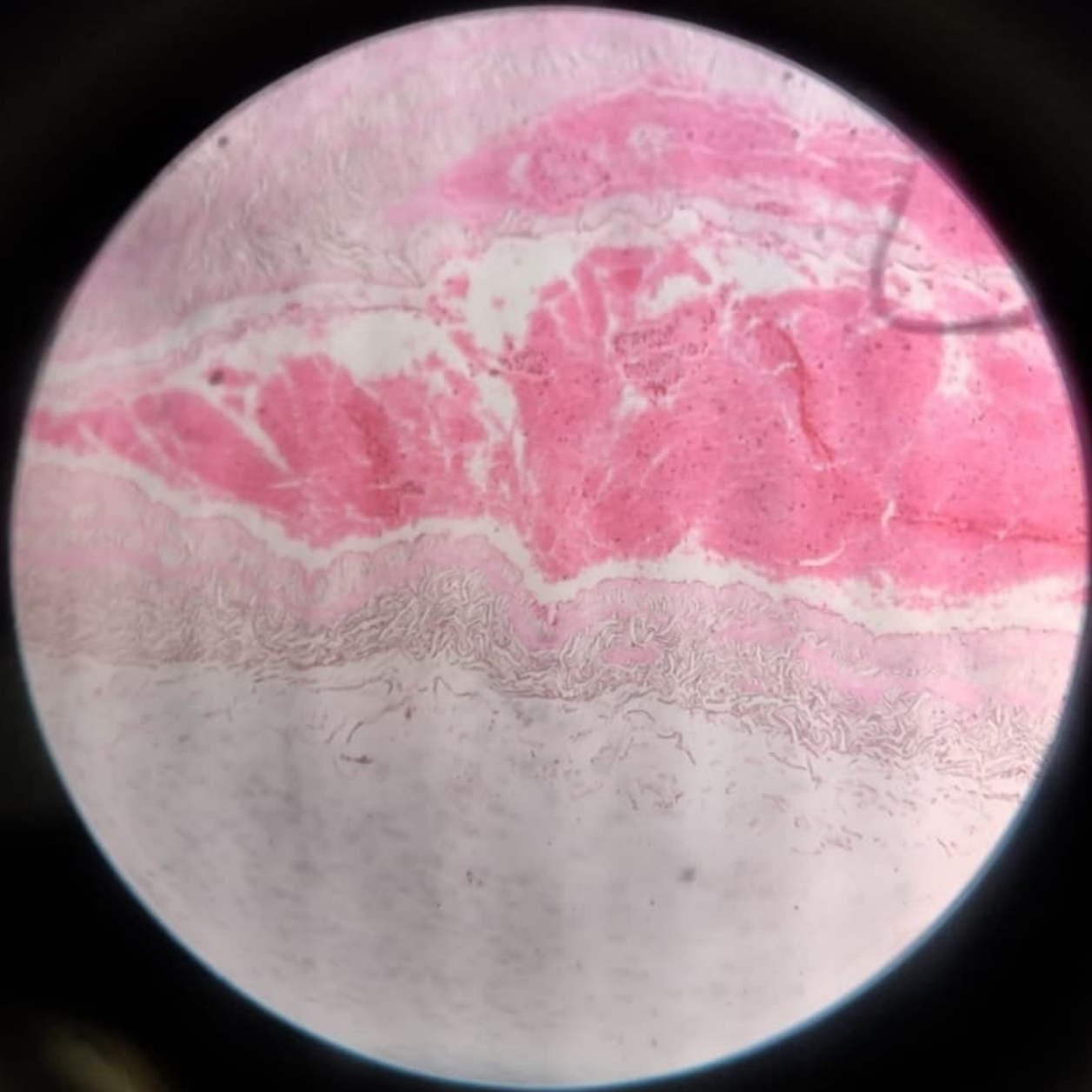
Tunica media

- thin
- larger quantity of collagen than arteries
- Amount of elastic or muscle tissue is much less.

Tunica adventitia

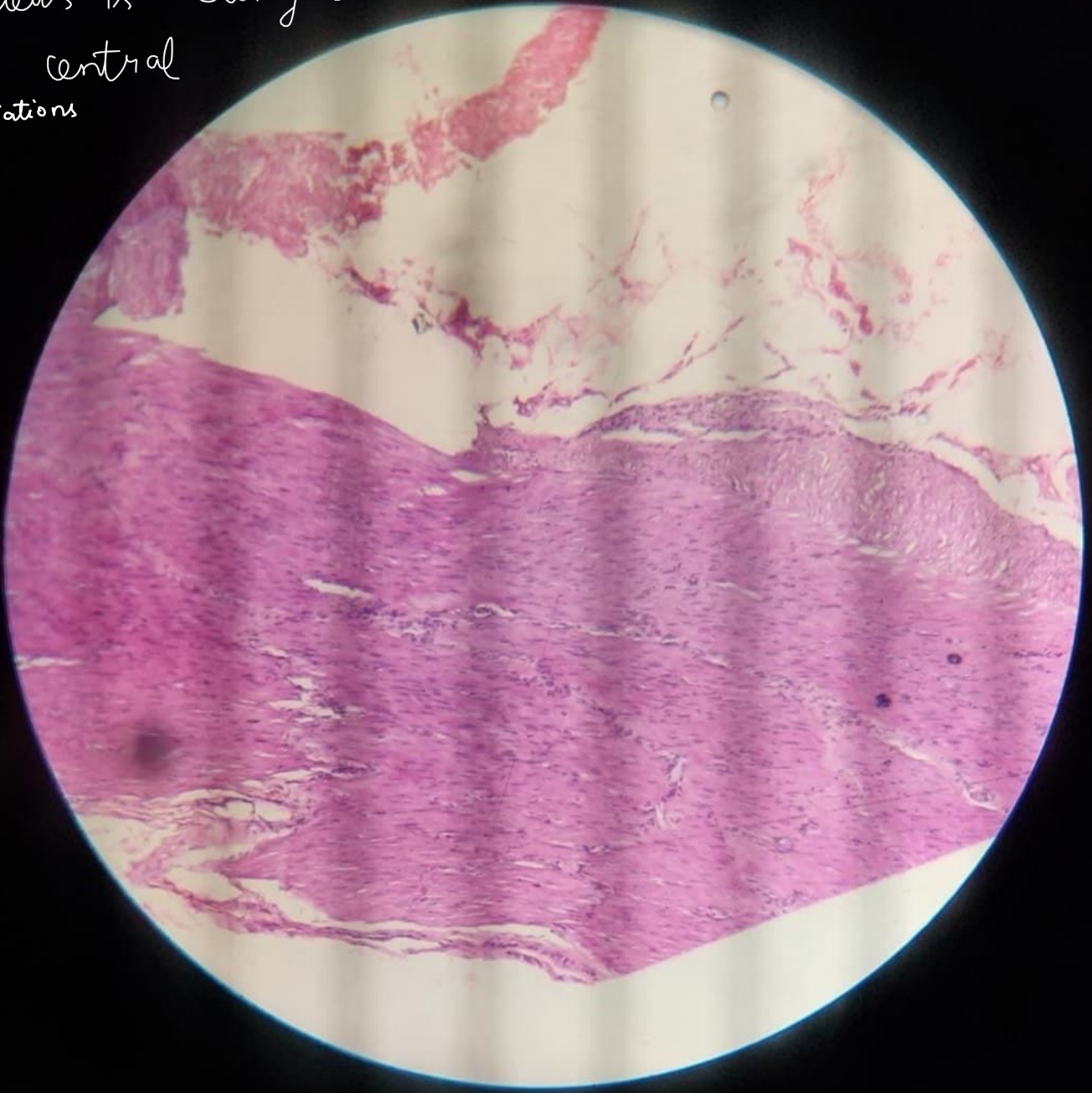
- relatively thick
- elastic and muscle fibers
- longitudinal muscle fibres





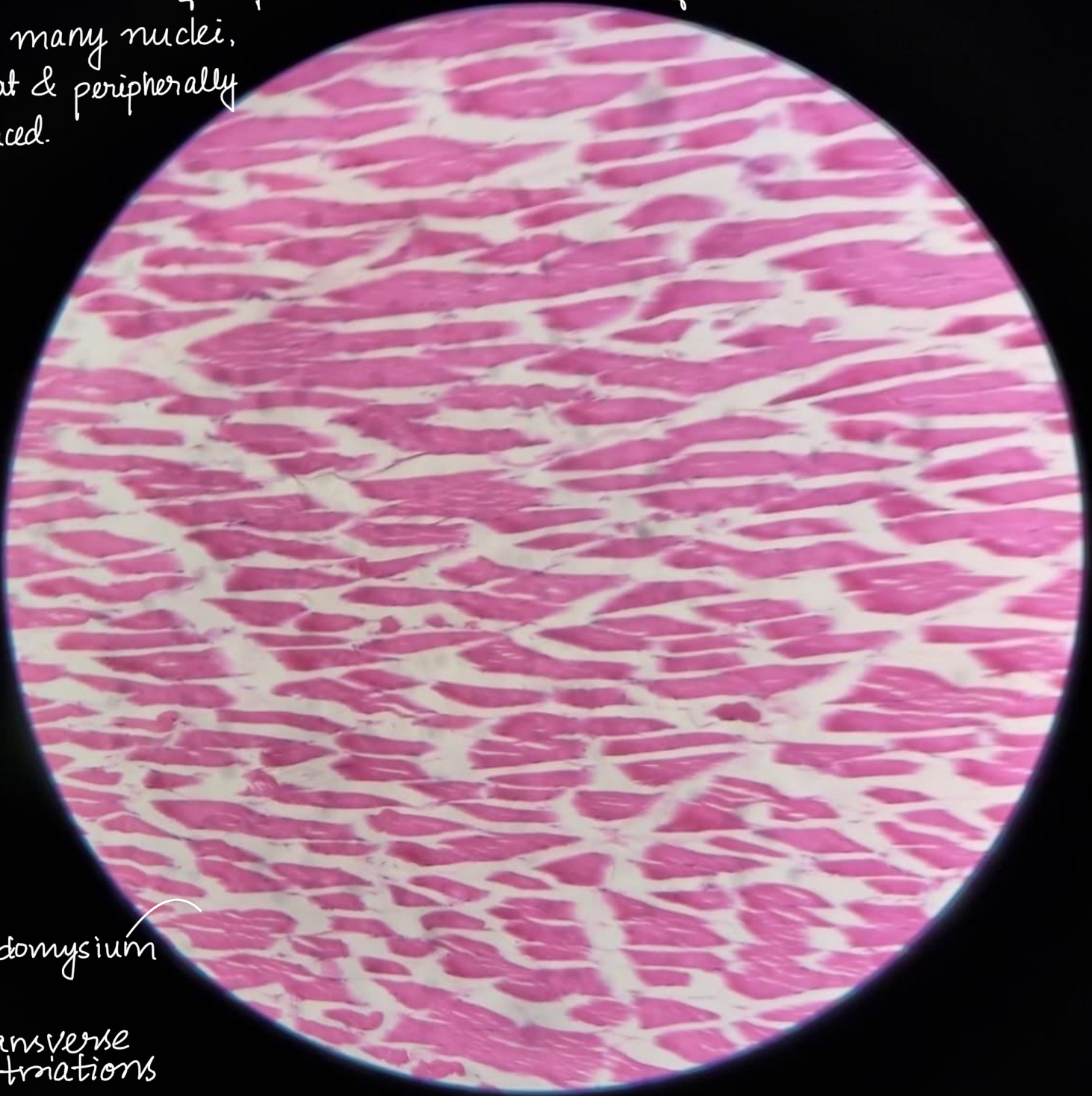
- Vasa vasorum absent
- No to very little amount of smooth muscle tissue present in tunica adventitia.

- Spindle shaped cells with tapering ends.
- Nucleus is elongated and central
- No striations



- Smooth muscles are not striated because the myofilaments are not arranged regularly along the length of the spindle-shaped cells.

Fibers are long & parallel without branching.
has many nuclei,
flat & peripherally
placed.

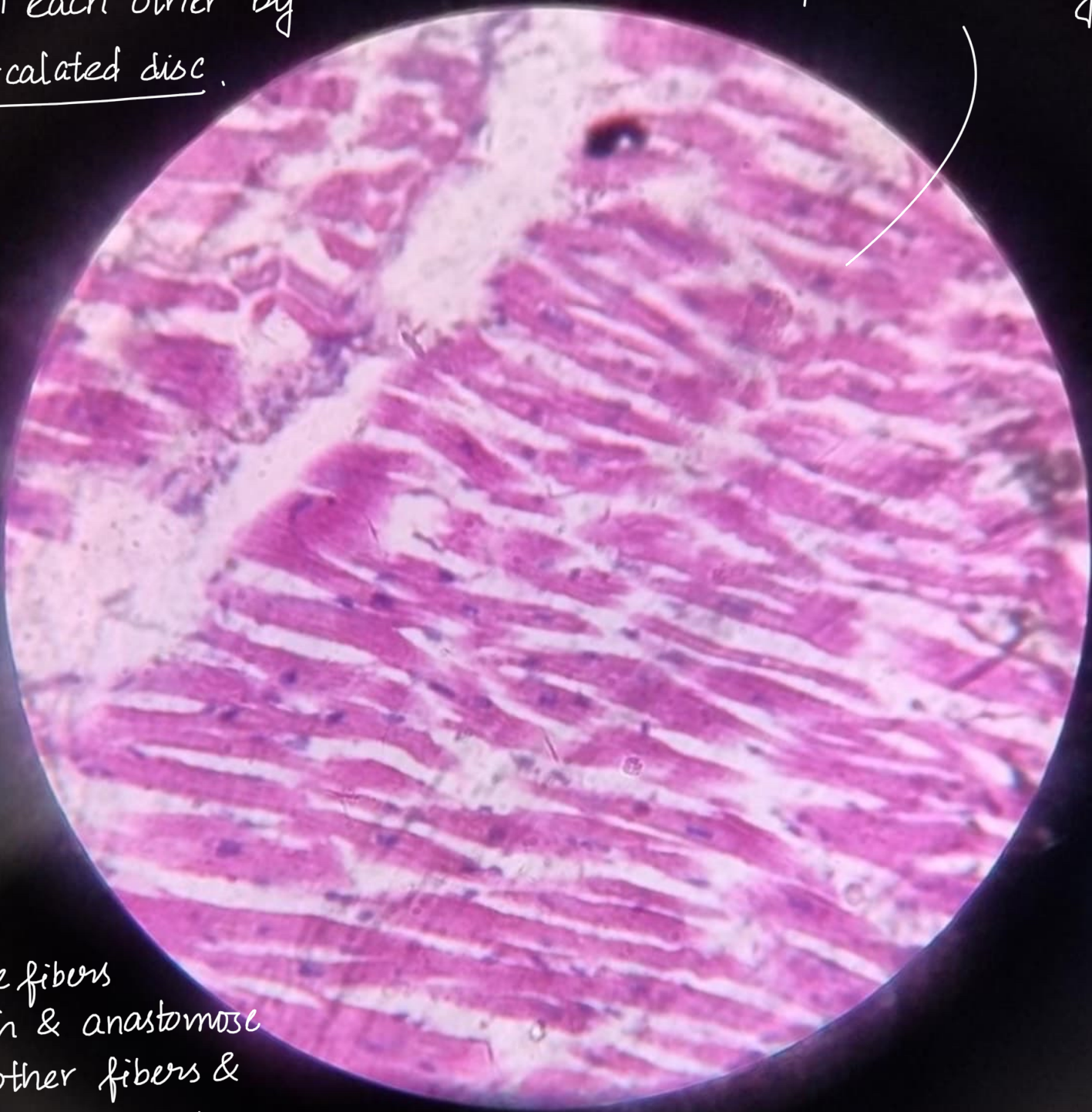


Endomysium

Transverse
striations

Adjacent cells separated
from each other by
Intercalated disc.

single nucleus
placed centrally



Muscle fibers
branch & anastomose
with other fibers &
form a network.

