

Open Lab Histology Review

D.HAMMOUDI, MD

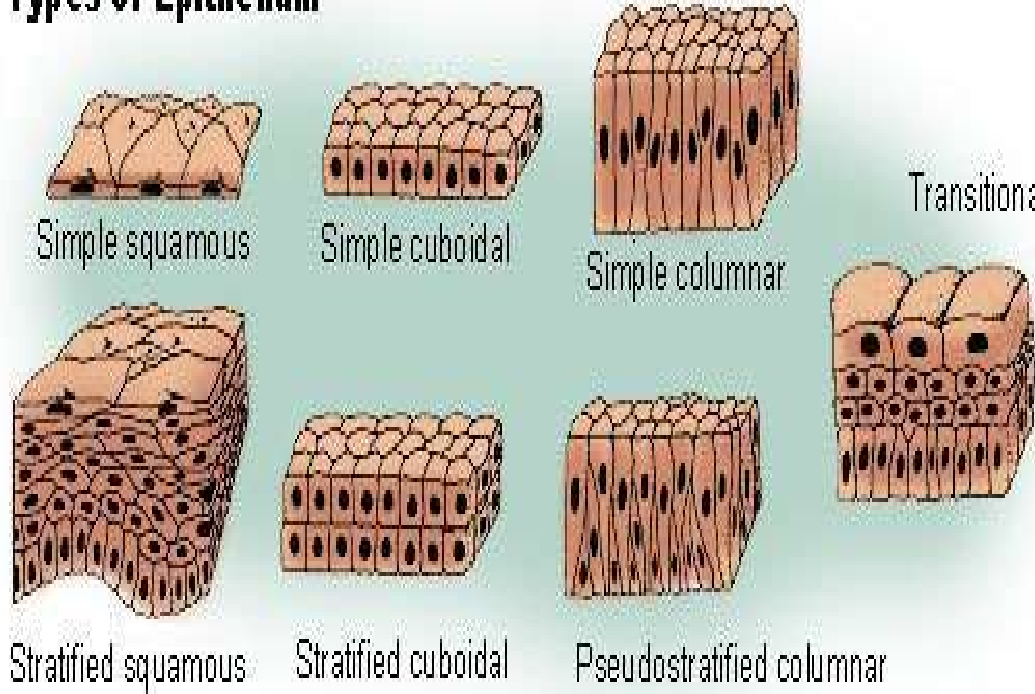
Prince George community college

Tutoring Center Lago



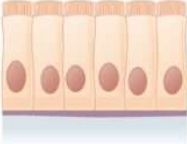




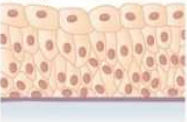


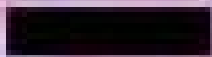
PRINCE GEORGE'S
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Types of Epithelium

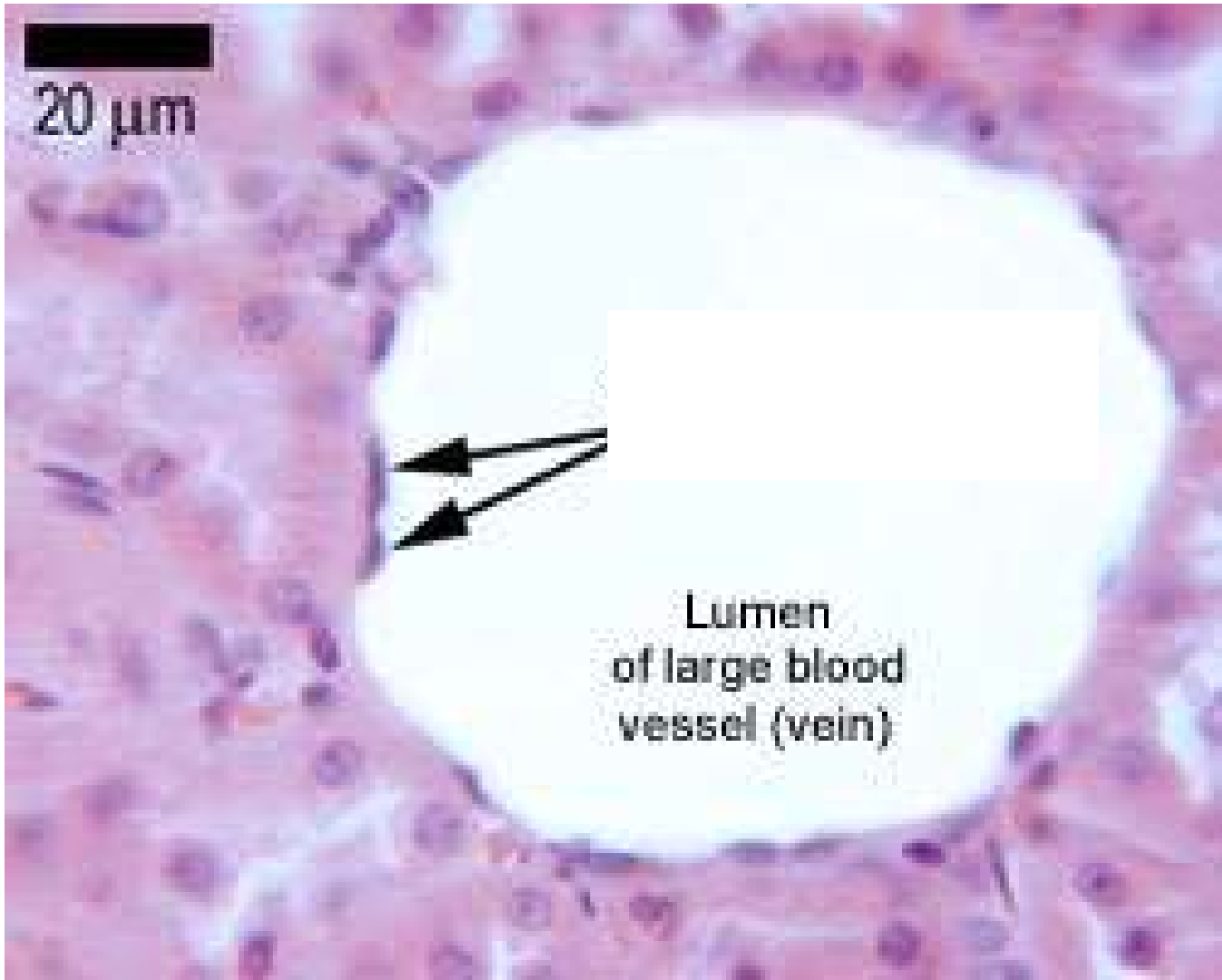


Classification of Epithelium		
Simple Squamous	Simple Cuboidal	Simple Columnar
Stratified Squamous	Stratified Cuboidal	Stratified Columnar

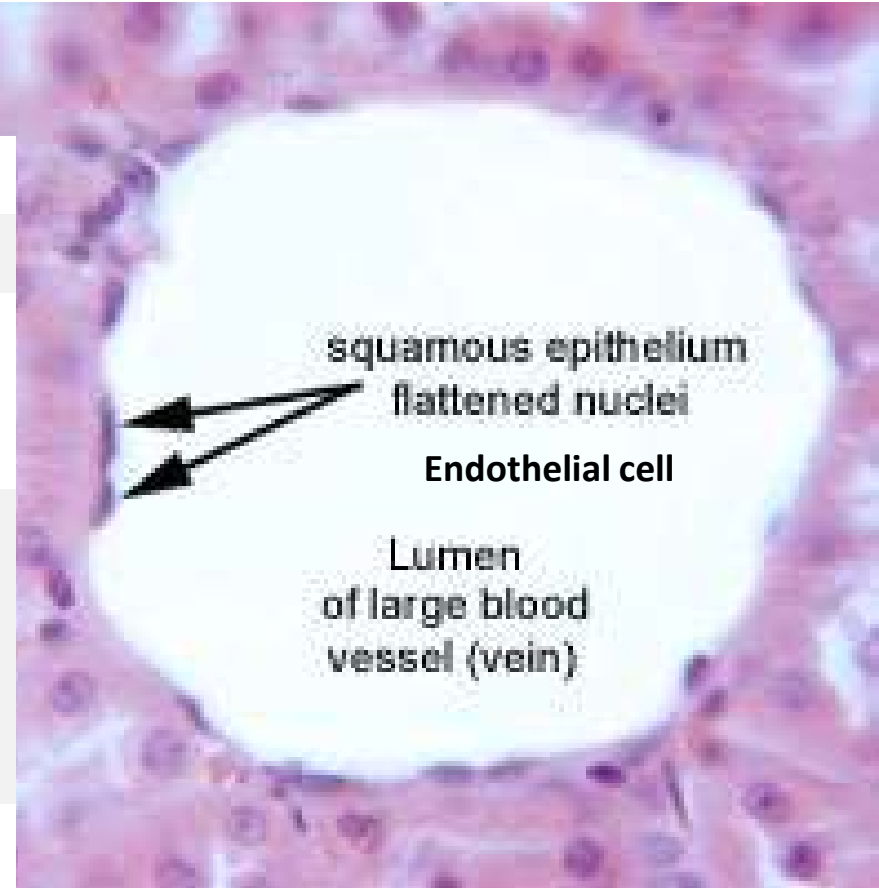
Cells	Location	Function
Simple squamous epithelium 	Air sacs of lungs and the lining of the heart, blood vessels, and lymphatic vessels	Allows materials to pass through by diffusion and filtration, and secretes lubricating substance
Simple cuboidal epithelium 	In ducts and secretory portions of small glands and in kidney tubules	Secretes and absorbs
Simple columnar epithelium 	Ciliated tissues are in bronchi, uterine tubes, and uterus; smooth (nonciliated tissues) are in the digestive tract, bladder	Absorbs; it also secretes mucous and enzymes
Pseudostratified columnar epithelium 	Ciliated tissue lines the trachea and much of the upper respiratory tract	Secretes mucus; ciliated tissue moves mucus
Stratified squamous epithelium 	Lines the esophagus, mouth, and vagina	Protects against abrasion
Stratified cuboidal epithelium 	Sweat glands, salivary glands, and the mammary glands	Protective tissue
Stratified columnar epithelium 	The male urethra and the ducts of some glands	Secretes and protects
Transitional epithelium 	Lines the bladder, urethra, and the ureters	Allows the urinary organs to expand and stretch



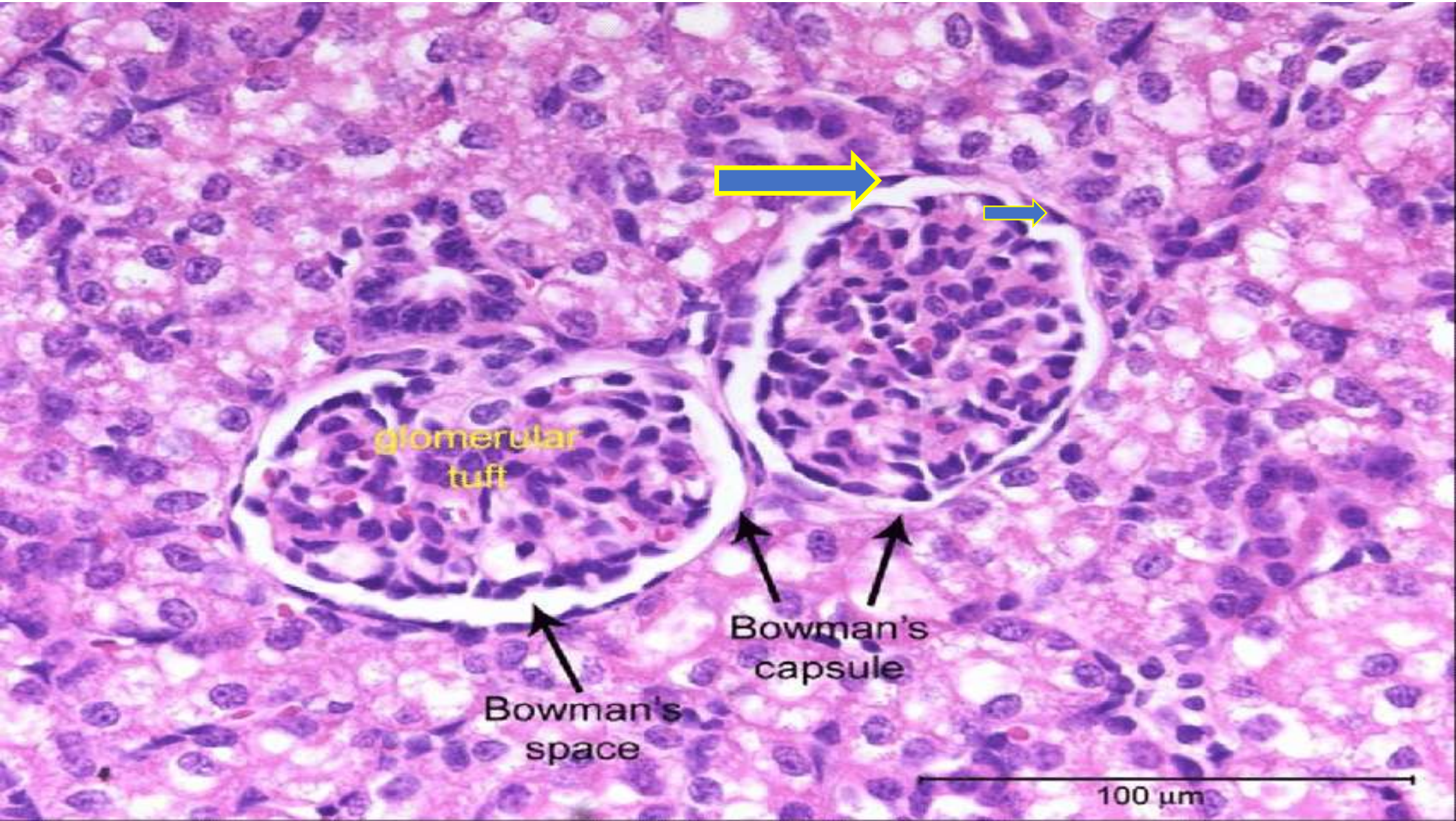
20 μm



Lumen
of large blood
vessel (vein)



Location	Function	Notes
Alveoli of the lungs	Gas exchange	–
Bowman's Capsule and Loop of Henle of kidney	Barrier for filtration	–
Lining of the blood and lymph vessels	Exchange of gases and nutrients. Passage of certain blood cells into tissues.	The simple squamous epithelia lining the blood and lymph vessels is known as “endothelium”
Lining of the body cavities – i.e. the pleura, pericardium and peritoneum	Lubrication between tissues and organs	The simple squamous epithelia lining the body cavities is known as “mesothelium”



glomerular tuft

Bowman's space

Bowman's capsule

100 μ m

Simple squamous epithelium, Bowmen capsule



Simple Cuboidal Epithelium



Location

Thyroid follicles

Small ducts of many exocrine glands

Kidney tubules

Surface of ovary (“germinal epithelium”)

