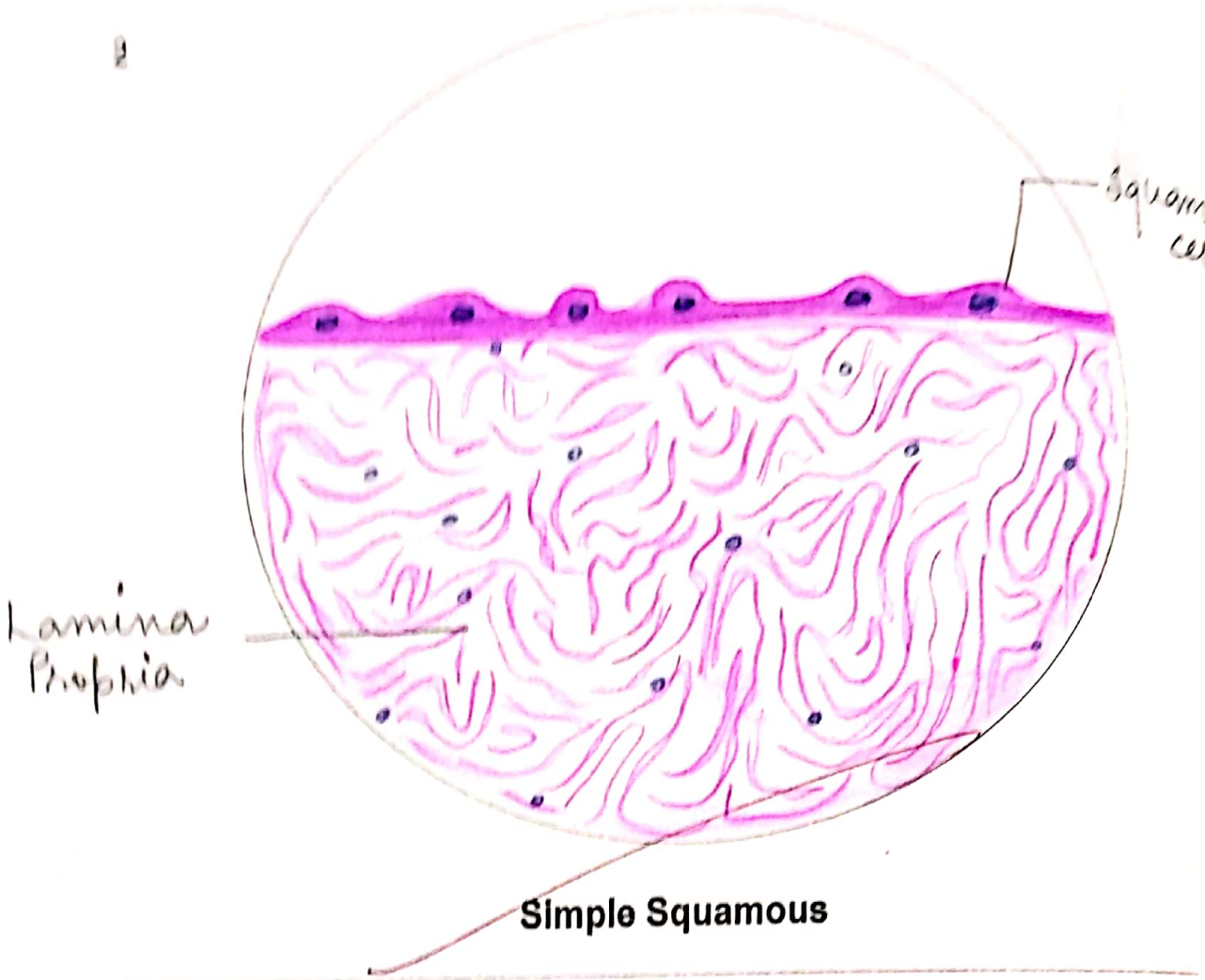
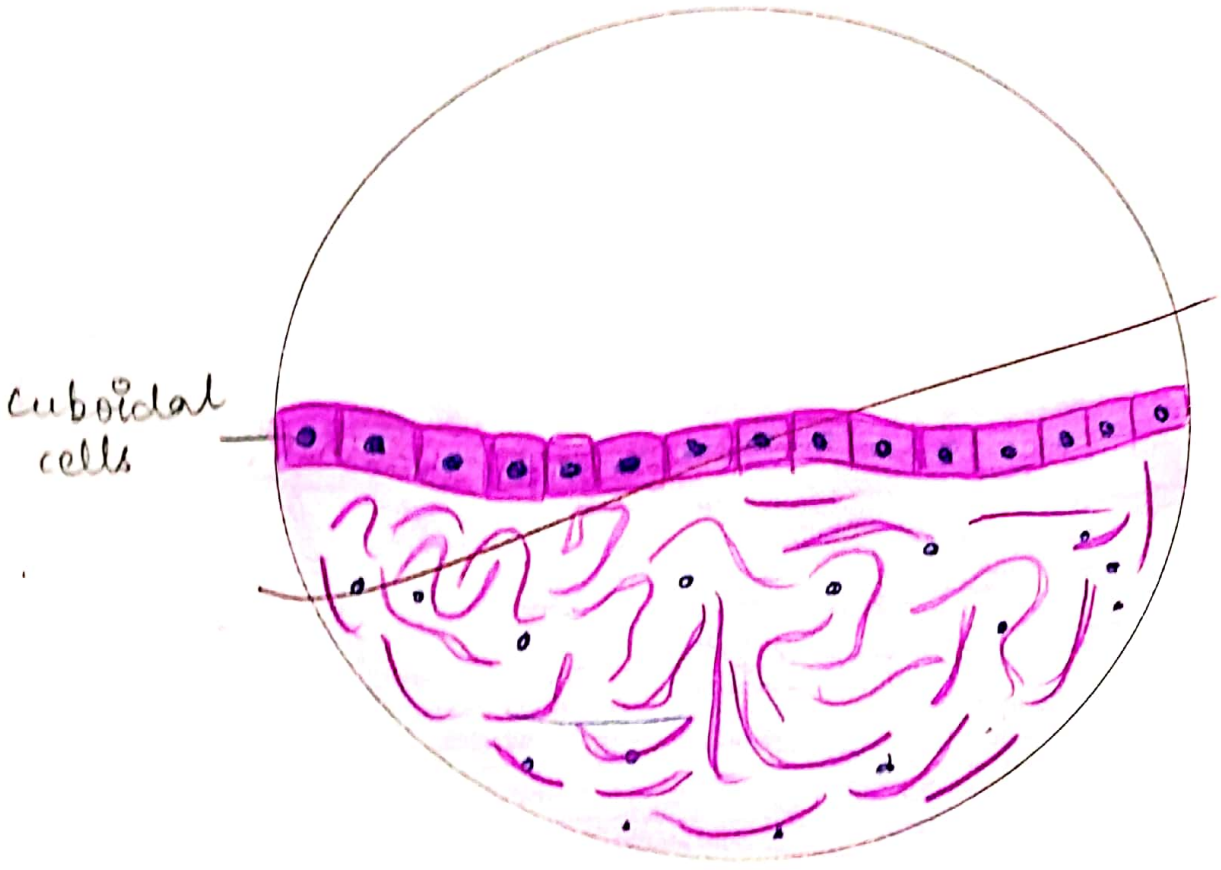


Simple Squamous



Simple Cuboidal

EPITHELIAL TISSUE

Epithelium is of two types:-

1. Simple Epitheliuml
2. Stratified epithelium - consist of two or more layers of cells.

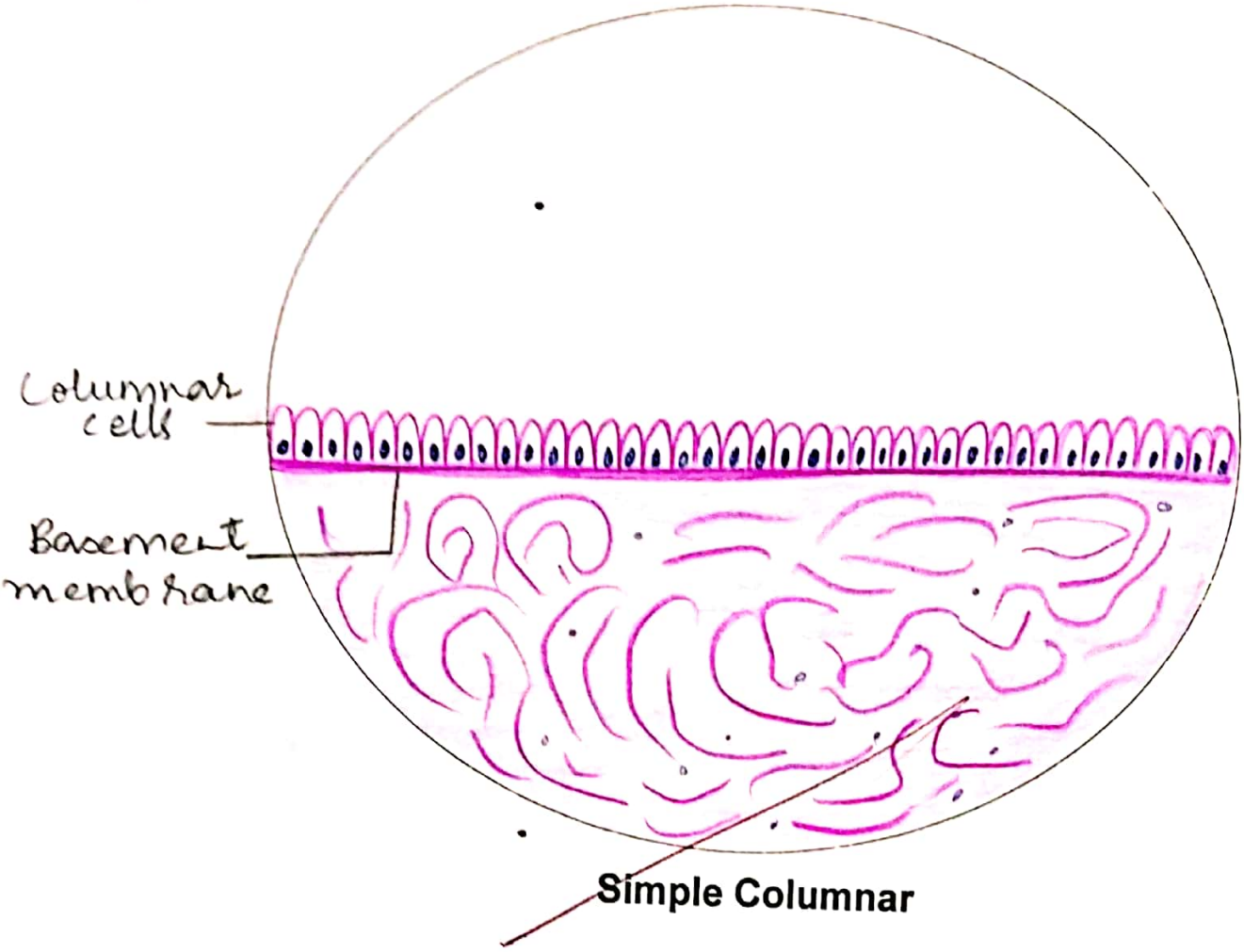
Simple Epithelium

(I) Simple Squamous

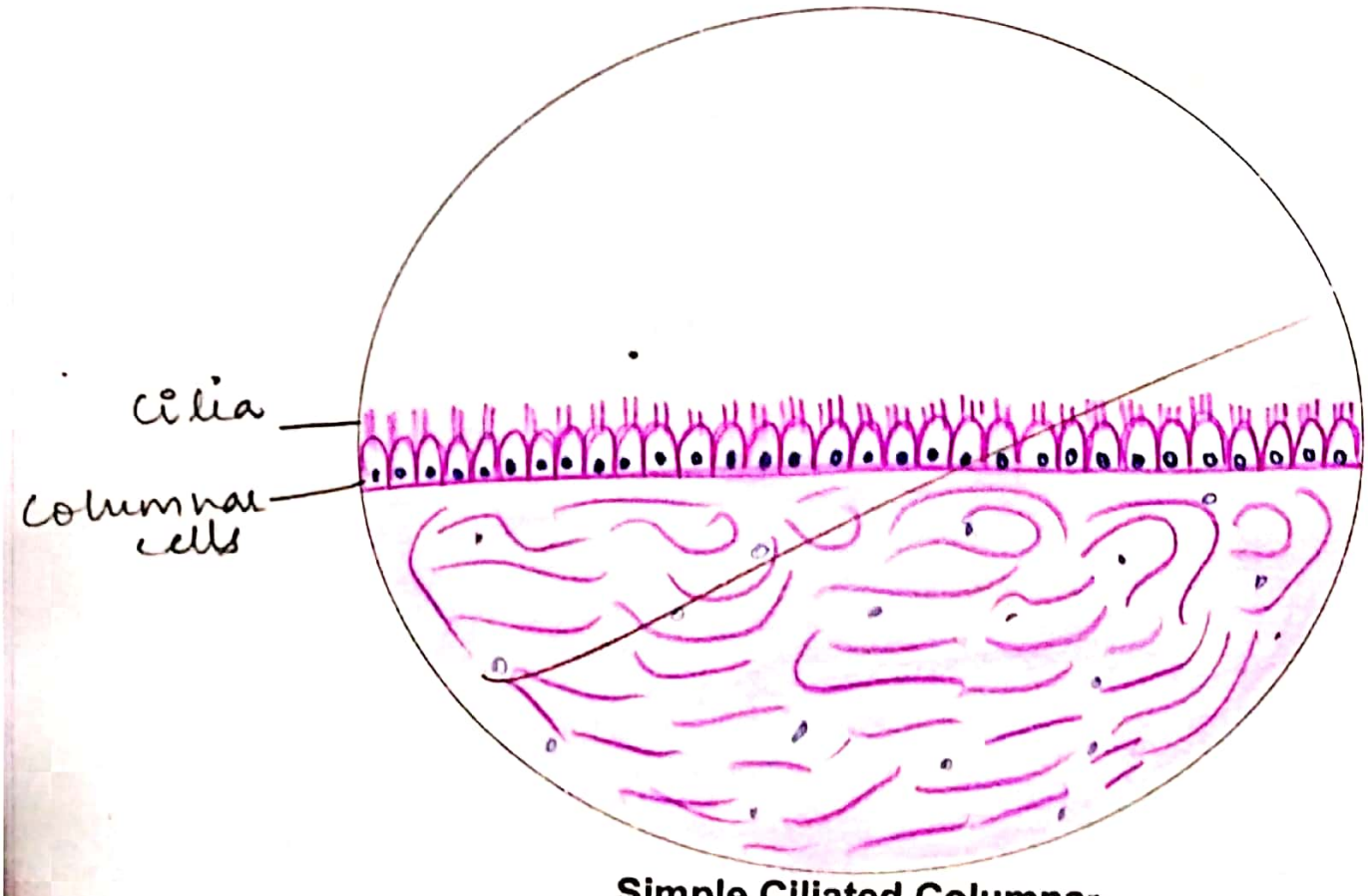
→ cells of this epithelium are flattened.
→ Bulgings are produced on the surface by nuclei.
→ cells have polygonal outlines.
→ It lines the alveoli of lungs, free surfaces of peritoneum, pleura and pericardium.

II) Simple Cuboidal

→ made up of cells that look like squares.
→ Nuclei are rounded.
→ It lines the follicles of the thyroid gland, kidney tubules, germinal layer of ovary and duct of various glands.



Simple Columnar



Simple Ciliated Columnar

(iii) Simple Columnar

→ Height of the cells is much greater than their width.

→ Nuclei are oval and lie near the bases of the cells

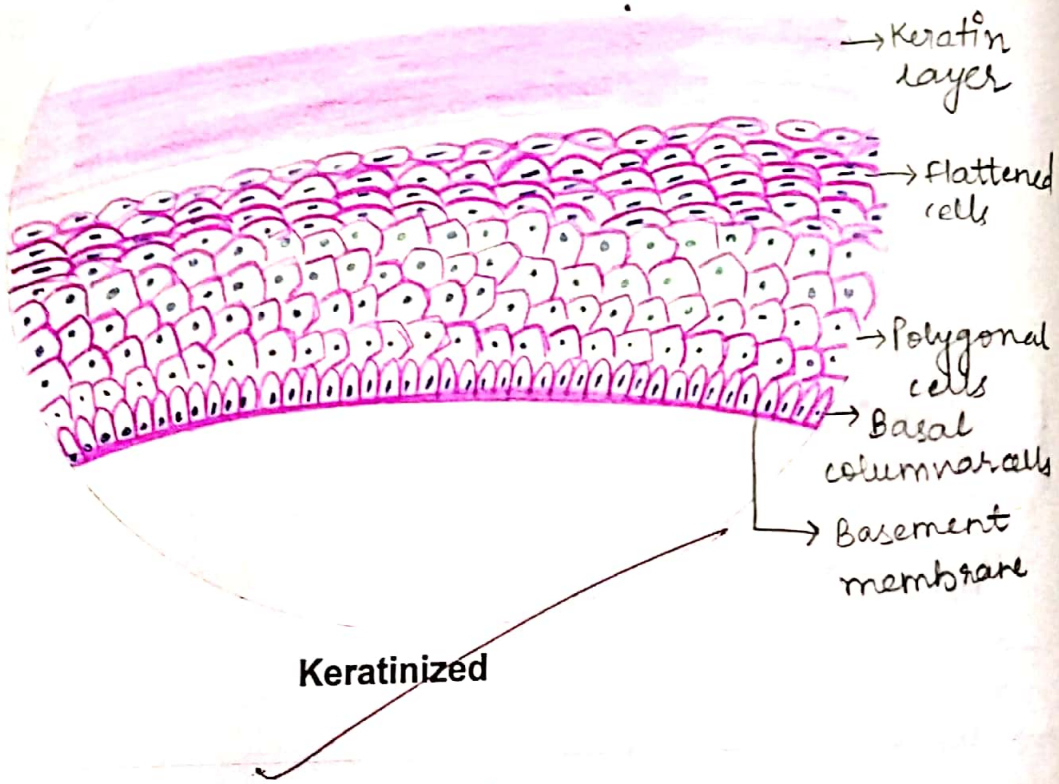
→ It lines the mucous membrane of stomach and of the large intestine.

(iv) Simple Ciliated Columnar

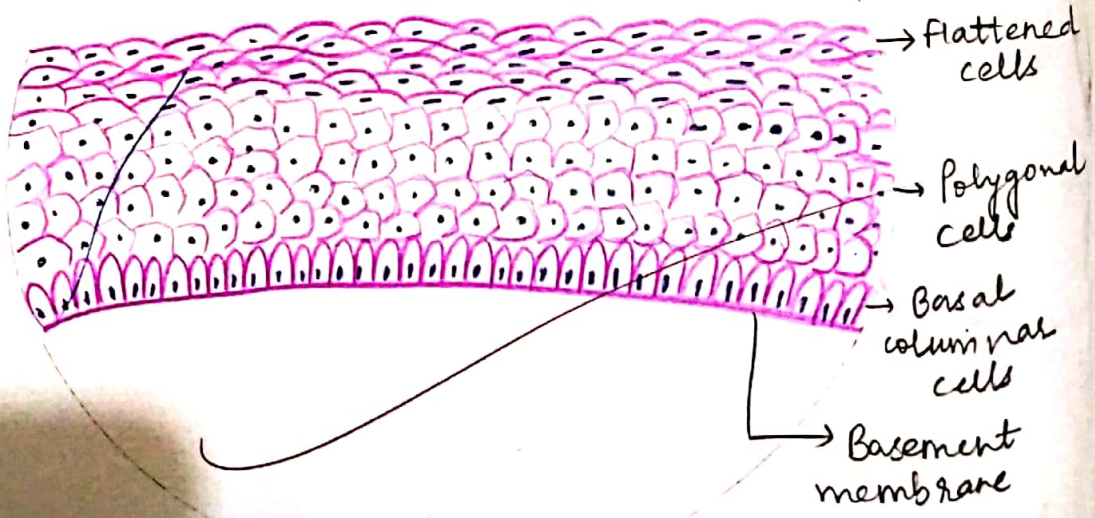
→ Cells surface bears cilia.

→ Move mucous and other substances.

→ found in respiratory tract, uterus, uterine tubes, efferent ductules, parts of middle ear and auditory tube.



Keratinized



Non -Keratinized

EPITHELIAL TISSUE (contd.)