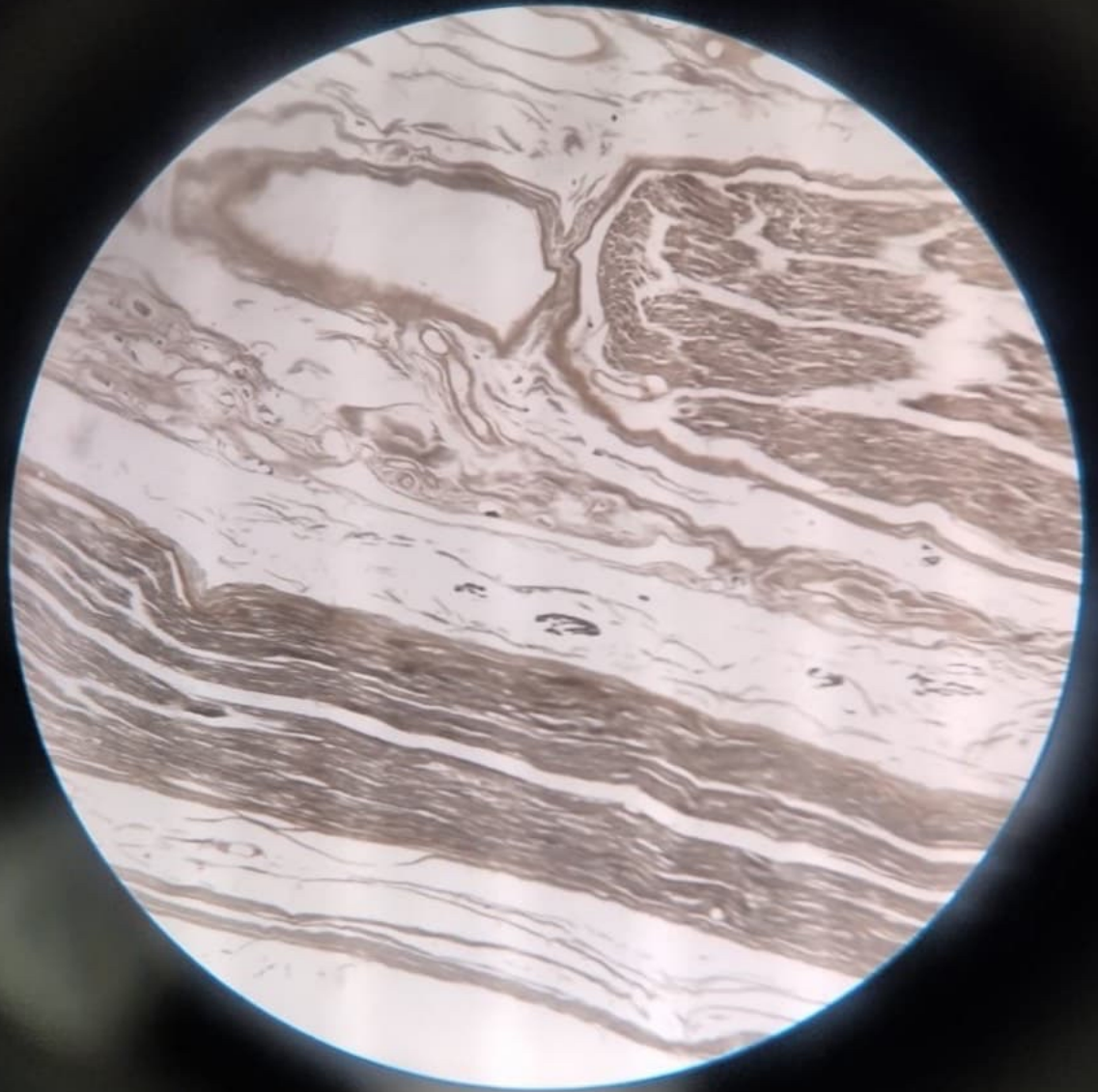
<http://www.newsworld-asia.india-64.com>

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ab Lower limb Thorax Head and neck...

Cardiac muscle

- Presence of thick black band of myelin sheath, surrounding the lightly stained axon.
- Absence of myelin sheath at nodes of Ranvier.



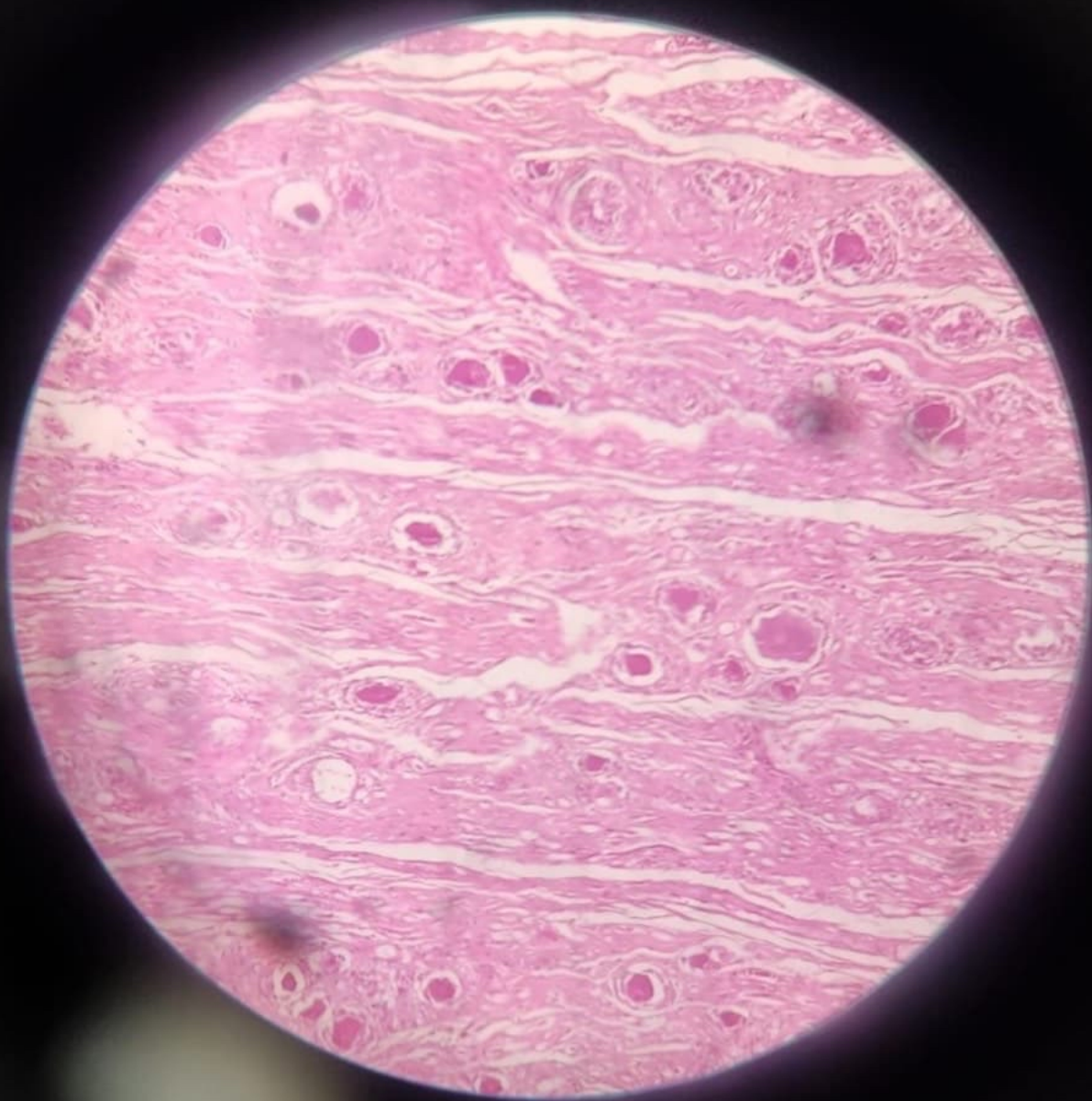
- i. Covered by meninges – dura, arachnoid, pia mater (out to in)
- ii. Central retinal artery & vein are seen.
- iii. Pial septa divides the nerves into bundles.



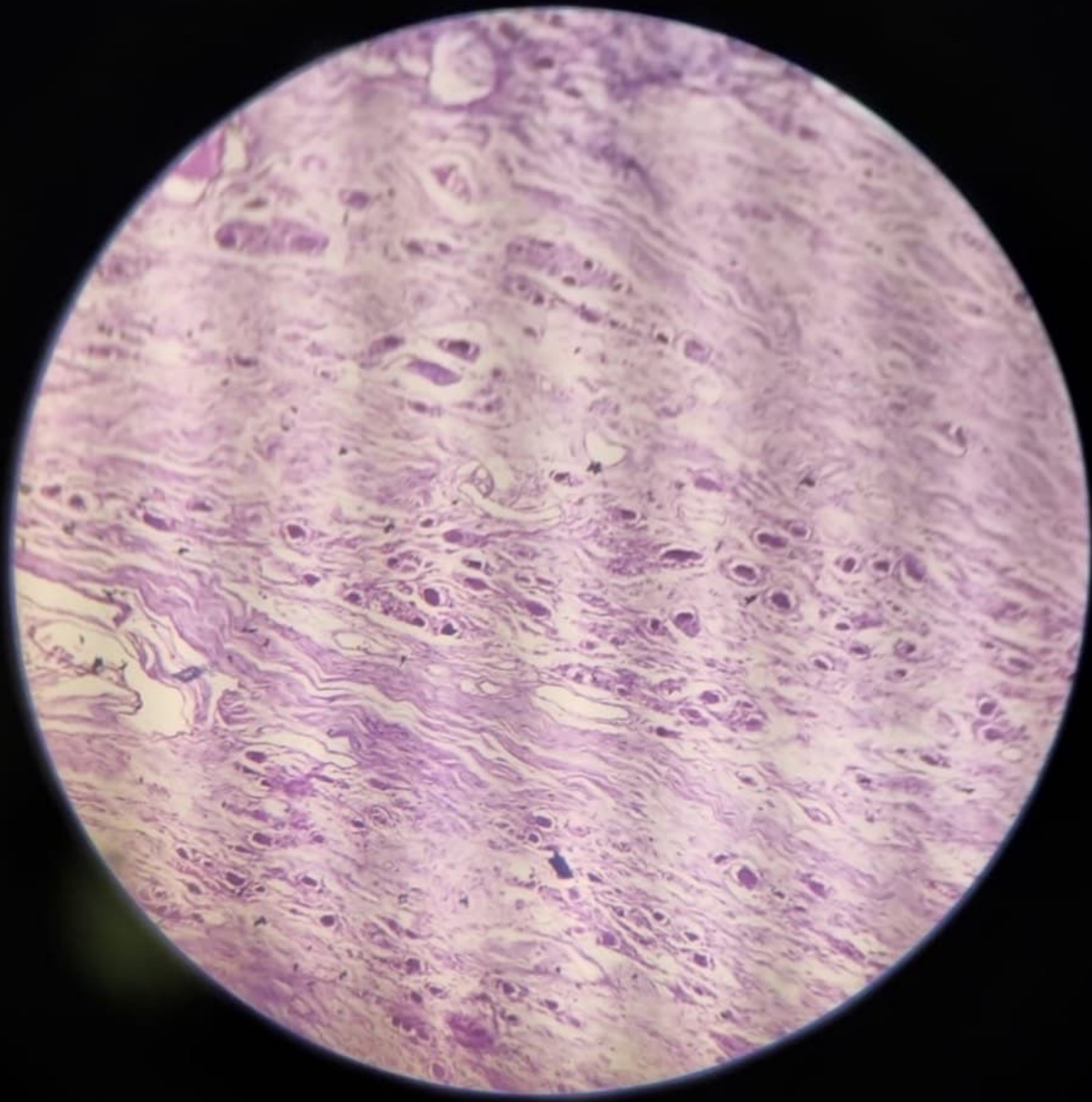
central retinal
vein & artery

pial septa

Unipolar/ Pseudounipolar neurons $\bar{c}$ centrally placed nucleus
Neurons are presented in groups b/w group of $\hat{n}$ fibers.
Prominent satellite cells are seen.

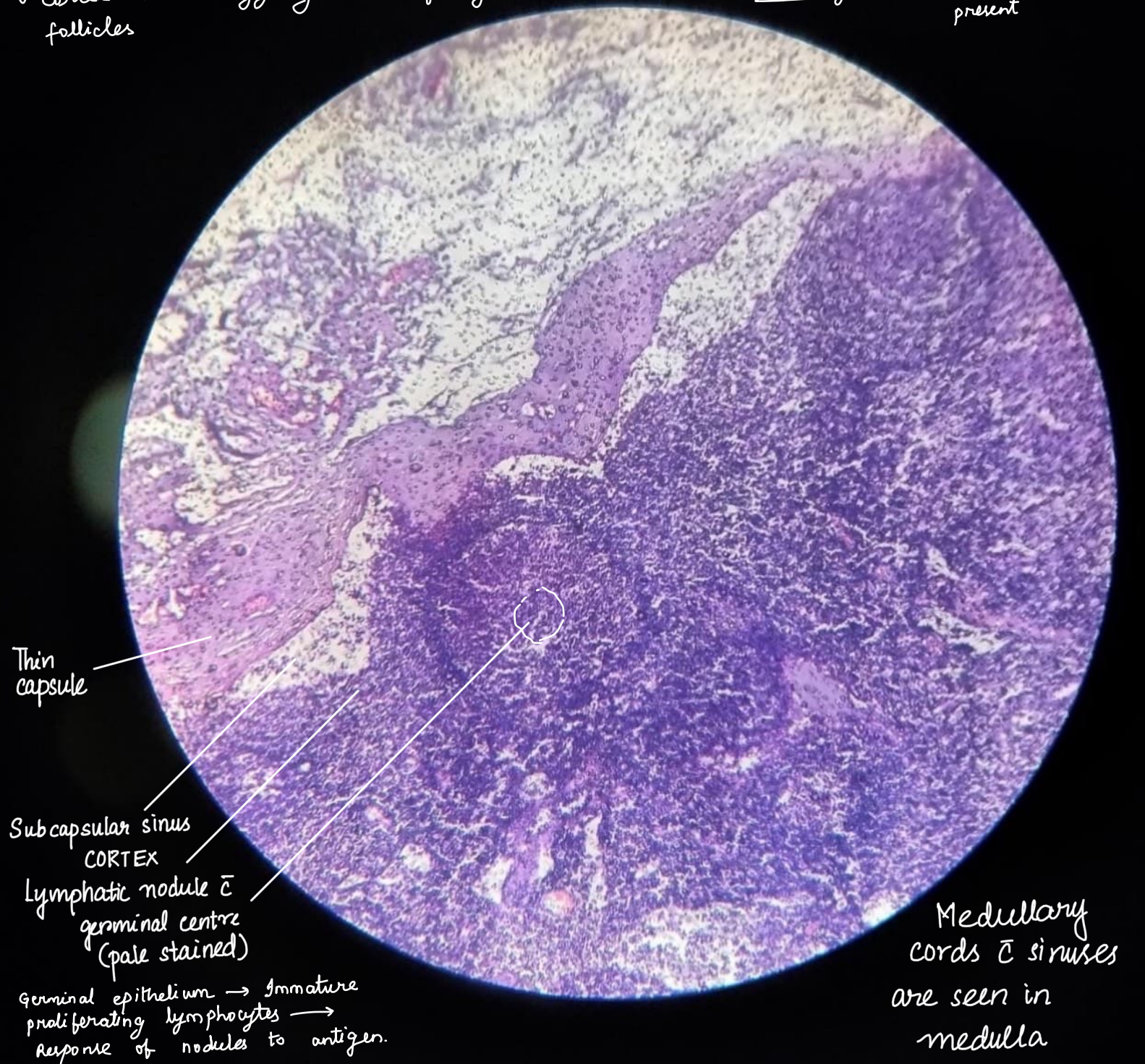


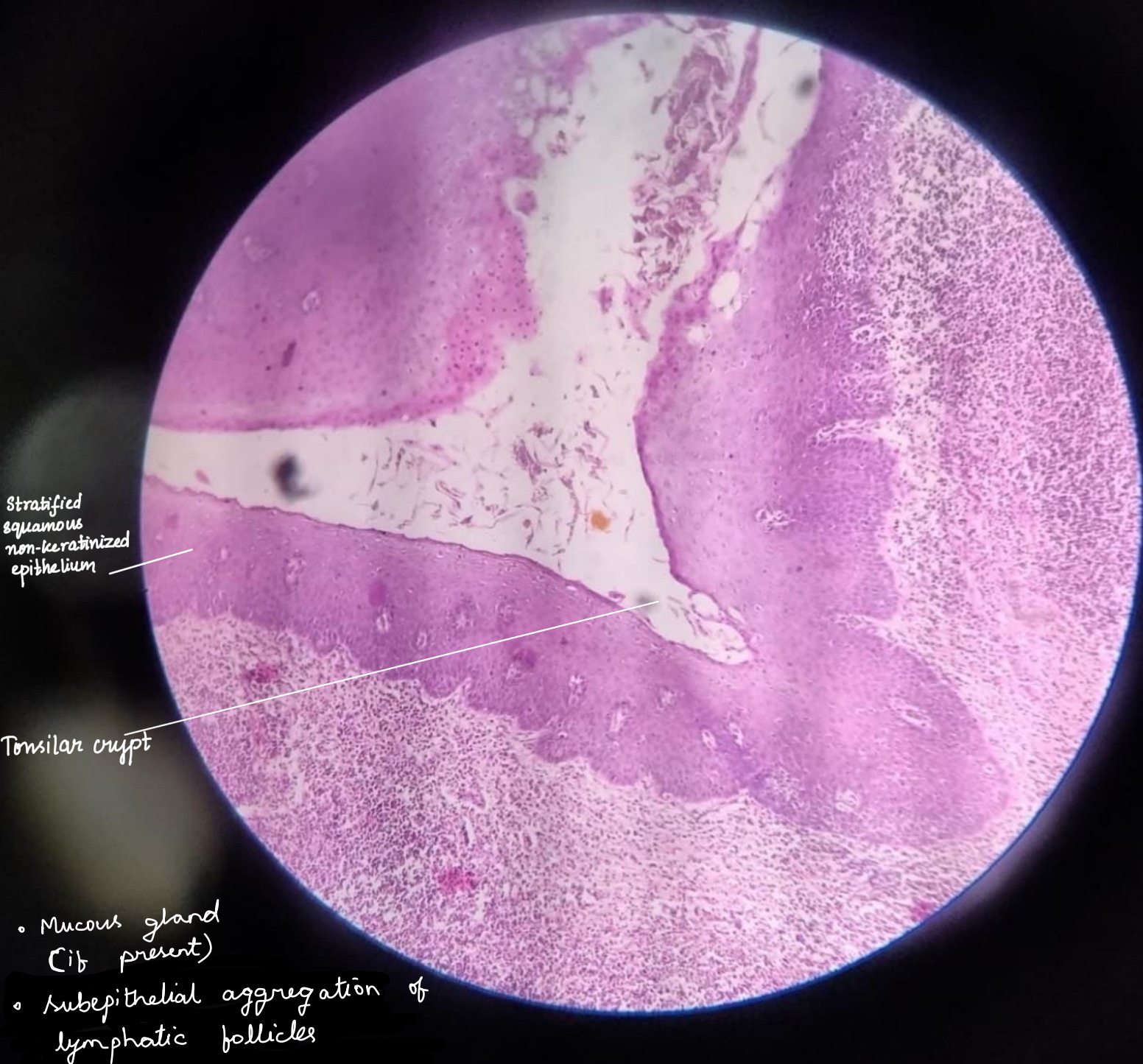
- Multipolar neurons & eccentrically placed nucleus.
- Neurons are scattered b/w nerve fibers.