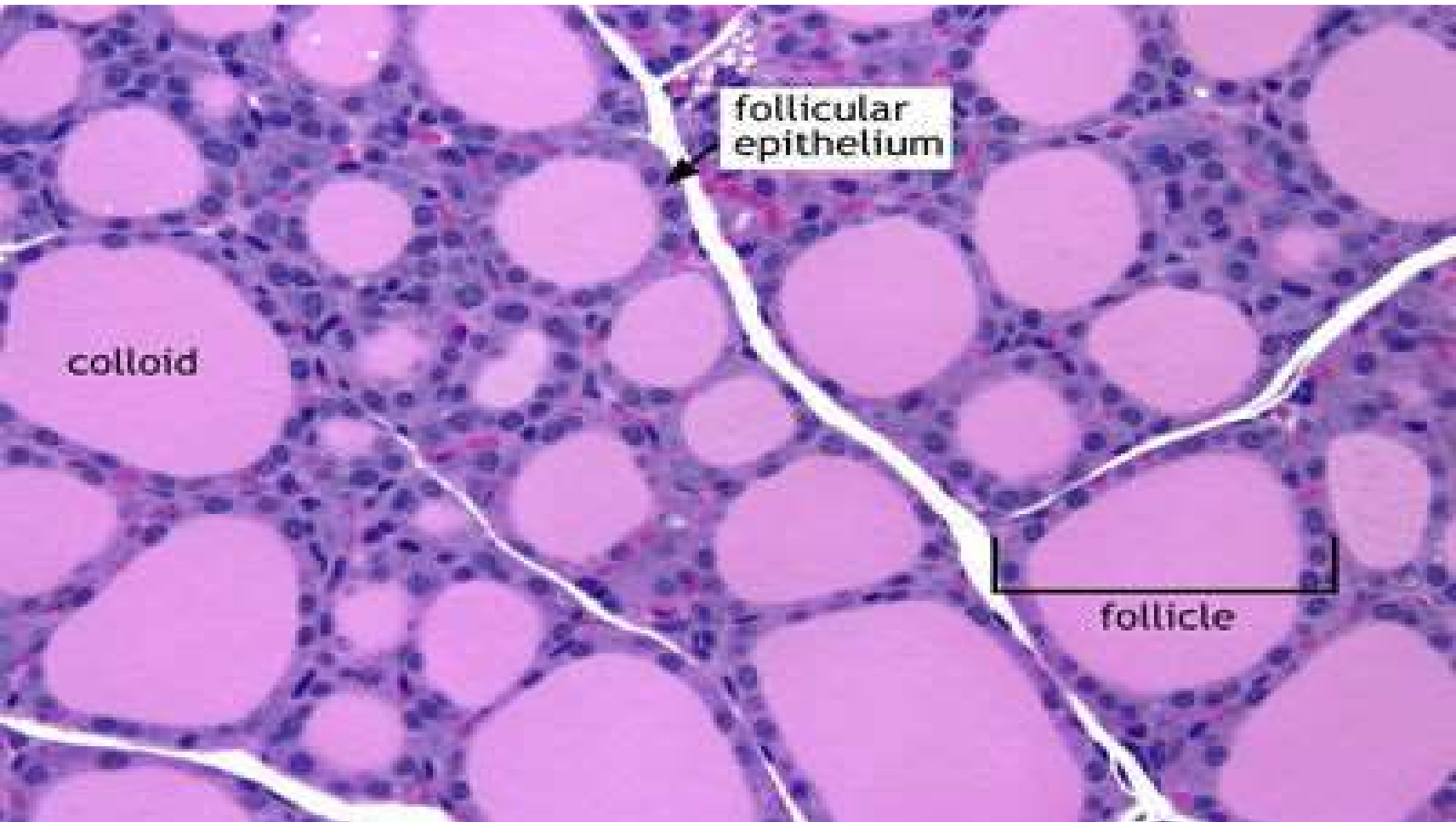
Function

Hormone synthesis, storage and mobilisation

Absorption and passage of exocrine secretions

Absorption and secretion

Barrier/covering of follicles

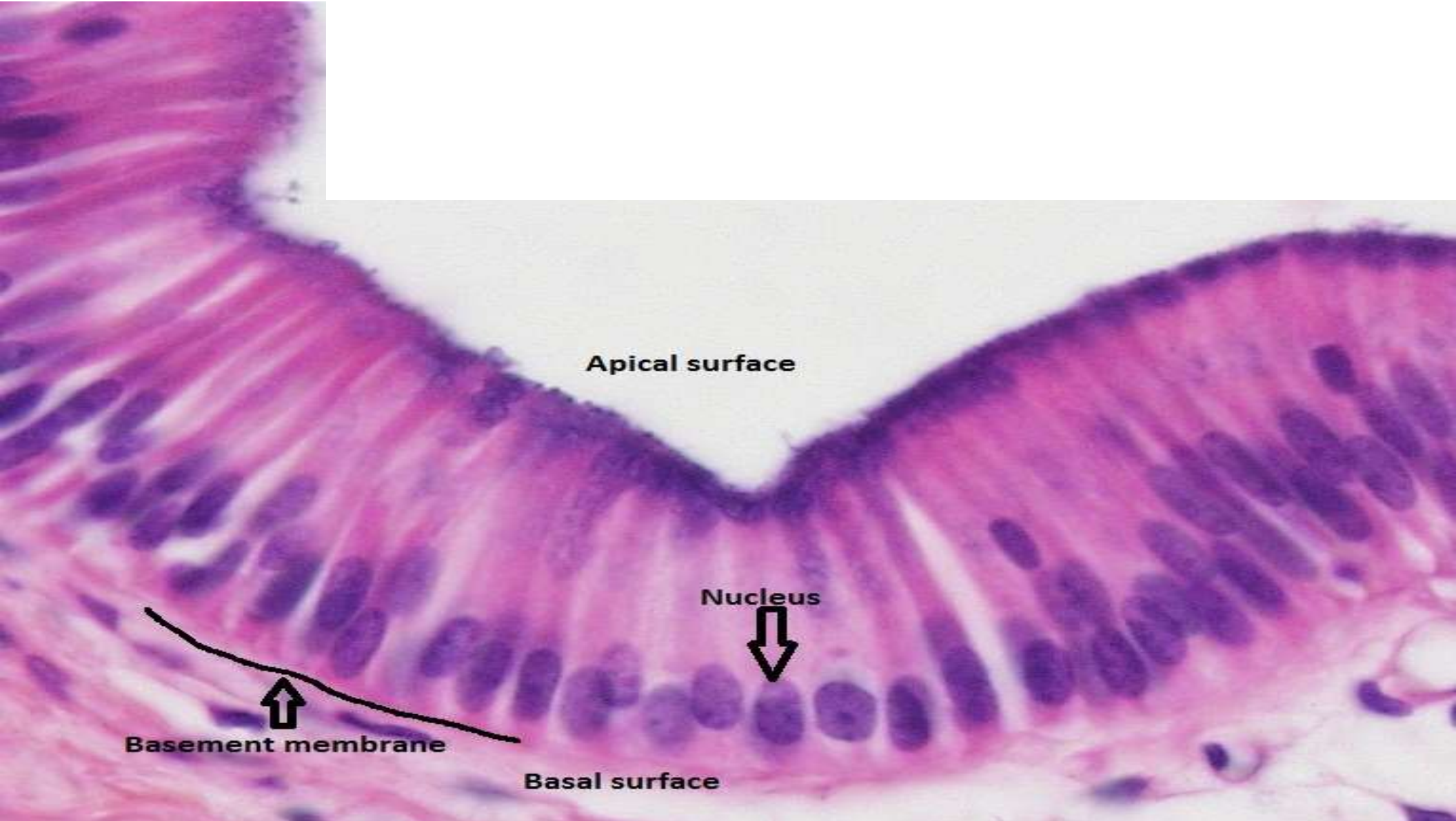


follicular
epithelium

colloid

follicle

Simple cuboidal epithelium , Thyroid gland



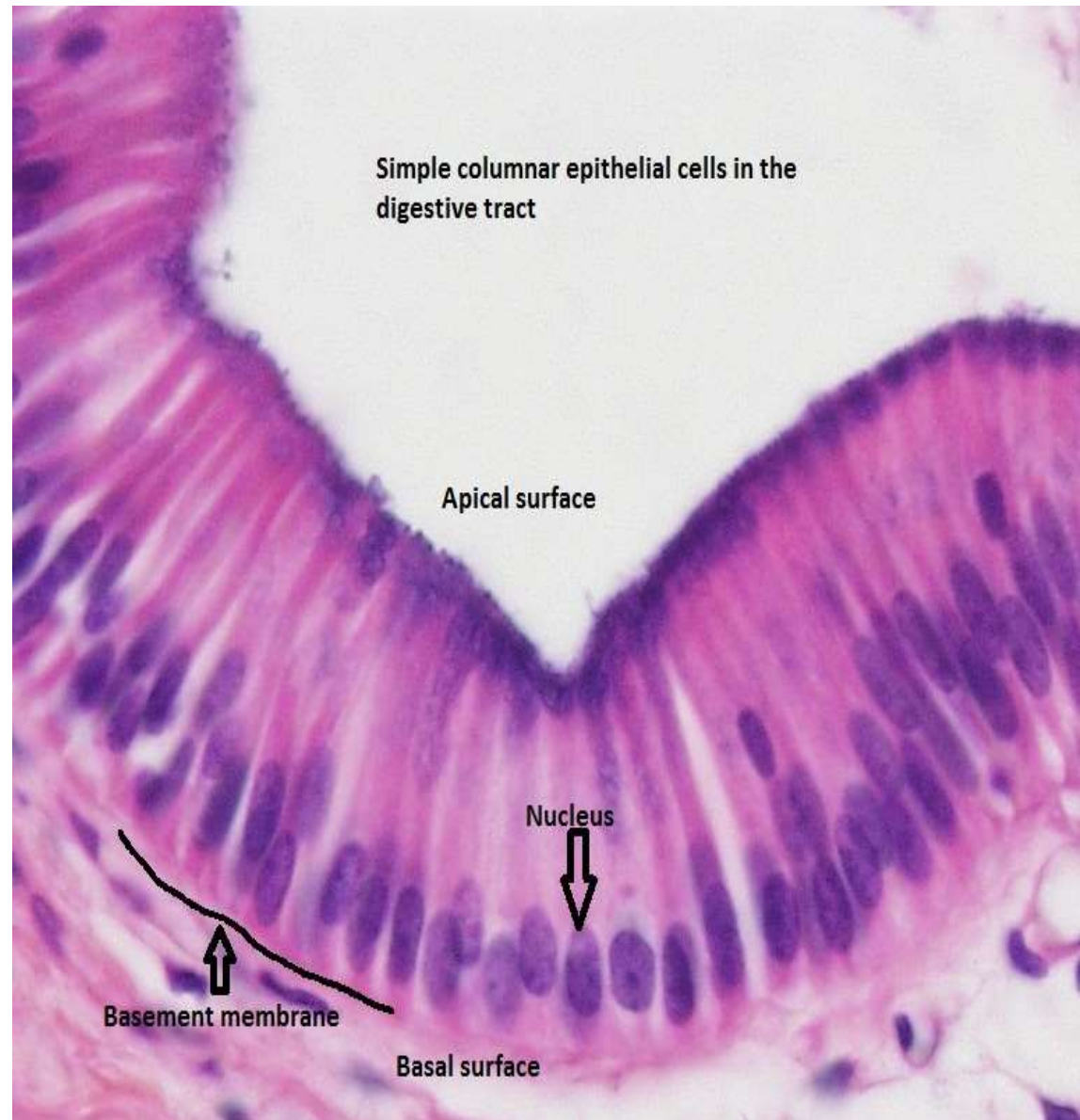
Apical surface

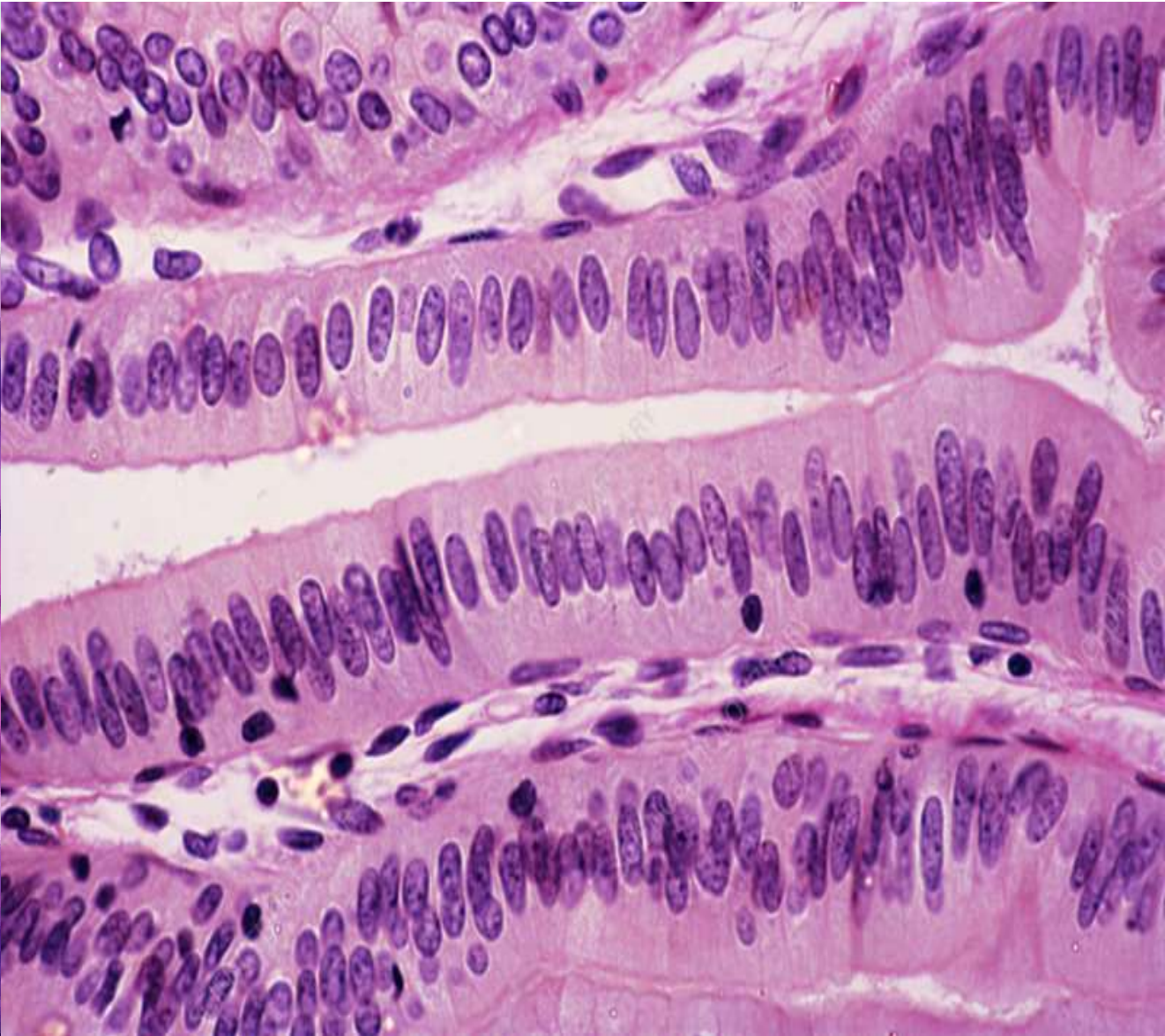
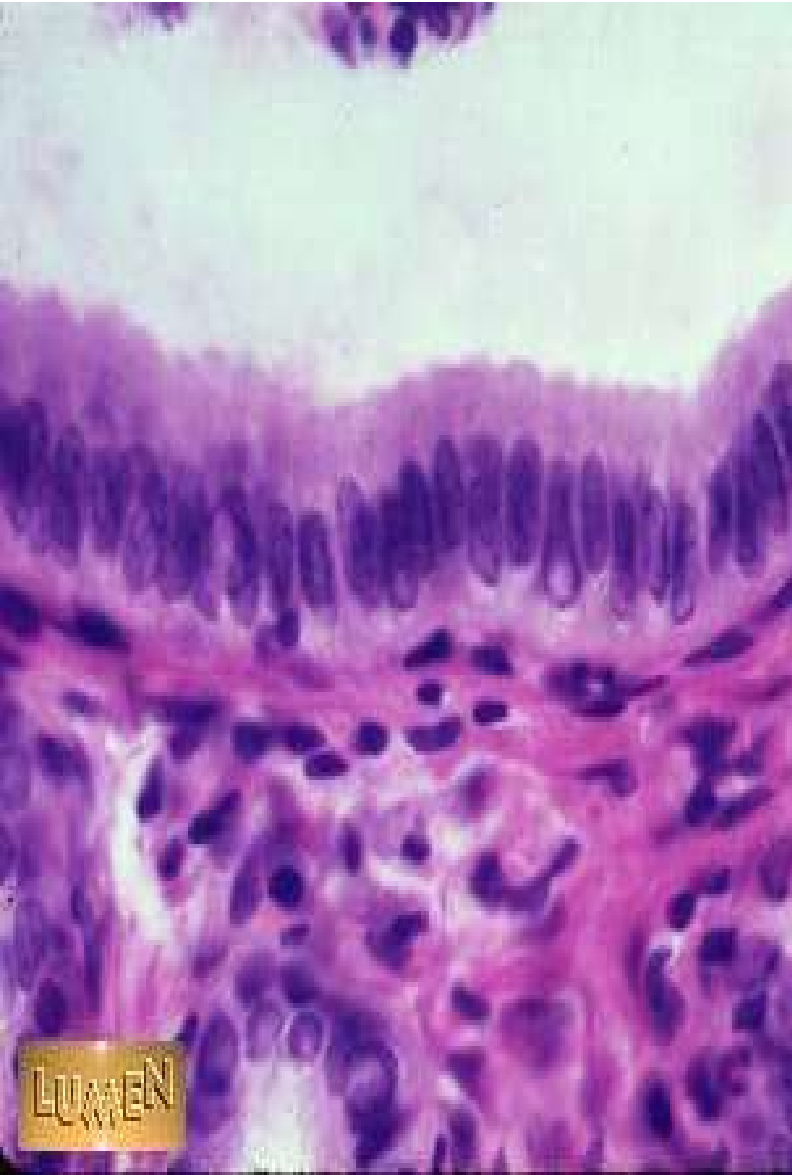
Nucleus

Basement membrane

Basal surface

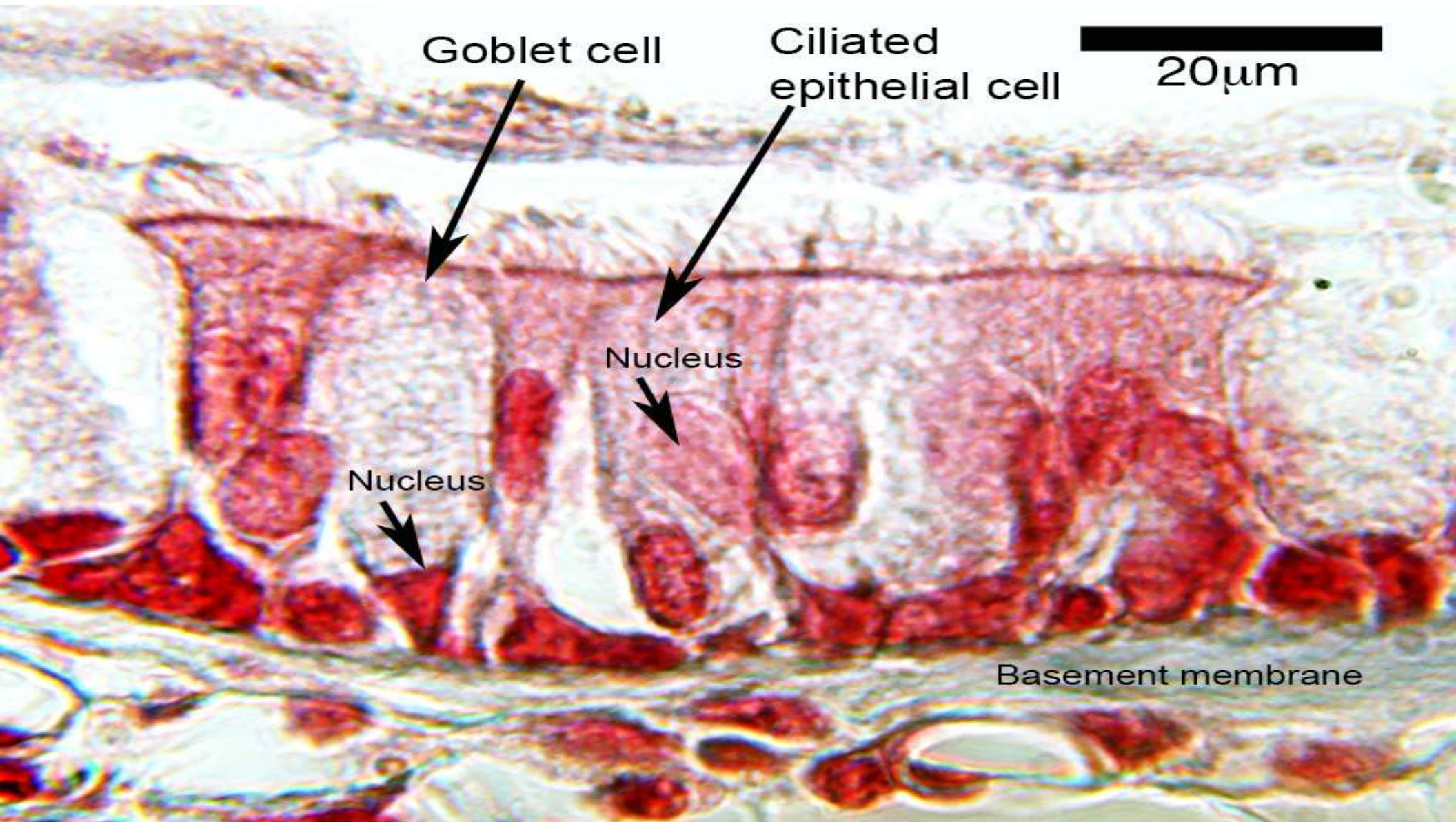
Location	Function	Specialisations
Lining of the stomach, and gastric glands	Absorption and secretion of gastric juices	Microvilli form a "brush border" which increases surface area for absorption
Small intestine and colon	Absorption, secretion and lubrication	Microvilli form a "brush border" which increases surface area for absorption
Gallbladder	Absorption of water and electrolytes from the bile	–
Fallopian tubes	Transport of ova	Some cells are ciliated to help to waft the egg along from the ovary to the uterus



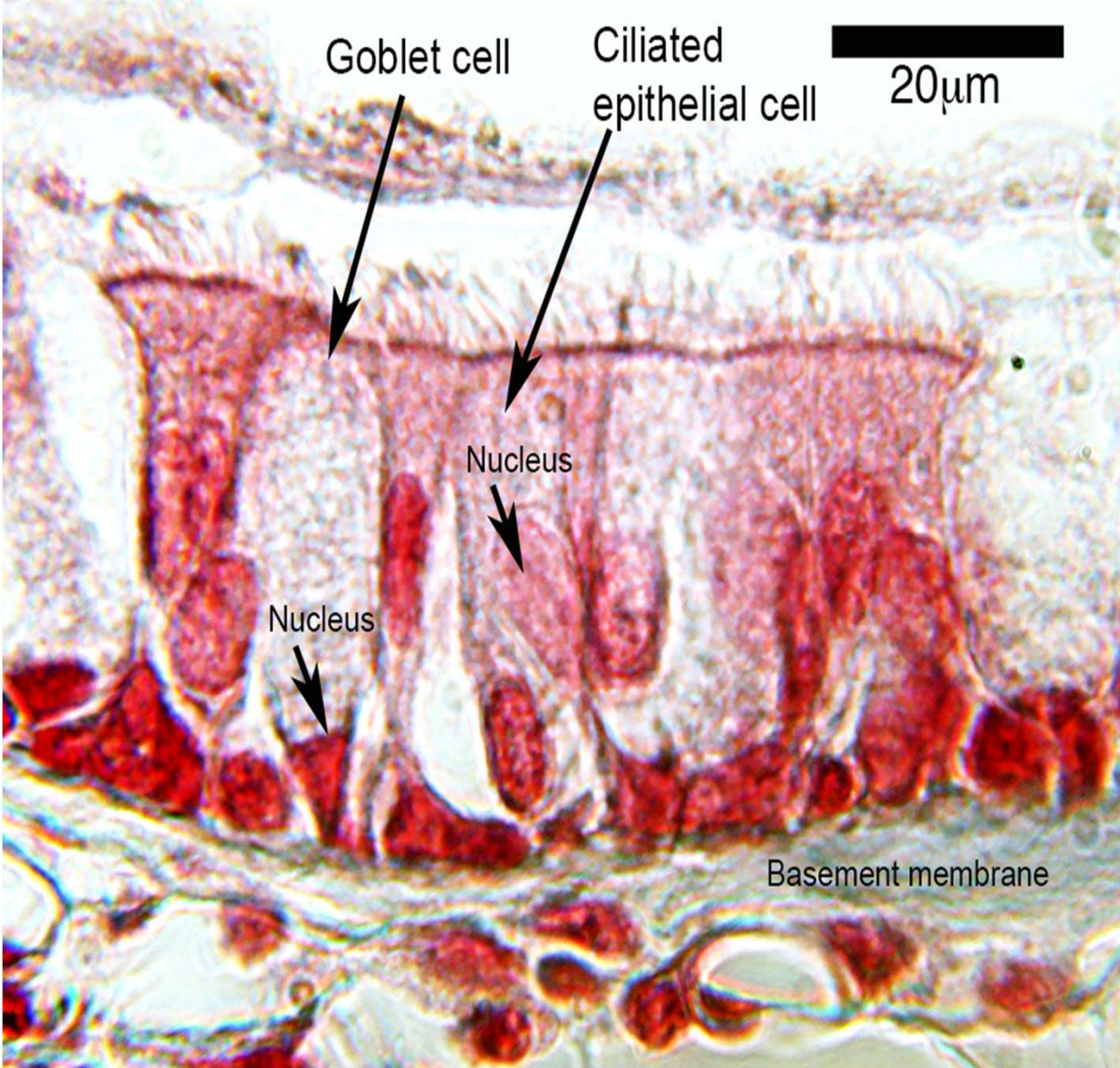


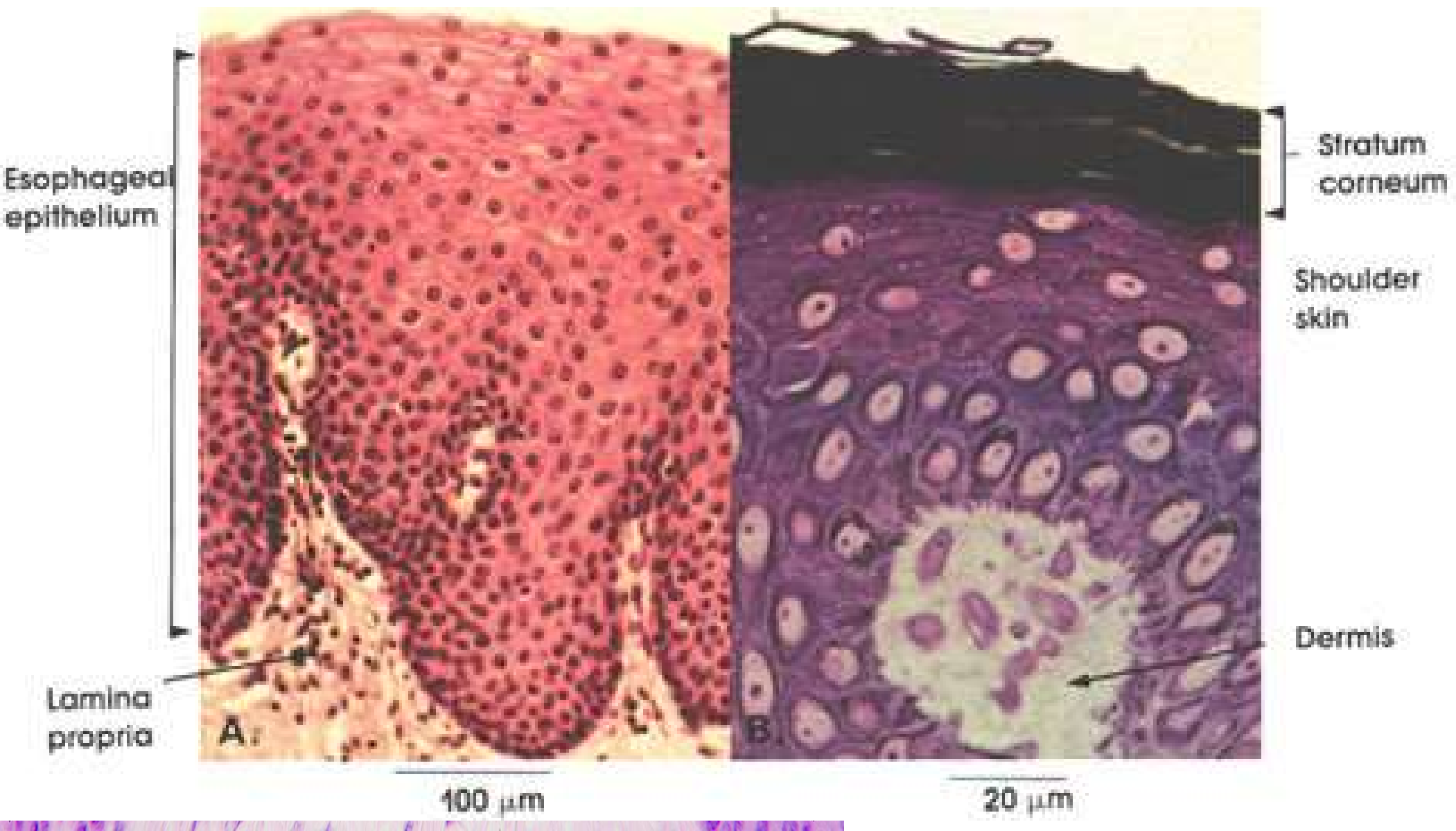
LUMEN

Simple columnar epithelium – Gastro intestinal



Ciliated Pseudostratified Epithelium





Stratified Squamous Epithelium

Stratified squamous epithelium can be further divided into **keratinised** and **non-keratinised** stratified squamous epithelium.

Keratinised stratified squamous epithelium is multi-layered squamous epithelium where the upper layers of cells, furthest from the basement membrane, are no longer alive and are filled with a protein called keratin.

Keratinised stratified squamous epithelium forms the **epidermis** of the skin, and a small amount is also found in the **mouth**.

Its functions are to:

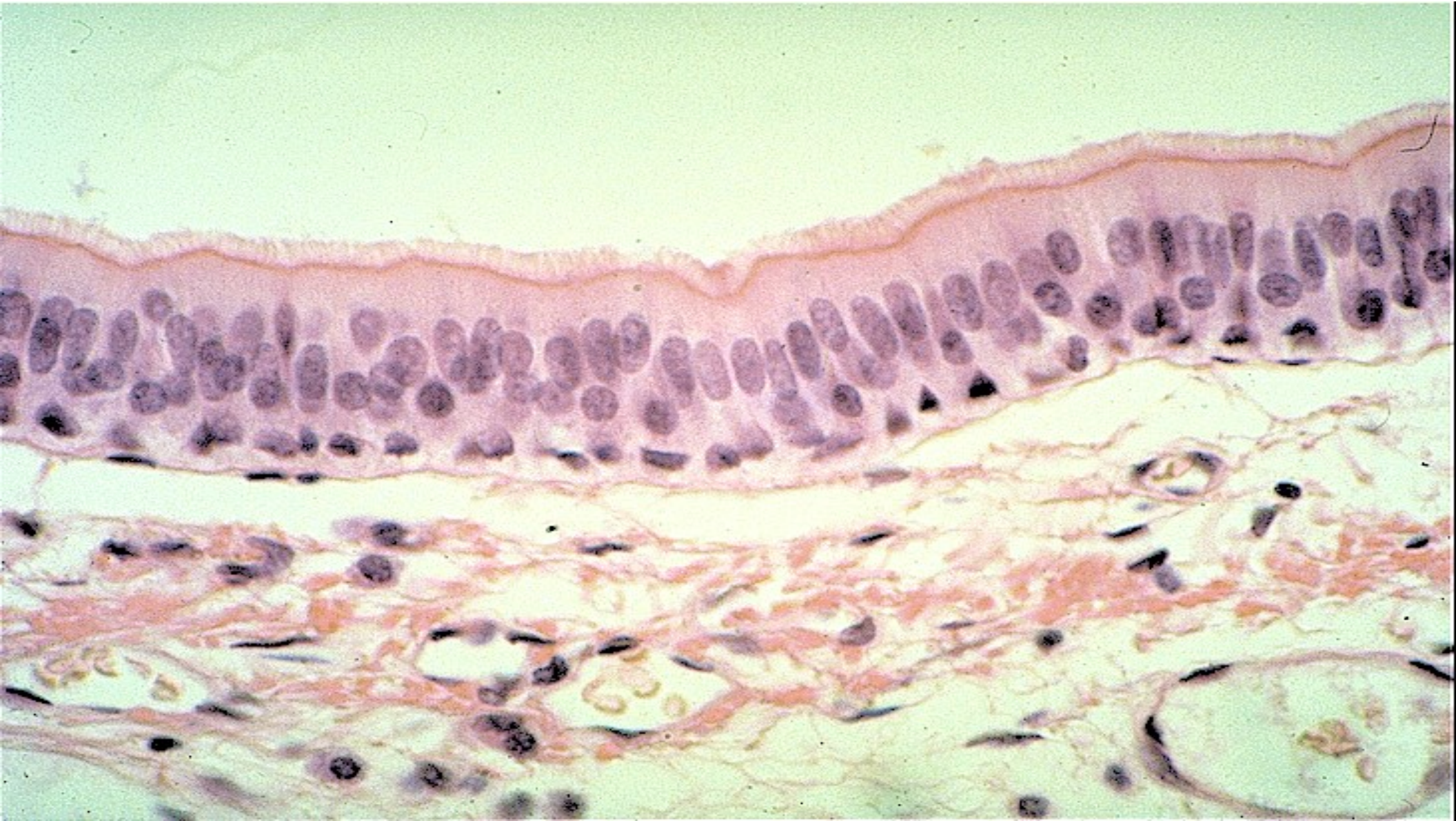
- **Protect against physical trauma and abrasion**
- **Prevent water loss**
- **Provide a physical barrier against the invasion of microbes**
- **Protect against UV light**

Non-keratinised stratified squamous epithelium

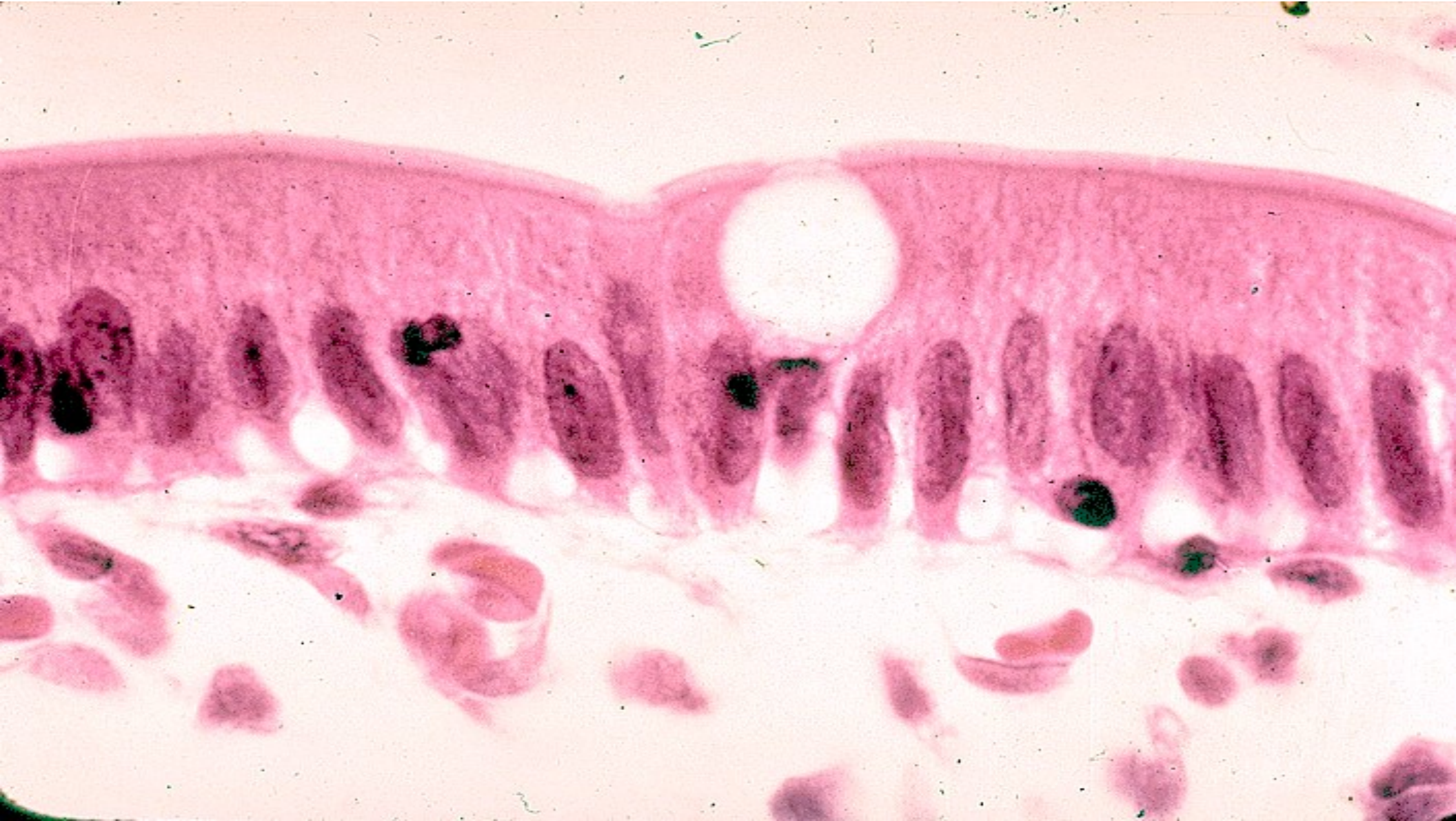
- It is primarily involved in **protecting against abrasion**, and **reducing water losses**, thus keeping surfaces moist.
- It is found in a wider variety of locations than keratinised stratified squamous epithelium, including the **vagina, oesophagus, larynx, mouth, cornea, and part of the anal canal**.

In the vagina,

- the epithelial cells are also involved in the maintenance of a low pH.
- The cells are rich in glycogen which acts as a substrate for **lactobacilli** to produce lactic acid, thus lowering pH.



