A still life scene featuring a teapot, a teacup, lemons, and flowers. The background shows a window with a grid pattern, through which light is streaming. In the foreground, there is a white teapot with a green handle and a matching teacup with a green handle. A white bowl with a scalloped edge contains several lemons and limes. Two more lemons are sliced and placed on the table in front of the bowl. To the left, a vase holds pink and yellow flowers. The overall atmosphere is bright and fresh.

By replacing your morning coffee with green tea, you can lose up to 87% of what little joy you still have left in your life.

Excellence. NO EXCUSES!

EXCELLENCE

If Not Excellence, what?

If Not Excellence Now, when?



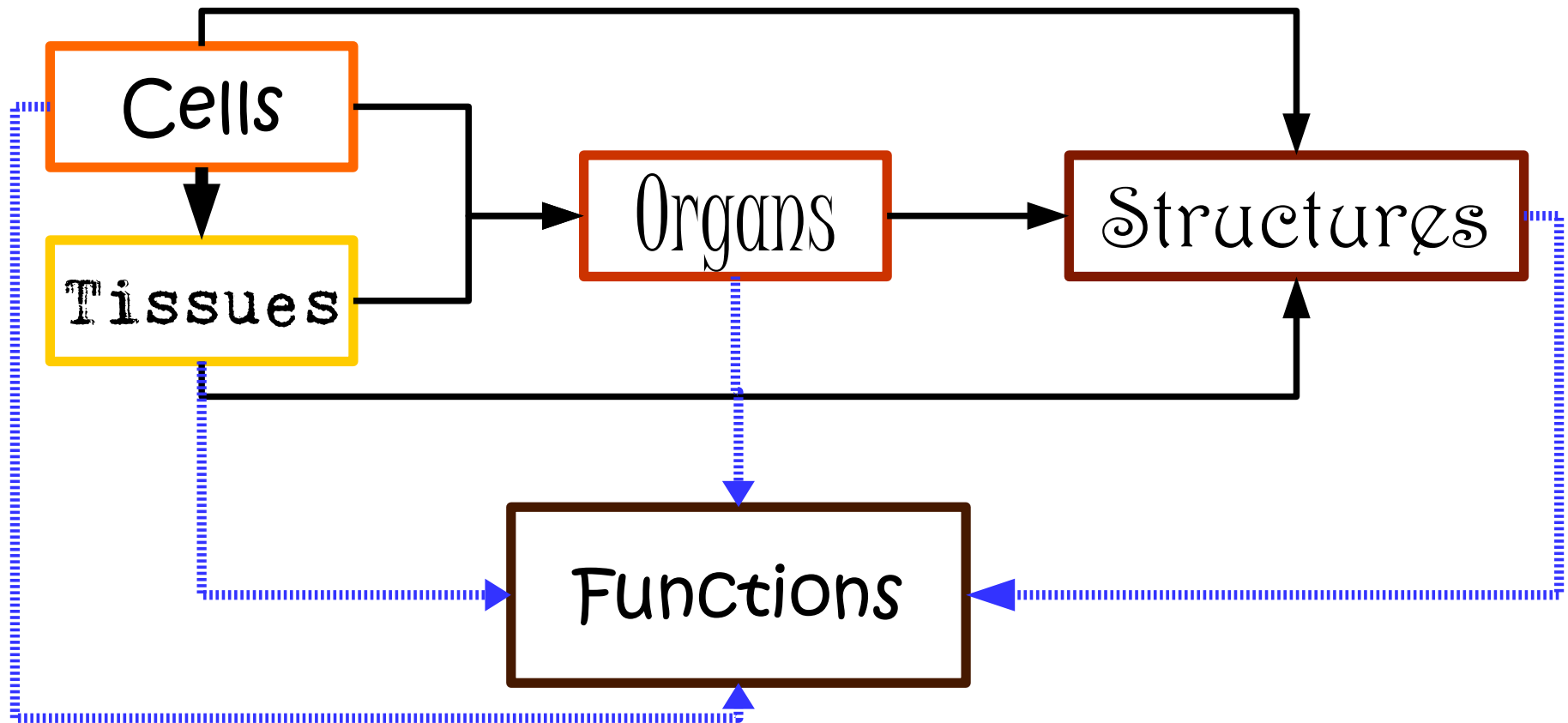
TRY AND FAIL.
DON'T FAIL TO TRY.

#THURSDAYTHOUGHTS

Write



What stuff could there be?



histoweb.co.za

Lining Epithelia

&

Connective Tissues

&

Glandular Epithelia

Index in your workbook

Survey feedback

Look

Draw

what do you consider the
foundation of your
learning success?

write these down.

EXERCISE

SLEEP

DIET



Contact information

Marius Loots

072 580 6723

marius.loots@up.ac.za

Retrieval Practise

Because it is what works to make it like cinnamon



20 marks



RULES

Ink!!!



Best Effort!



No Consultation



Google

x

← → ↻ <https://www.google.com>

Search Images Maps Play YouTube News Gmail Drive Calendar More ▾

Google



Google Search

I'm Feeling Lucky

Assess yourself

Nailed it



Not sure



Nailed it!

You are
confident about
your answer.



Not sure...

You do not know or
are uncertain.





1. In what part of the cell cycle is the structure in the image?



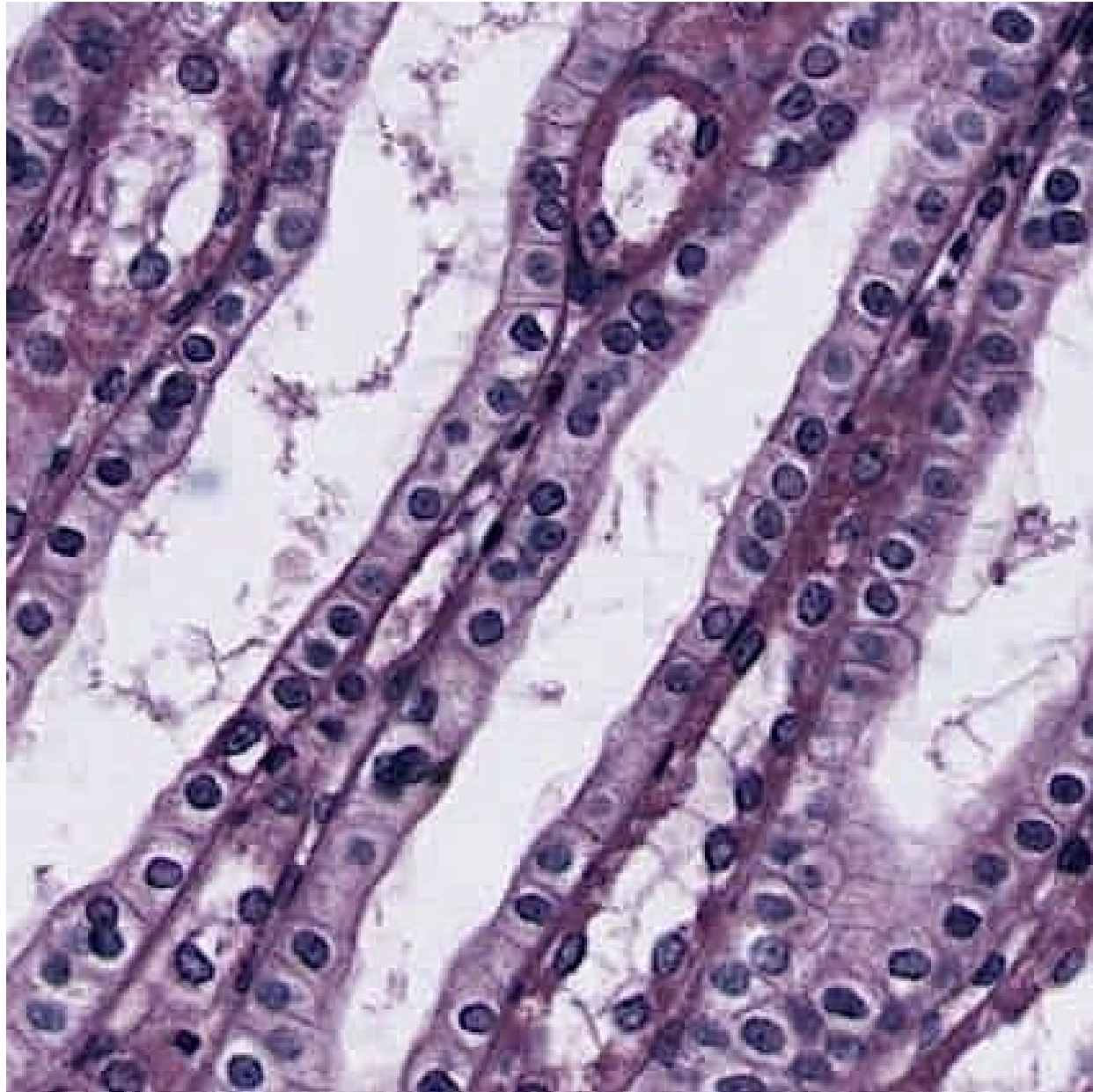
= 1

2. Which microscope was used to produce the image?



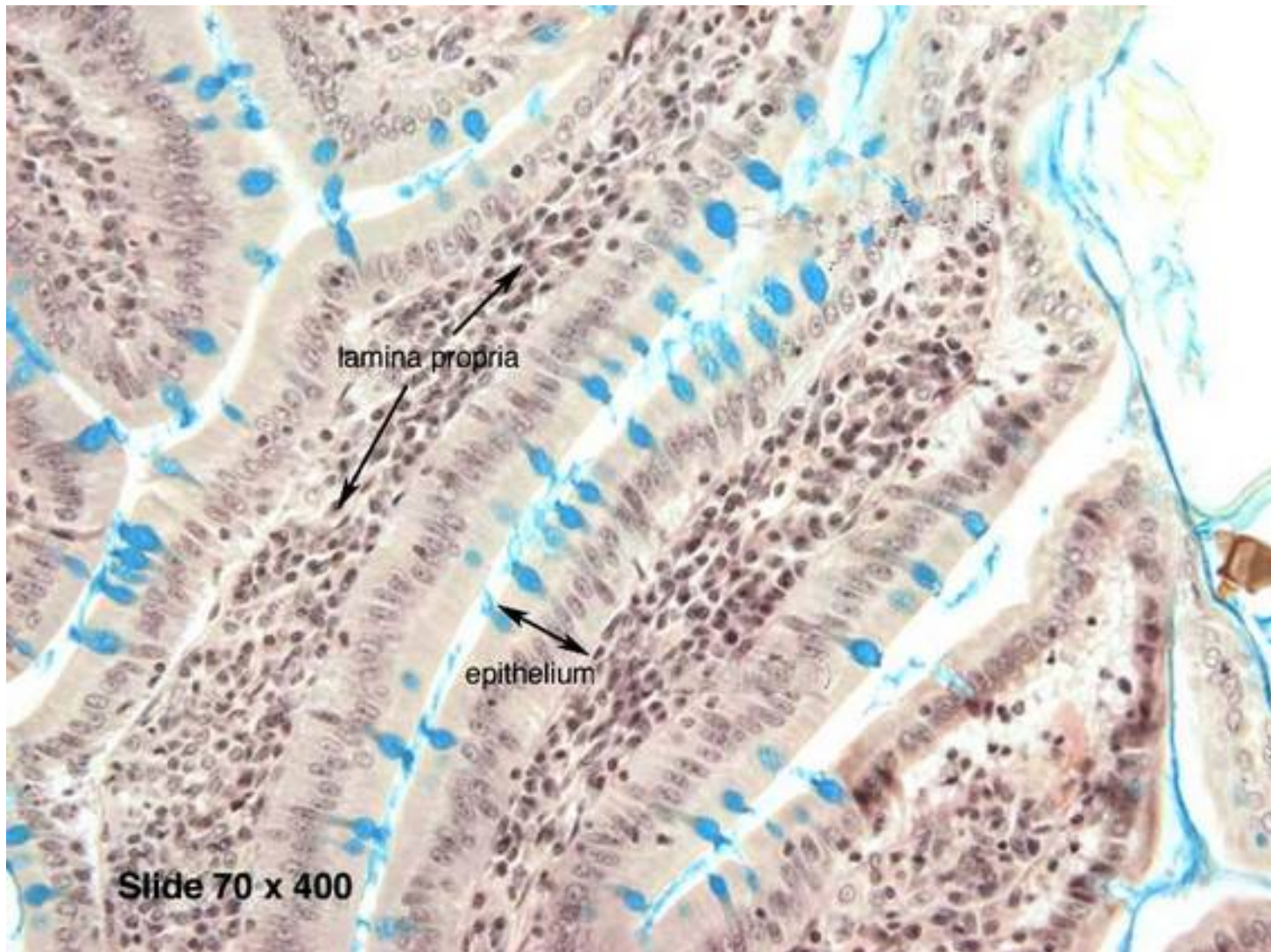
= 1

3. Identify the epithelium.

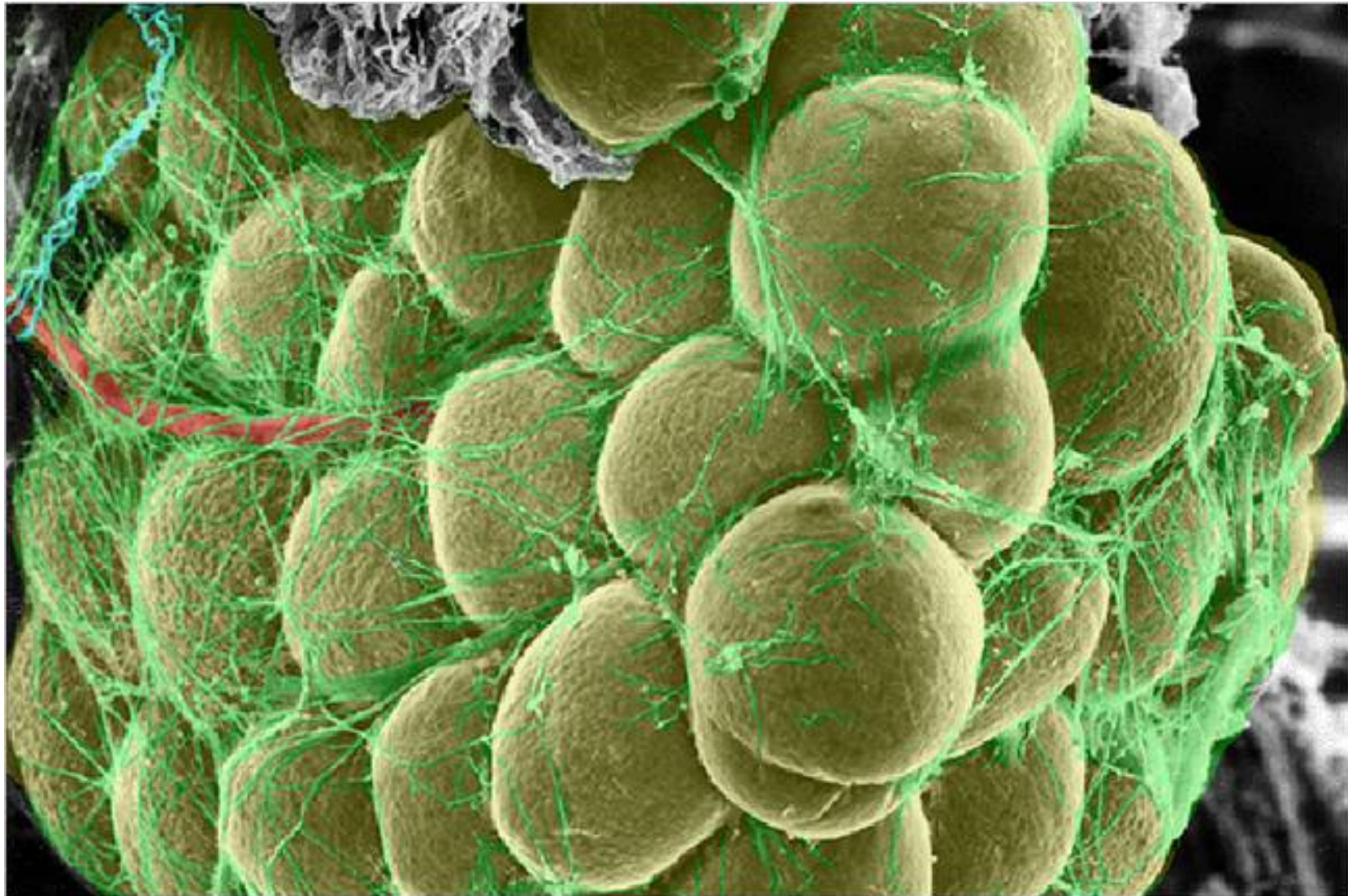


= 1

4. Identify the epithelium cell stained selectively by alcian blue

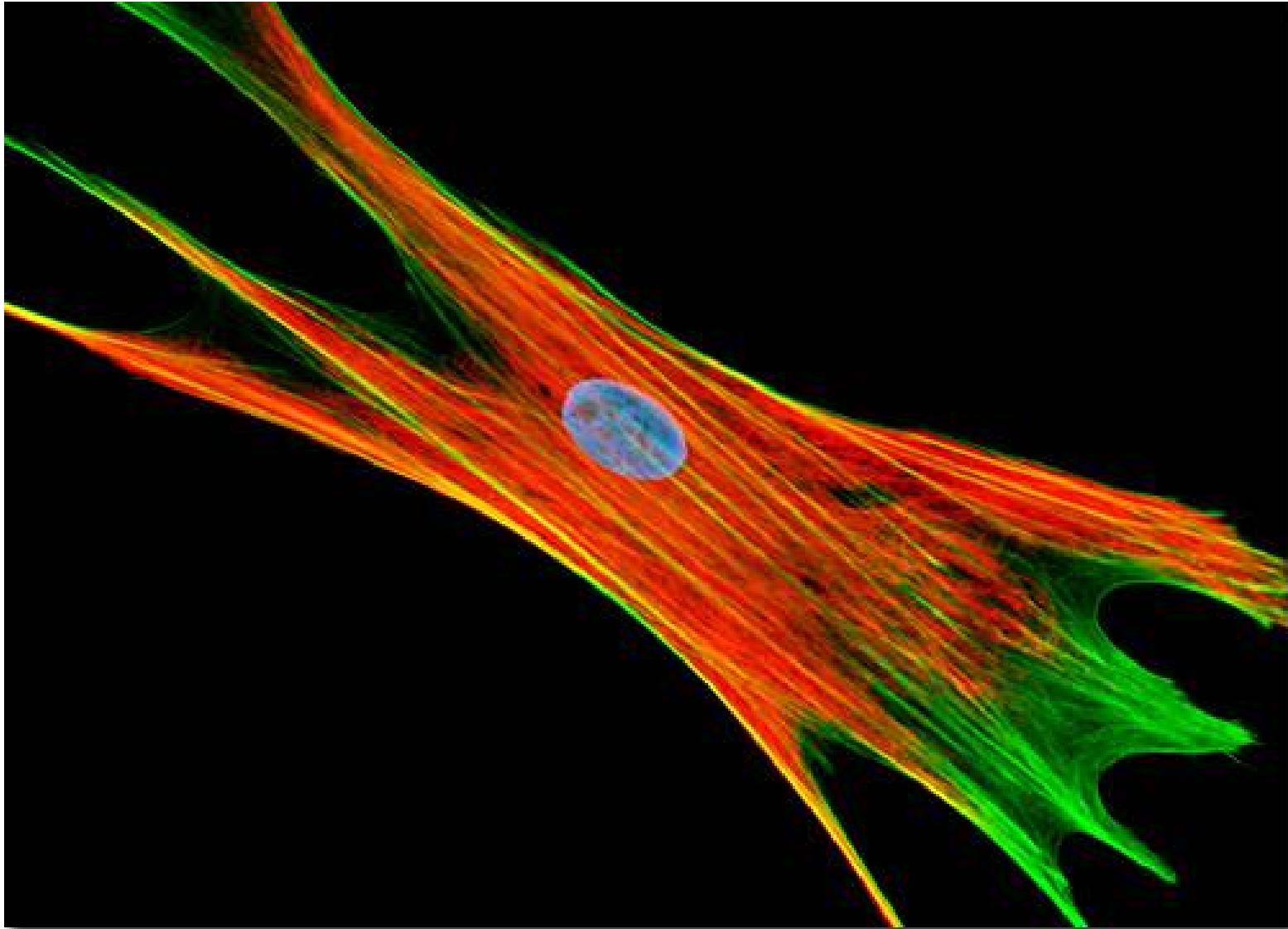


5. Identify the support tissue



= 1

6. What is the function of the support tissue cell?



Grade your answers



Community of Truth

What is my answer?

What is the correct answer?

I am am wrong, what was my error?

THUS: Find the truth

1. In what part of the cell cycle is the structure in the image?



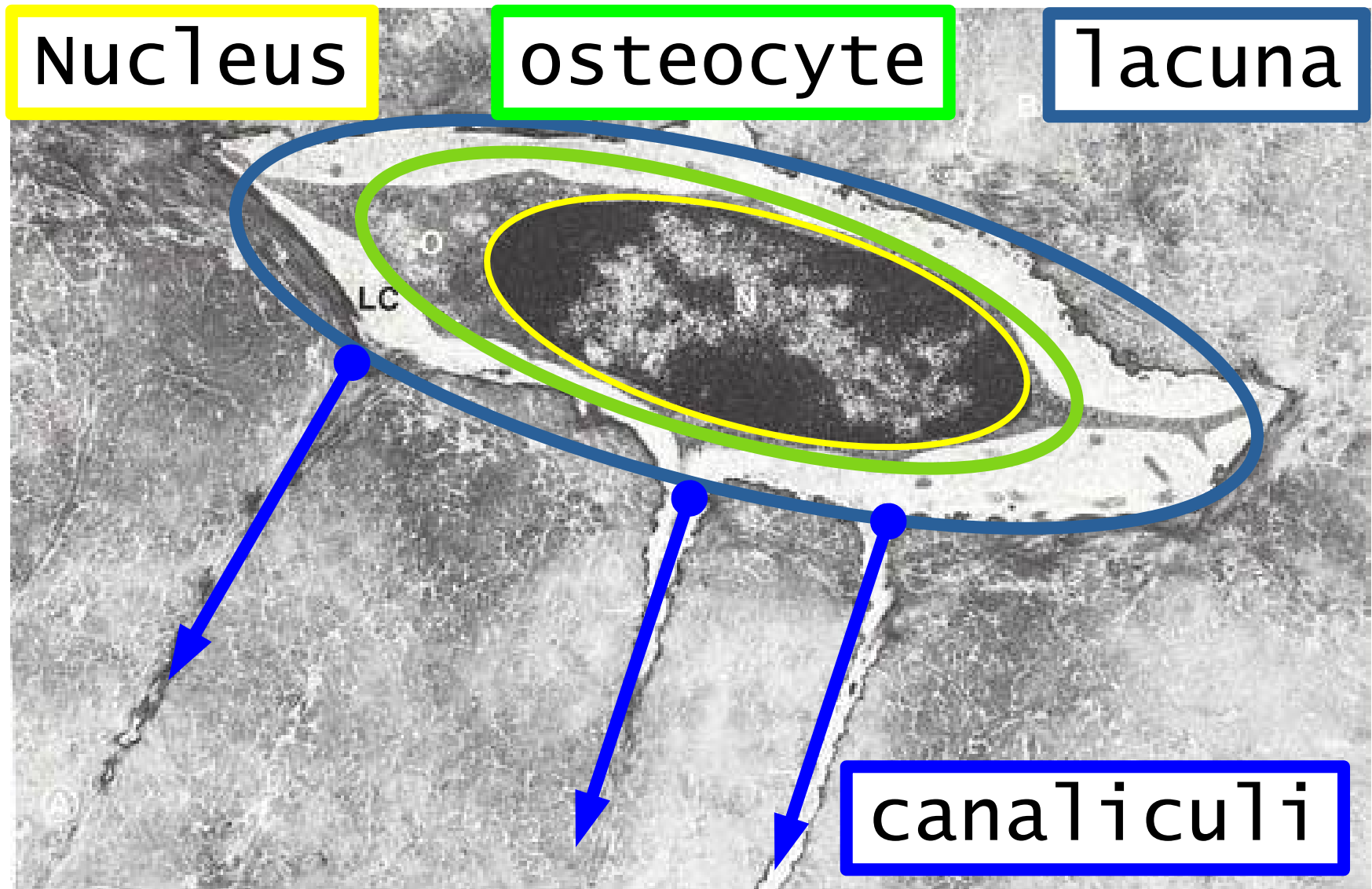
= 1 = Metaphase or Anaphase

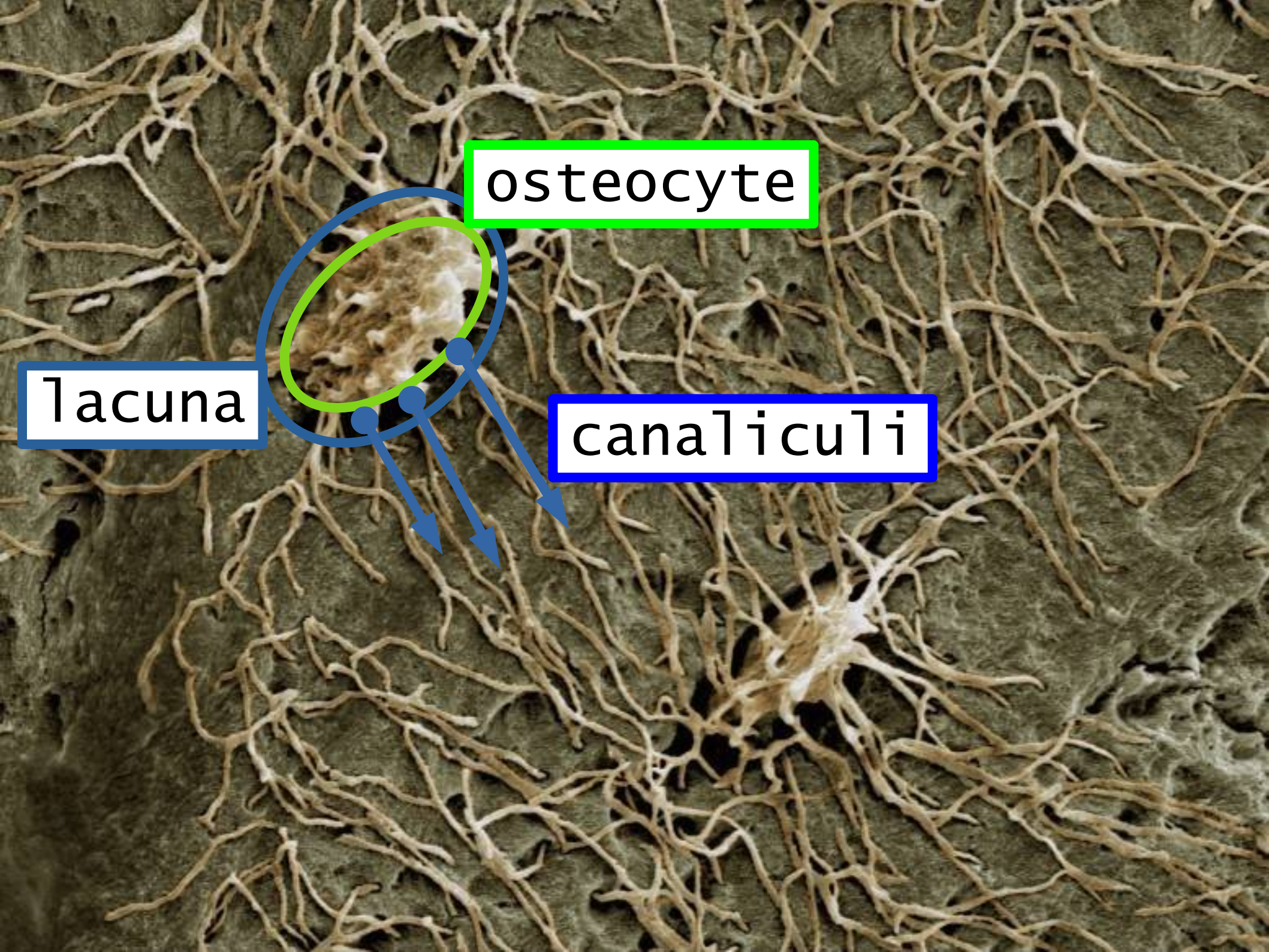
2. Which microscope was used to produce the image?