- Capsule with subcapsular sinus
- Well demarcated cortex and medulla.
- Cortex with aggregation of lymphatic follicles

- Primary nodules - Aggregation of small lymphocytes
- Secondary nodules - Germinal centre present





- Presence of red pulp and white pulp.
- White pulp with eccentric nucleus.
- cords of Billroth
- Numerous trabeculae with arteriole

Capsule and trabeculae
 ↓
 Fibrous tissue
 ↓
 Abundant elastic fibres

Thick capsule & trabeculae
 extending from it into the organ



Central arteriole
 (peripherally placed in white pulp)

◦ Capsule with trabeculae

Covered by capsule & septa
extending into organs
and divides into indistinct
lobules.

◦ Hassall's corpuscle
(pink stained) in medulla

Outer dark
stained
CORTEX

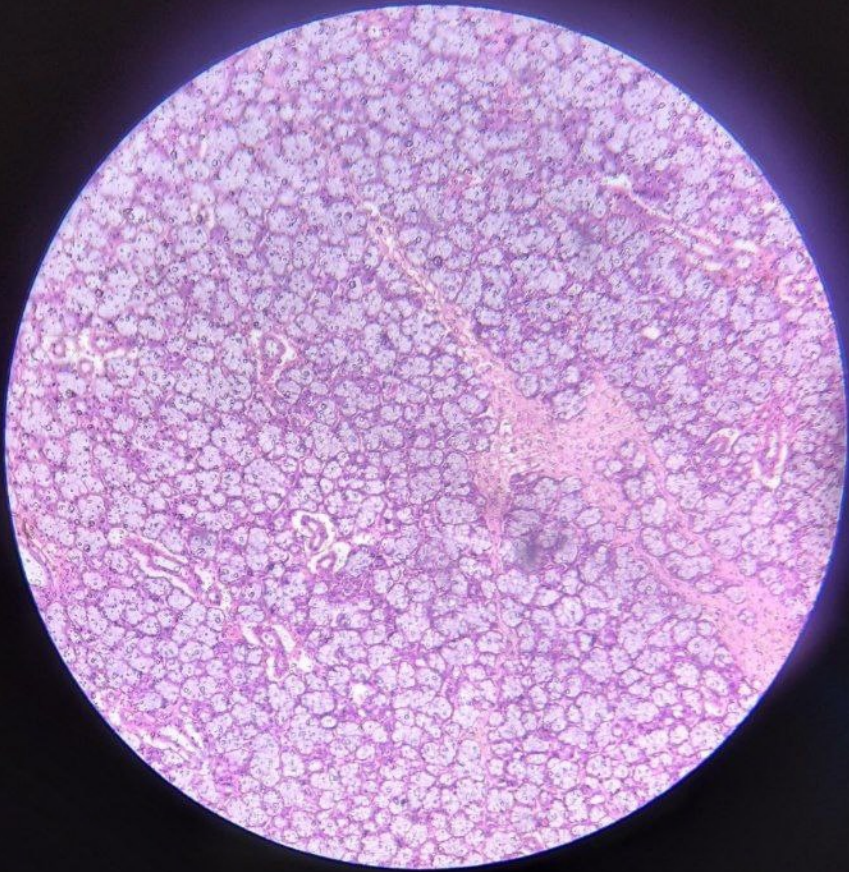
Inner lightly
stained
medulla

Trabecular vessels



(Parotid) Serous salivary Gland

- i) Mostly contain serous acini
- ii) Intercalated and striated (interlobular) ducts are seen.
- iii) Interlobular duct can be seen.
- iv) Adipocytes may be seen.



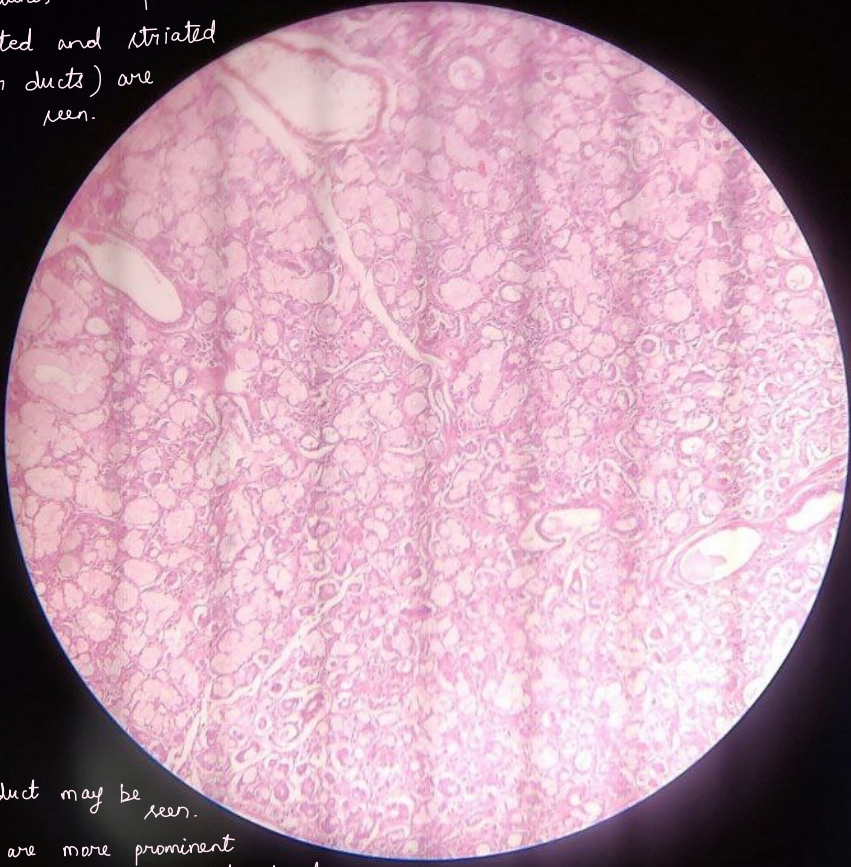
i) Predominantly mucous acini are present with few serous acini

iii) It also contains adipocytes.

ii) Intercalated and interlobular duct can be seen.

^(Sublingual) Mucous salivary Gland

- i) Predominantly serous with few mucous acini.
- ii) Serous demilunes are present.
- iii) Intercalated and striated (intralobular ducts) are seen.

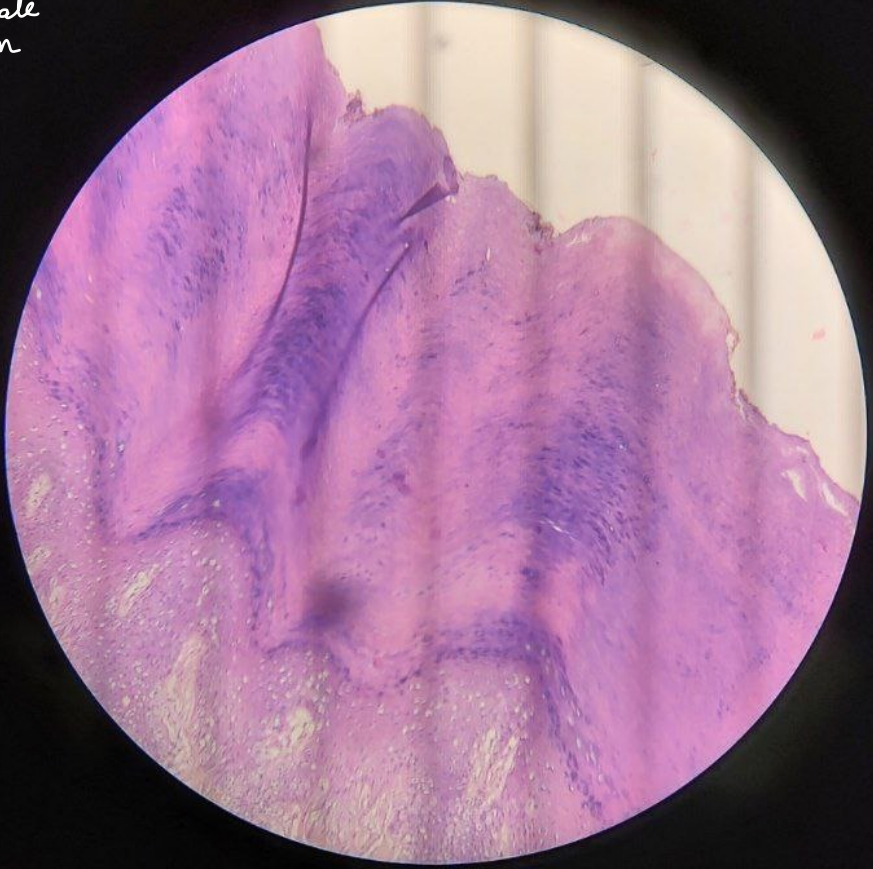


- iv) Interlobular duct may be seen.
- v) Striated ducts are more prominent than those in parotid gland.

(Submandibular) Mixed Salivary Gland

Non-hairy / Thick skin

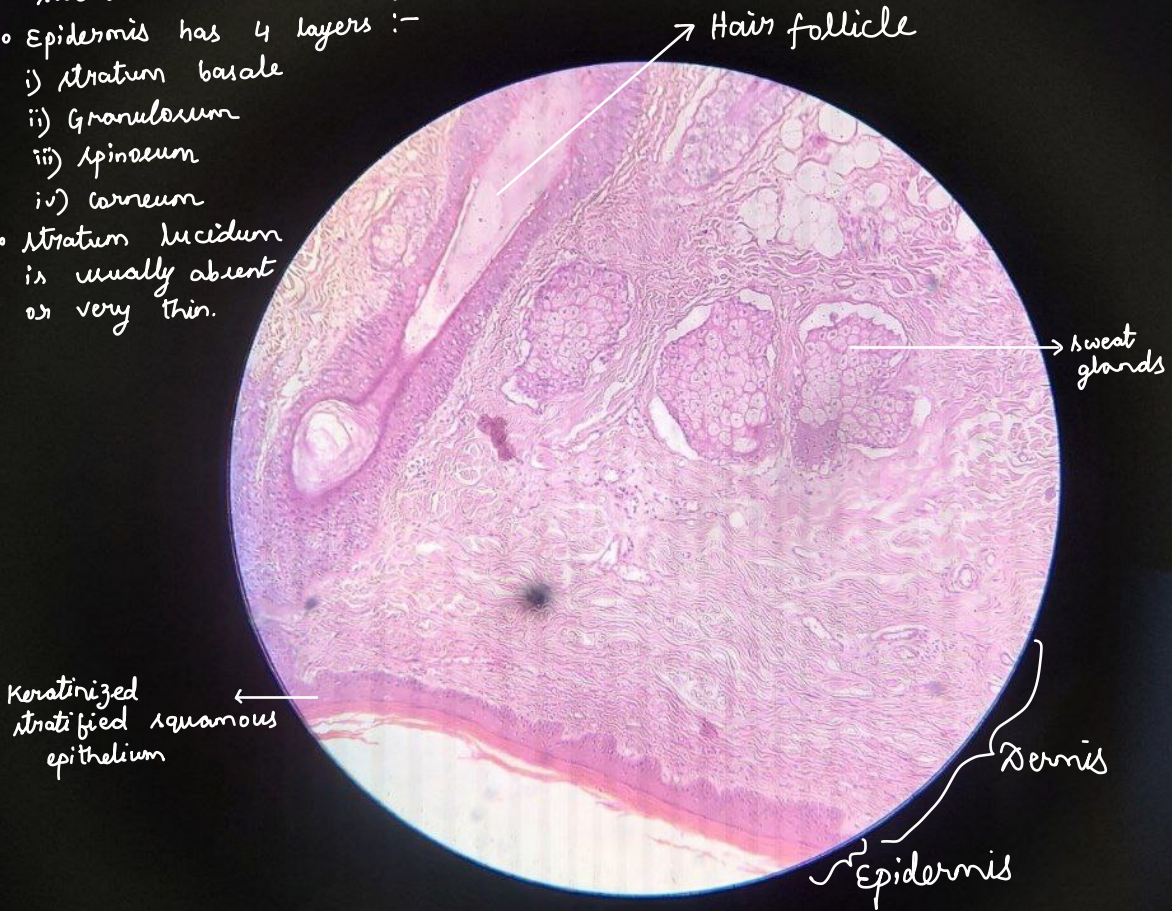
- Skin is made up of epidermis and dermis.
- Dermis is thinner and does not contain hairs, sebaceous gland or sweat gland.
- Epidermis has five layers:-
 - i) Stratum basale
 - ii) Granulosum
 - iii) Spinosum
 - iv) Lucidum
 - v) Corneum



Thick skin

- Thin skin (hairy skin) is made of dermis and epidermis.
- Dermis contains hairs, arrector pili, sweat and sebaceous glands.
- Epidermis has 4 layers :-
 - i) stratum basale
 - ii) Granulosum
 - iii) spinosum
 - iv) corneum
- Stratum lucidum is usually absent or very thin.

• Epidermis is Keratinized stratified squamous epithelium.

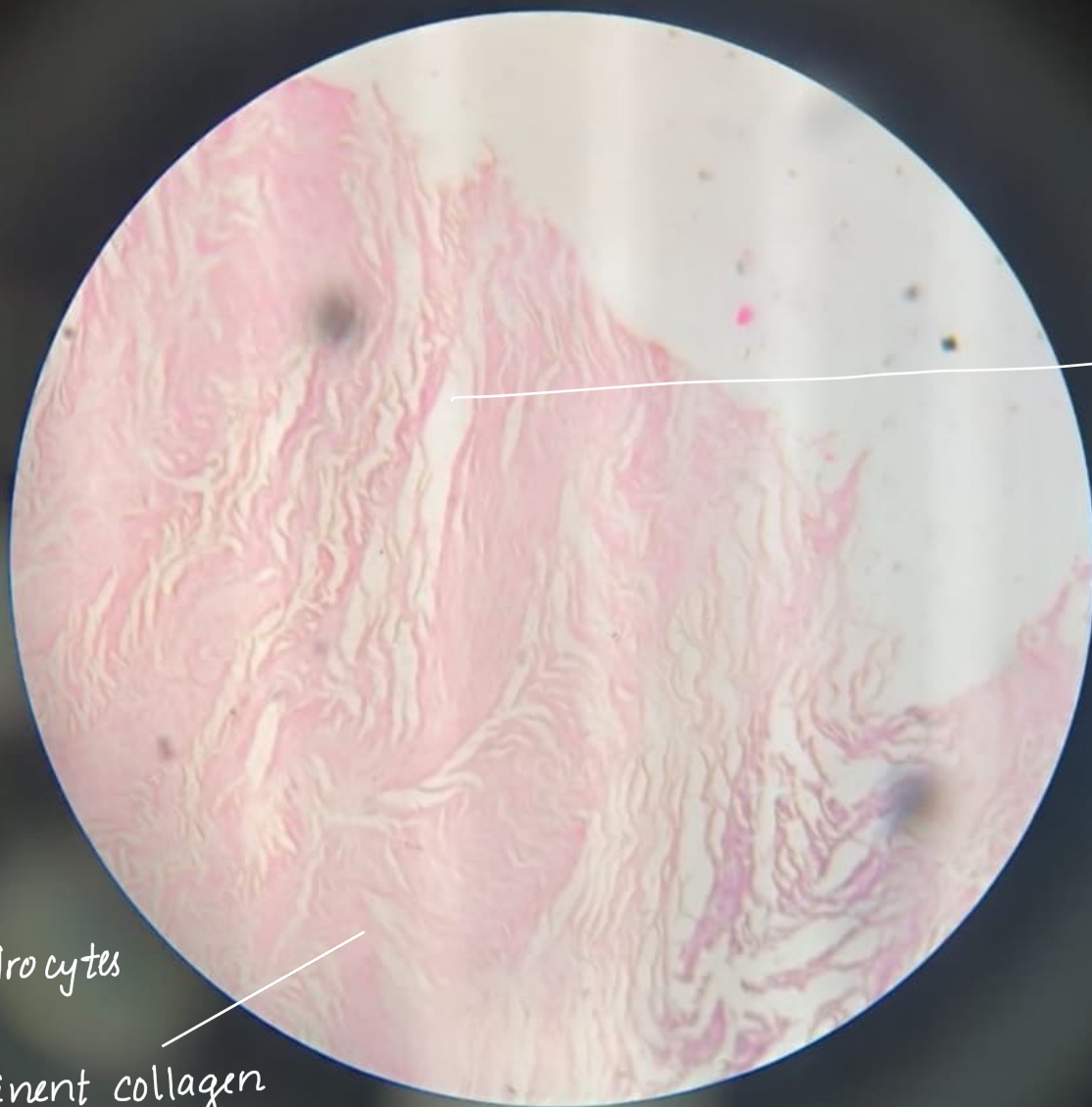


Thin skin



Thin skin again

Own



→ Cartilage matrix.

Row of chondrocytes

Prominent collagen fibers

No perichondrium

- Perichondrium absent.
- ⊕ of prominent collagen fibres arranged in bundles with rows of chondrocytes intervening b/w the bundles
- eg. - Intervertebral disc, menisci of knee joint.