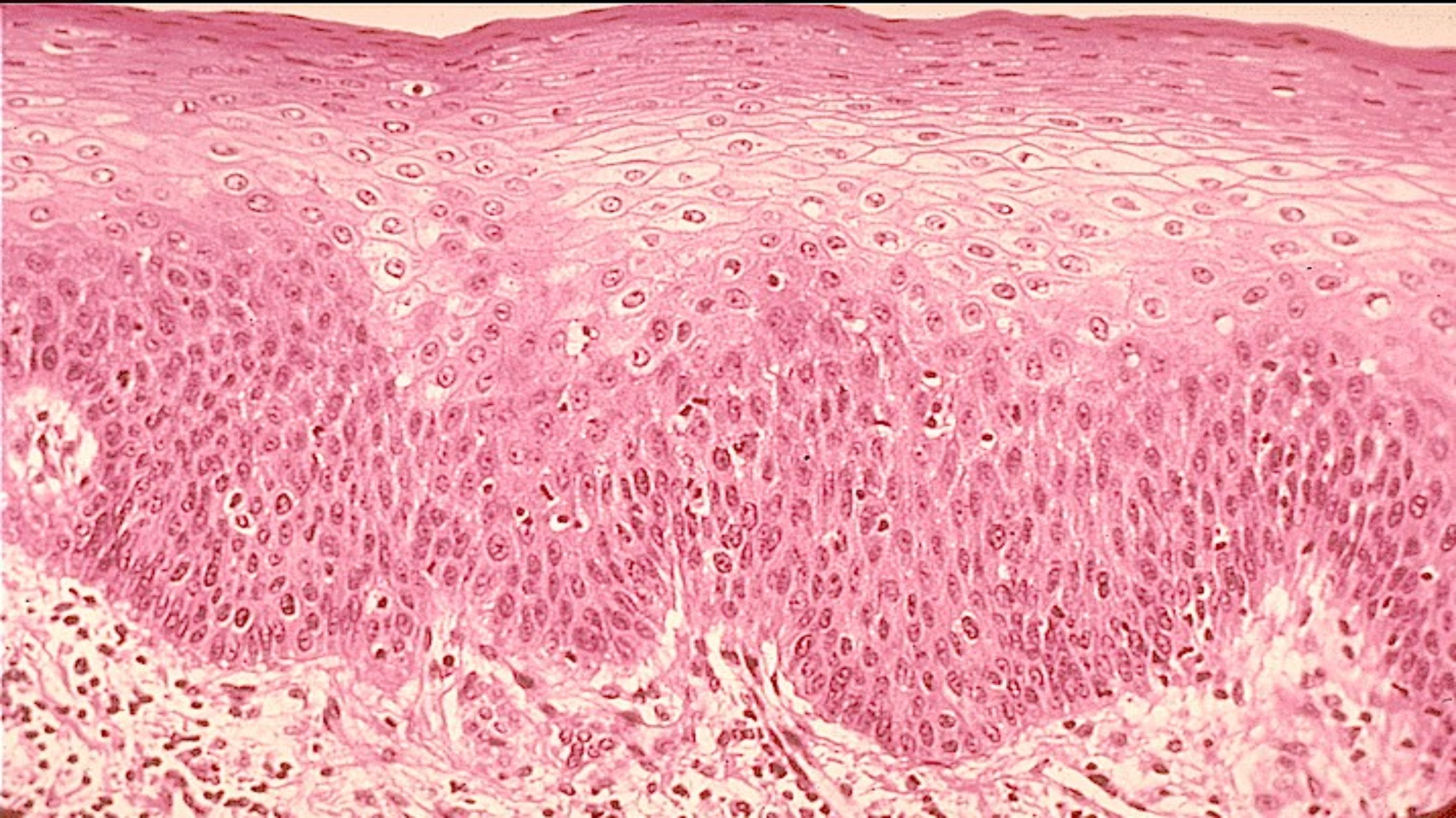
Ciliated Pseudostratified Columnar Epithelium



SIMPLE COLUMNAR

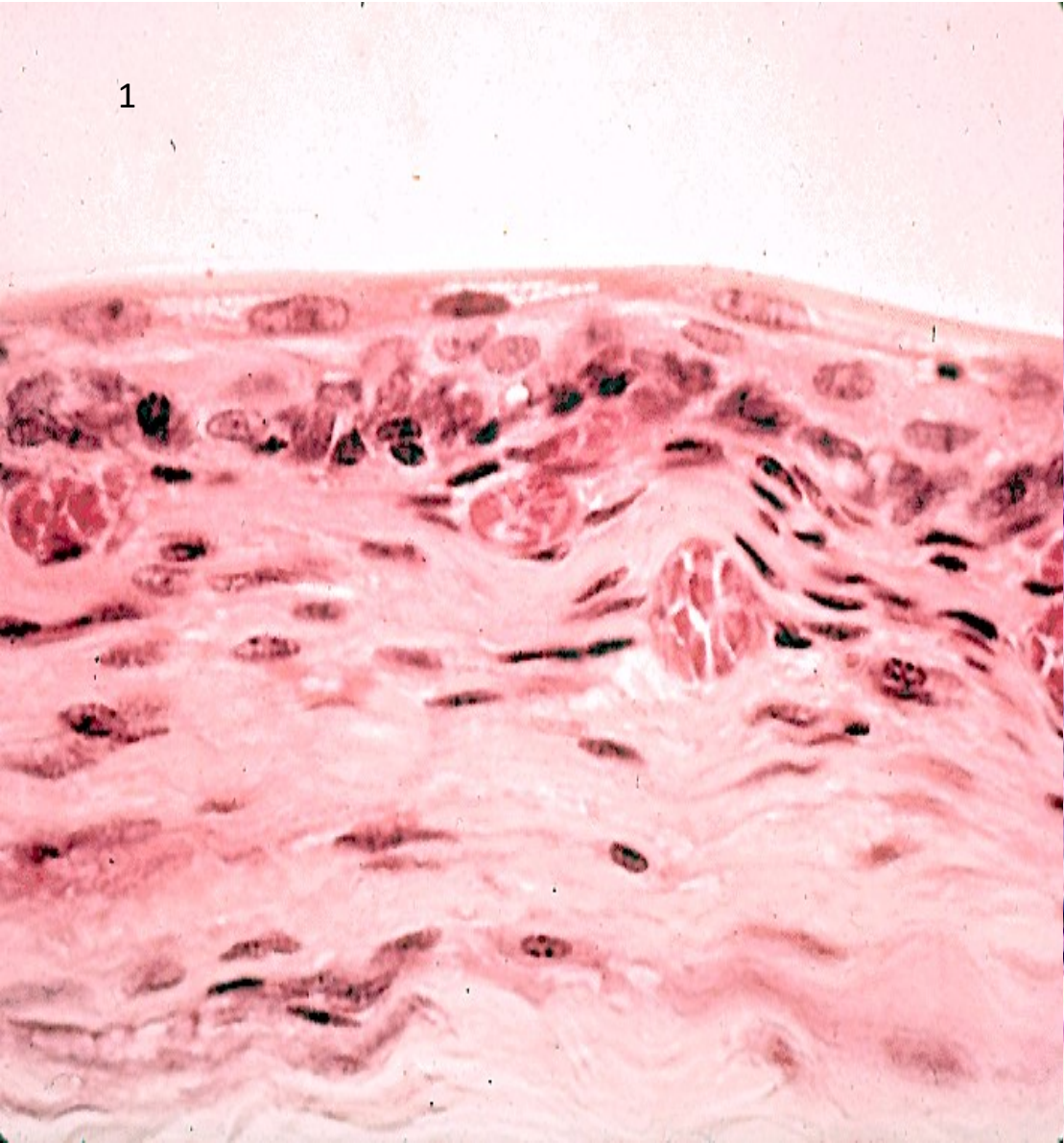


SIMPLE CUBOIDAL

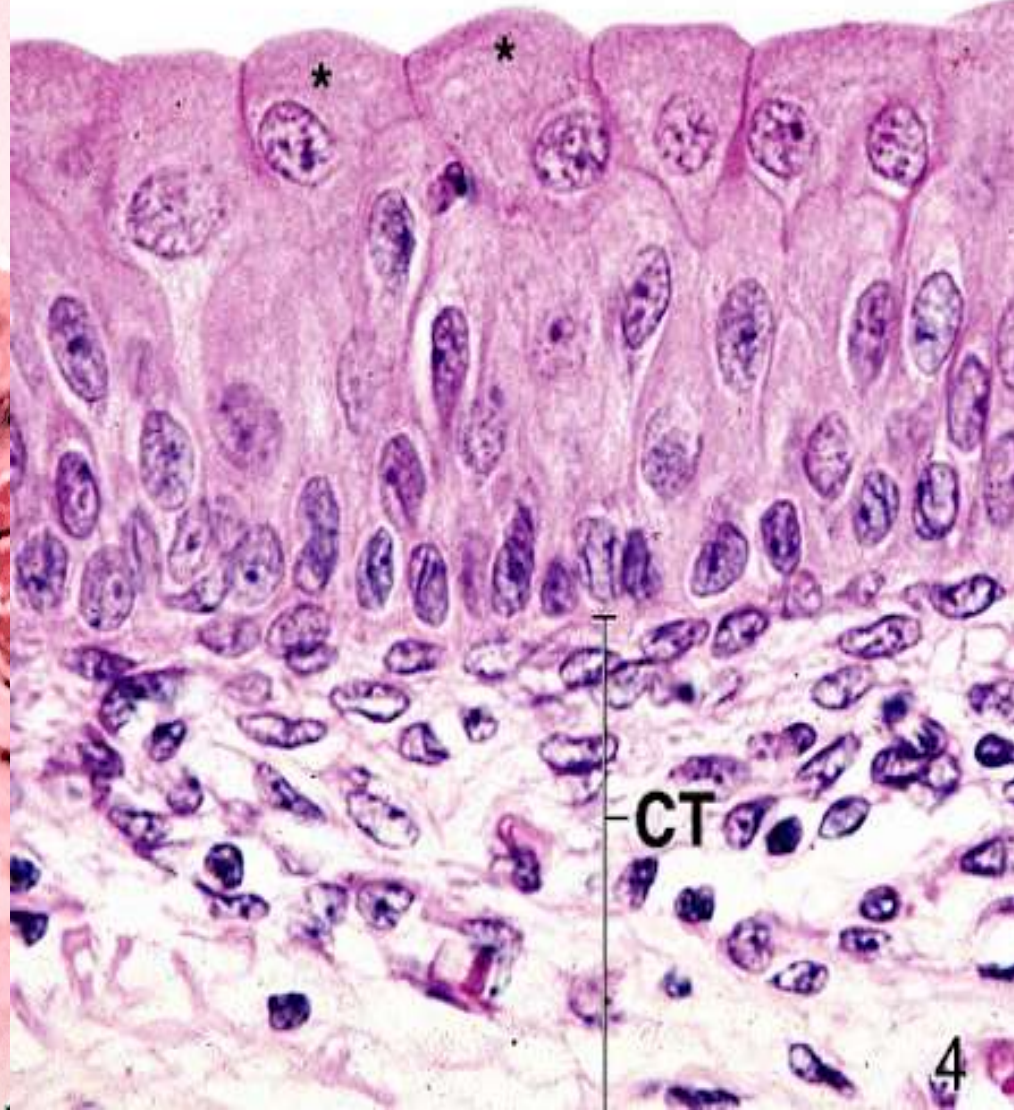


Non Keratinised Stratified Squamous Epithelium

1



2



1/ Transitional Epithelium, Distended

2/ Transitional Epithelium, non Distended

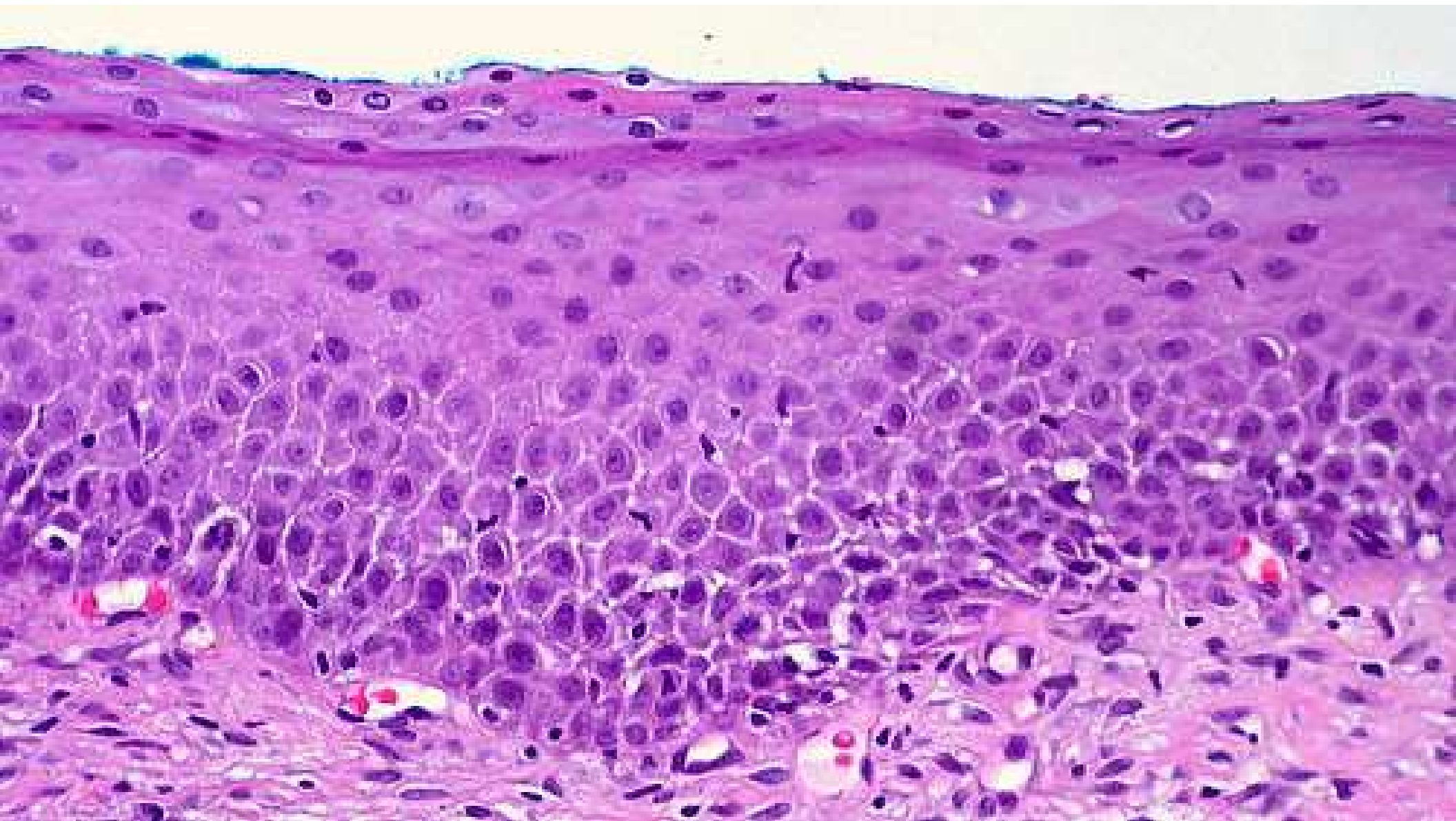
NAME THIS TISSUE, WHAT THE
BLUE ARROW REPRESENTS?



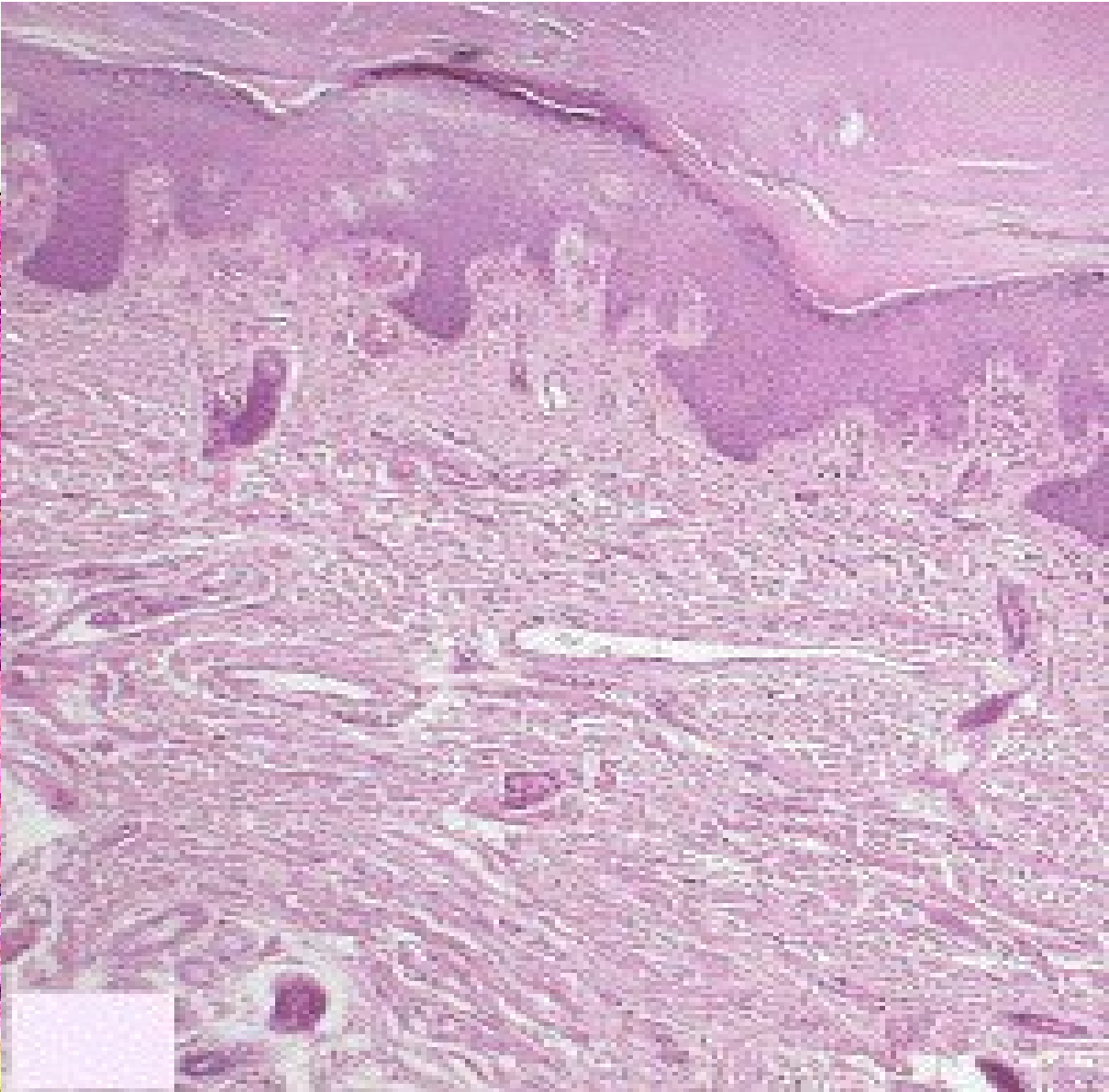
NAME THIS TISSUE, WHAT THE BLUE ARROW
REPRESENTS?

Stratified squamous epithelium, spinosum layer,
desmosomes blue arrow

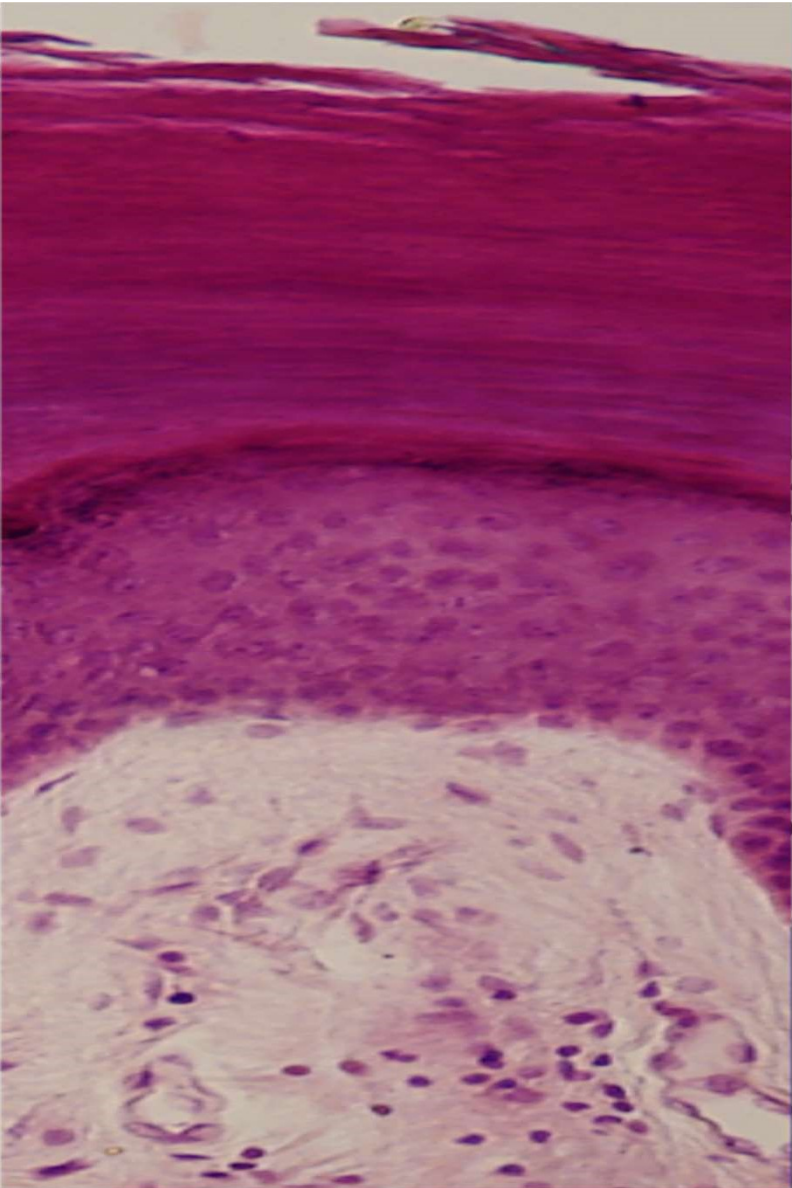




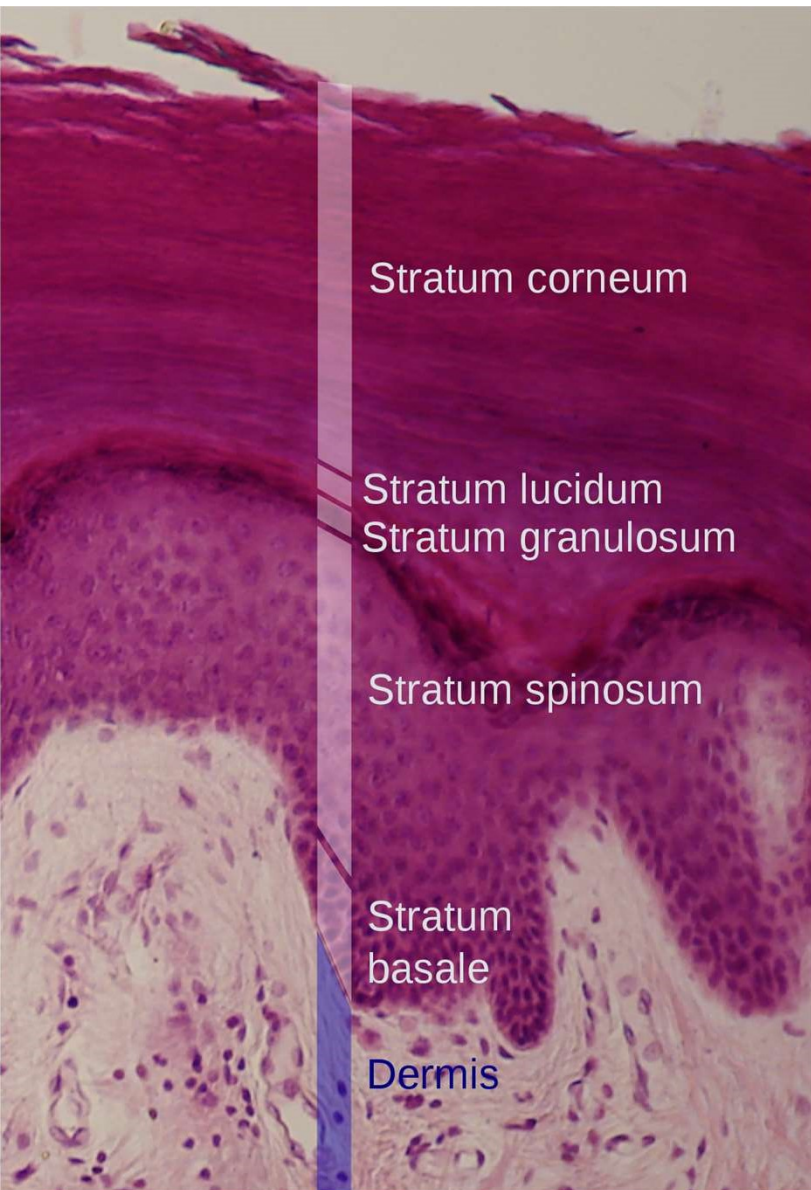
Non Keratinised Stratified Squamous Epithelium



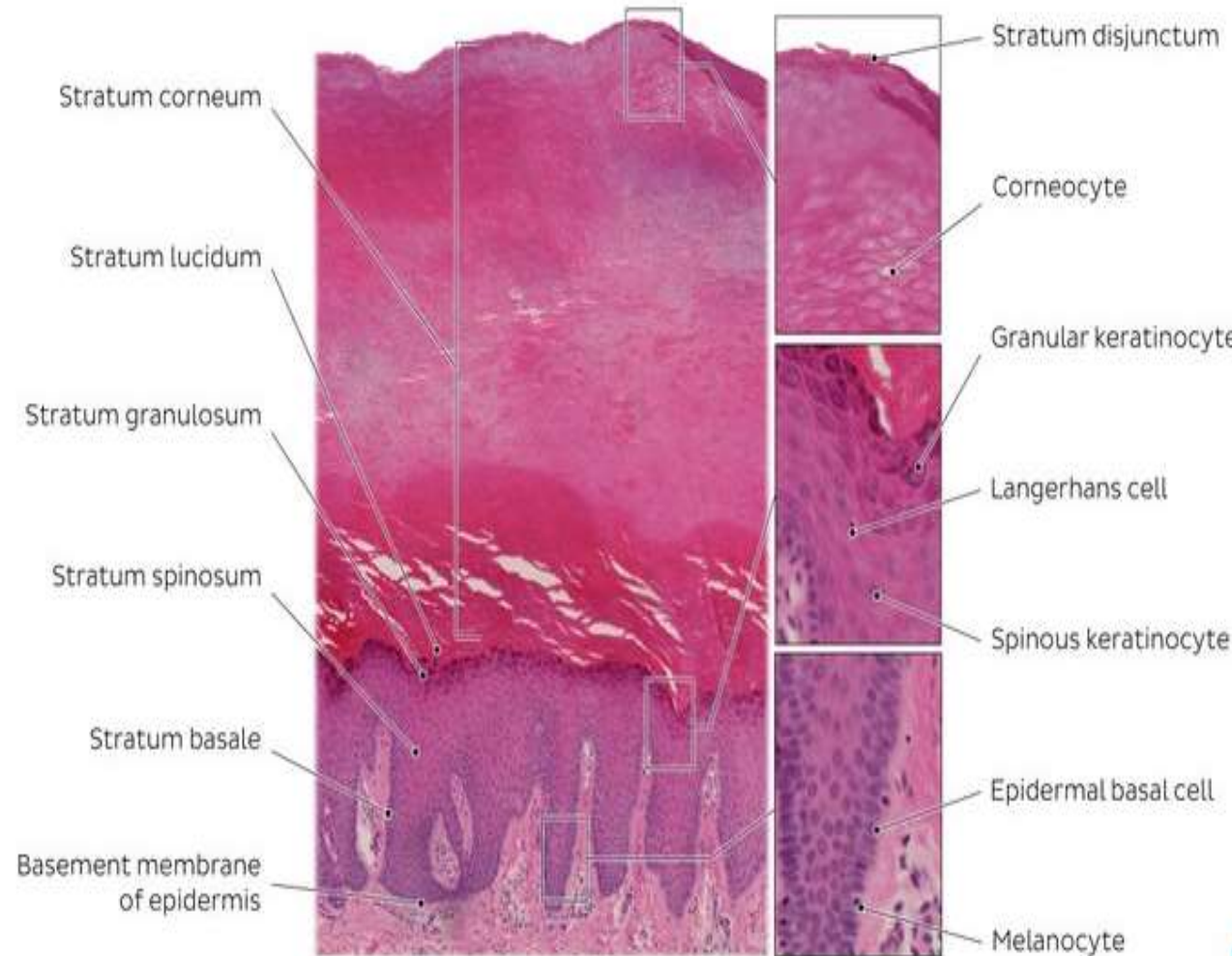
keratinized stratified squamous epithelium