= 1 = Scanning electron microscope

Osteocyte



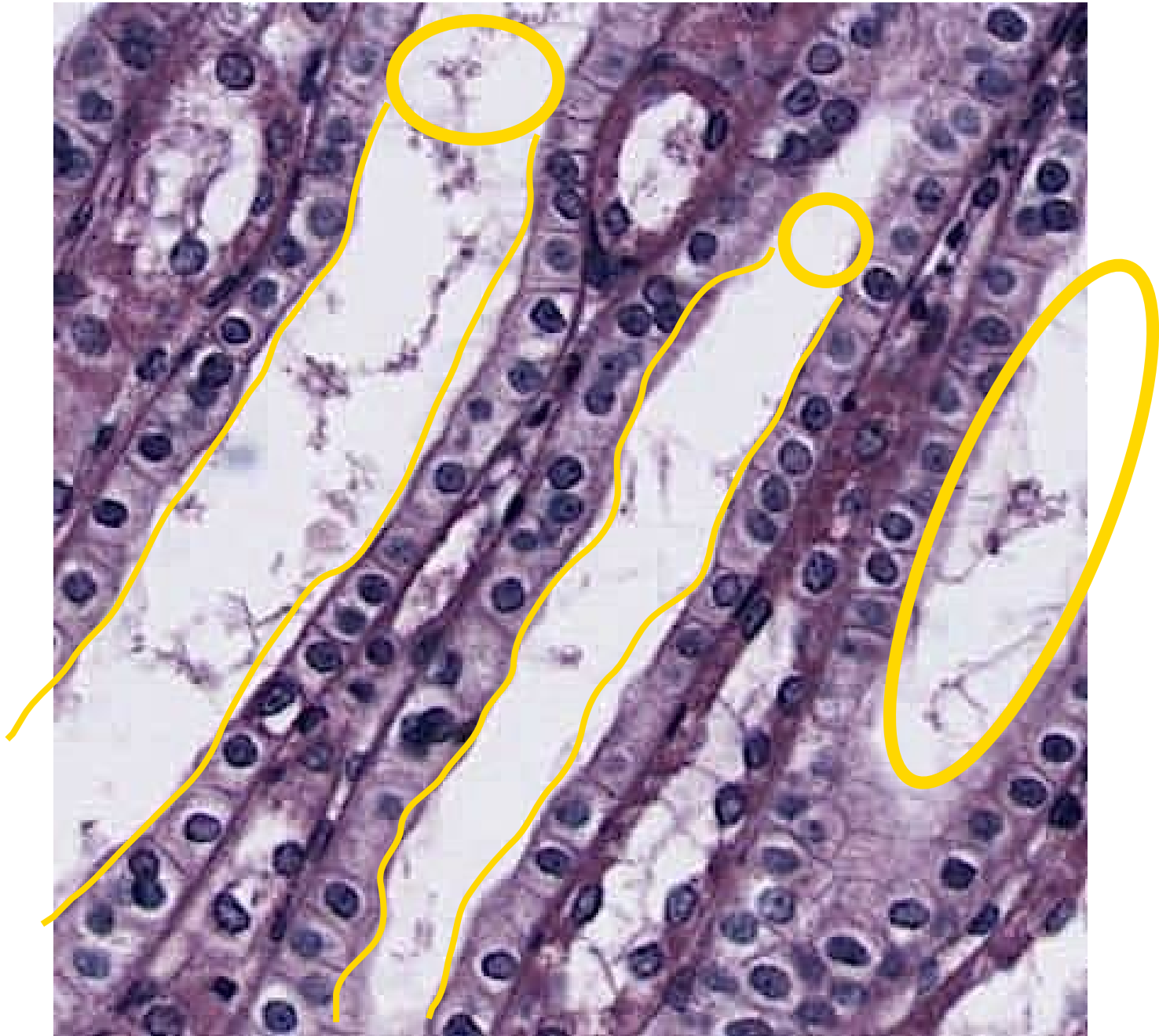


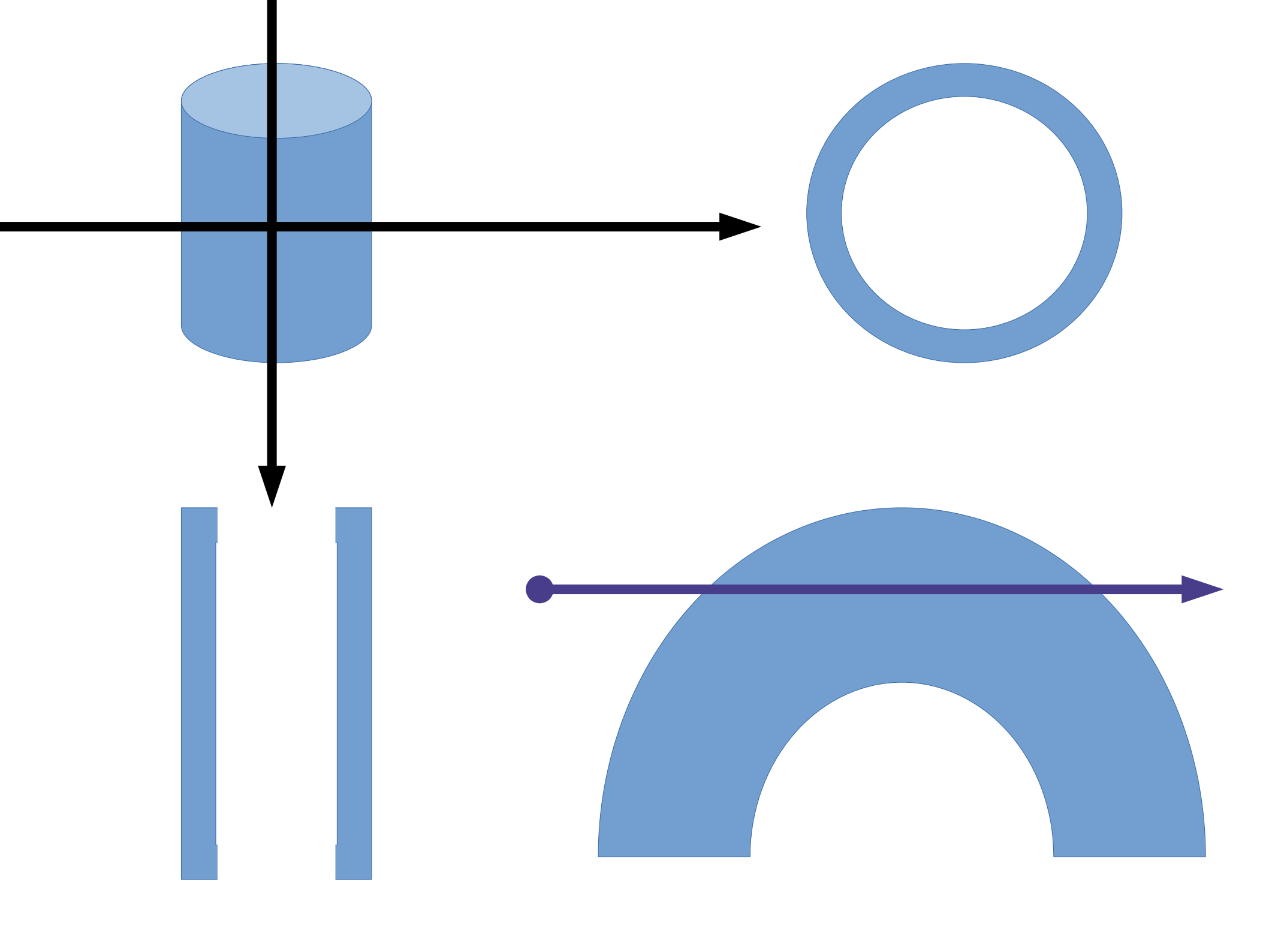
osteocyte

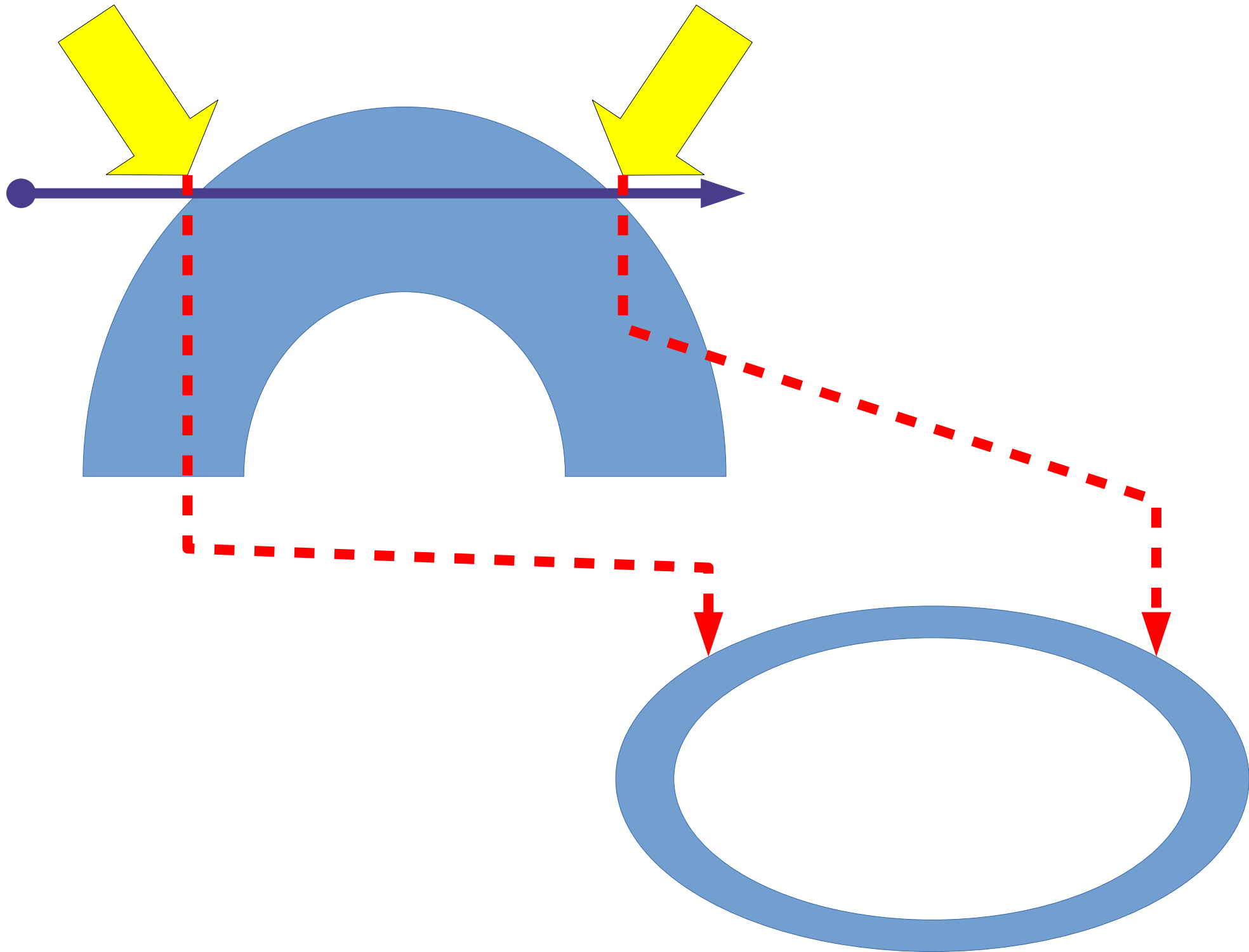
Lacuna

canaliculi

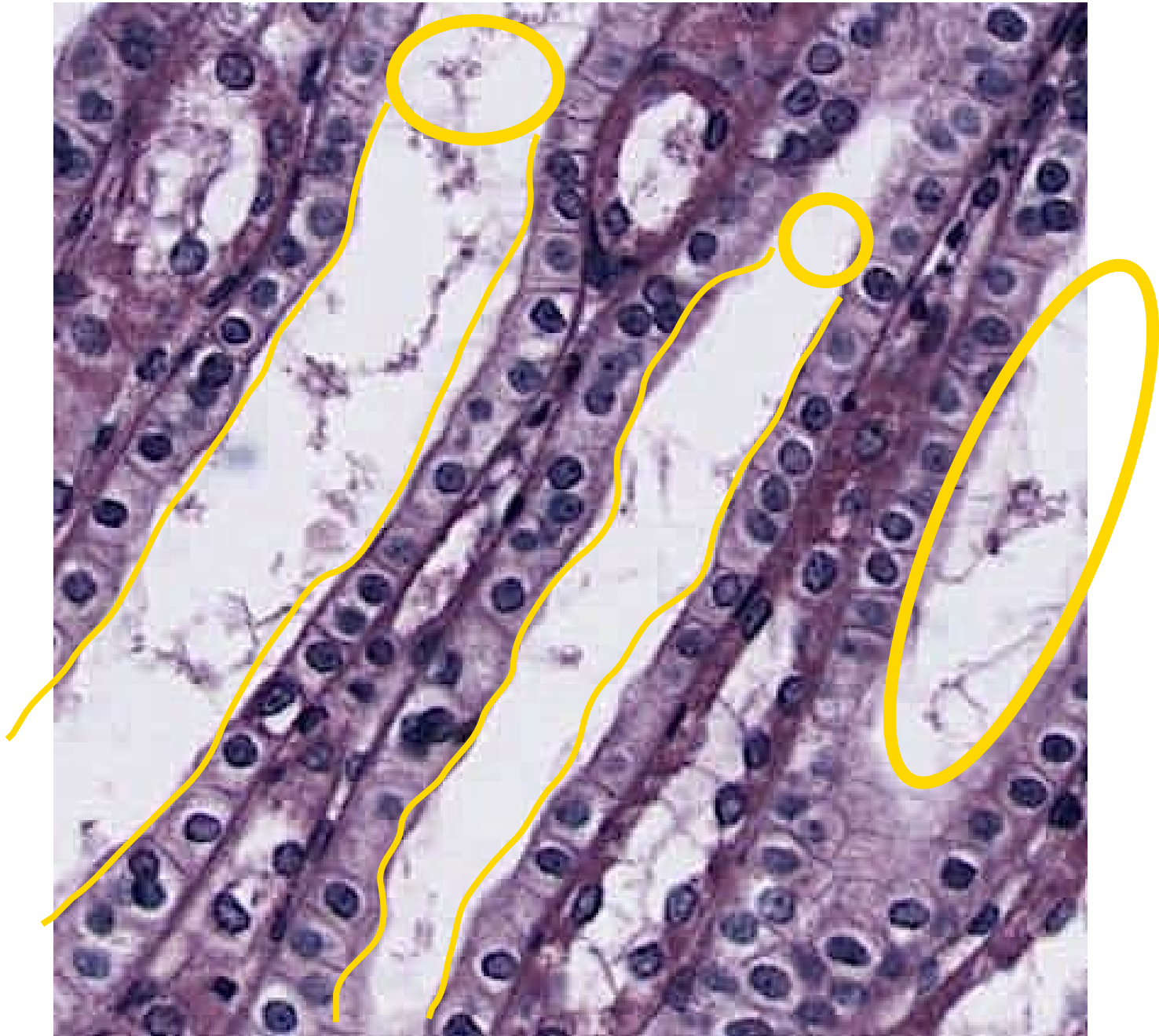
3. Simple cuboidal epithelium



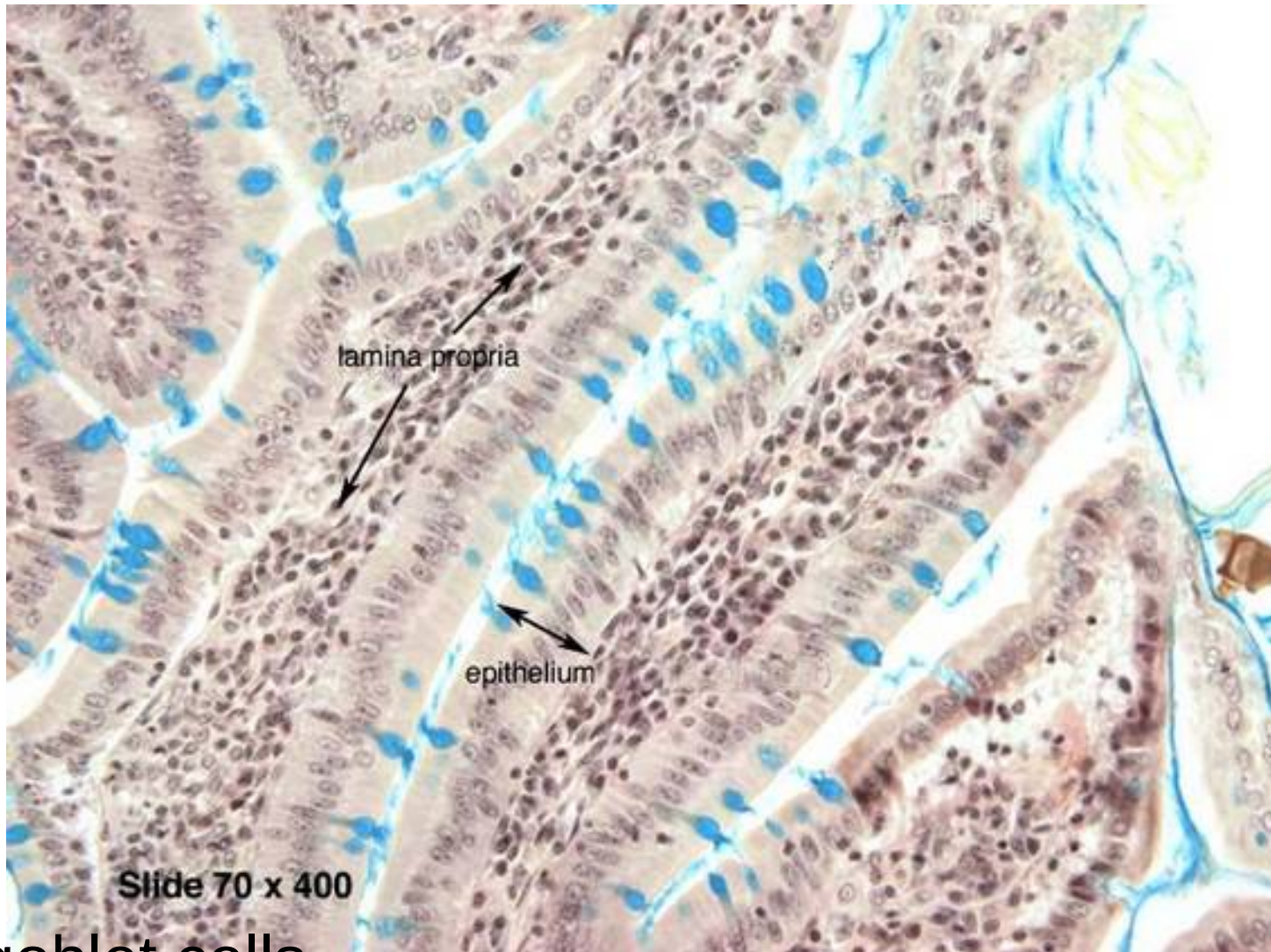




3. Simple cuboidal epithelium

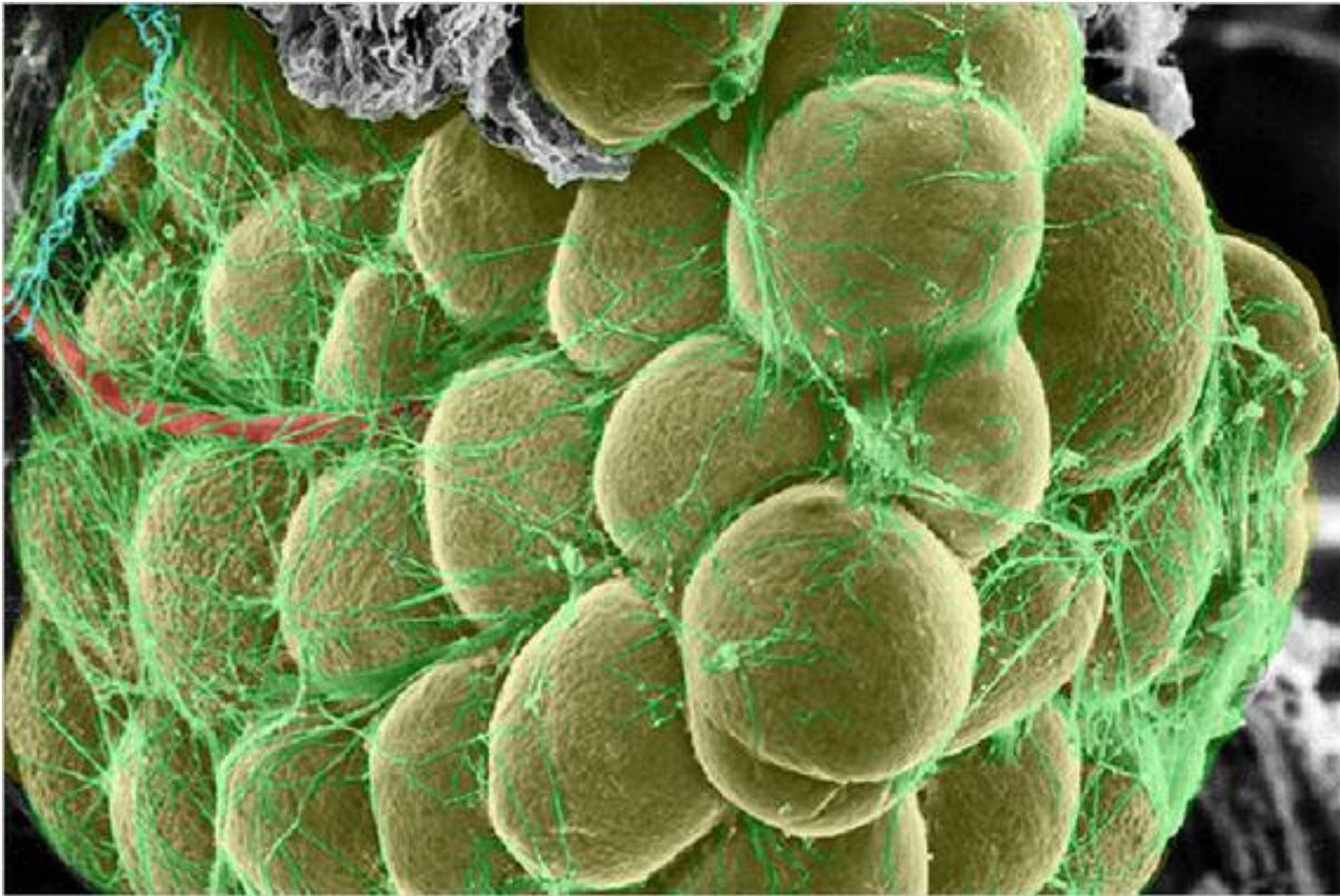


4. Identify the epithelium cell stained selectively by alcian blue



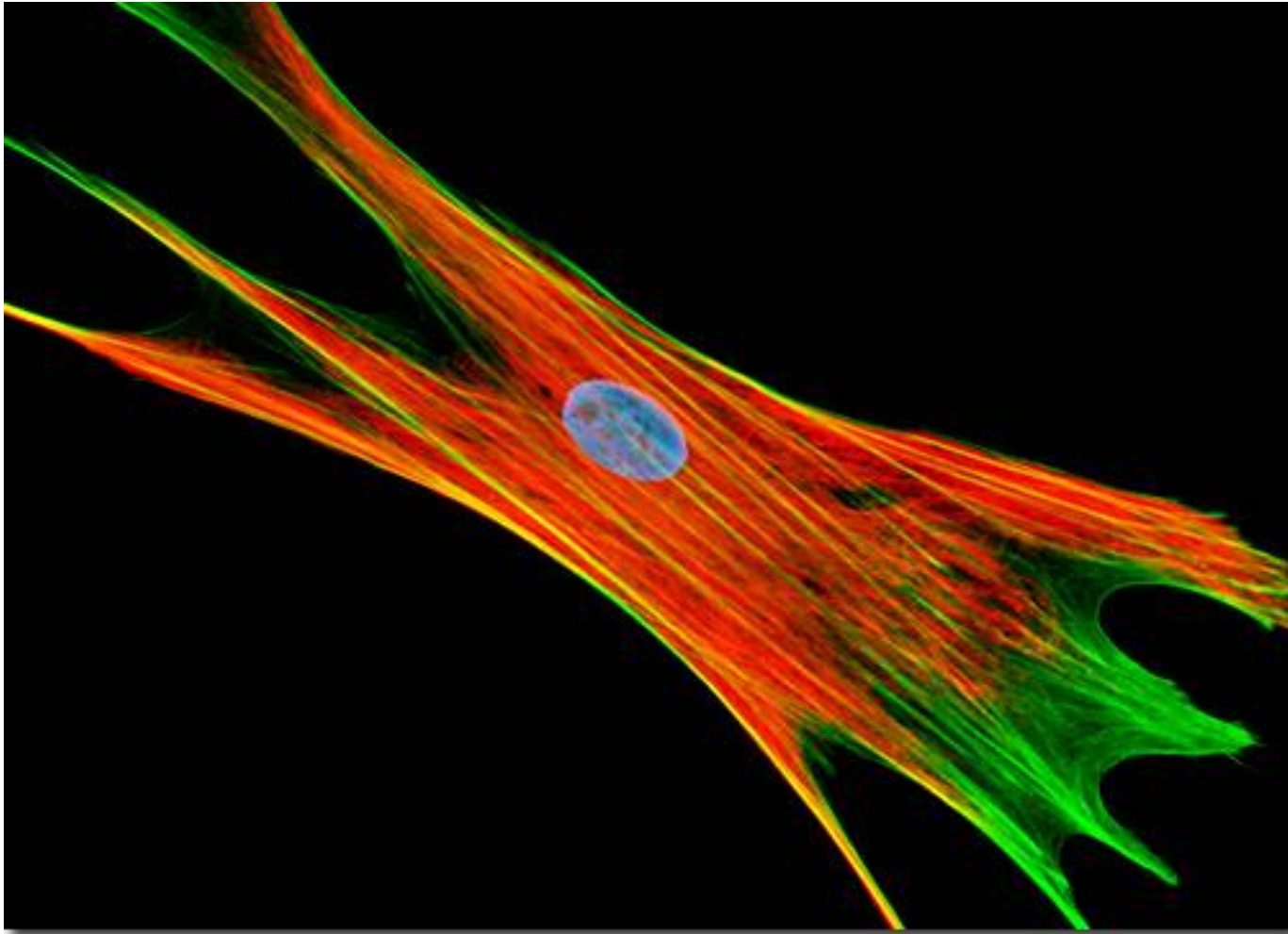
= 1 = goblet cells

5. Identify the support tissue



= 1 = fat tissue

6. What is the function of the support tissue cell?



= 1 = secrete collagen

Reflection

Final step:
Are you happy with your grade?



Microscope

- Know the parts
- Functions of each part
- Various types



Ultrastructure of the cell
=
Components of the cell

Mitosis
&
Meiosis
&
Cell cycle

On all content

Write today's Date
The current Topic

Epithelia – what?

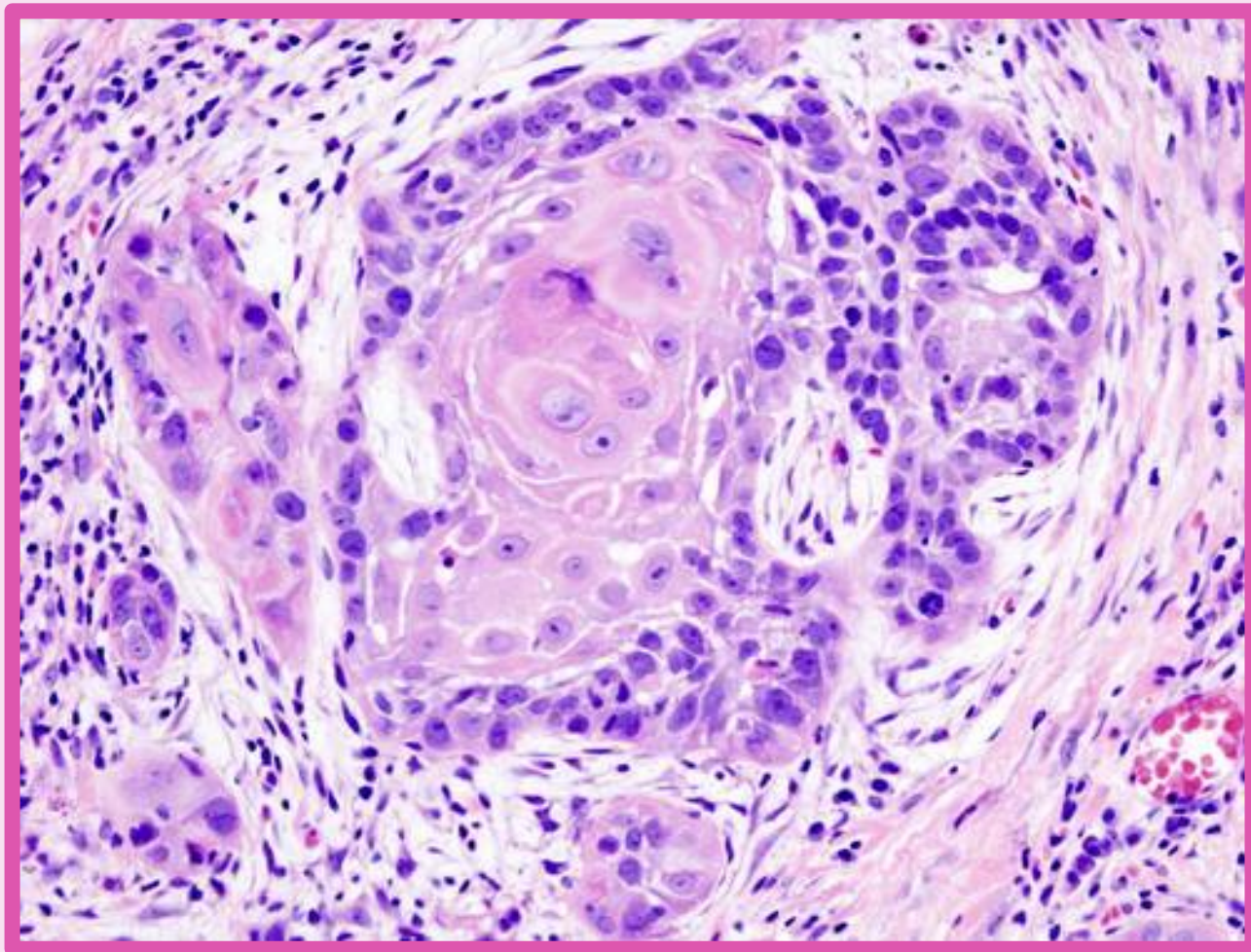


Epithelia – why?



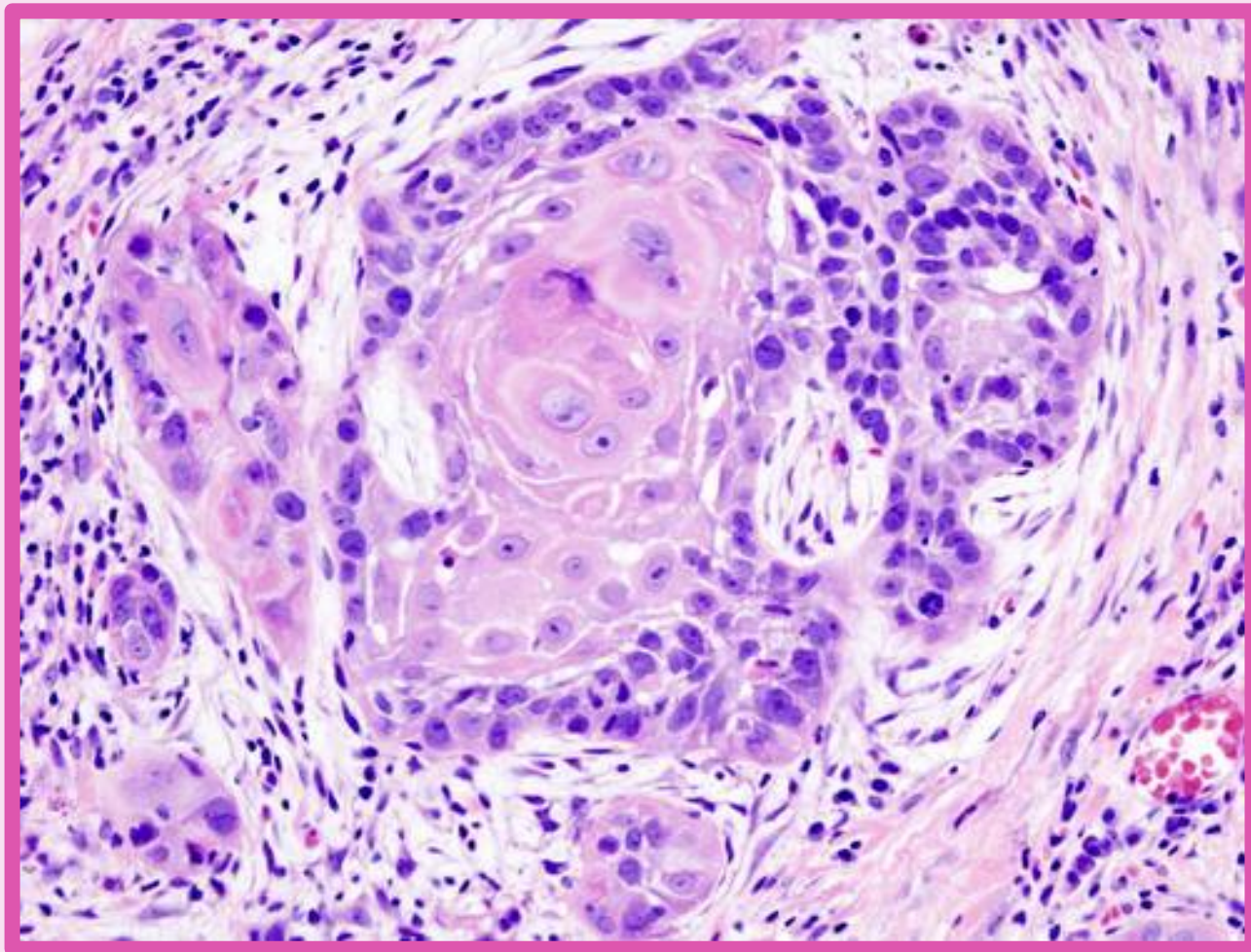
Carcinomas

80 – 90% of all cancers are from?