Stratified Epithelium

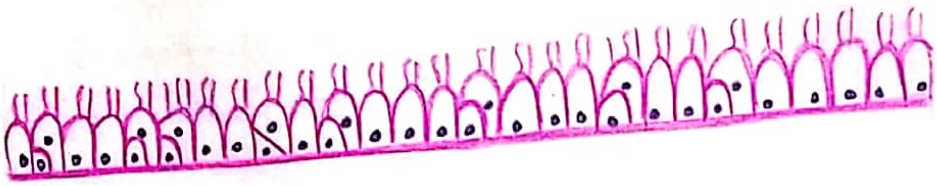
(i) Stratified Squamous Epithelium

Dry or keratinized

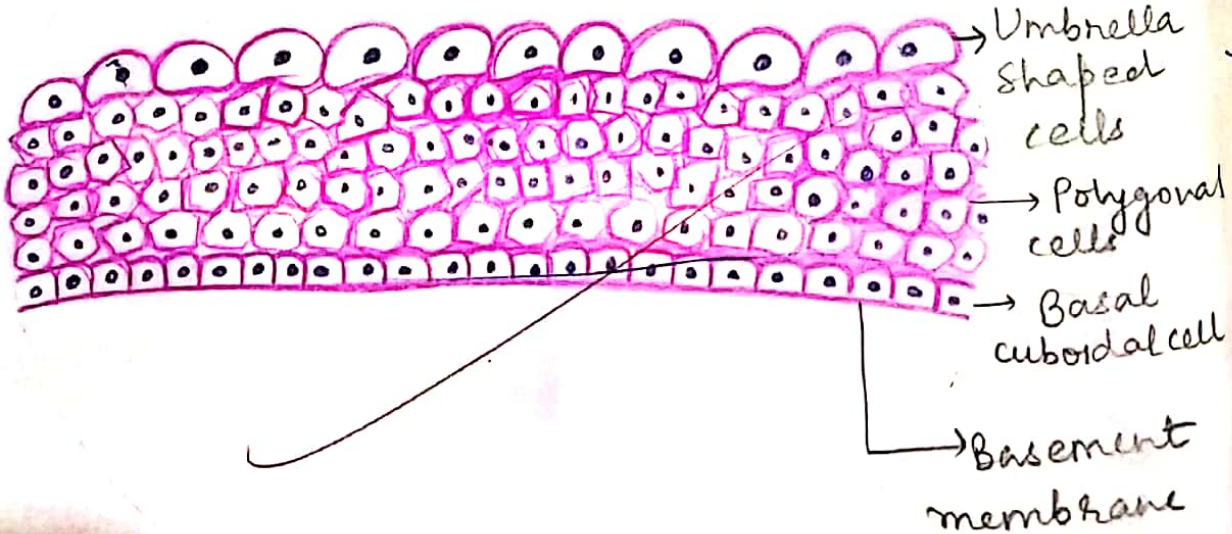
→ surface layer is made up of keratin
→ Epithelium → dry without nuclei
→ Deepest layer is columnar
→ Present in skin

Wet or Non-Keratinized

→ Cells in the basal layer are columnar
→ cells in middle layers are polyhedral
→ cells of superficial layers are flattened.
→ Nuclei are oval in basal layer, rounded in middle layer, elongated in superficial layer.
→ It lines some organs like oesophagus and vagina.



Pseudostratified Ciliated Columnar Epithelium



Transitional Epithelium

EPITHELIAL TISSUE (contd.)

Pseudostratified Ciliated Columnar Epithelium

→ It appears to be multilayered but has actually single layer of cells.

→ Multilayered appearance is due to different levels of nuclei at different cells.

→ Bear hair like projection called cilia.

→ Some cells are basal and short, other are tall ciliated columnar.

→ Lines the trachea, large bronchi and ductus deferens.

Transitional Epithelium

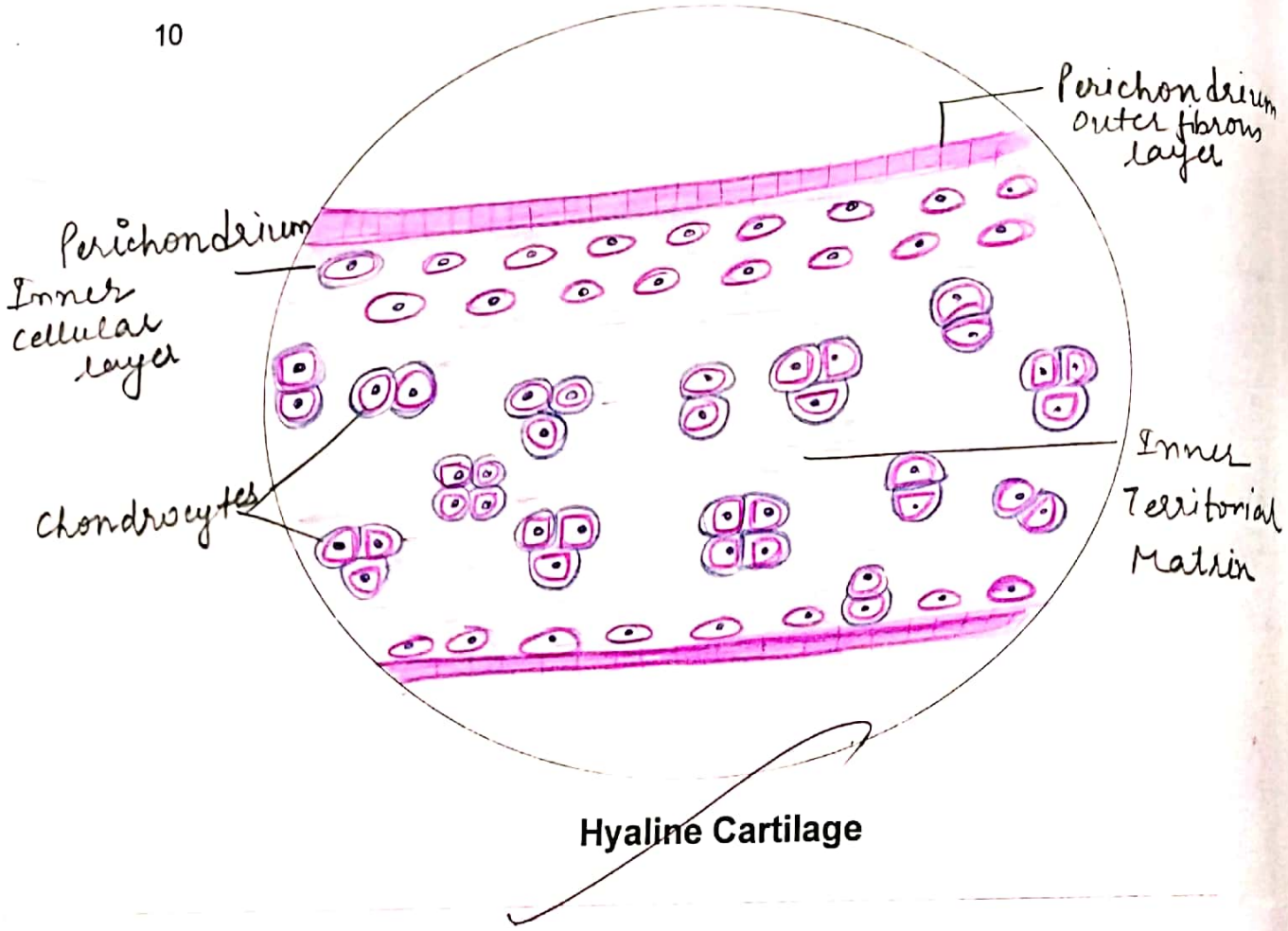
→ Several layer of cells with round nuclei.

→ Deepest cells are columnar or cuboidal.

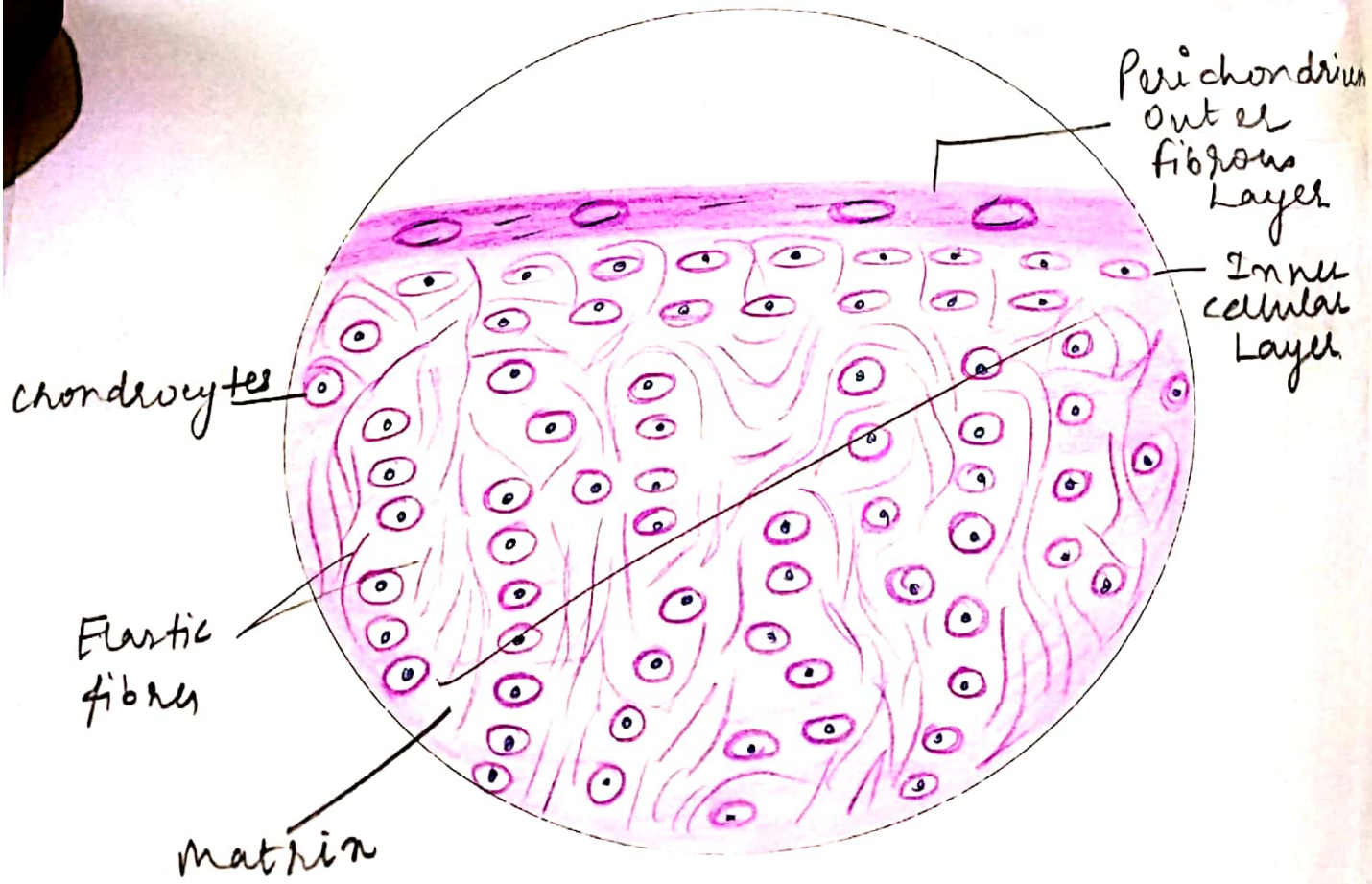
→ Middle layers are polyhedral pear shaped cells.

→ Cells of surface layer are large and umbrella shaped.

→ Lines many parts of urinary bladder.



Hyaline Cartilage



Elastic Cartilage

CARTILAGE

Carlilage

Consist of cells (chondrocytes and chondroblasts) and matrix (fibres and ground substance).

Three types: hyaline, elastic, fibrocartilage based on the amount and types of fibres present in the matrix.

Hyaline Cartilage

→ Group of chondrocytes surrounded by homogeneous mixture

→ near the surface, cells are flattened and merges with connective tissue.

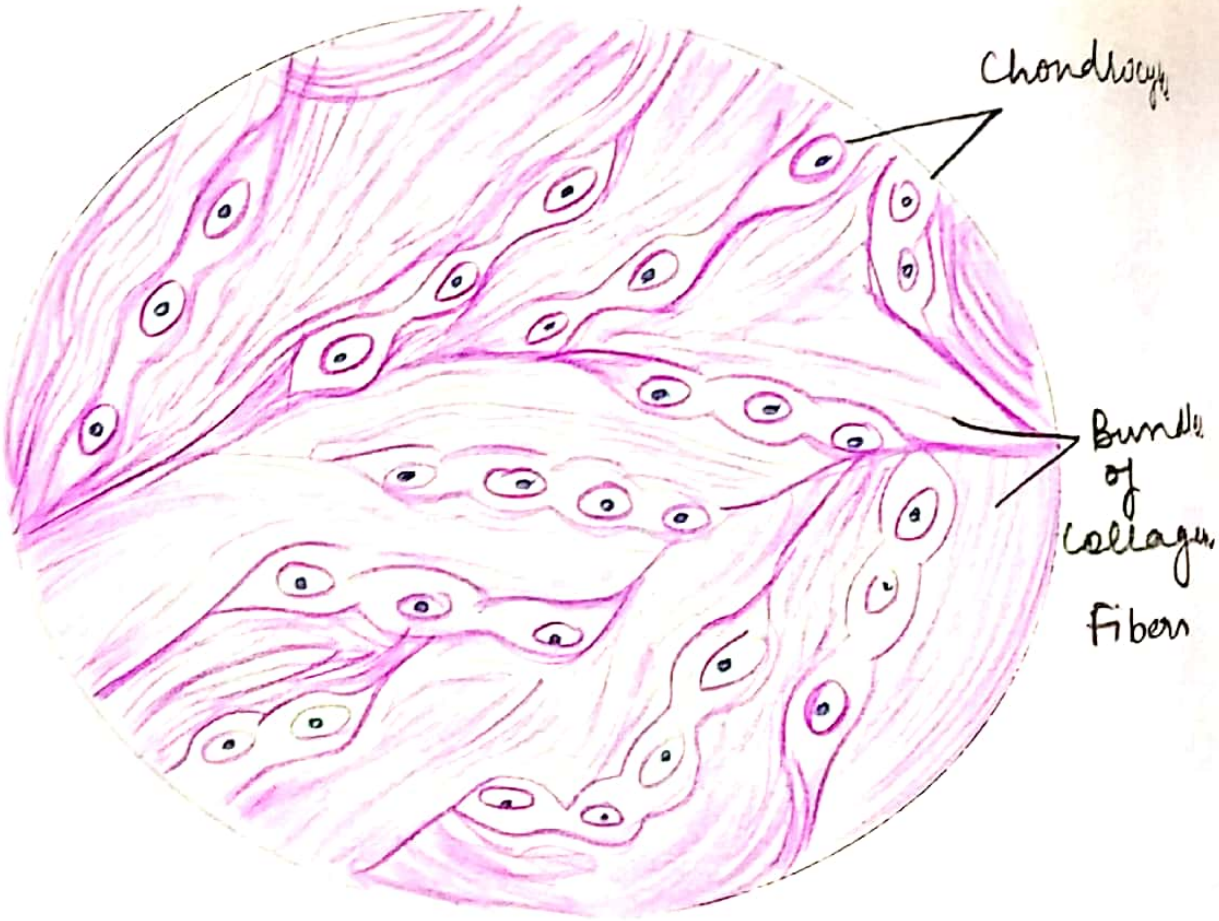
→ This CT forms perichondrium.

→ Ex → costal cartilage and articular cartilage of synovial joint.

Elastic Cartilage

→ characterised by presence of chondrocytes within lacuna surrounded by bundles of elastic fibres.

→ Perichondrium is present showing outer fibrous and inner cellular layer.



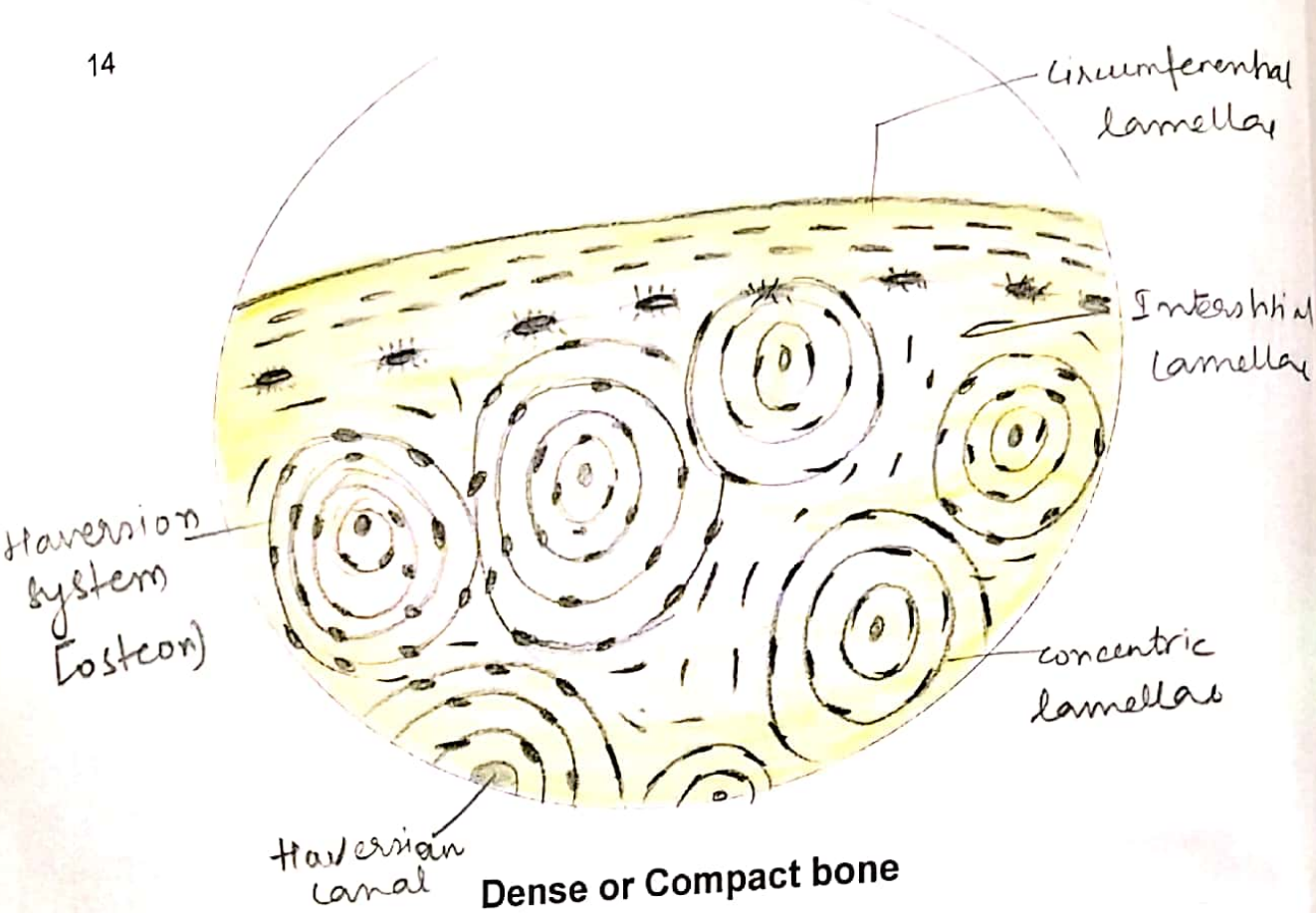
Fibrocartilage

Fibrocartilage

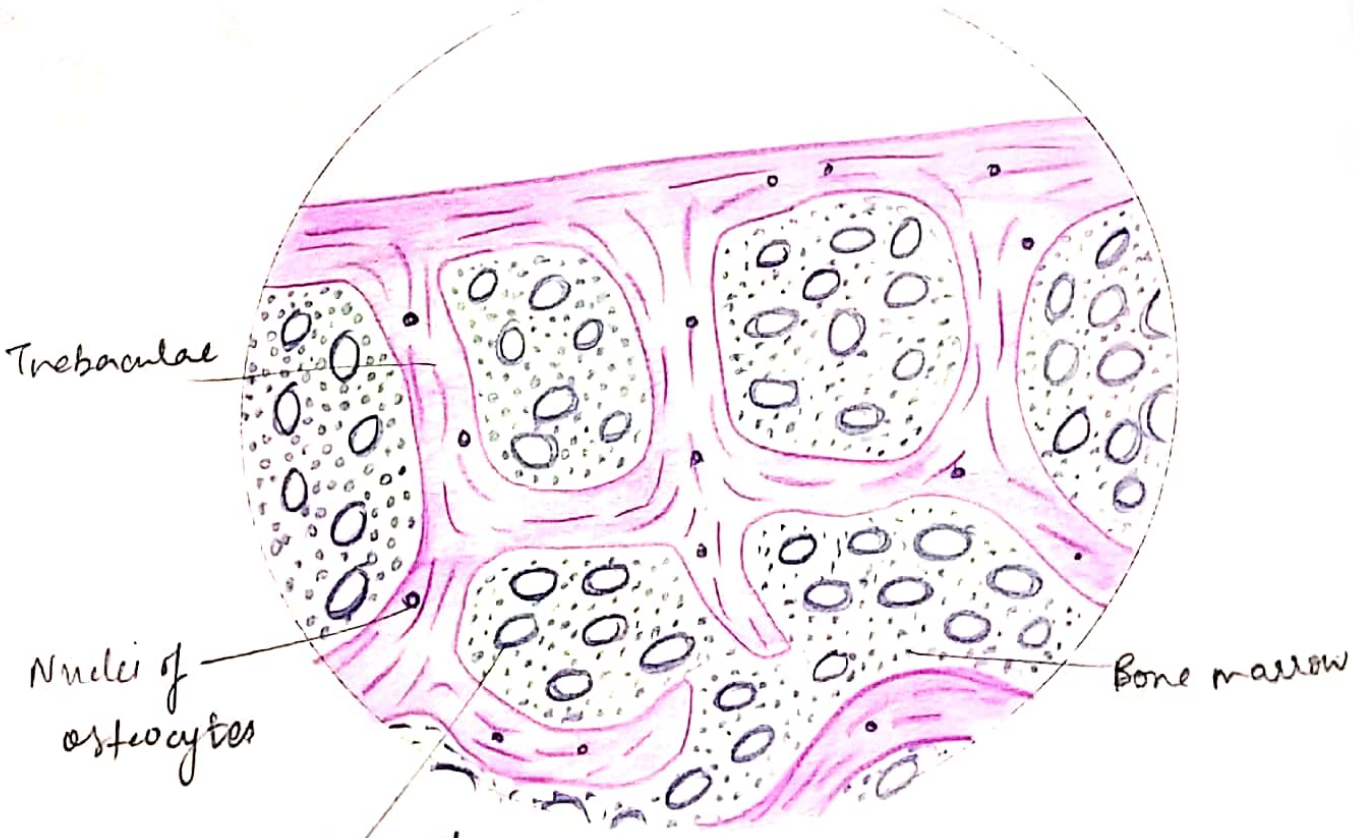
characterised by presence of collagen fibres arranged in bundles with rows of chondrocytes intervening between the bundles

→ Perichondrium is absent.