Perichondrium

Outer fibrous
Inner cellular



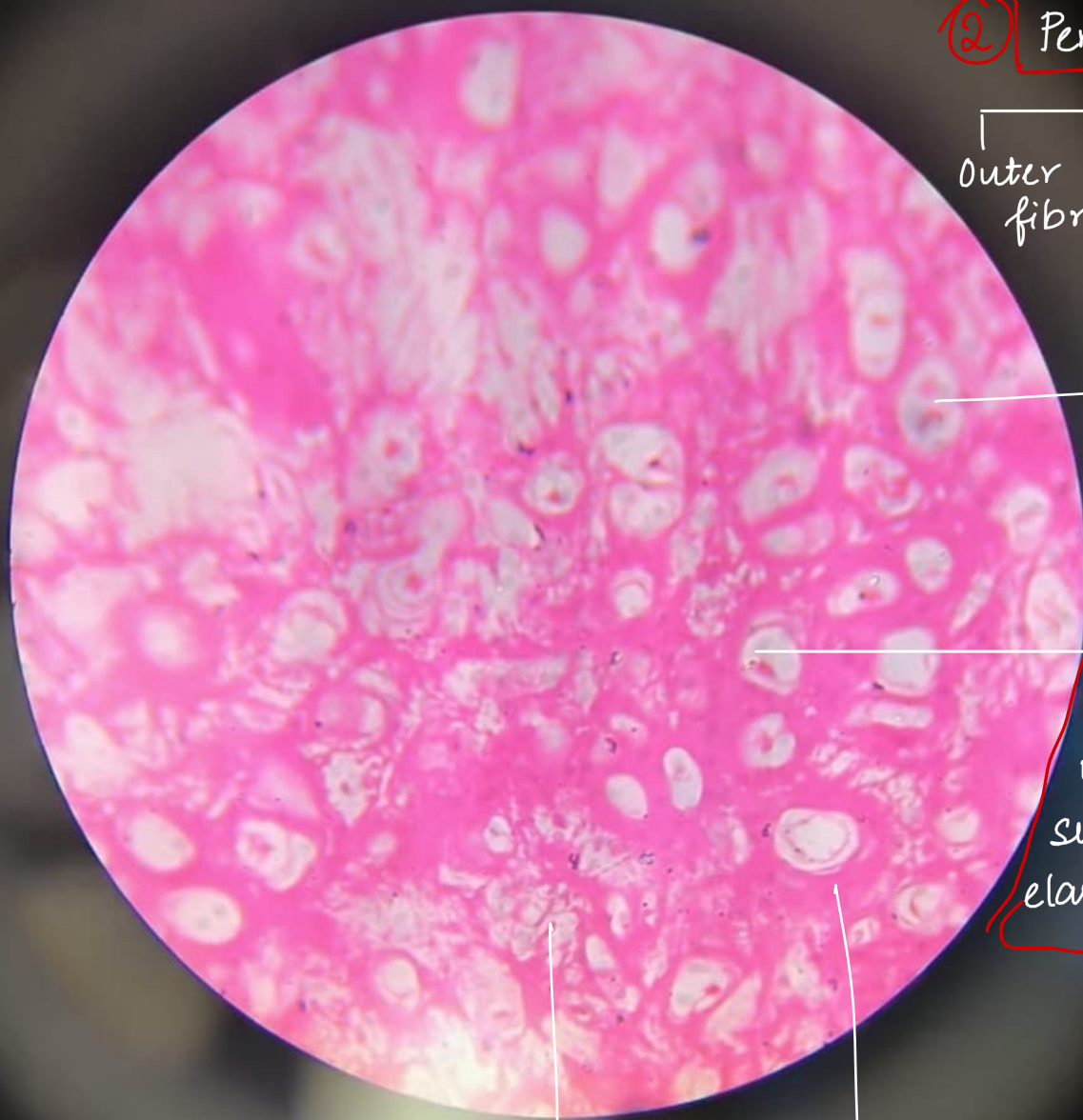
Territorial matrix / lacunar capsule.

Interterritorial matrix.

Isogenous group of chondrocytes — cell nest in lacunae. (2)

Homogenous basophilic matrix separating the chondrocytes (1)

• eg. — Tracheal rings, large and small bronchi.



② Perichondrium

Outer
fibrous

Inner
cellular

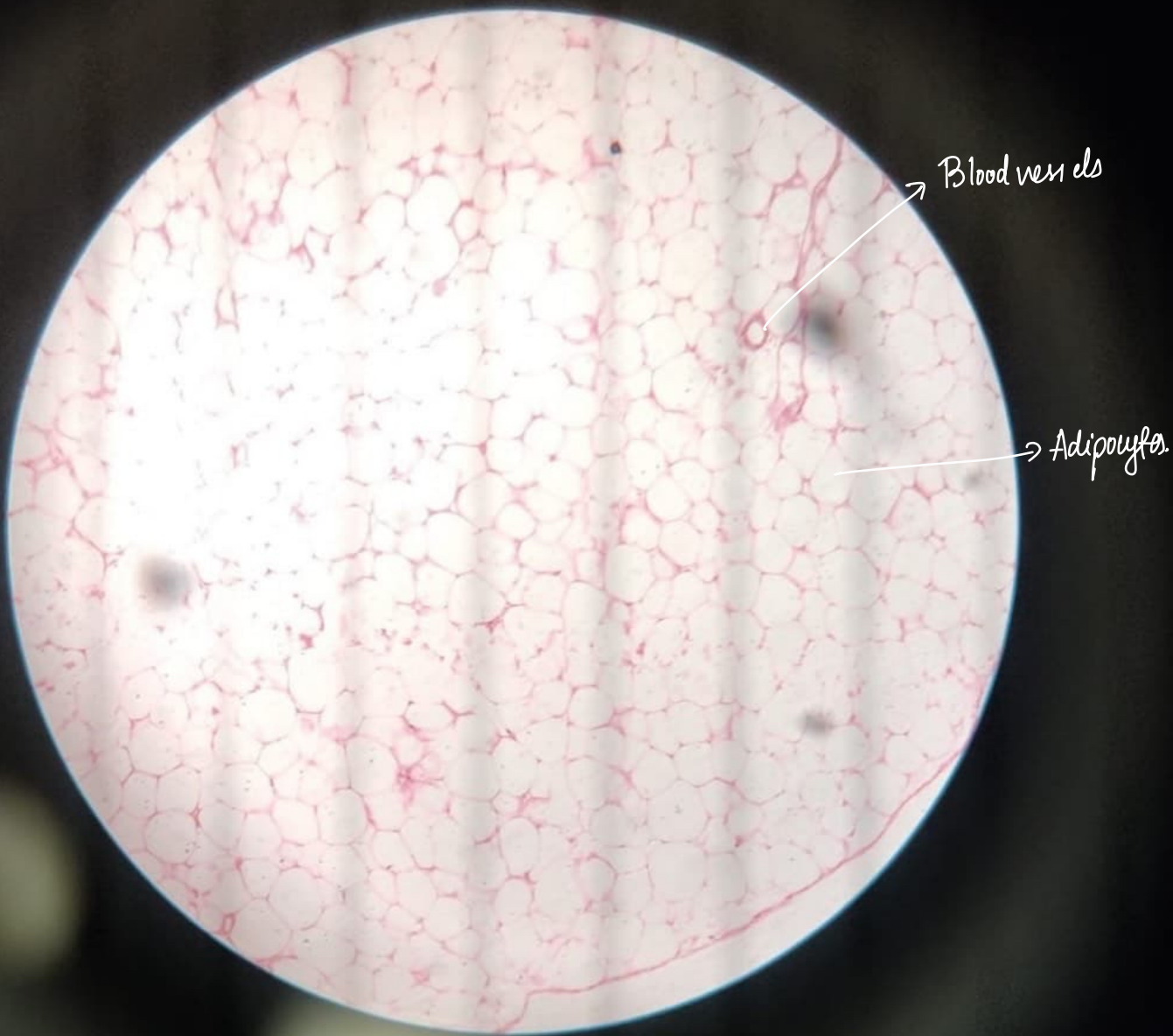
lacunae with
chondrocytes.

①
Single
chondrocyte
within lacunae
surrounded by
elastic fibers

Elastic fibres.

Cartilage matrix.

- eg. - Epiglottis, pinna and medial part of auditory tube.



- Signet - ring shaped cells.
- Blood vessels seen.
- Cells in group with thin rim of cytoplasm (pink border).
- Flat nucleus lies to one side (eccentric)
- eg. - Under skin
- Visceral fat

- ✓ Irregularly arranged bundles of collagen fibres. (wavy bundles)
- ~~Collagen fibres arranged parallel to each other.~~
- ✓ Ground substance less in amount
- Fibres more in amount.
- ex. - Dermis, sclera, periosteum, adventitia of blood vessels.



- Collagen fibres loosely arranged which enclose spaces filled with abundant ground substance and interstitial fluid.
- Numerous fibroblasts and macrophages ⊕ along with other types of conn. tissue cells.
- eg. - Endomysium
lamina propria
of GIT.



T.S of long Bone.

Circumferential lamellae.

Interstitial lamellae.

Volkman's Canal.

Cement line.

Haversian canal

Concentric lamellae.

- ① Haversian system = Concentric lamellae + Lacunae with osteocytes + Haversian canal containing blood vessels and nerves
(osteon)
- ③ Three types of lamellae
 - Circumferential
 - Concentric
 - Interstitial

Canalculi radiate from lacunae
Lacunae $\bar{c}$ osteocytes.
- ② Volkman's canal connecting adjacent Haversian canal may be seen.

L.S of compact bone.

Horizontal canal
↓
Volkmann's canal.



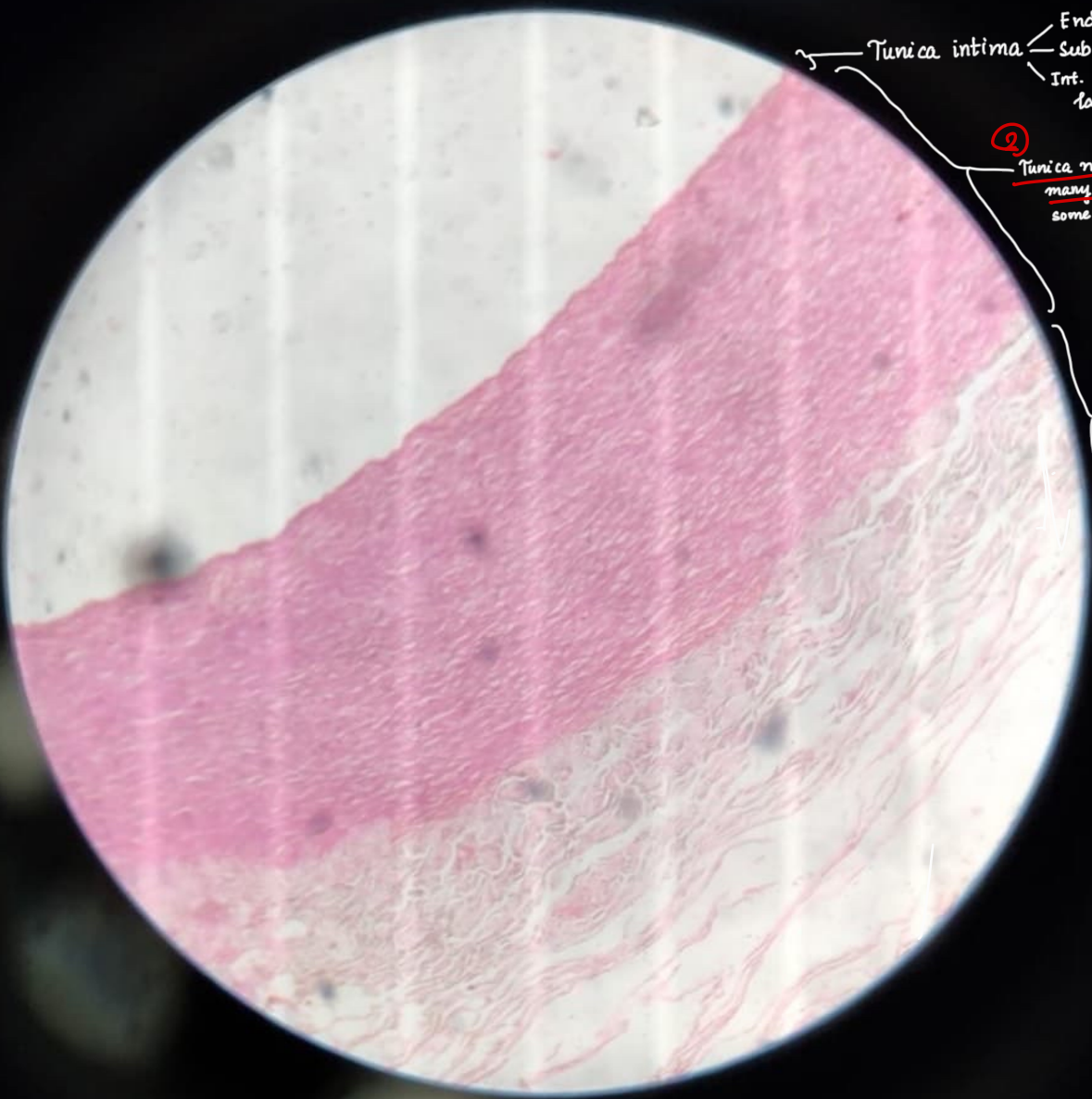
Volkman's canal.

→ Haversian canal.

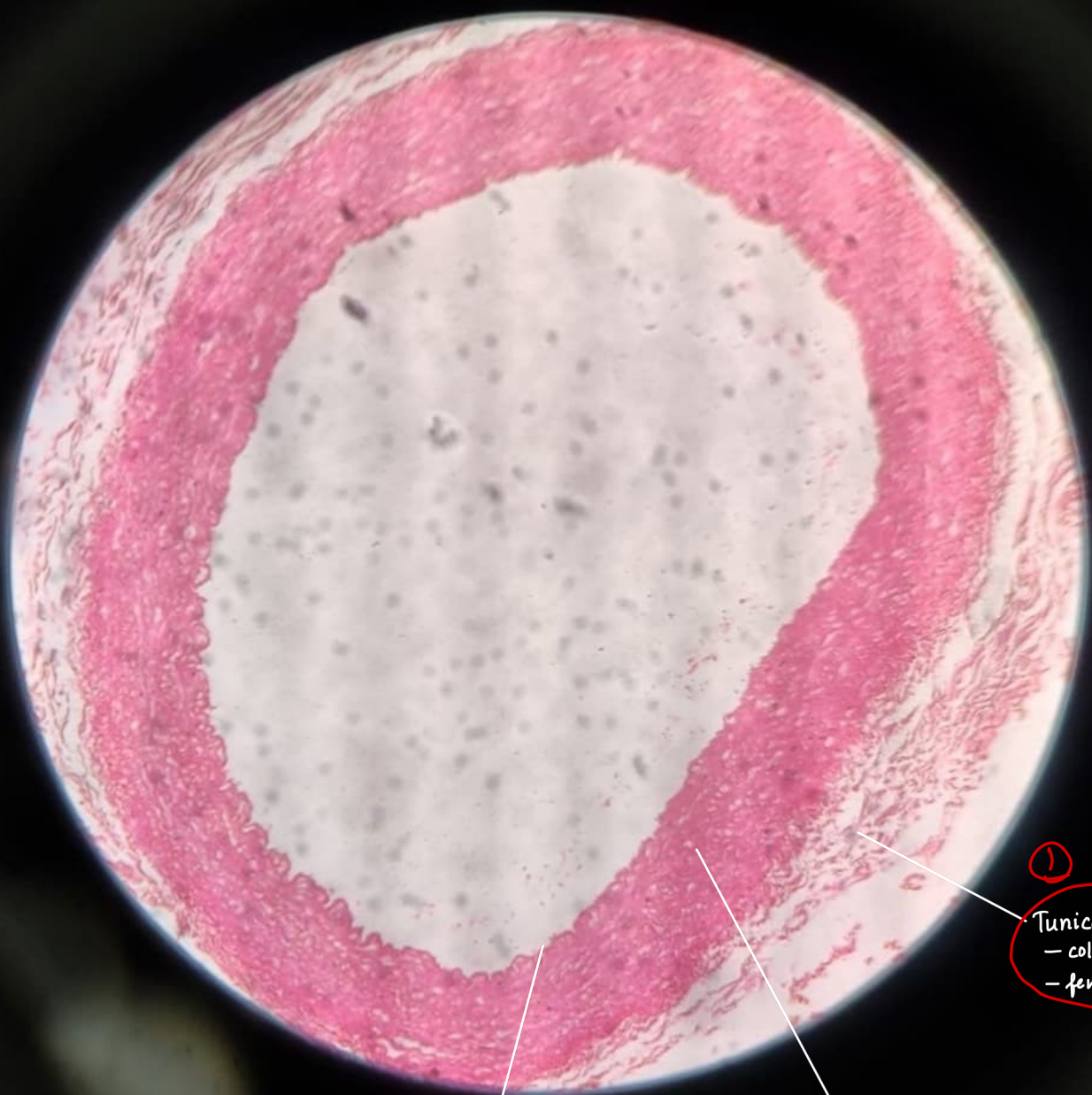
→ Cement line.

- (horizontal)
- ① Volkmann's canal, inner connecting Haversian system is seen.
 - ② Lacunae with osteocyte.