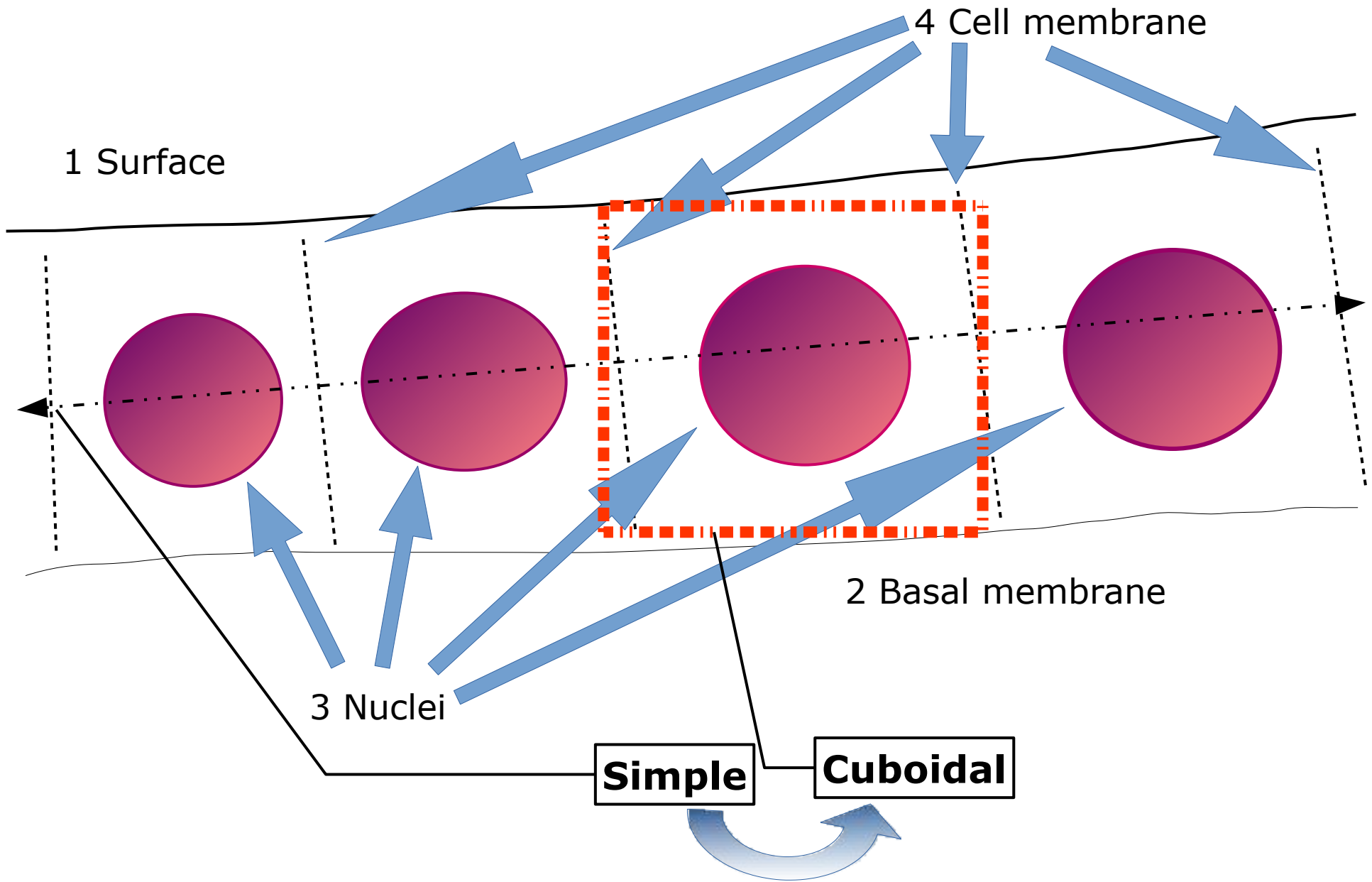


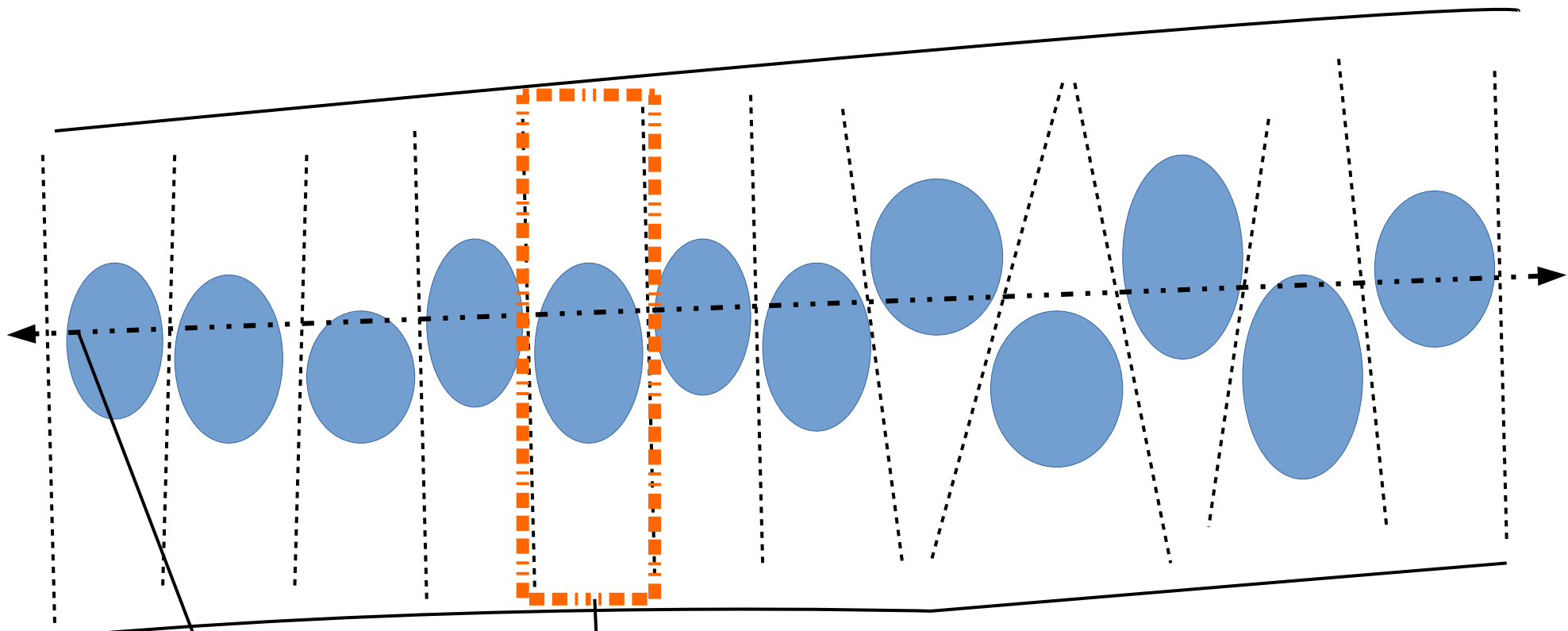
Carcinomas

80 – 90% of all cancers are from epithelial cells









Simple

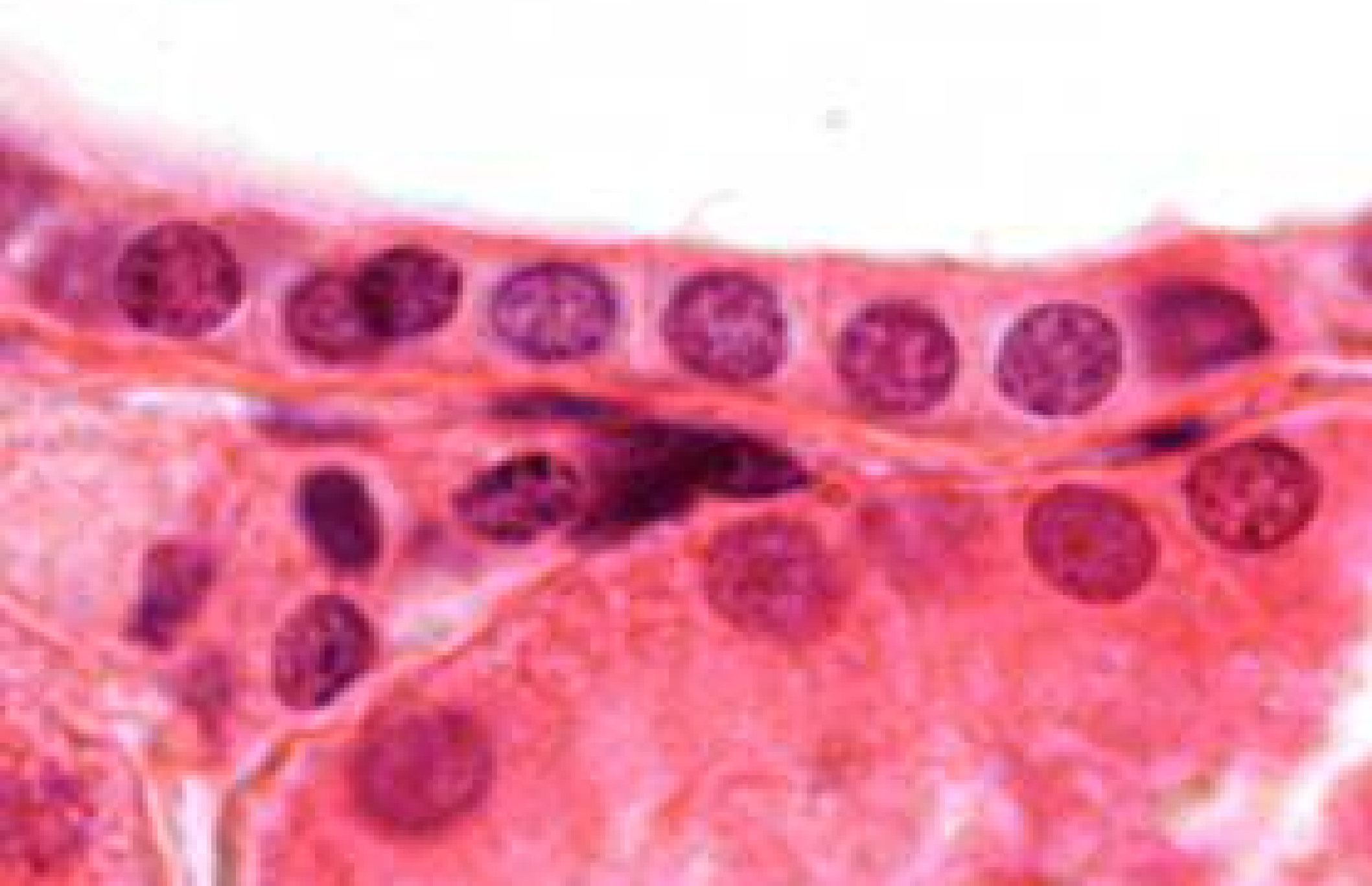
Columnar



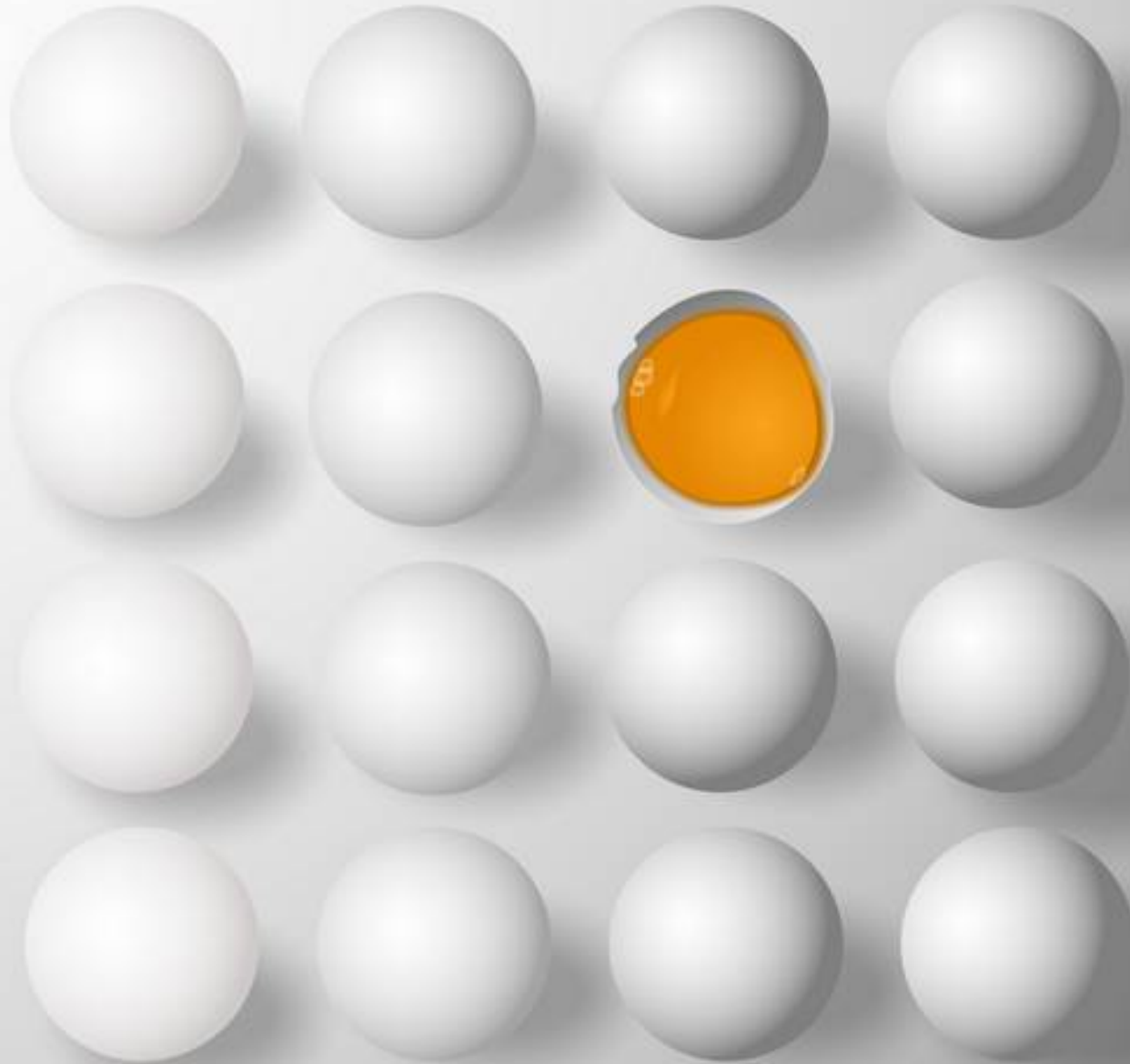
Simple = single layer

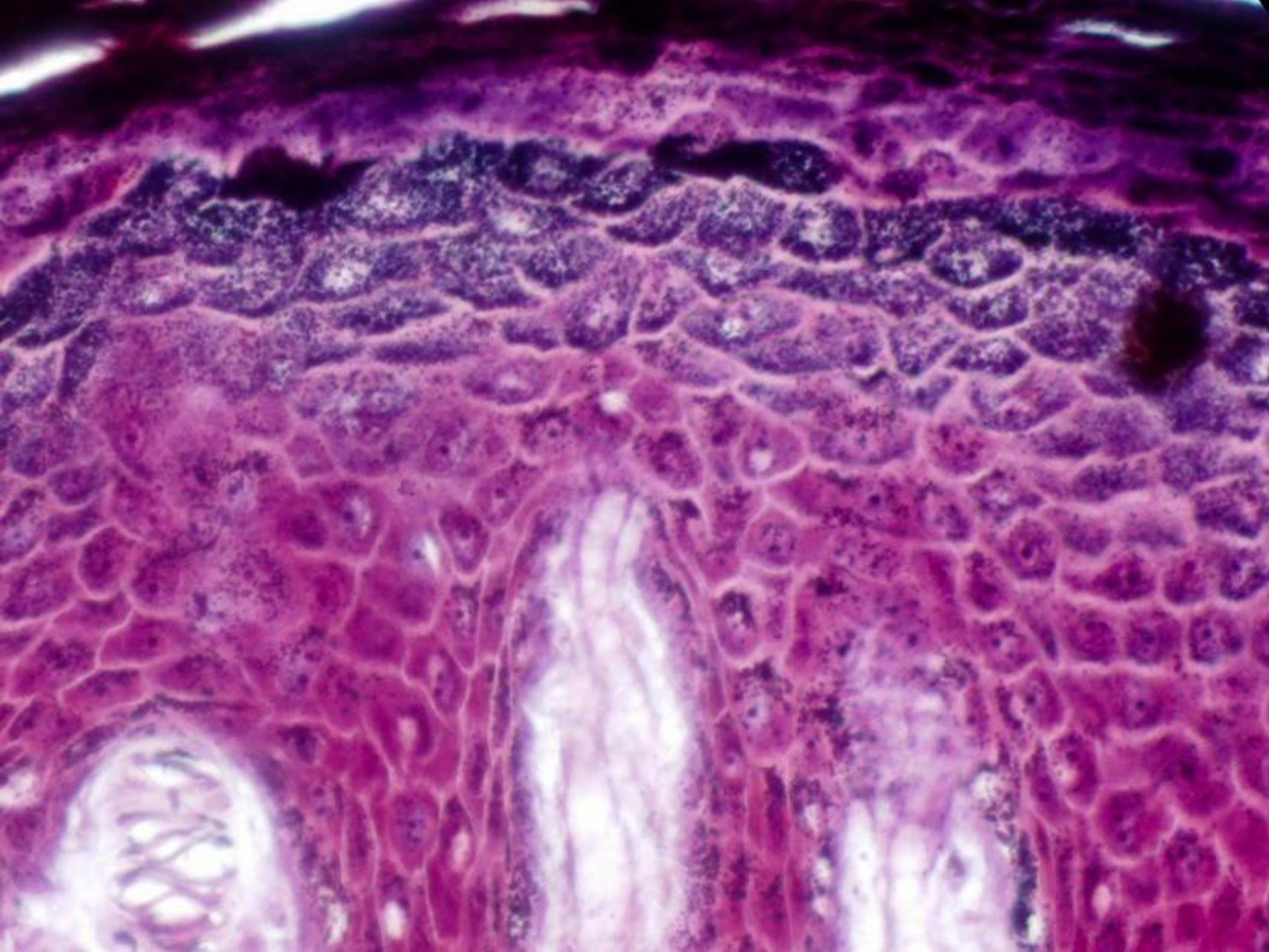


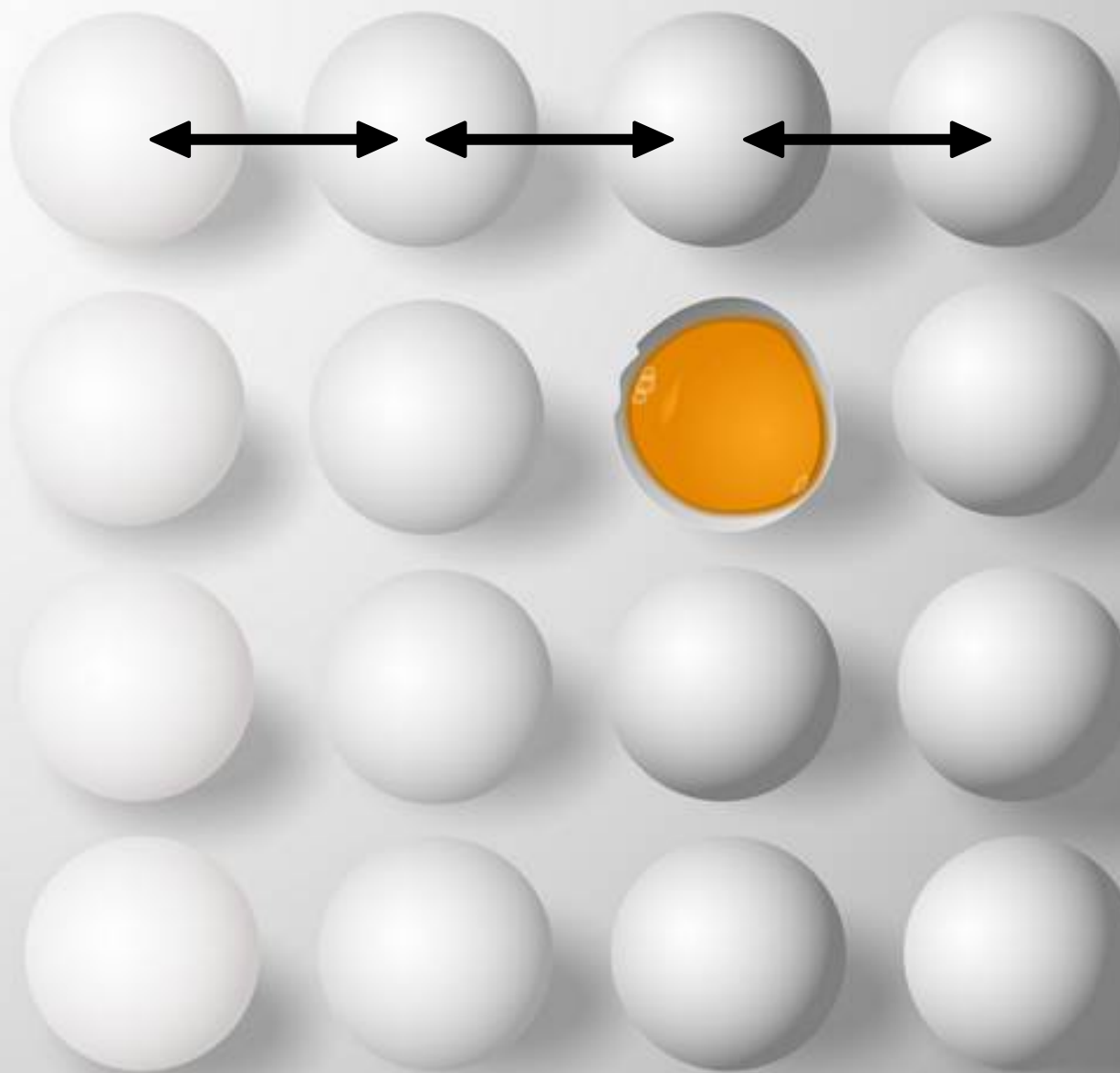
LUMEN



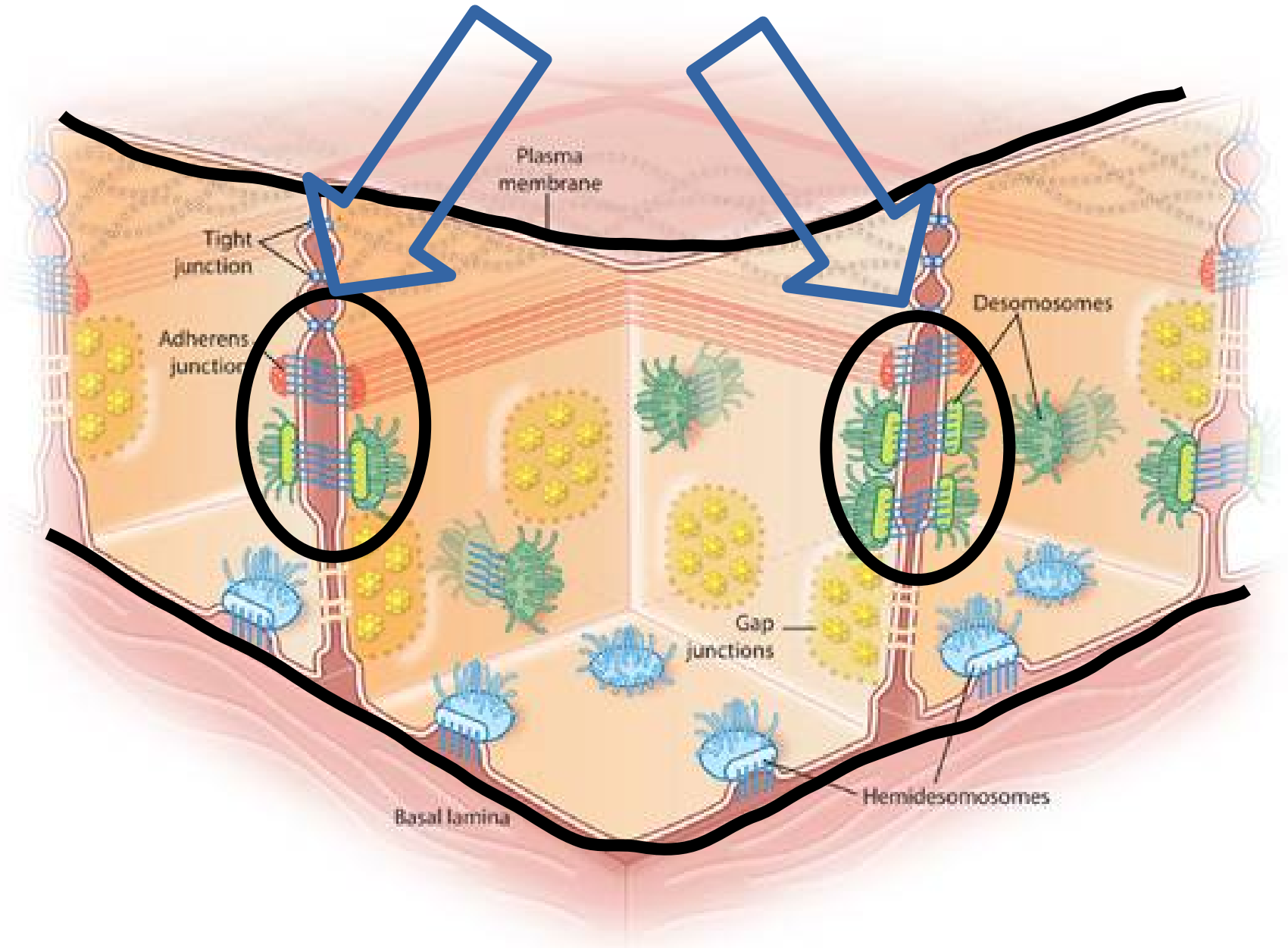
Stratified = multiple layers

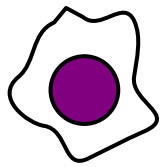




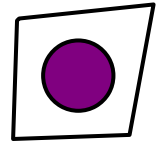


Adherens complexes

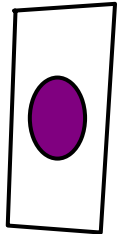




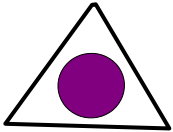
Polygonal cell



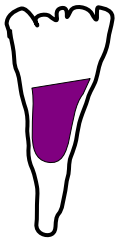
Cuboidal cell



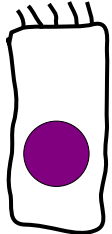
columnar cell



Basal cell



Goblet cell



ciliated columnar cell



Squamous cell

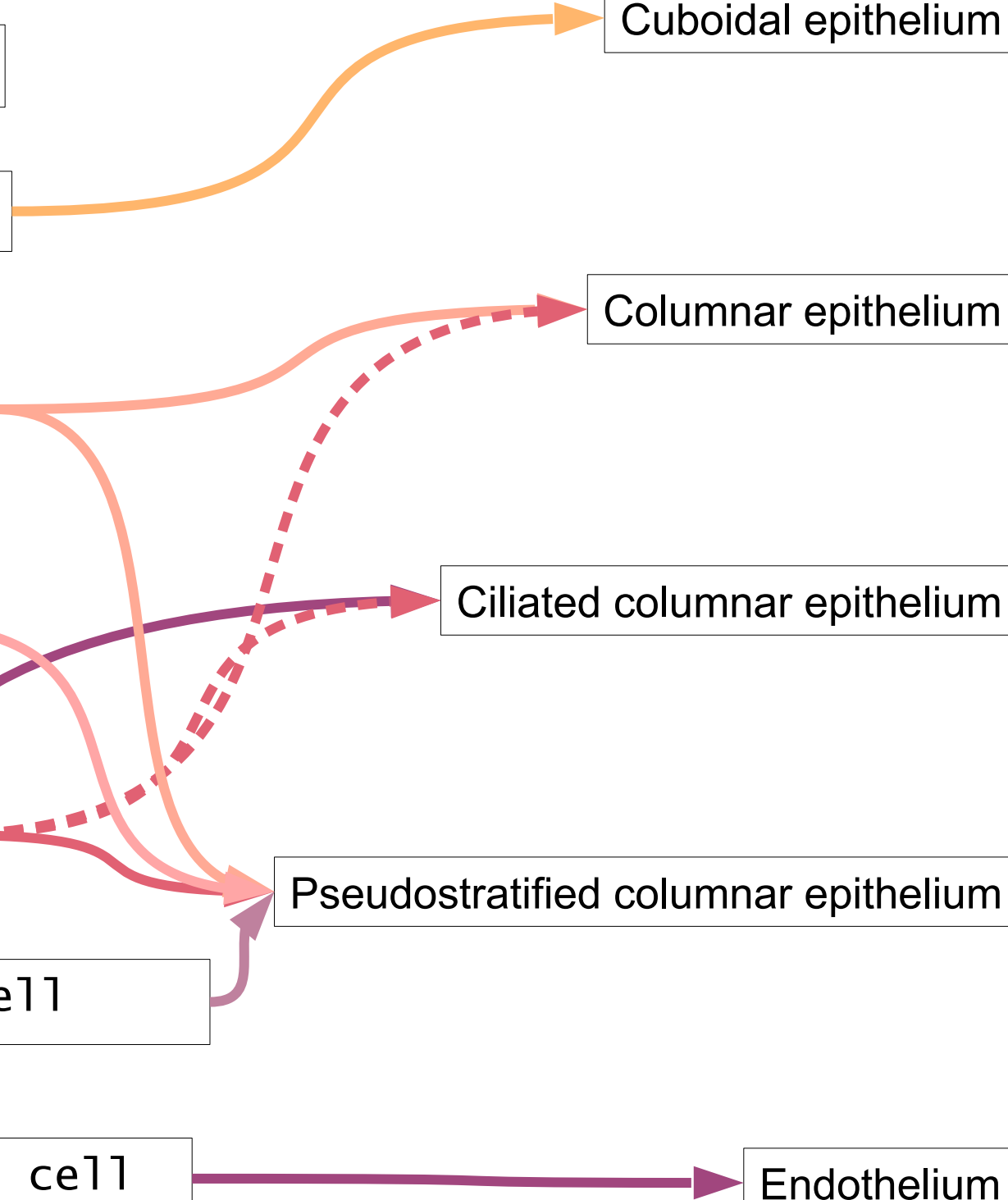
Cuboidal epithelium

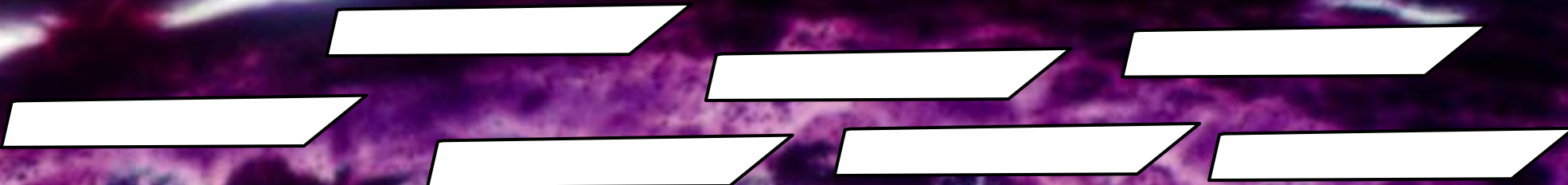
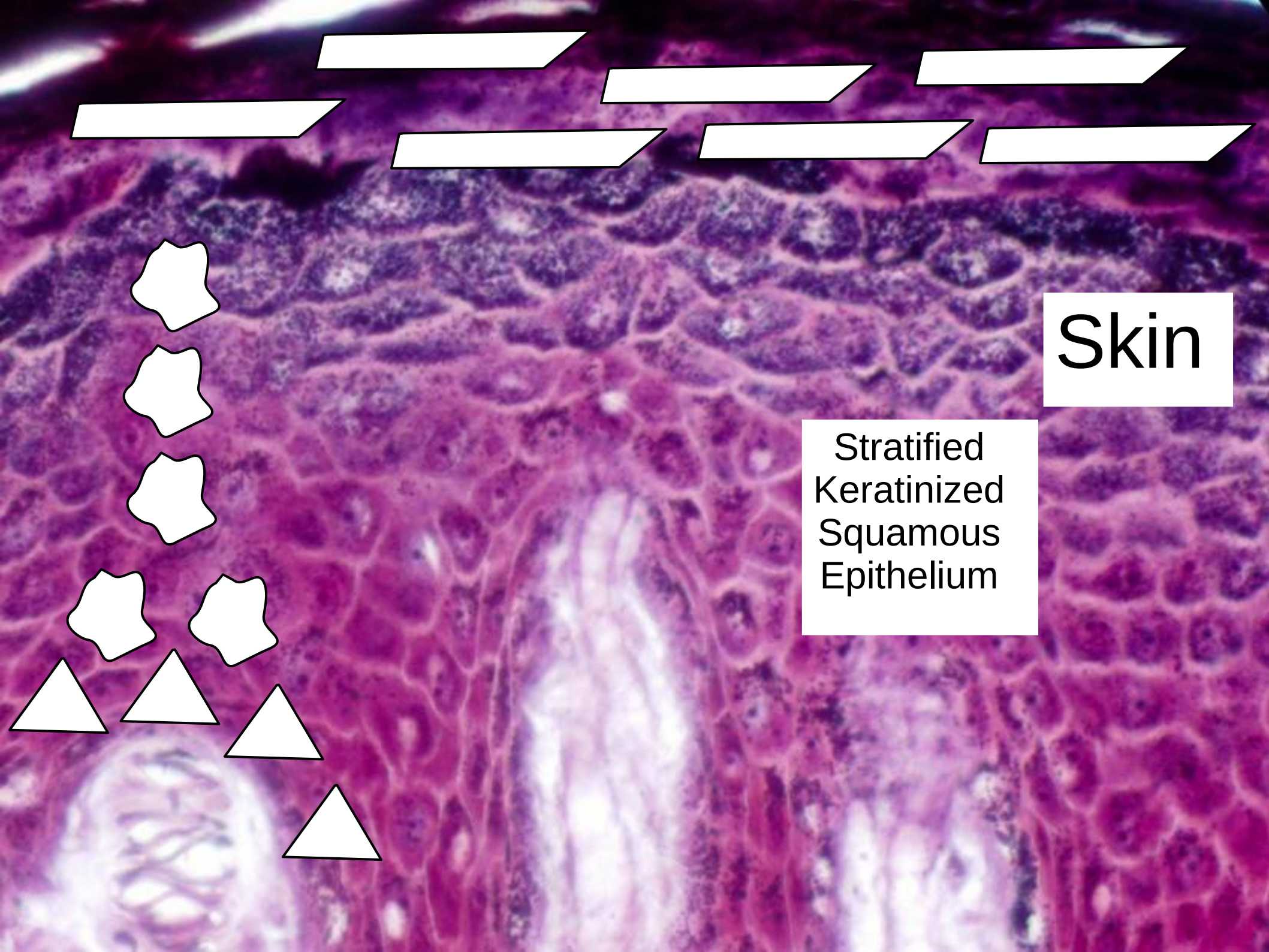
Columnar epithelium

Ciliated columnar epithelium

Pseudostratified columnar epithelium

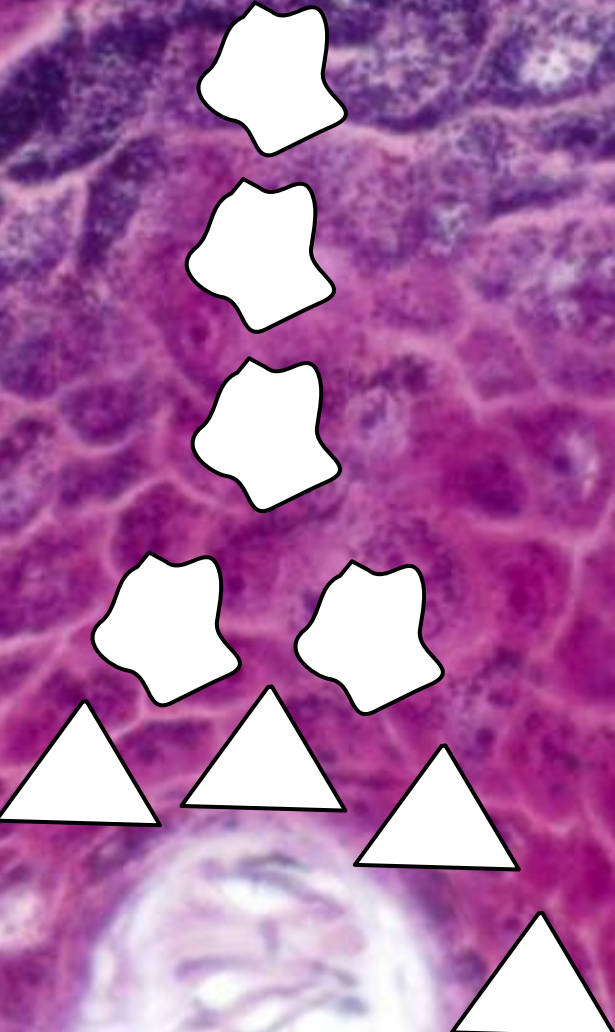
Endothelium





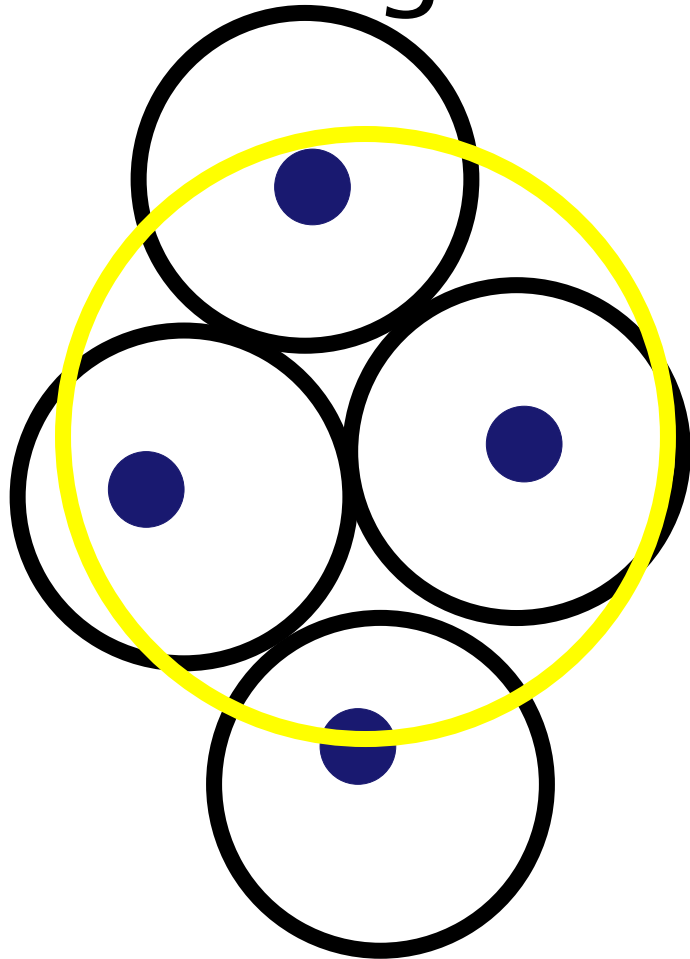
Skin

Stratified
Keratinized
Squamous
Epithelium

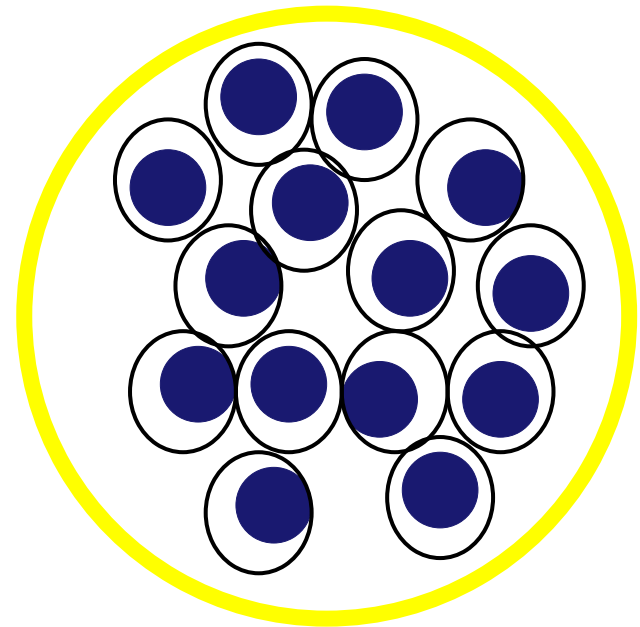


Stain: Dark vs Light

Large cells



Small cells





skin

THIS IS AN EXAMPLE!

DO ALL THE SLIDES!

skin is used
as an
example.

How many
slides do we
have to do?

ALL
of
them



Skin

Consider a needle penetrating skin.

Describe the layers.

Up to and including the vein.



List the layers

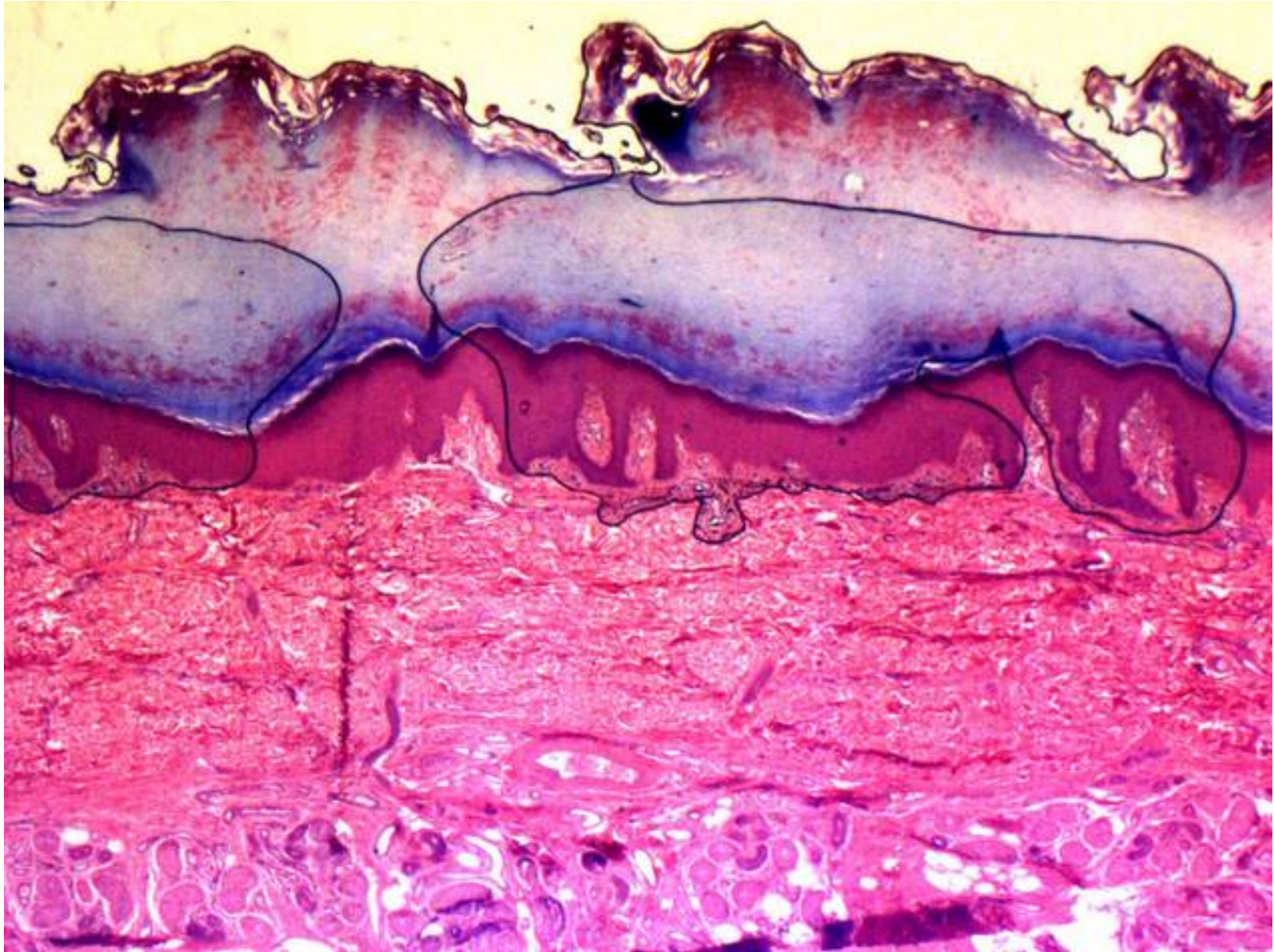
which layers of cells are penetrated?

what do they look like?

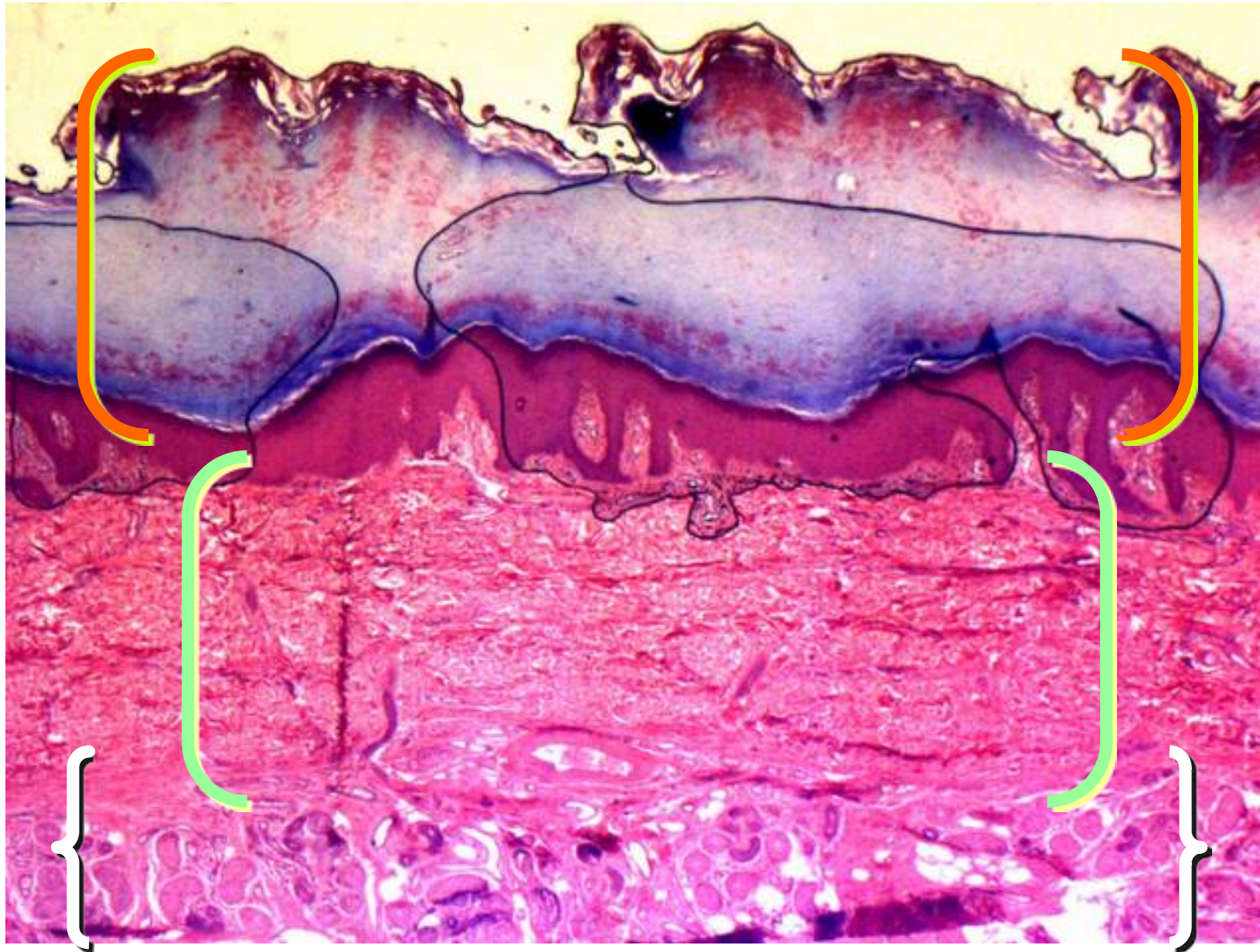
what is the function of each layer?

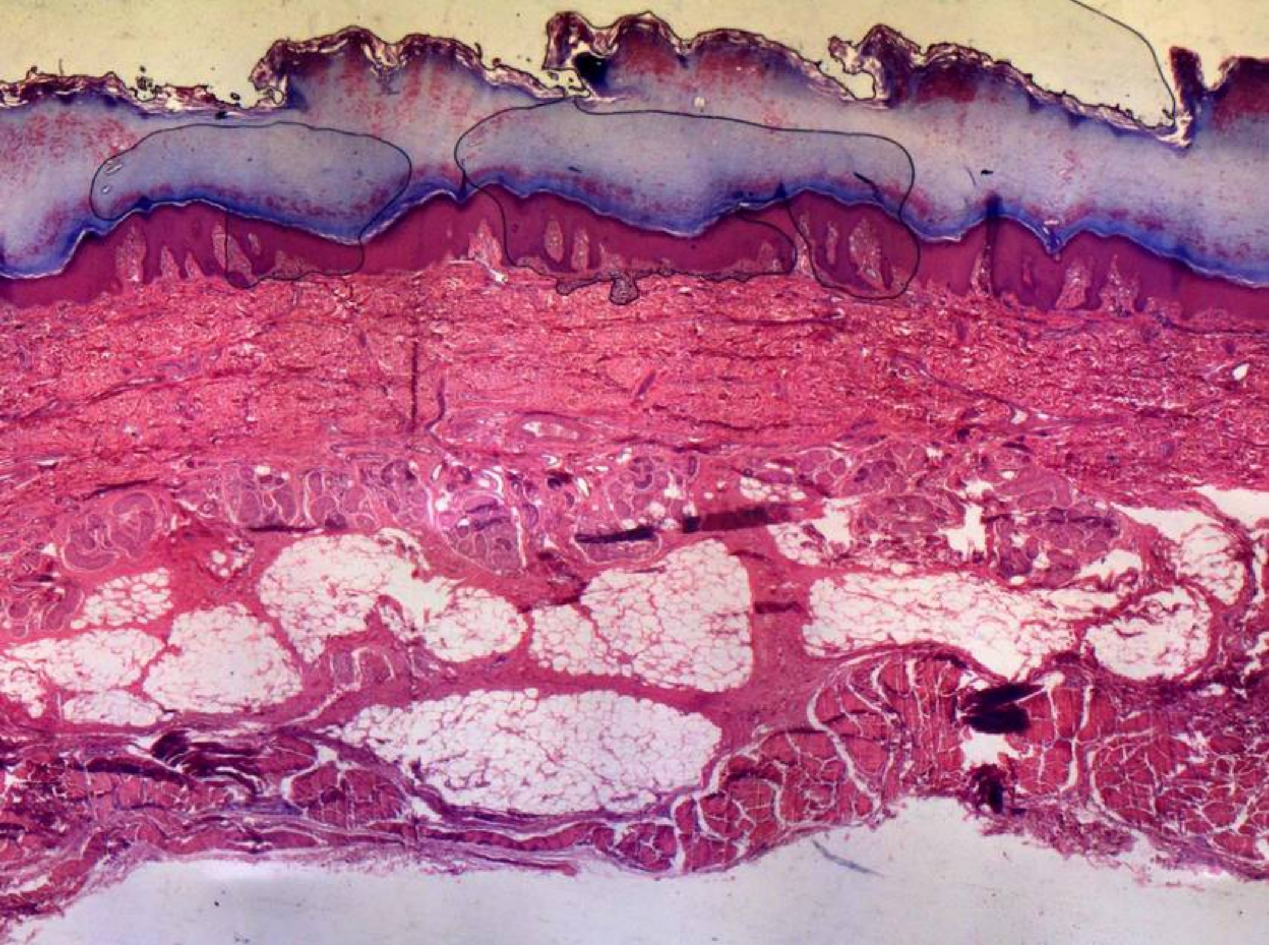
what is the function of each type of cell?

3 main layers seen.



Epidermis, Dermis, Hypodermis

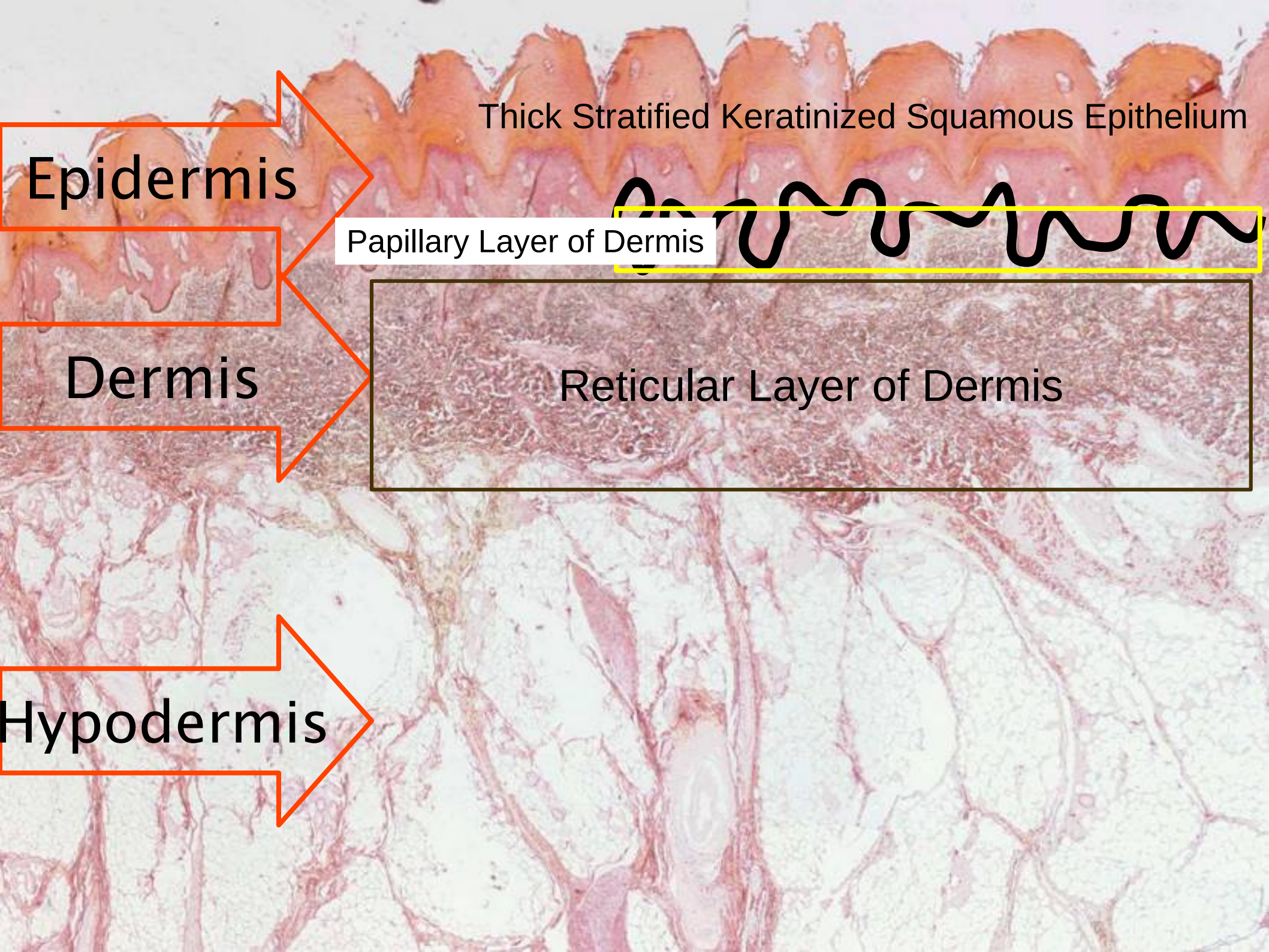




Slide 93: Thick skin – this slide is a section through the skin of the palm of the hand.

View the slides at low magnification. You should be able to see several layers, stained different colours and intensities. For a standard haematoxylin and eosin stained slide, there are three layers:

- A dark pink to red scalloped area – the epidermis.
- A central light pink eosinophilic area – the dermis.
- A very thick light pink area – the hypodermis.



Thick Stratified Keratinized Squamous Epithelium

Epidermis

Papillary Layer of Dermis

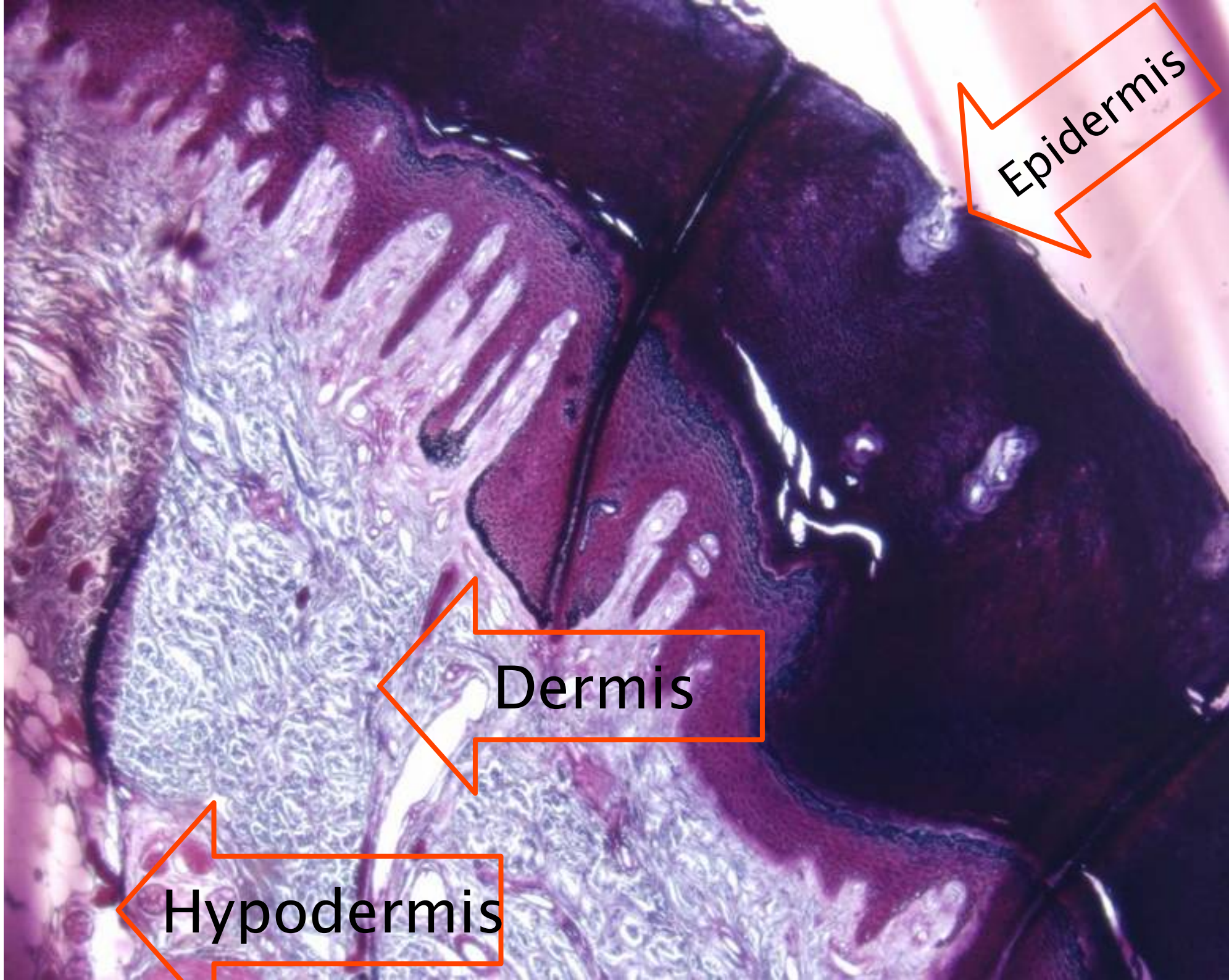
Dermis

Reticular Layer of Dermis

Hypodermis

Contextual questions

- Look at the palm of your hand and fingertips. The thickened outer layer is the outer layer of stratified squamous keratinized epithelium.
- Compare and describe the visual differences seen between the skin of the palm of your hand, the back of your hand, your forearm and scalp.
- Make a list of structures you expect to find in skin using the microscope.



Epidermis

Dermis

Hypodermis

Stratified
Squamous
Keratinized
Epithelium

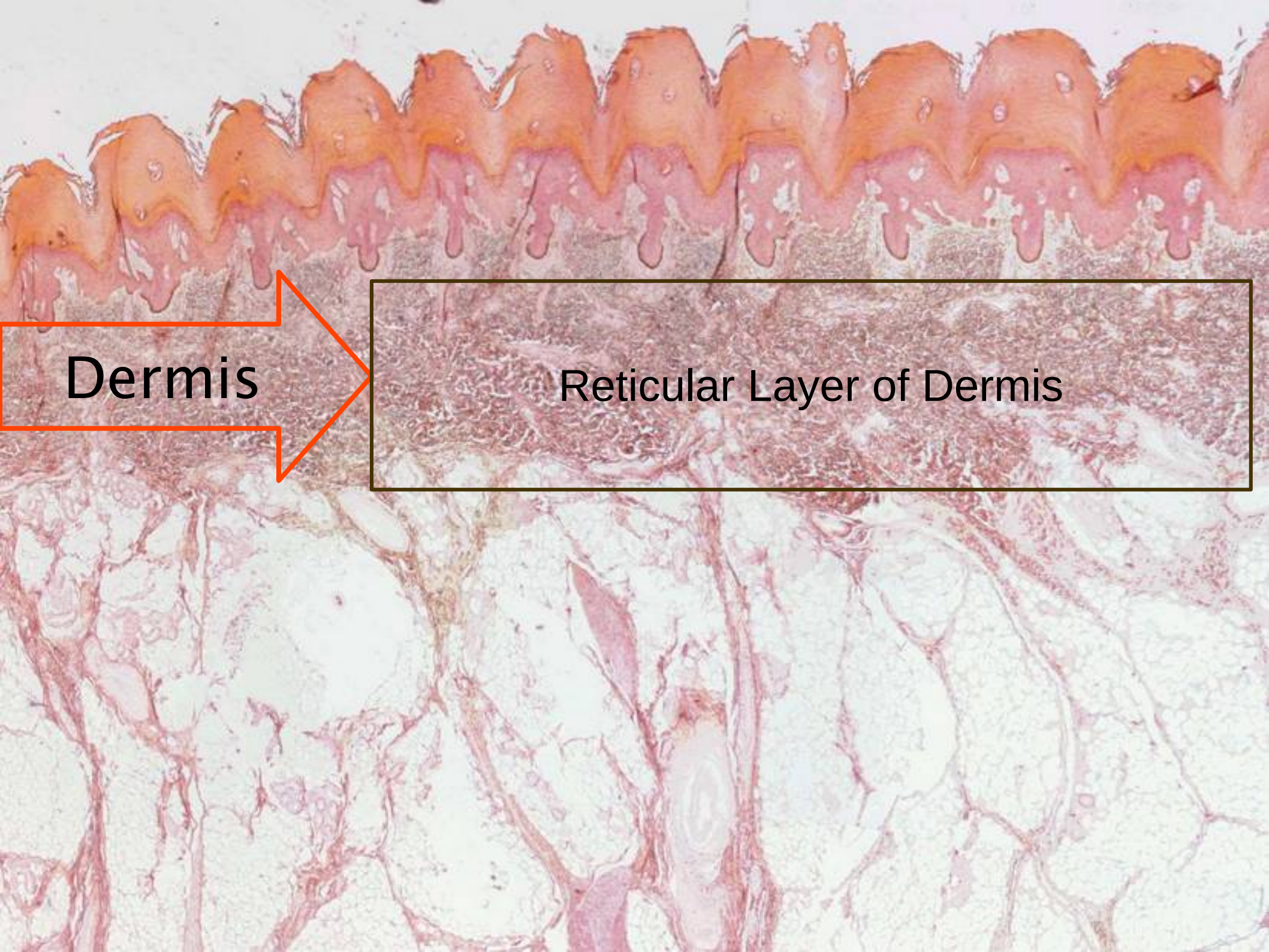
Dermis

The image shows a histological section of skin. On the left, there are two wavy black lines representing the epidermal-dermal junction. The epidermis is a thick, multi-layered structure. The upper part is the keratinized layer, and the lower part is the stratum basale. The dermis is the layer below the epidermis, containing various cells and fibers. An orange box highlights the epidermis, and a blue arrow points to the dermis.