→ seen in pubic symphysis and manubrio-sternal joint



Dense or Compact bone



Spongy or Cancellous bone

BONE

Bone

Highly specialized highly vascular living connective tissue. It consists of:

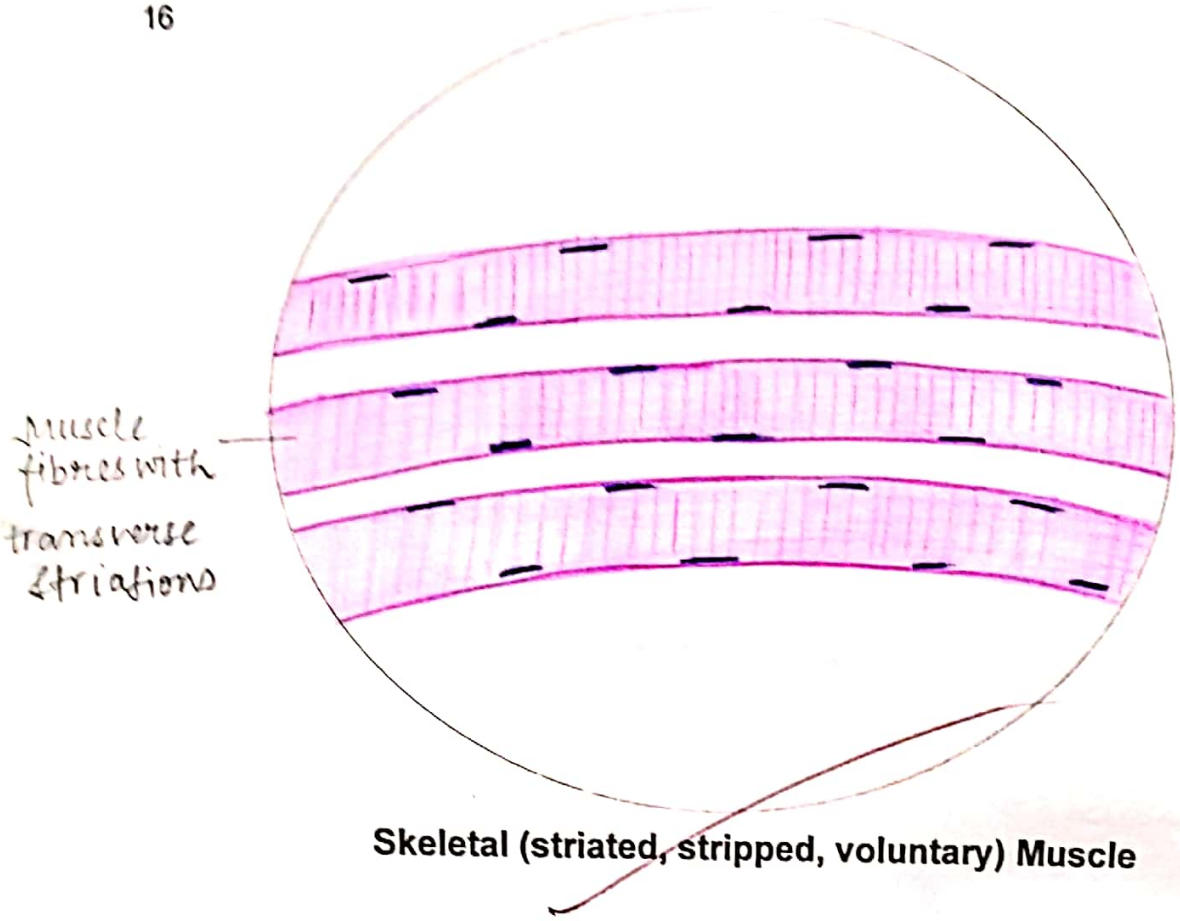
1. Cells- Osteoblasts, Osteocytes and Osteoclasts.
2. Intercellular substance-
   - Organic material: dense collagen fibres embedded in amorphous ground substance.
   - Inorganic material: Calcium and Magnesium salts.

Dense or Compact bone

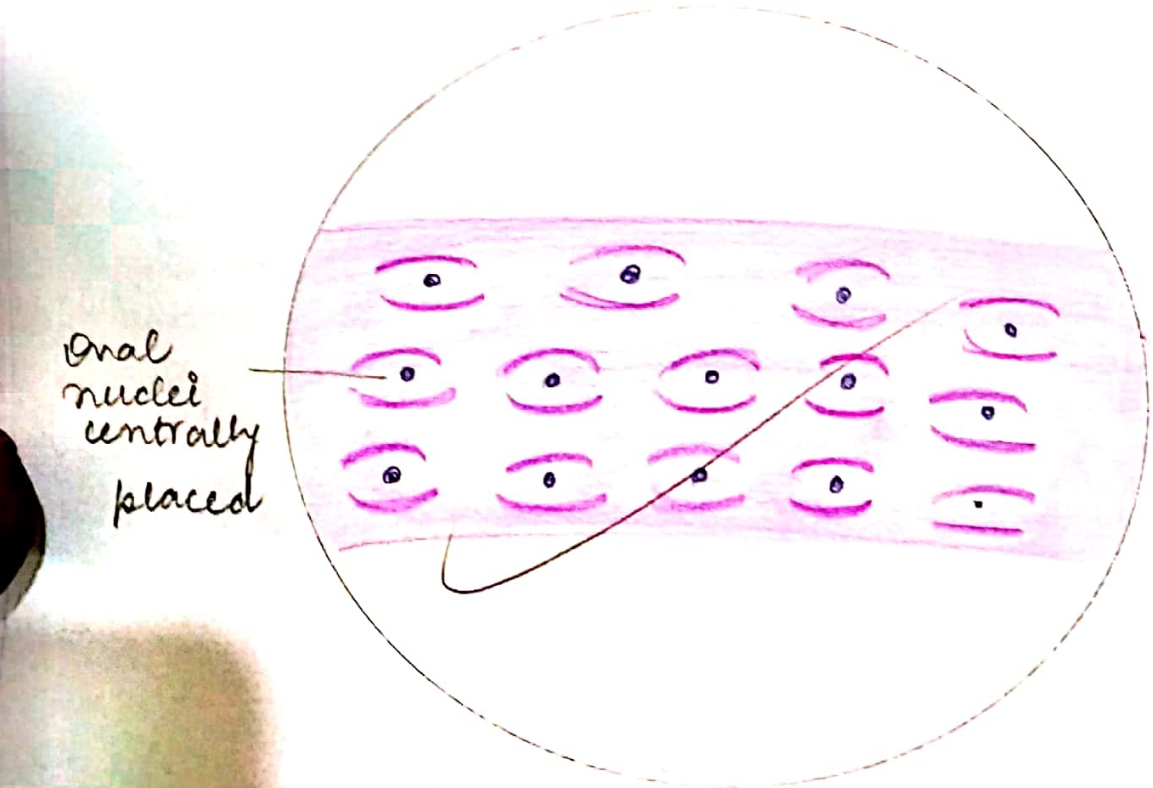
→ Haversian canal is seen in osteon
→ Around the canal, concentric lamellae are there
→ Lacunae are small spaces in which osteocytes are present
→ Volkmann's canal interconnecting adjacent haversian canal may be seen.

Spongy or Cancellous bone

→ made up of network of bony trabeculae in which nuclei of some osteocytes can be seen.
→ Spaces filled by bone marrow in which fat cells are present
→ Spaces b/w the fat cells is filled by various blood forming cells.



Skeletal (striated, stripped, voluntary) Muscle



Smooth (plain, involuntary) Muscle

MUSCLE TISSUE

Skeletal (striated, stripped, voluntary) Muscle

→ On longitudinal section, fibres show characteristic transverse striations

→ fibres are long and parallel without branching.

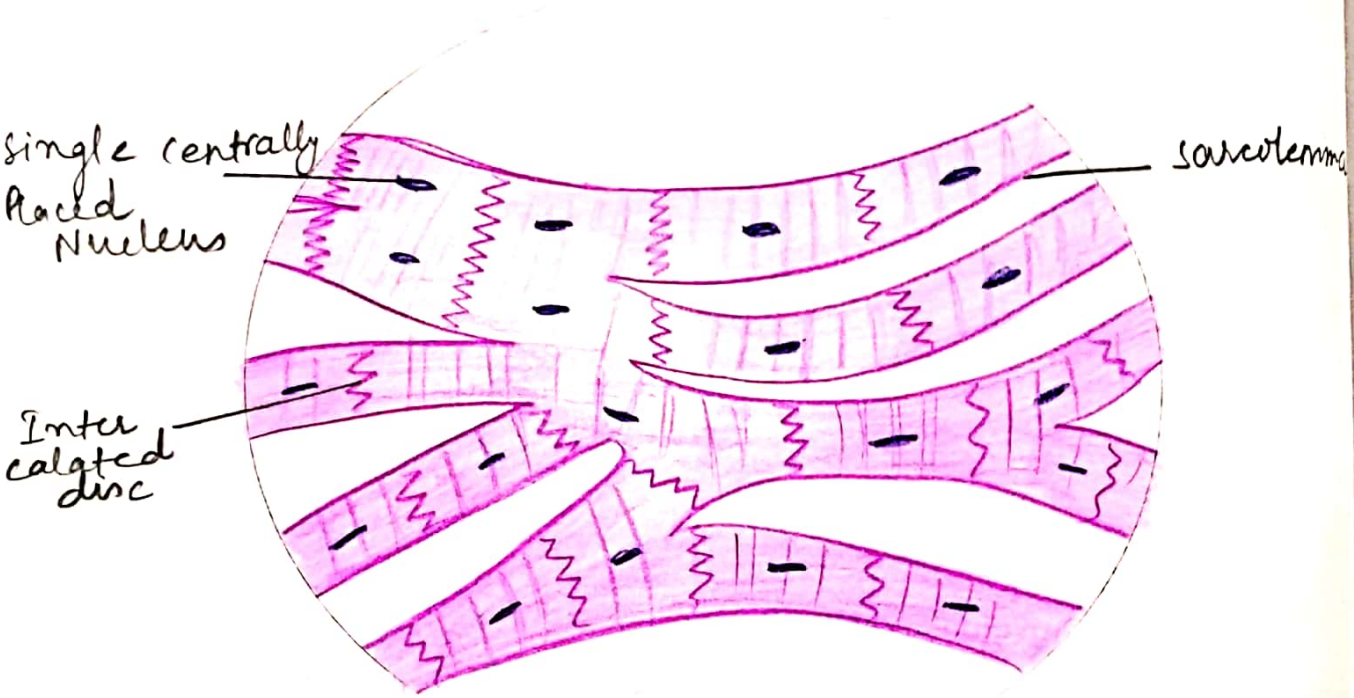
→ Many flat nuclei are placed at periphery.

Smooth (plain, involuntary) Muscle

→ Elongated, spindle shaped cells without striations are seen.

→ A single elongated centrally placed nucleus can be identified.

→ Present in walls of parts of gut in urinogenital tract.



Cardiac Muscle

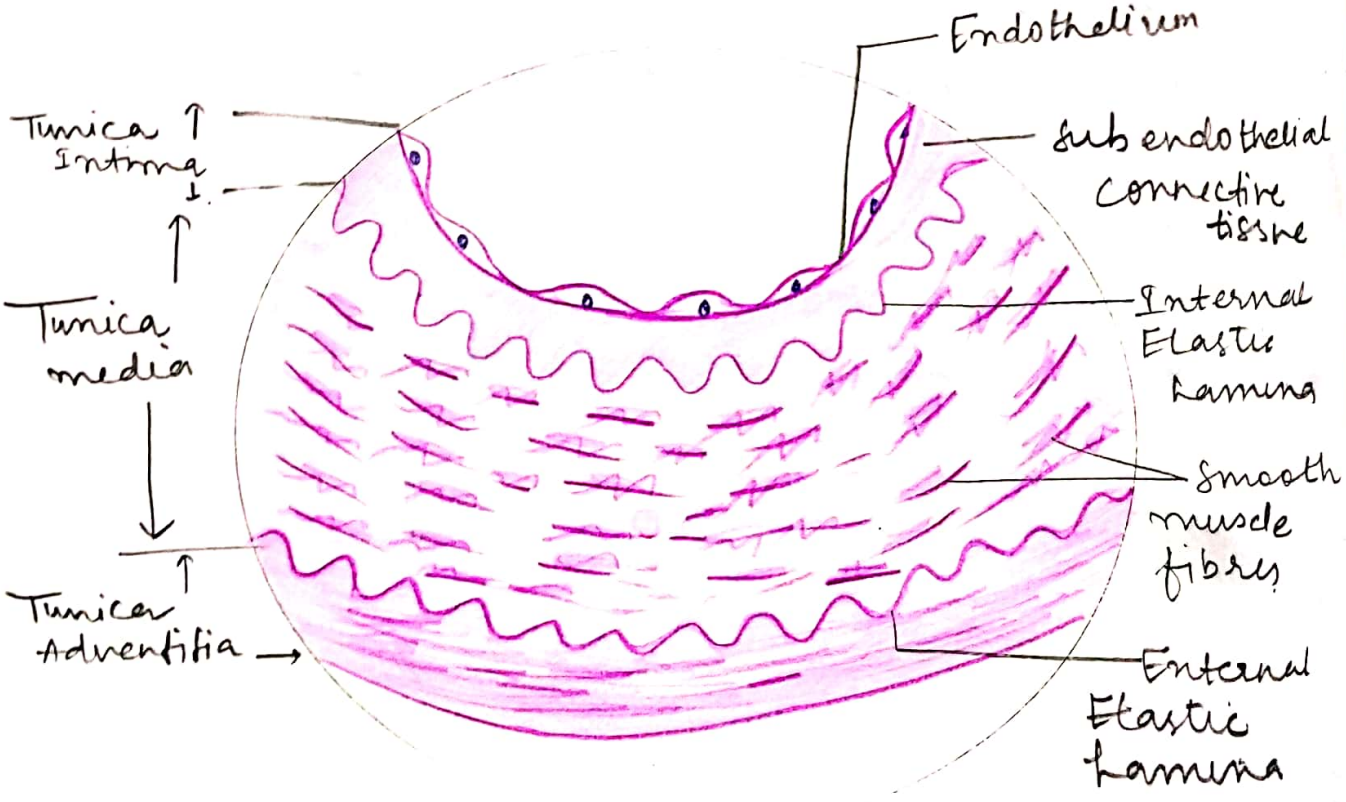
Cardiac Muscle

→ made up of cells each of which has a centrally placed nucleus and transverse striations.

→ A clear space called perinuclear halo is seen around the nucleus.

→ fibres shows branching

→ Adjacent cells are separated from one another by intercalated disc.



Muscular Artery

1 Mus
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1Tunic
2.Tunic
3.Tunic

2 Ela

3 Mu

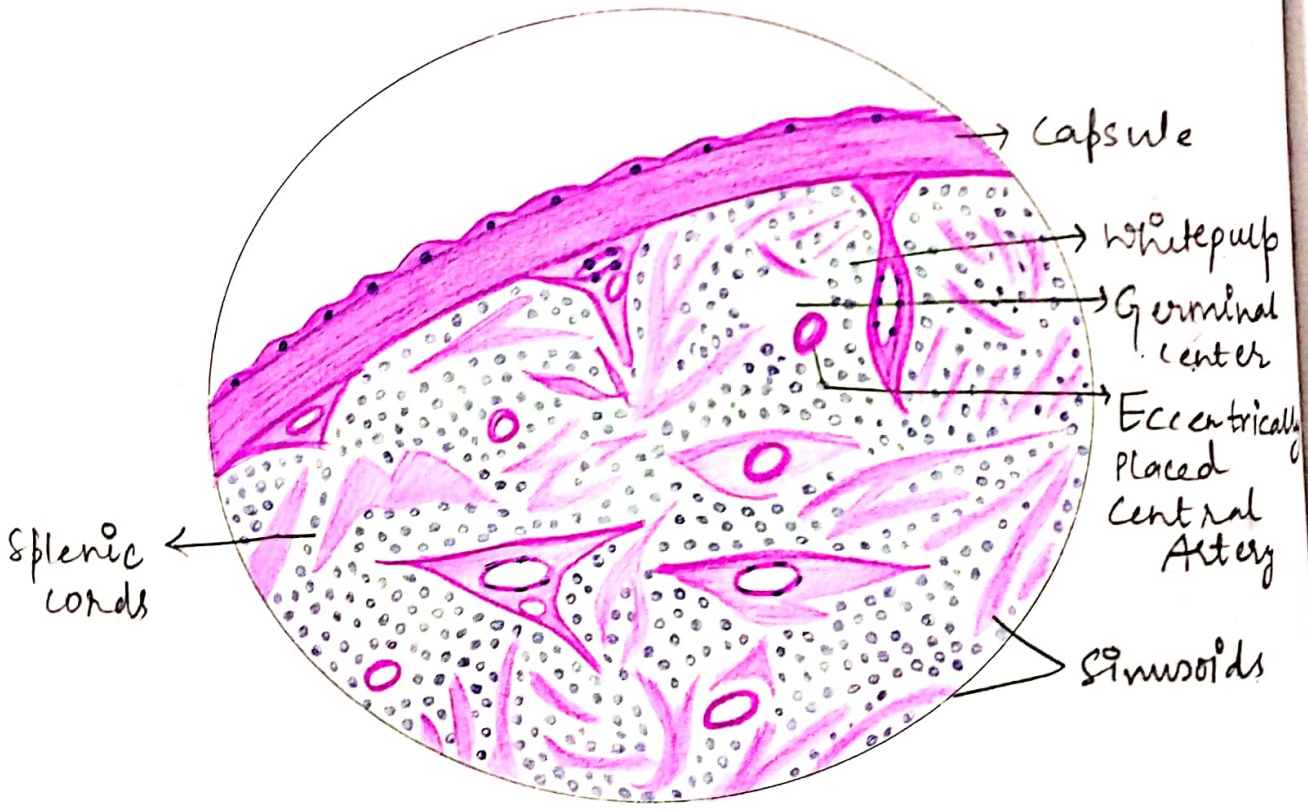
CIRCULATORY SYSTEM

1 Muscular Artery: The total thickness of the wall is more than the diameter of the lumen.

1Tunica Intima → made up of endothelium
2.Tunica media → composed of smooth muscle fibres circularly
3.Tunica adventitia → contains collagen fibres and few elastic fibres.

2 Elastic Artery:

3 Muscular Vein:



Spleen

Spleen

It is cha

① A thick
it Inte

② The sub
pulp
lympho

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→ Whi

LYMPHOID TISSUE

Spleen

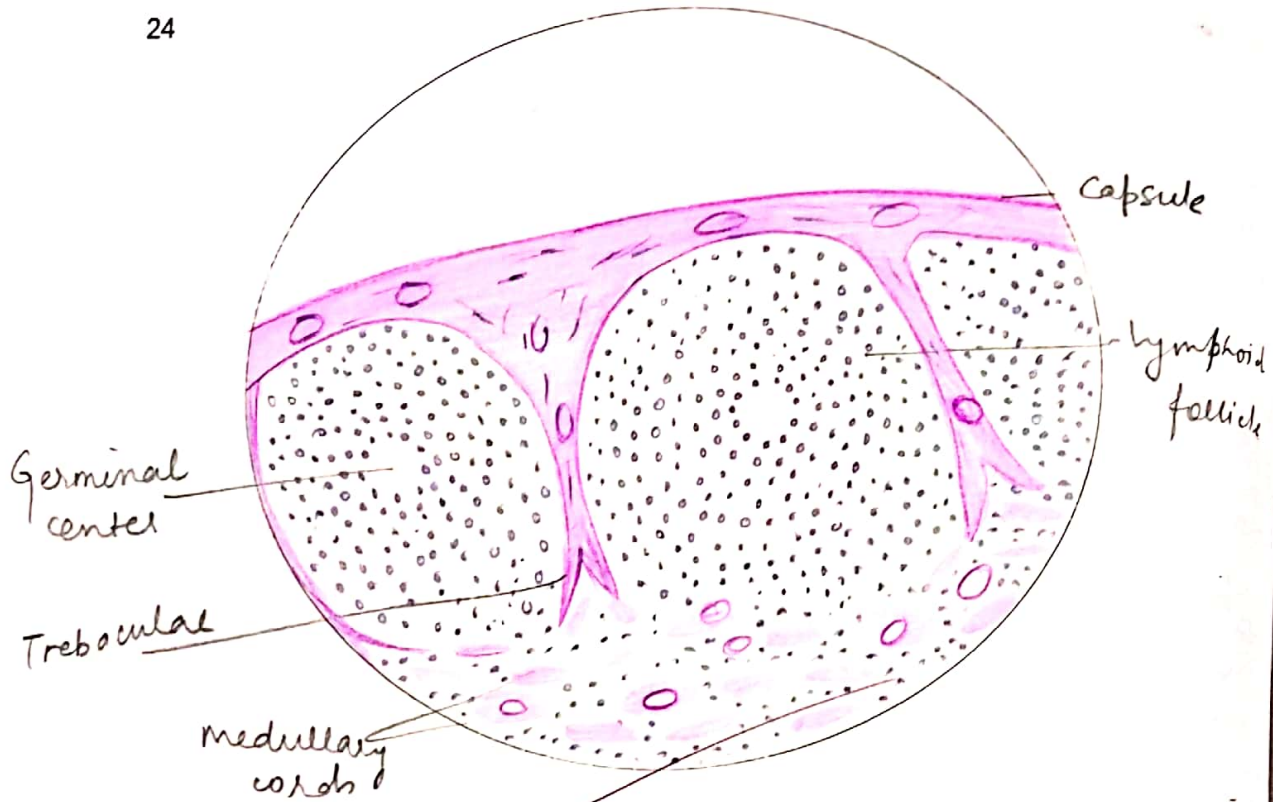
It is characterised by ↳

① A thick capsule with trabeculae extending from it into the organ.