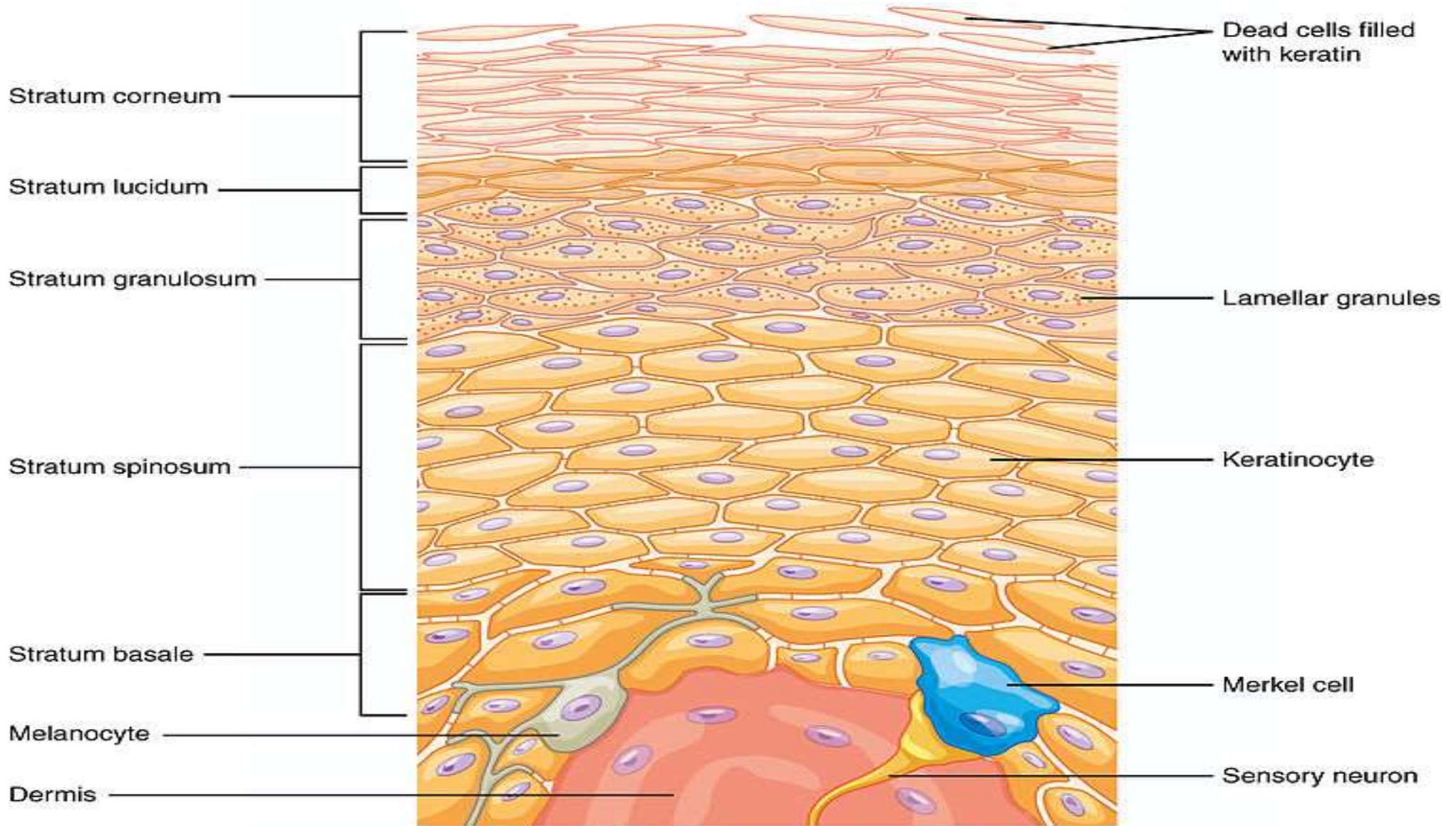


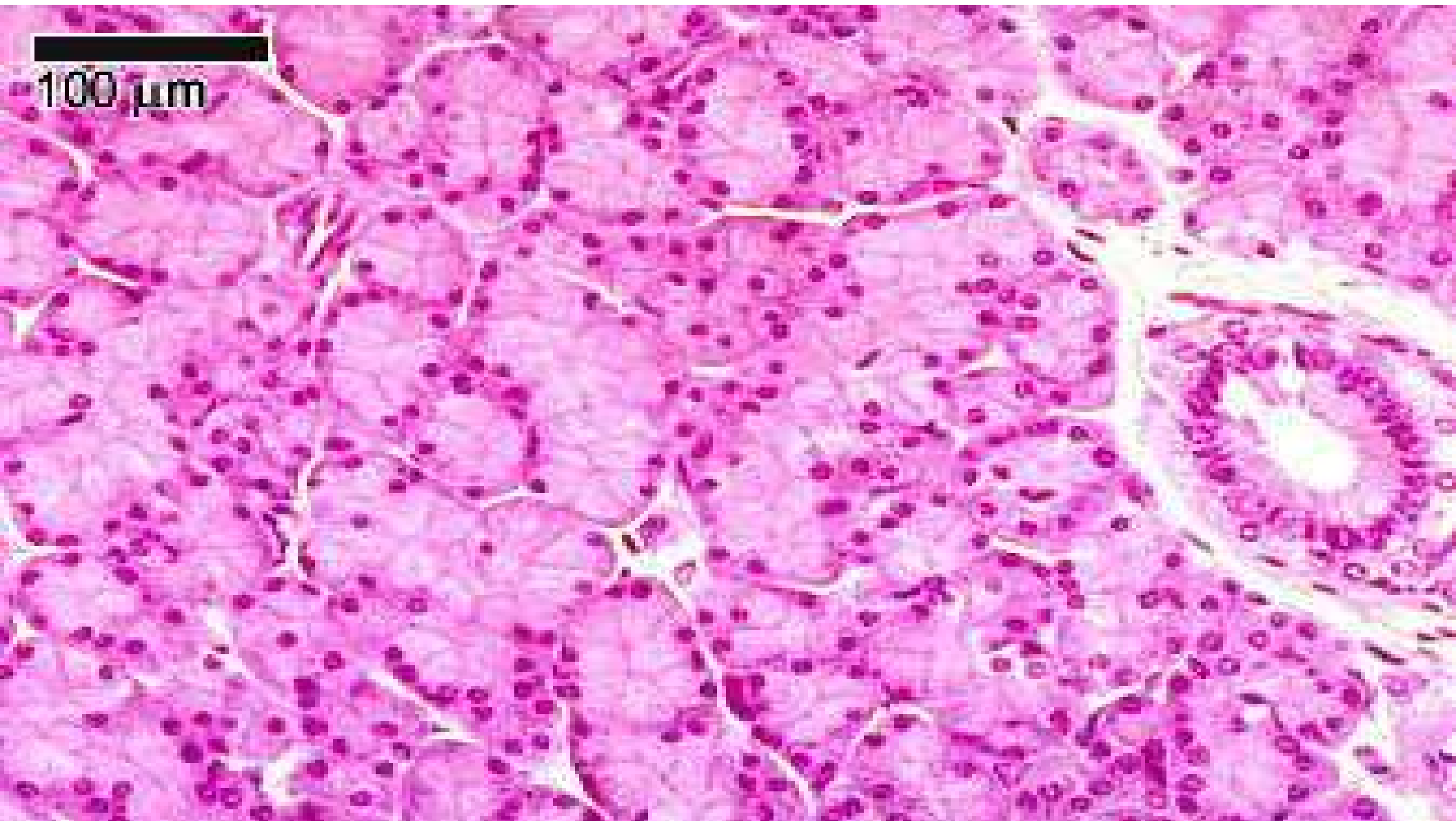
Type of epithelium?
Name the layers of the
epithelium?



keratinized stratified squamous epithelium
Thick skin







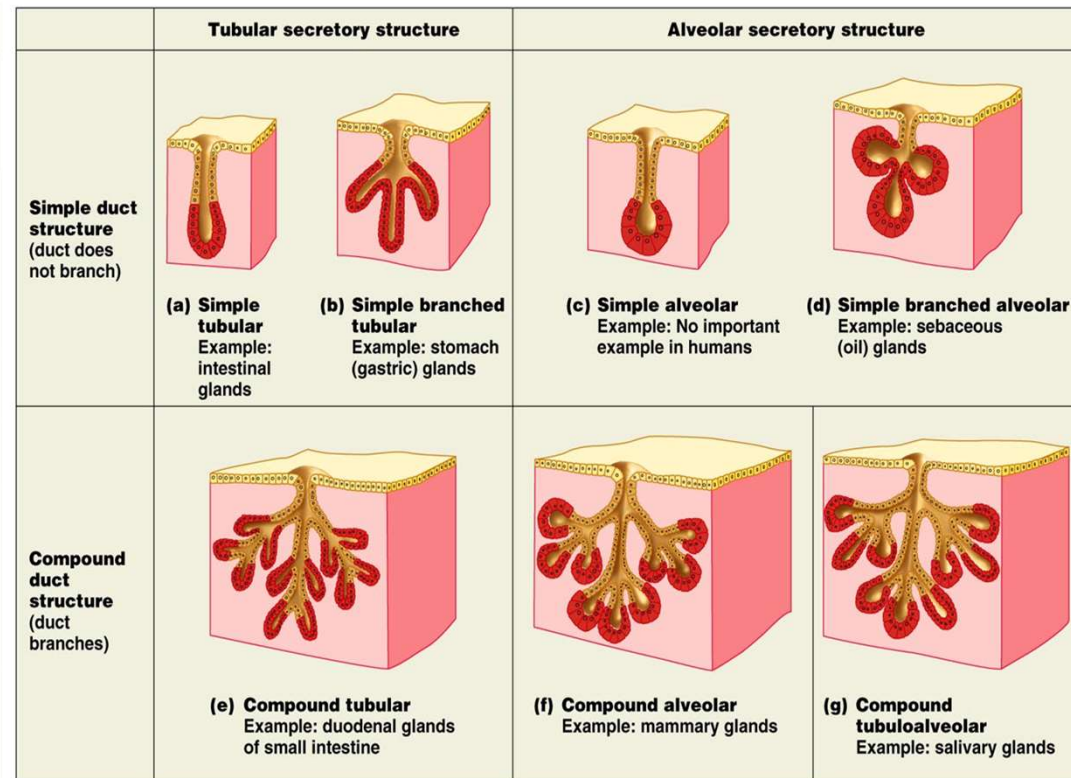
100 μm

Exocrine glands have ducts, simple cuboidal epithelium

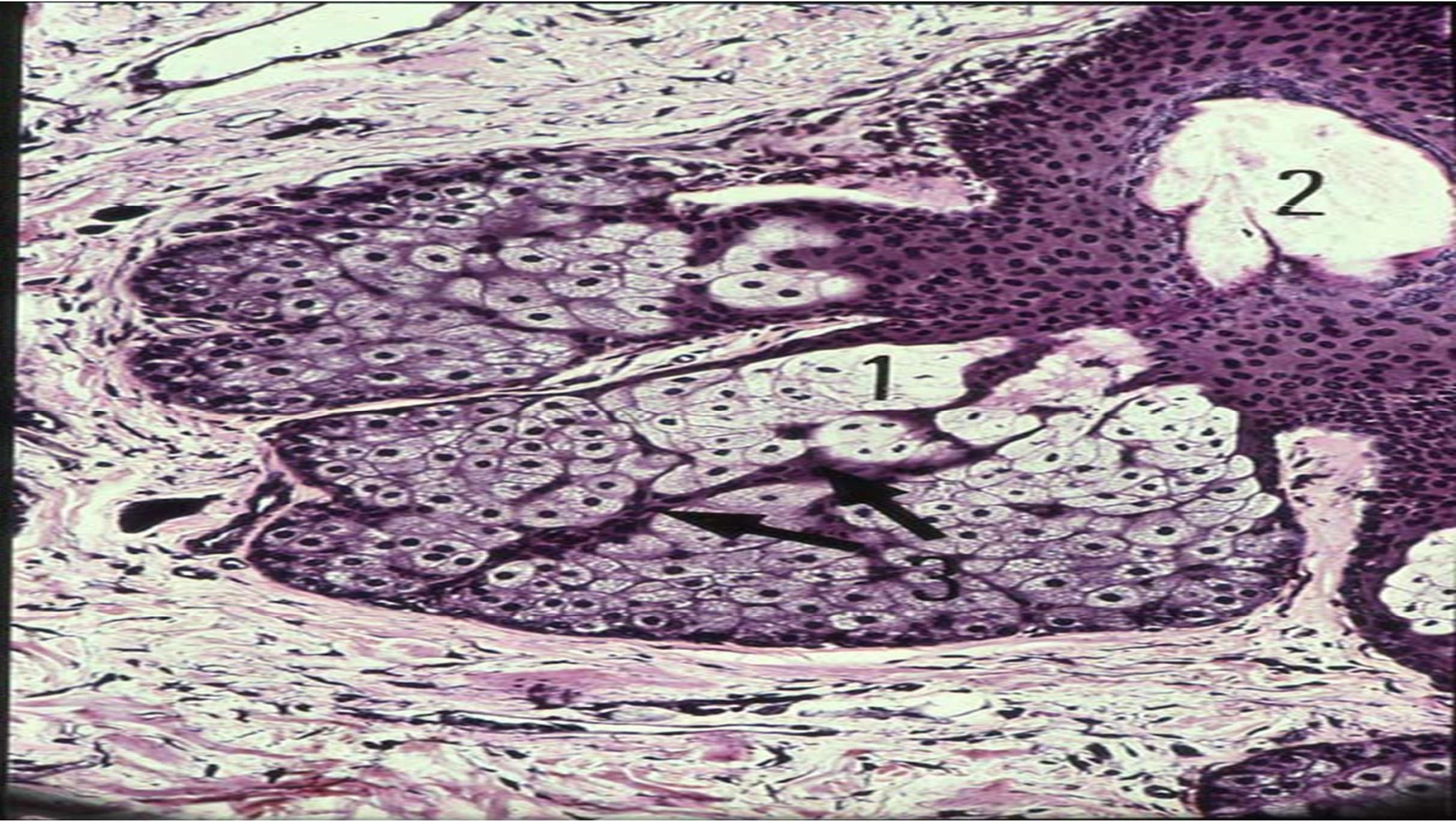
examples of exocrine glands are: sebaceous and sweat glands (in the skin), salivary glands (oral), Brunner's glands (duodenum = Beginning of the small intestine following the stomach)

Histologically, glands are described using some standard vocabulary, with which you should be familiar.

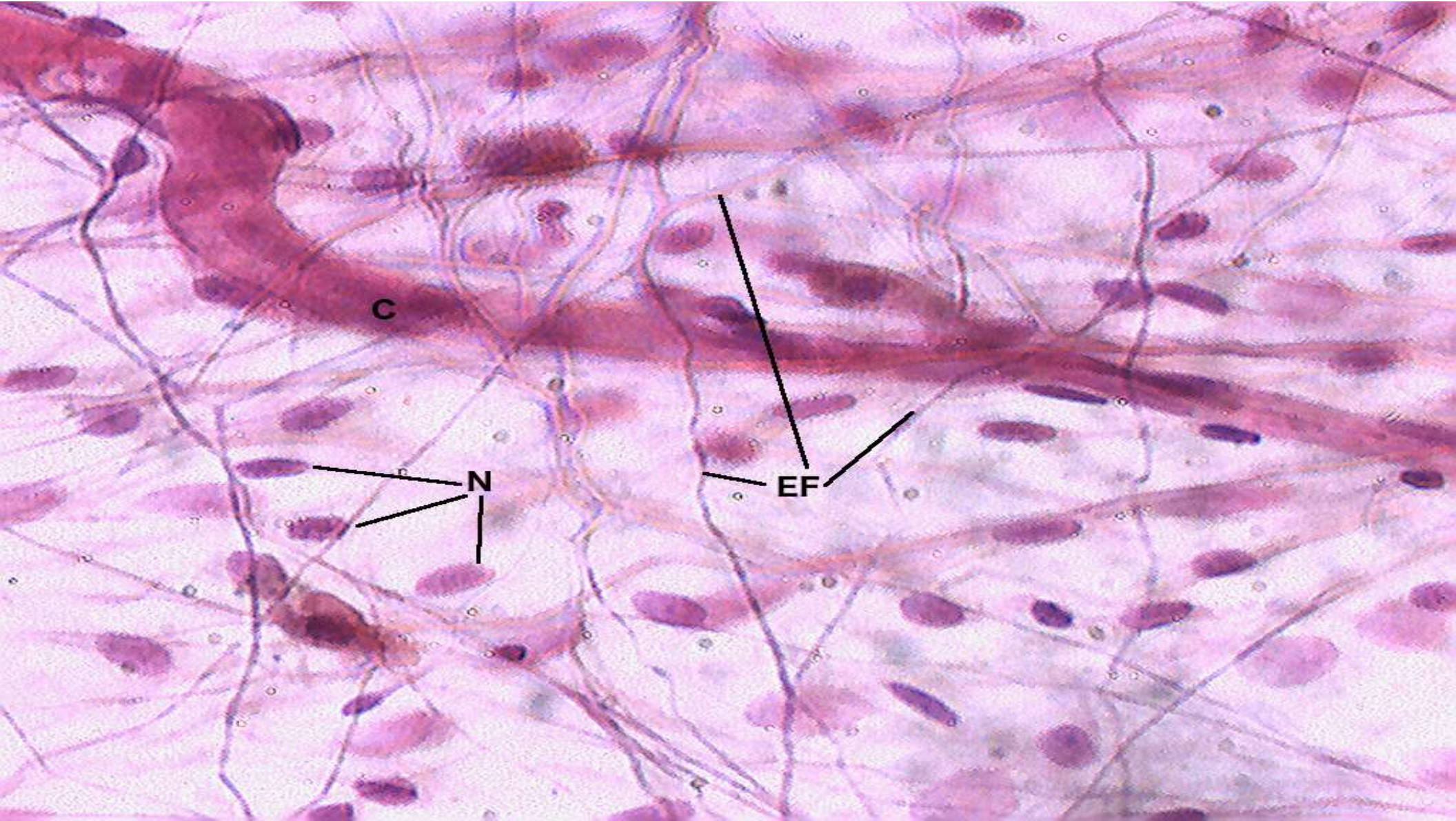
Destination of product:	exocrine / endocrine
Nature of product:	serous / mucous / mixed
Location of gland:	mucosal / submucosal
Arrangement of secretory cells:	acinus / tubule / cord
Number of interconnected units:	simple / compound
Duct function:	intercalated / striated secretory / excretory
Duct location:	intralobular / interlobular / interlobar
Tissue composition:	parenchyma / stroma



Key: = Surface epithelium = Duct = Secretory epithelium



Sebaceous gland = holocrine type of gland

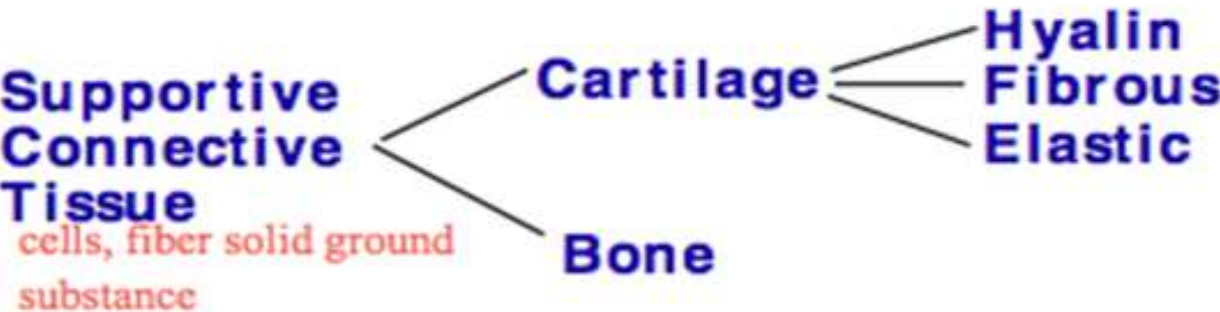
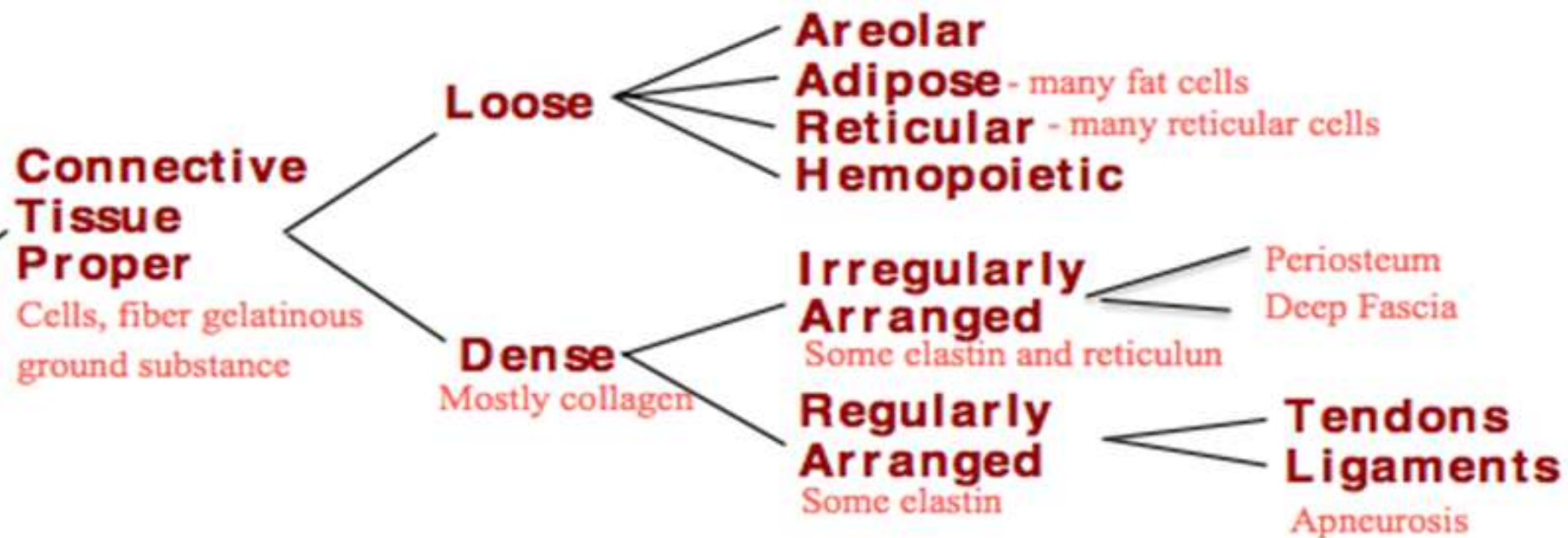