Dermis

All Connective Tissues

3 Components



Dermis

Reticular Layer of Dermis

Irregular

Dense

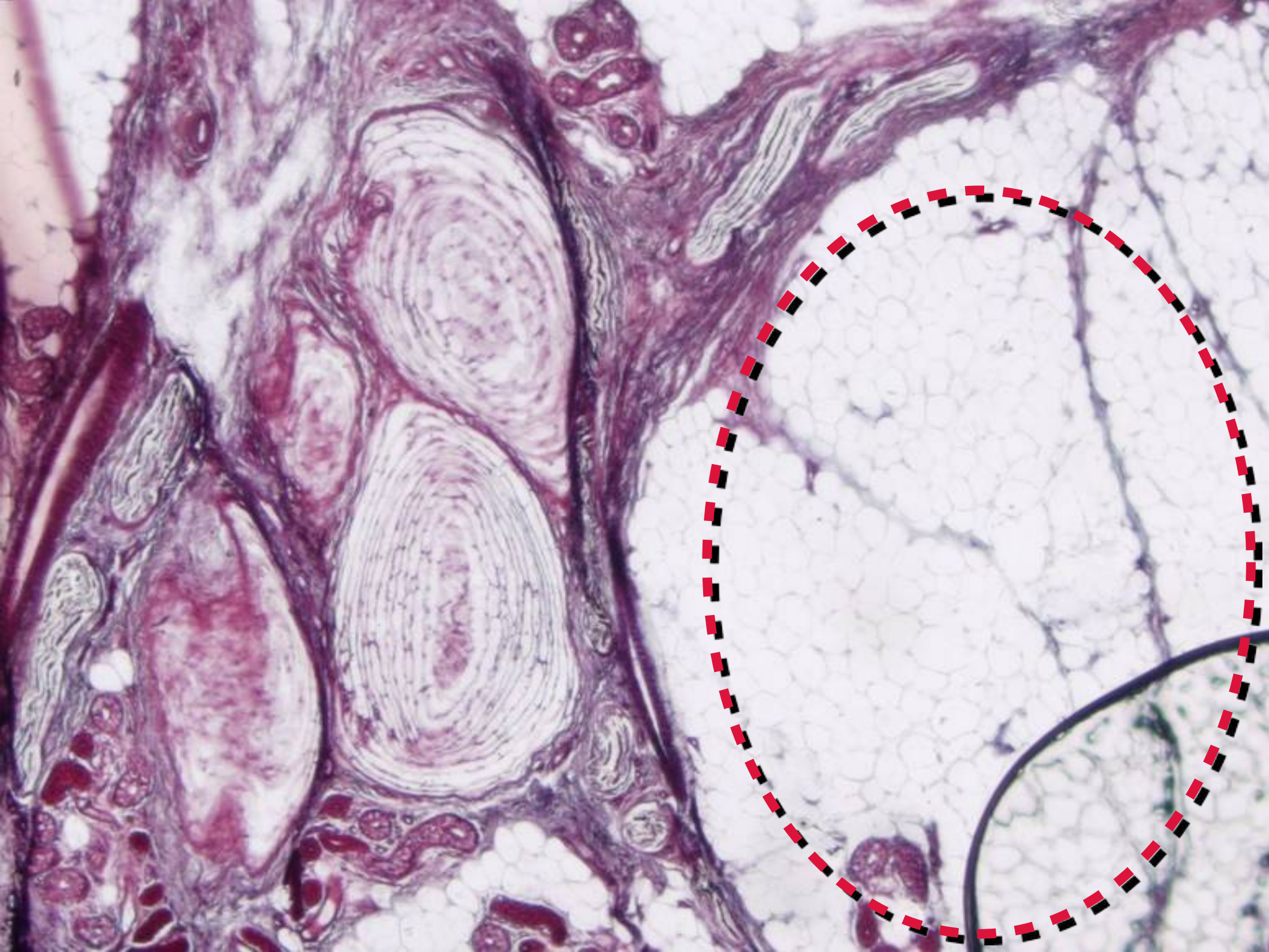
Connective Tissue

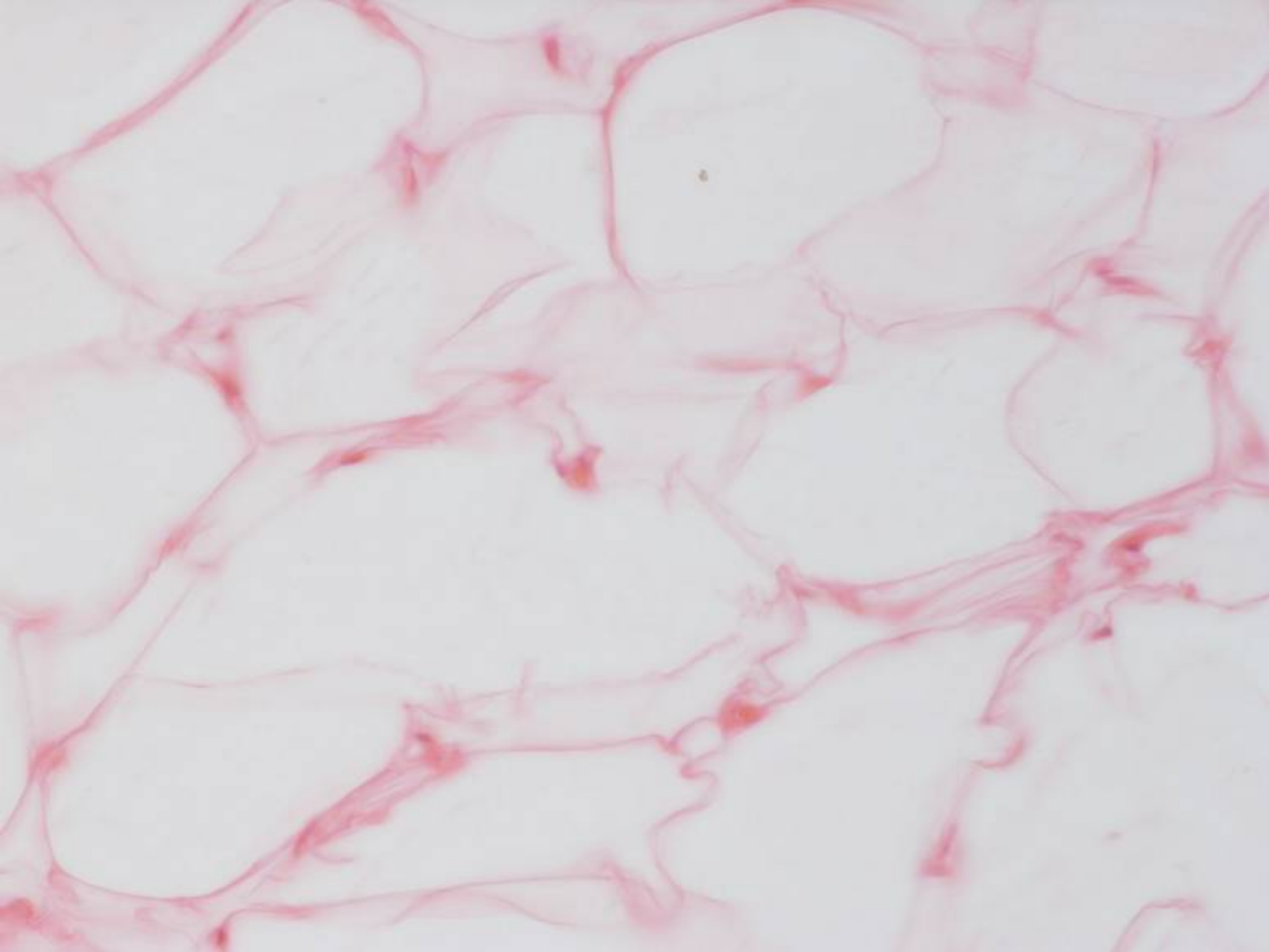
Cells

Fibres

Amorphous Ground Substance

Hypodermis





Eosin

High magnification

Fat cell

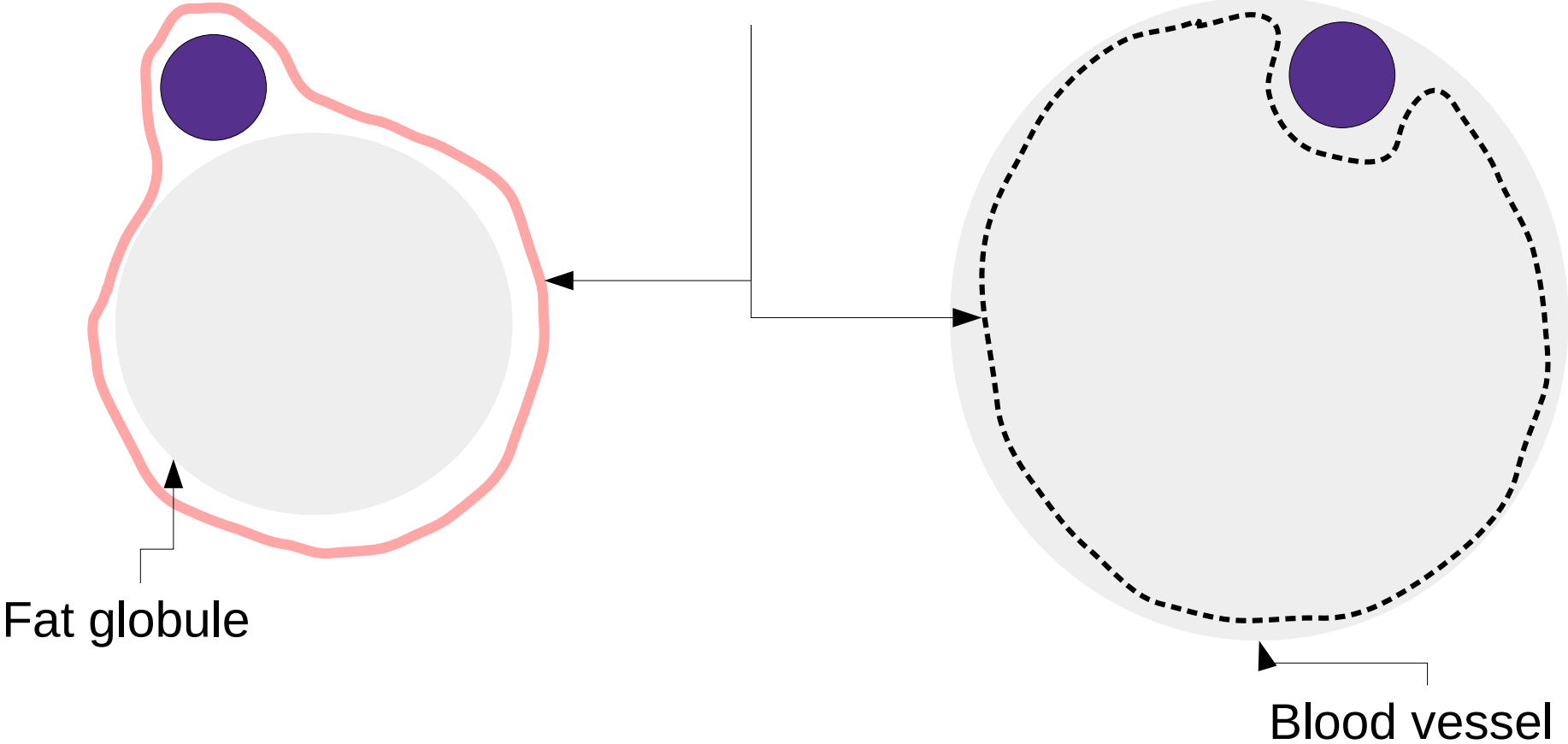


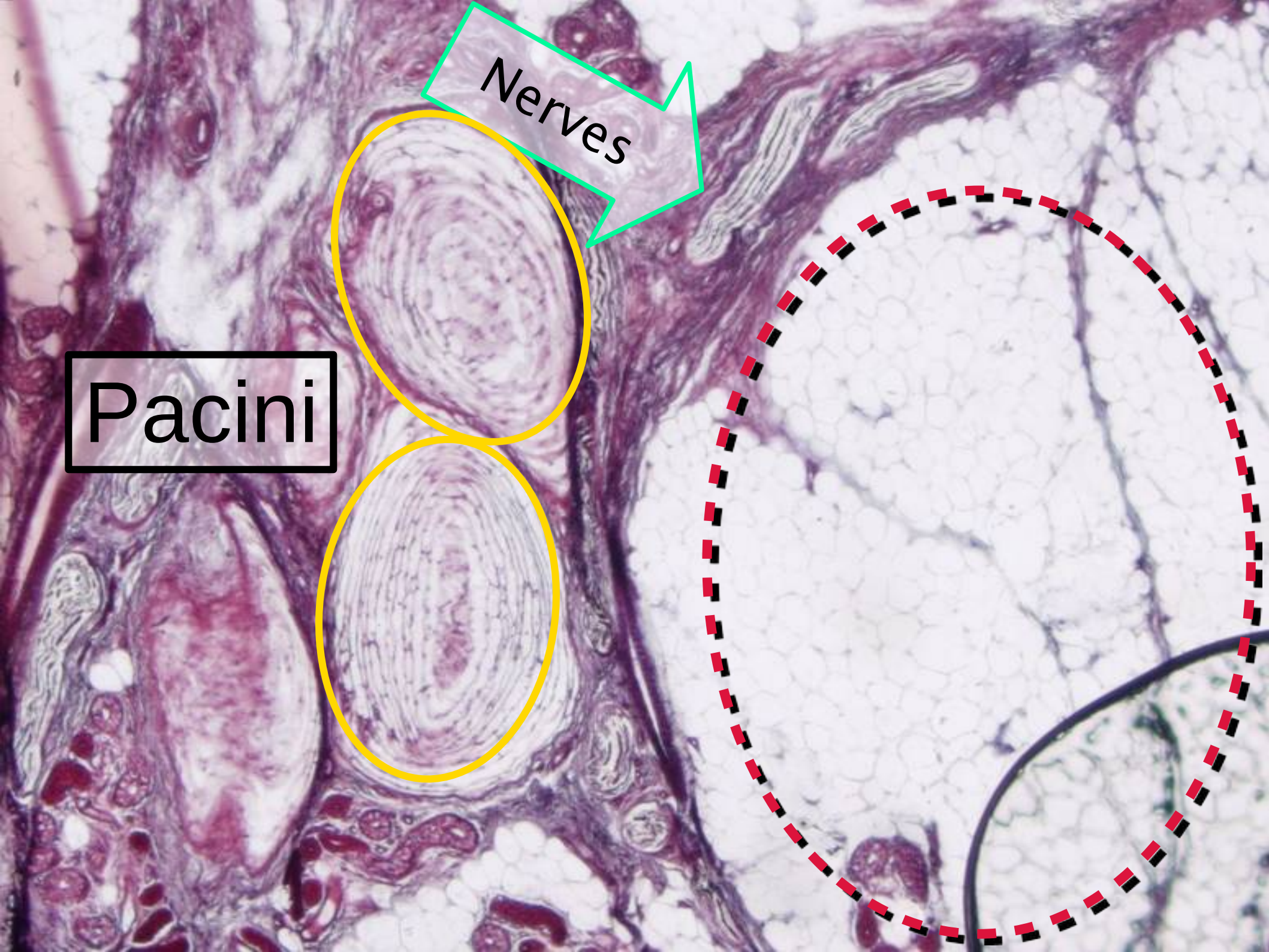
Adipose tissue

Fat cell

Endothelium

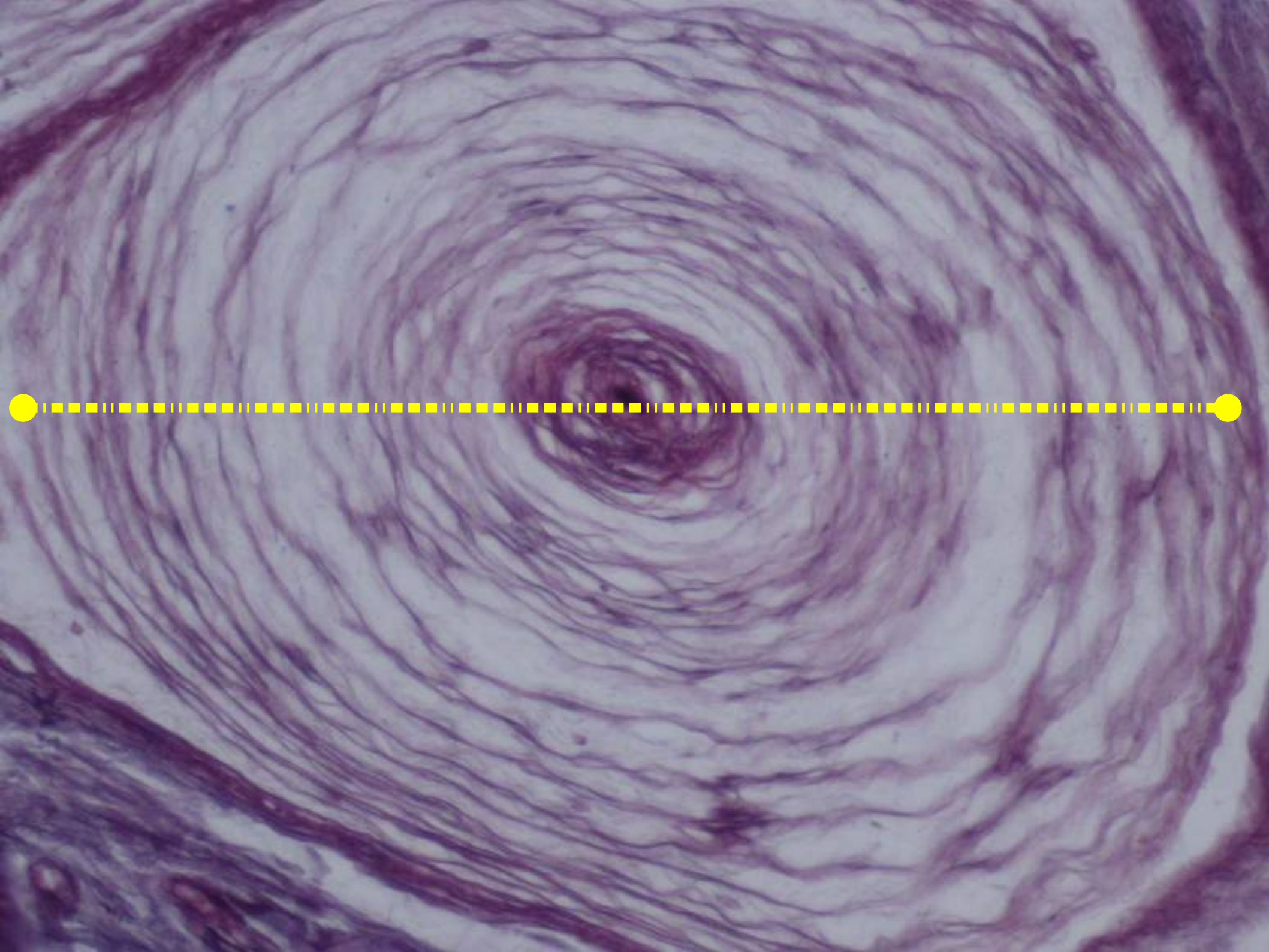
Cytoplasm

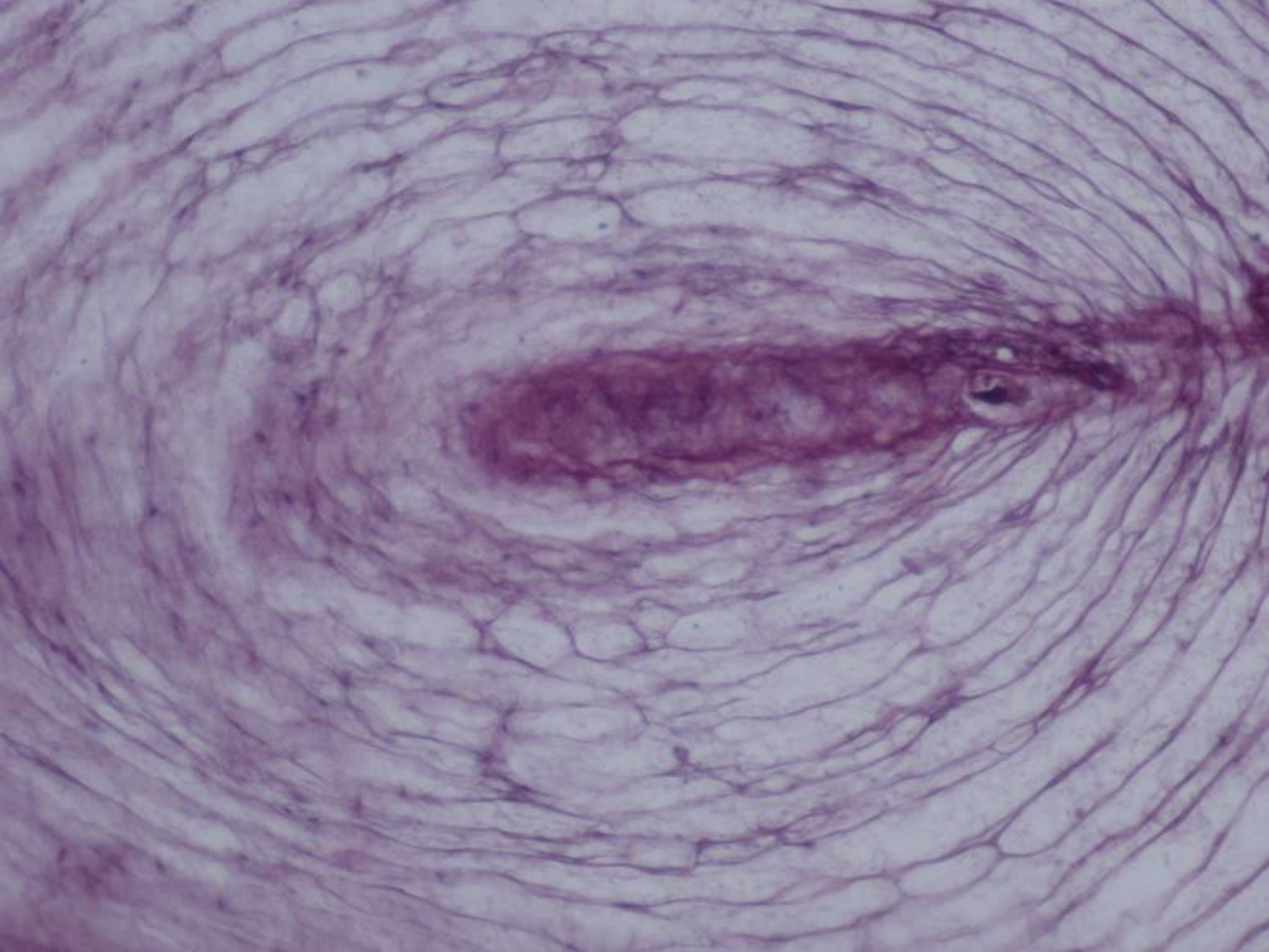


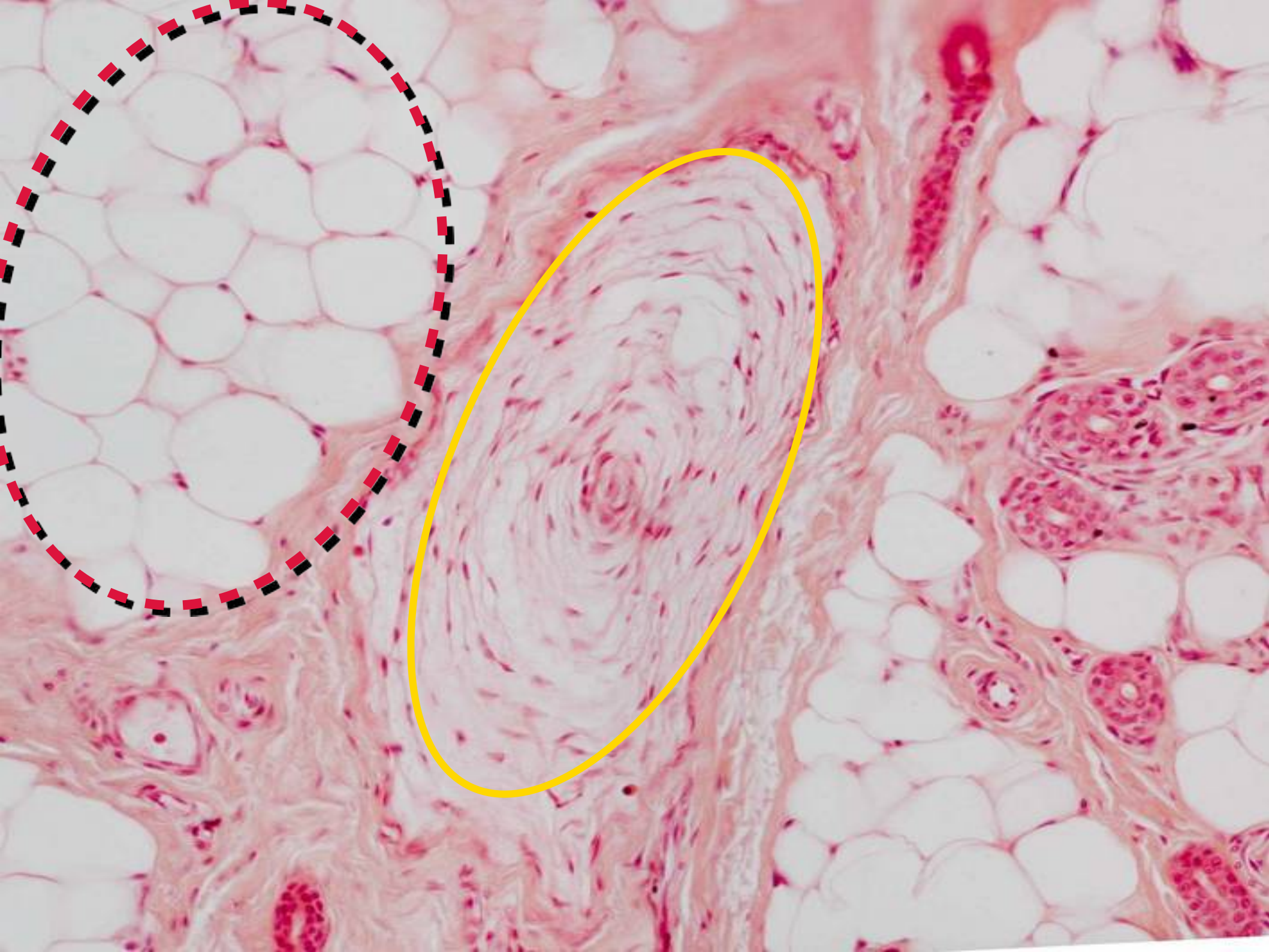


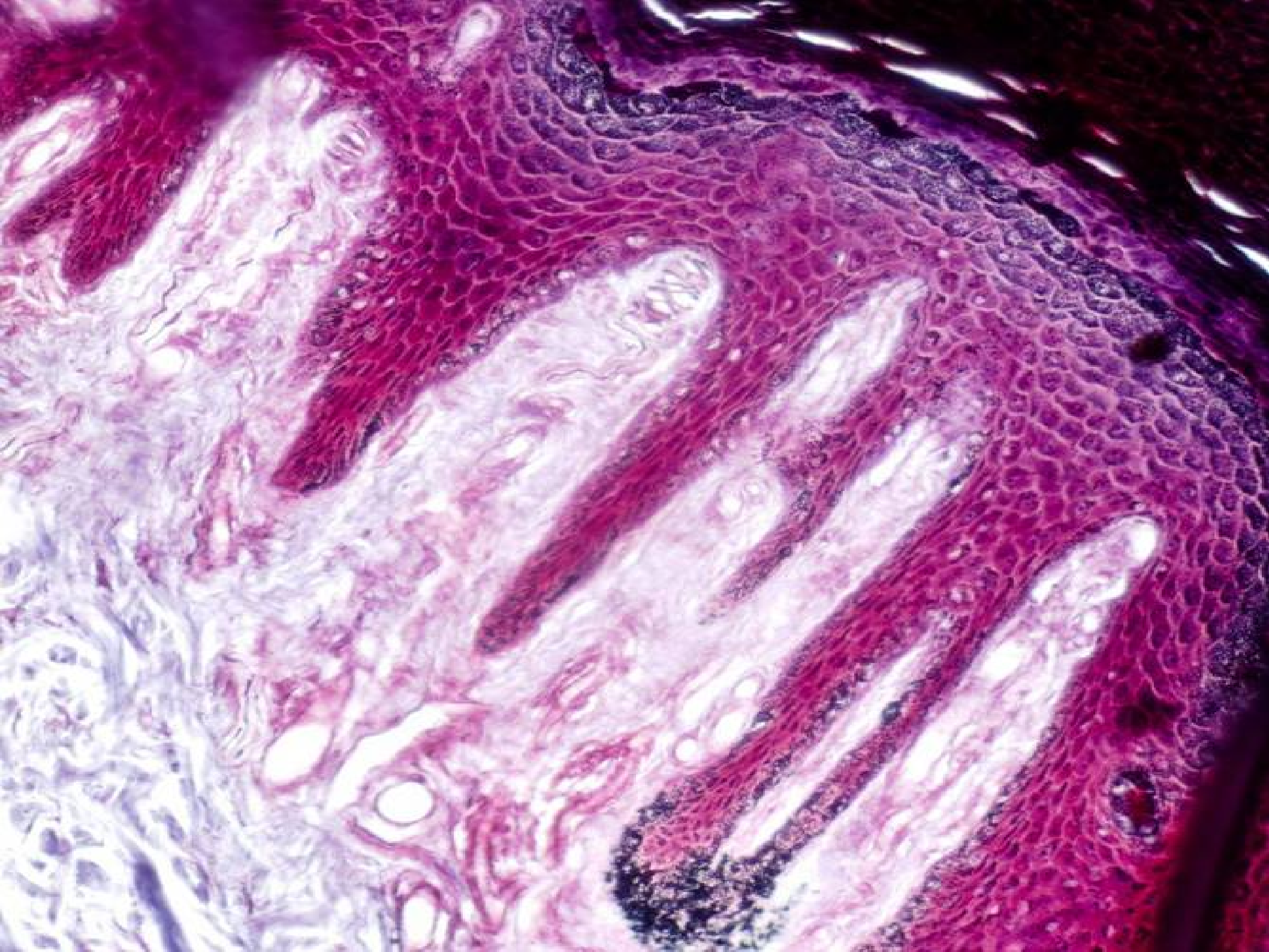
Nerves

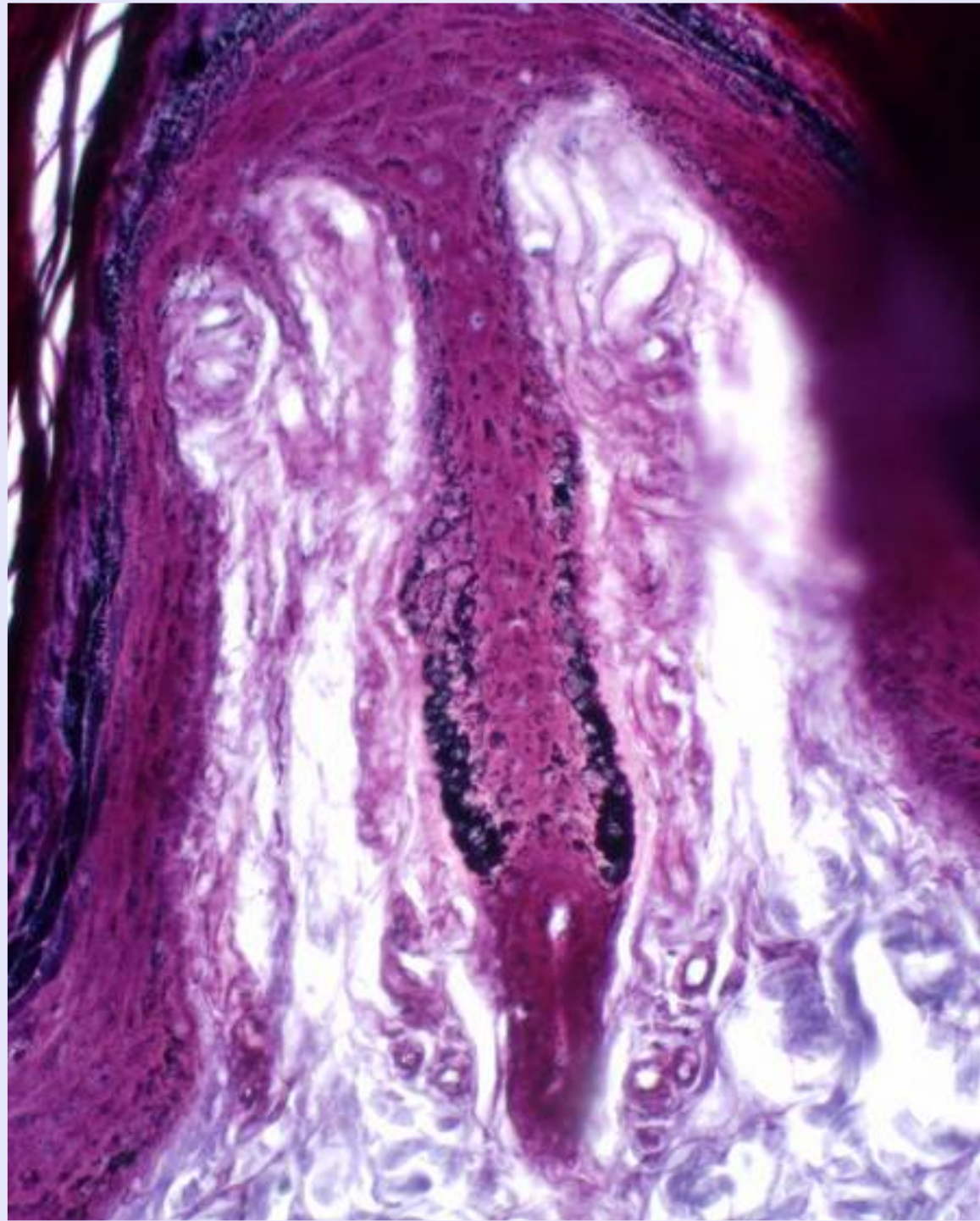
Pacini

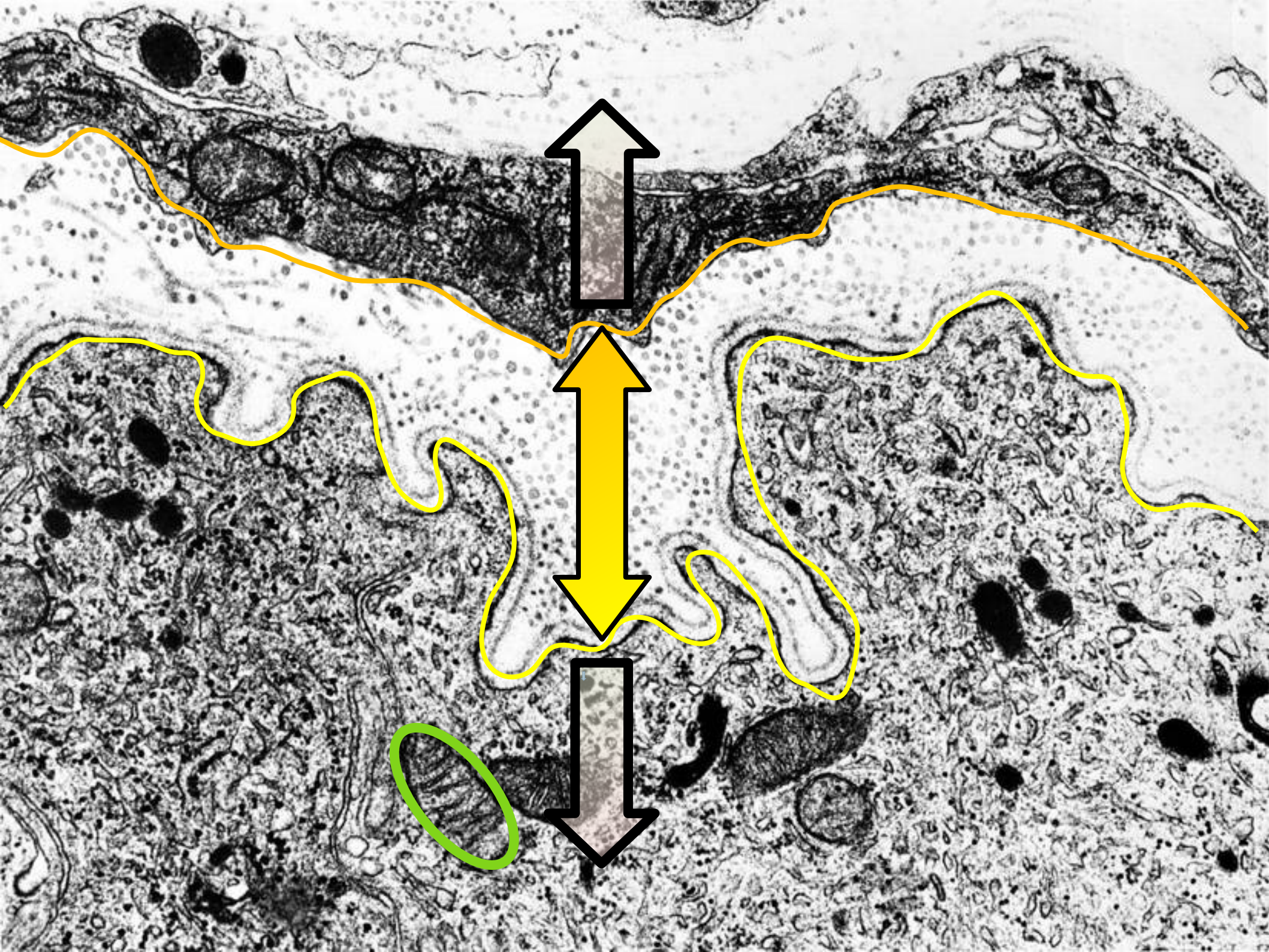


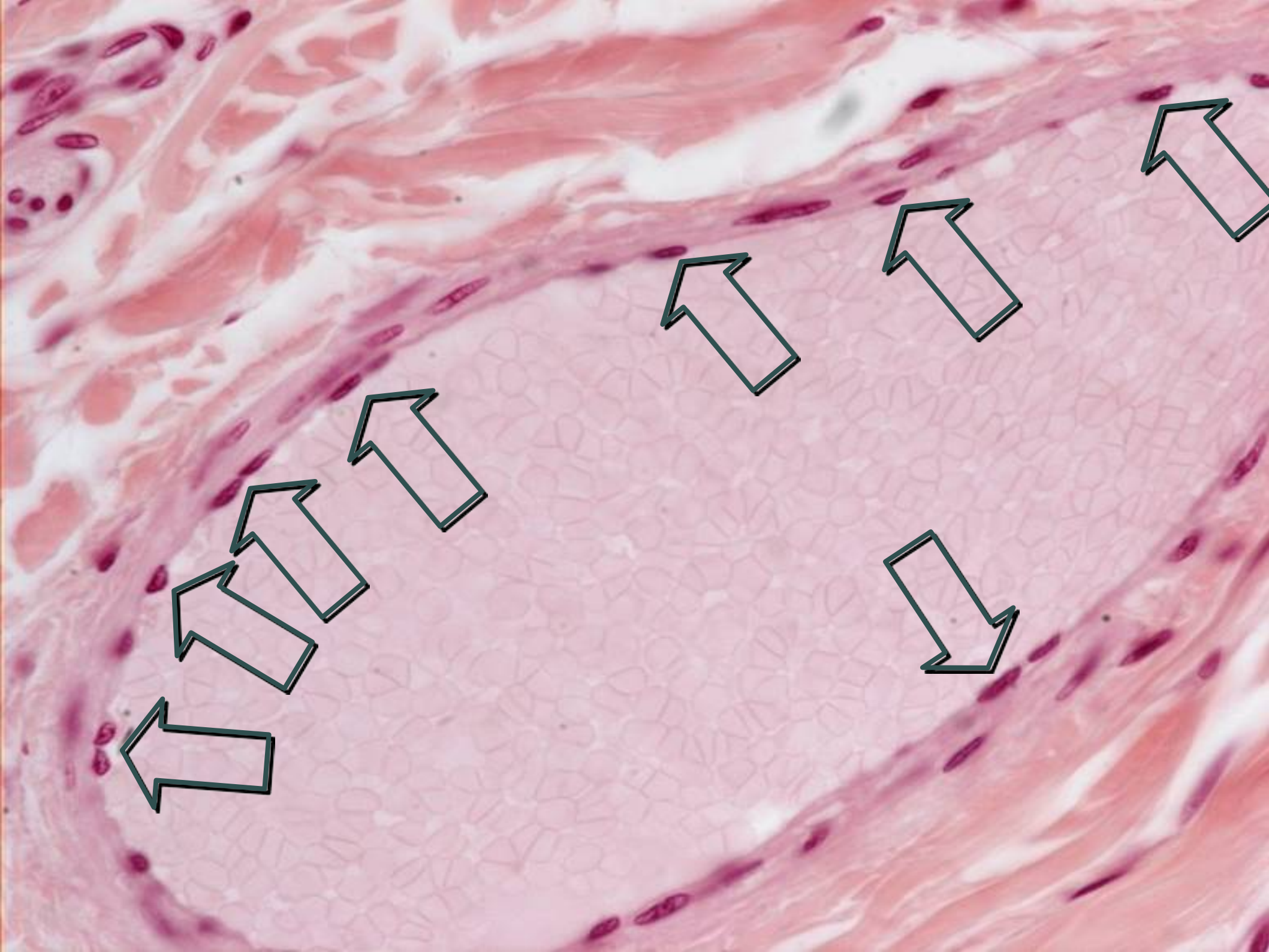


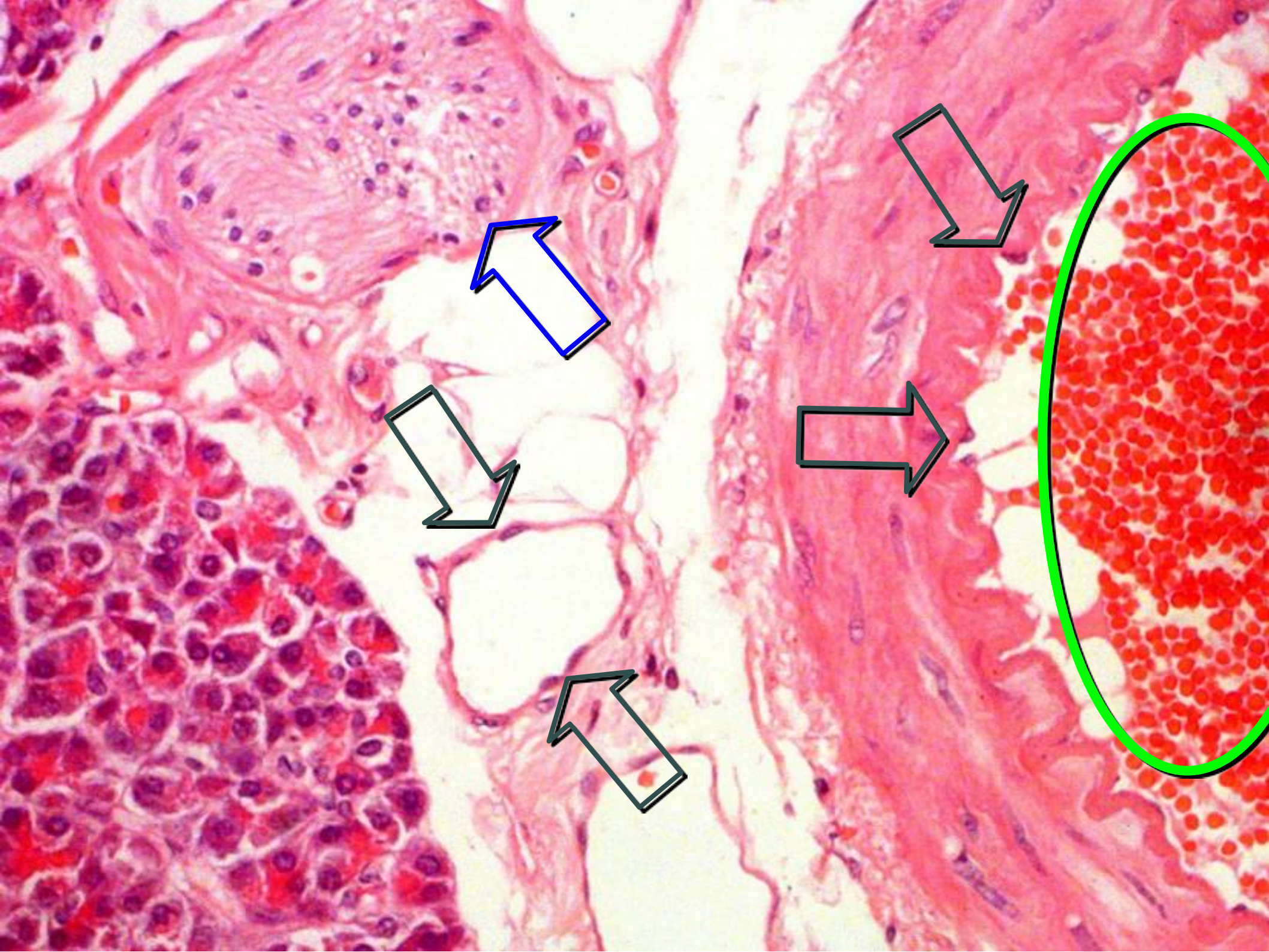










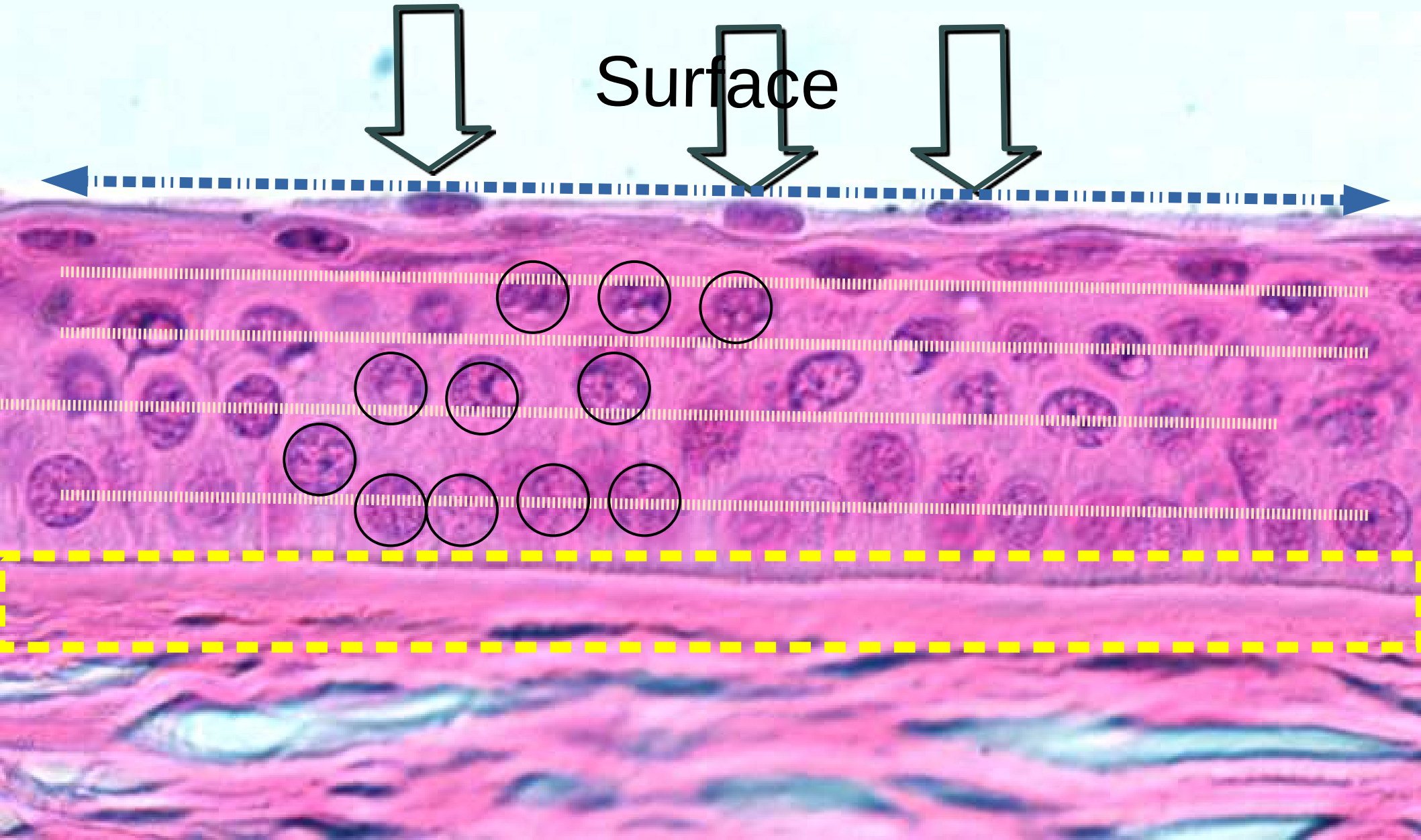




Thin stratified squamous epithelium

LUMEN

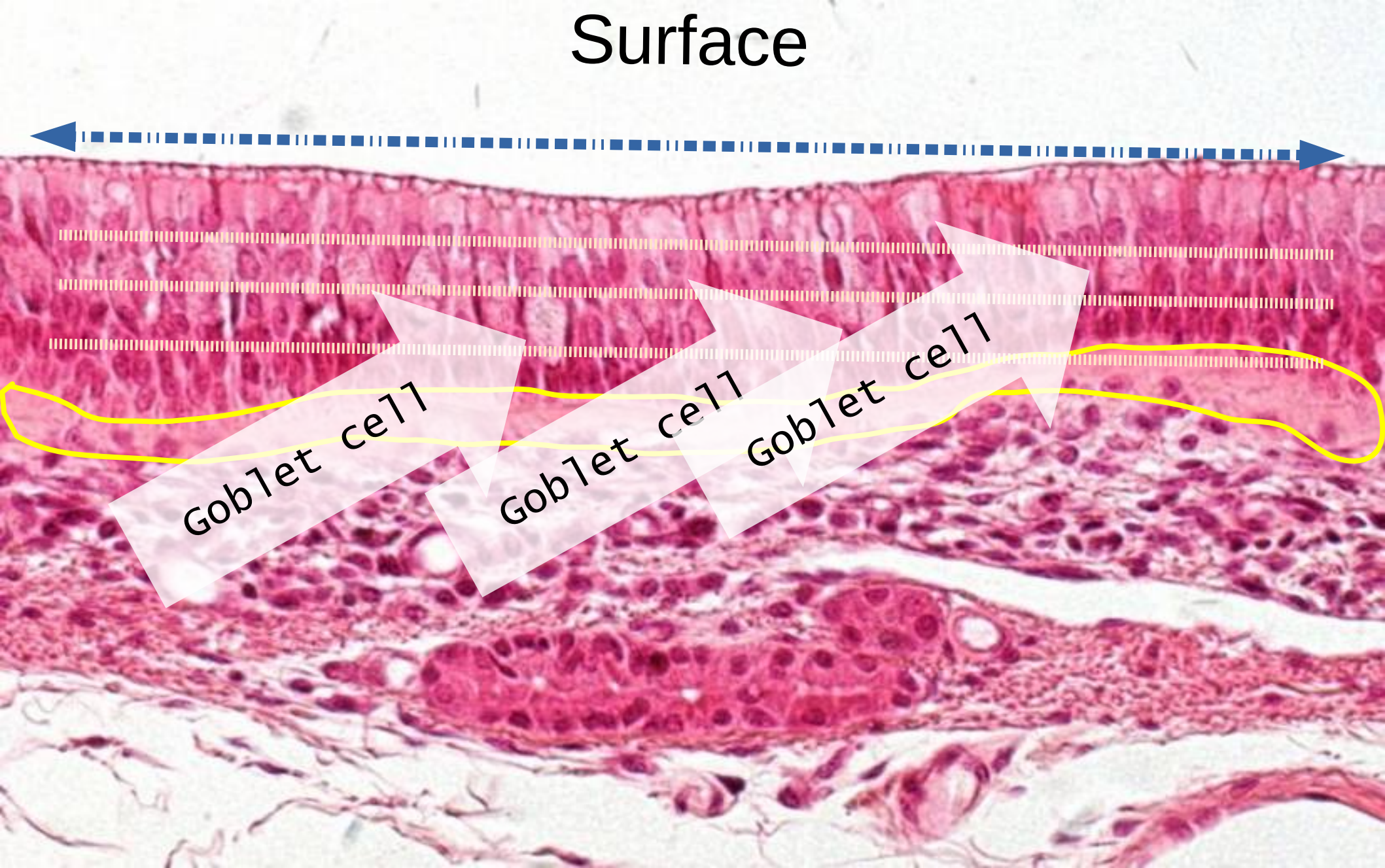