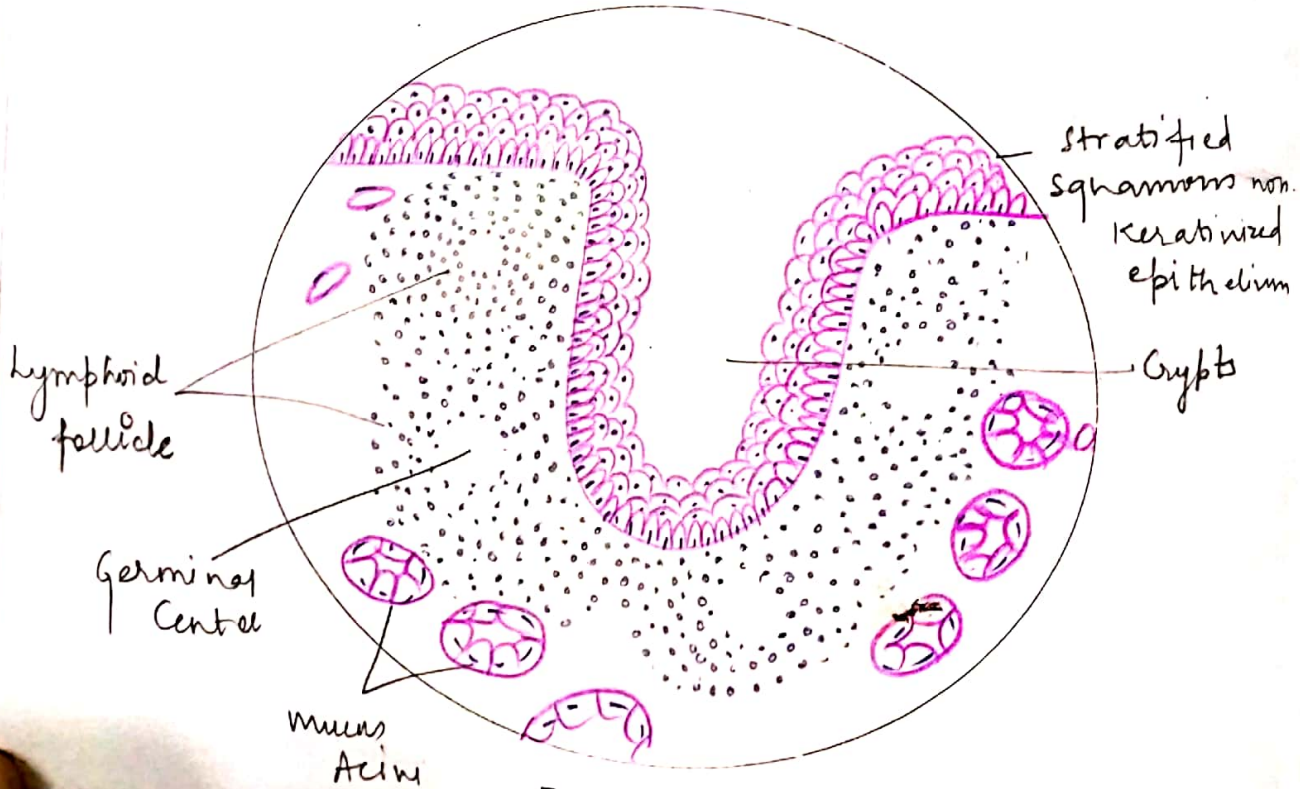
② The substance of the organ is divisible into red pulp in which there are diffusely distributed lymphocytes and numerous sinusoids.

→ white pulp has dense aggregations of lymphocyte.

→ white pulp are in the form of nodules surrounding arteride



Lymph Node



Palatine Tonsil

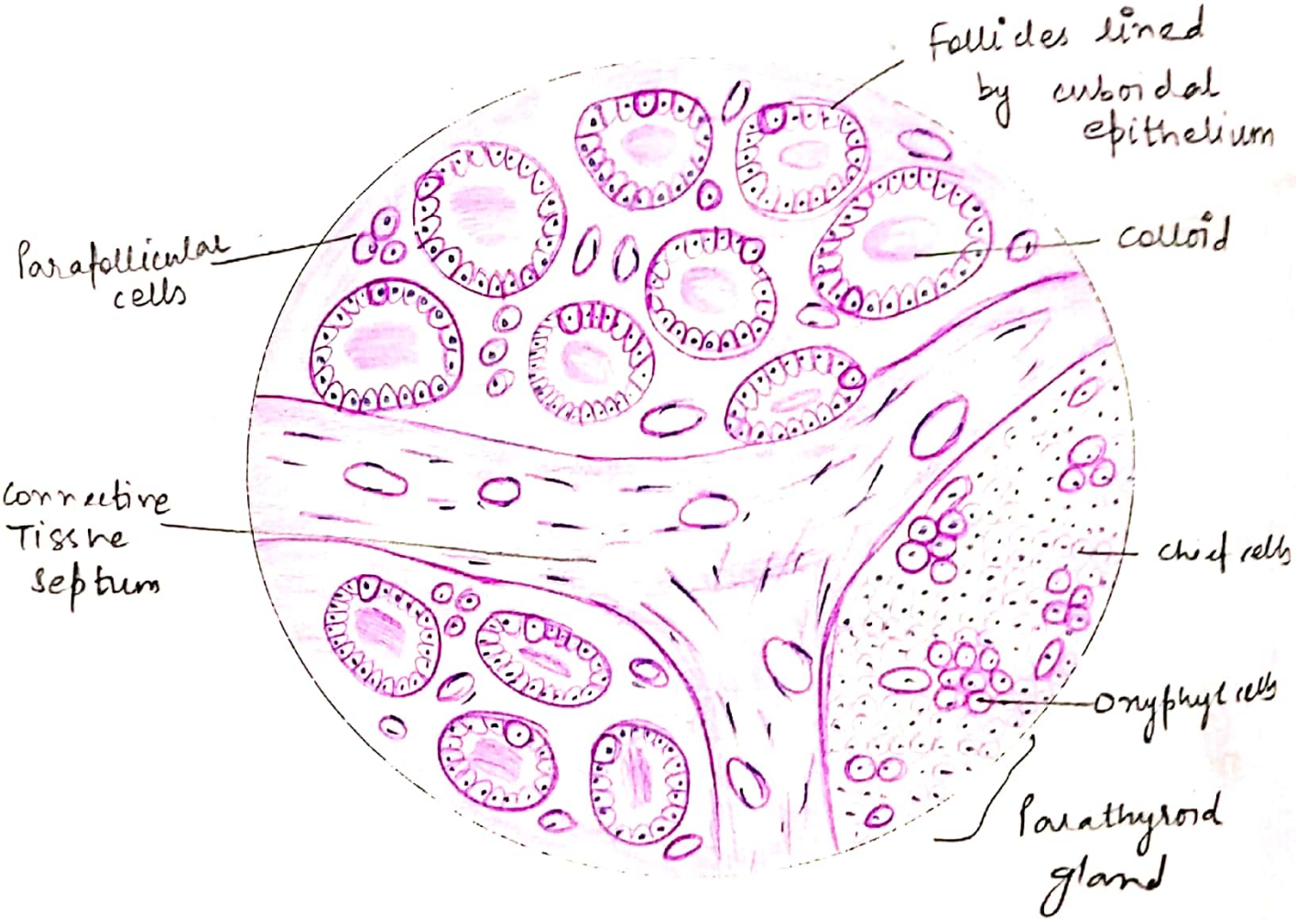
LYMPHOID TISSUE (contd.)

Lymph Node

→ fibrous capsule and subcapsular space seen
→ outer cortex, inner medulla differentiated.
→ cortex contains lymphoid follicles with germinal center.
→ medulla contains medullary cords and sinuses.

Palatine Tonsil

→ Surface lined by stratified squamous non-keratinized epithelium
→ surface shows depressions called tonsillar crypts.
→ Lymphoid follicles with germinal center seen along the crypts.



THYROID GLAND

THYROID GLAND

HYROID GLAND

→ secretion of follides of various sizes filled with colloid, lined by cuboidal cells.

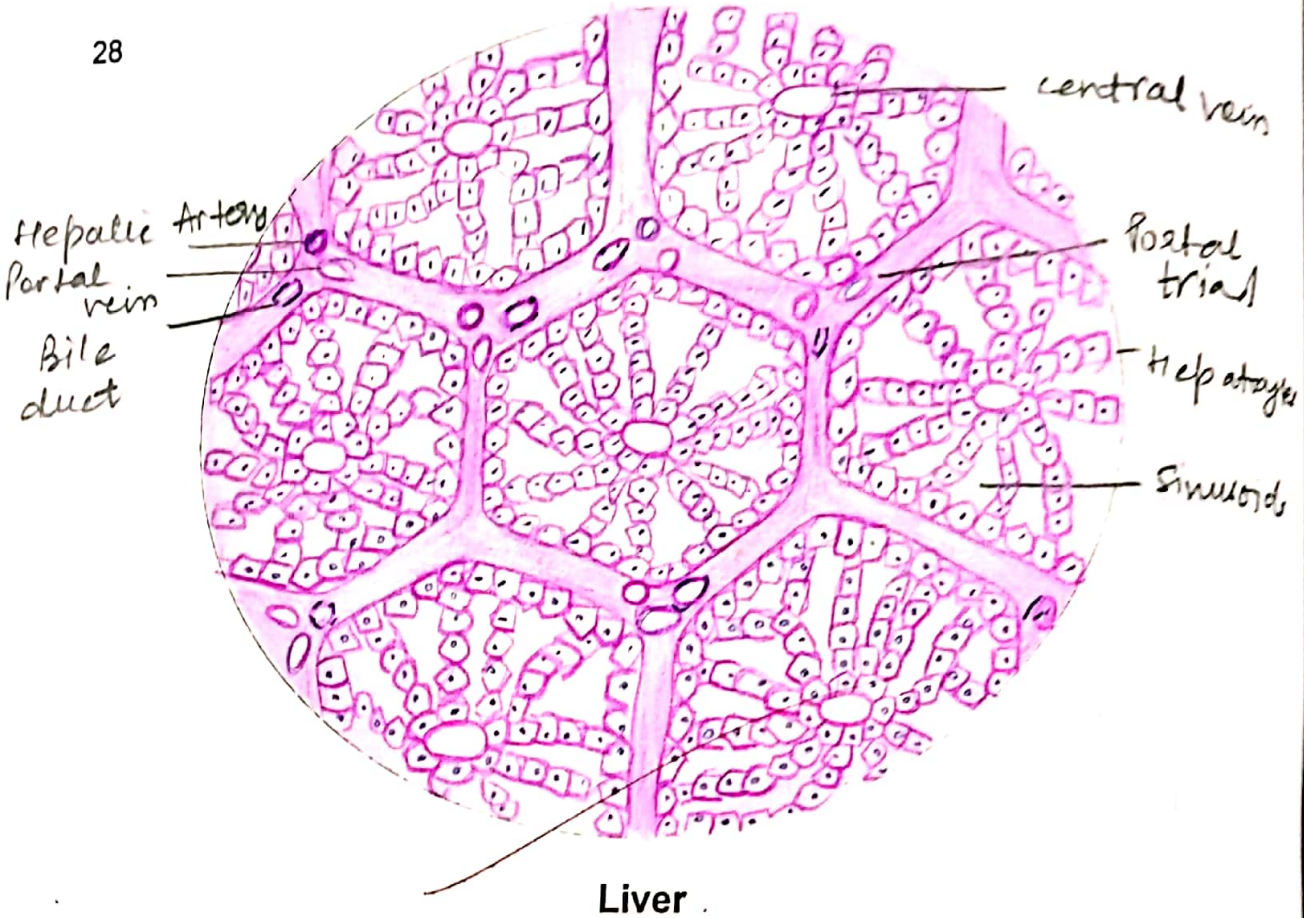
→ Parafollicular cells present

→ Highly vascular tissue – plenty of capillaries seen.

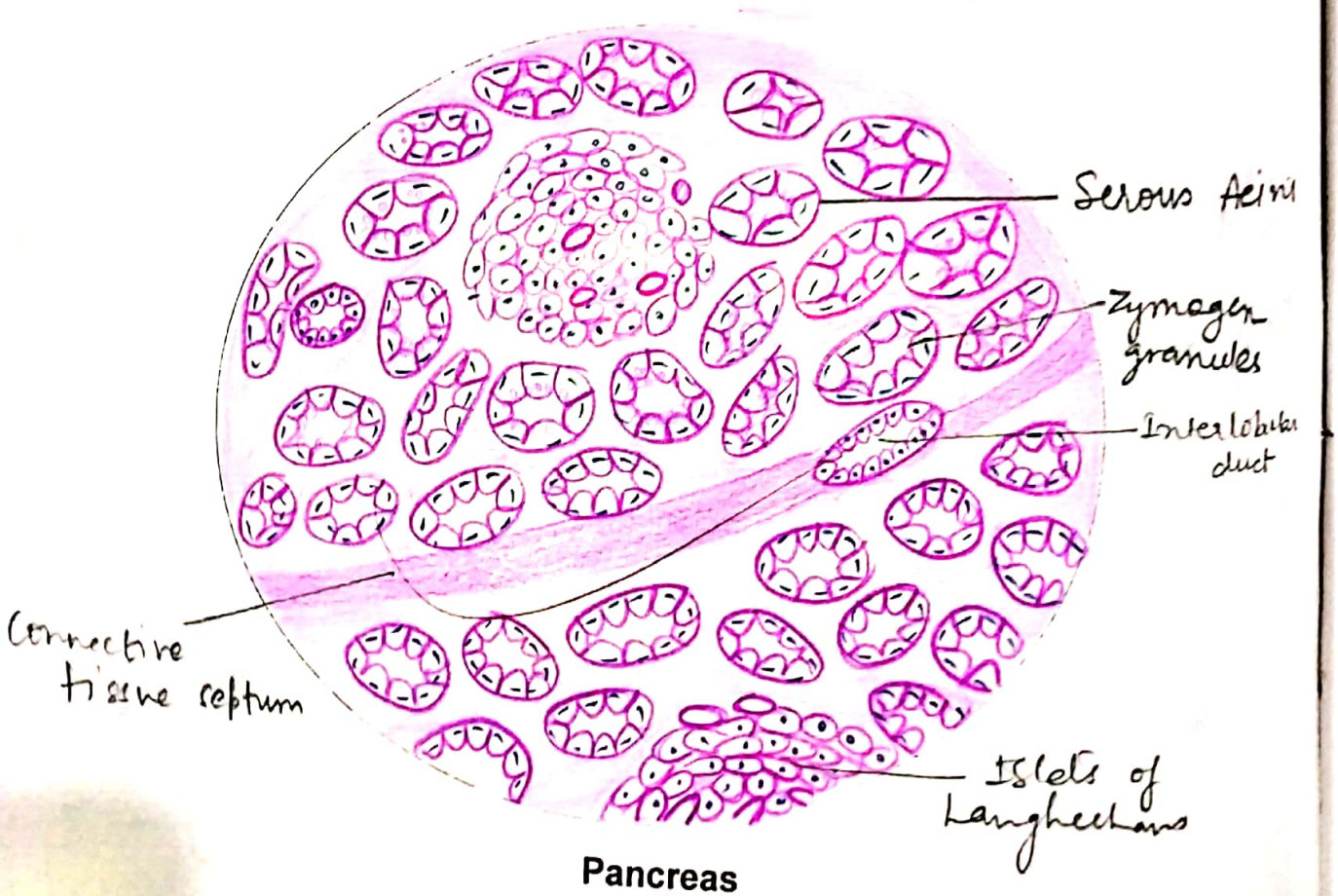
→ fibrous capsule surrounds the gland, sends septa inside dividing the gland into lobules.

→ follides are filled with eosinophilic homogenous material called colloid.

→ Parafollicular cells or C cells are located b/w the follicular cells. and basement membrane.



Liver



Pancreas

DIGESTIVE SYSTEM

Livor

→ Hexagonal area called hepatic lobules are present and are partially separated by connective tissue.

→ Each lobule has a small round space in centre called central vein.

→ Cords are made up of polygonal liver cells.

→ Along the periphery, there are angular intervals filled by connective tissue.

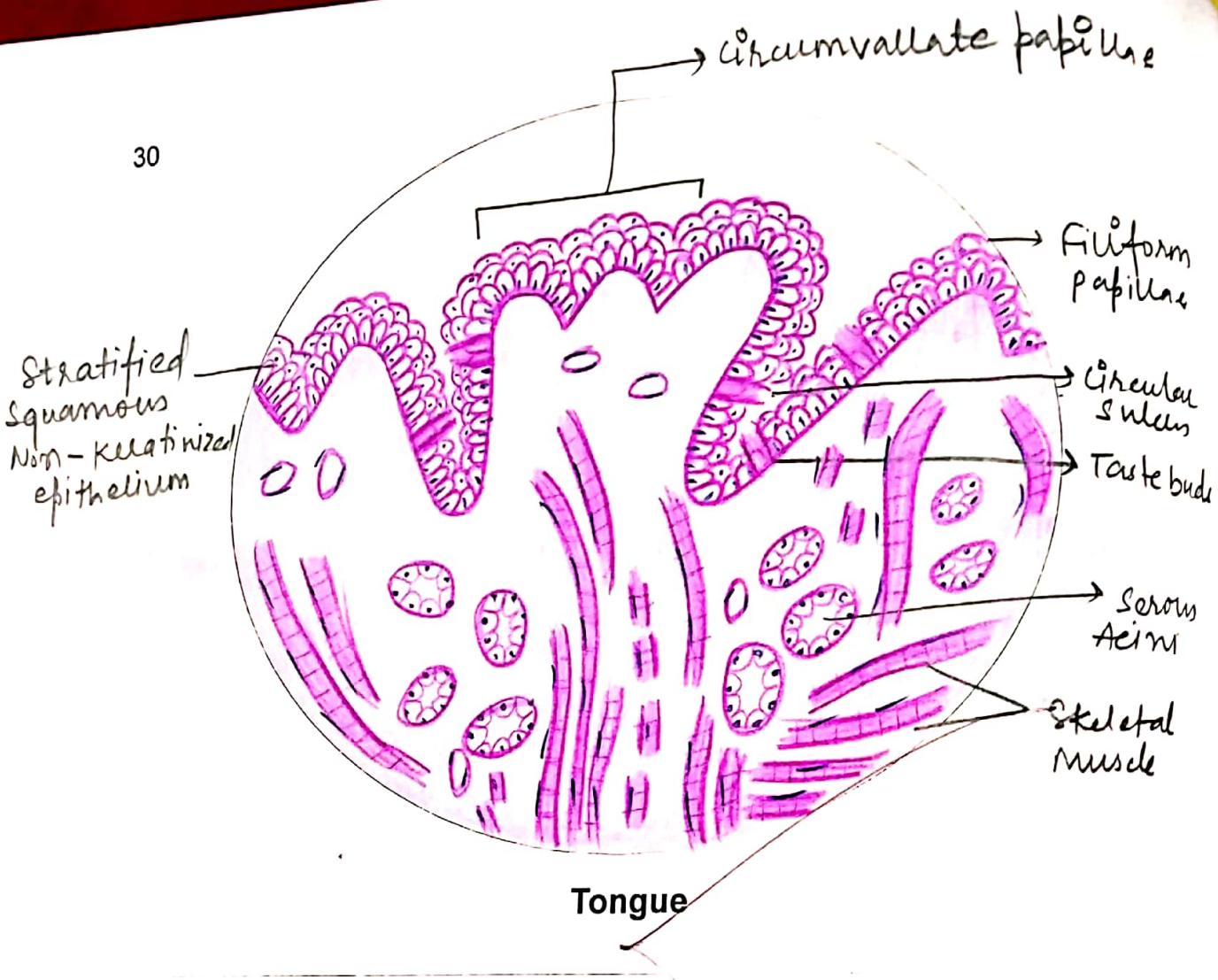
→ Portal vein, a branch of hepatic artery and an interlobular bile duct forms portal triad.