Large artery /
Elastic artery



- Tunica intima
 - Endothelium
 - Subendothelial connective tissue
 - Int. elastic lamina (1st layer of elastic fibers)
- ② Tunica media
 - many elastic fibers & some smooth muscles
- ① Tunica adventitia
 - collagen fibers & several elastic fibers
 - Vasa vasorum



①
Tunica adventitia
- collagen fiber
- few elastic fibers

② Tunica media with smooth muscles

Tunica intima

- Endothelium

- Int. elastic lamina which is thrown into wavy folds due to contraction of smooth muscle fibers

Tunica intima

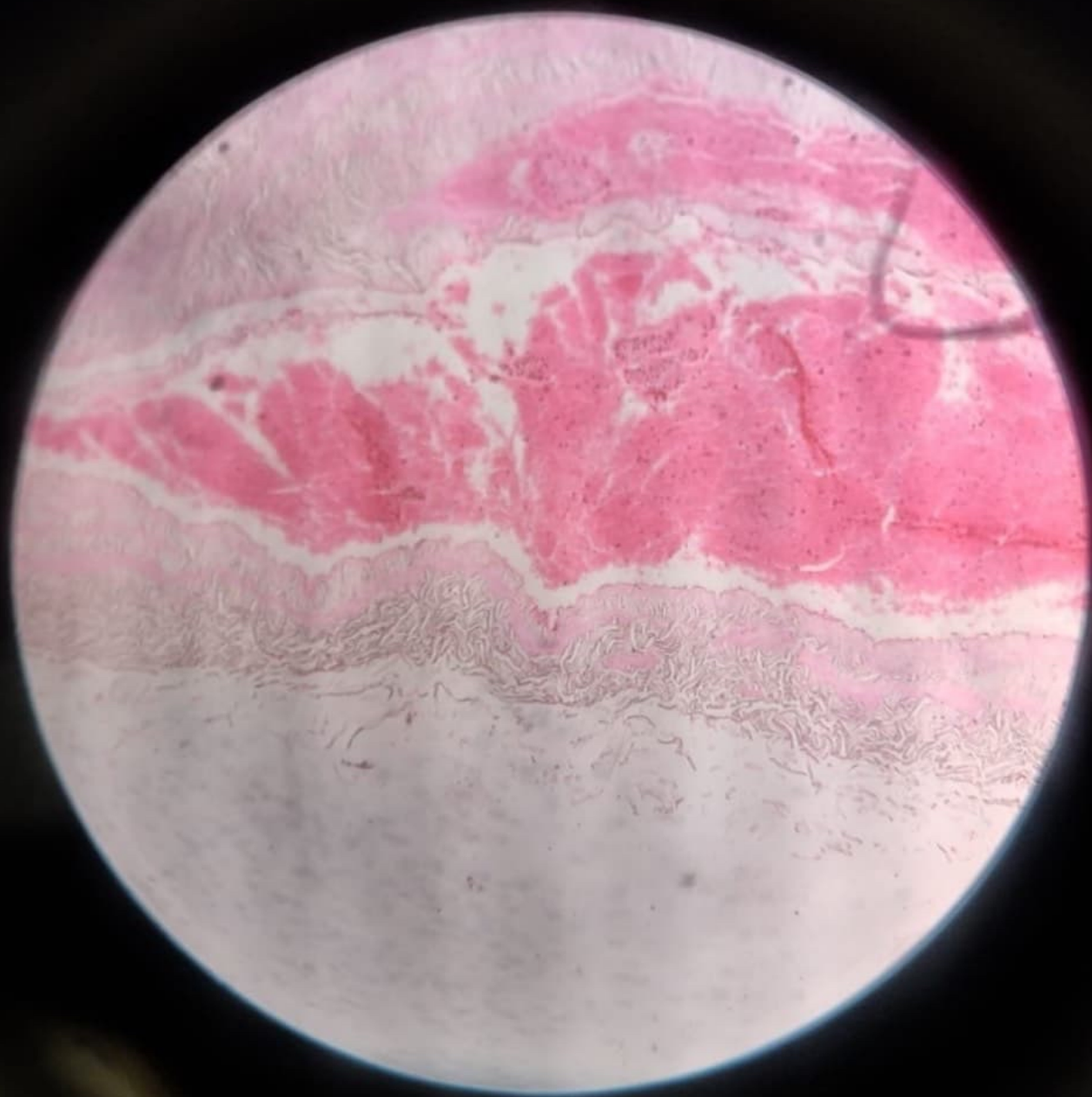
Tunica media

- thin
- larger quantity of collagen than arteries
- Amount of elastic or muscle tissue is much less.

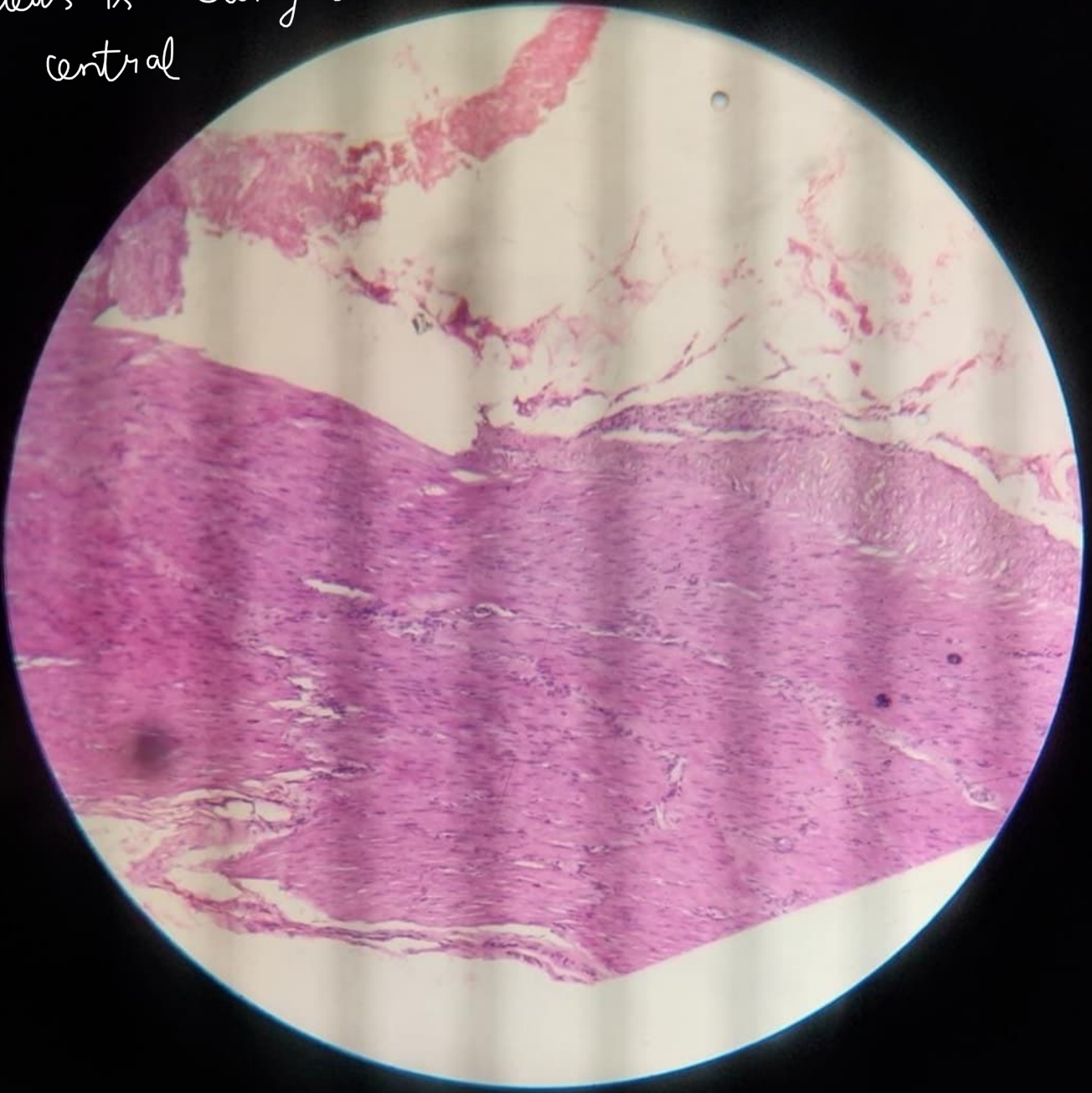
Tunica adventitia

- relatively thick
- elastic and muscle fibers

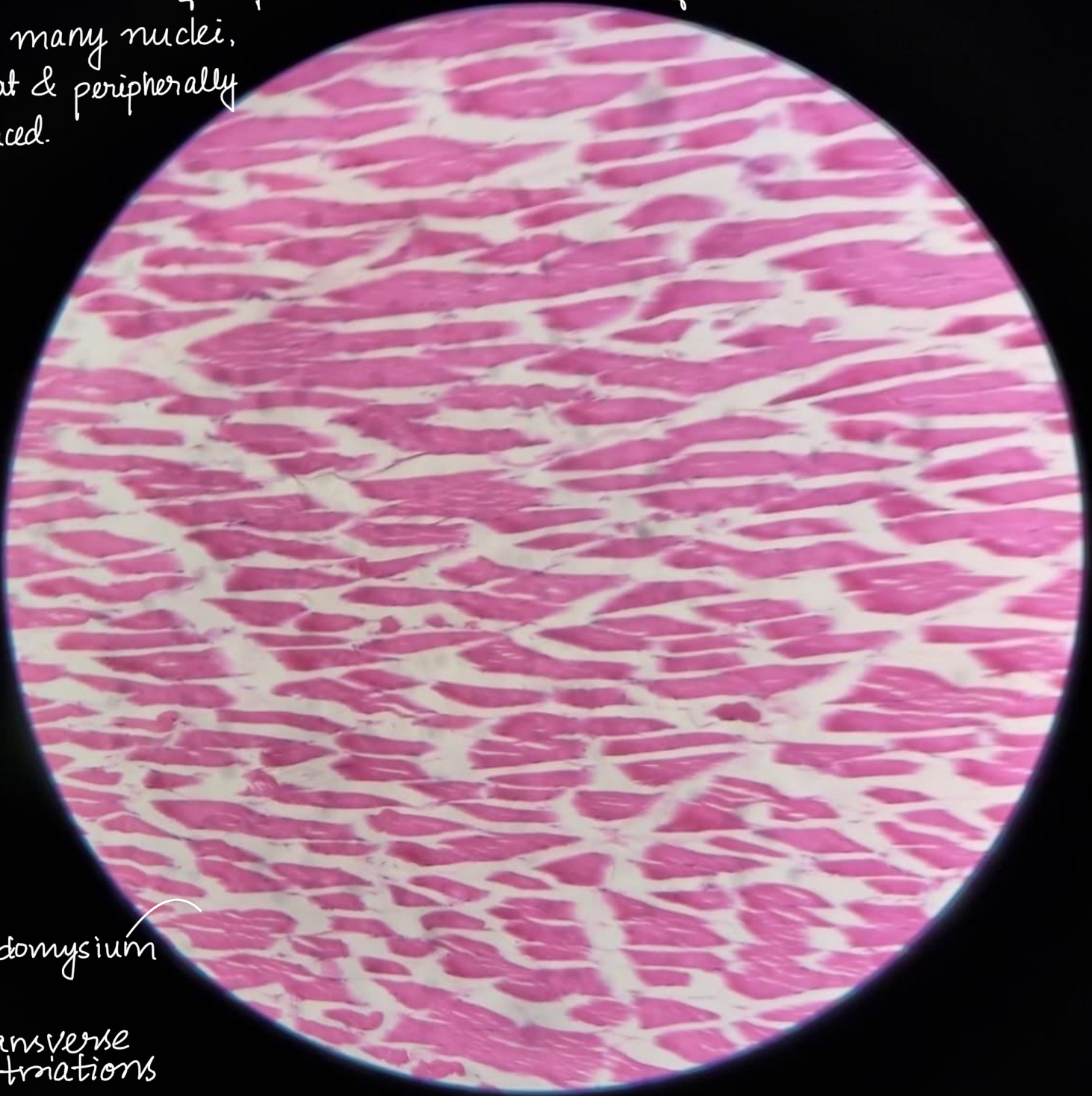




- Spindle shaped cells with tapering ends.
- Nucleus is elongated and central



Fibers are long & parallel without branching.
has many nuclei,
flat & peripherally
placed.

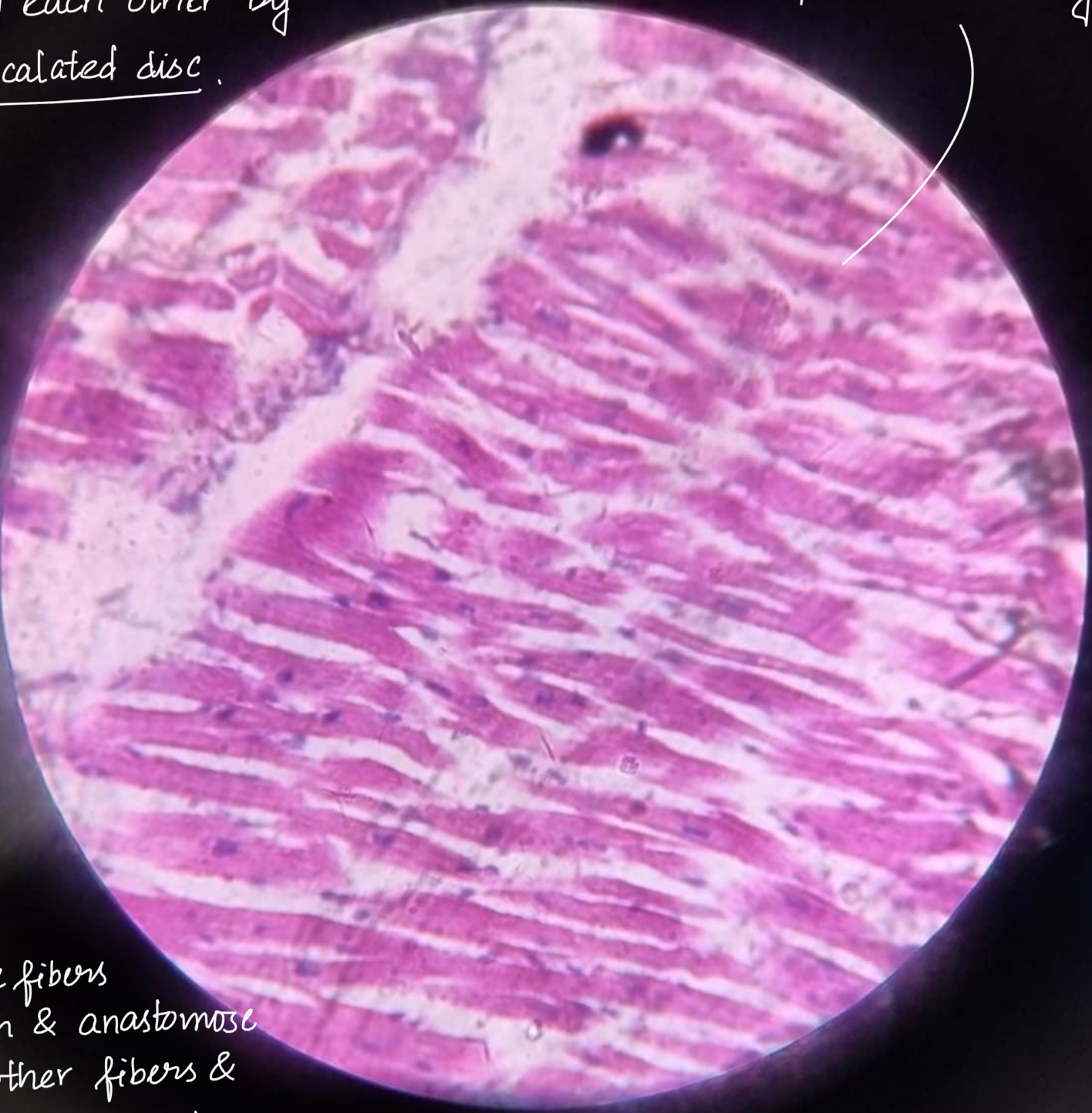


Endomysium

Transverse
striations

Adjacent cells separated from each other by Intercalated disc.

① single nucleus placed centrally



Muscle fibers branch & anastomose with other fibers & form a network.