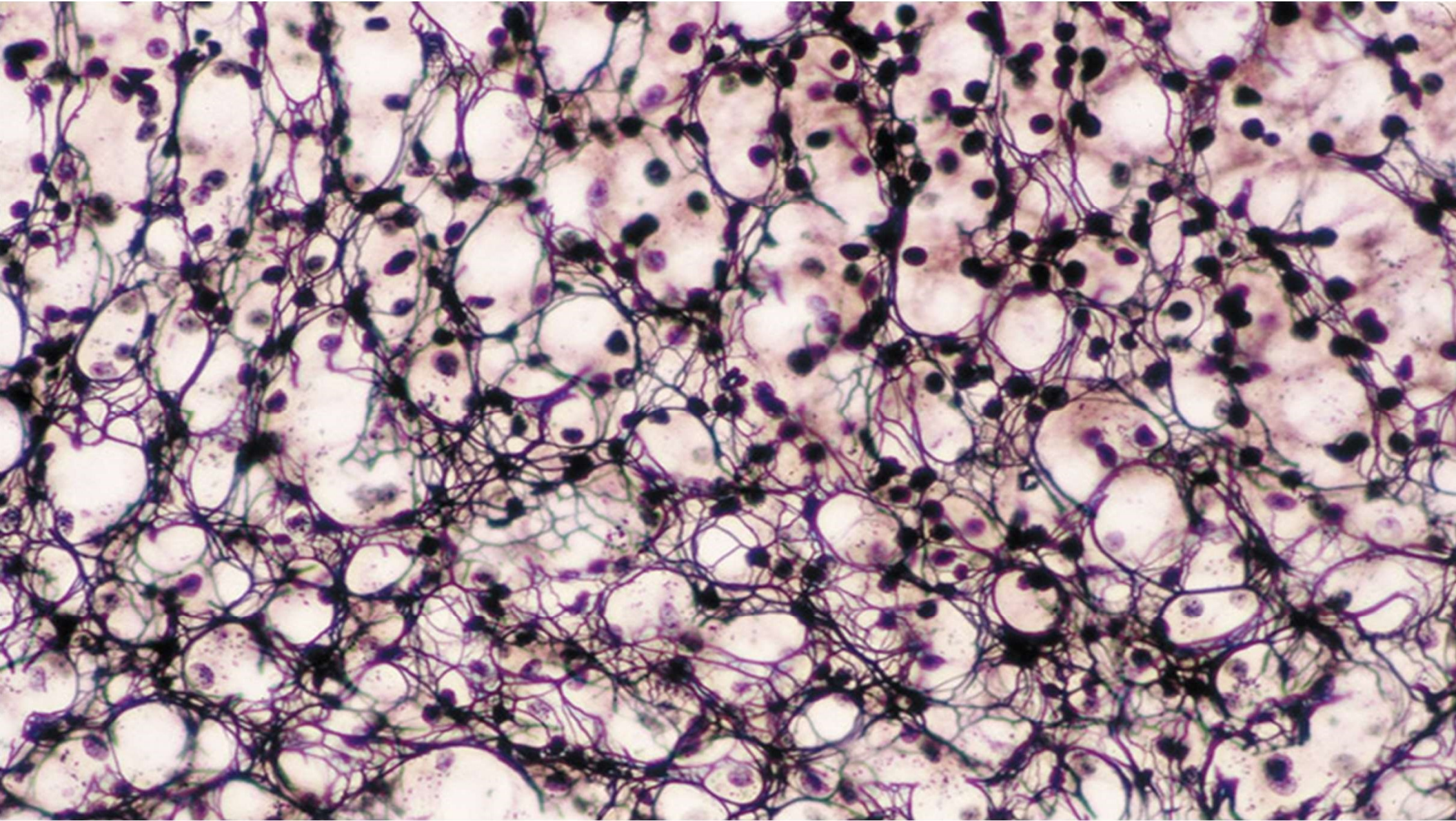
C

N

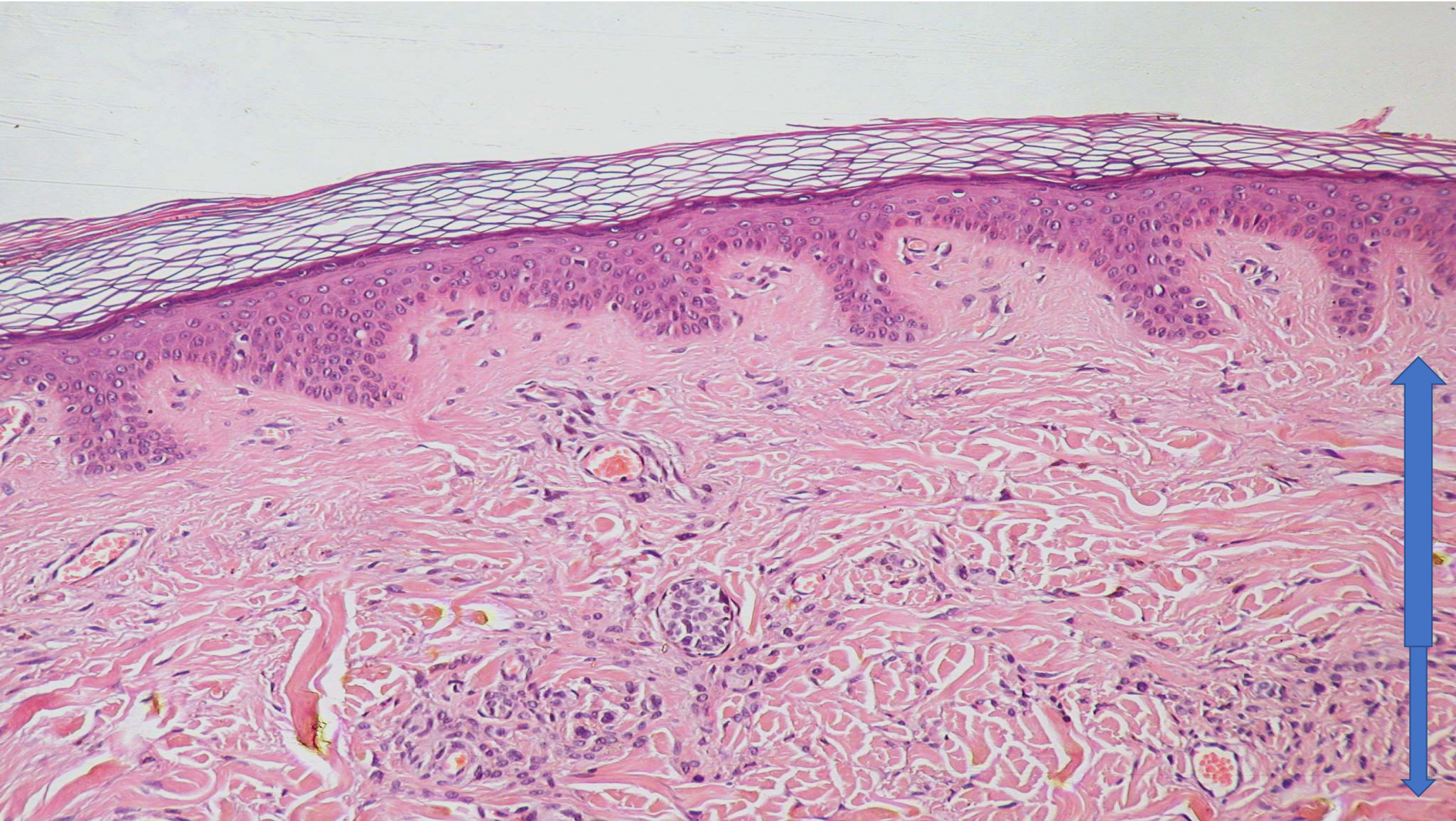
EF

Loose or areolar connective tissue

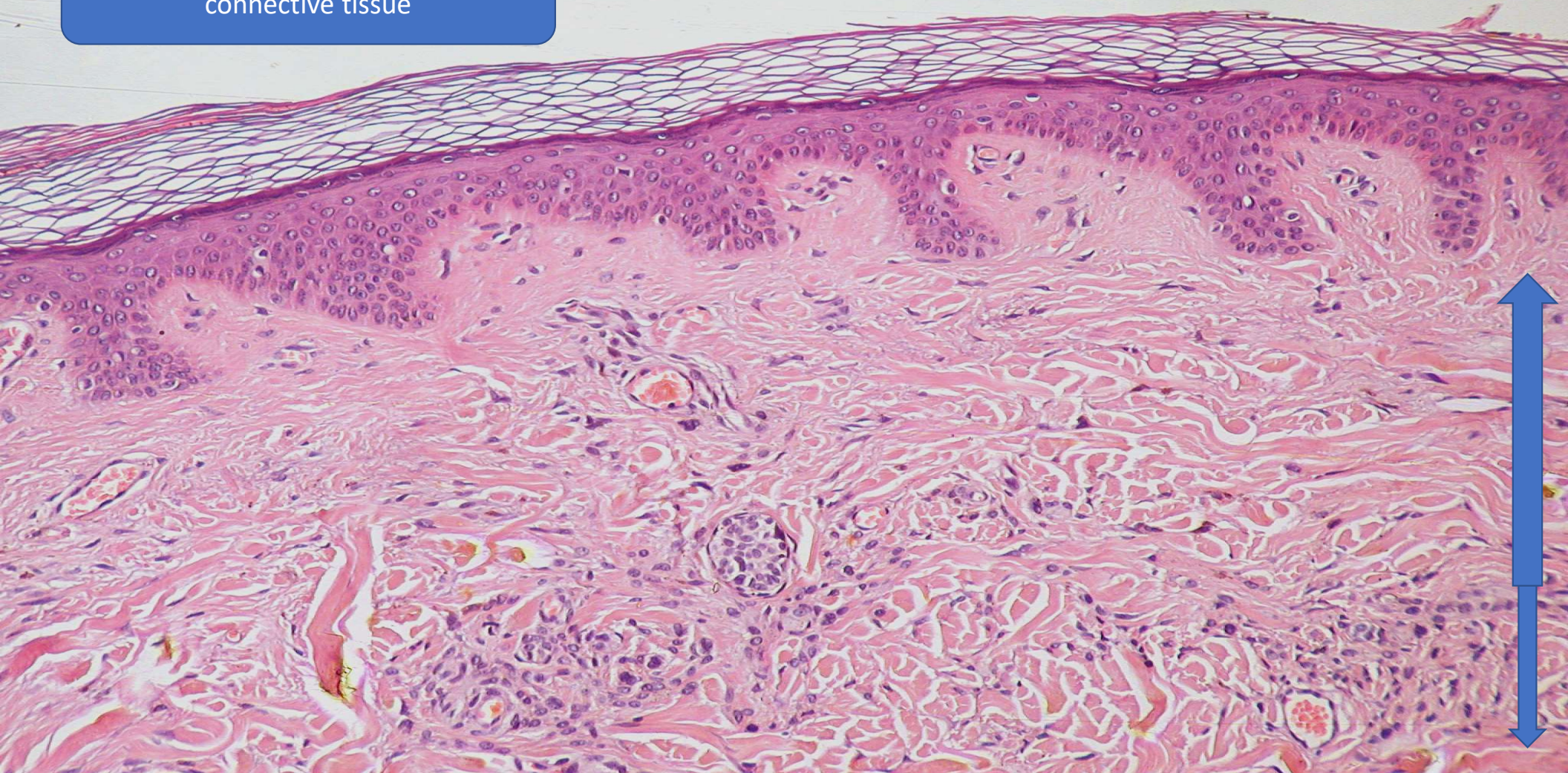


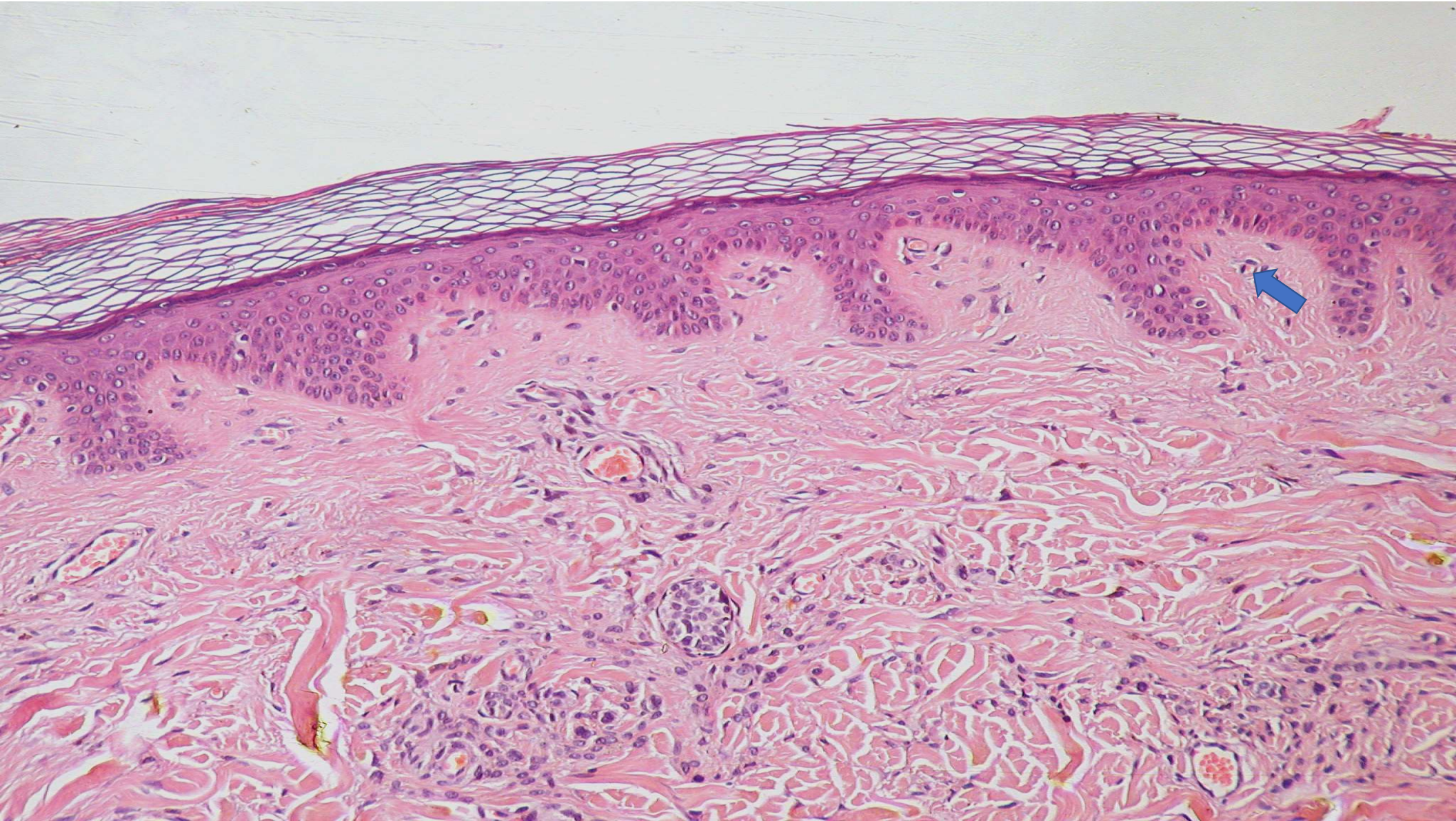


Reticular connective tissue, Lymph nodes , spleen

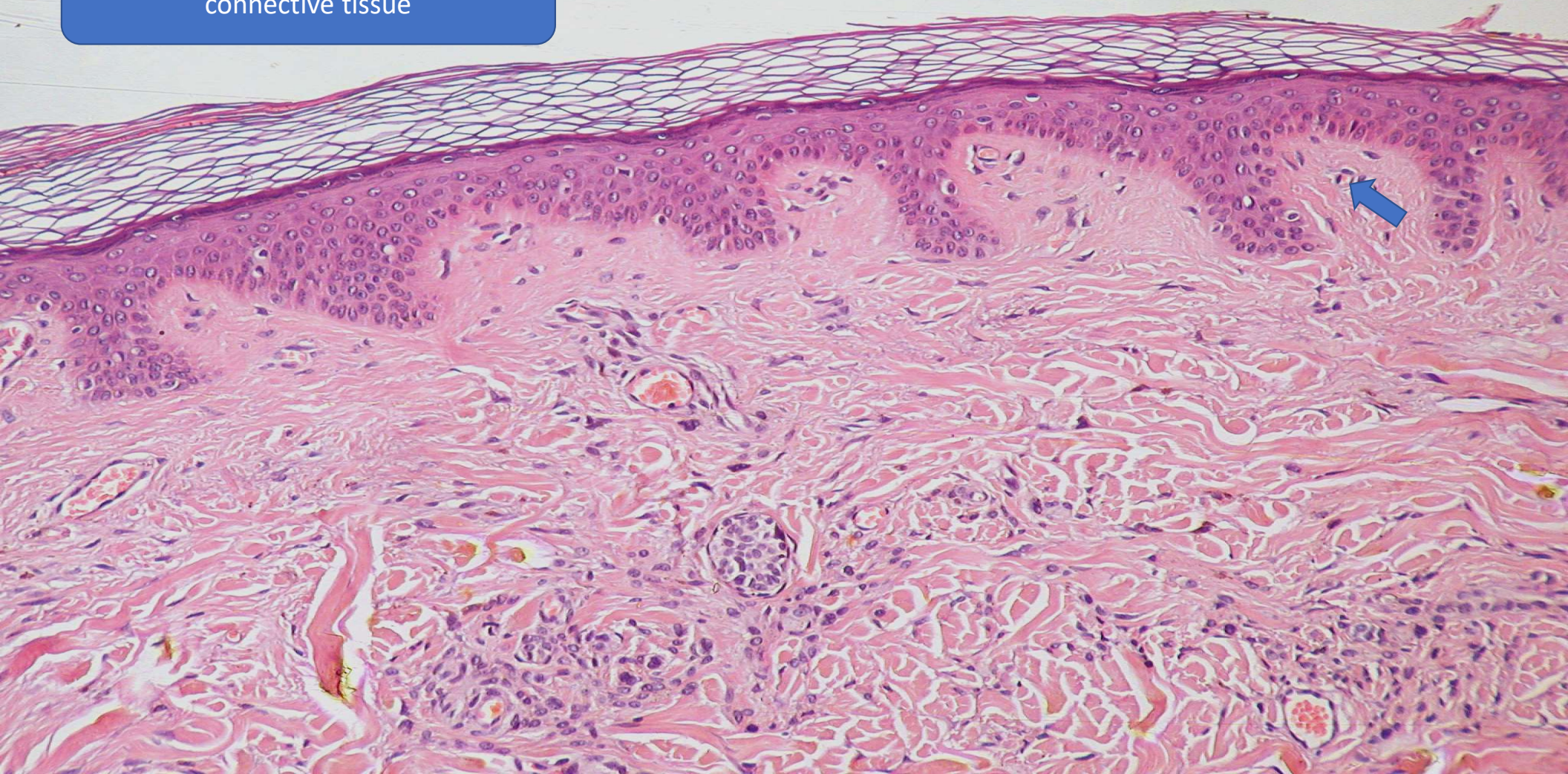


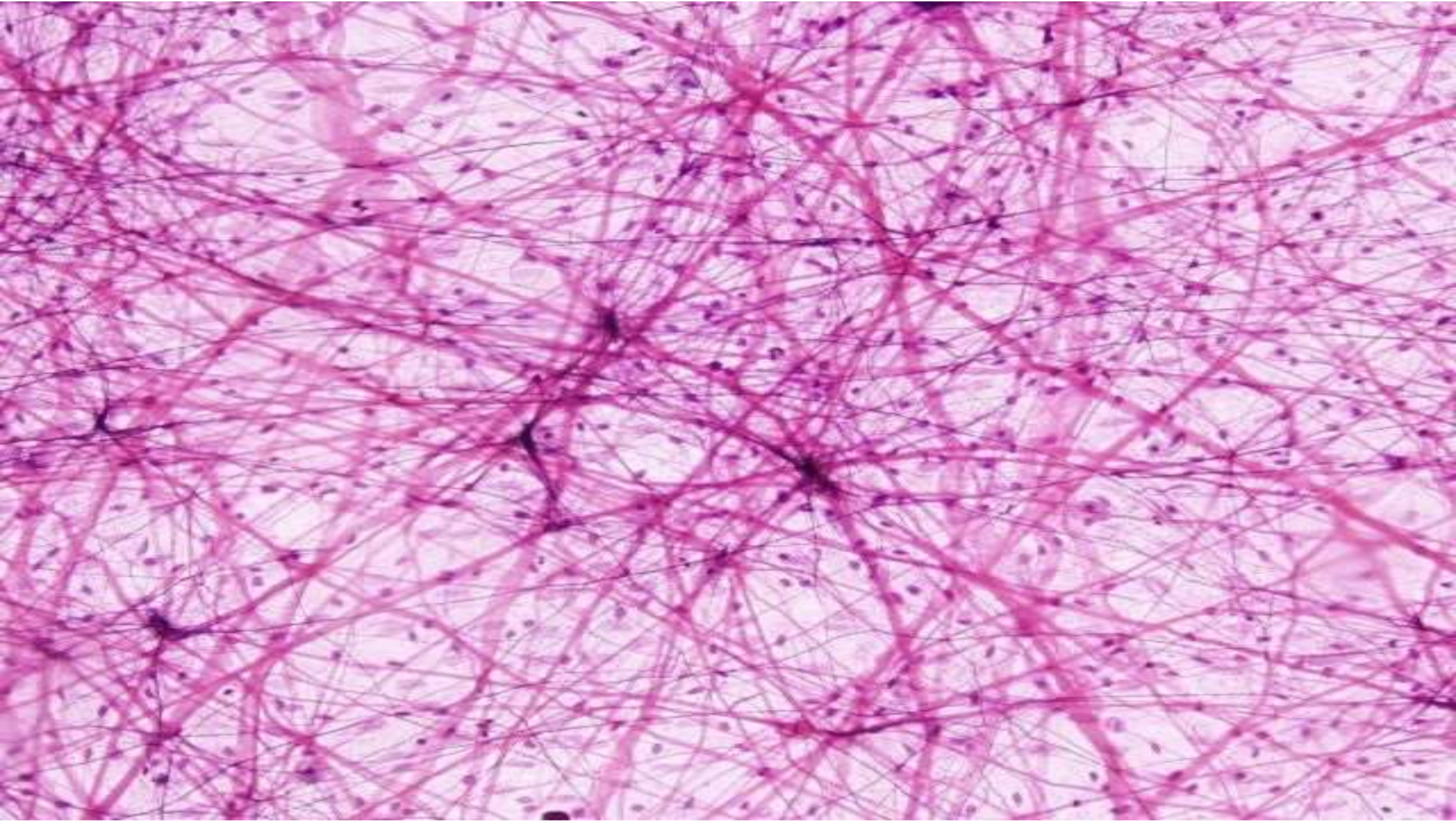
Reticular Dermis, dense irregular connective tissue





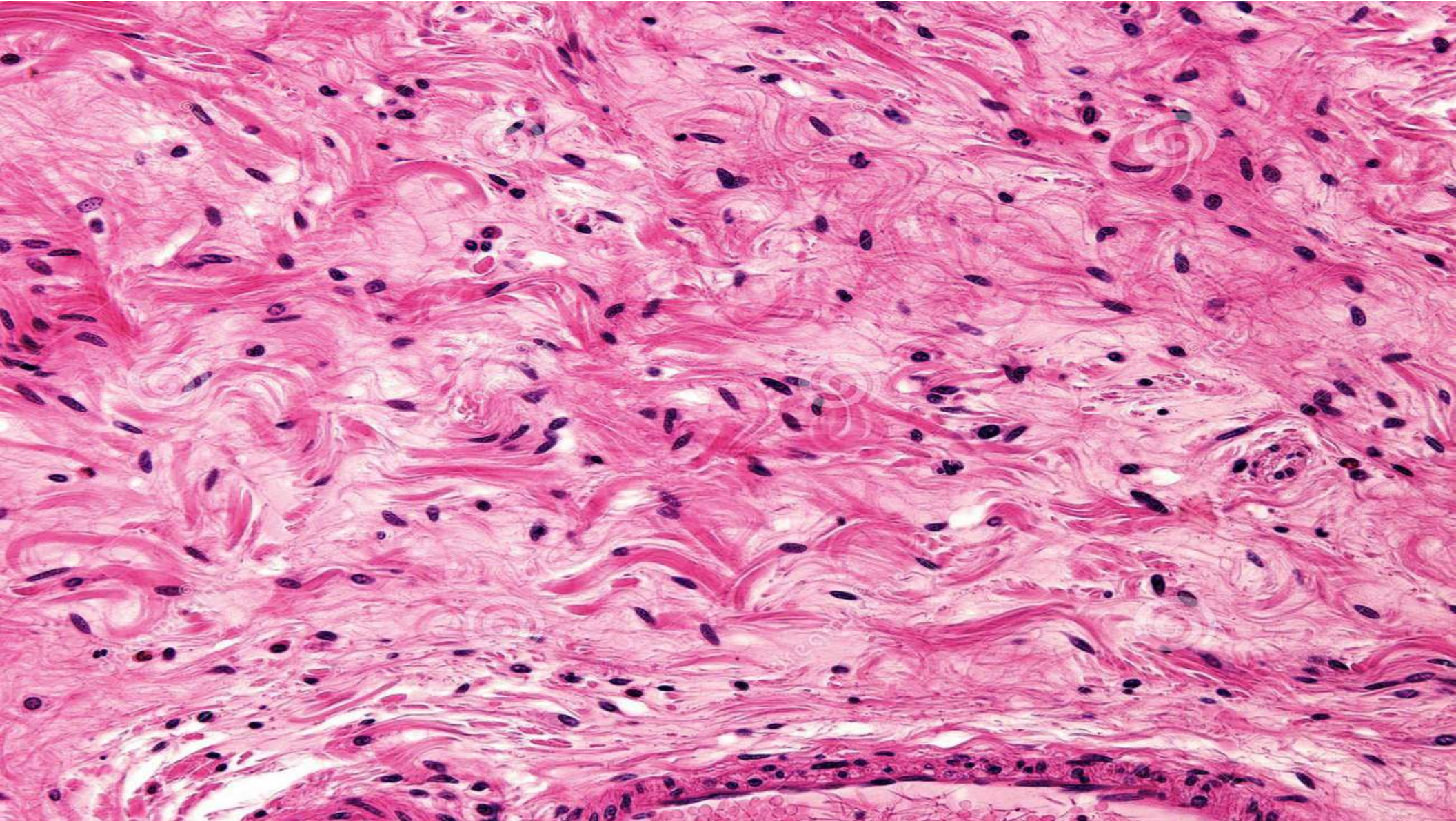
Papillary layer Dermis, dense loose
connective tissue



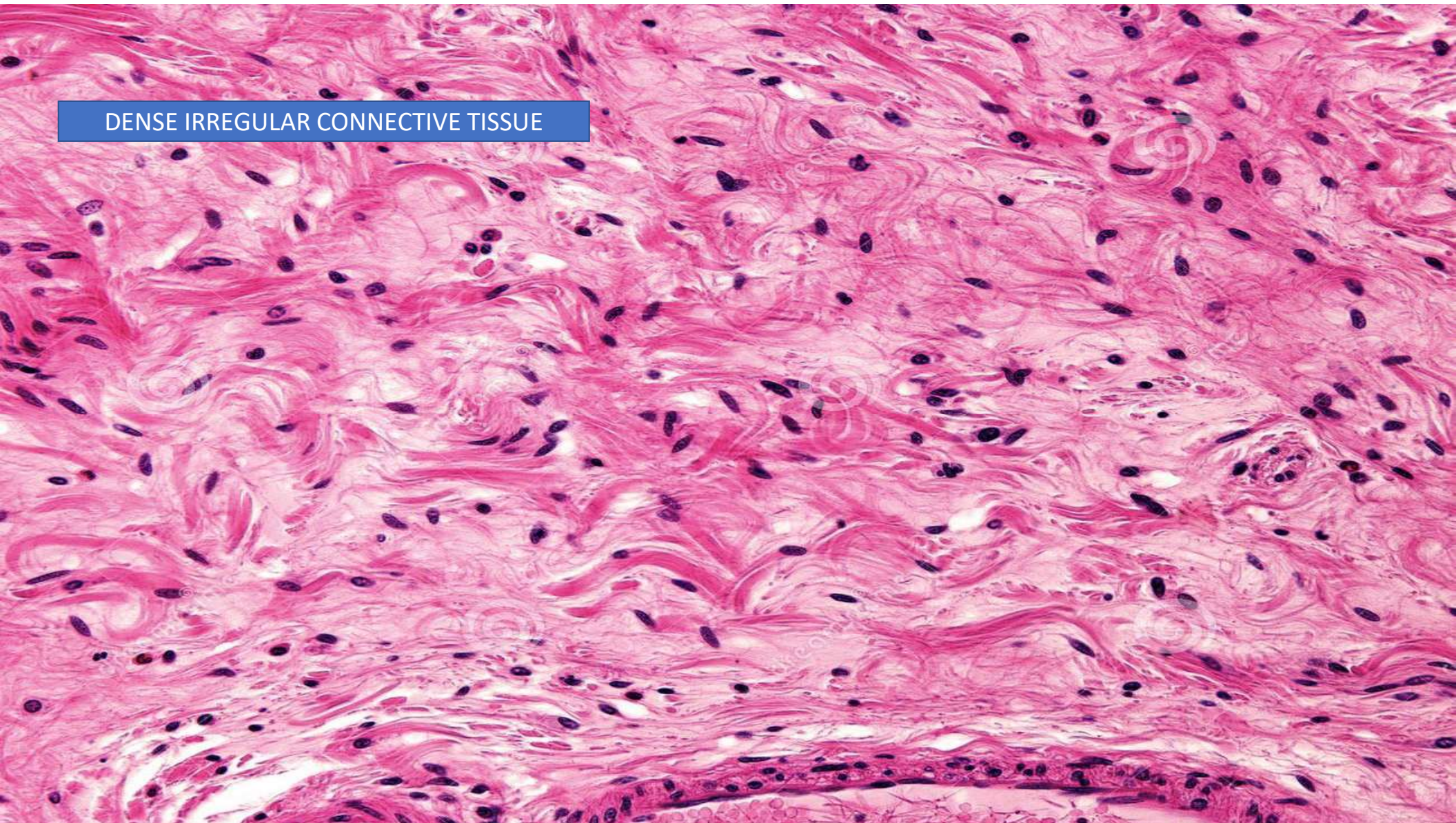




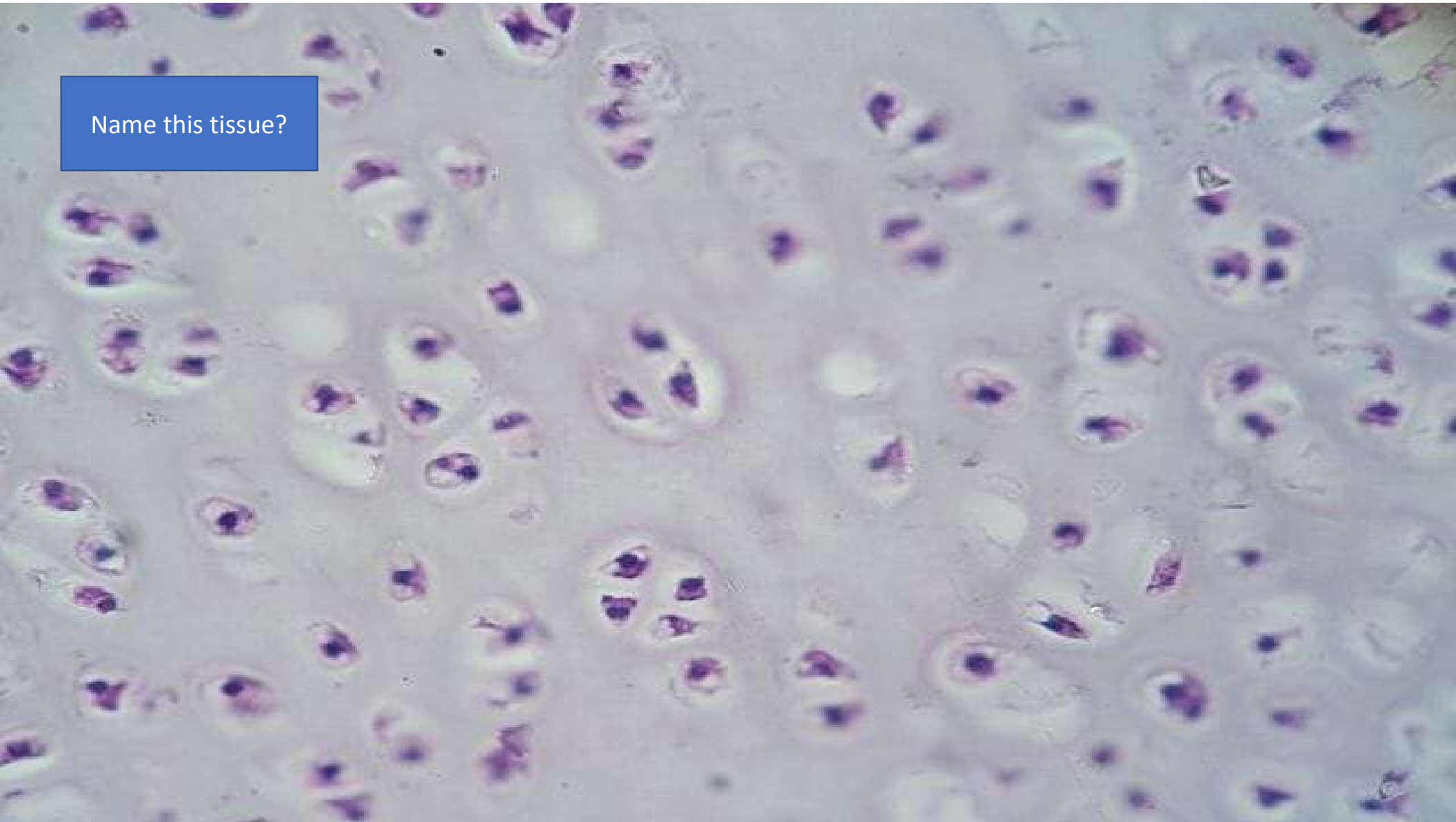
LOOSE CONNECTIVE TISSUE



DENSE IRREGULAR CONNECTIVE TISSUE



Name this tissue?