Pancreas

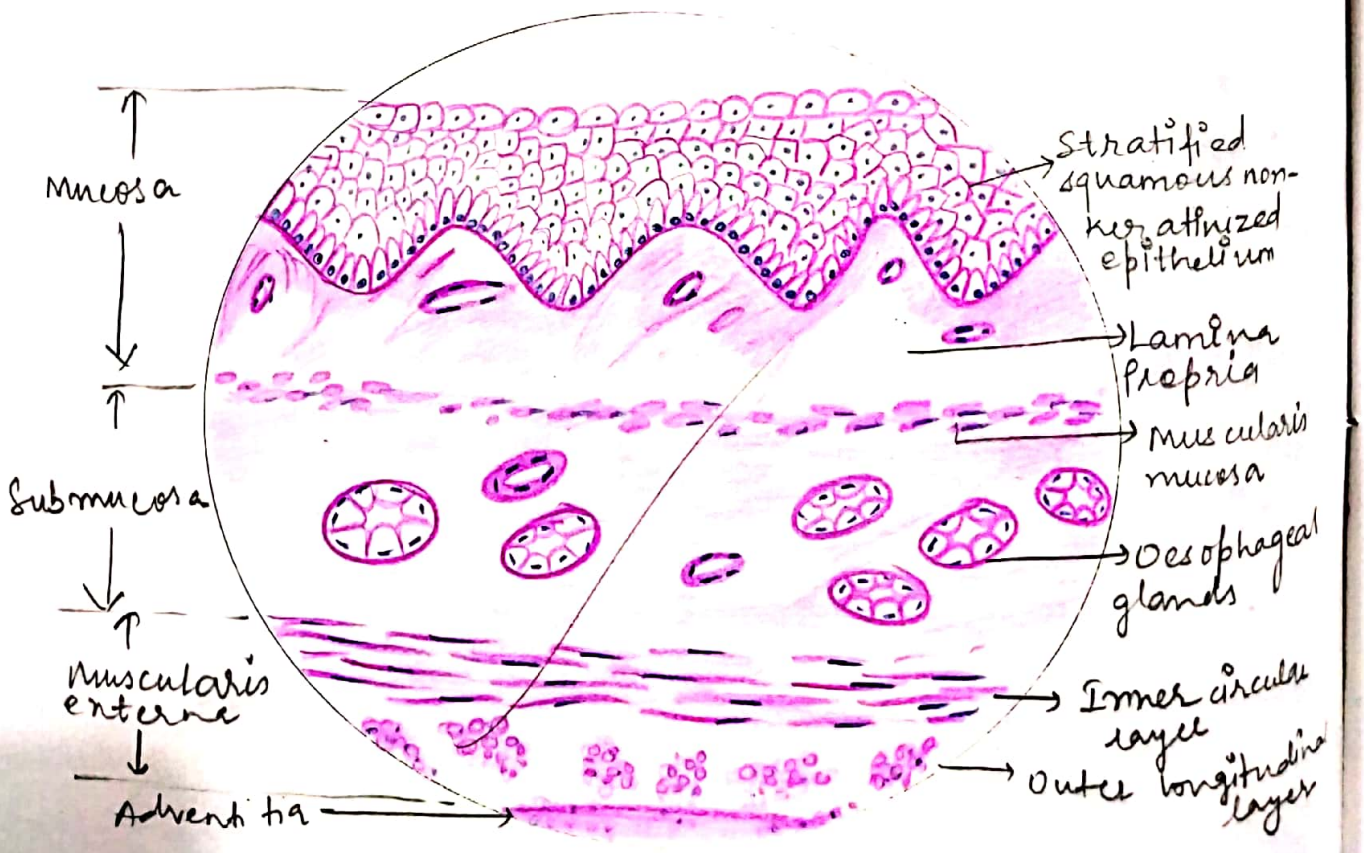
→ Gland is made up of serous acini

→ Cells forming the acini are basophilic.

→ At some places, acini are separated, by area where aggregations of cells is quite different from the acini form "pancreatic islets"



Tongue



Oesophagus

DIGESTIVE SYSTEM (Alimentary Canal)

Tongue

→ Covered on both surfaces by non-keratinised stratified squamous epithelium.

→ The undersurface of tongue is smooth, but on the dorsum shows papillae.

→ Each papillae has a core of connective tissue [Lamina Propria] covered by epithelium.

→ some papillae are pointed [filiform] while others are broad at top [fungiform], circumvallate papillae are broad and at same level as the surrounding mucosa.

→ Main mass is formed by skeletal muscle.

→ Serous and mucous glands are present

Oesophagus

→ On transvere section it shows following layers from within outwards ↔

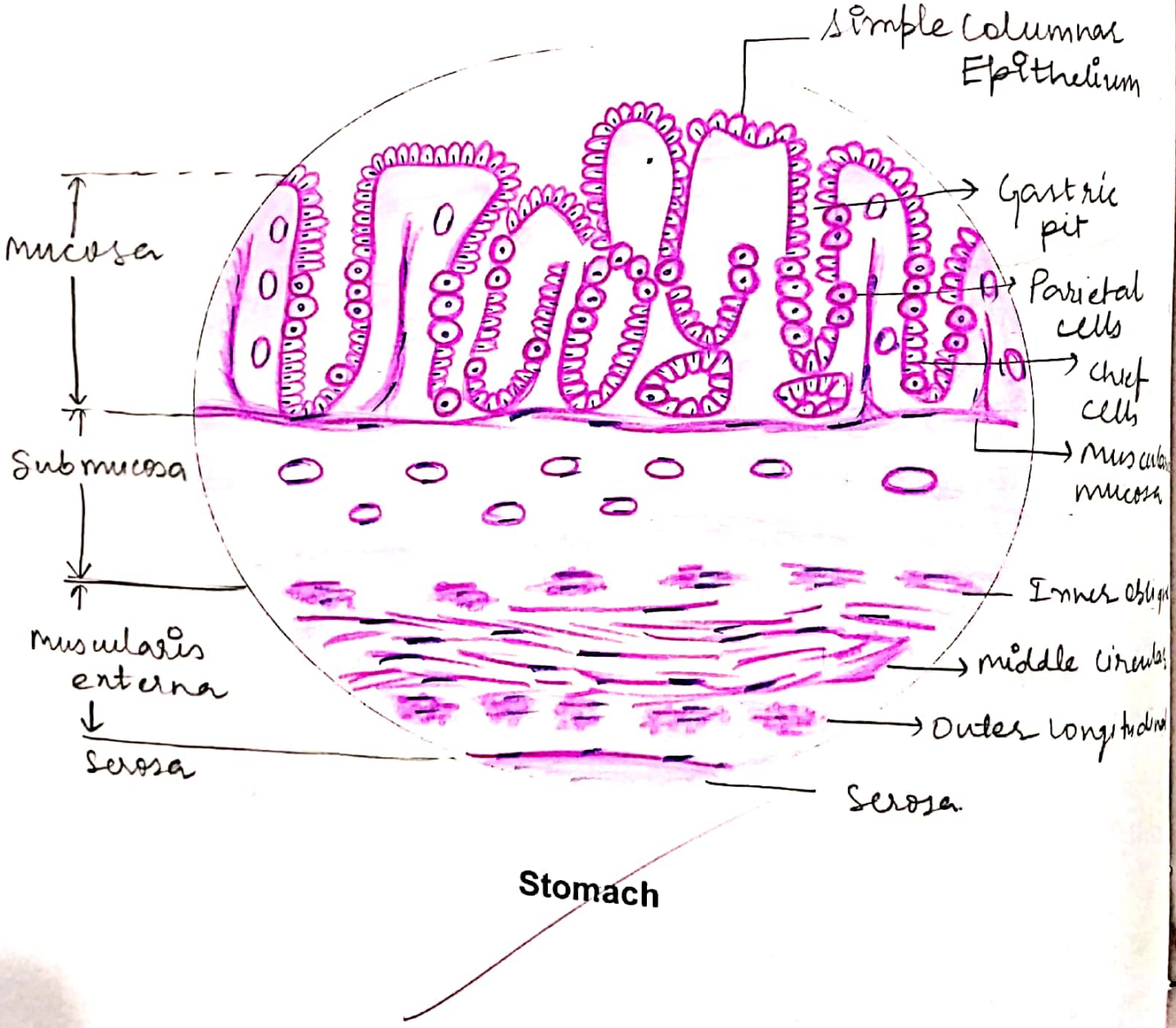
(1) Lining of non-keratinised stratified squamous epithelium.

(2) Connective tissue of Lamina propria

(3) Muscularis mucosa collectively constitute mucosa.

(4) Submucosa having oesophageal glands.

(5) Layers of circular musde and the layers of longitudinal muscle constituting muscularis externa.


Simple Columnar Epithelium
Gastric pit
Parietal cells
Chief cells
Muscularis mucosa
Inner oblique
Middle circular
Outer longitudinal
Serosa
mucosa
Submucosa
muscularis externa
Serosa

Stomach

DIGESTIVE SYSTEM (contd.)

Stomach

It is composed of ↔

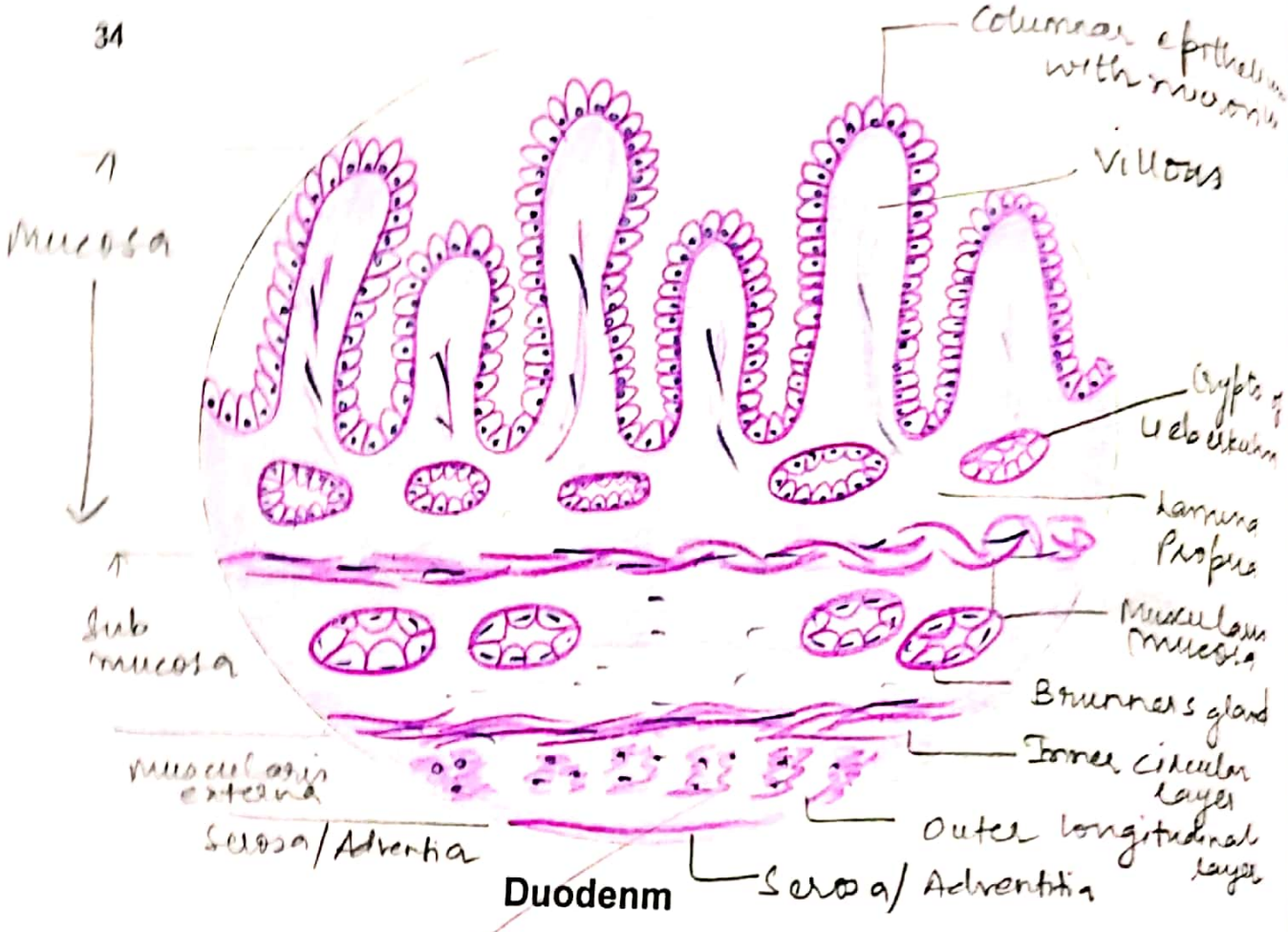
(i) mucosa
(ii) Submucosa
(iii) muscularis externa
(iv) serosa

→ mucosa is lined by simple tall columnar epithelium. It shows invagination called gastric pits. Lamina propria contains gastric glands. muscularis mucosa is made up of layers of smooth muscles.

→ submucosa consist of fibroelastic connective tissue, blood vessels and Meissner's nerve plexus.

→ muscularis externa is composed of three layers of smooth muscles → Inner oblique, middle circular and outer longitudinal.

→ serosa is visceral peritoneum [simple squamous epithelium] over a layer of loose connective tissue.



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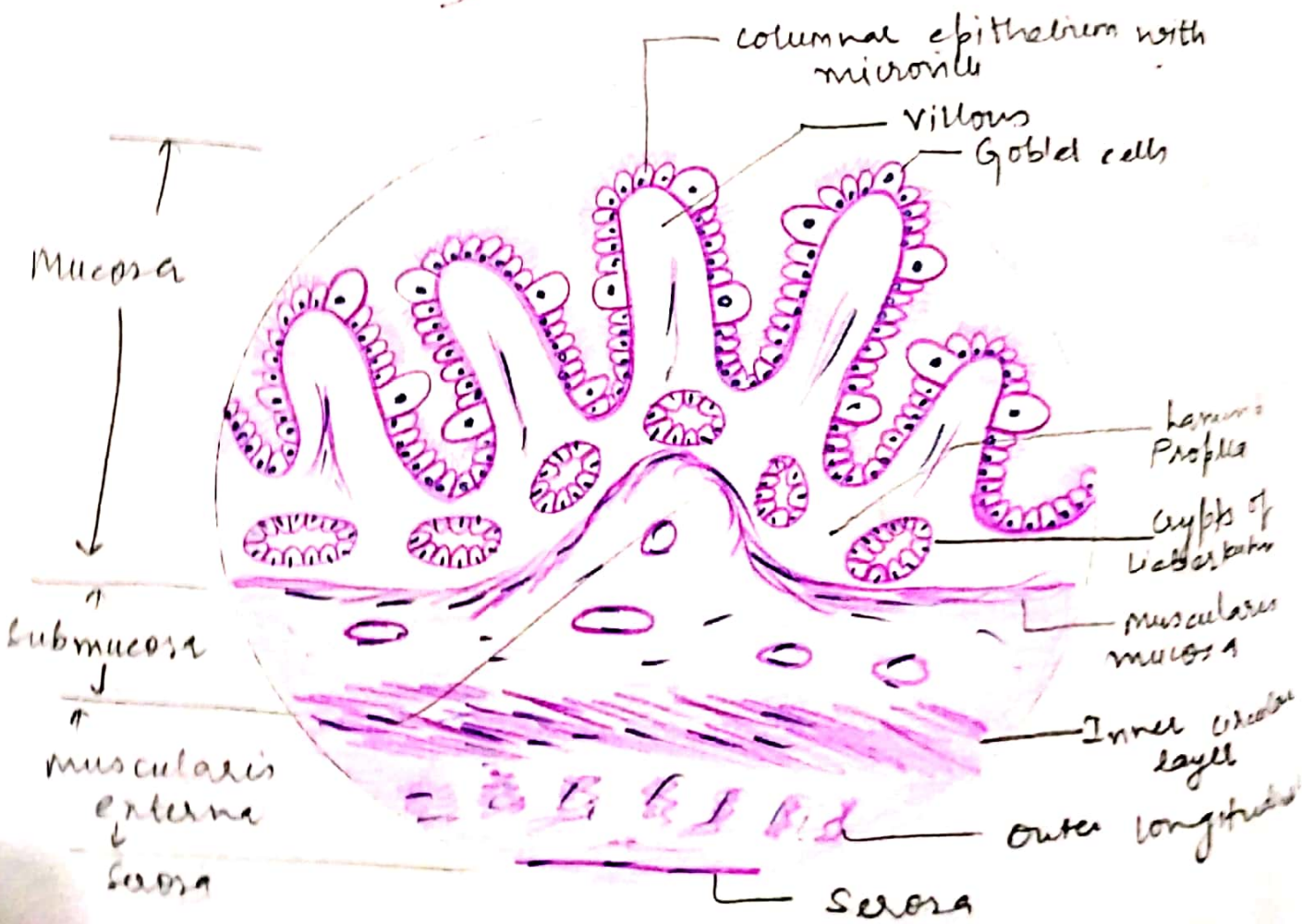


Jejunum

DIGESTIVE SYSTEM (contd.)

Duodenum

Submucosa is packed with mucous secreting glands of Brunner.

→ These are present below muscularis mucosa

Brunner's gland are tubuloalveolar glands.

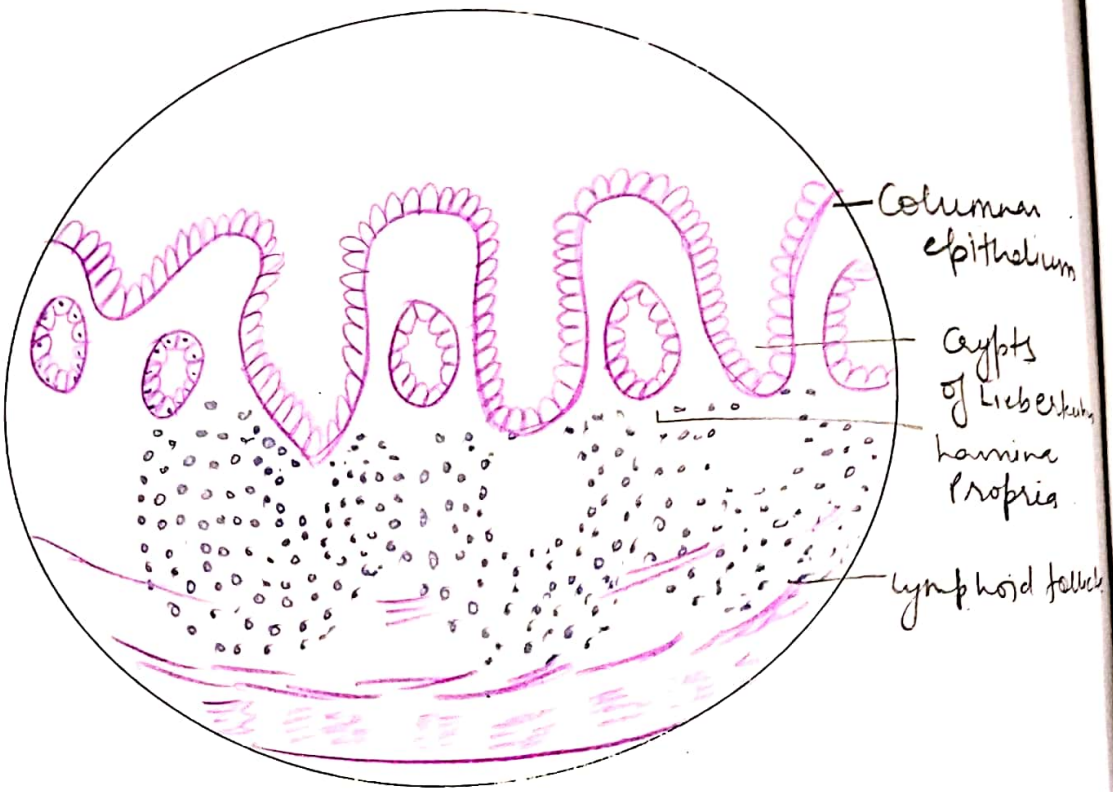
→ cells are mucous secreting columnar cells having flattened basal nuclei.

Jejunum

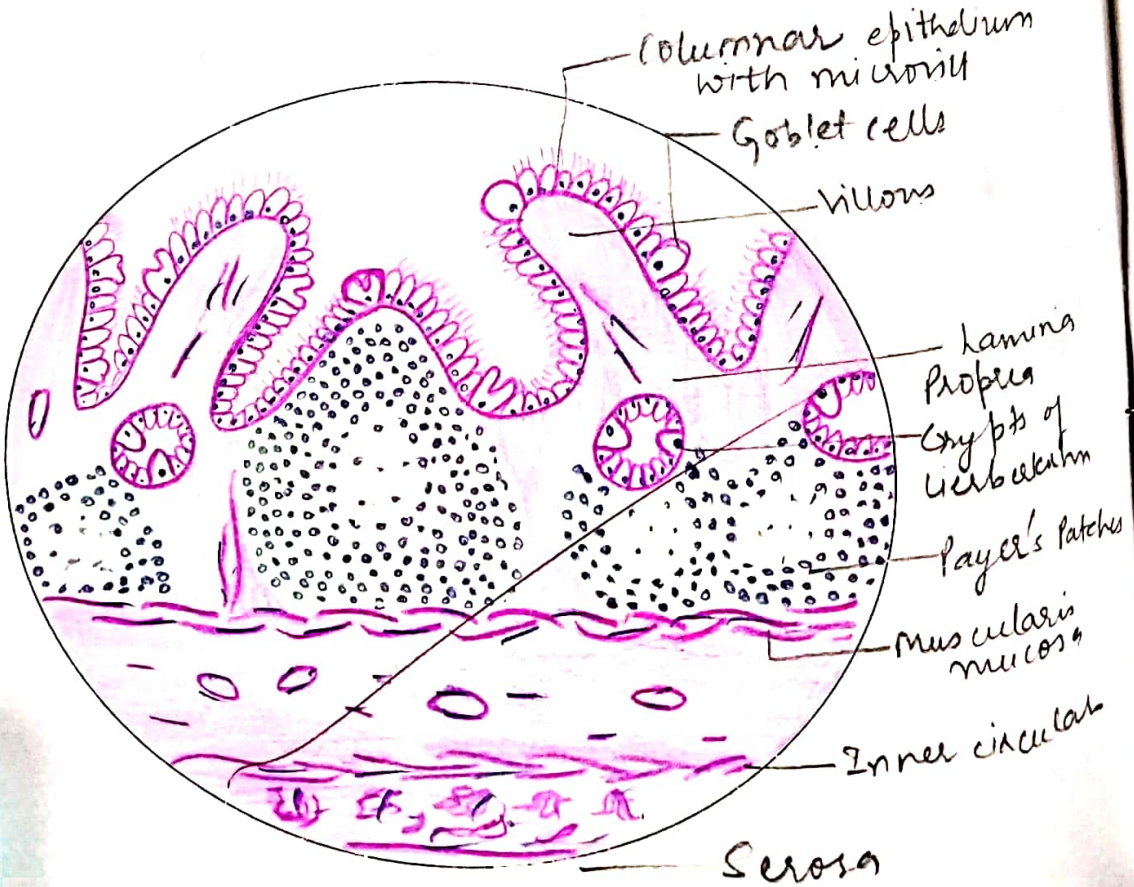
→ mucosal villi, lined by columnar epithelium with microvilli and lots of goblet cells.