Surface



Pseudostratified columnar epithelium

LUMEN

Surface



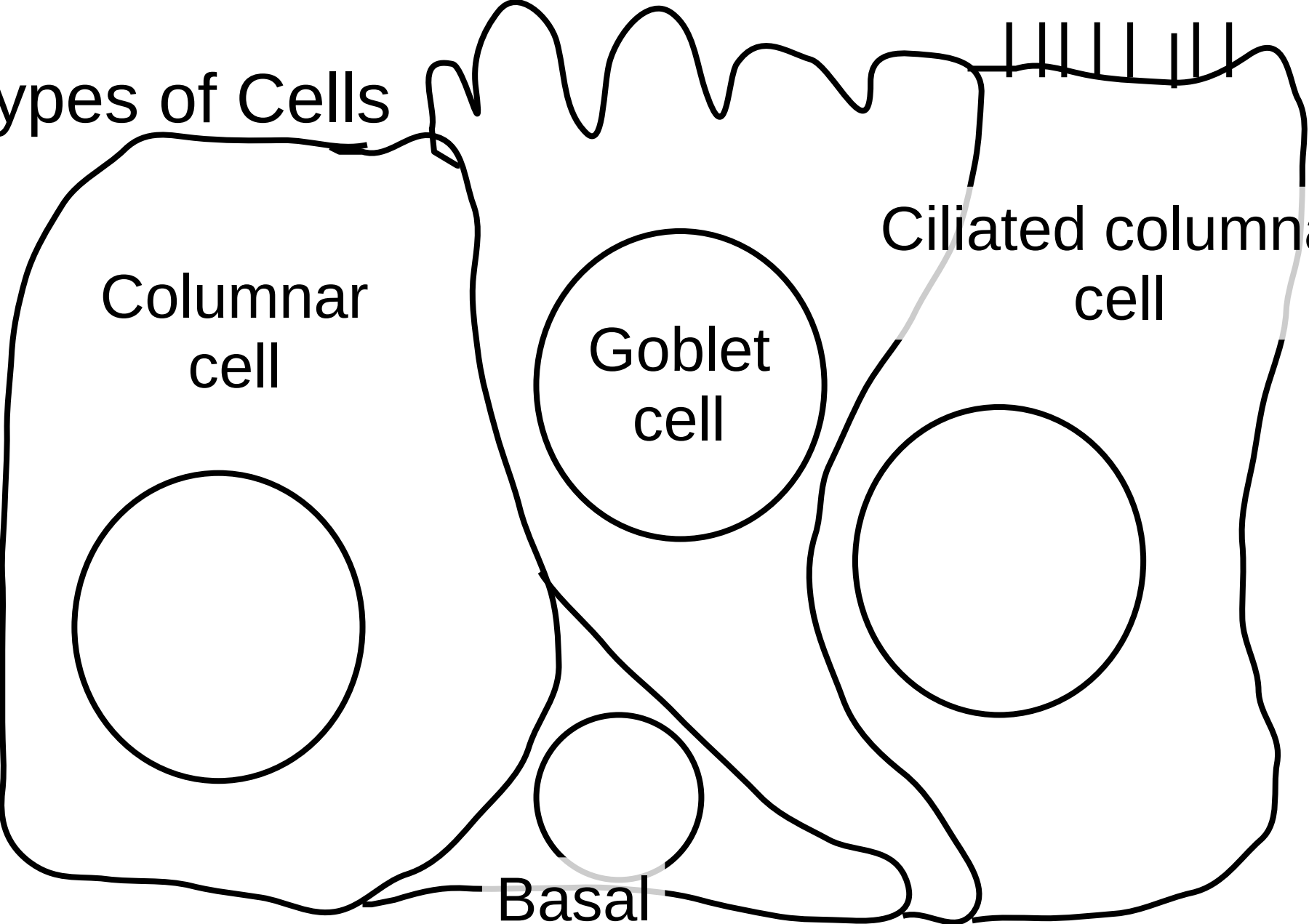
Goblet cell

Goblet cell

Goblet cell

Pseudostratified columnar epithelium

4 Types of Cells



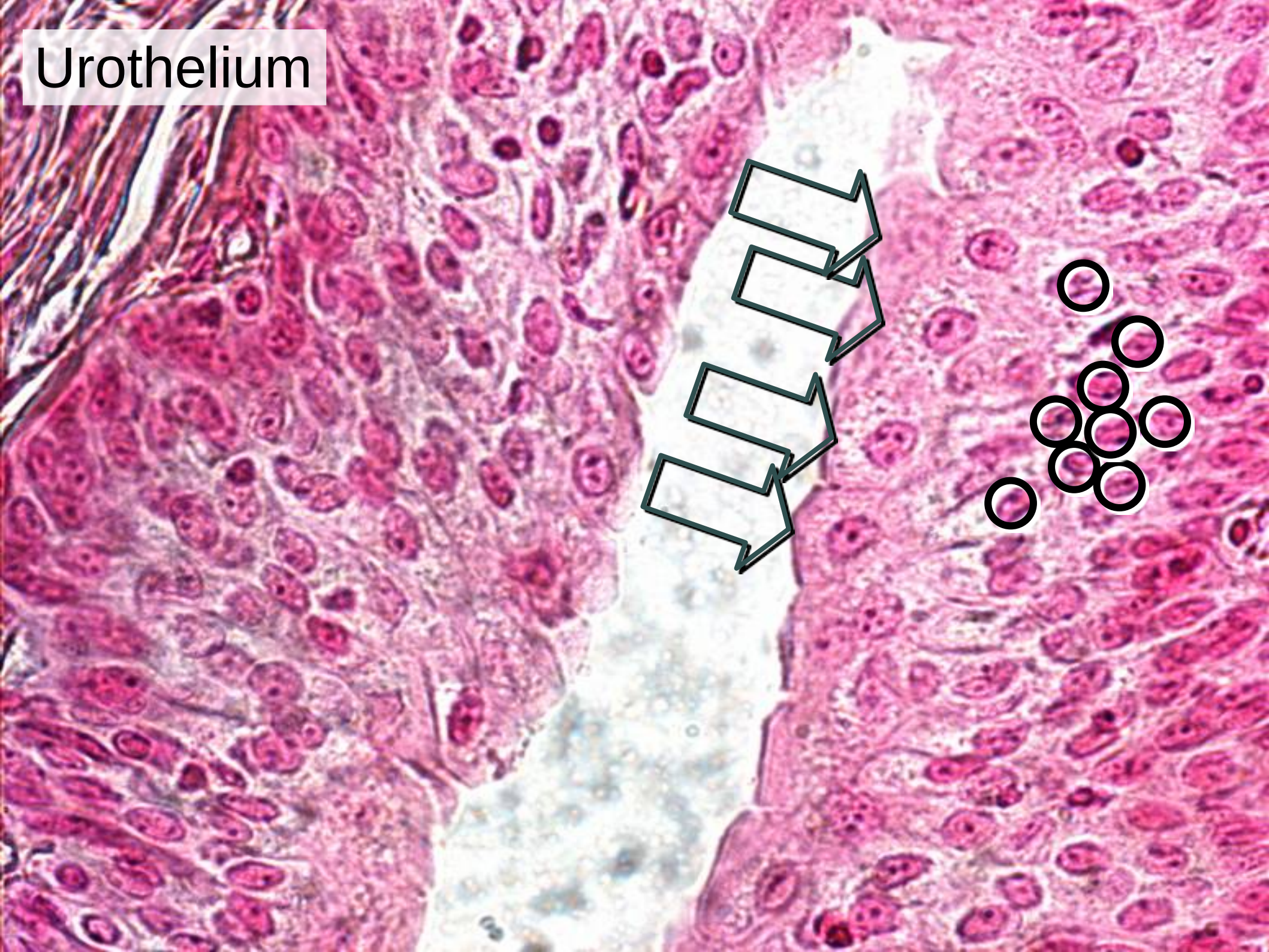
Columnar cell

Goblet cell

Ciliated columnar cell

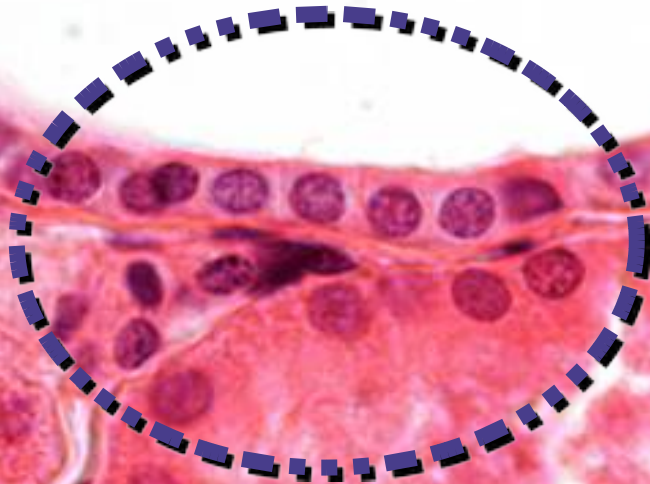
Basal cell

Urothelium



Cuboidal epithelium

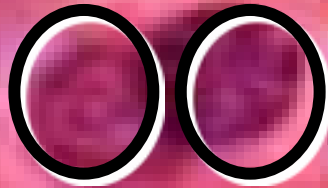
LUMEN



LUMEN

Simple

Cuboidal



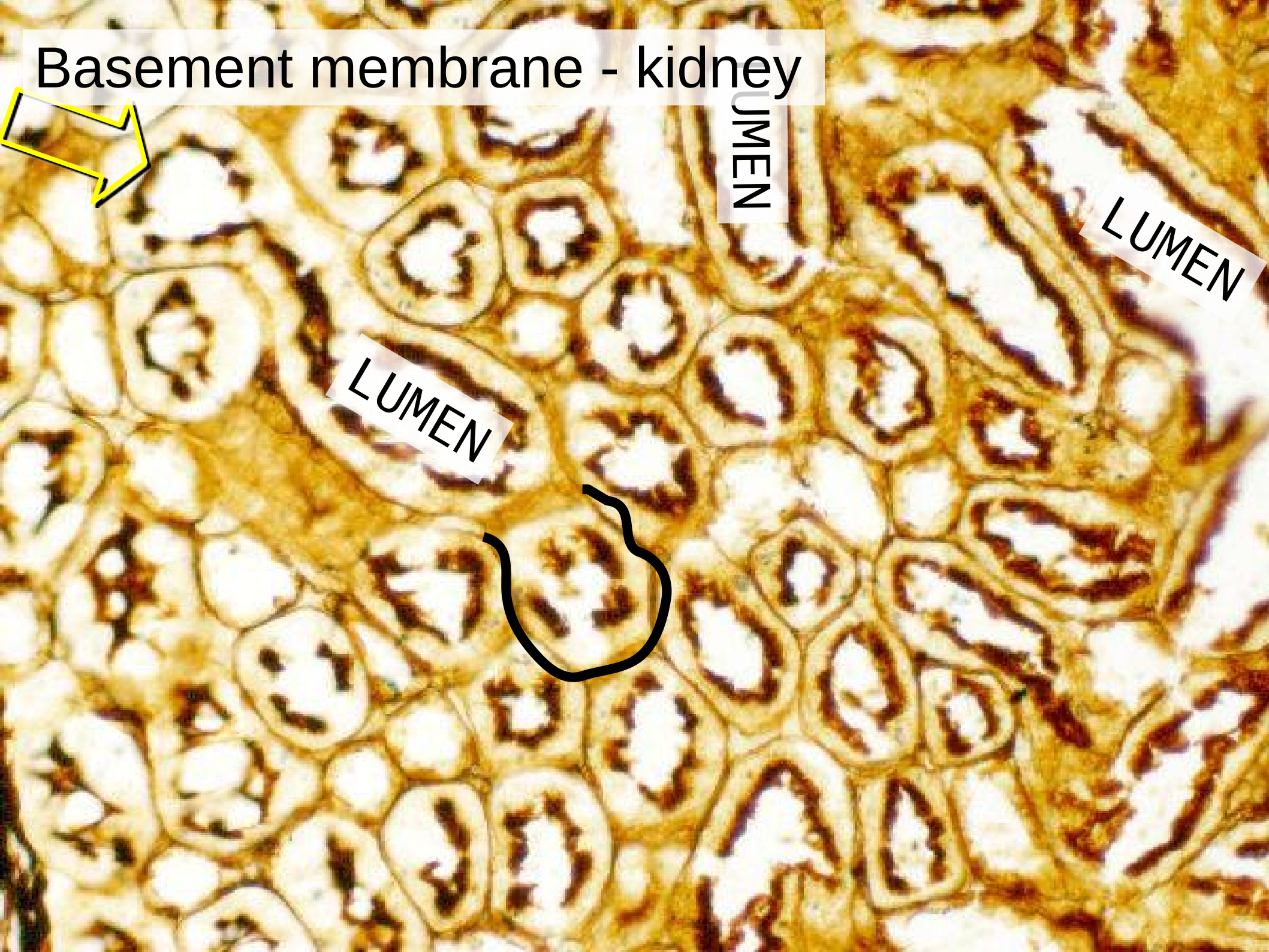
Basement membrane - kidney

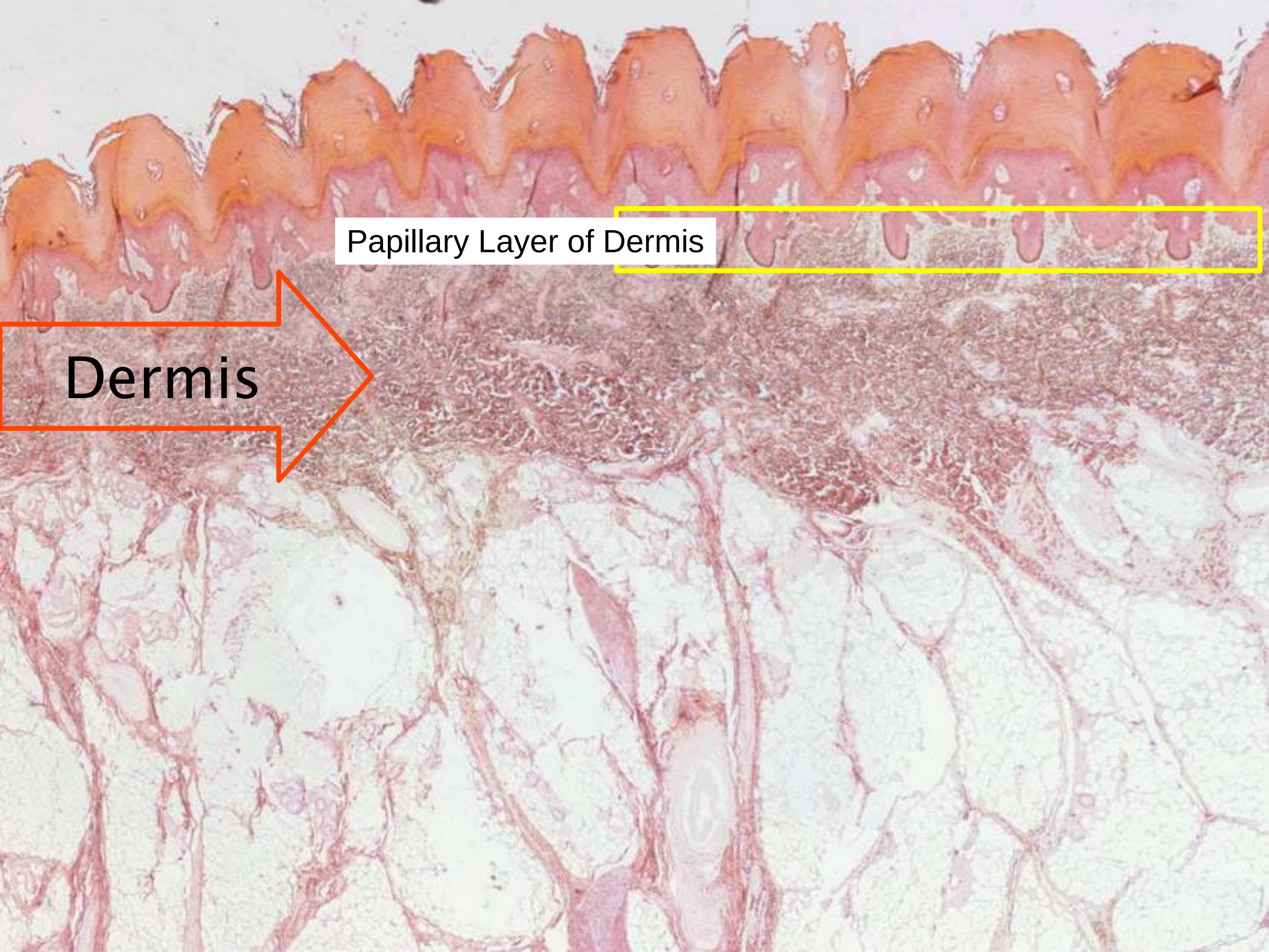


LUMEN

LUMEN

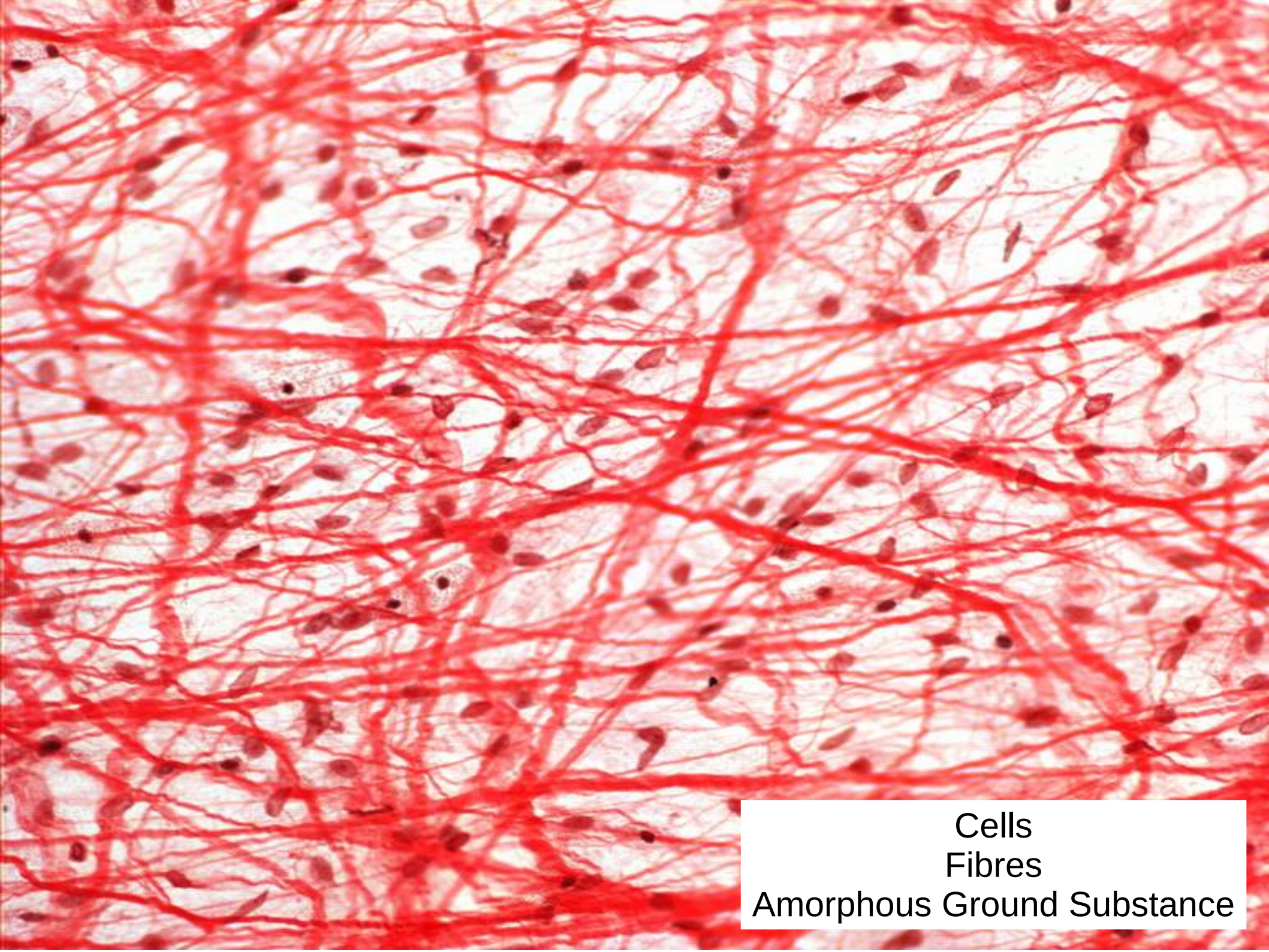
LUMEN





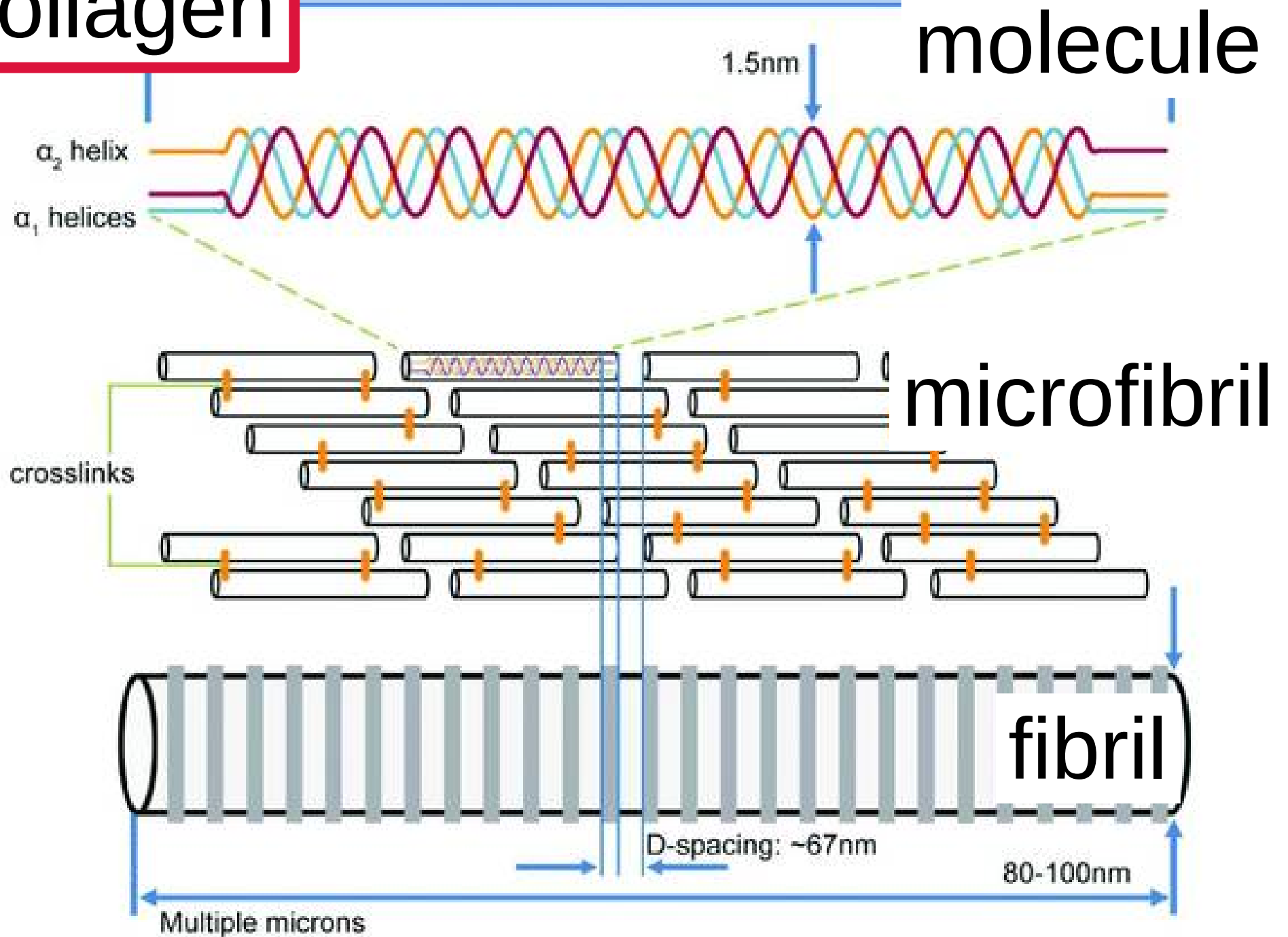
Papillary Layer of Dermis

Dermis



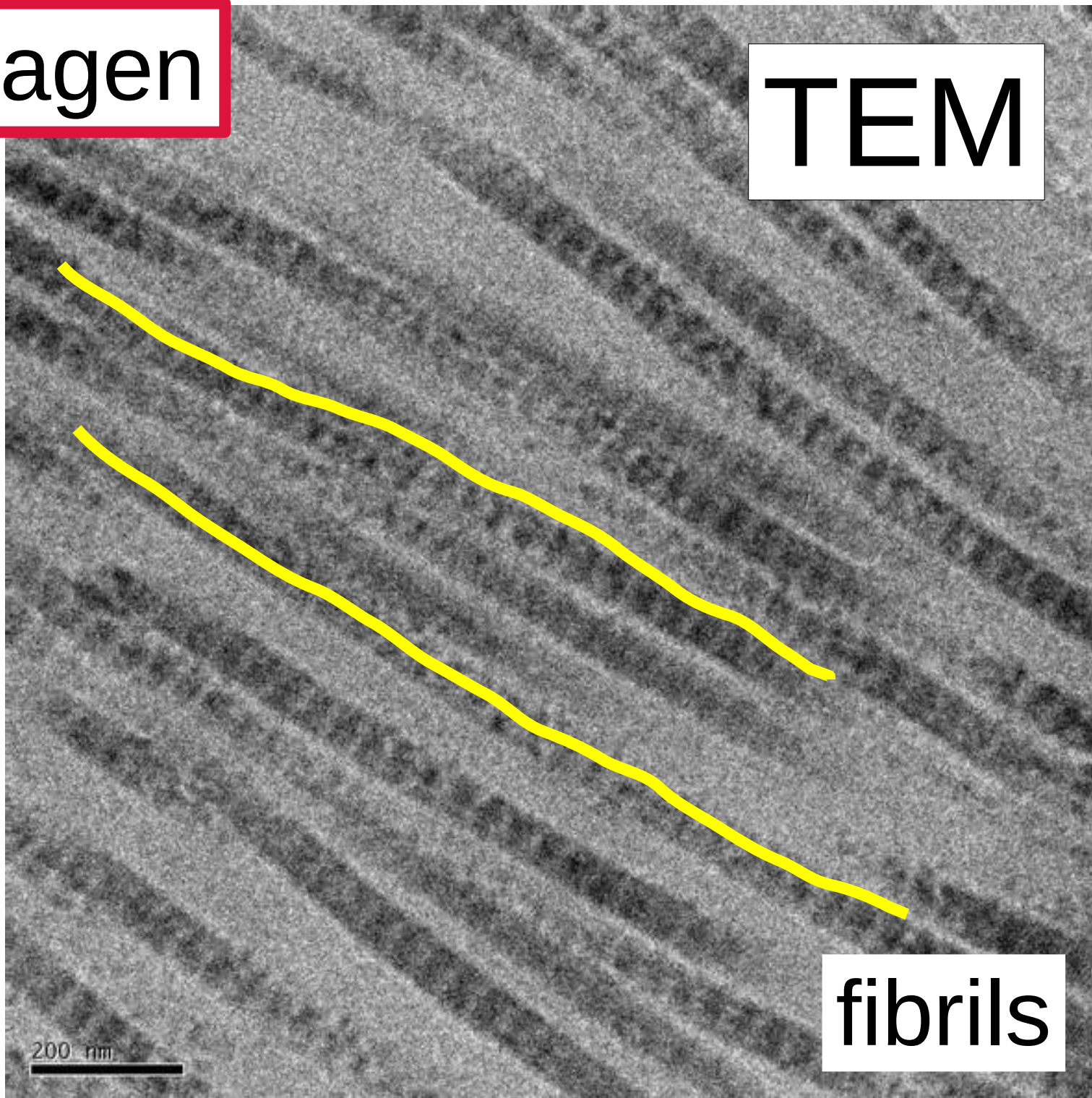
Cells
Fibres
Amorphous Ground Substance

Collagen



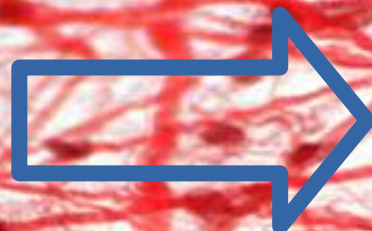
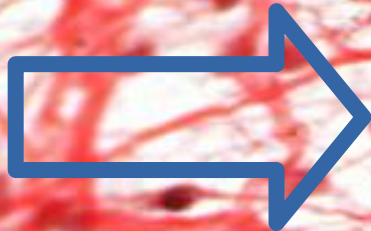
Collagen