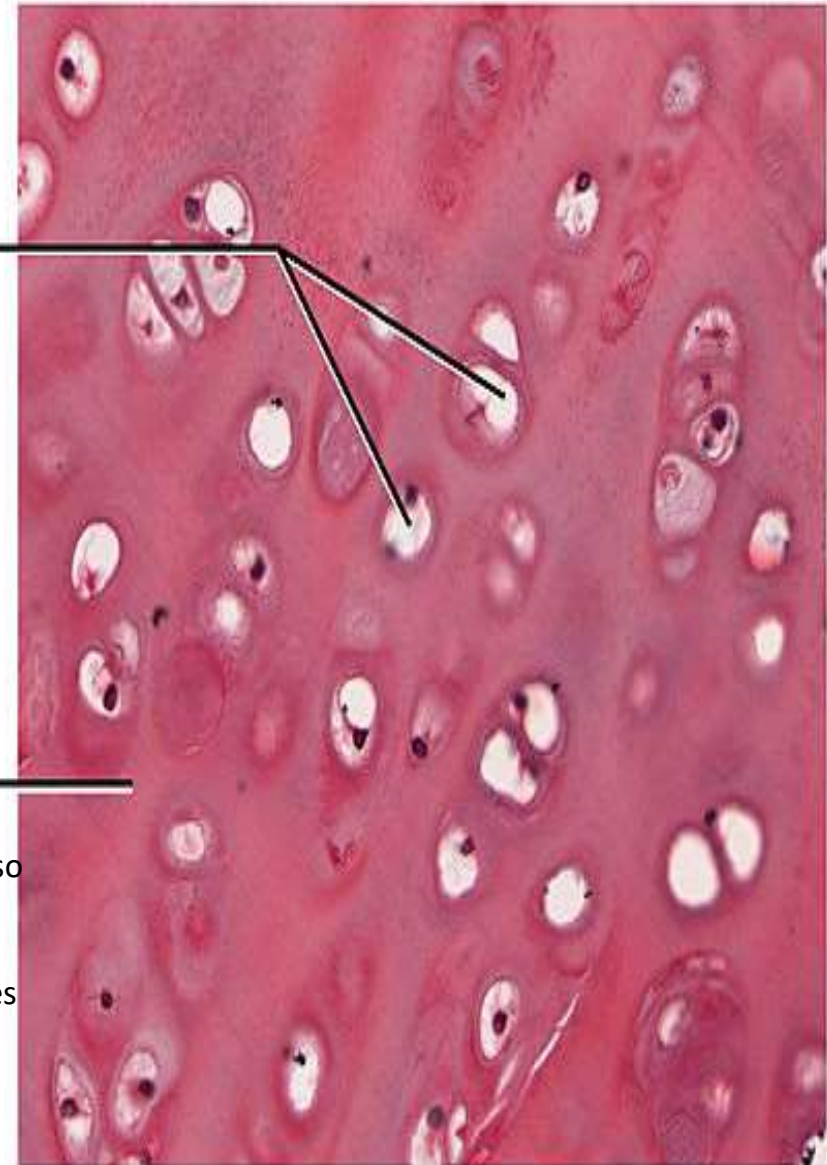
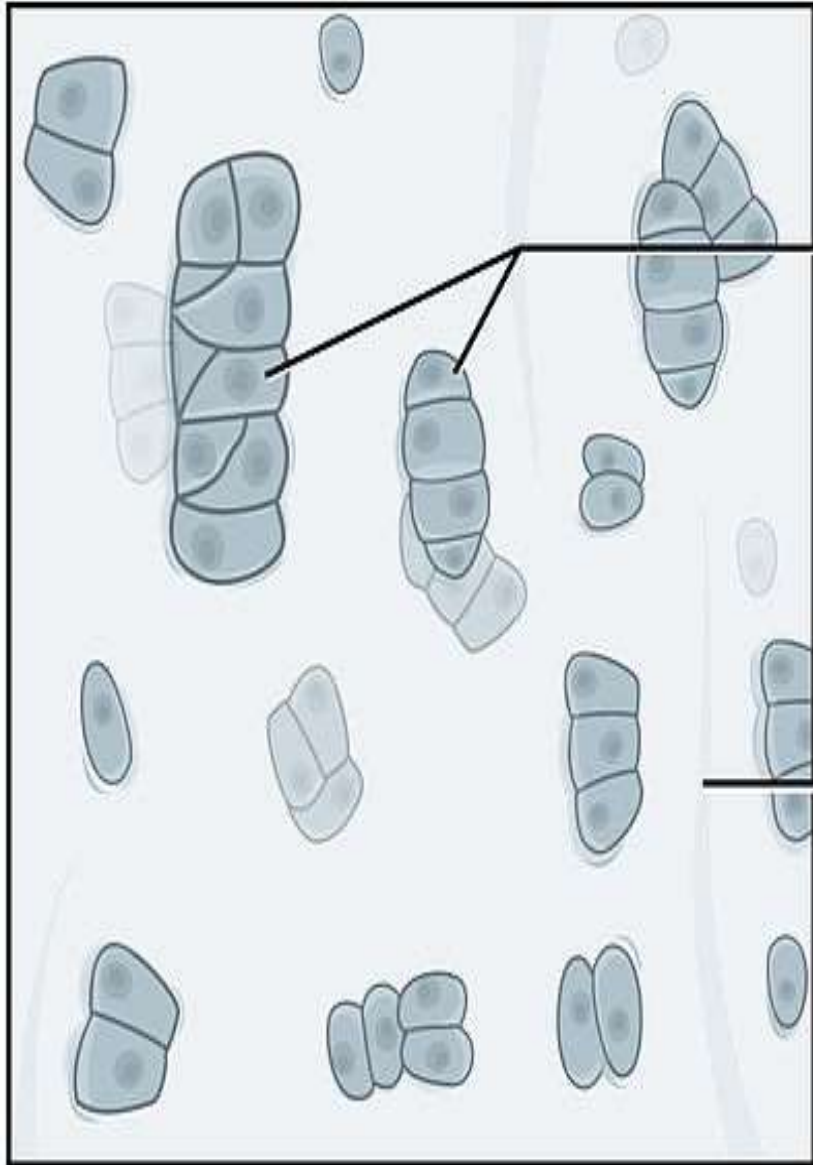


(a) Hyaline cartilage

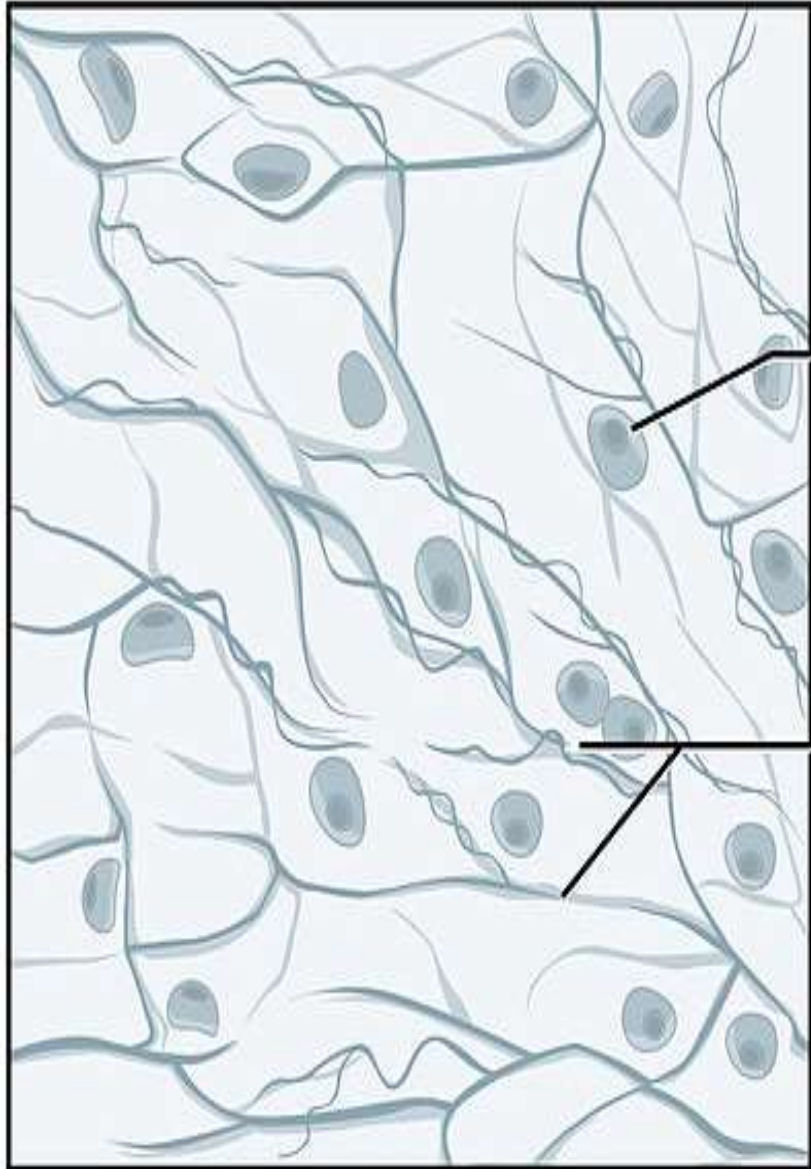
Chondrocytes
in lacunae

Matrix

This is the most common form of cartilage in the body and also the weakest type. It is mostly made up of collagen (type II) with relatively few elastic fibres and is surrounded by a perichondrium.

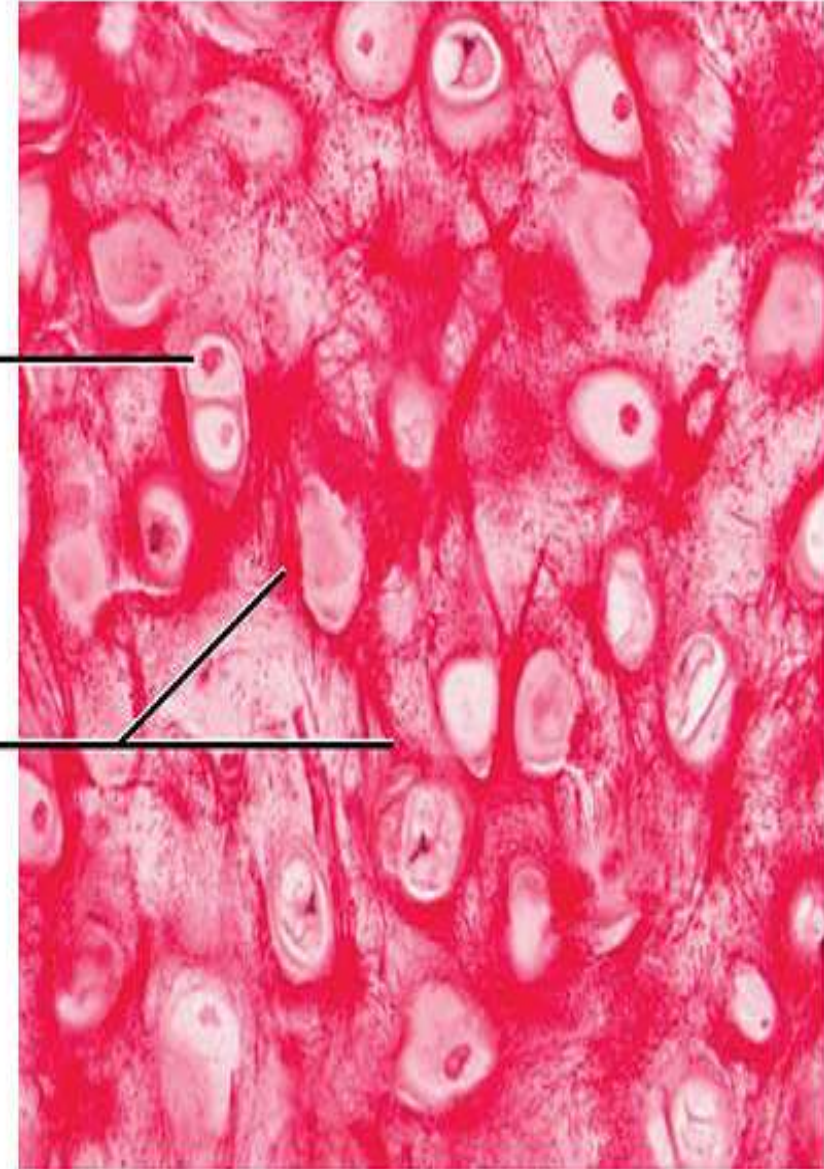


(c) Elastic cartilage

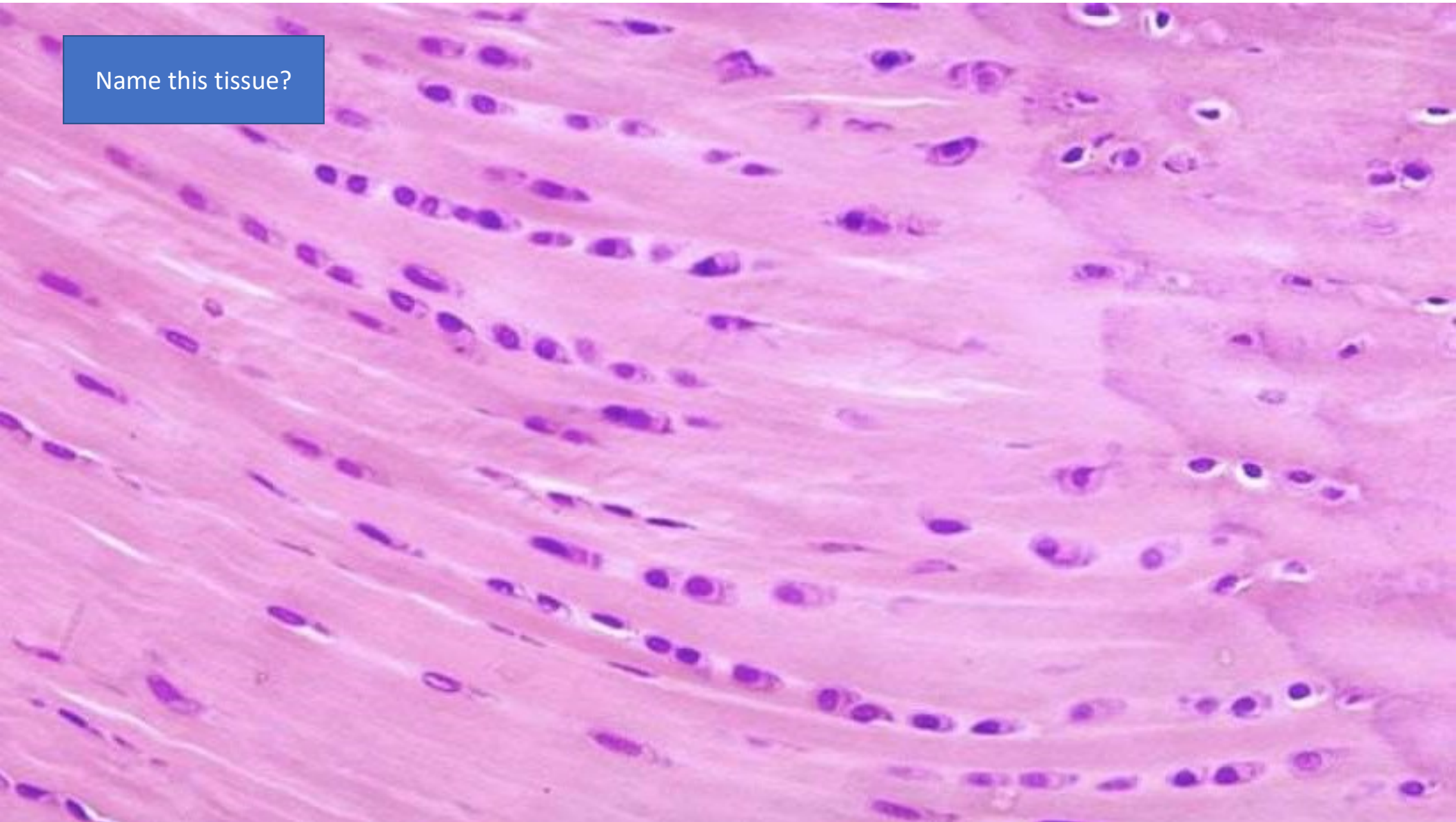


Chondrocyte
in lacuna

Elastic fibers
in matrix



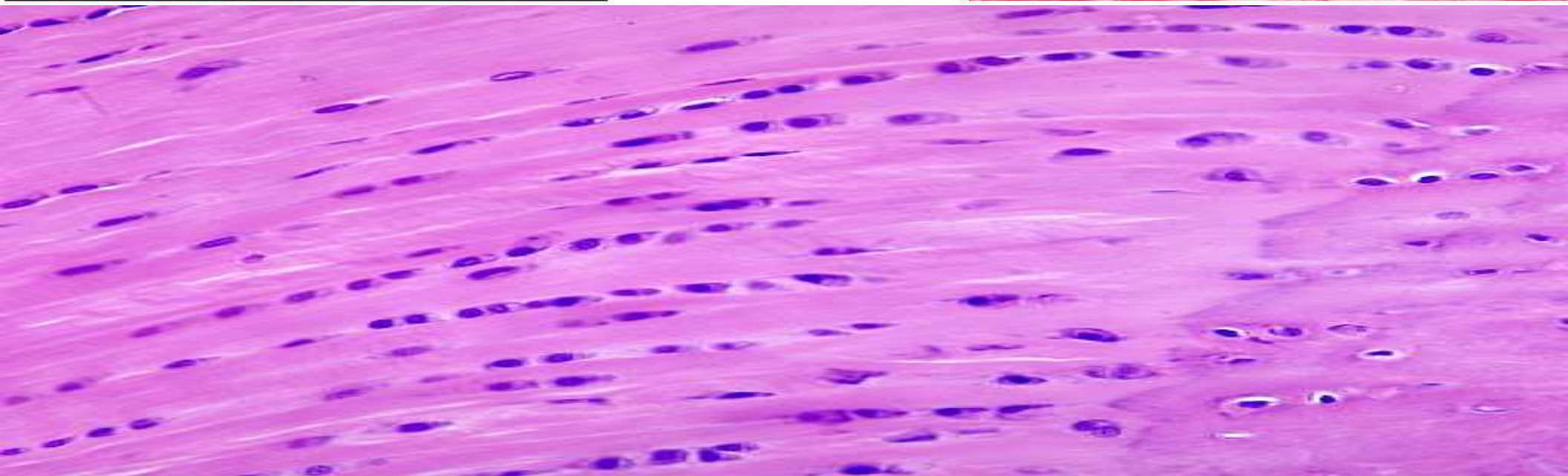
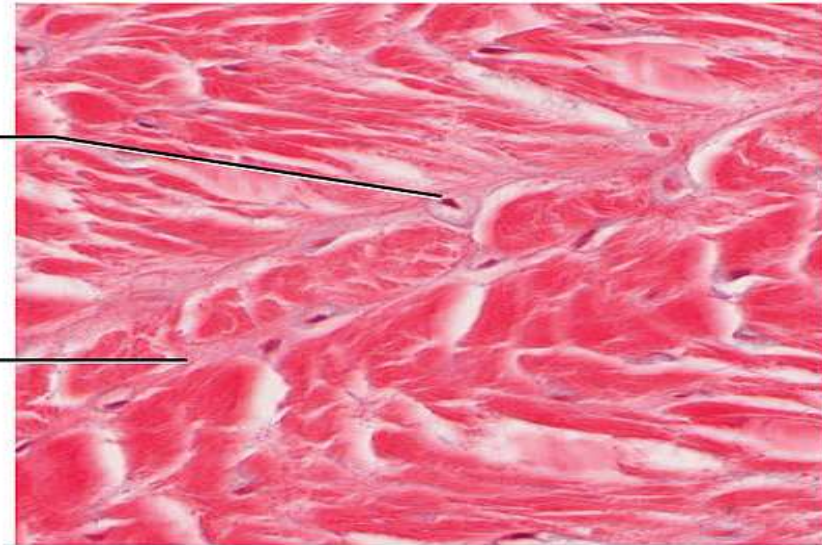
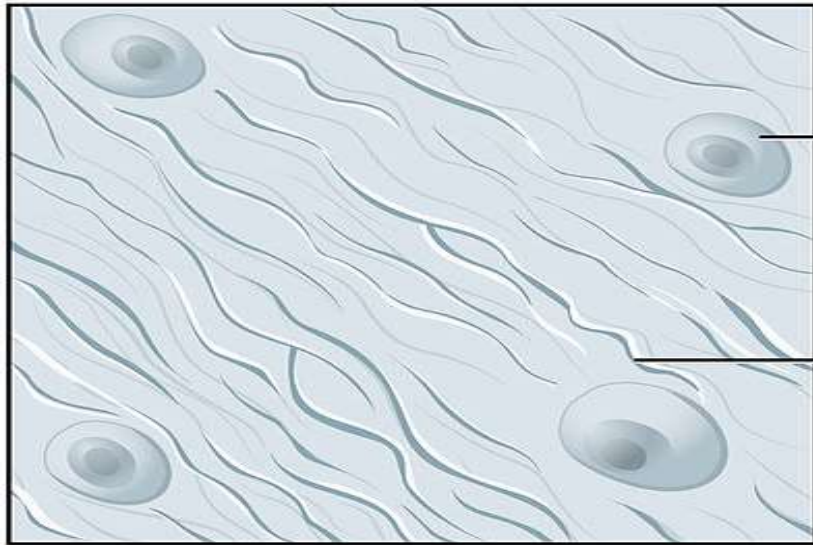
Name this tissue?