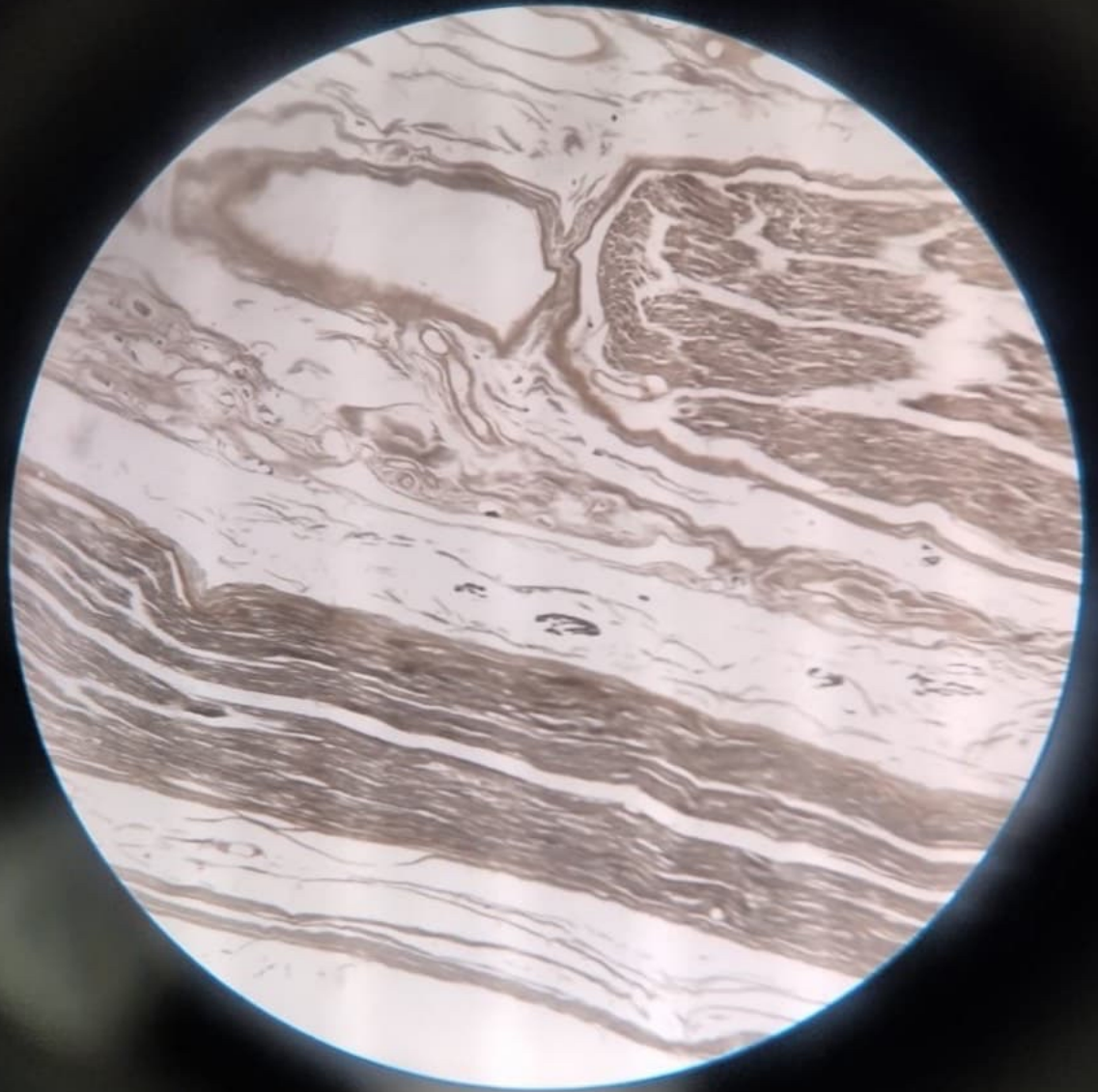
<http://www.newsworld-asia.com>

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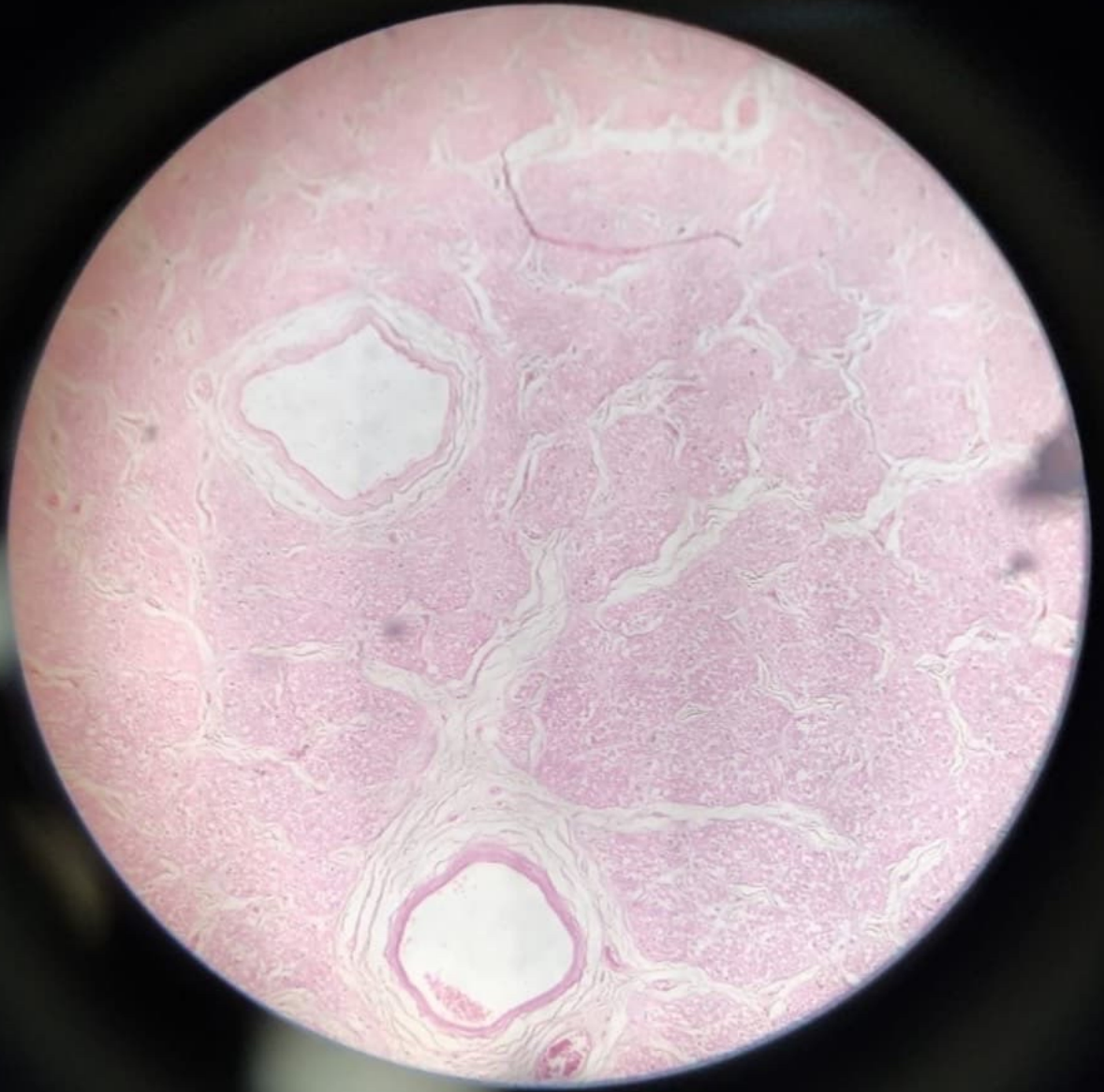
ab Lower limb Thorax Head and neck...

Cardiac muscle

① Each nerve fibre is covered by endoneurium.



- i. Covered by meninges – dura, arachnoid, pia mater (out to in)
- ii. Central retinal artery & vein are seen. ①
- iii. Pial septa divides the nerves into bundles. ②



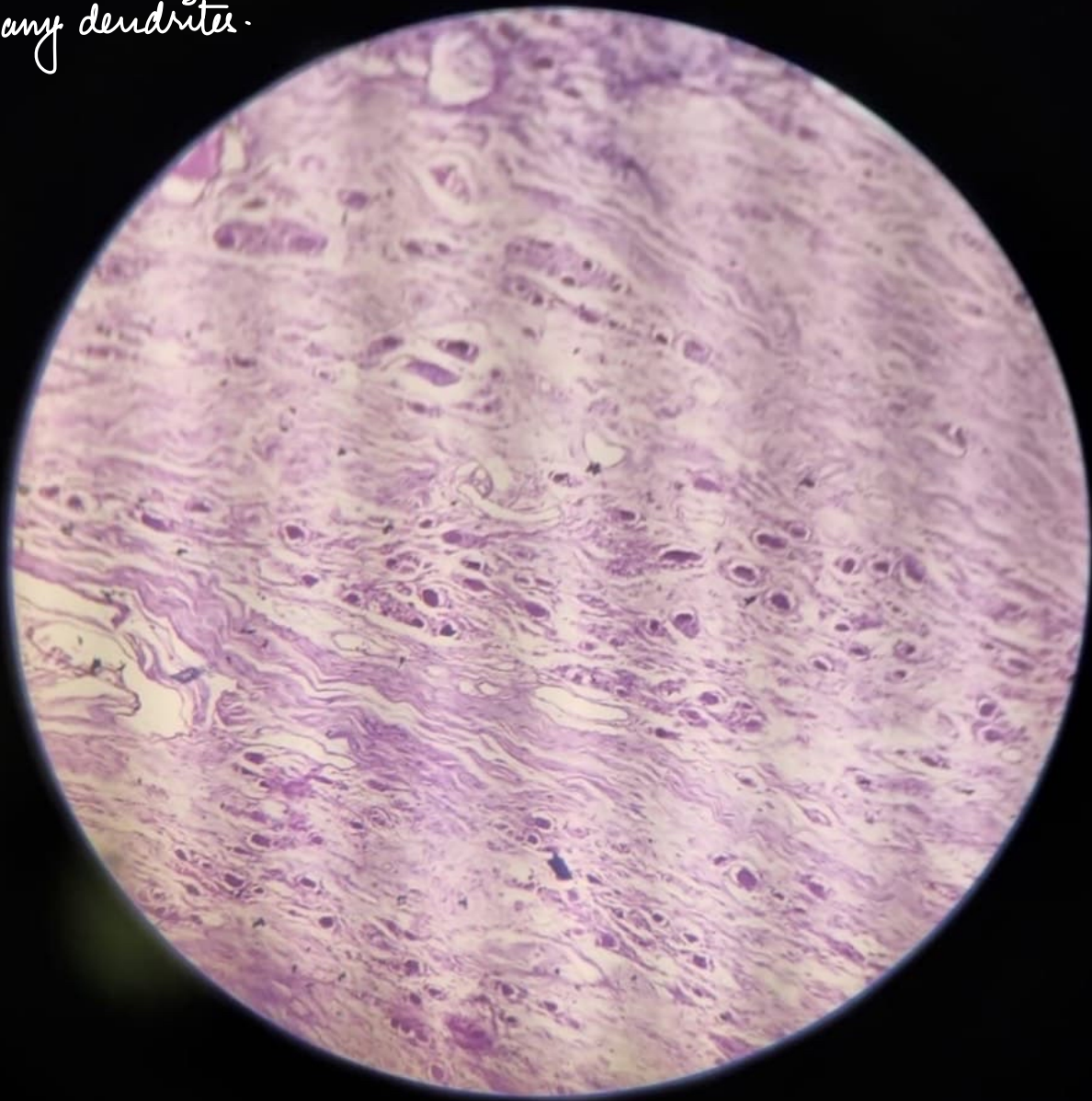
Unipolar/ Pseudounipolar neurons $\bar{c}$ centrally placed nucleus
Neurons are presented in groups b/w group of $\hat{n}$ fibers.
Prominent satellite cells are seen.

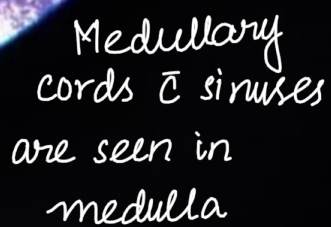


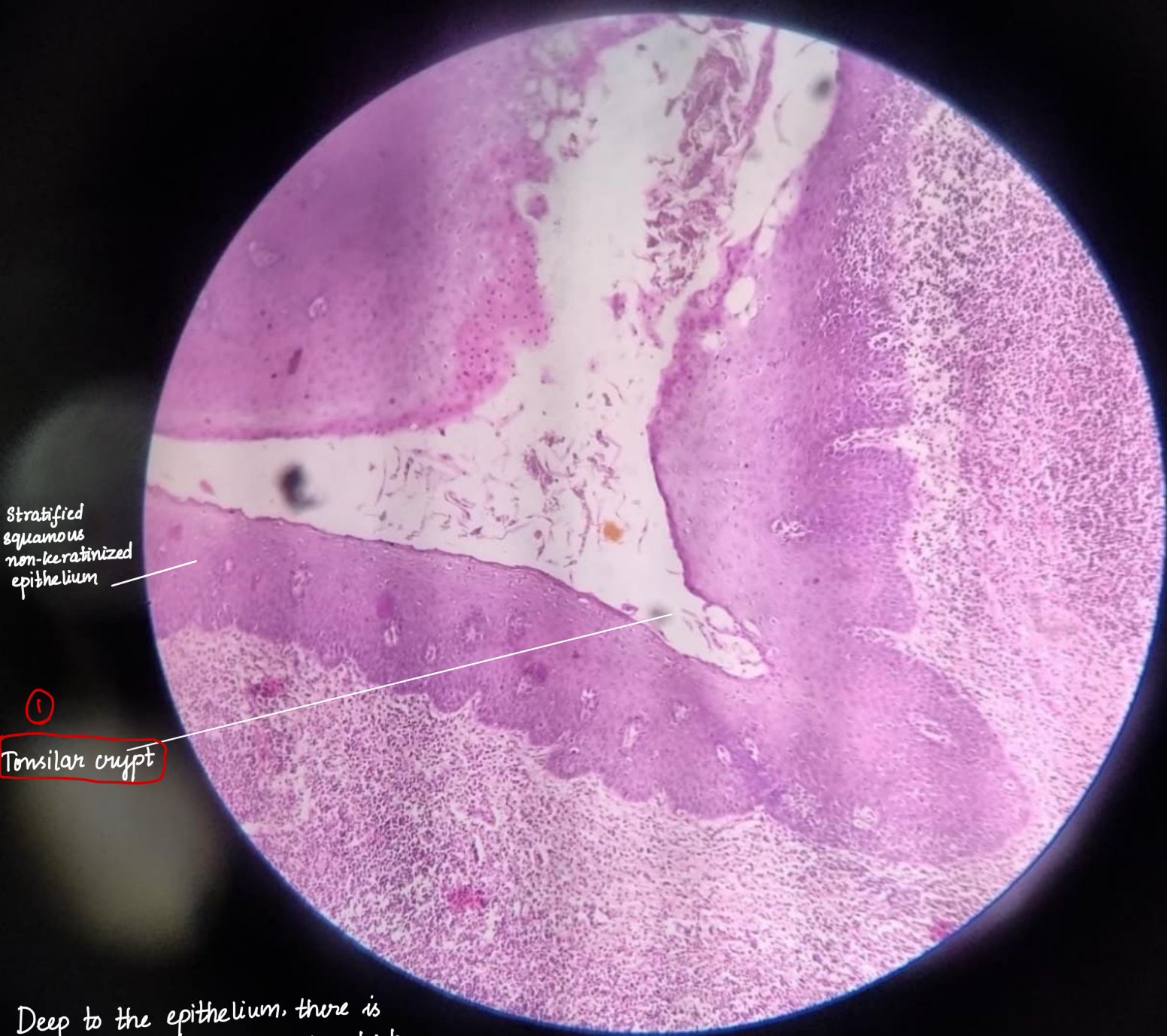
Pseudounipolar
neurons.

Multipolar neurons $\bar{c}$ eccentrically placed nucleus.
Neurons are scattered b/w nerve fibers.

Single axon, many dendrites.







Stratified
squamous
non-keratinized
epithelium

①
Tonsillar crypt

Deep to the epithelium, there is
diffuse lymphoid tissue in which
typical lymphatic nodule can be seen.

<https://www.bbc.com/news/world-asia-india-64...>

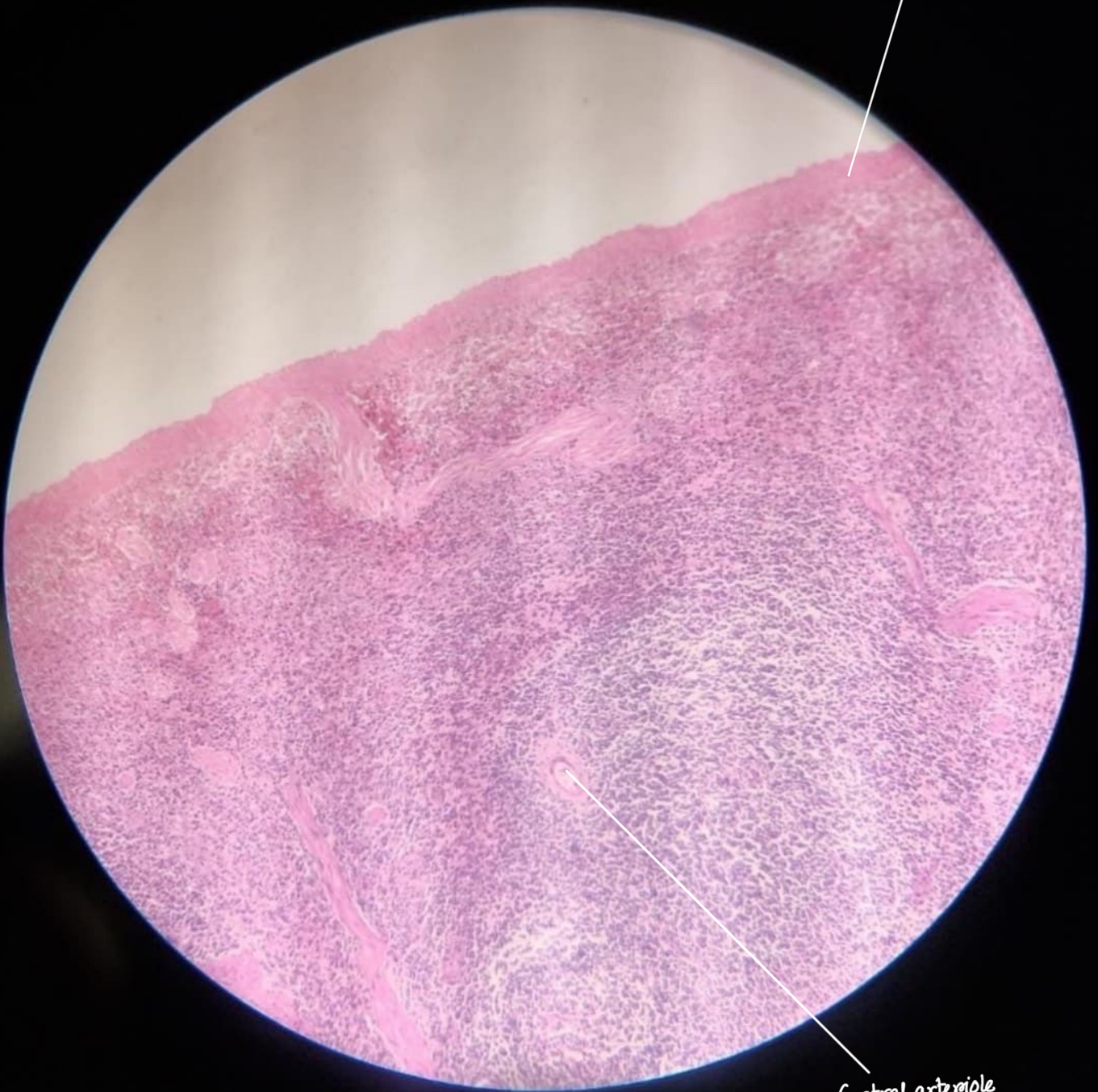
Panja Senior AllMS K

23/02/2023

ib Lower limb Thorax Head and npe...