TEM



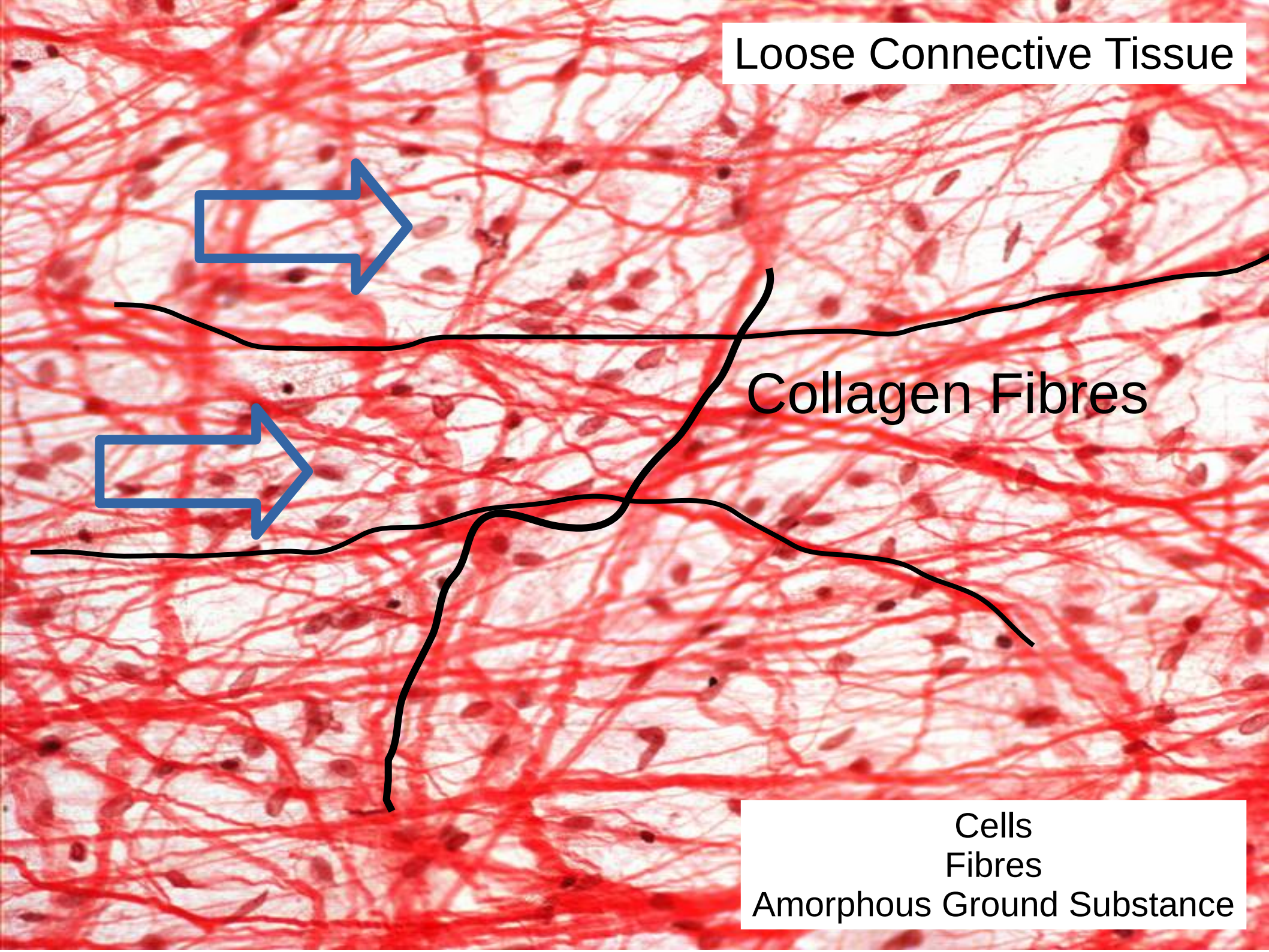
fibrils

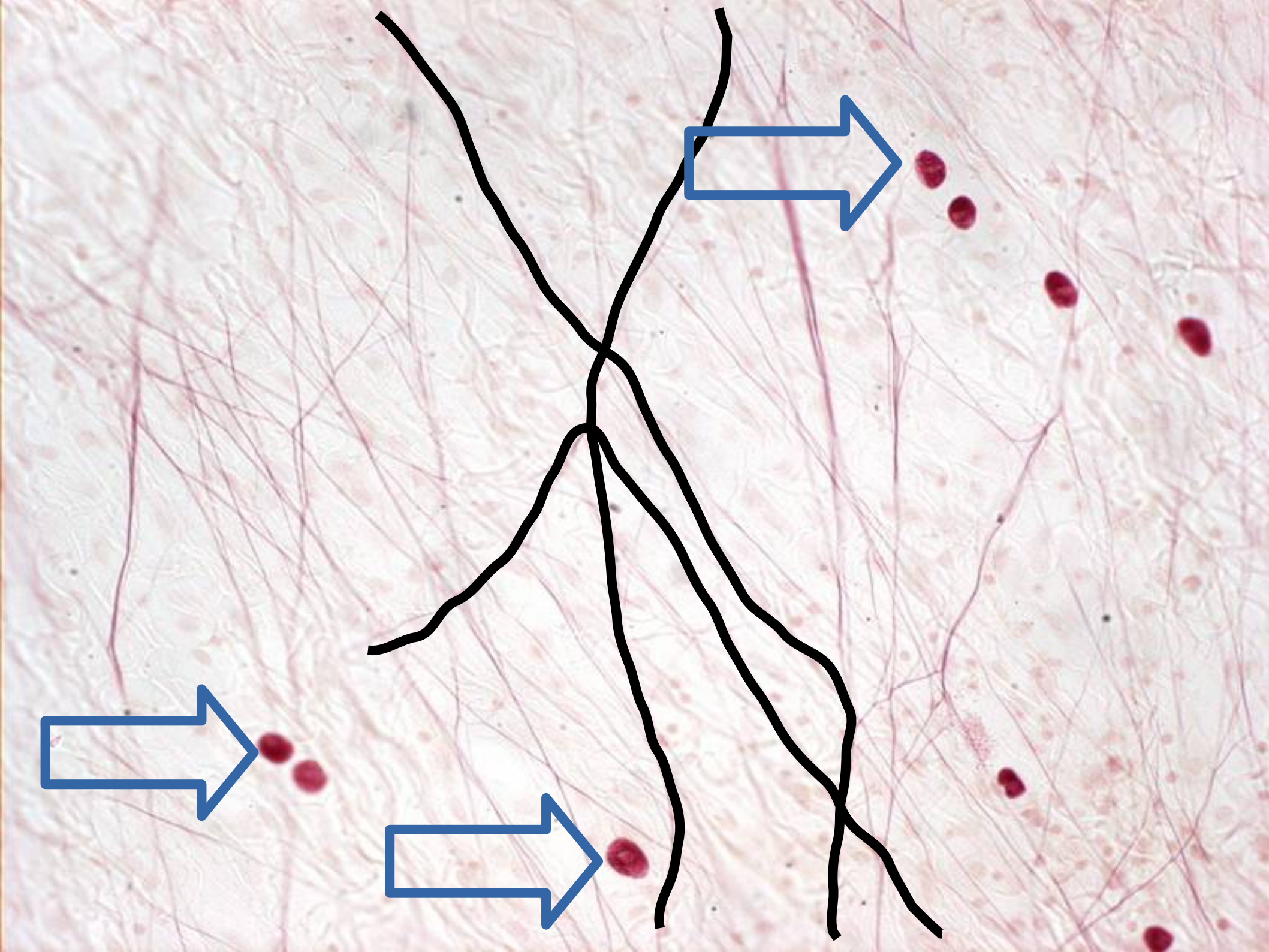
Loose Connective Tissue



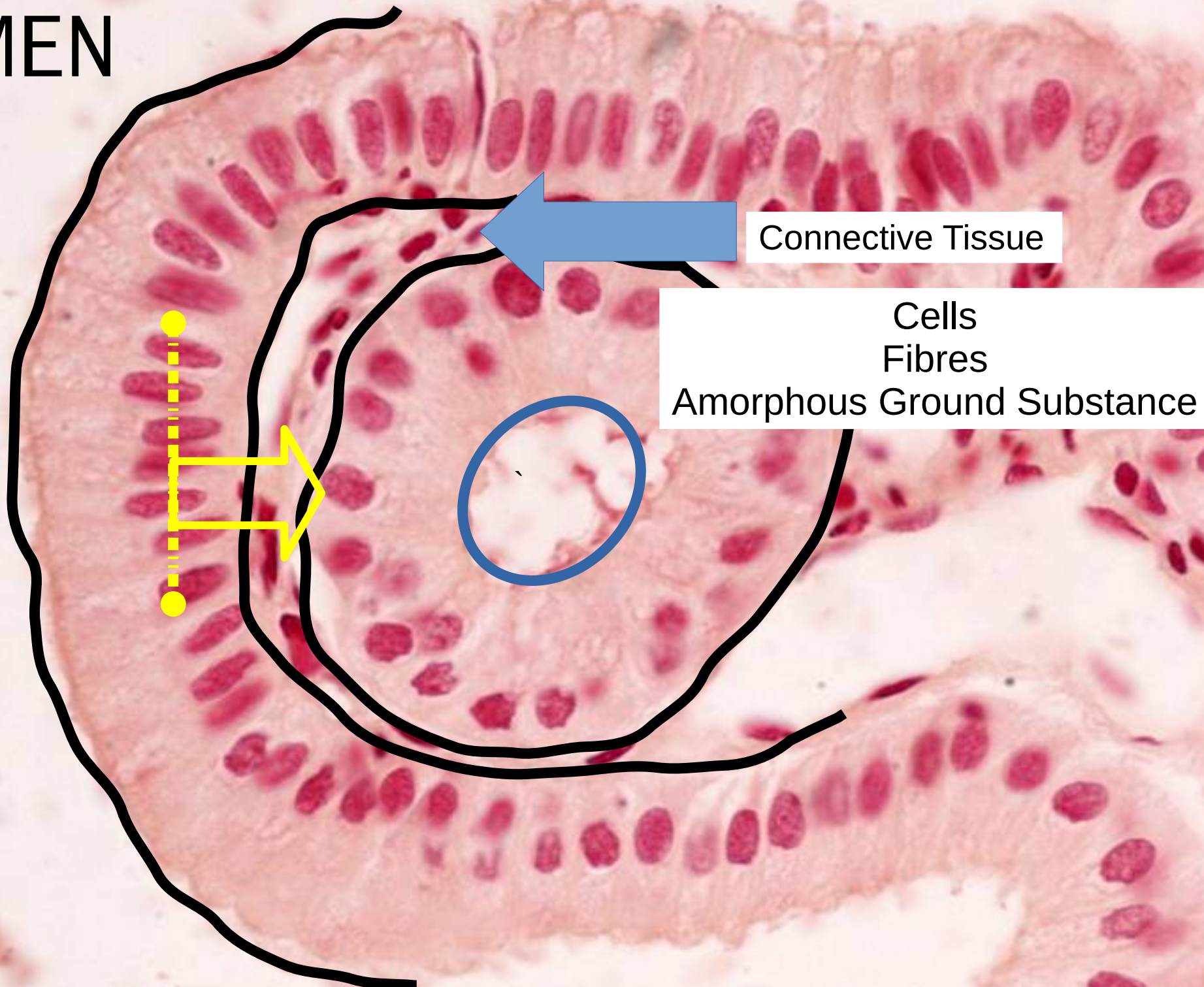
Collagen Fibres

- Cells
- Fibres
- Amorphous Ground Substance





LUMEN

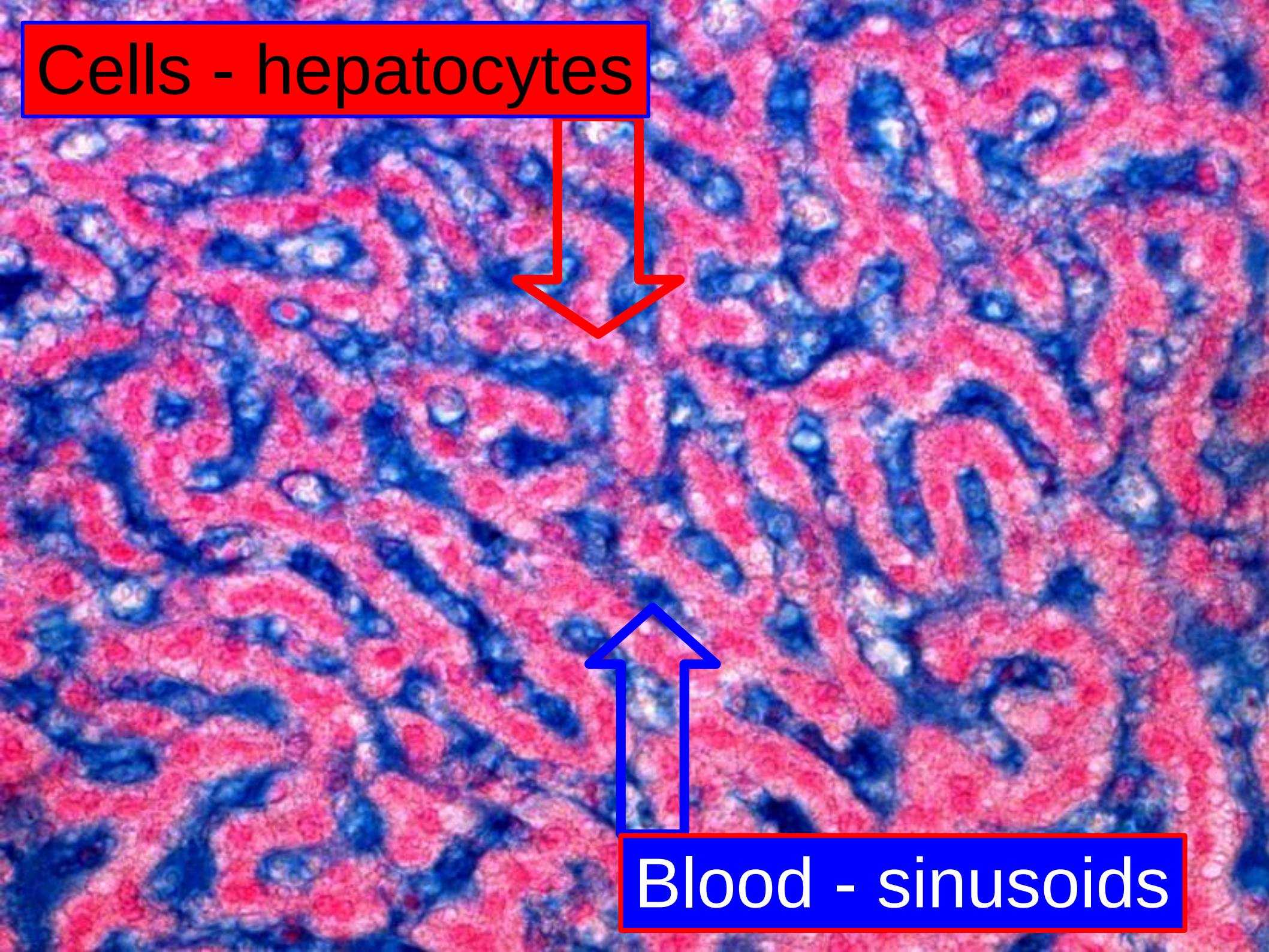


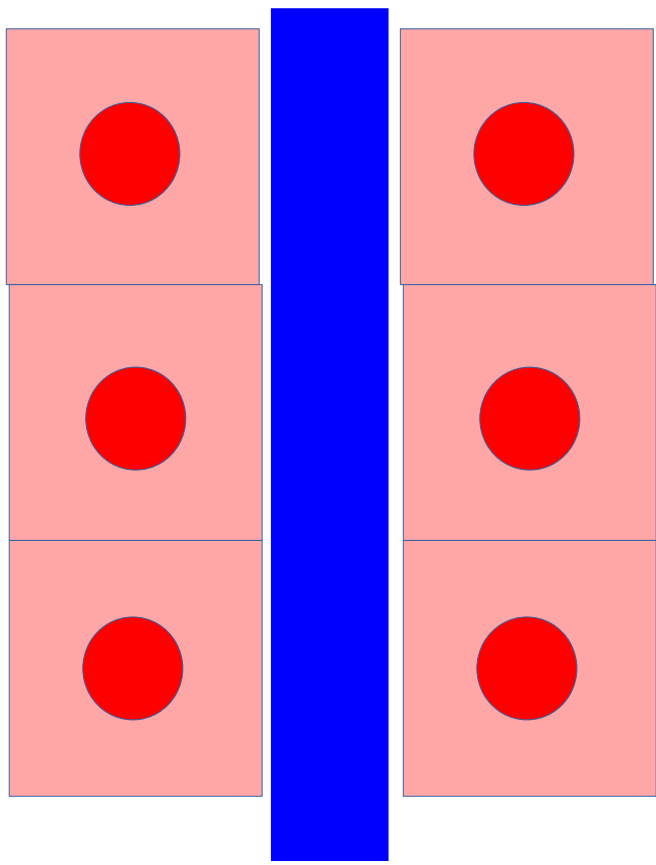
Connective Tissue

Cells
Fibres
Amorphous Ground Substance

Cells - hepatocytes

Blood - sinusoids



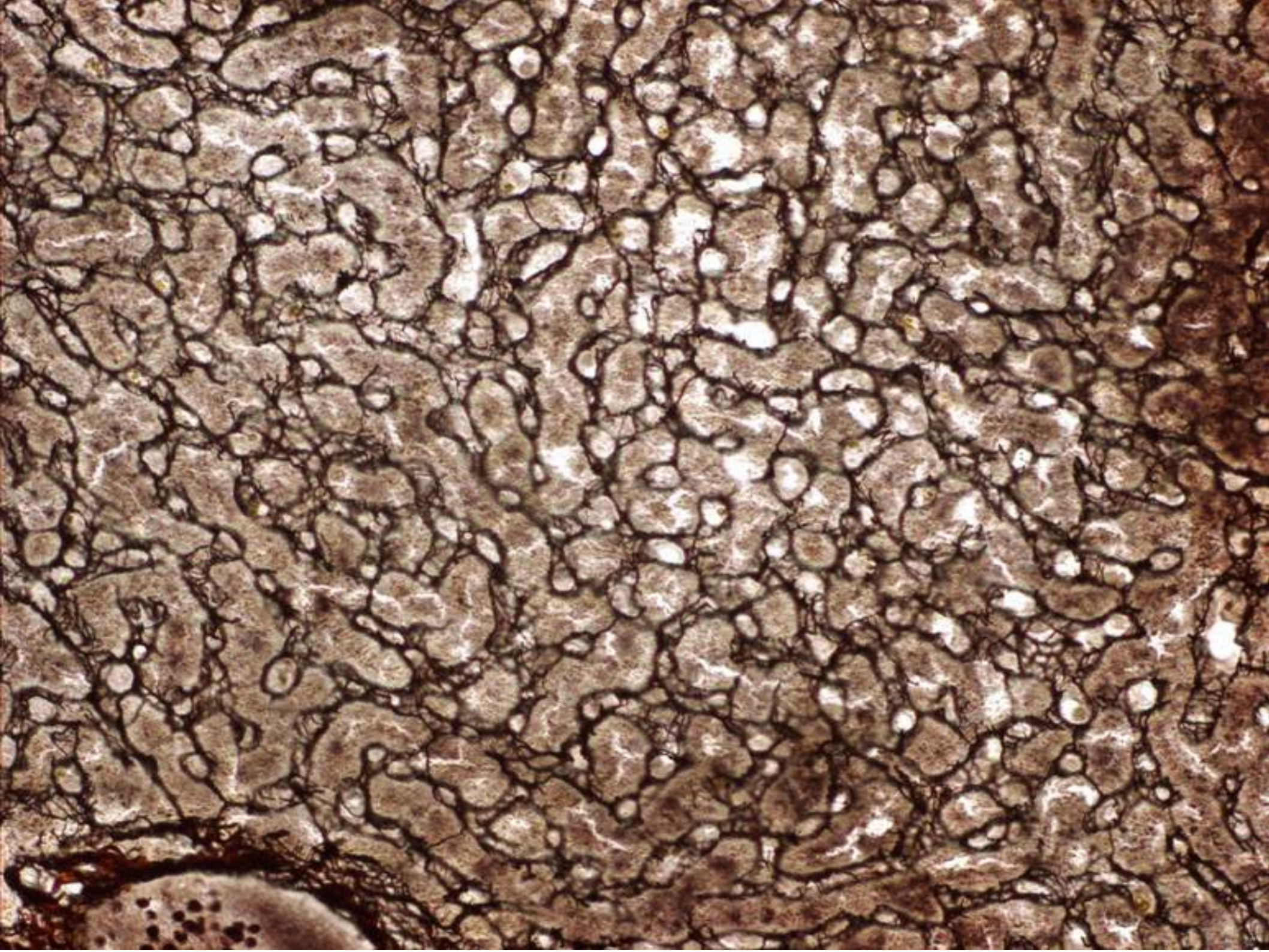


Cells - hepatocytes

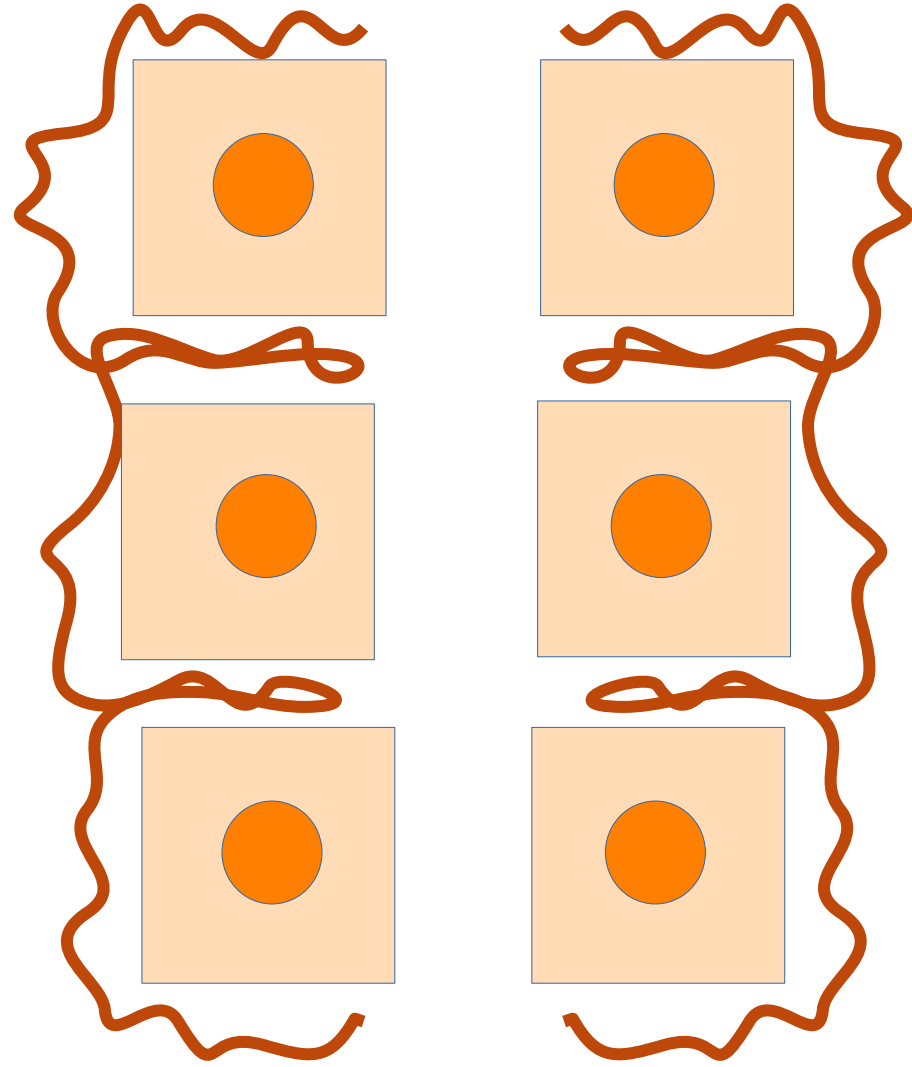
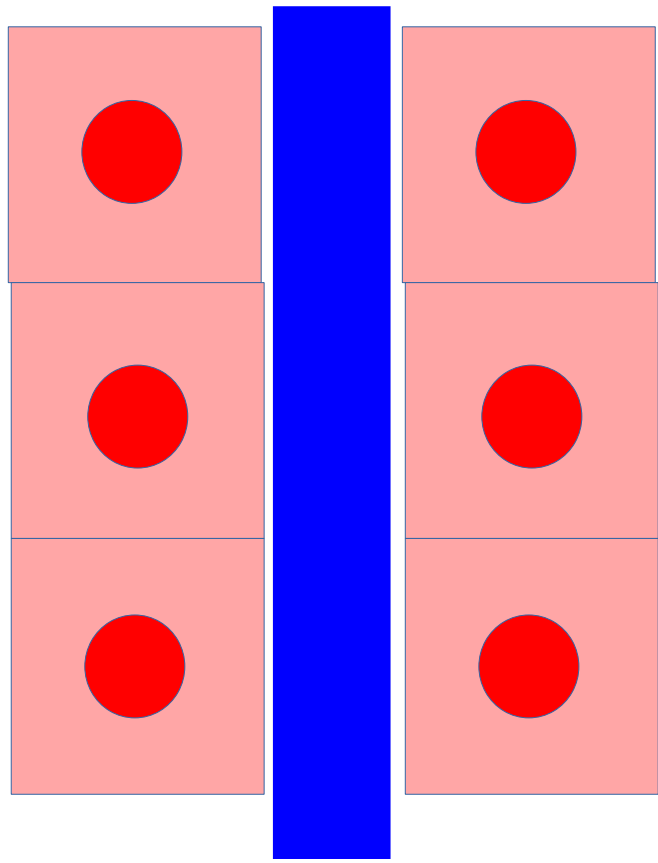
A microscopic image of liver tissue stained with Masson's trichrome. The hepatocytes are stained red, while the nuclei and reticular fibers are stained blue. A red arrow points from the top label to the hepatocytes, and a blue arrow points from the bottom label to the sinusoids.

Different stain – reticular fibres

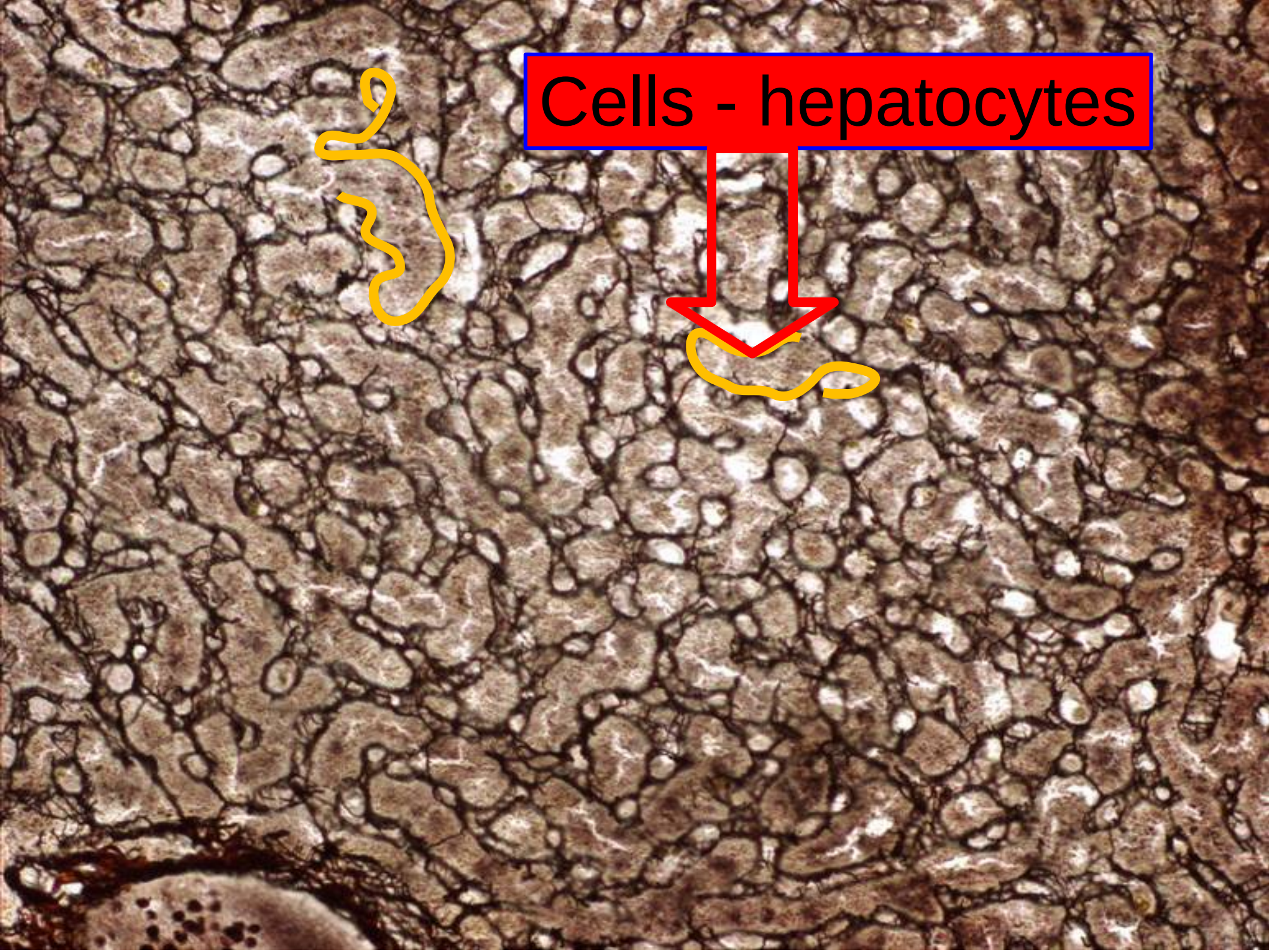
Blood - sinusoids



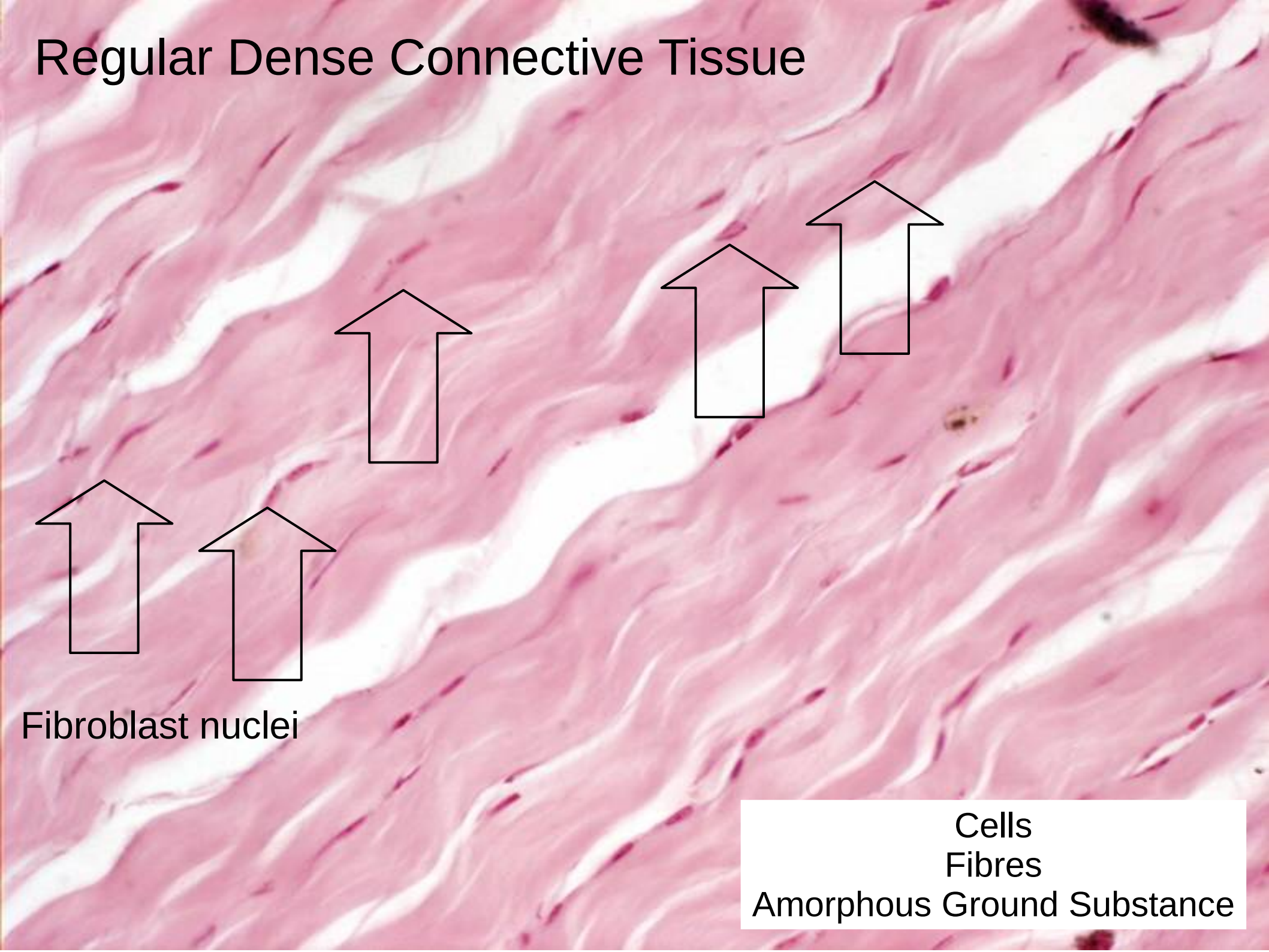




Cells - hepatocytes



Regular Dense Connective Tissue

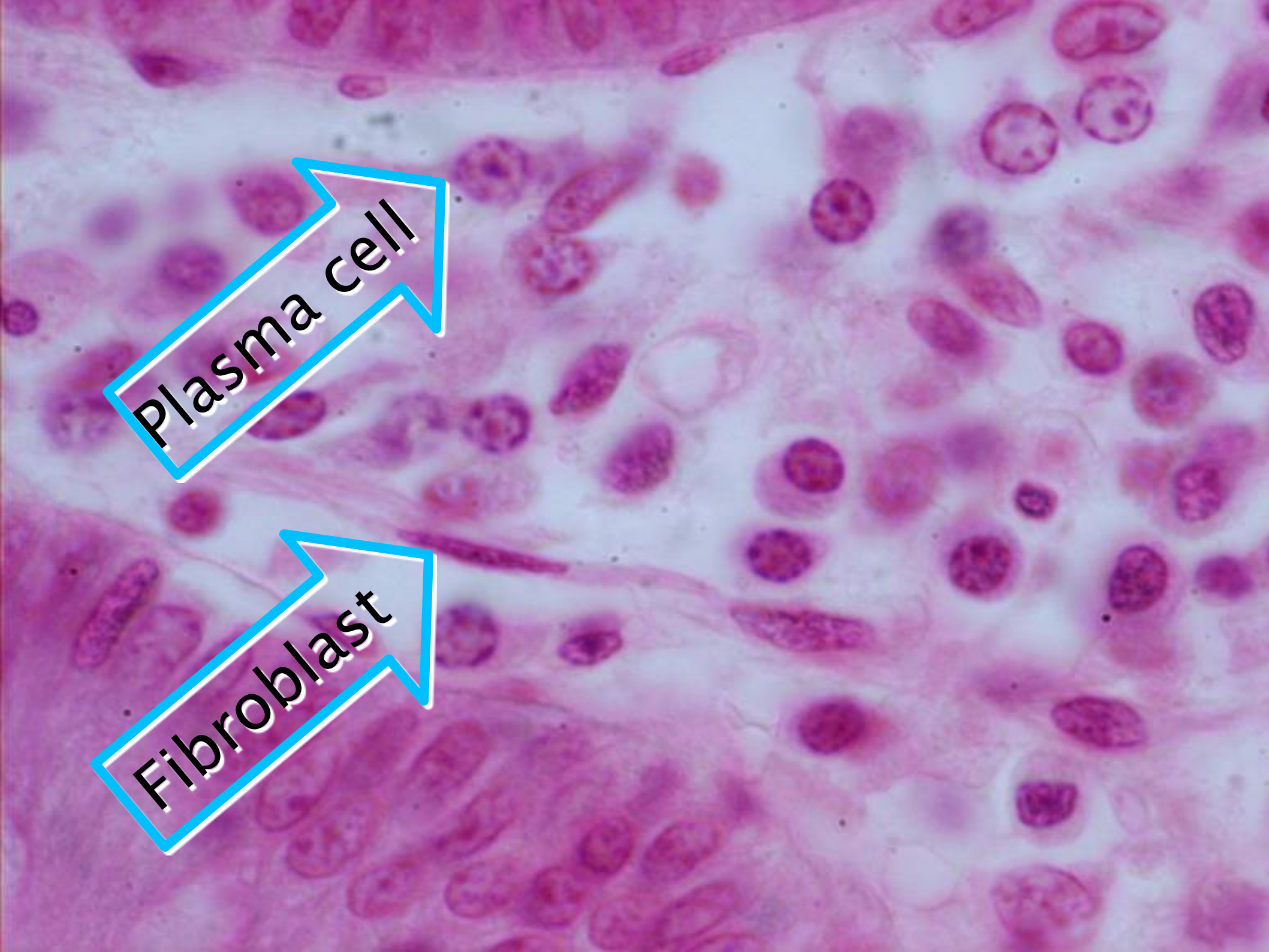


Fibroblast nuclei

Cells
Fibres
Amorphous Ground Substance

A light micrograph of a tissue section stained with hematoxylin and eosin (H&E). The image shows a dense network of pink-stained collagen fibers and various cells. A prominent feature is a large, pale-staining cell with a large, centrally located, reddish-brown nucleus and a granular cytoplasm, which is identified as a mast cell. A blue arrow points from the text 'Mast cell' to this specific cell. Other cells with more typical nuclei and less cytoplasmic detail are scattered throughout the field.

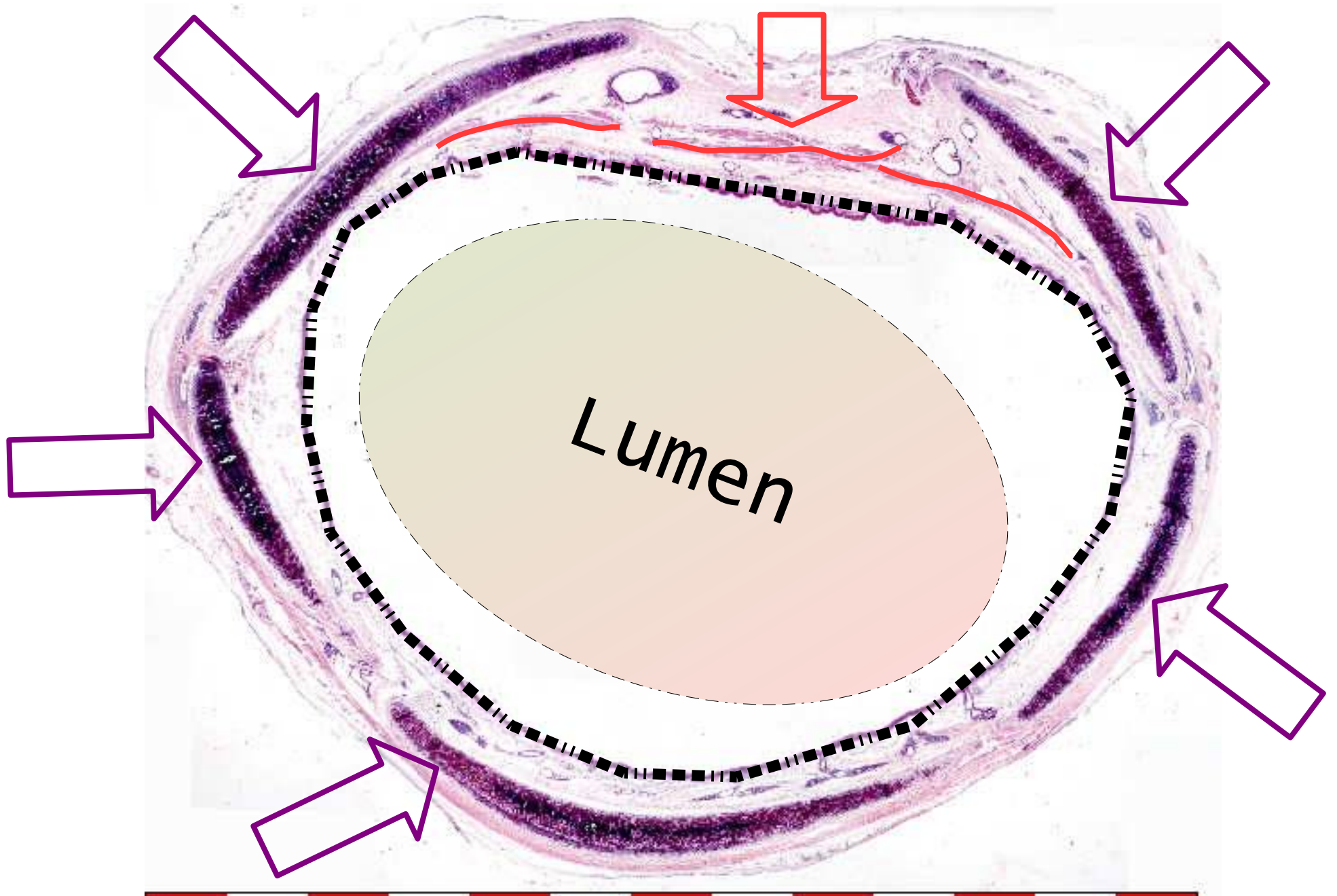
Mast cell



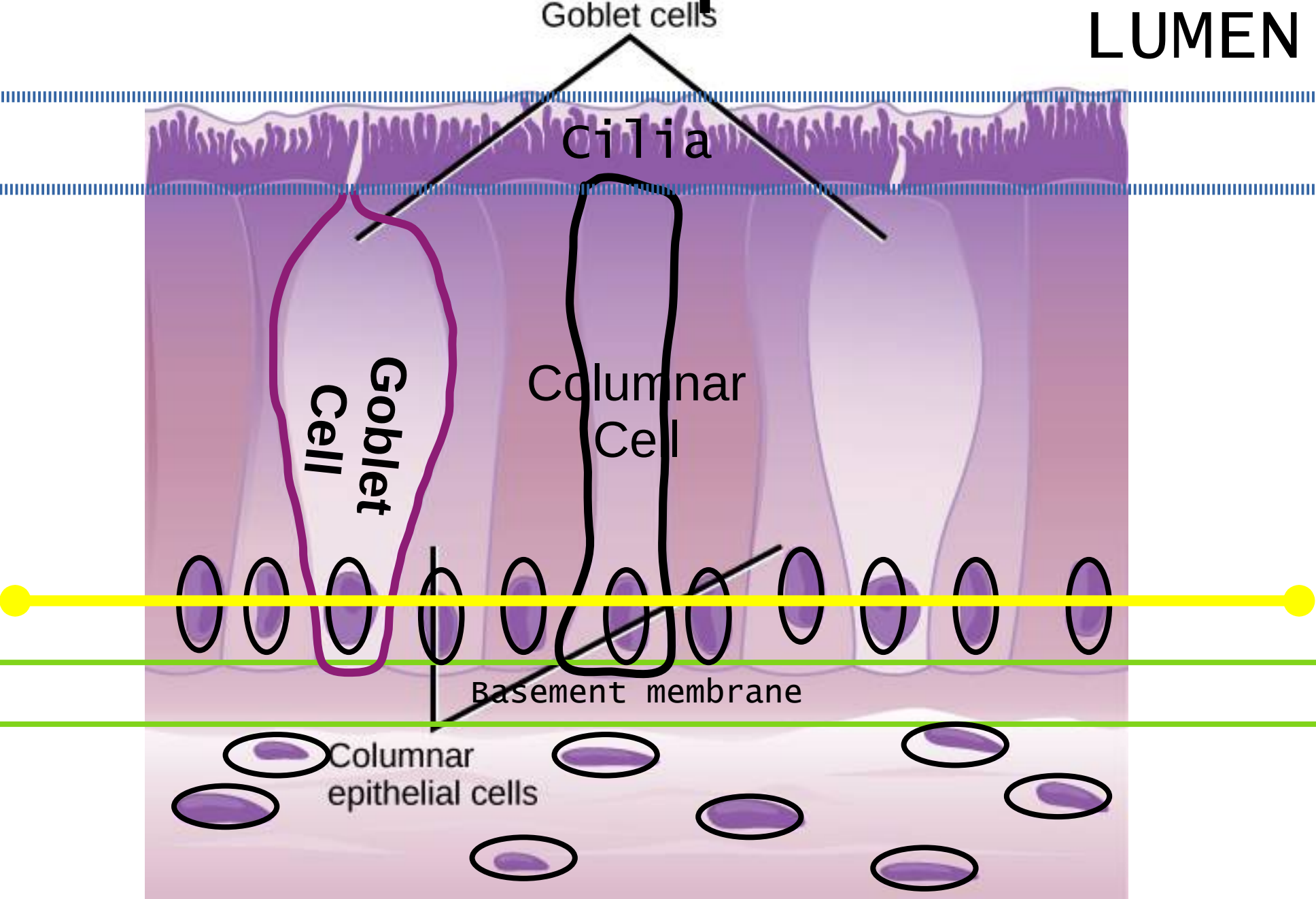
Plasma cell

Fibroblast

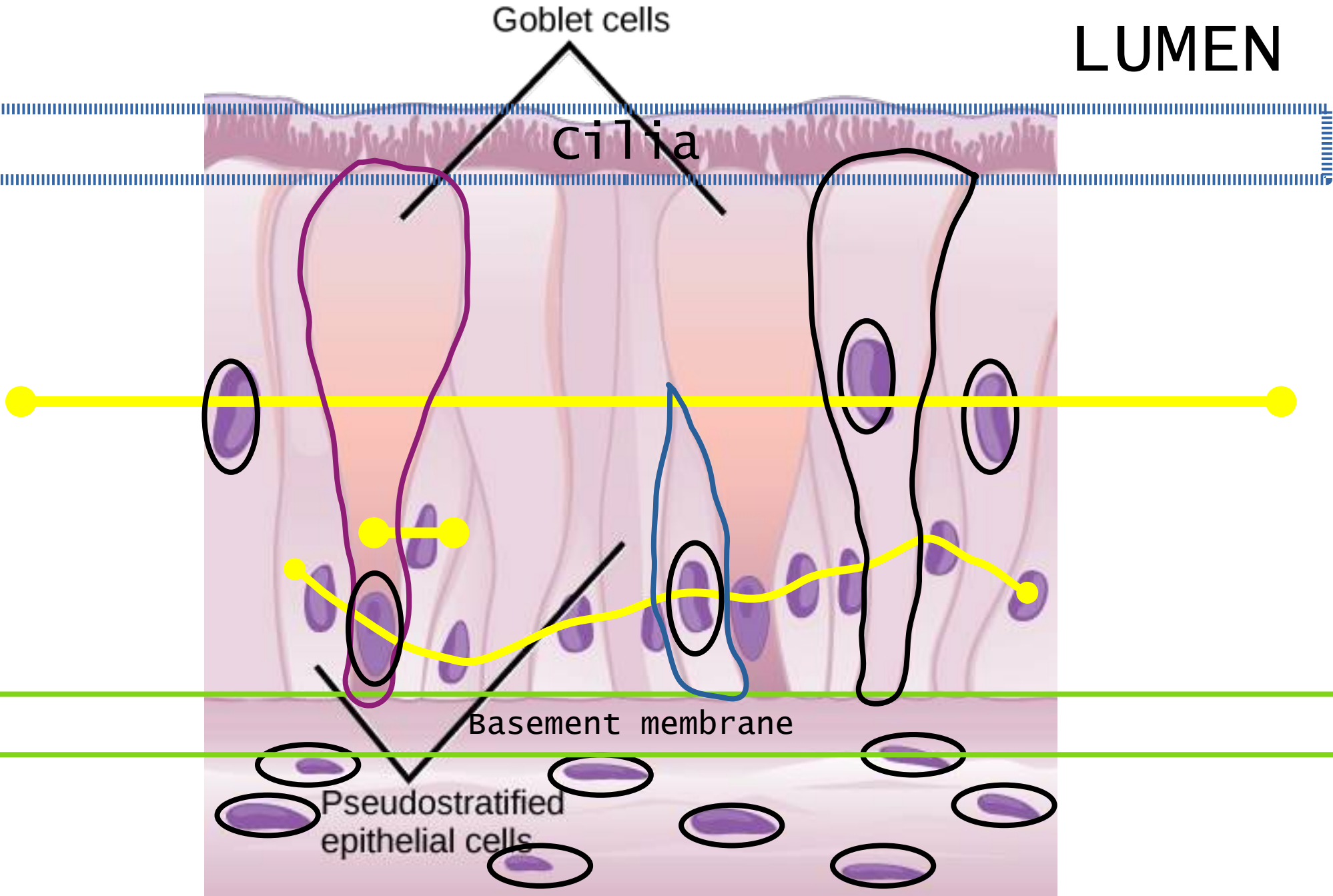
Slide 73: Macroscopic view of the trachea