(b) Fibrocartilage

Chondrocyte
in lacuna

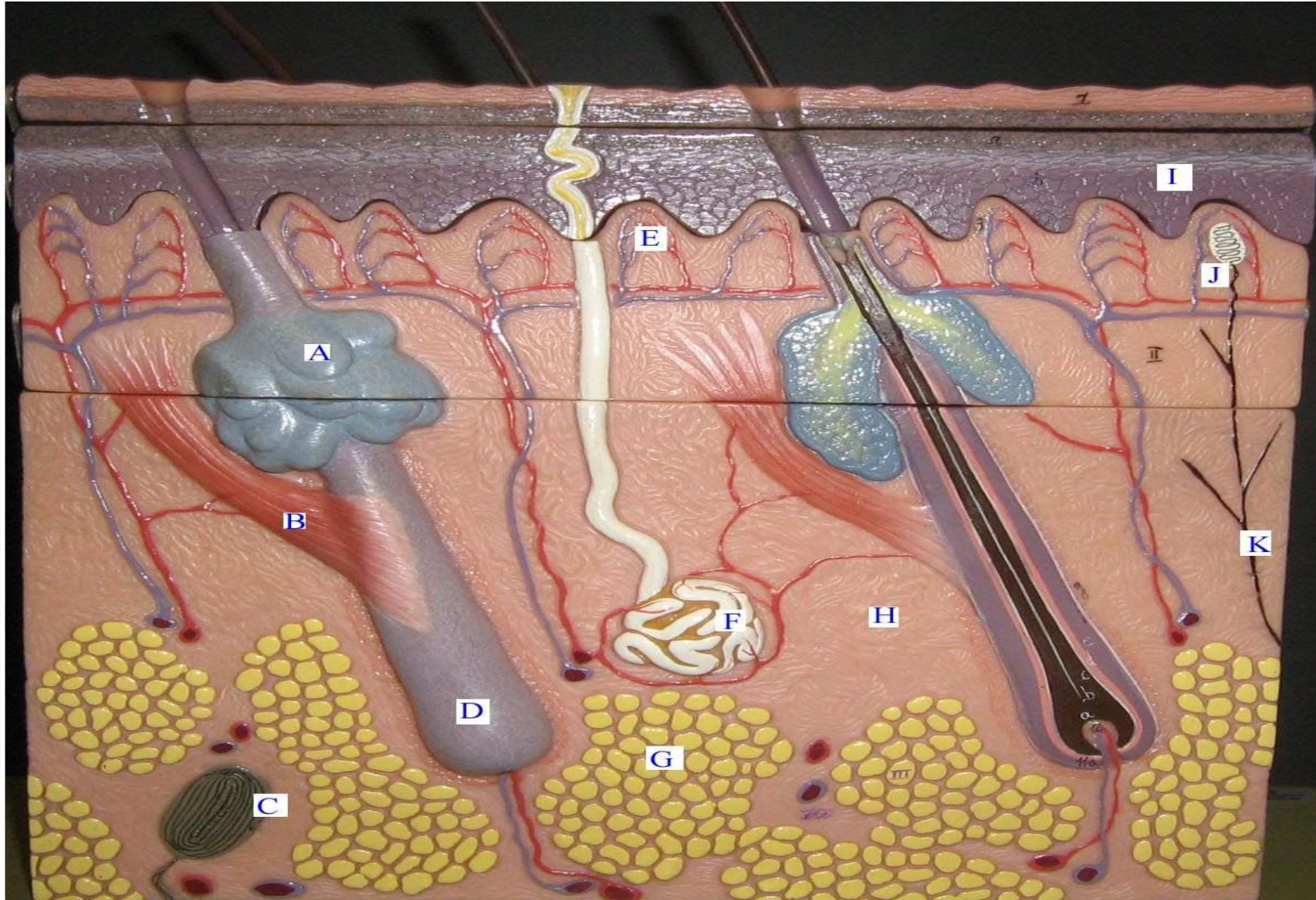
Collagen fiber
in matrix

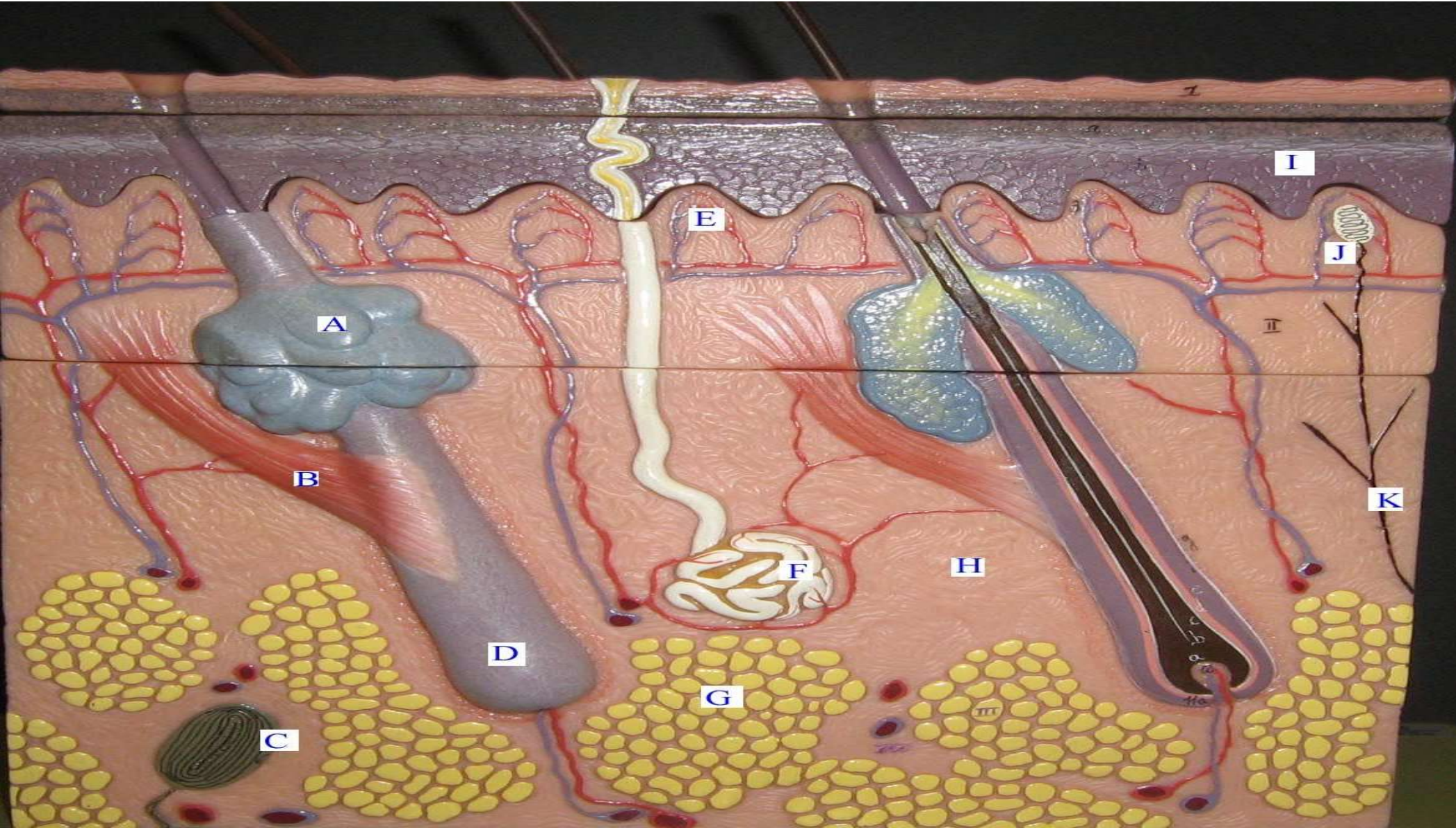


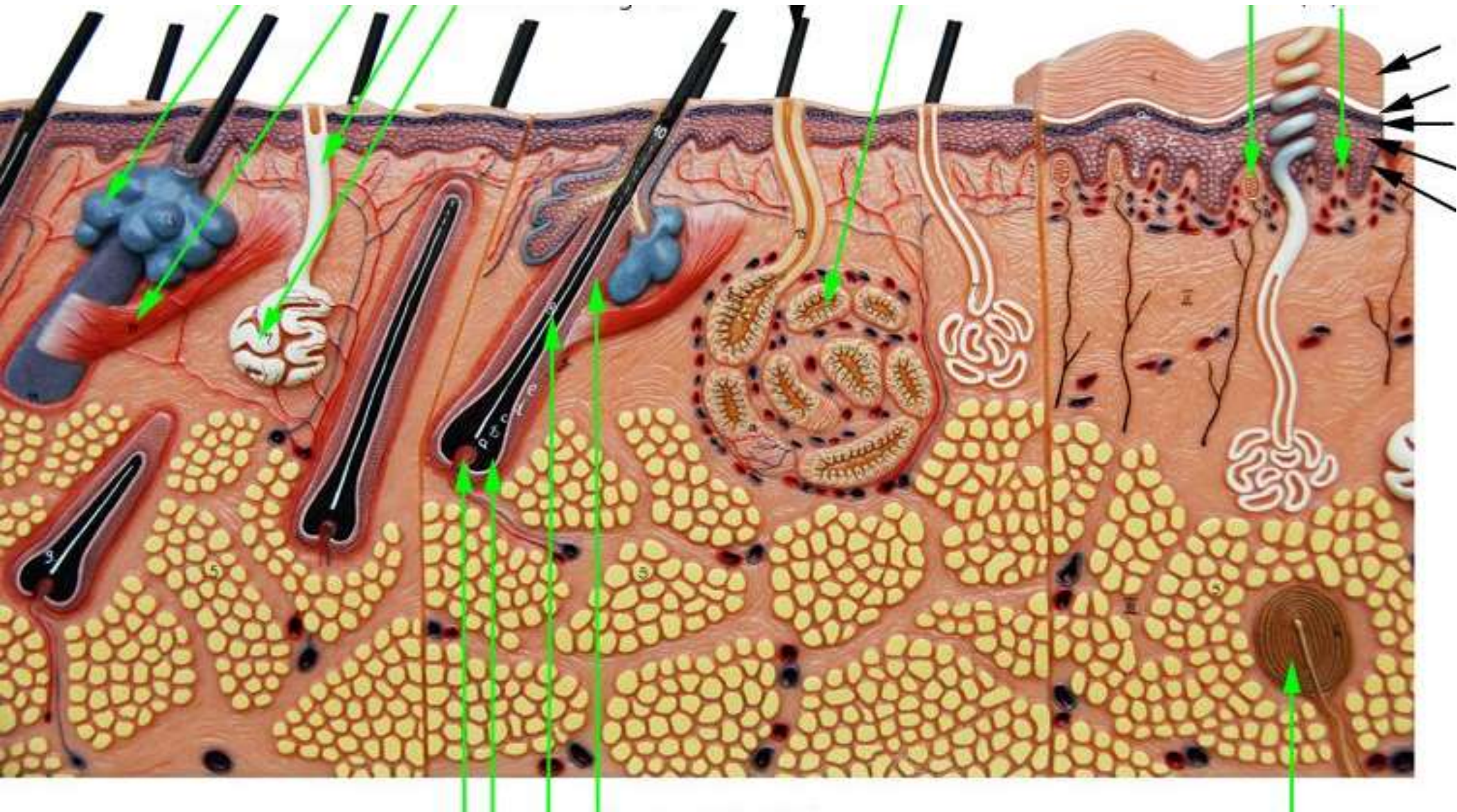


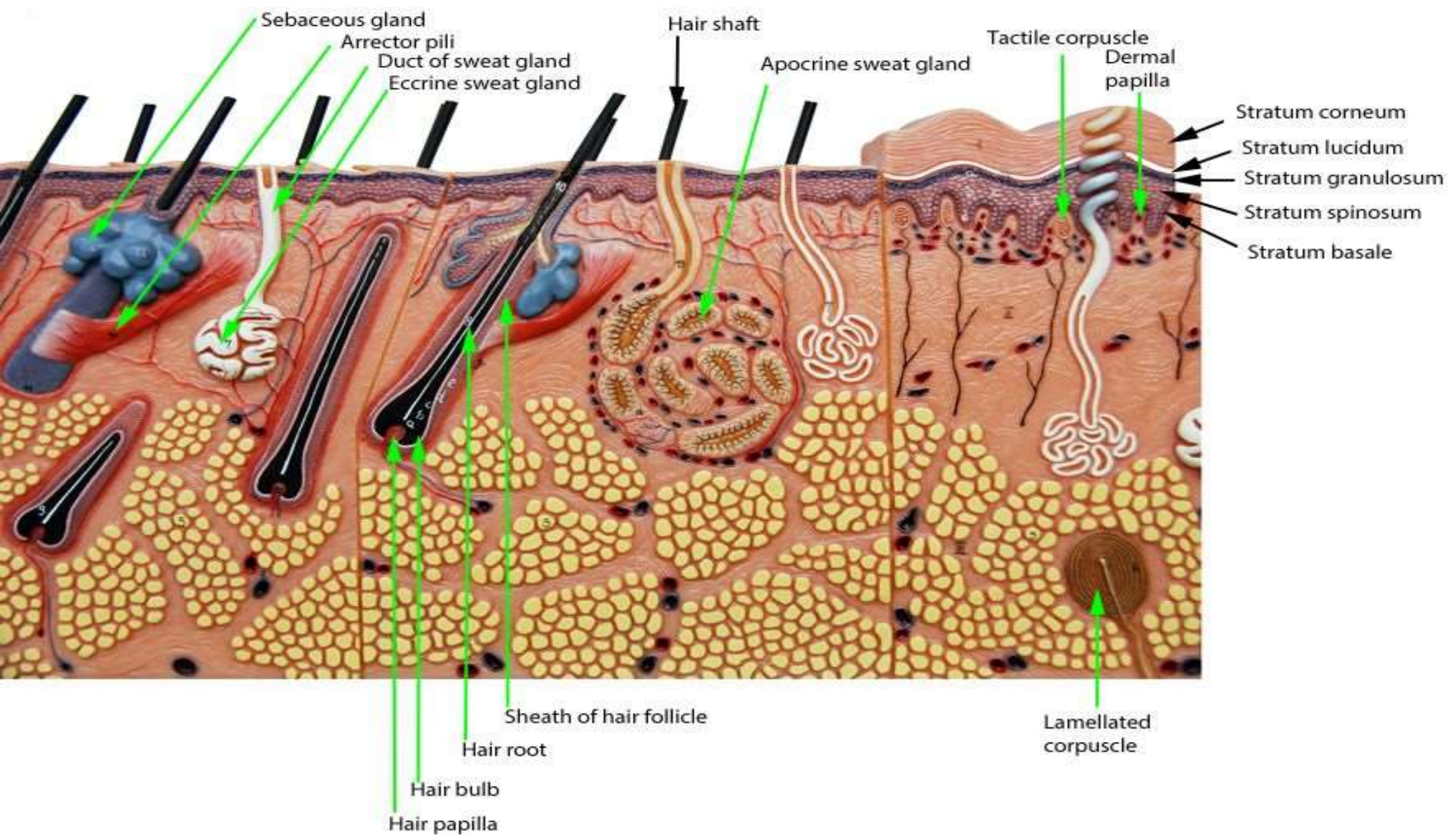
Osteon

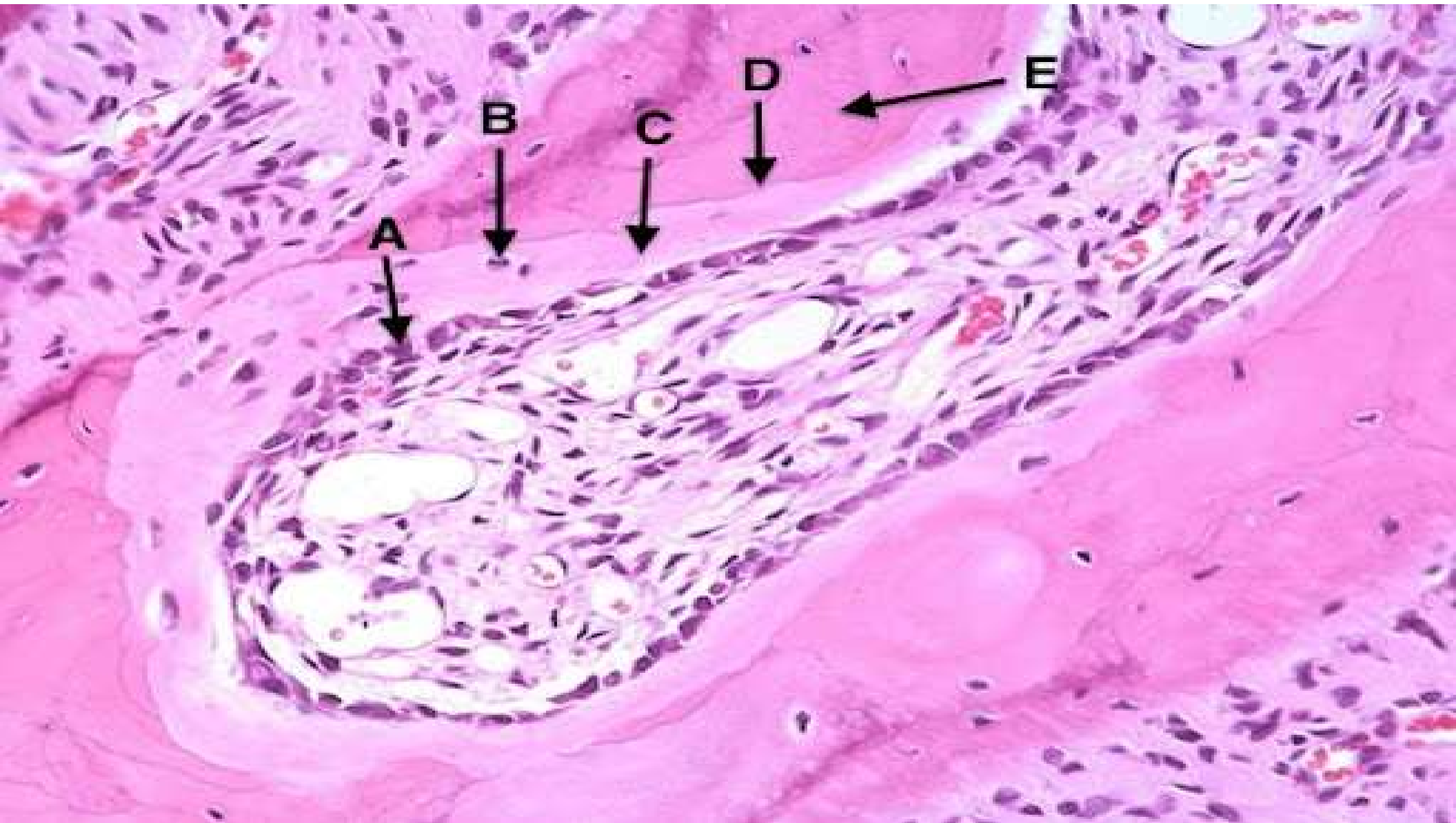
- A sebaceous gland
- B arrector pili muscle
- C Pacinian corpuscle
- D hair bulb
- E capillary bed
- F eccrine gland
- G adipose
- H connective tissue of dermis
- I epidermis
- J Meissner's corpuscle
- K nerve