Tonsil

Thick capsule & trabeculae
extending from it into the organ



Central arteriole
(peripherally placed in white pulp)

Red pulp has diffusely distributed lymphocytes and
numerous cords.

Covered by capsule & septa
extending into organs
and divides into indistinct
lobules.

Hassall's corpuscle
(pink stained) in medulla

Outer dark
stained
CORTEX

Inner lightly
stained
medulla

Trabecular vessels



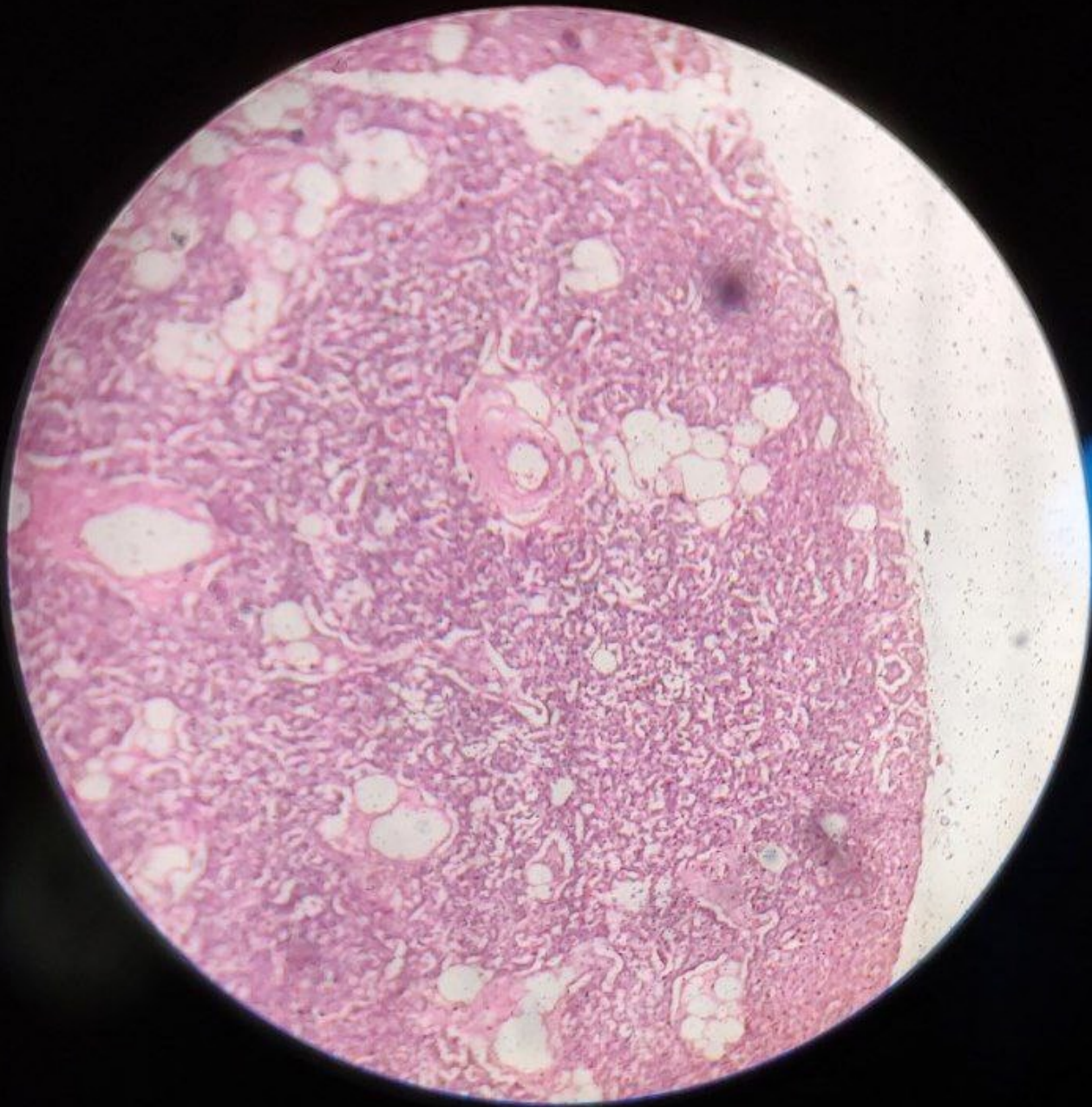
Trachea



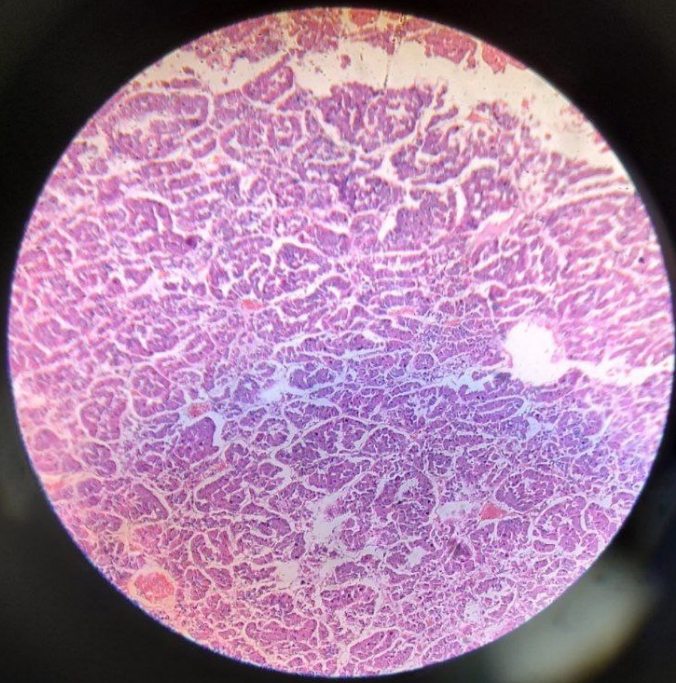
Lung



Thyroid 4x



Parathyroid



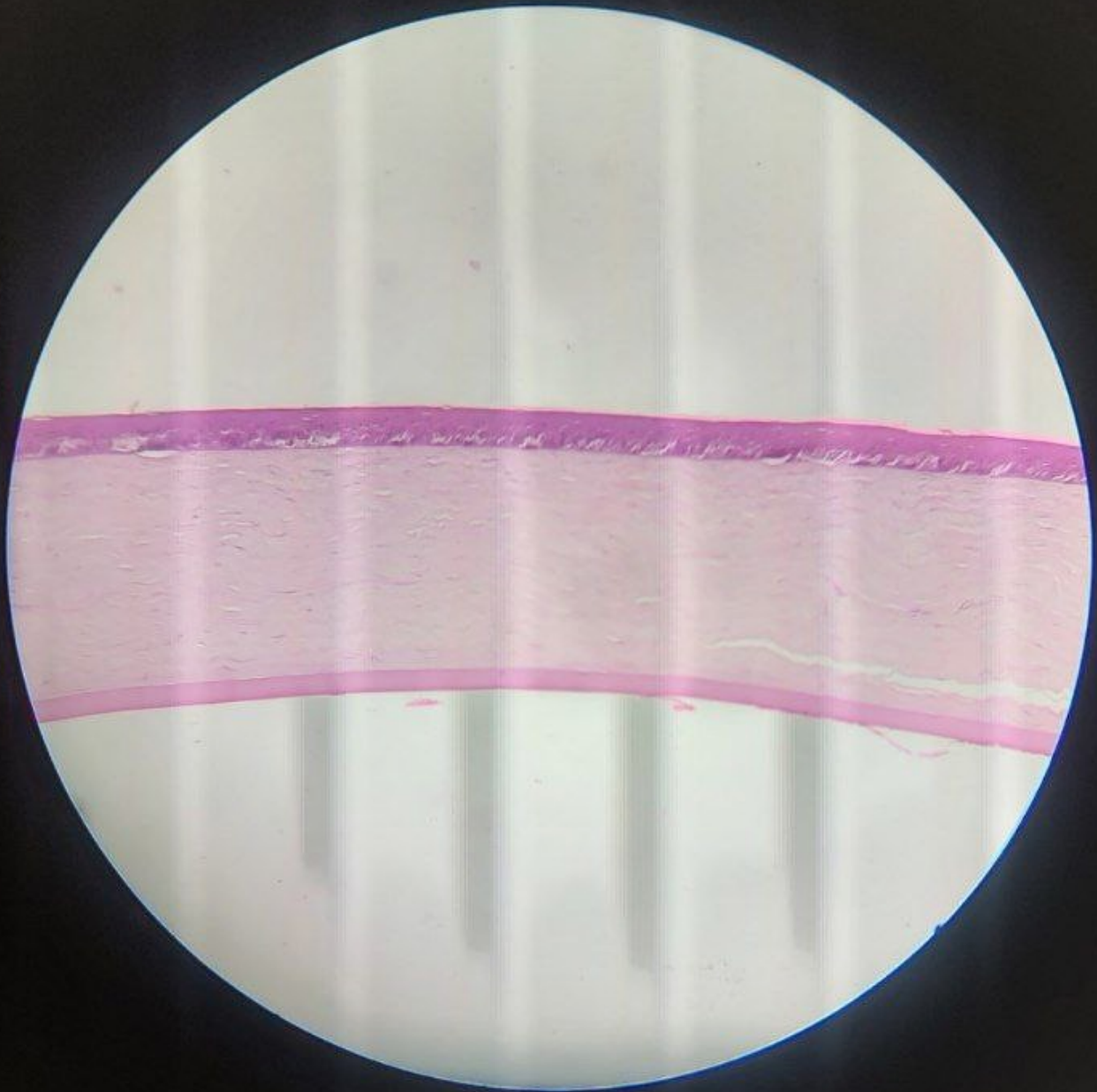
Pituitary



Pituitary again



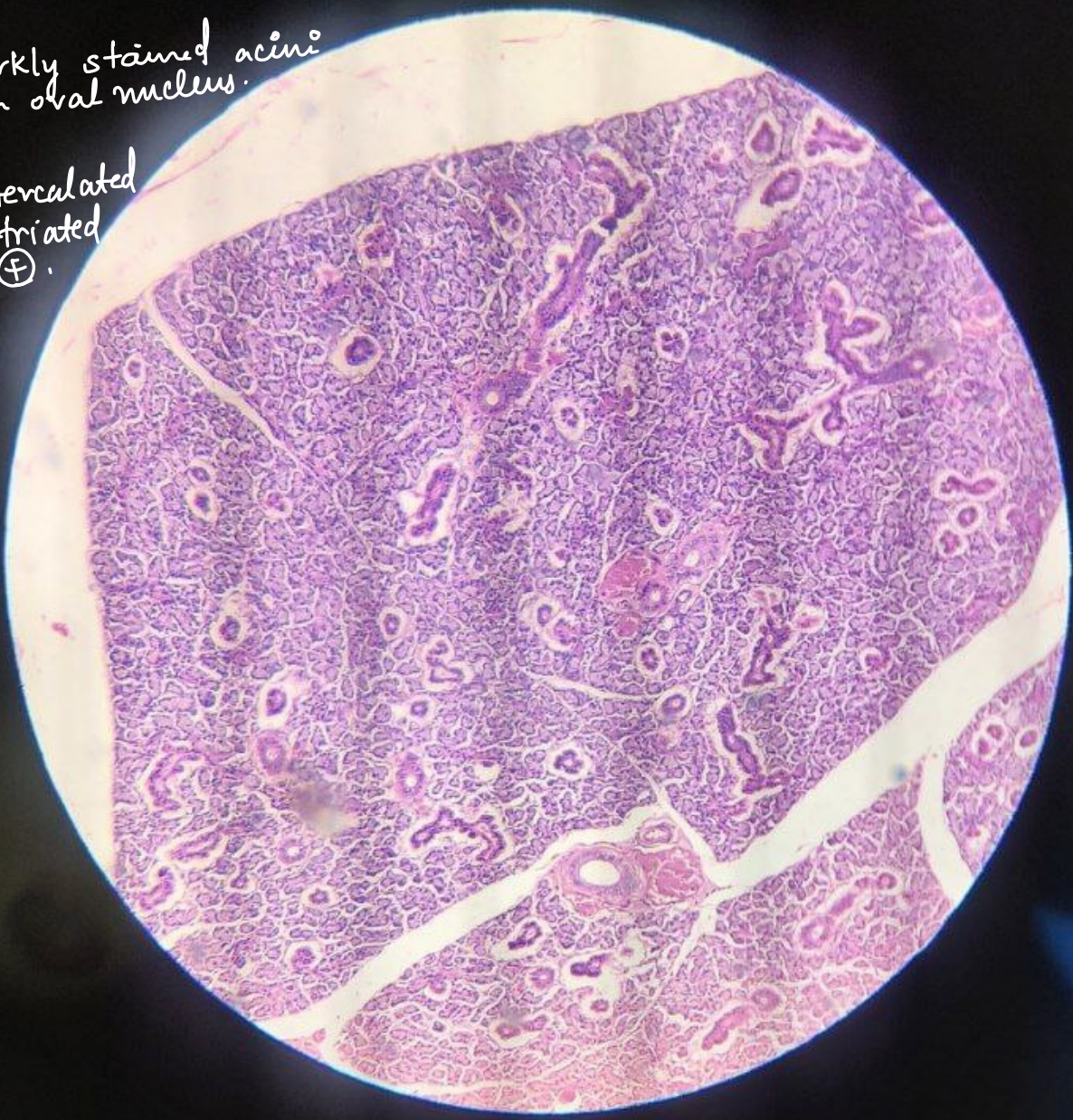
Retina



Cornea

① Darkly stained acini
with oval nucleus.

② Intercalated
and striated
duct ⊕.

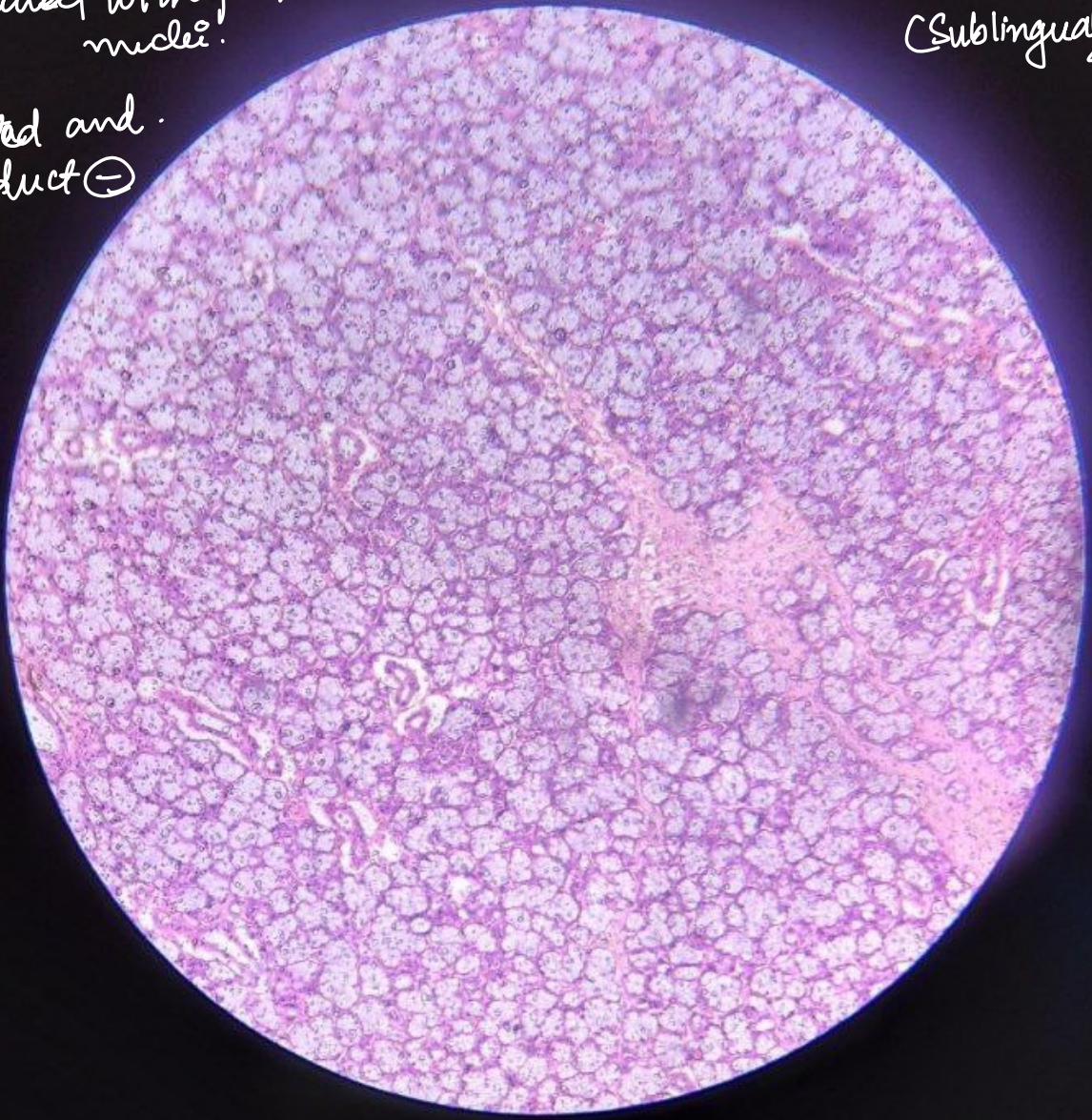


Serous salivary Gland

① lightly stained with flat nuclei.