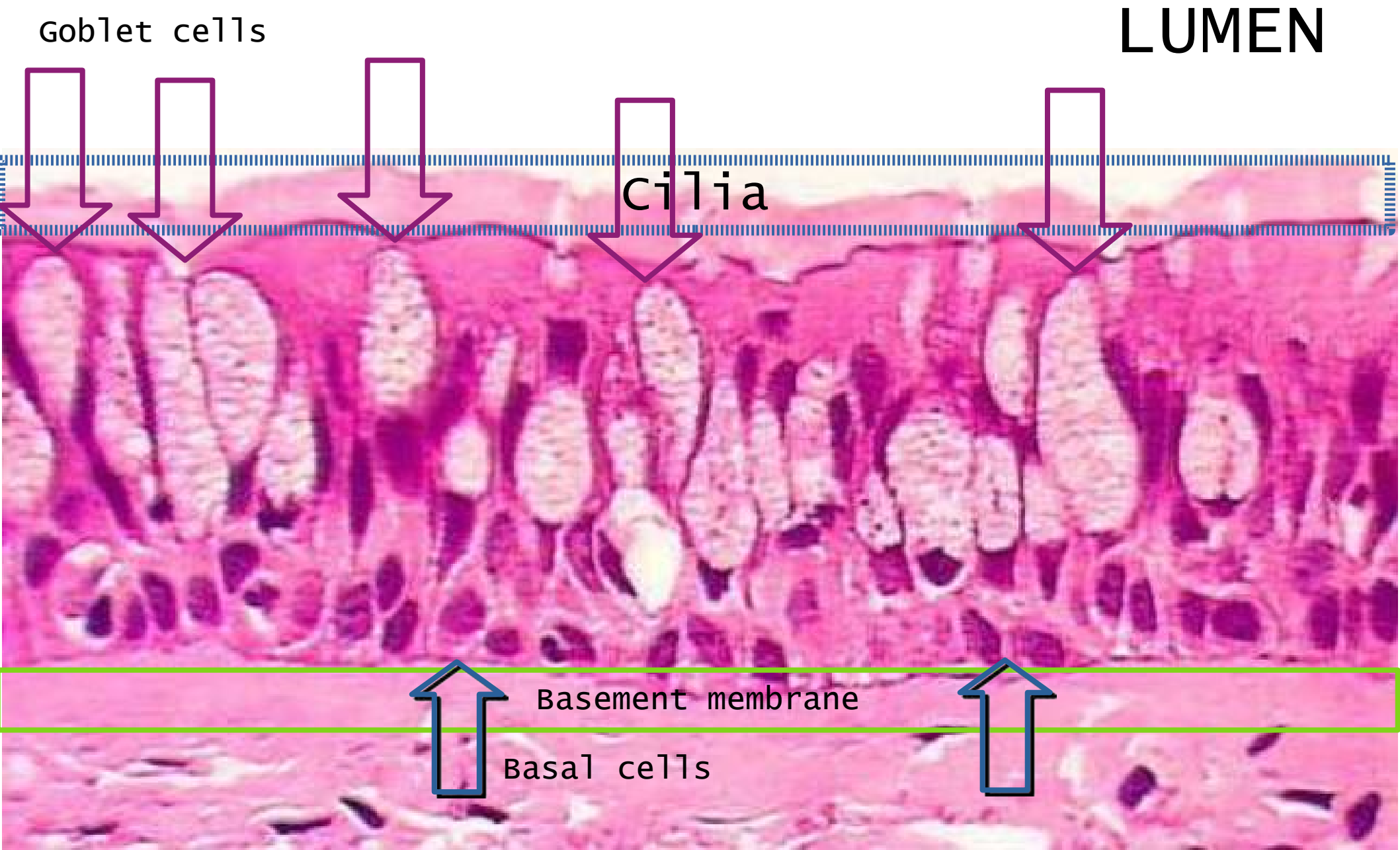
Columnar epithelium



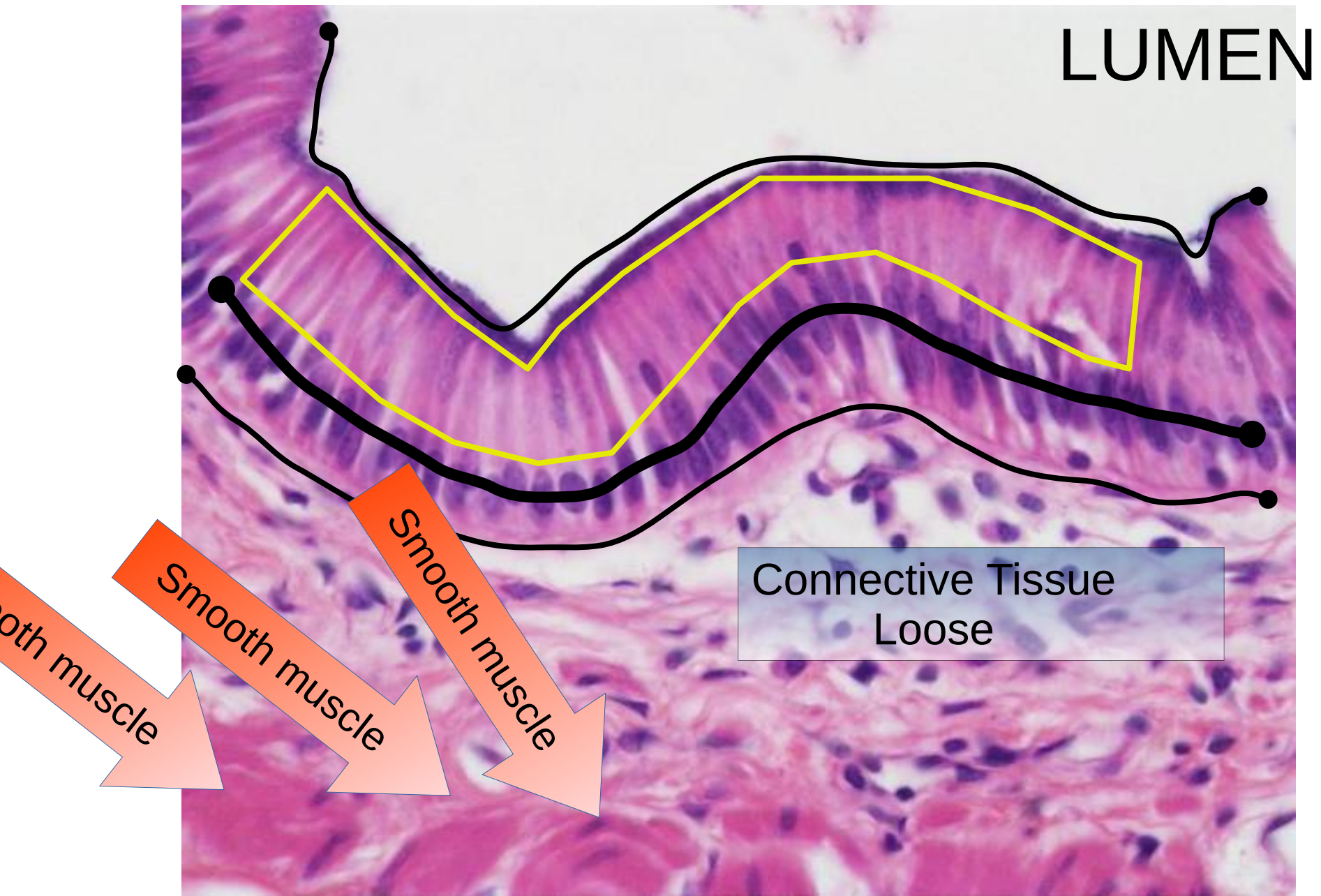
Pseudostratified columnar



Pseudostratified columnar



Columnar epithelium



Columnar epithelium



Slides for this week

Epithelia

Connective tissues

Epithelia

- Mesothelium: Slide 3
- Endothelium: Slide 93
- Endothelium: Slide 41
- Simple cuboidal epithelium: Slide 76
- Simple columnar epithelium: Slide 58
- Simple ciliated columnar epithelium: Slide 97
- Pseudostratified ciliated columnar epithelium: Slide 73
- Thin stratified squamous unkeratinizing epithelium: Slide 29
- Thick stratified squamous unkeratinizing epithelium: Slide 31
- Stratified squamous keratinizing epithelium: Slide 93
- Urothelium: Slide 78
- Urothelium: Slide 79


Basal membrane & general connective tissue

- Basal lamina (kidney): Slide 8
- Connective tissue cells: Slide 42
- Fat cells: Slide 5
- Gelatinous connective tissue: Slide 100
- Loose connective tissue for collagen fibers: Slide 6
- Loose connective tissue for elastic fibers: Slide 30
- Reticular fibers (liver): Slide 48
- Loose connective tissue (section): Slide 94
- Fatty connective tissue: Slide 93
- Dense irregular connective tissue: Slide 94
- Dense regular connective tissue: Slide 17


Glandular Epithelium

When can we



A histological section of the colon stained with hematoxylin and eosin (H&E). The image displays the mucosal layer with prominent, finger-like mucosal folds (crypts) extending into the lumen. Each crypt is lined by a simple columnar epithelium. The crypts are separated by deep, narrow grooves. The underlying submucosa is visible as a lighter, less cellular layer. The overall structure is characteristic of the large intestine's mucosal lining.

Slide 42 - Colon

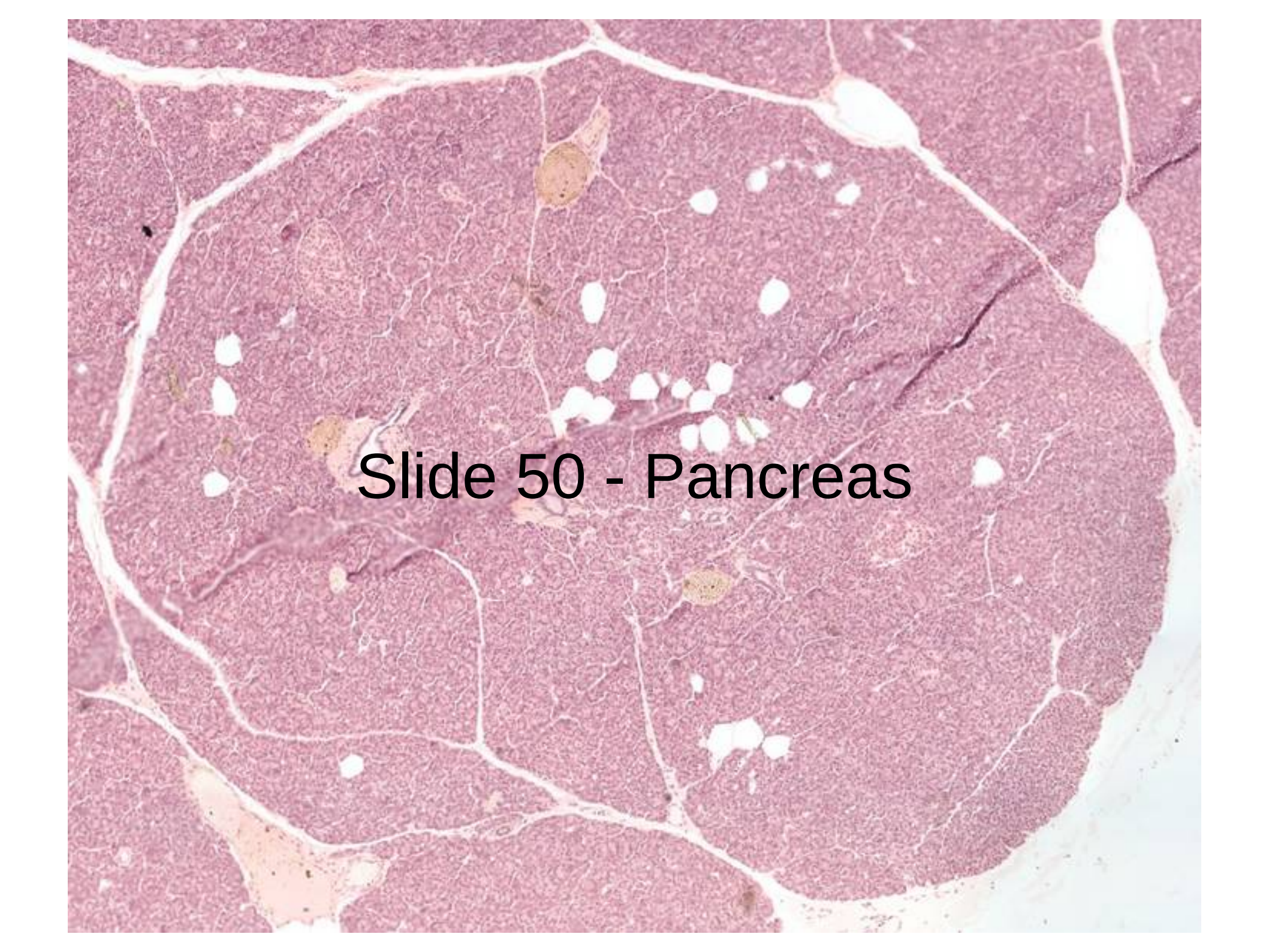


Slide 7 – Tongue

This histological slide shows a cross-section of a tongue. The surface is covered by a thick, stratified squamous epithelium, which is stained pink. Below the epithelium is a layer of connective tissue, also stained pink, containing various structures such as blood vessels and nerves. The overall appearance is that of a dense, fibrous tissue structure.



Slide 39 – Pharyngeal tube

A low-magnification light micrograph of a cross-section of a pancreas. The image shows a large, roughly circular lobule of acinar tissue, which is stained a deep pinkish-purple. The lobule is separated from the surrounding tissue by a thin layer of connective tissue. In the center of the lobule, there is a cluster of small, pale, circular structures, likely representing the main pancreatic duct or a branch of it. The overall appearance is that of a well-organized, lobulated organ.

Slide 50 - Pancreas



Slide 52 – Pituitary gland

A low-magnification histological section of an adrenal gland, stained with hematoxylin and eosin (H&E). The gland is shown in a longitudinal section, revealing its characteristic three-layered structure. The outermost layer is the adrenal cortex, which is densely stained pink and shows a clear boundary with the surrounding connective tissue capsule. The inner layer is the adrenal medulla, which is less densely stained and contains the chromaffin cells. The overall shape is elongated and somewhat irregular, with some internal branching or lobulation. The text "Slide 56 – Adrenal gland" is overlaid in the center of the image.

Slide 56 – Adrenal gland



Slide 55 – Thyroid gland

Analogies



Two systems

- Exocrine

- Endocrine

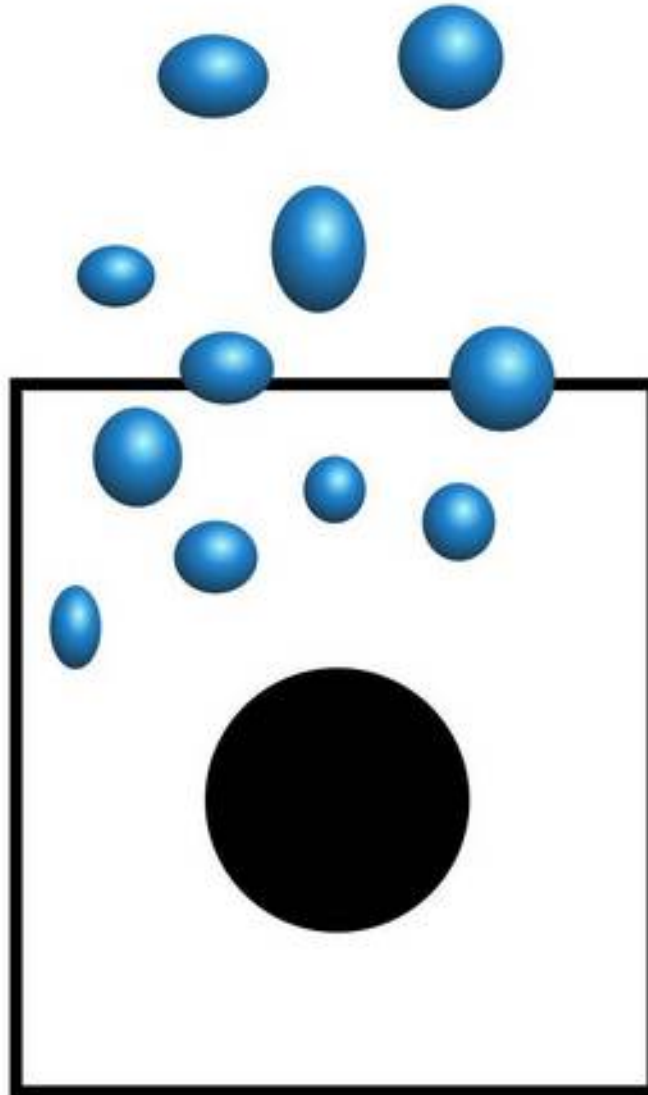
Exocrine

- Single cell
- Simple
 - Alveolar
 - Tubular
- Compound
 - Alveolar
 - Tubulo-alveolar
 - Tubular