→ Intestinal glands present

→ No submucosal glands or peyer's patch.



Jejunum ~~—~~ Appendix



Ileum

Appendix

Jejunum : diffe

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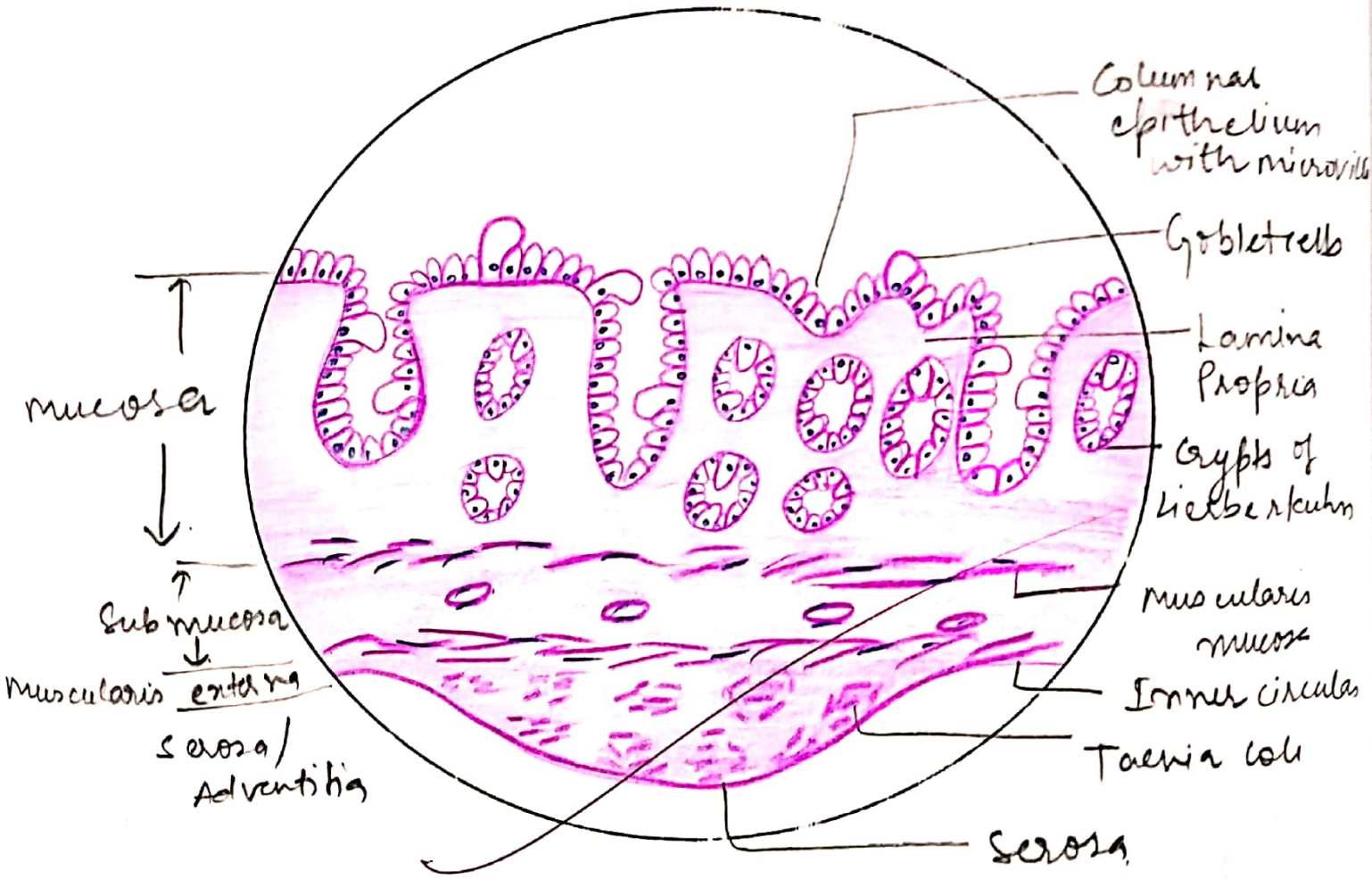
Appendix

Jejunum : differentiating features are

Ileum : Differentiating features are

→ Mucosal villi, lined by columnar epithelium with microvilli and lots of goblet cells.

→ Peyer's patch in mucosal extending to submucosa


Columnar epithelium with microvilli
Goblet cells
Lamina Propria
Crypts of Lieberkuhn
muscularis mucosa
Inner circular
Taenia coli
Serosa
mucosa
Submucosa
Muscularis externa
Serosa/ Adventitia

Colon

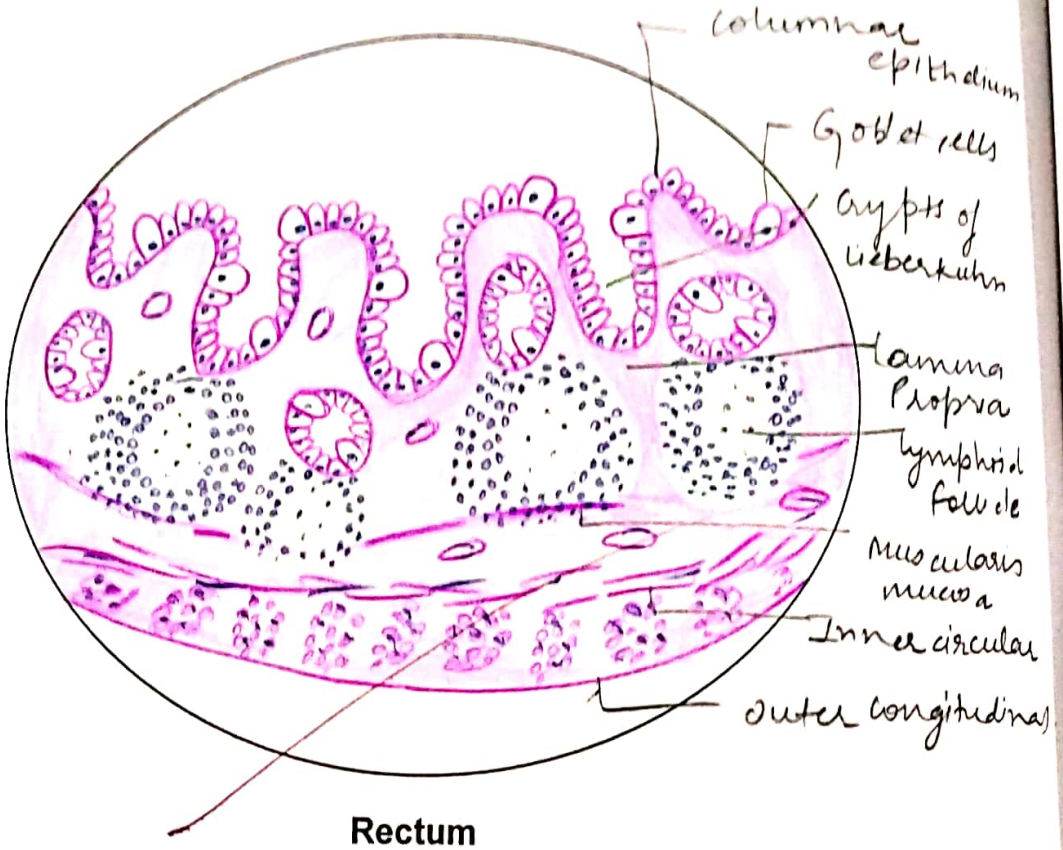
DIGESTIVE SYSTEM (contd.)

Colon

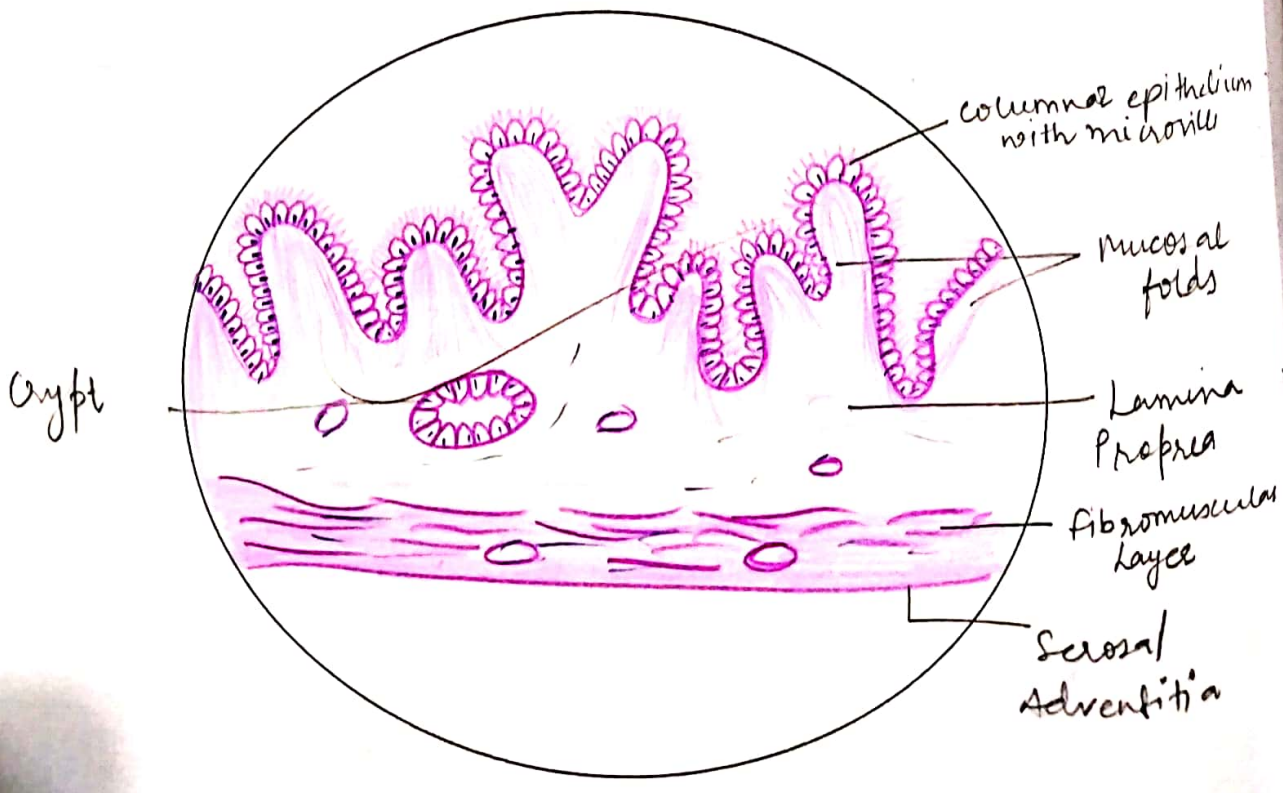
→ lining epithelium is tall columnar with lots of goblet cells.

→ Lamina propria is filled with crypts of Lieberkuhn.

→ Taenia coli in the muscularis externa.



Rectum



Gall Bladder

Rectum

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Gall Bla

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Rectum

→ lining epithelium is tall columnar with lots of goblet cells.

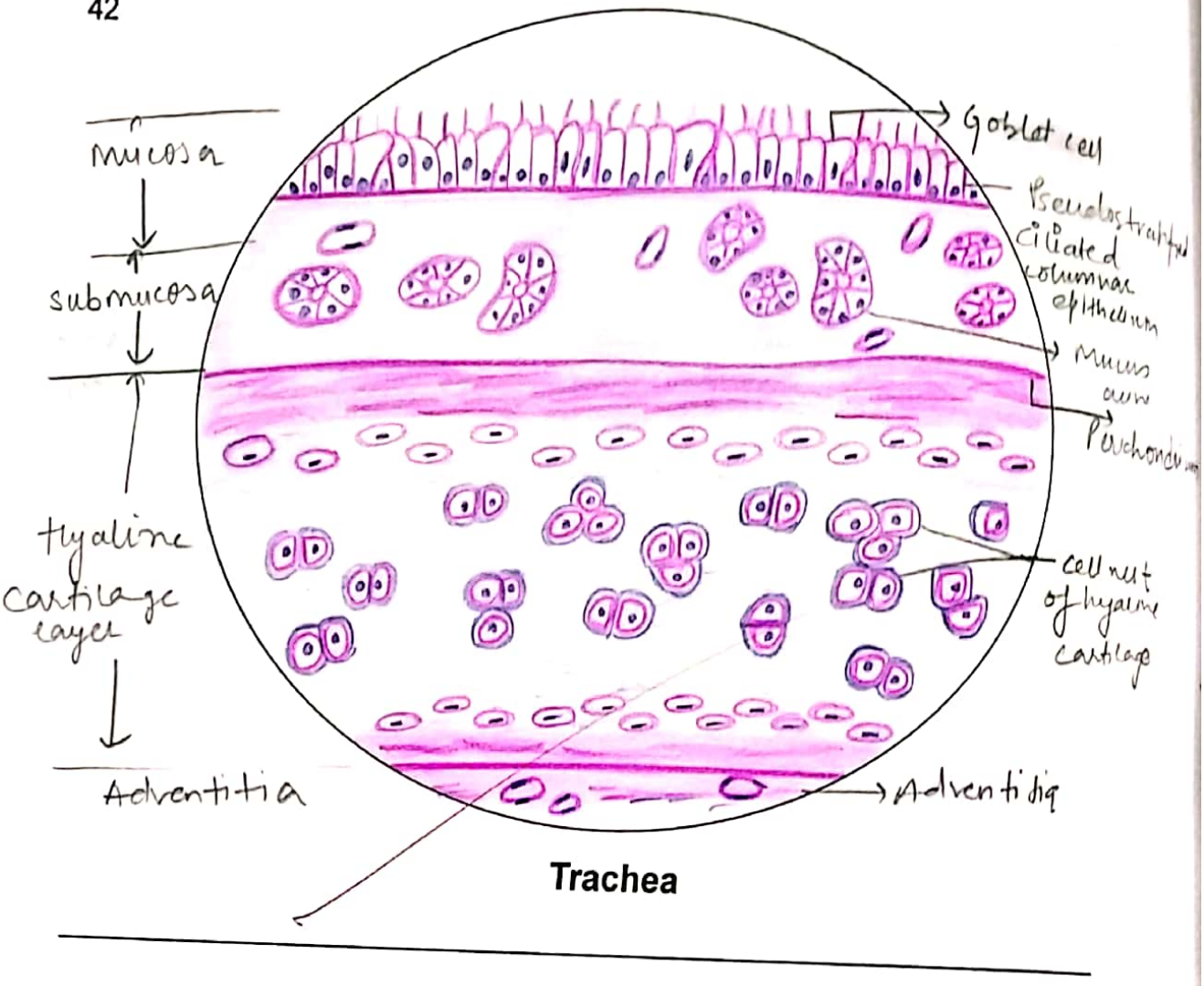
→ Lamina propria filled with lymphoid follicles and few crypts of Lieberkuhn.

→ No villi, no taenia coli

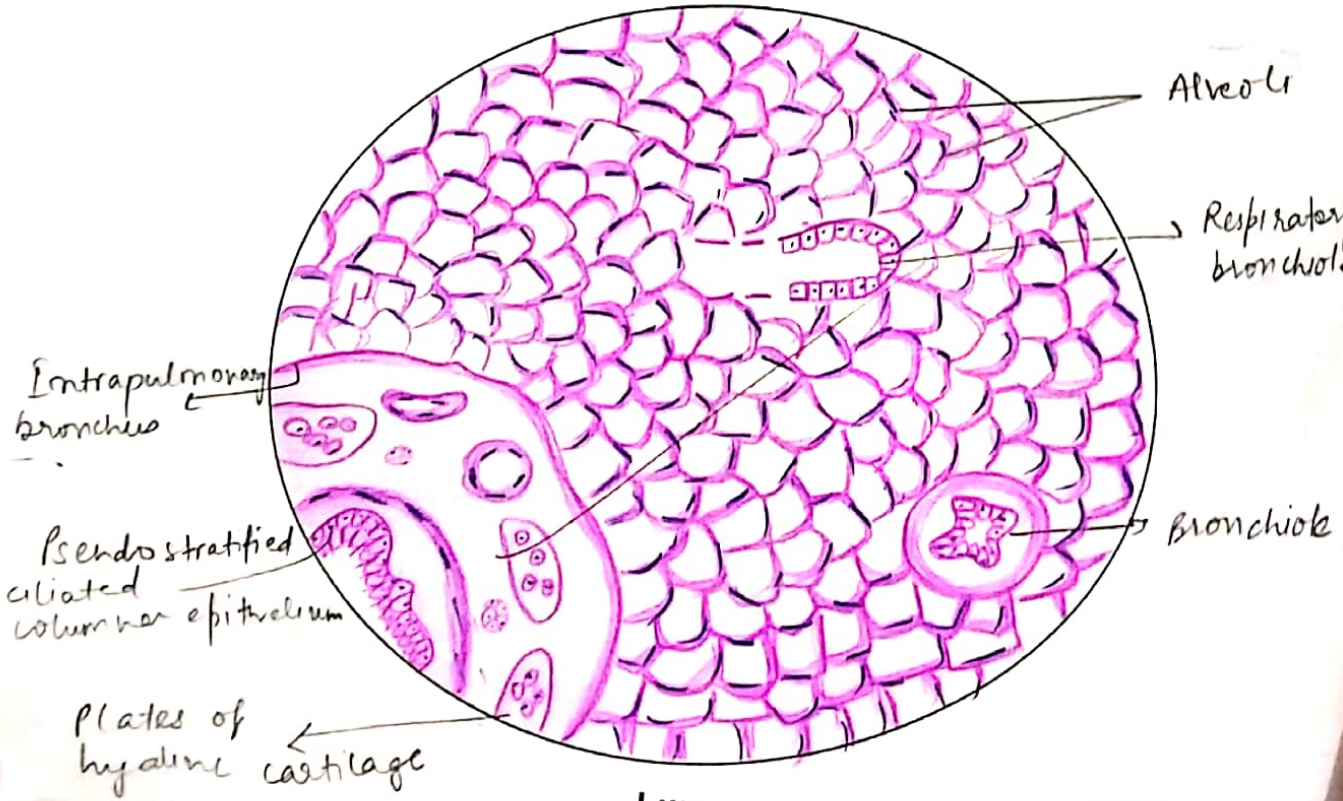
Gall Blader

→ mucosa thrown into folds lined by simple tall columnar epithelium with brush border.

→ fibromuscular wall seen



Trachea



Lung

RESPIRATORY SYSTEM

Trachea

→ wall of trachea is made up of layers but these are quite different

→ mucosa is formed by pseudostratified ciliated columnar epithelium with goblet cells and underlying lamina propria

→ submucosa is found deep to mucosa and is made up of loose connective tissue containing mucous, sirous gland, blood vessels and ducts of gland

→ Next layer is made up of hyaline cartilage. chondrocytes increase in size from periphery to centre. They may appear as isogenous groups surrounded by darkly stained territorial matrix.

→ External to the cartilage is the outer casking of collagen fibres called adventitia.

Lung

→ Lung substance is made up of numerous alveoli.

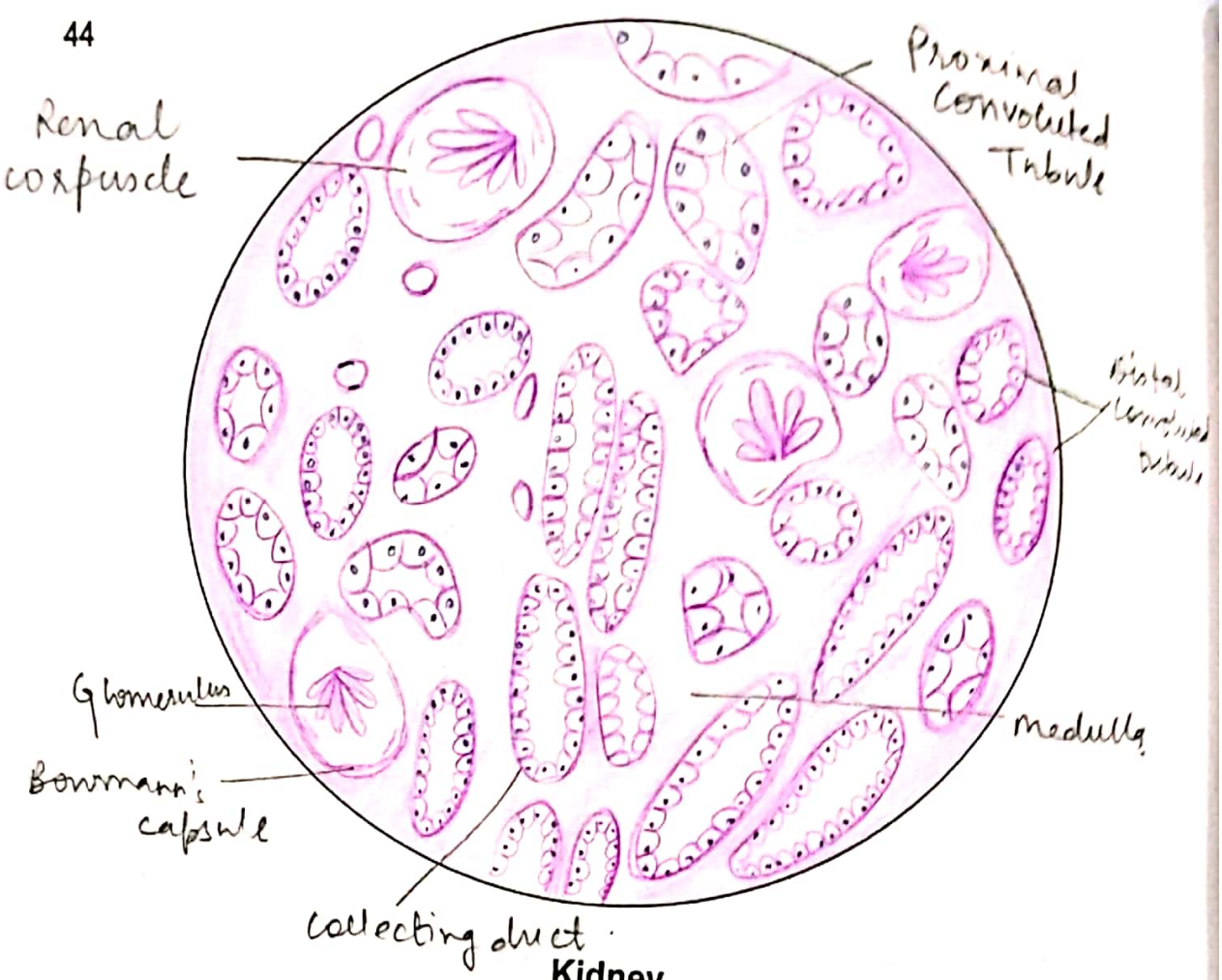
→ Alveoli are thin walled spaces lined by simple squamous epithelium.