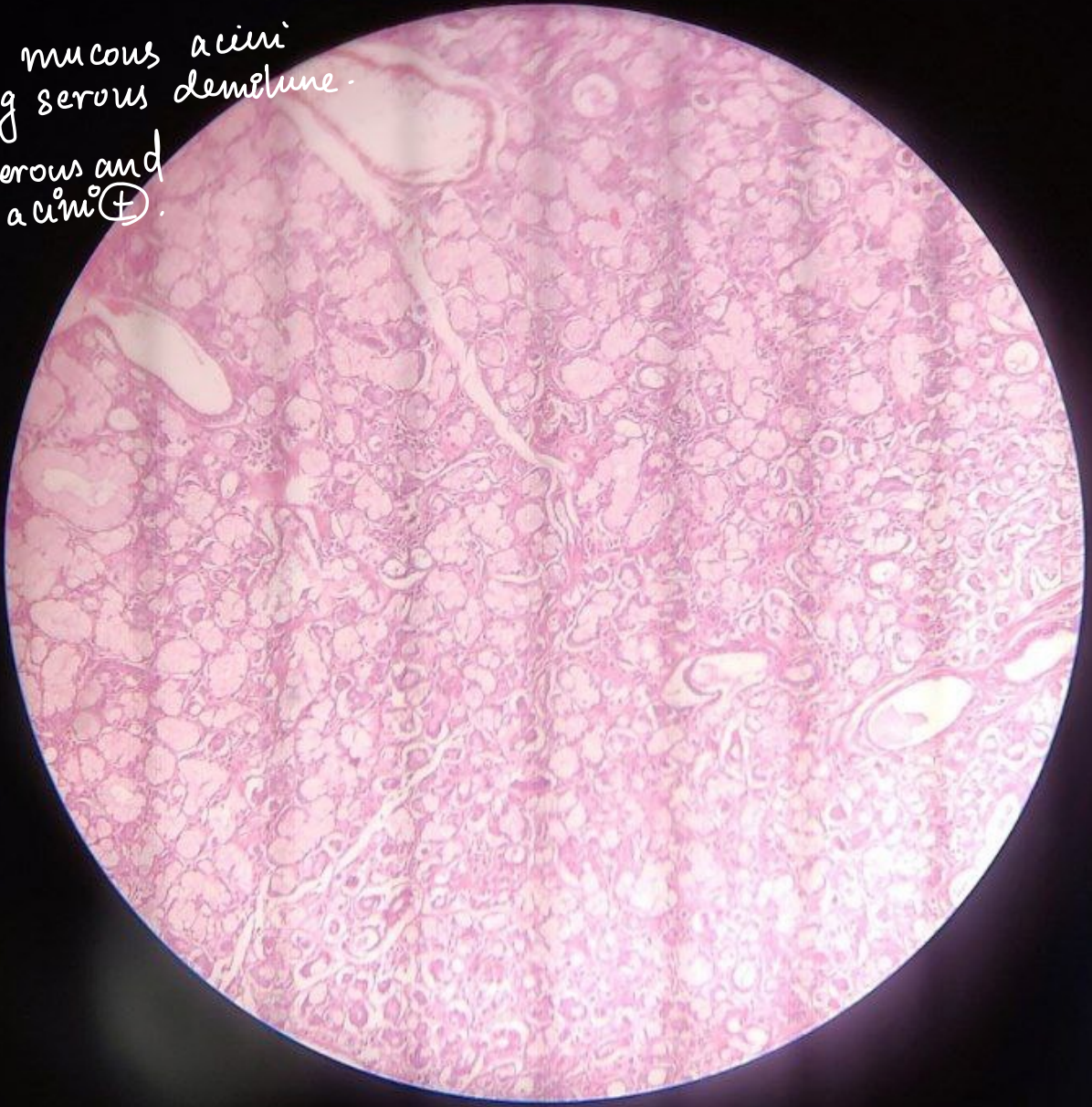
② Intercalated and striated duct ⊖

Mucous
(Sublingual).



Mucous salivary Gland

- ① Some mucous acini forming serous demilune.
- ② Both serous and mucous acini ⊕.



Mixed Salivary Gland

① Thick stratum corneum ⊕.

② Stratum granulosum distinctly visible.



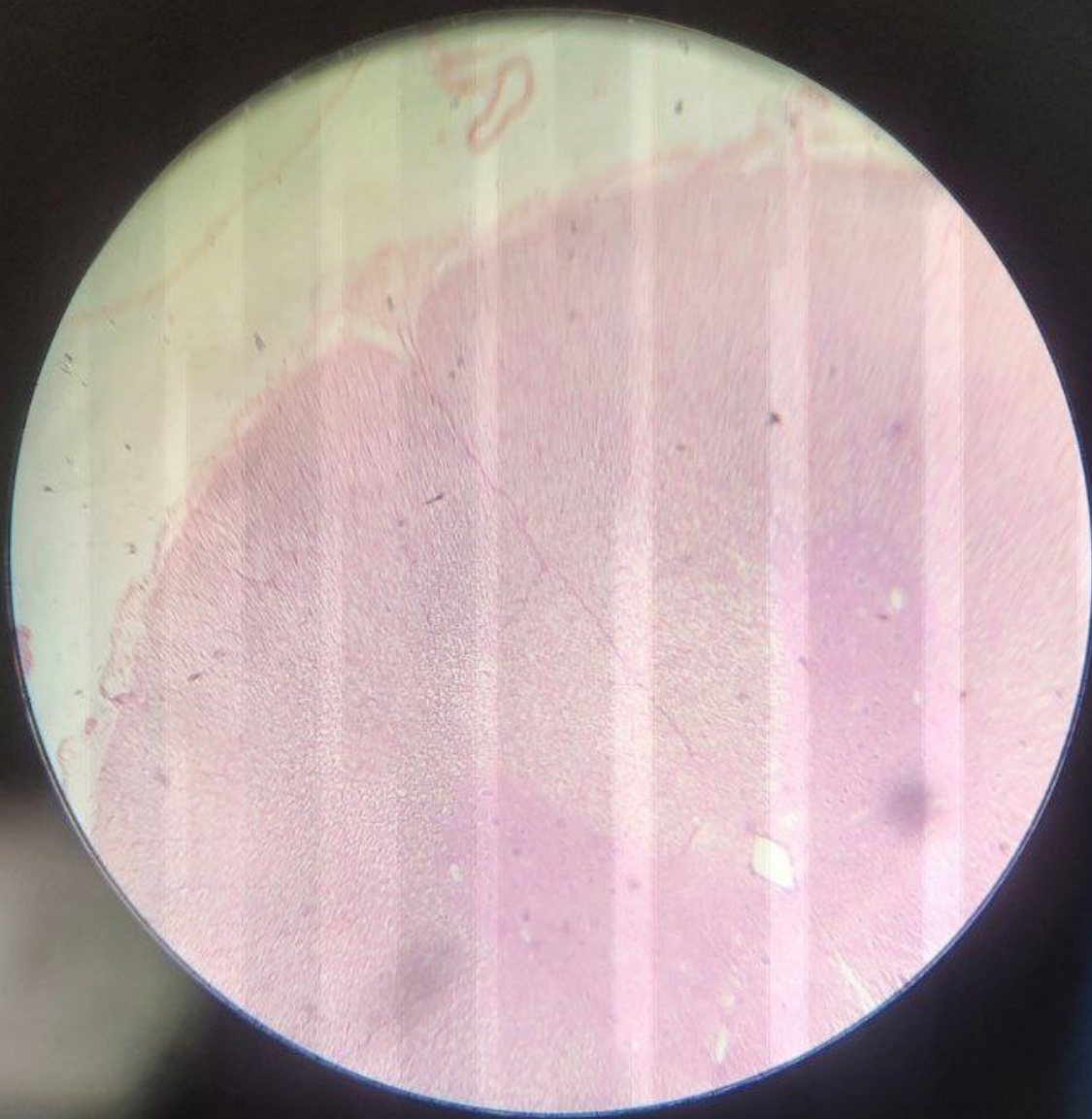
Thick skin

① Hair follicle ⊕

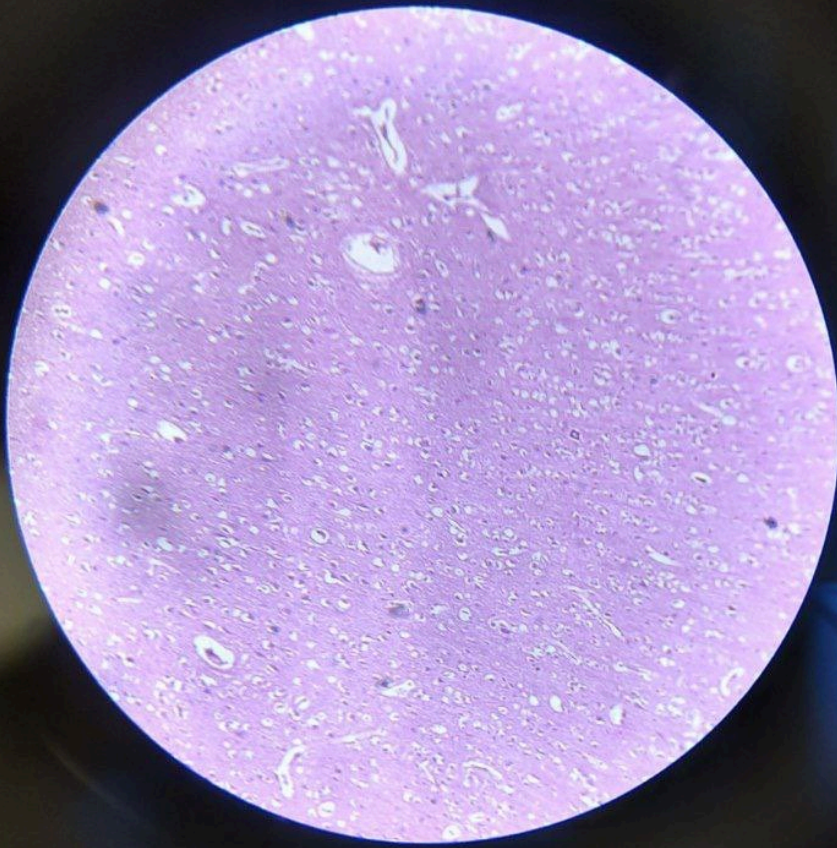
② Arrector pili muscle ⊕ .



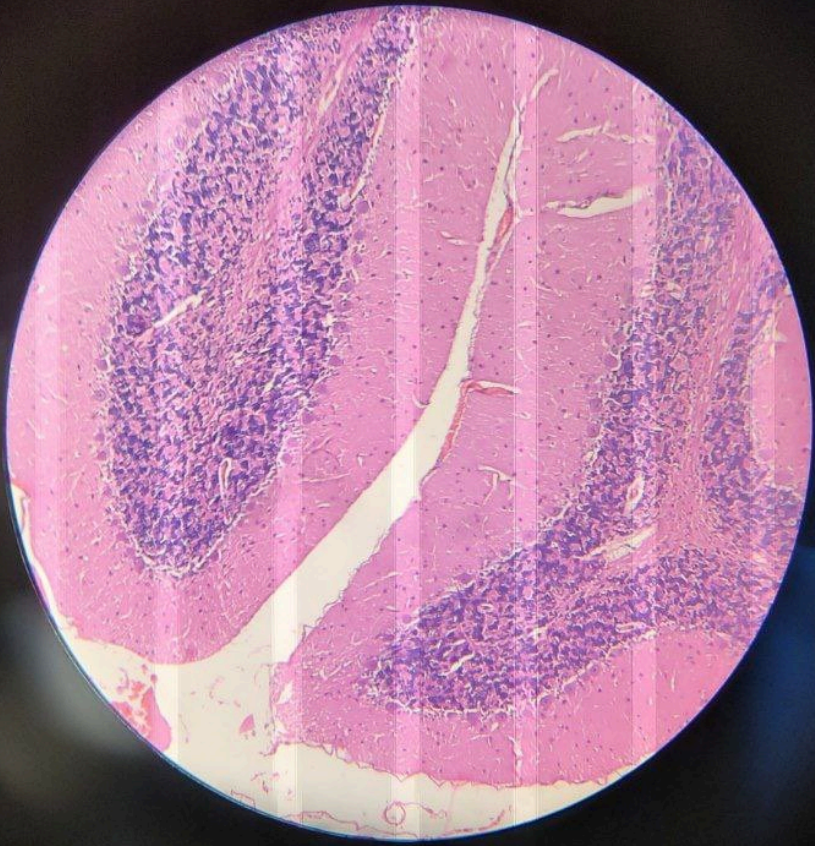
Thin skin



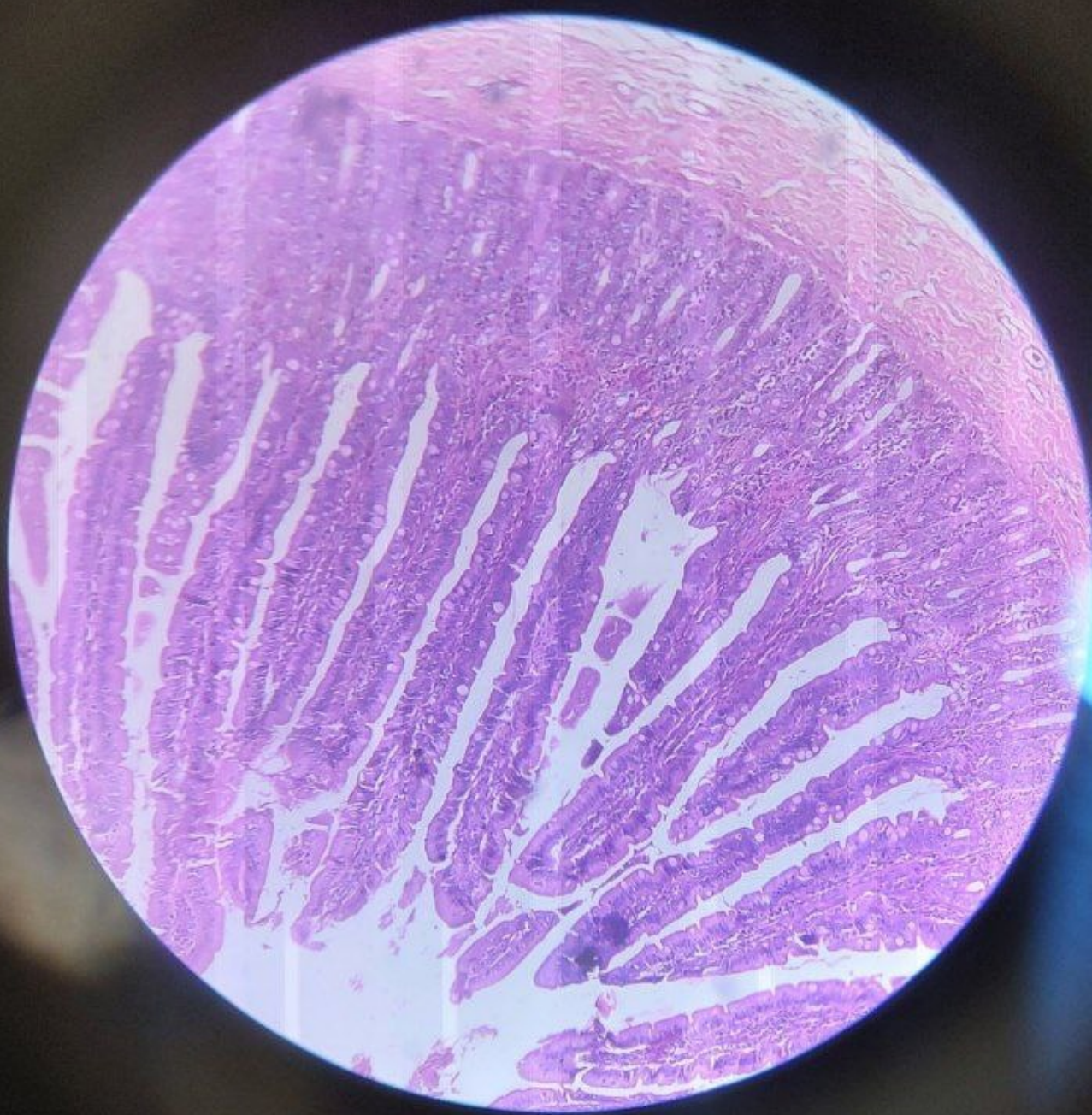
Spinal cord



Cerebrum



Cerebellum



Jejunum