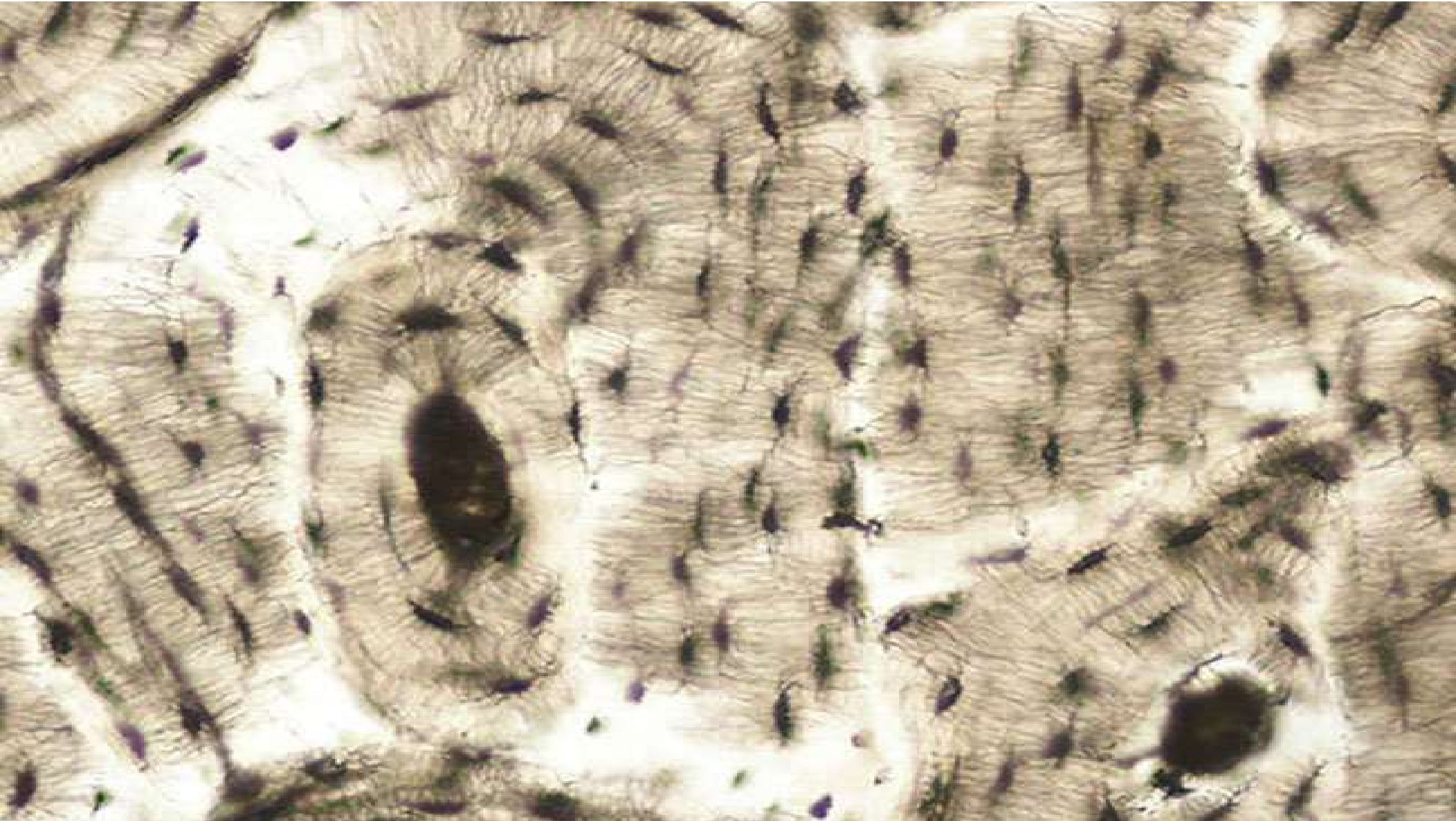


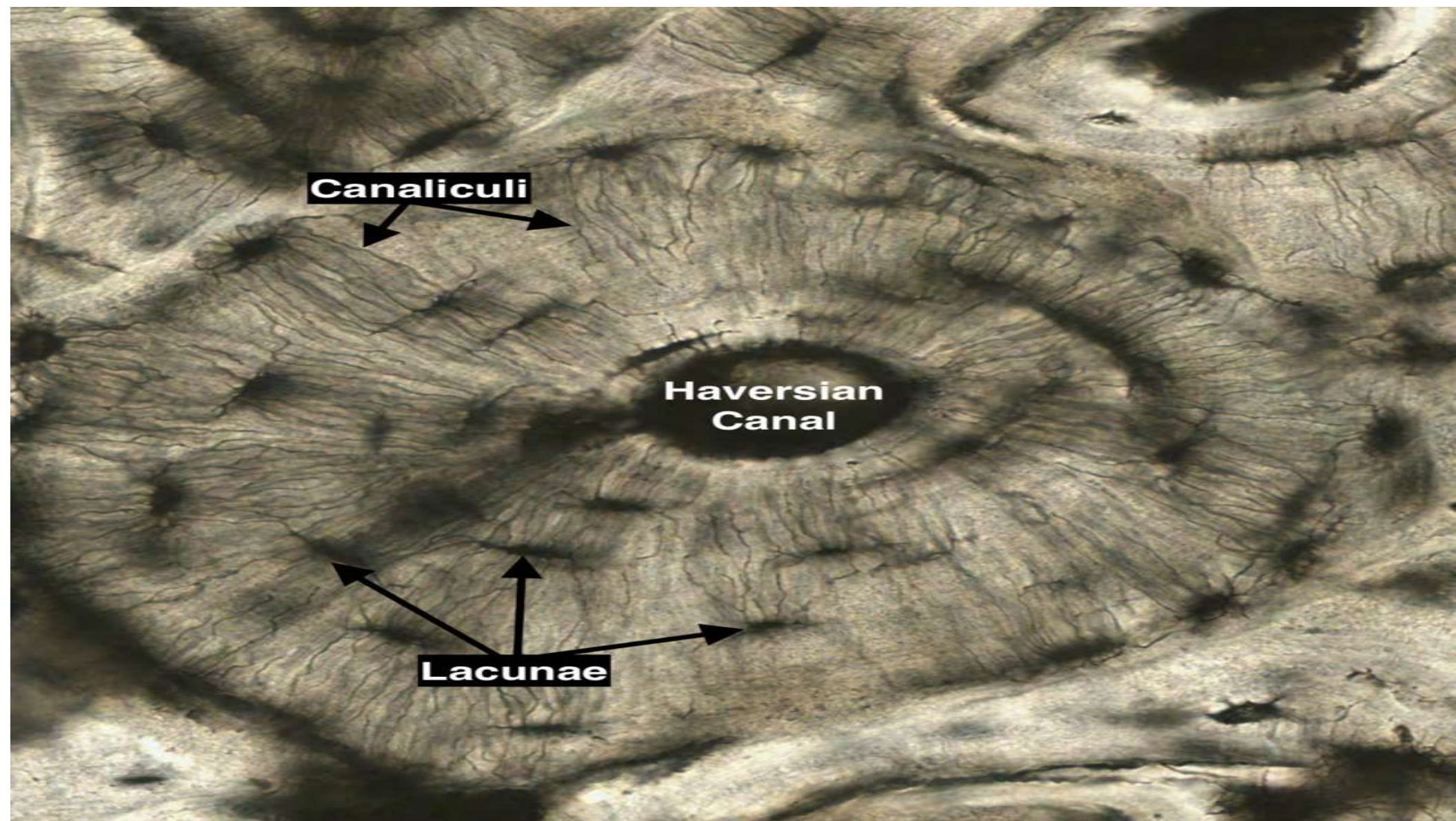








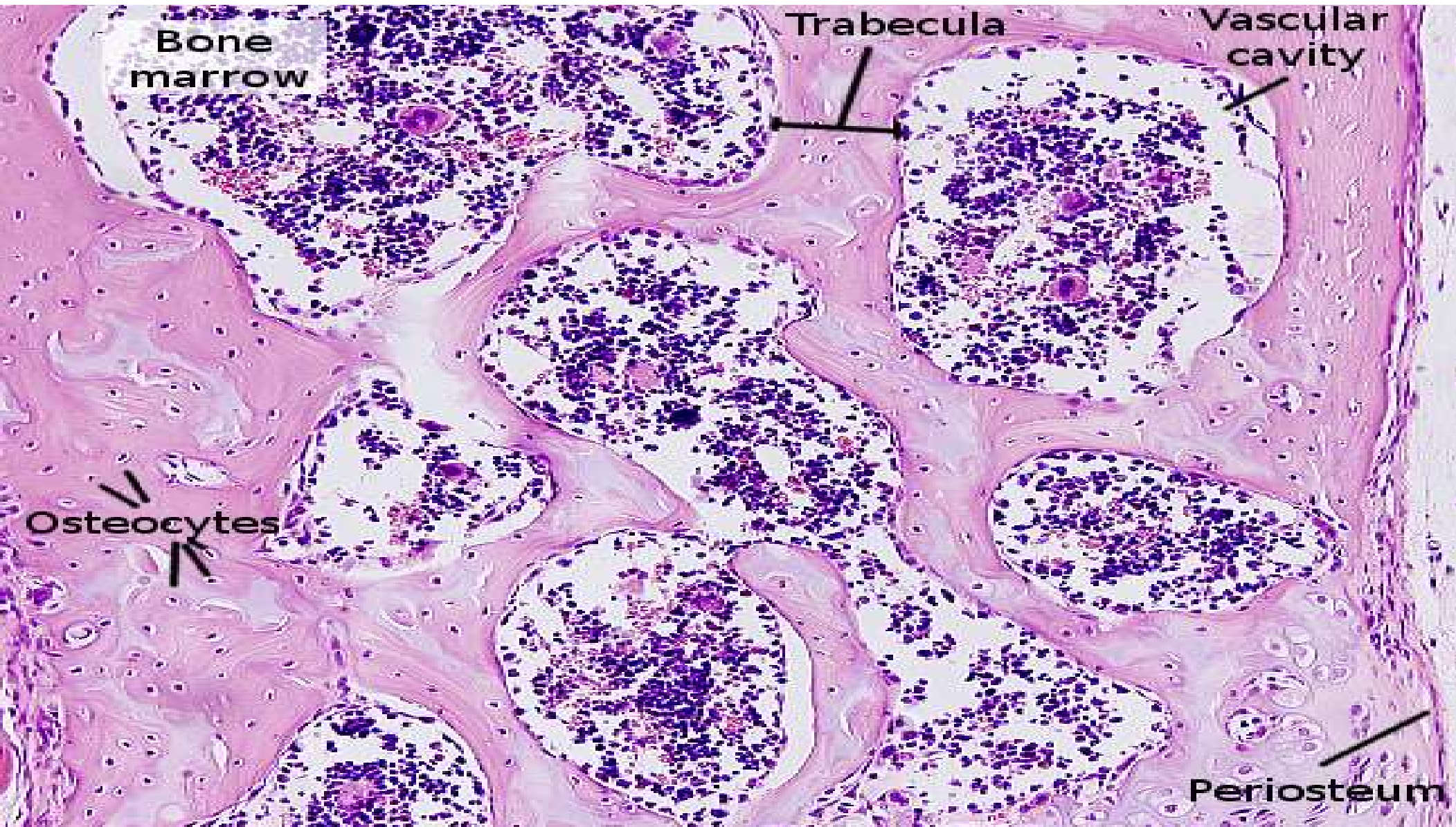


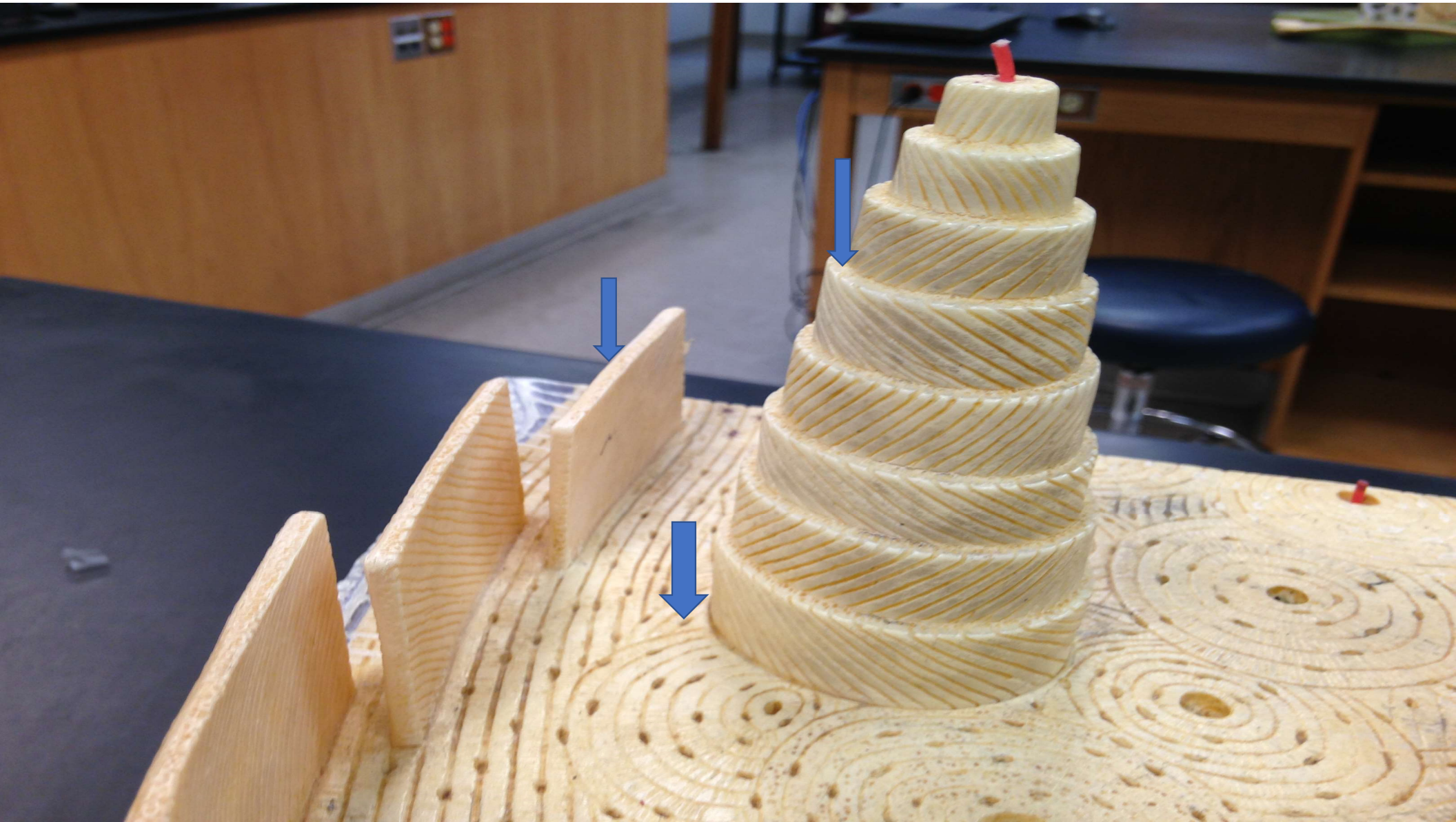


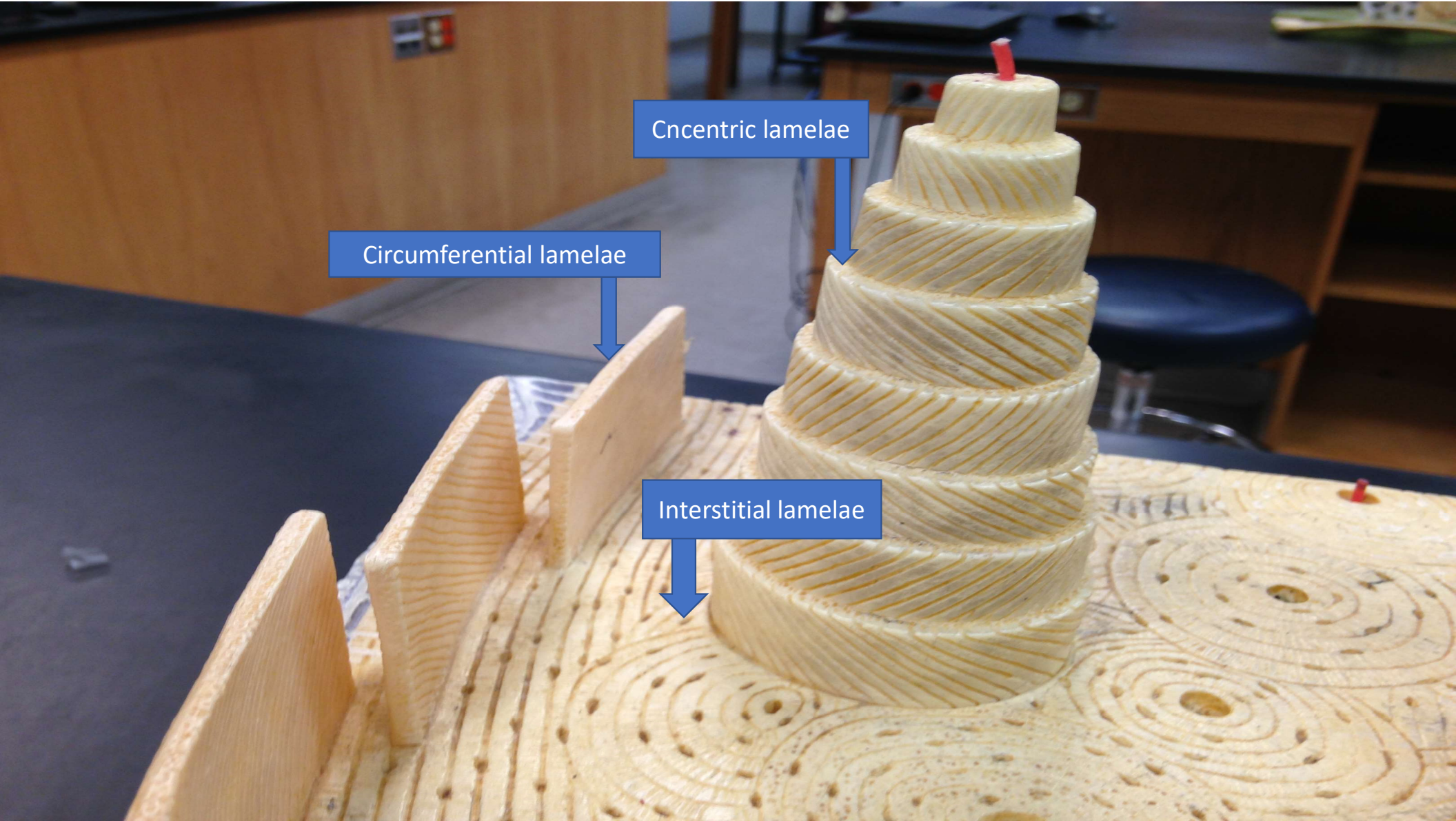
Canaliculi

**Haversian
Canal**

Lacunae





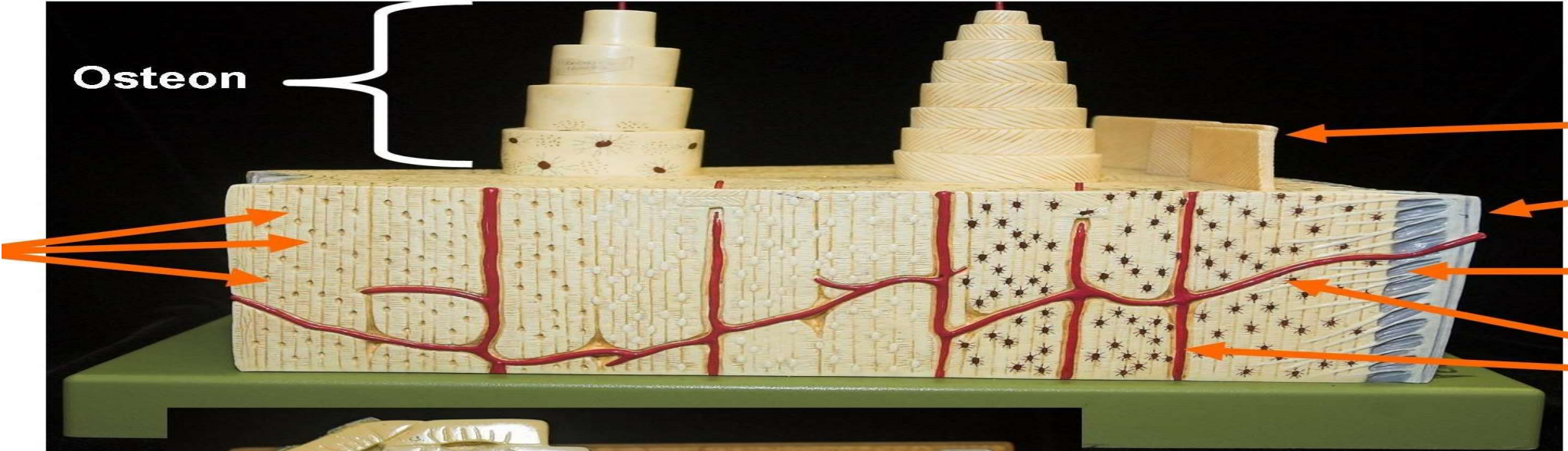
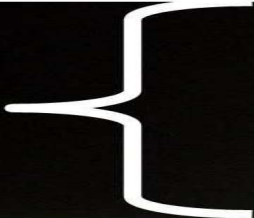


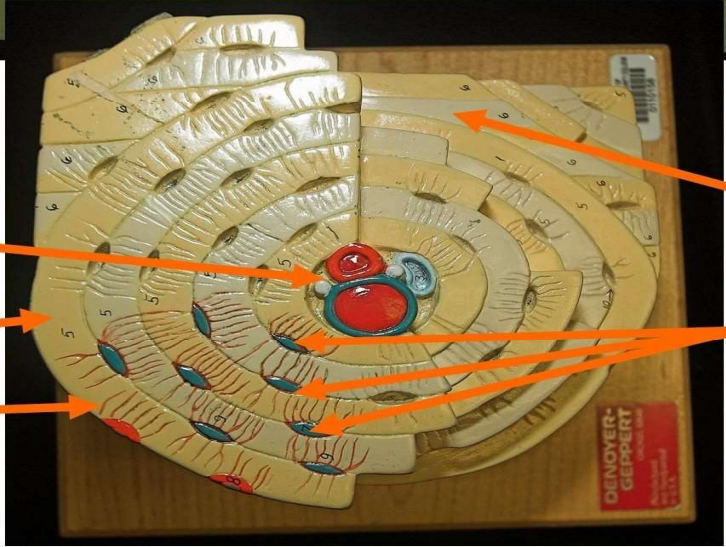
Cncentric lamellae

Circumferential lamellae

Interstitial lamellae

Osteon





Lacuna (cavities which house osteocytes)

Osteon

Circumferential lamellae

Periosteum

Sharpey's fibers

Perforating canal

Central canal

Osteon Model

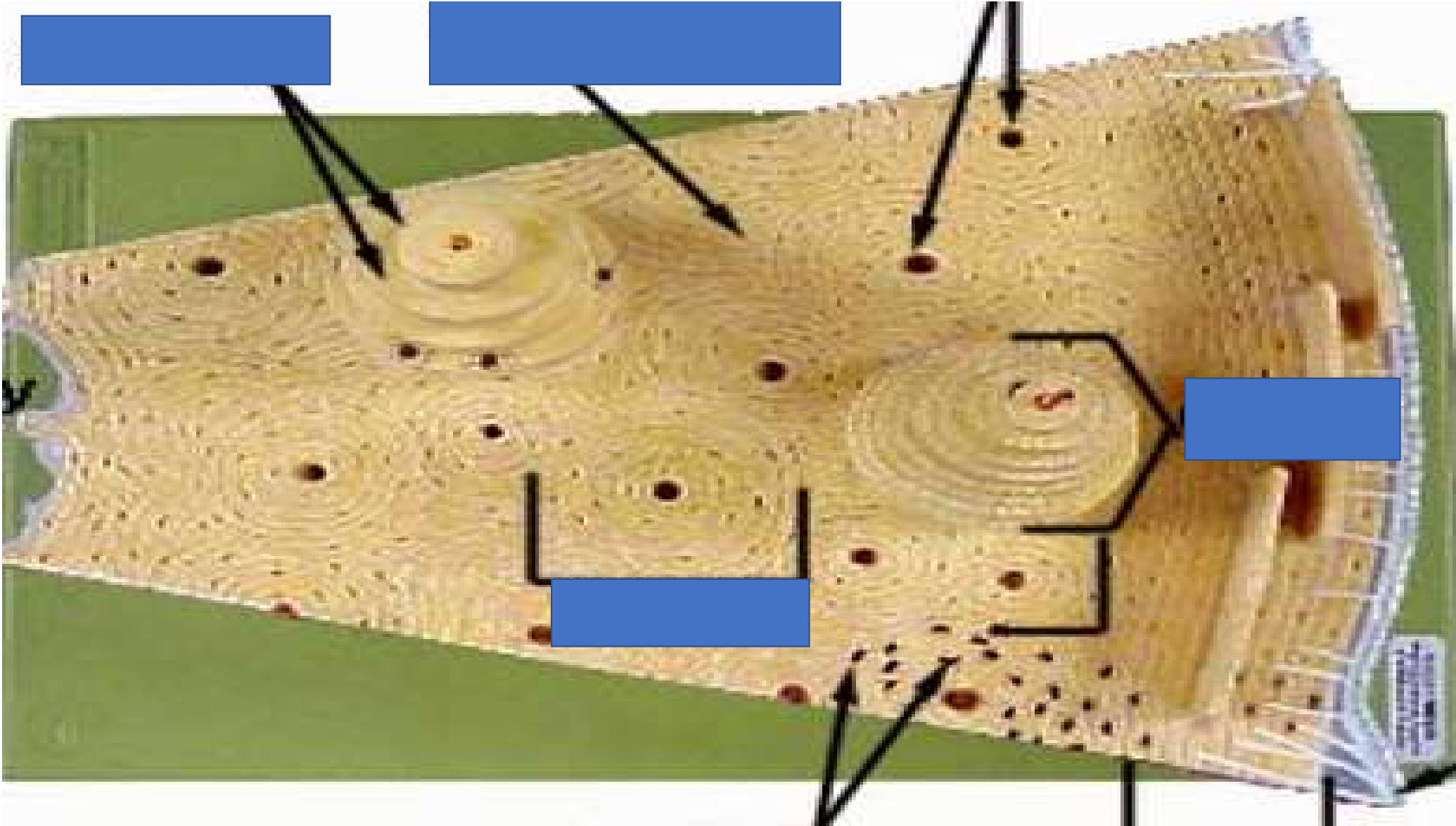
Central canal

Concentric lamellae

Canaliculi

Interstitial lamellae

Osteocytes



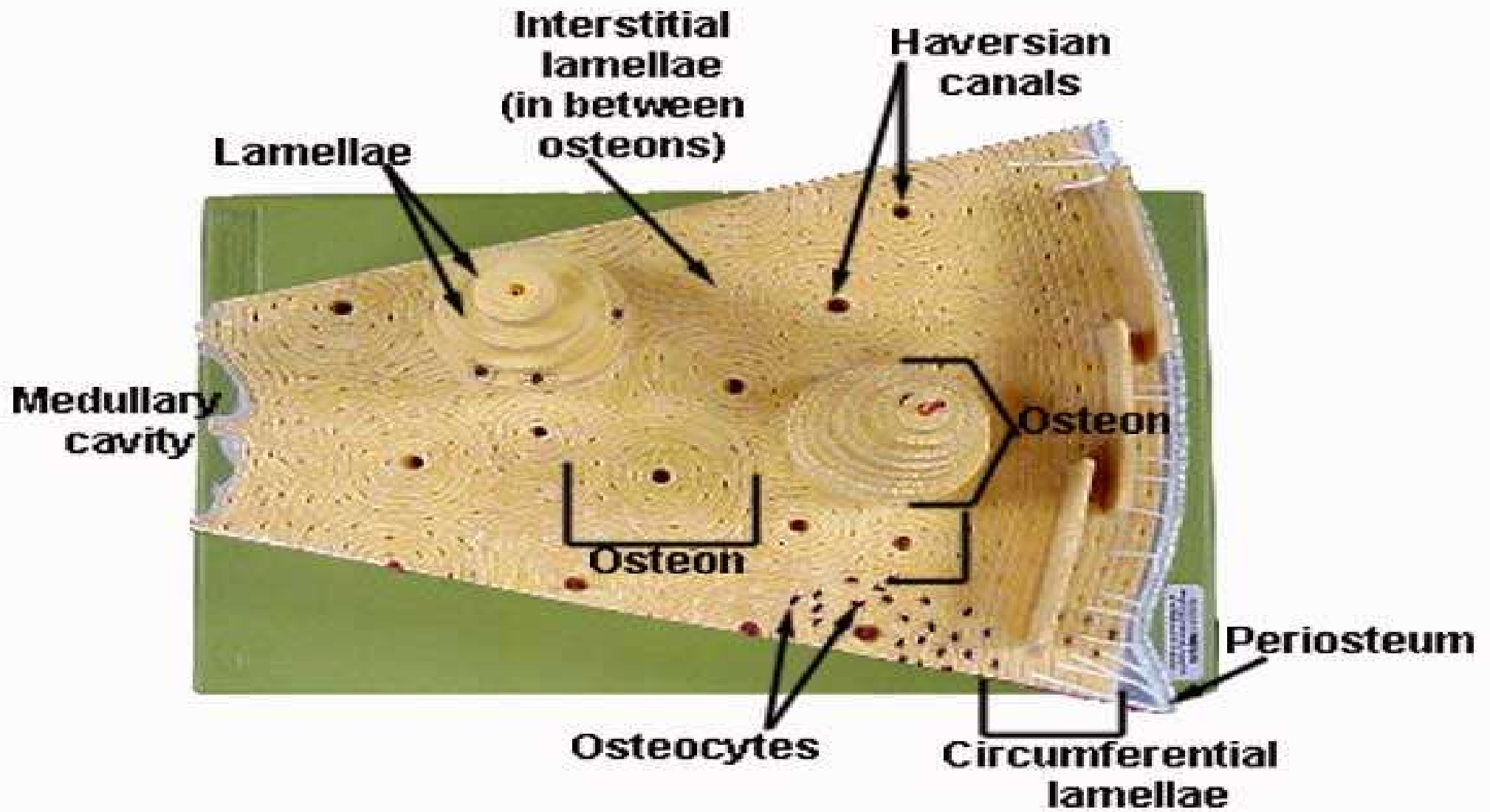
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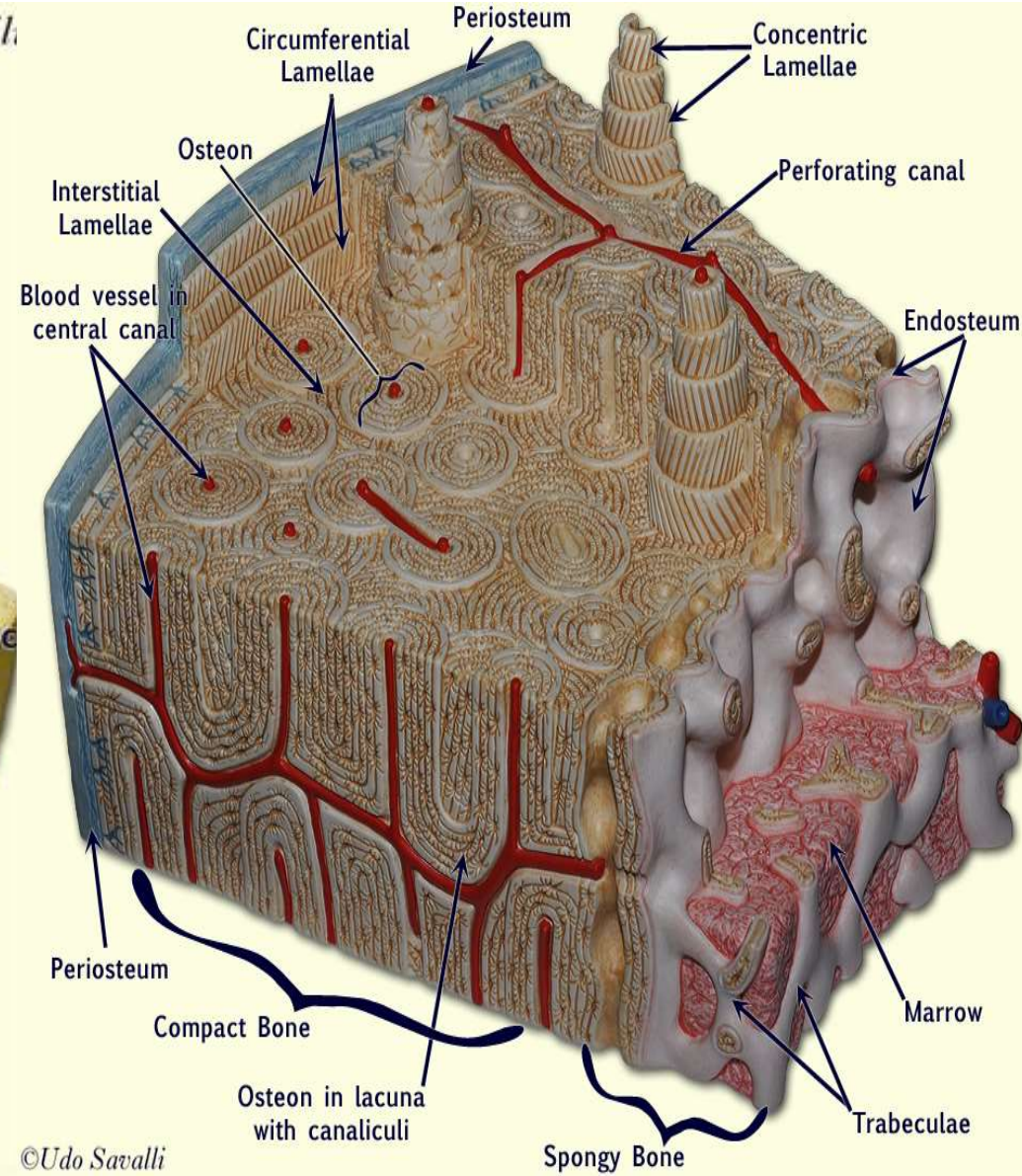
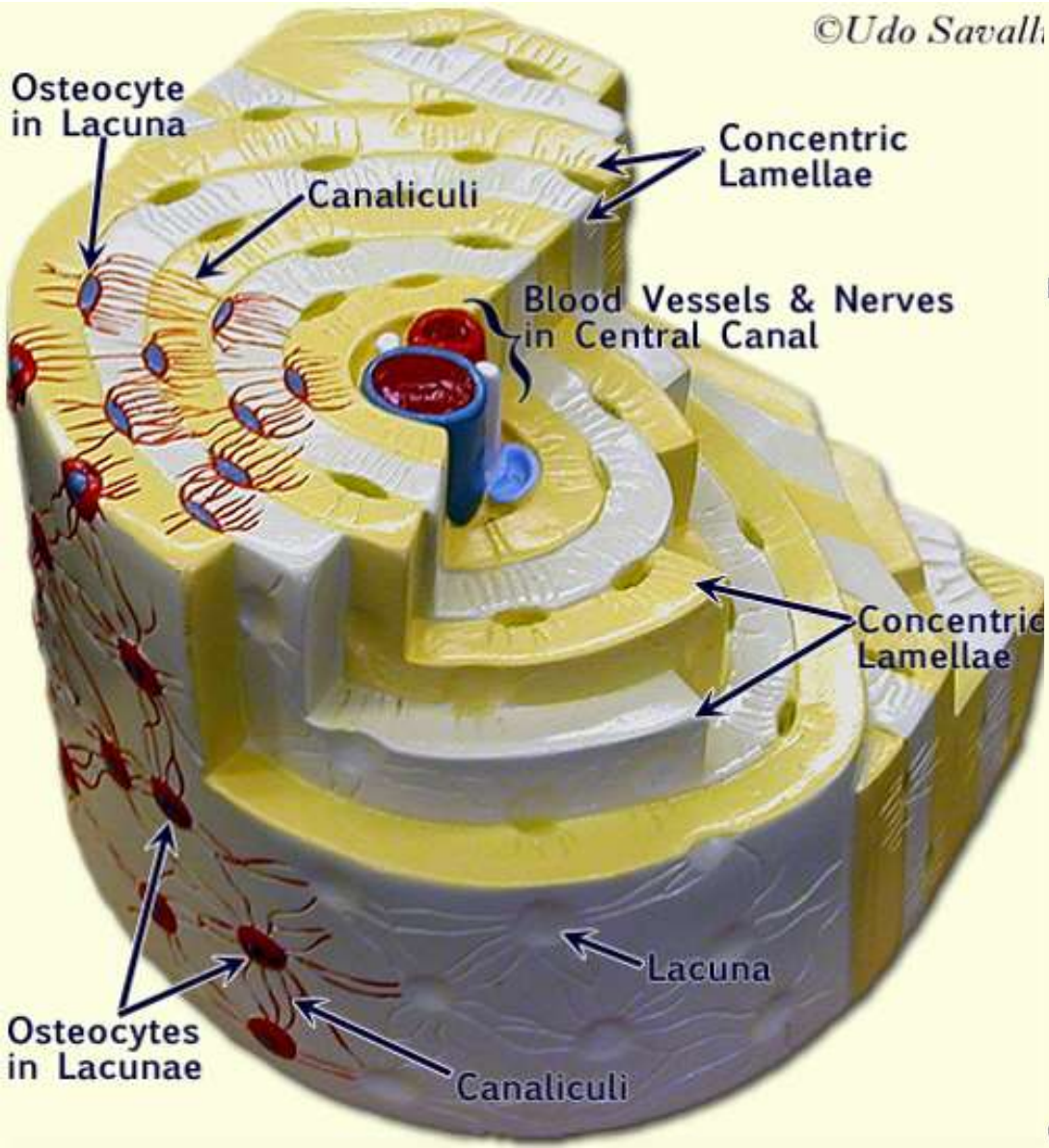
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