→ smooth muscle cartilage and glands are present in the wall of large bronchus and it is lined by pseudostratified ciliated columnar epithelium with goblet cells

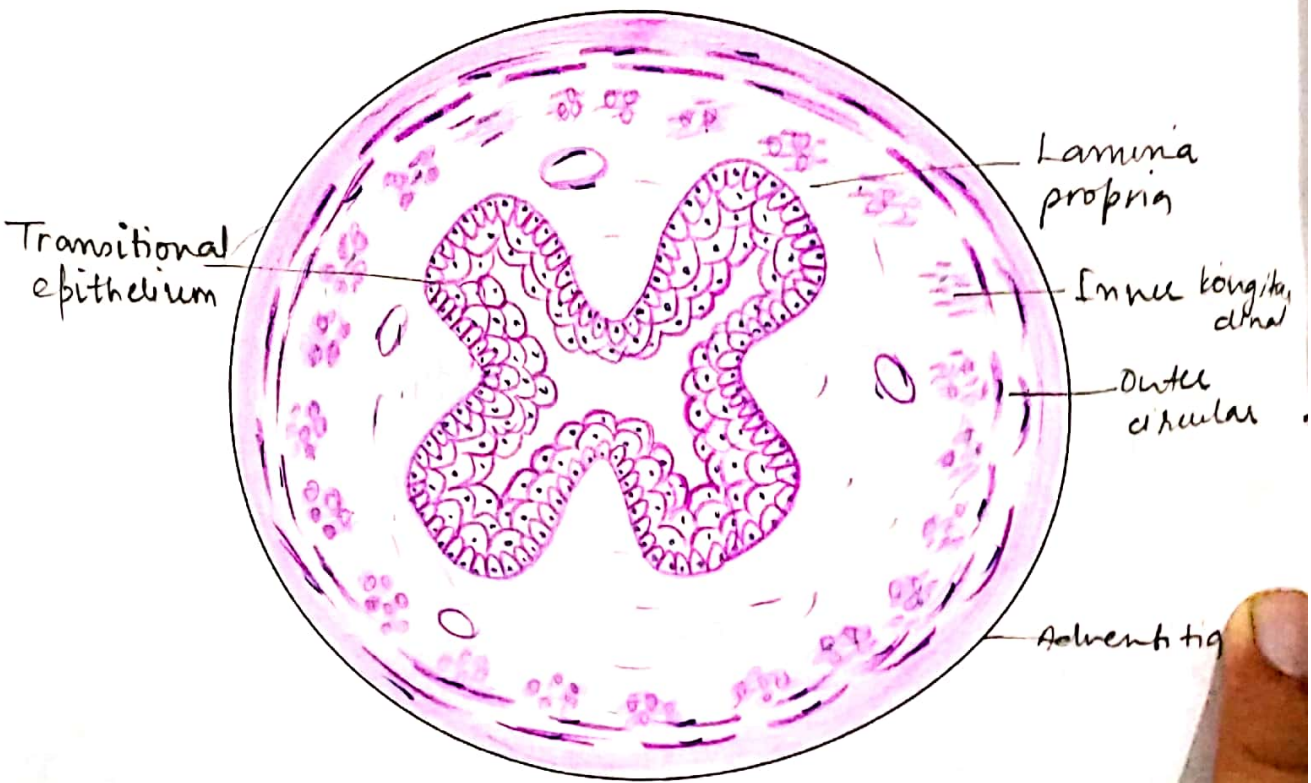
→ Small bronchioles- simple columnar epithelium, wall of smooth muscle, no cartilage in their walls.

→ Respiratory bronchiole and alveolar duct are also present.

→ Pleura has a lining of mesothelium resting on 2 layers of connective tissue



Kidney



Ureter

URINARY SYSTEM

Kidney

① Outer cortex – Renal corpuscles and sections of proximal and distal convoluted tubules seen

② Inner medulla – sections of collecting ducts and loop of Henle seen

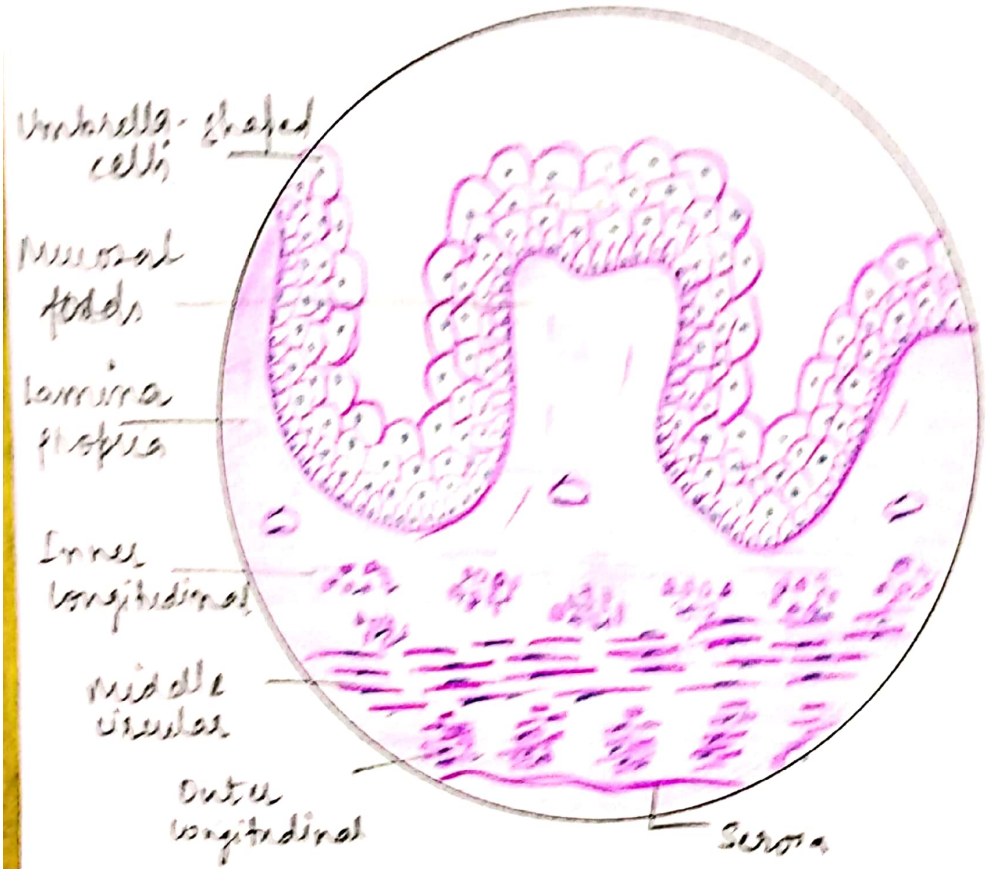
③ The lumen of PCT is small and indistinct. It is lined by cuboidal epithelium.

Ureter

① Mucosal folds lined by transitional epithelium

② Muscular tube – inner longitudinal, outer circular layer of smooth muscles

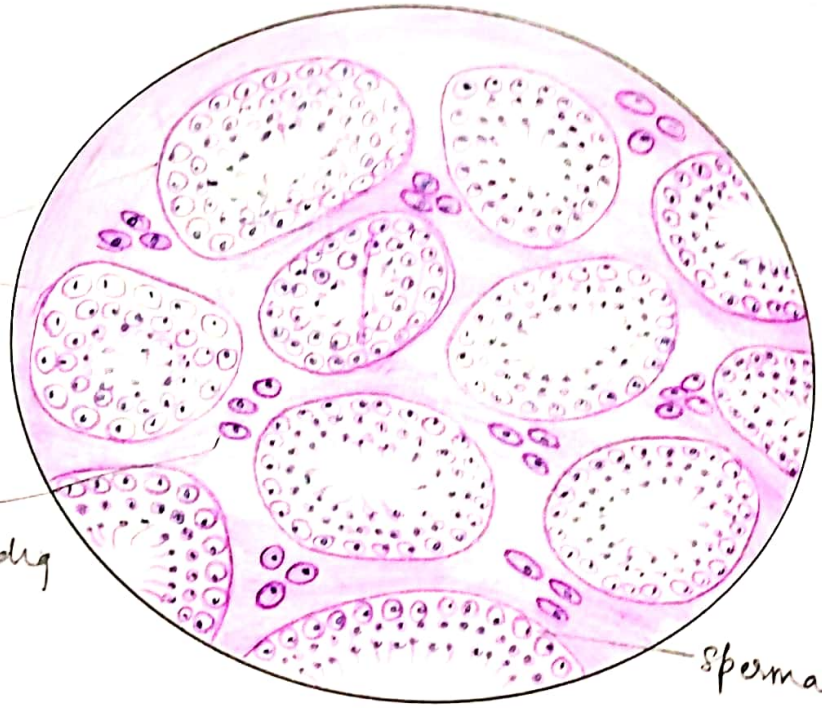
③ Epithelium rests on a layer of connective tissue.



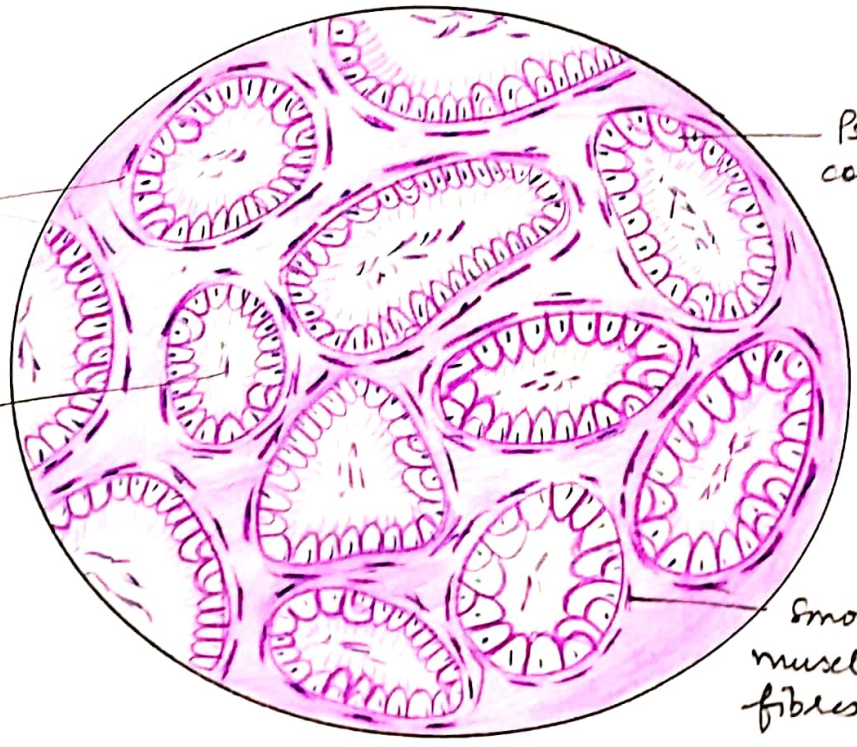
Urinary bladder

Urinary bladder

1. mucosa lined by transitional epithelium
2. Thick muscular wall made of three-ill-defined layers
3. Thick lamina propria
4. Outer surface is lined in parts by peritoneum.



Testis



Epididymis

Testis

① Te
tuni
ser

② Tubul
bloo

③ Eac
ger
sp

Epididym

①. C
c

②

③

MALE REPRODUCTIVE SYSTEM

Testis

① Testis has an outer fibrous layer, tunica albuginea deep to which are seen seminiferous tubules.

② Tubules are separated by CT containing blood vessels and groups of interstitial cells

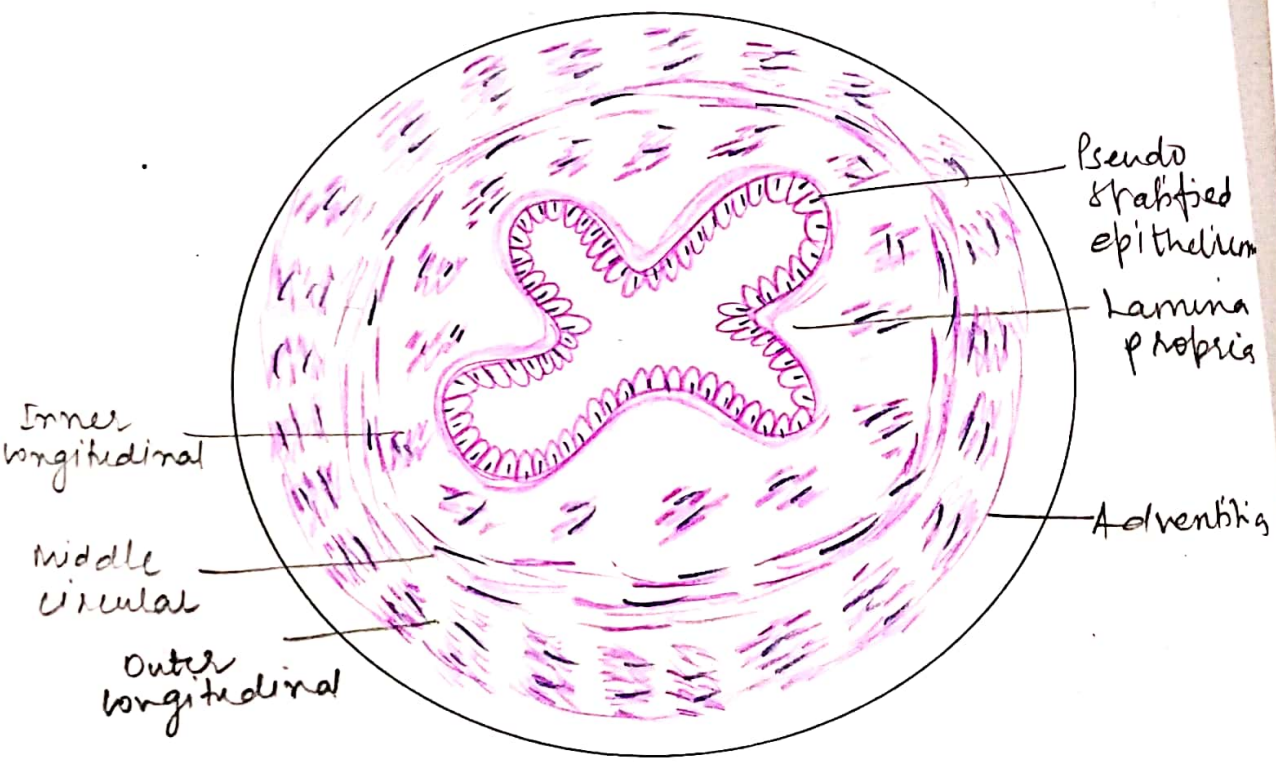
③ Each tubule is lined by several layers of germinal cells which eventually form the spermatozoa.

Epididymis

①. Cut sections of tubules lined by pseudostratified columnar epithelium in which there are tall columnar cells and shorter basal cells that don't reach the lumen.

② columnar cells bear stereocilia

③. clumps of spermatozoa are present in the lumen of the tubule

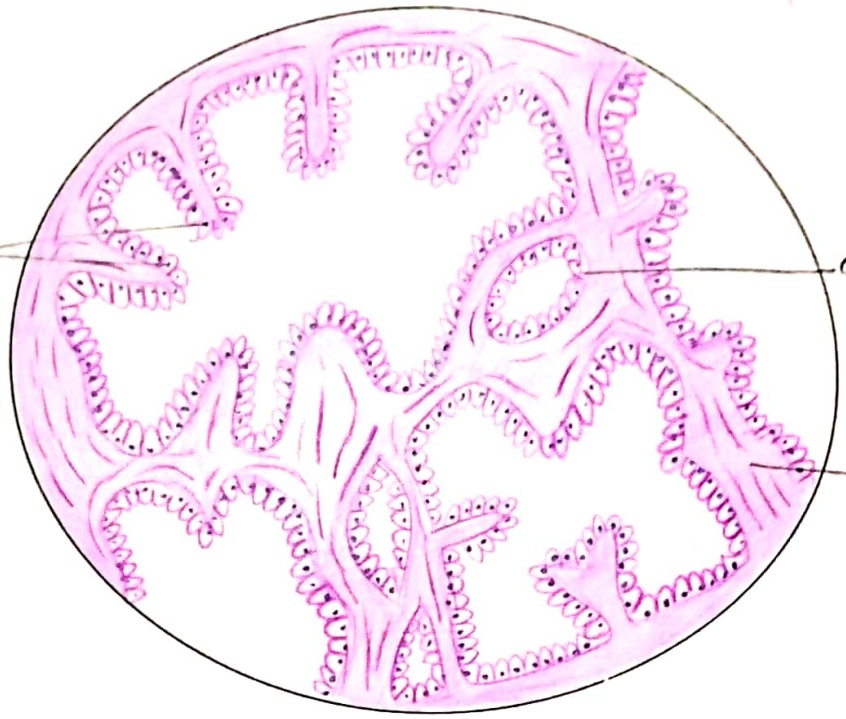


Vas Deferens

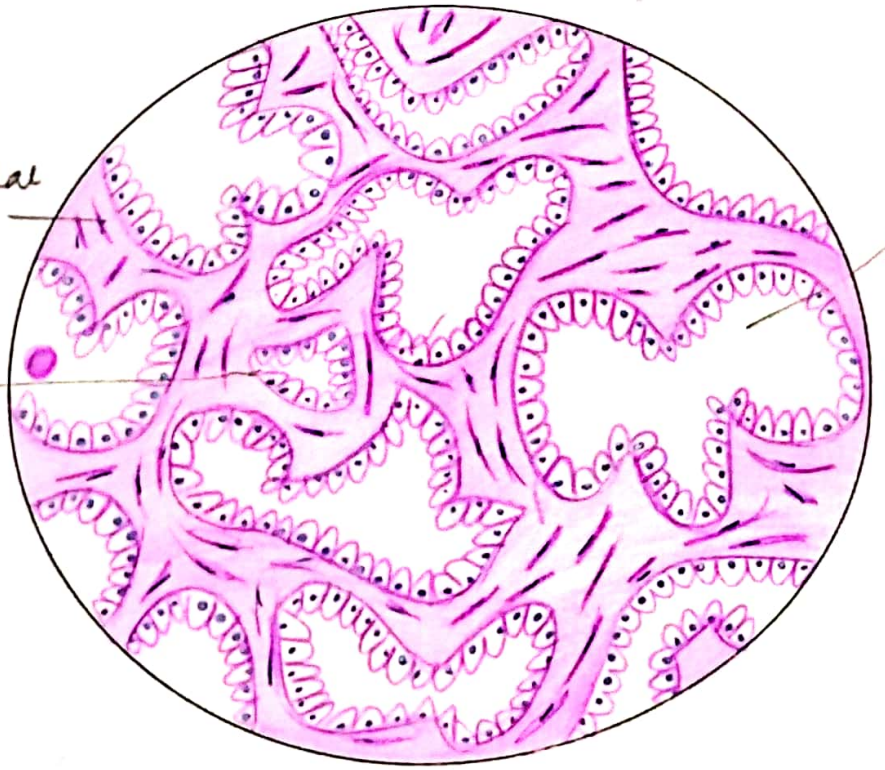
Vas Deferens
→ lined by
→ muscle coat
longitudina
longitudi
→ muscle
containi

Vas Deferens

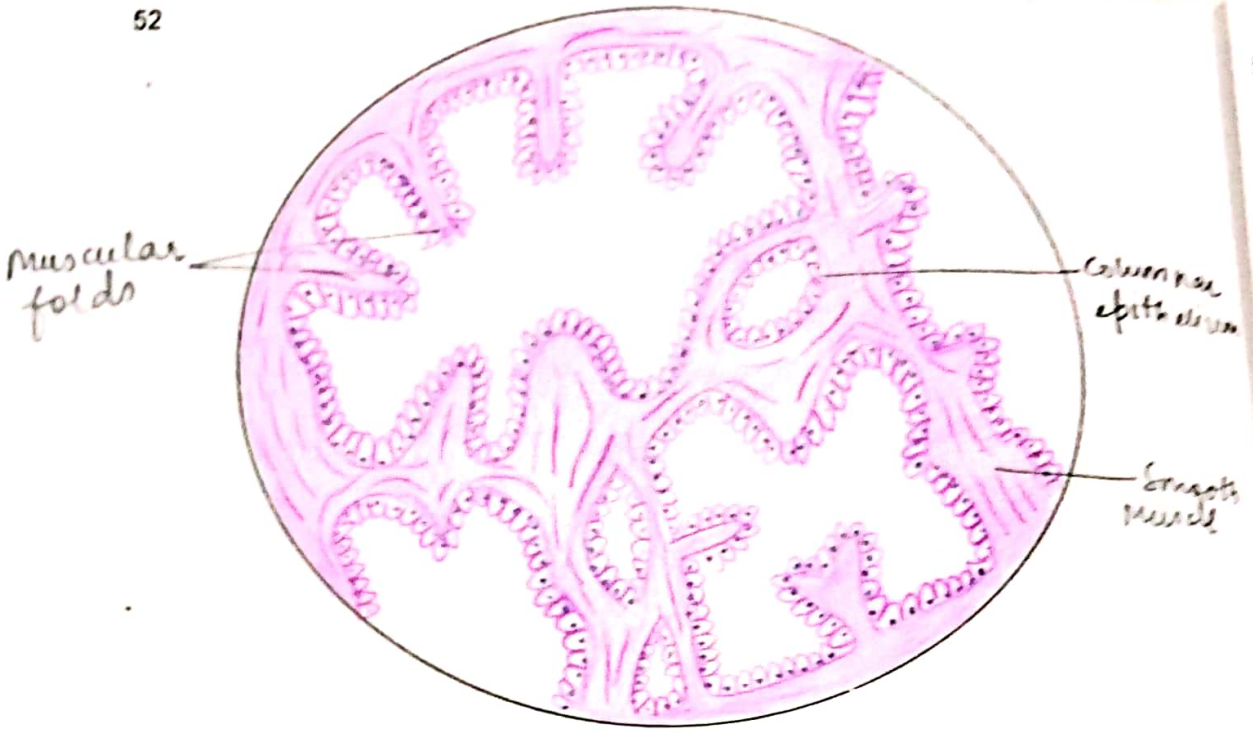
→ Lined by pseudostratified columnar epithelium.
→ Muscle coat is thick. Three layers, inner longitudinal, middle circular and outer longitudinal are seen.
→ Muscle coat is surrounded by adventitia containing blood vessels and nerves.



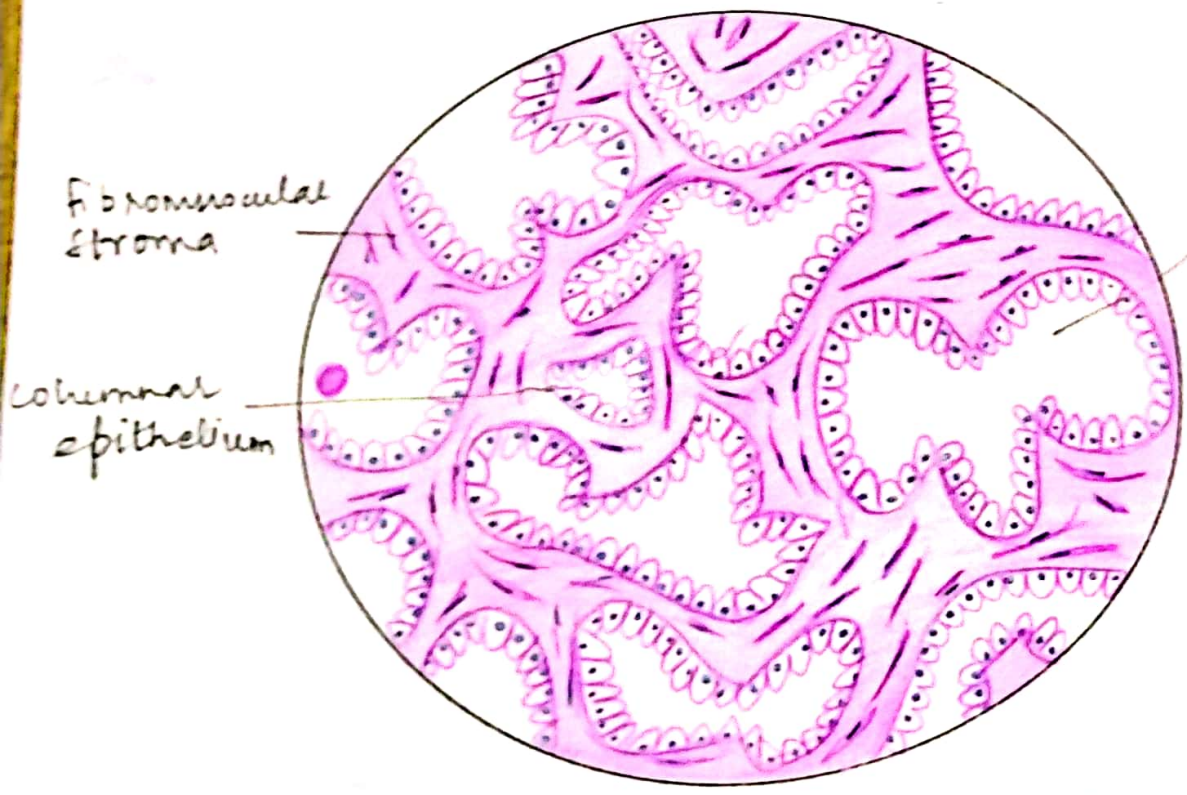
Seminal Vesicle



Prostate



Seminal Vesicle



Prostate

MALE REPRODUCTIVE SYSTEM (contd.)

Seminal Vesicle

→ Lumen is filled with highly convoluted mucosal folds.

→ Lining epithelium - pseudostratified columnar type.

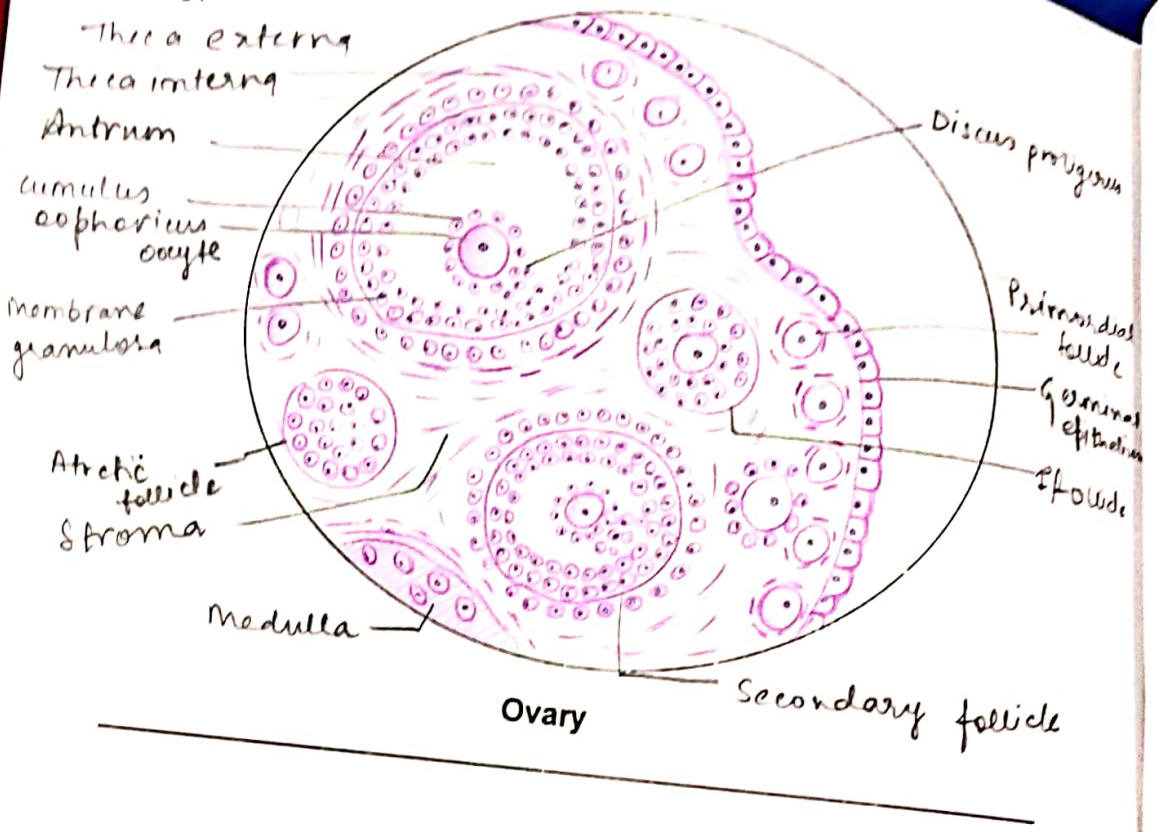
Prostate

→ It consists of glandular tissue embedded in prominent fibromuscular tissue.

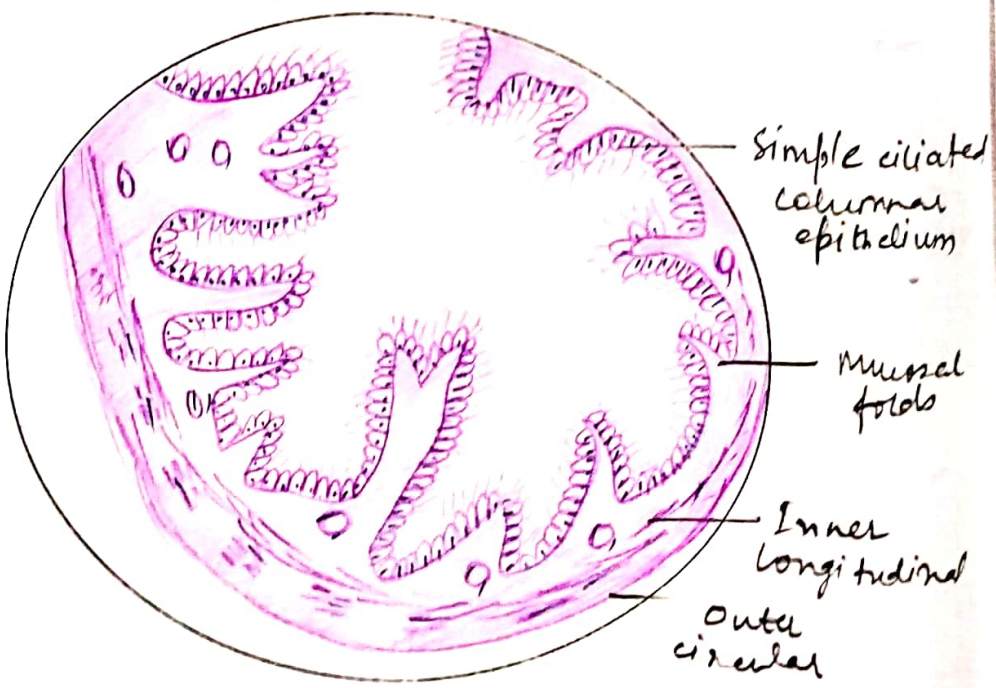
→ Glandular tissue is in the form of follicles and are lined by columnar epithelium

→ Lumen may contain amyloid bodies called corpora amylacea.

→ follicles are separated by broad bands of fibromuscular stroma.



Ovary



Uterine tube

FEMA

Ovary → Outer ... diff... prima...

→ Inner ...

→ Surface ... of cu...

→ Medulla ... Sm...

Uterine tube

→ Lining ... Mucosa

→ Muscula...

→ Muscle

→ Serosa

FEMALE REPRODUCTIVE SYSTEM

Ovary

→ Outer corter - show ovarian follicles in different stages of development - primordial, primary, Secondary and Graafian follicle.

→ Inner medulla - contains CT with blood vessels.

→ Surface lined by germinal epithelium made of cuboidal cells

→ Medulla - contains CT with blood vessels and Smooth muscles

Uterine tube

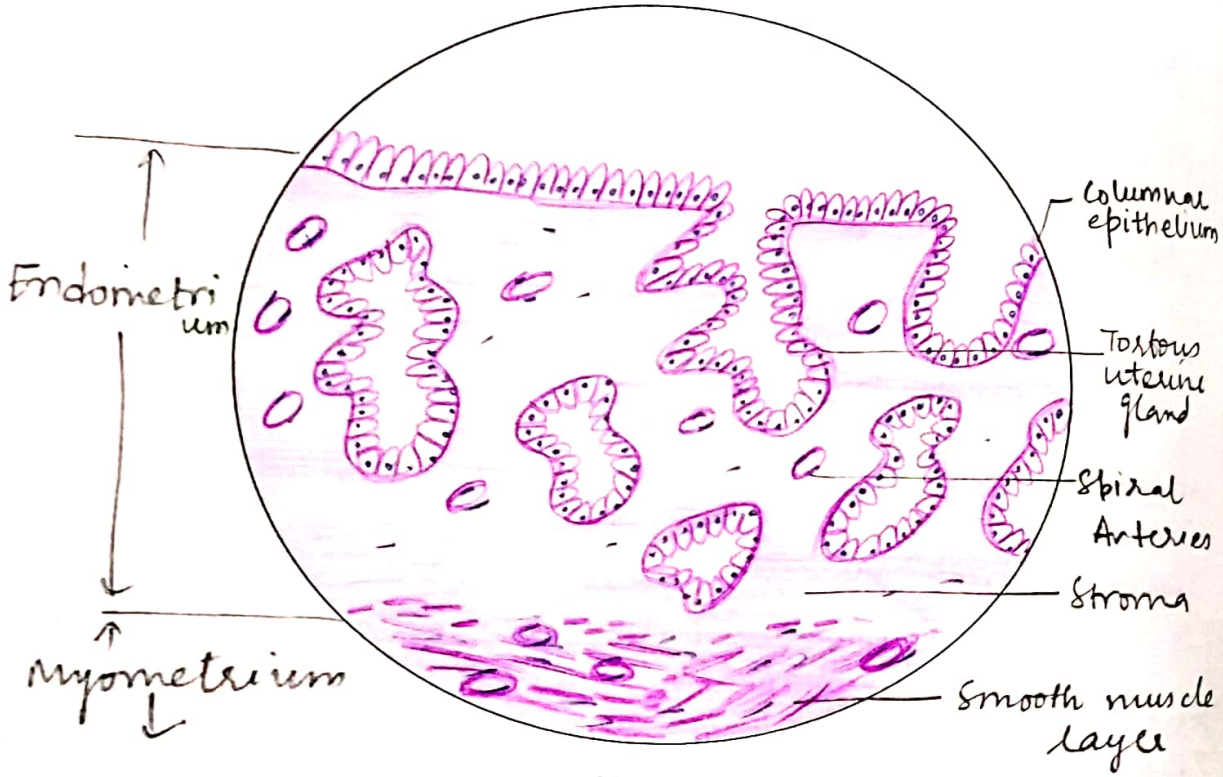
→ lining epithelium - simple columnar cells with cilia.

Mucosa thrown into folds filling the lumen.

→ Muscular tube

→ Muscle layer - inner circular and outer longitudinal

→ Serosa - lined by flat squamous cells of peritoneum



Uterus

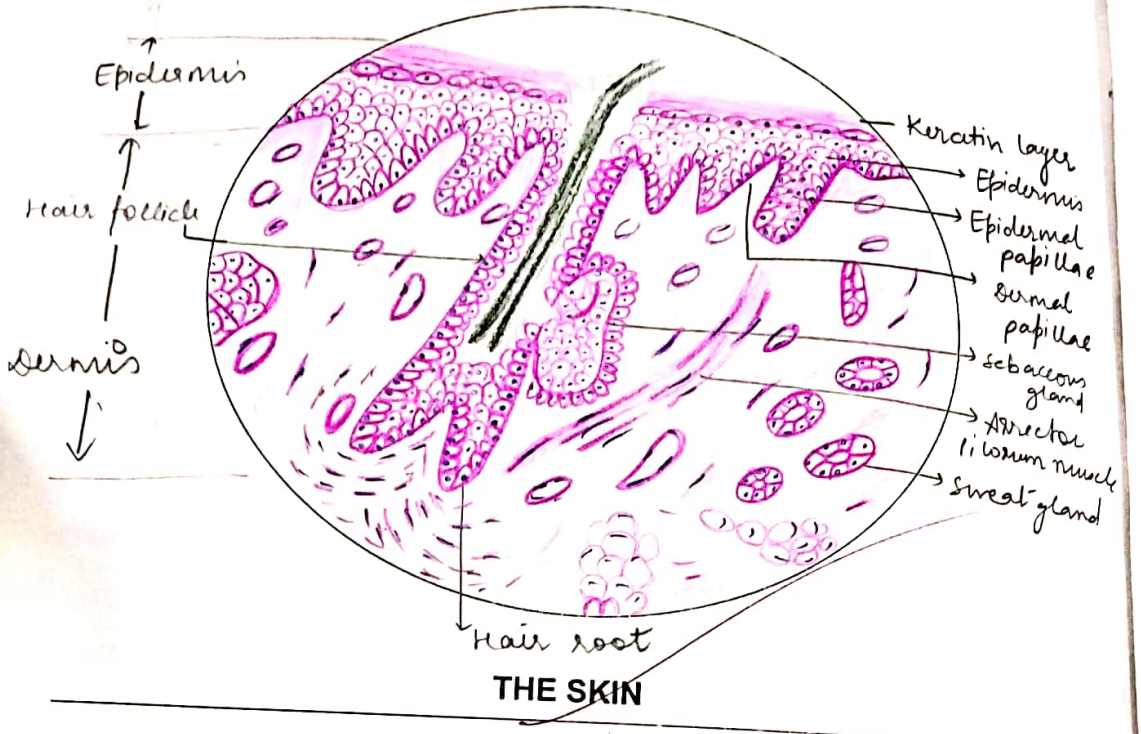
Uterus

1. Inner
   stra
2. mid
3. Out

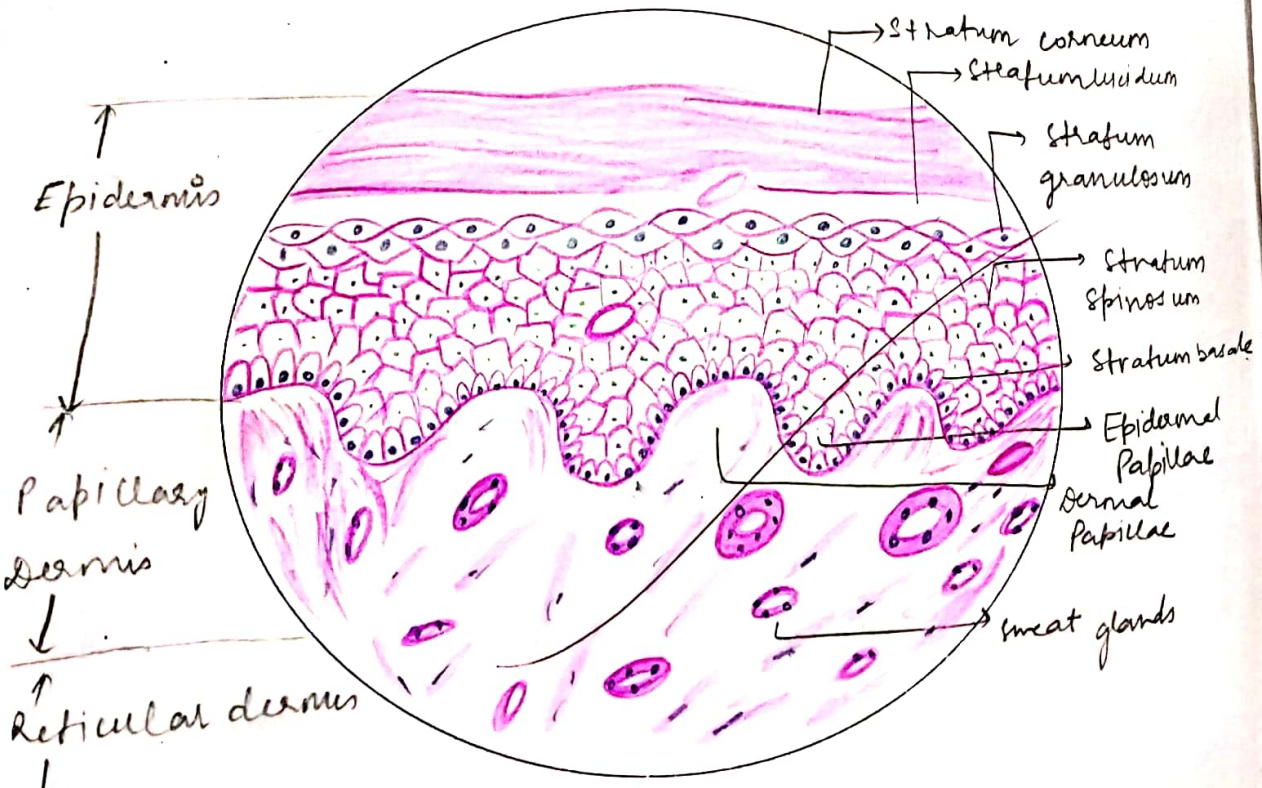
FEMALE REPRODUCTIVE SYSTEM (contd.)

Uterus

1. Inner endometrium – Lined by simple columnar cells
   Stroma contains tubular uterine glands and spiral arteries
2. middle thick muscular layer – myometrium
3. Outer perimetrium



THE SKIN



THE SKIN

THE SKIN

1. Thin
→ Outer
→ Inner

2. Thi
→ Out
→ Inn
→ No

THE SKIN

THE SKIN

1 .THE SKIN

2 .THE SKIN

1. Thin skin —
→ Outer epidermis — stratified squamous epithelium with thin keratin layer
→ Inner dermis - connective tissue with hair follicles, sebaceous glands, arrector pili muscle and sections of sweat glands.

2. Thick skin -
→ Outer epidermis- stratified squamous epithelium with thick keratin layer
→ Inner dermis — Connective tissue with sections of sweat glands and their ducts.
→ No hair follicles/ sebaceous glands seen.