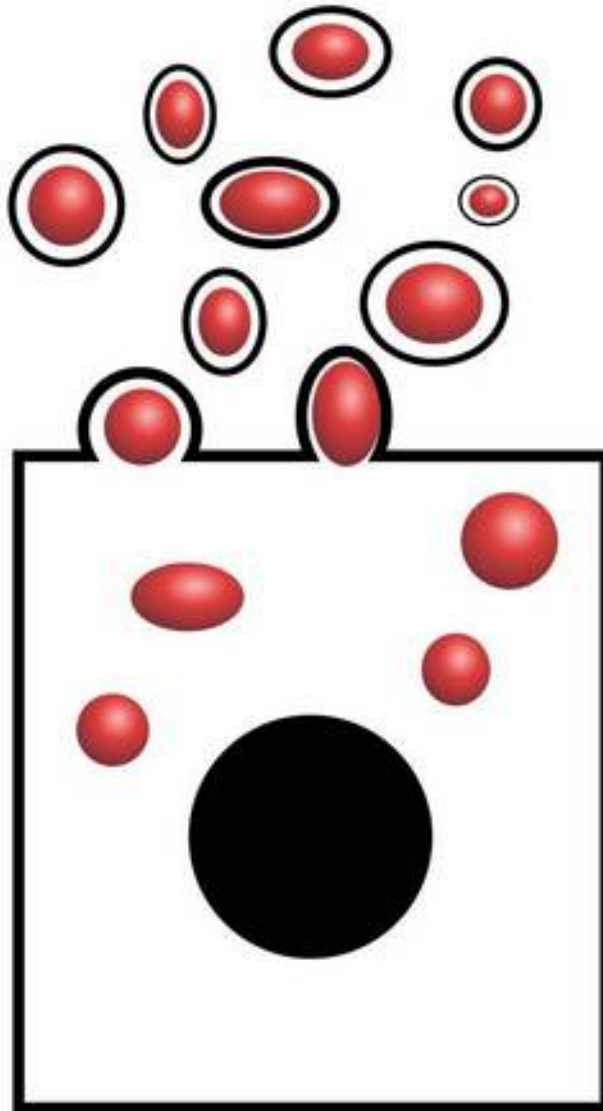
Modes of Secretion

- Merocrine
- Apocrine
- Holocrine

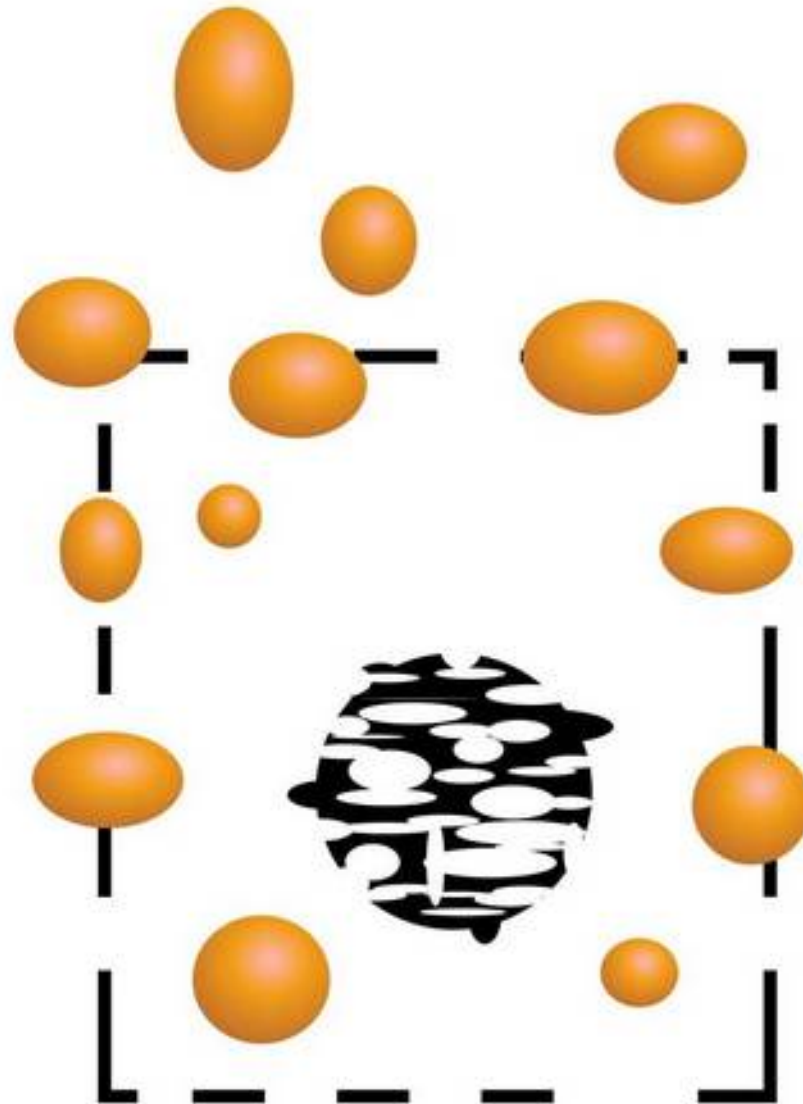
Merocrine



Apocrine



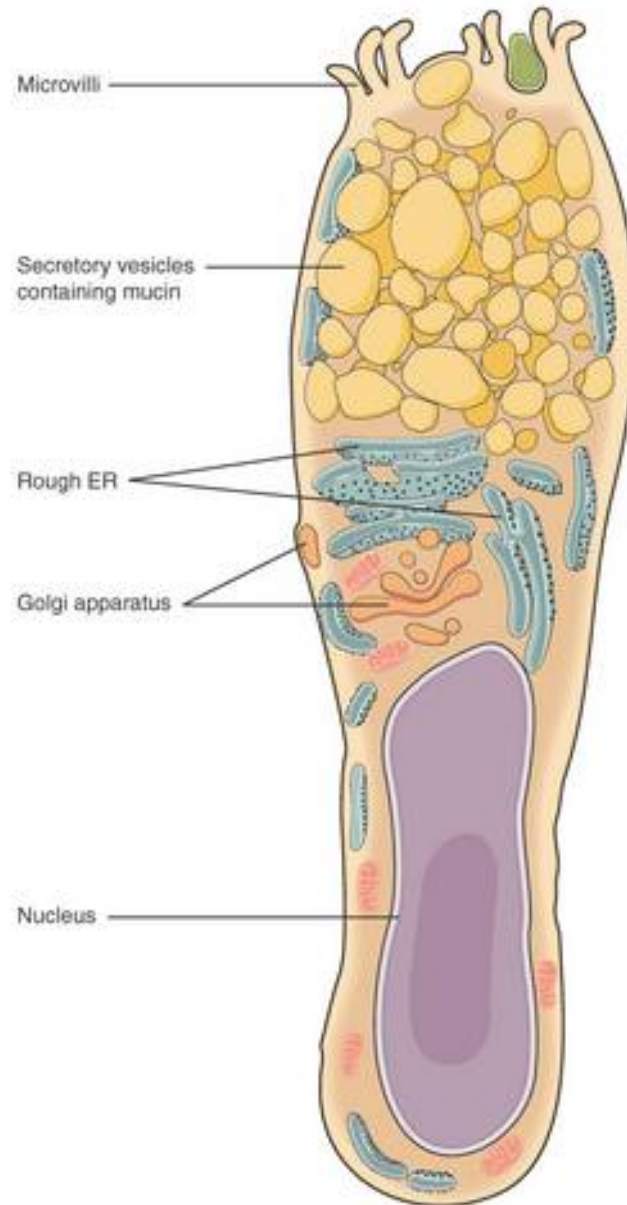
Holocrine

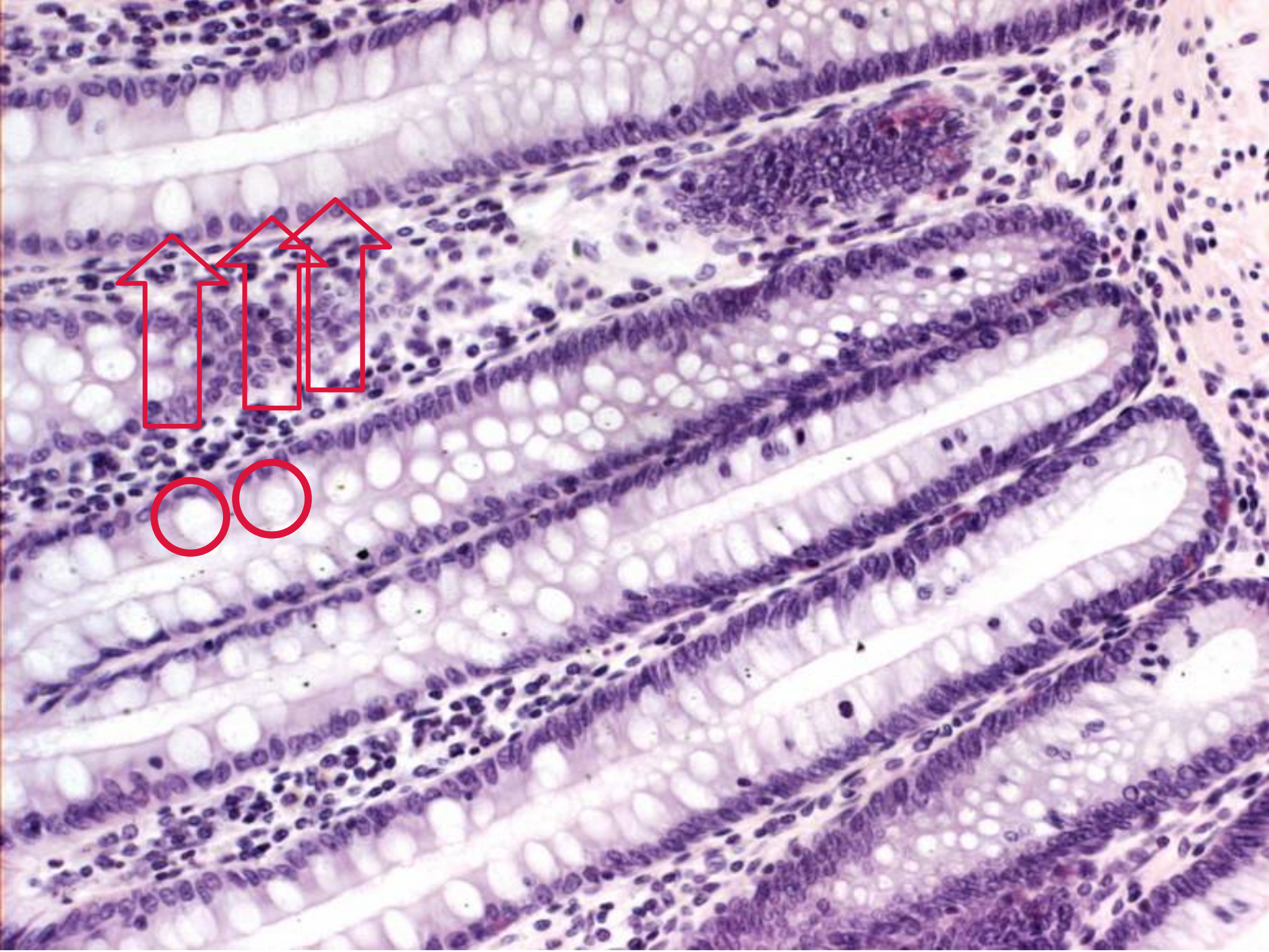


Epithelium Analogy

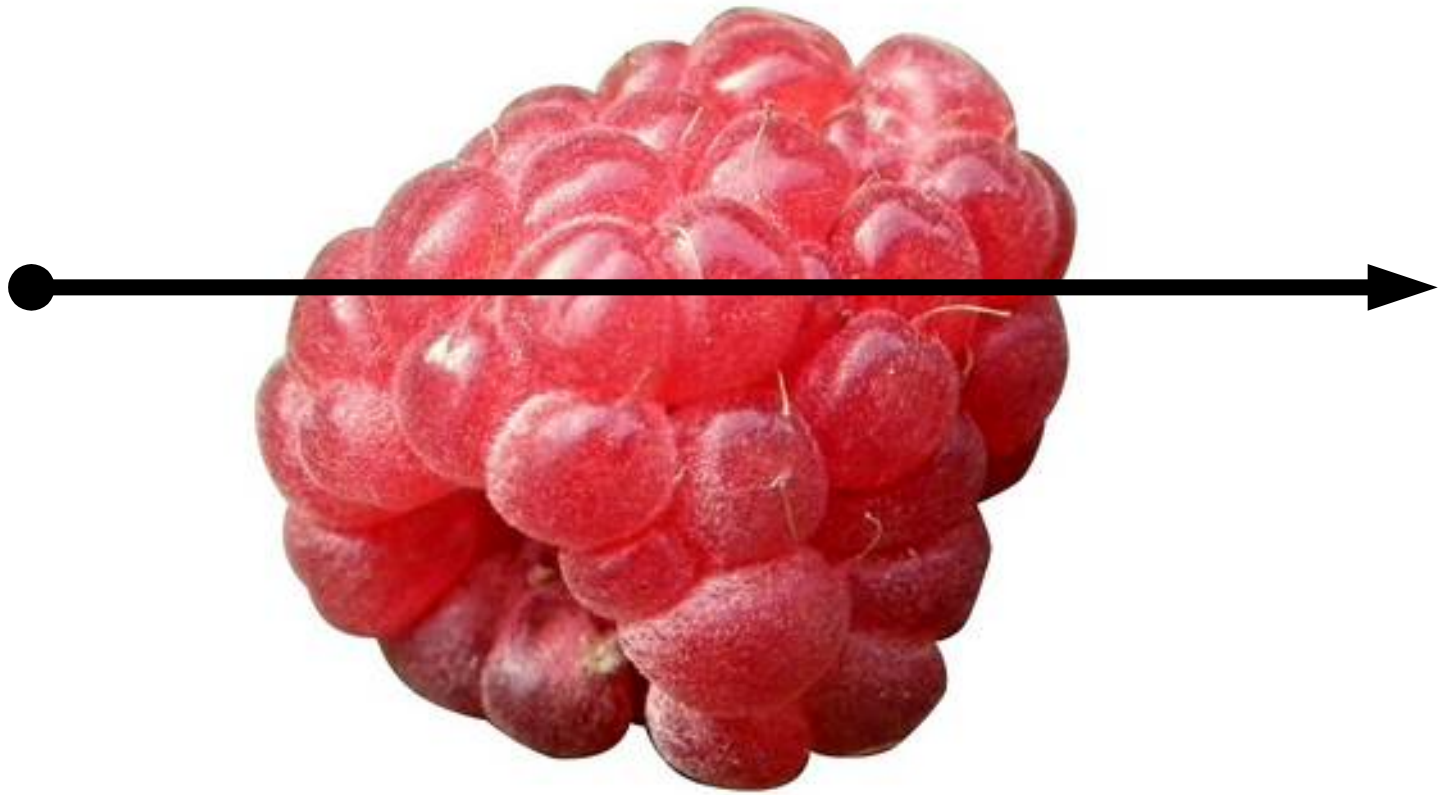


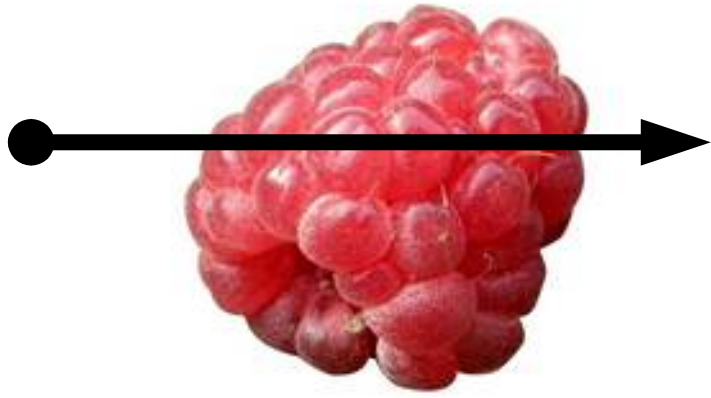
Single cell



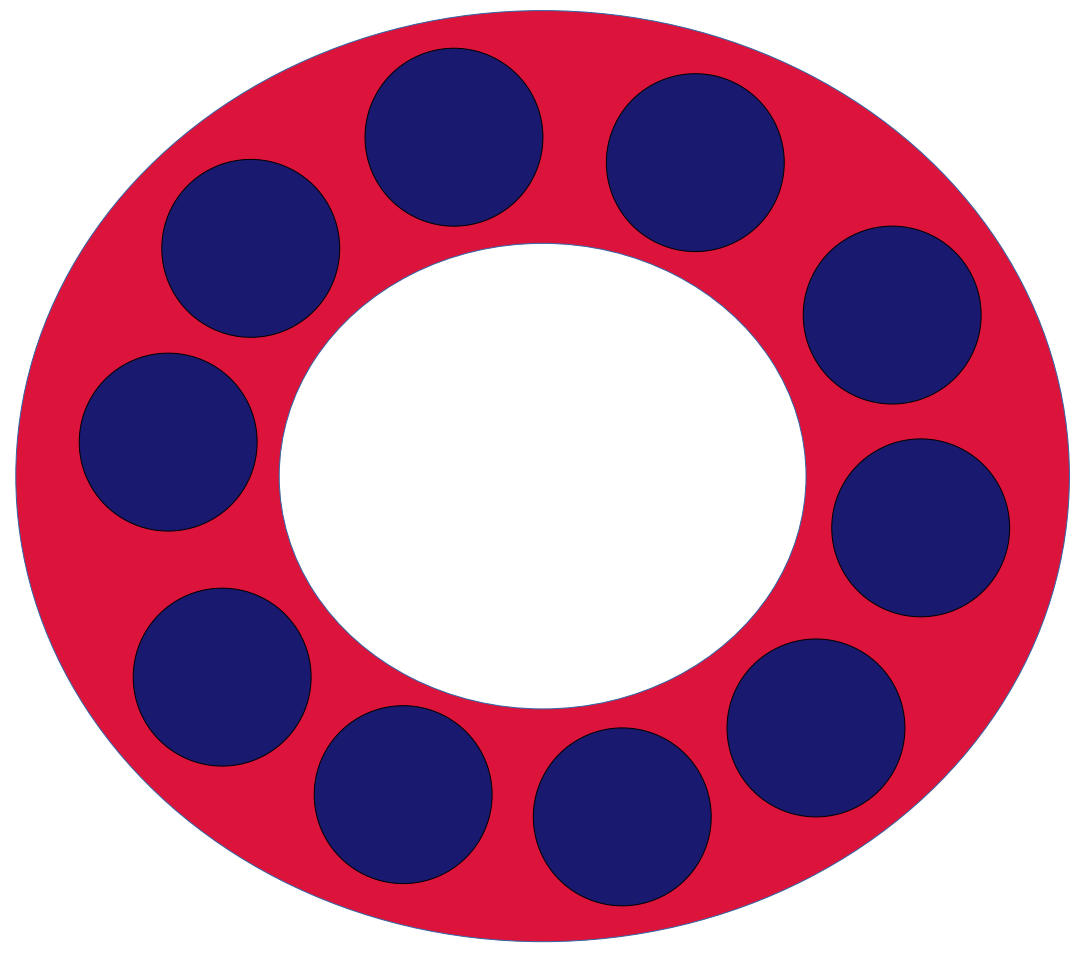


Alveolar

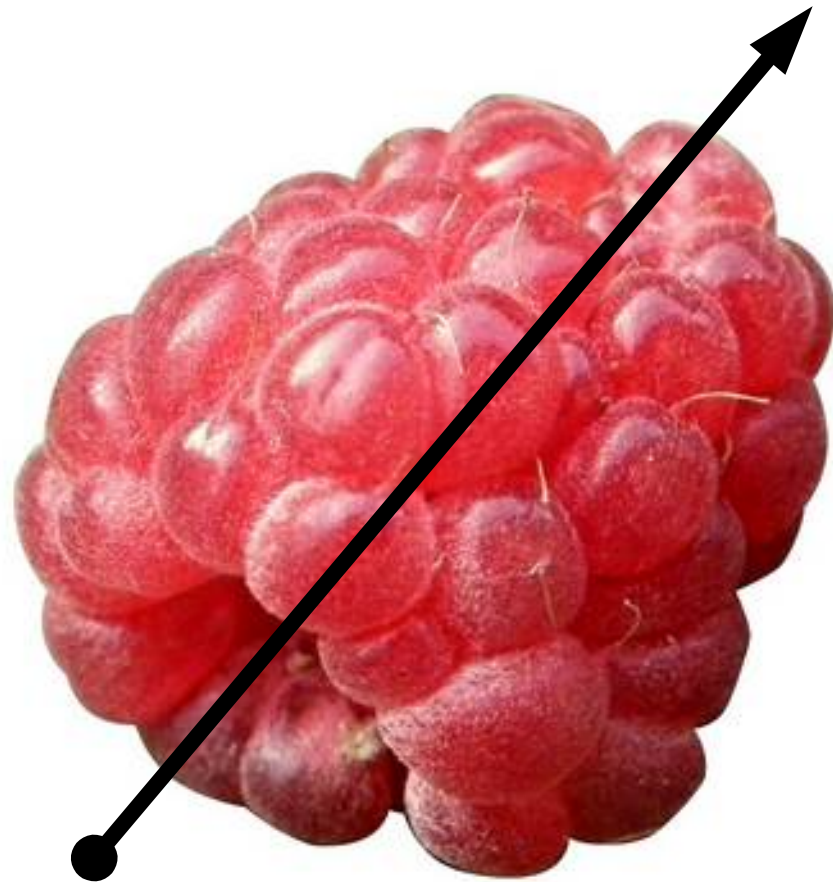


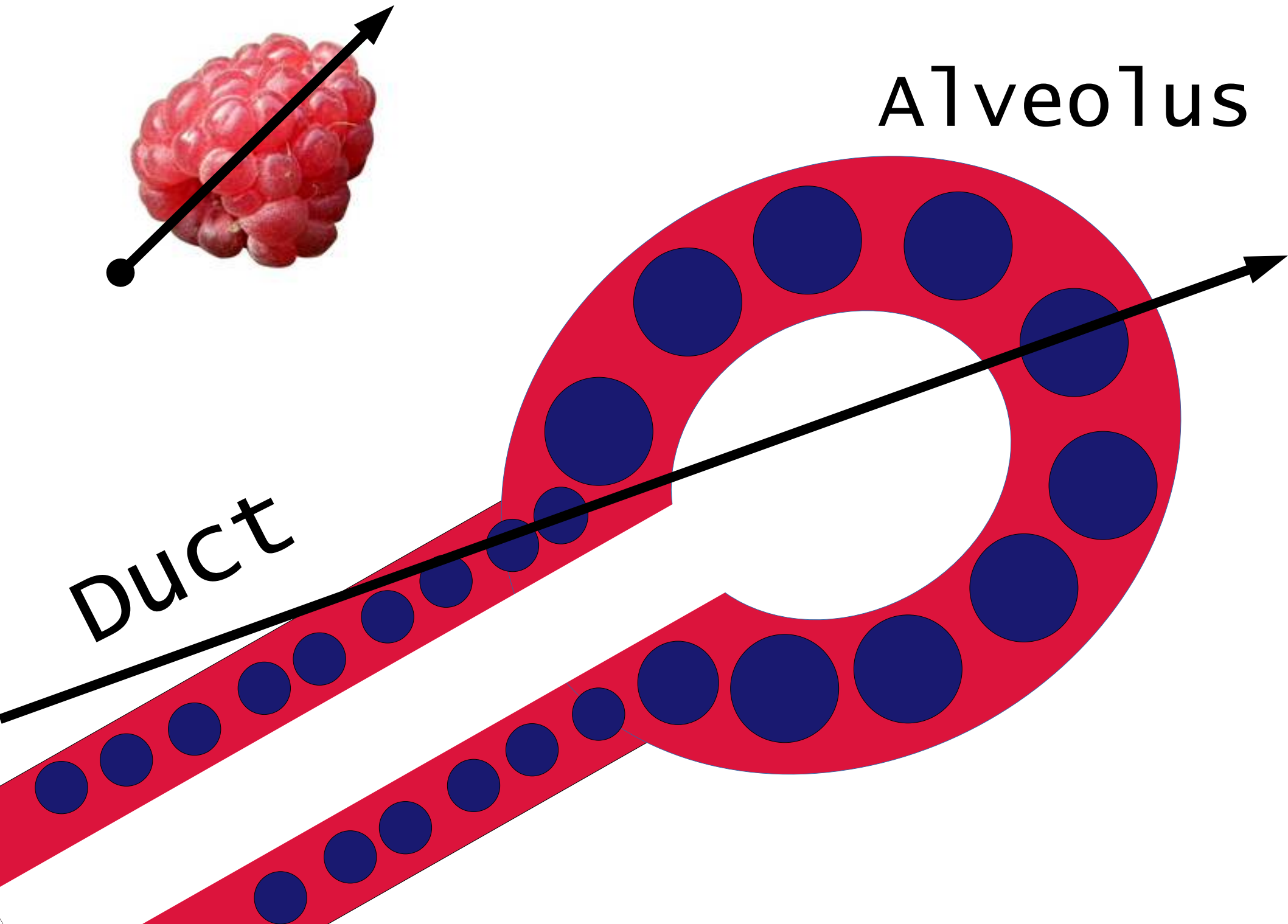


Alveolus



Alveolar





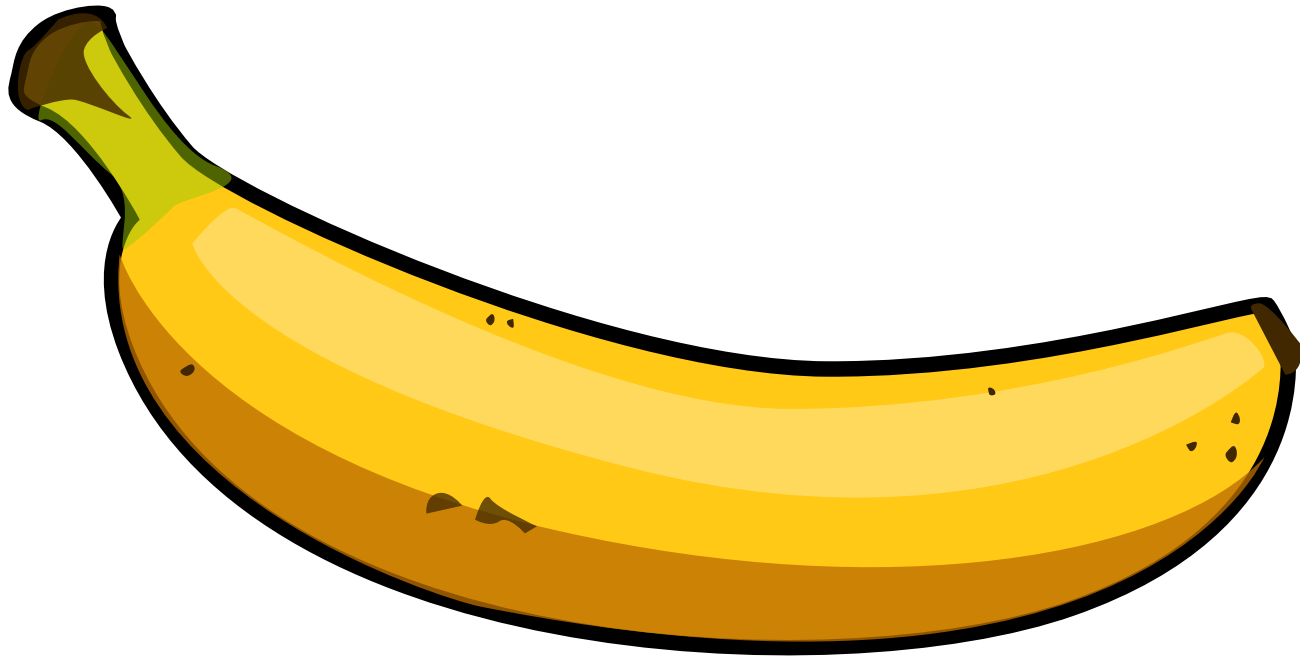
Compound Alveolar



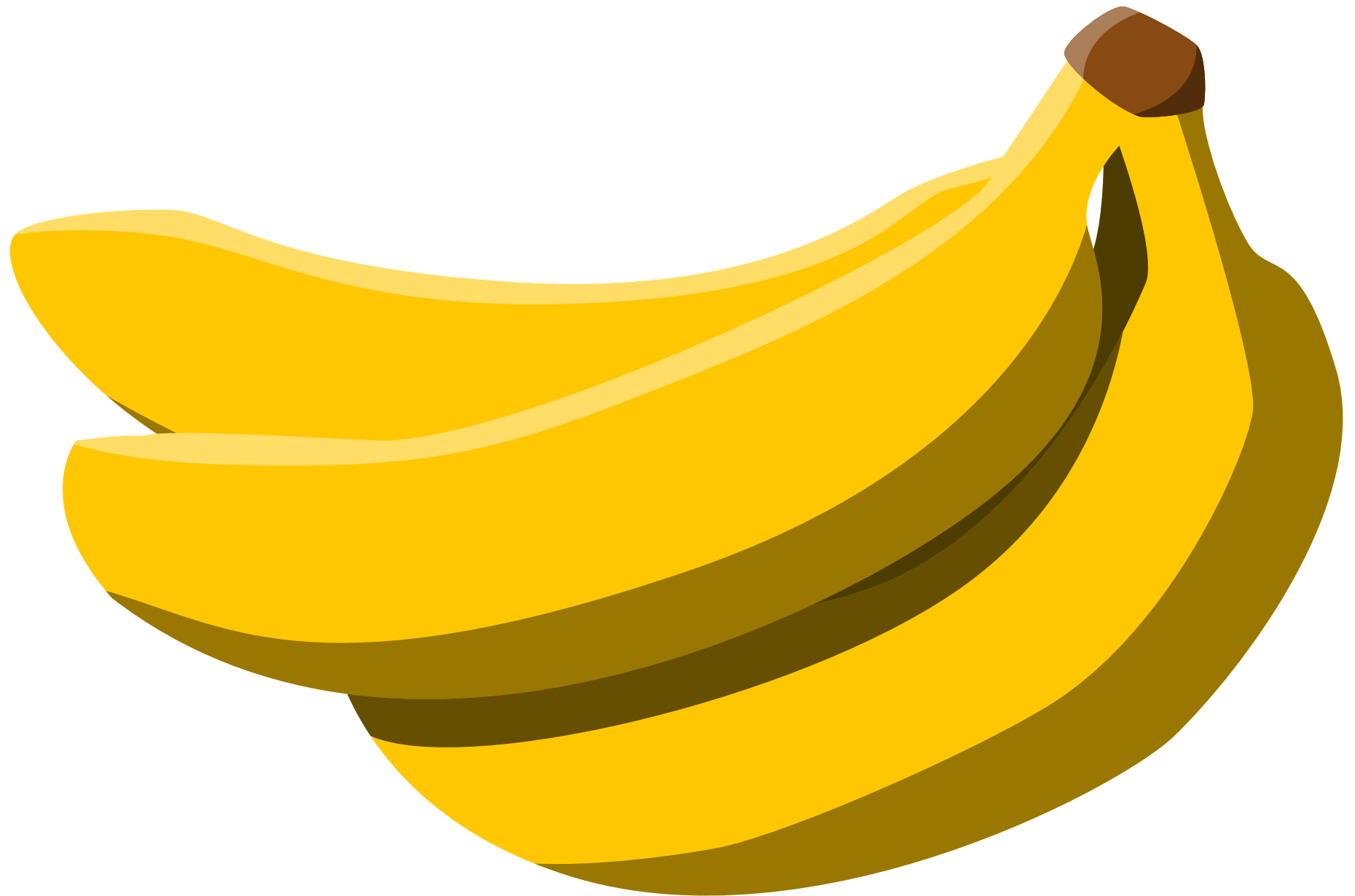
Compound Alveolar



Tubular



Compound Tubular



Compound Tubular



Slice and Dice



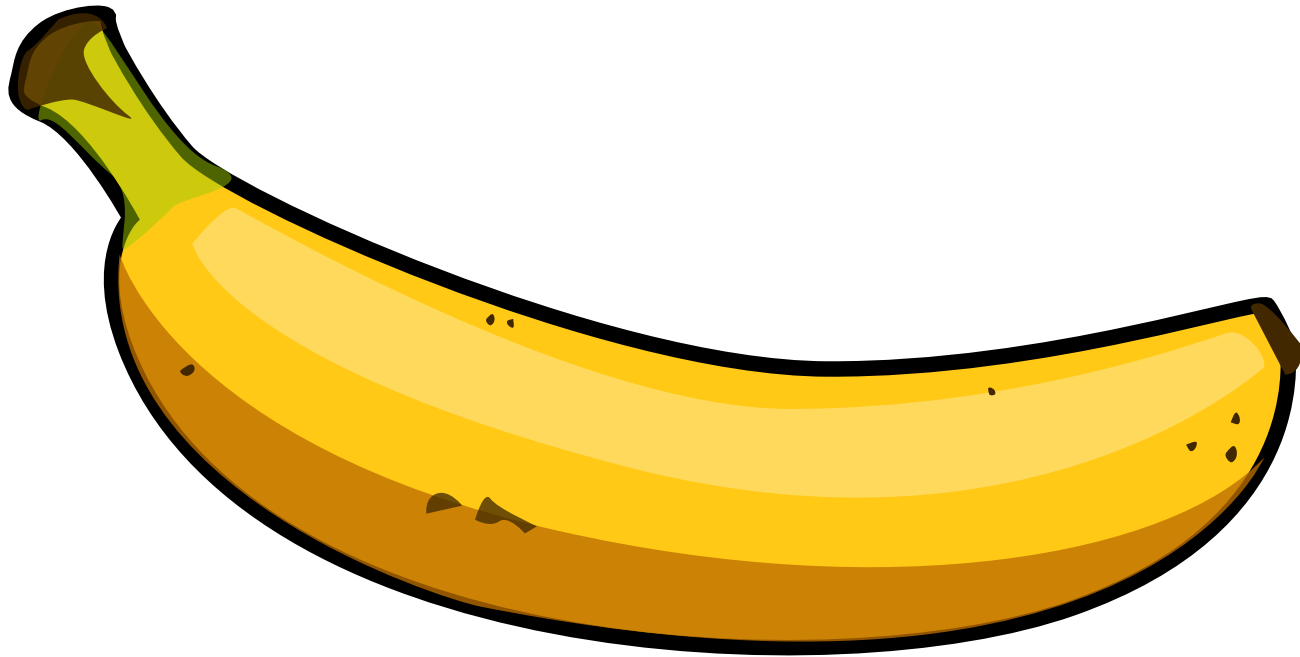
Slide 42 - Colon

Goblet cells
Simple tubular glands

Epithelium Analogy



Tubular



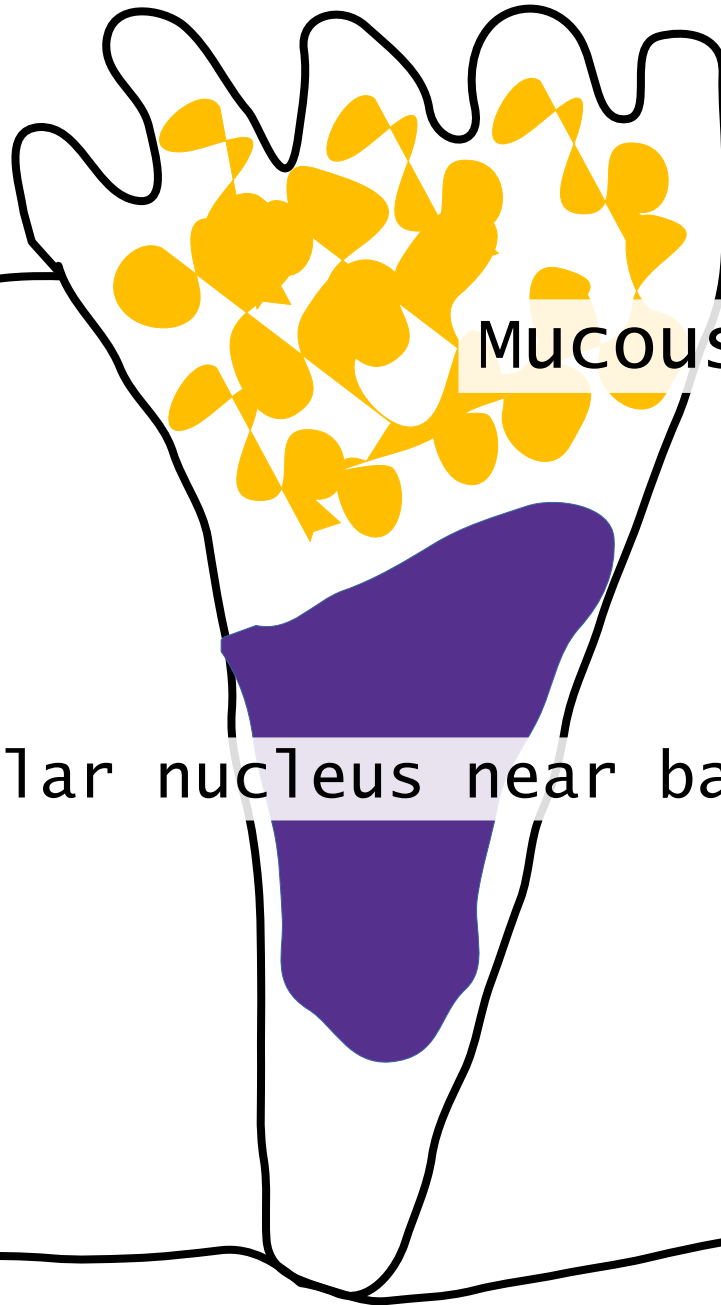
Goblet cell in epithelium

Luminal surface

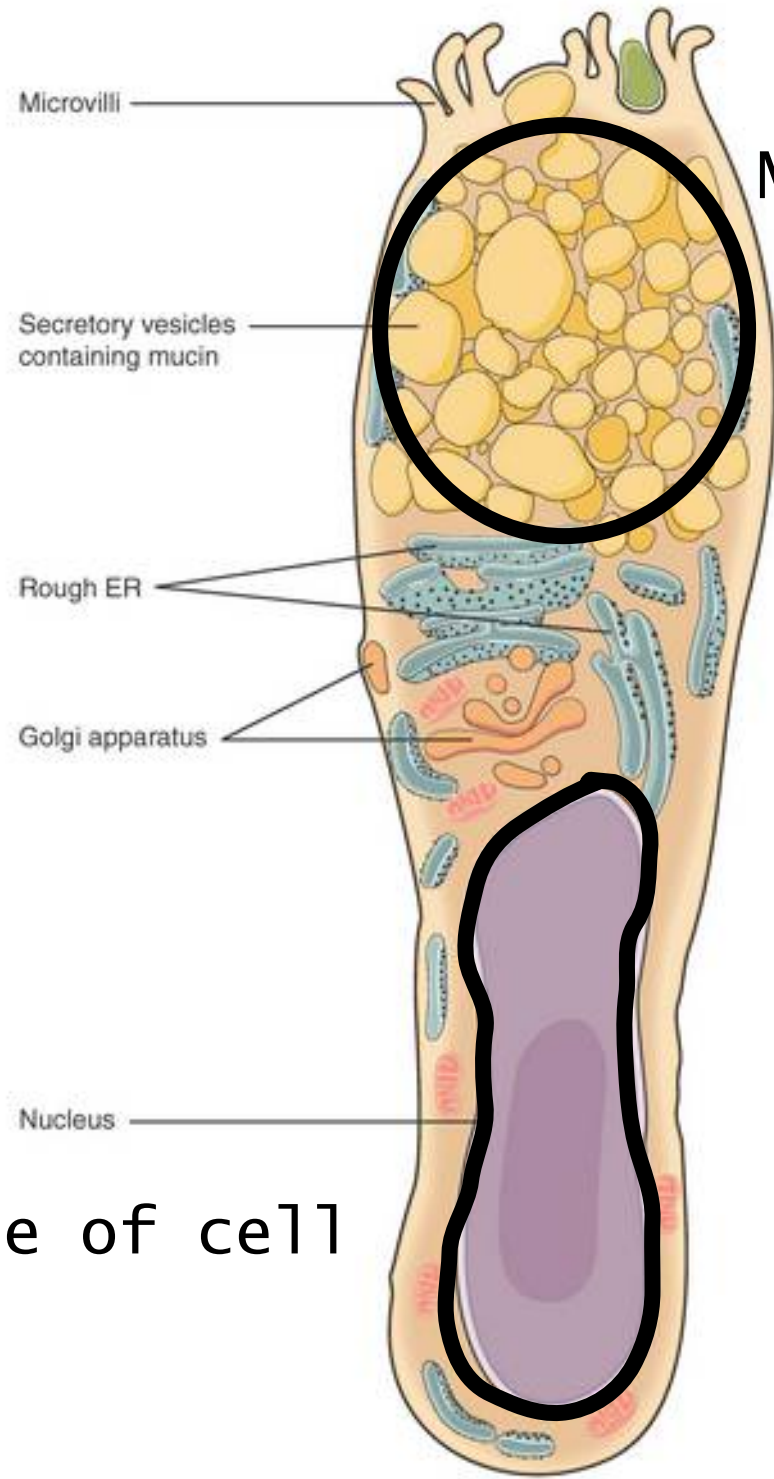
Mucous secrete

Triangular nucleus near base of cell

Basement membrane



Goblet cell



Microvilli

Mucous secrete

Secretory vesicles containing mucin

Rough ER

Golgi apparatus

Nucleus

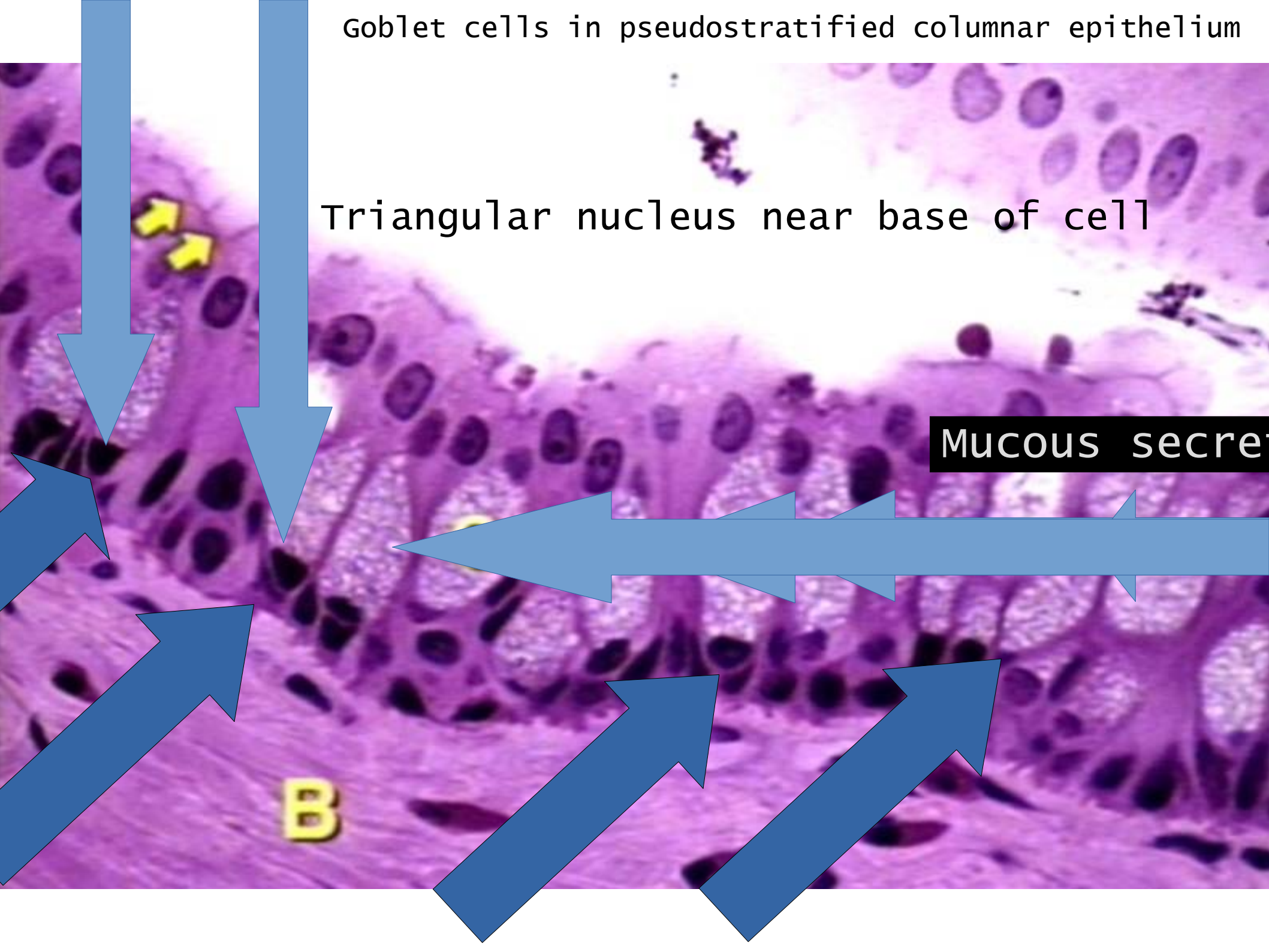
Nucleus near base of cell

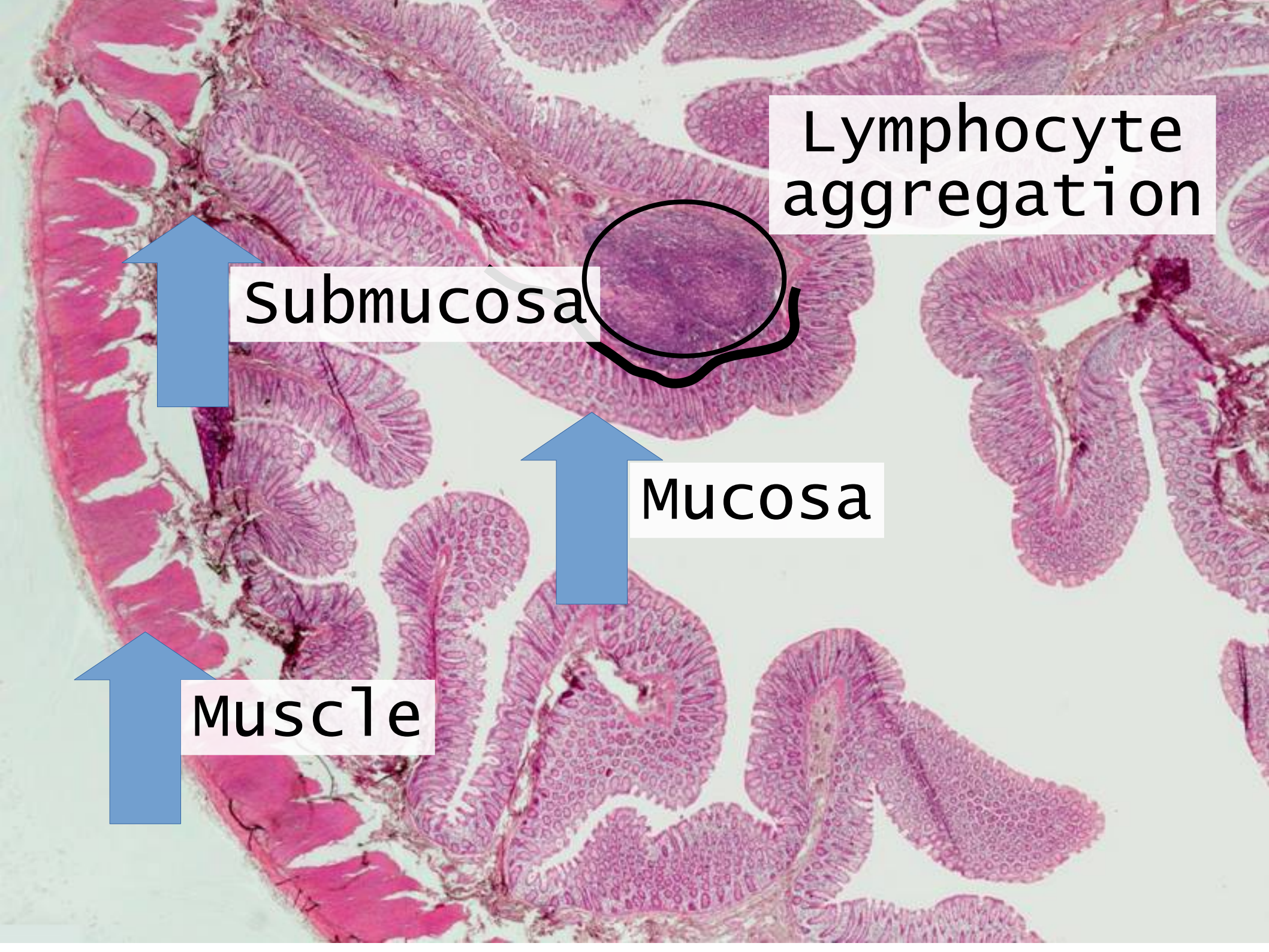
Goblet cells in pseudostratified columnar epithelium

Triangular nucleus near base of cell

Mucous secretion

B





Lymphocyte aggregation

Submucosa

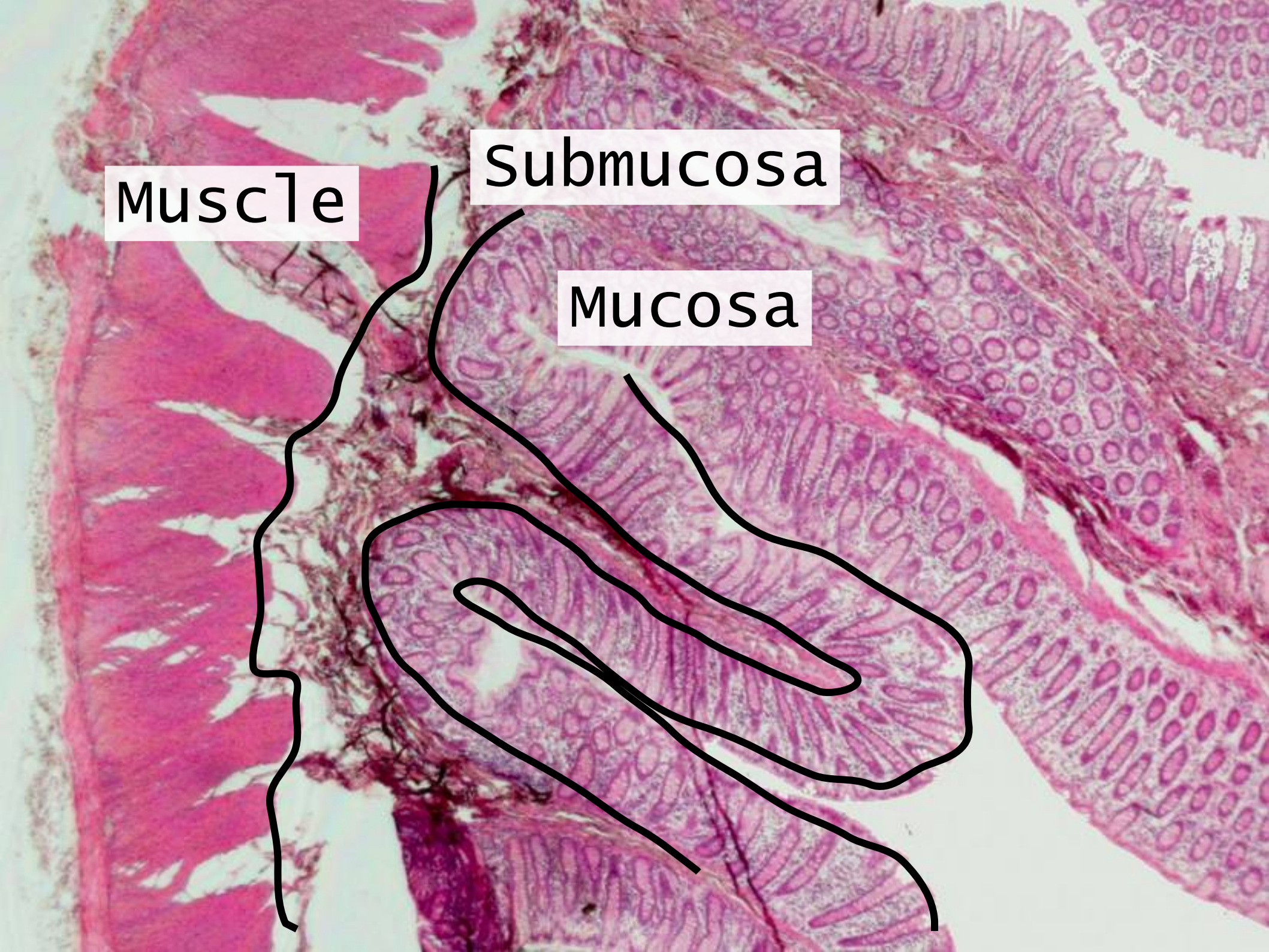
Mucosa

Muscle

Muscle

Submucosa

Mucosa

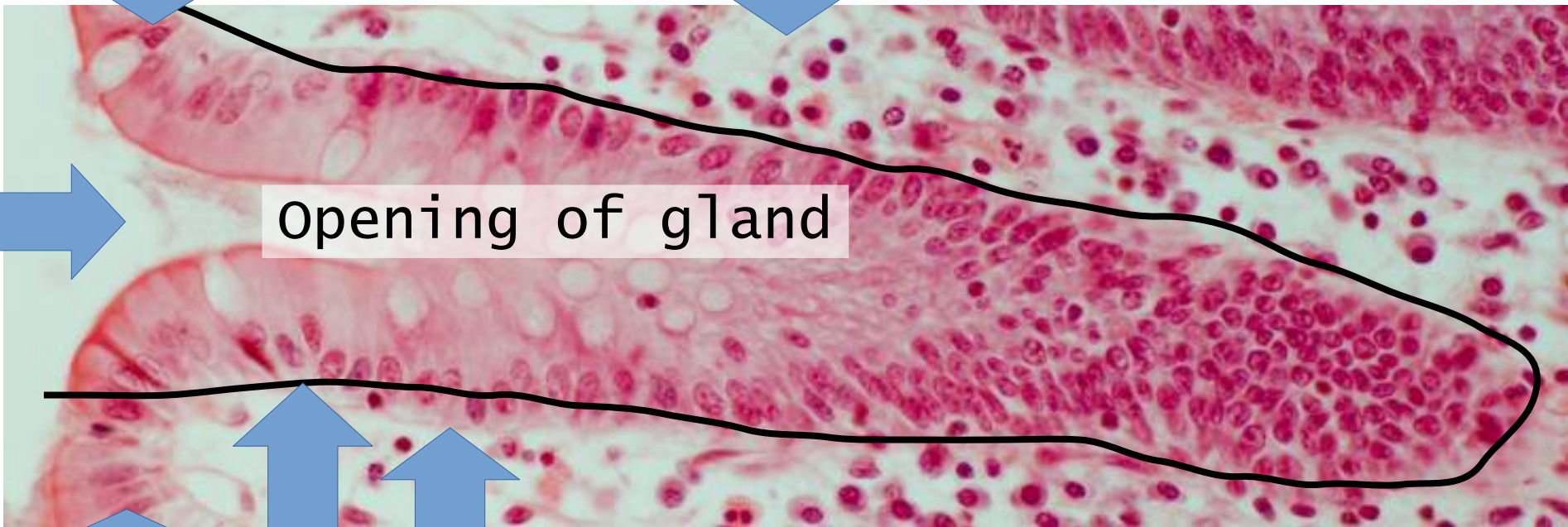




Simple
Tubular
Gland

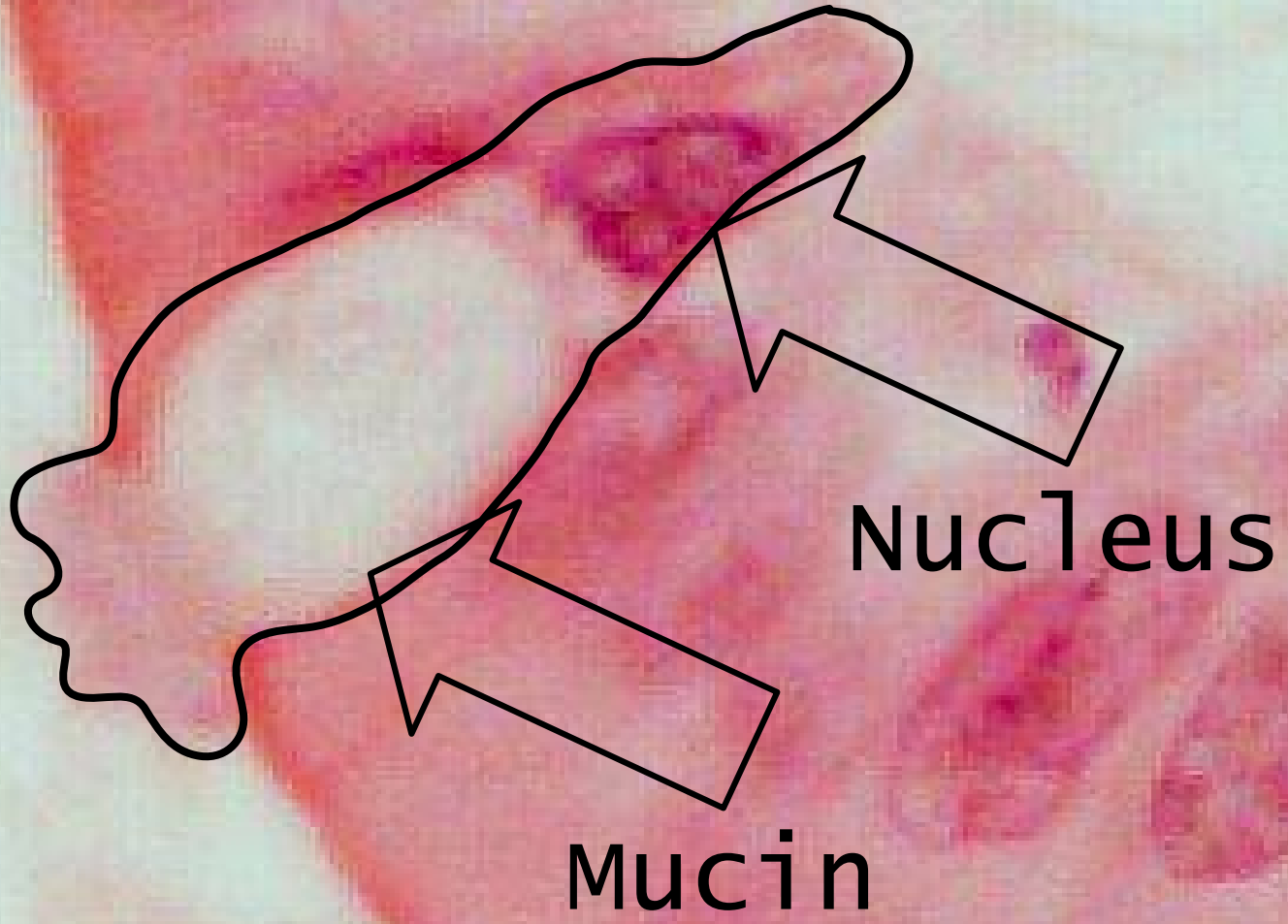
Goblet cell

Lamina propria



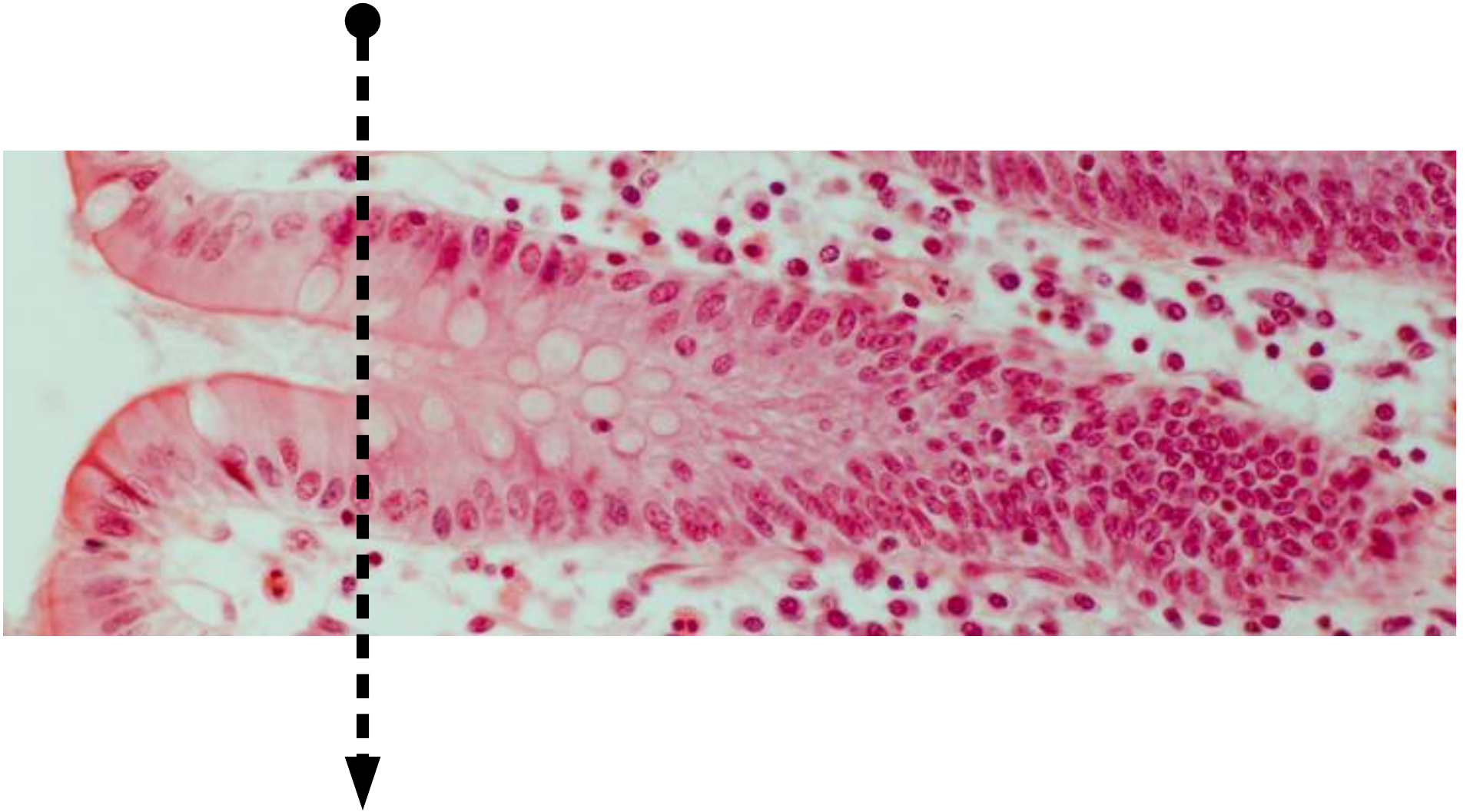
Opening of gland

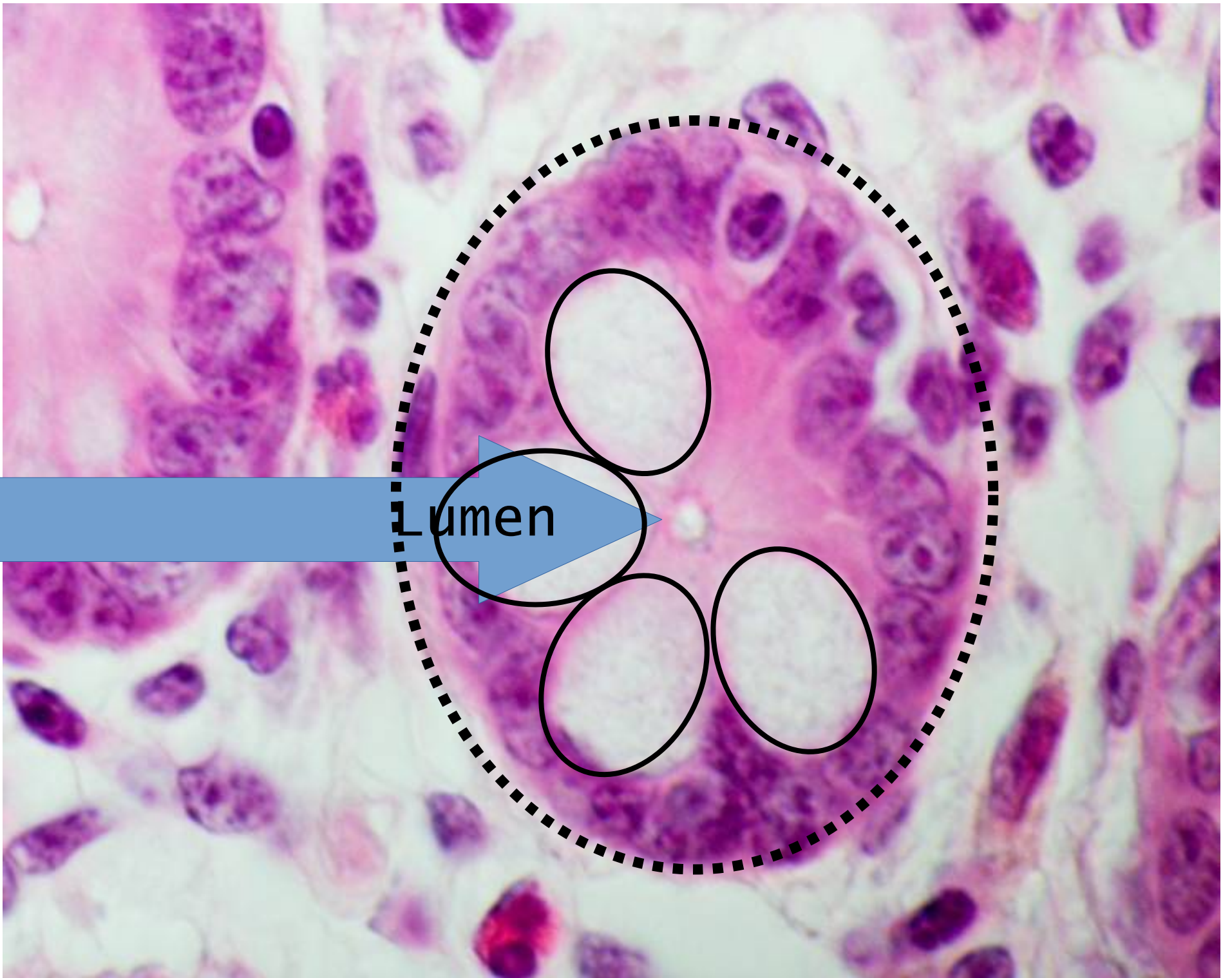
Columnar cells



Nucleus

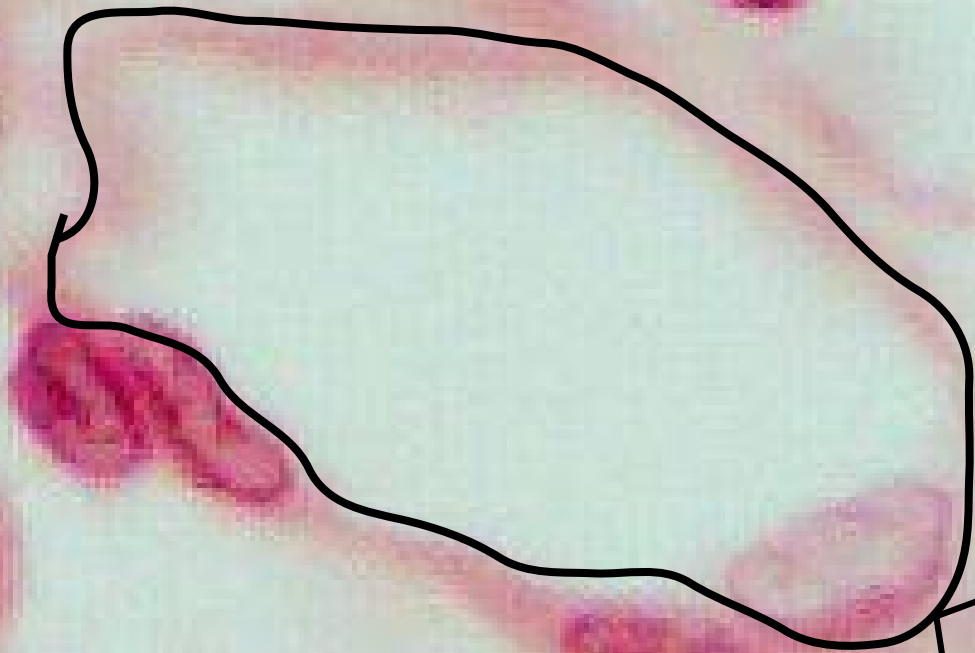
Mucin





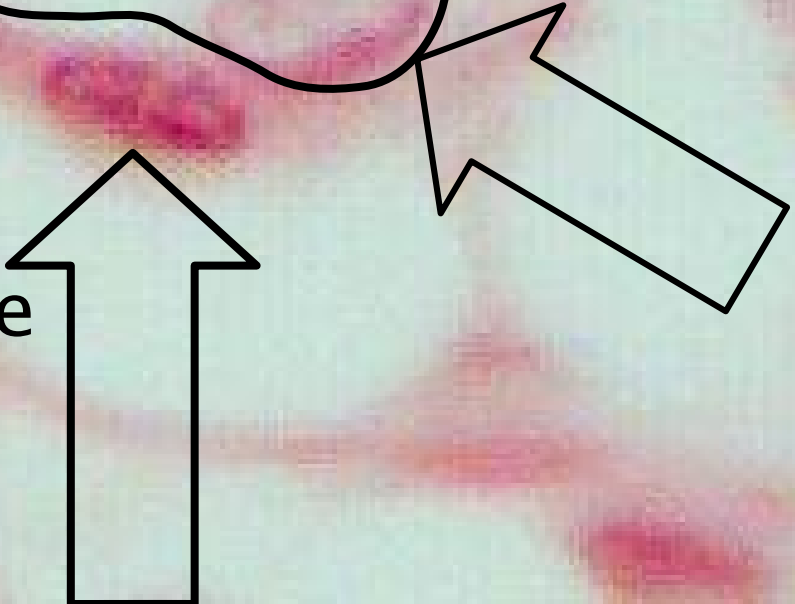
Lumen

Capillary



Endothelium
nucleus

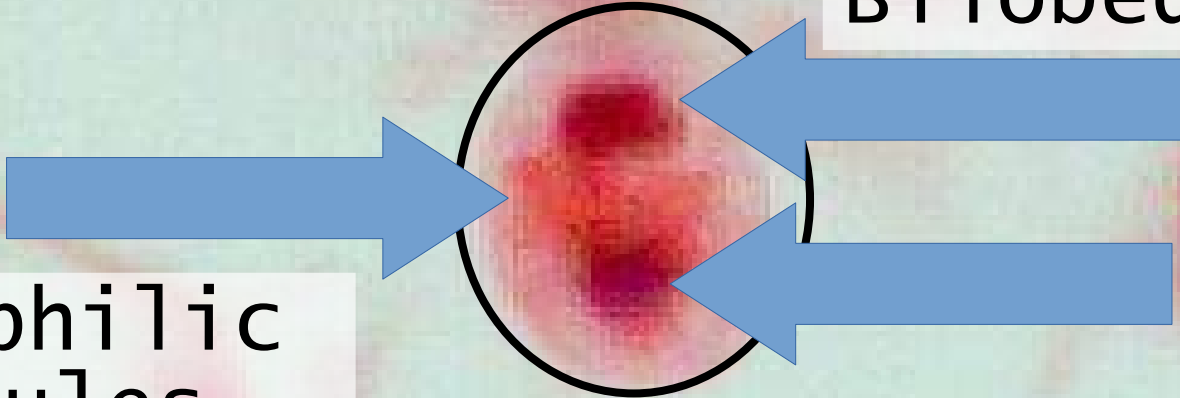
Pericyte

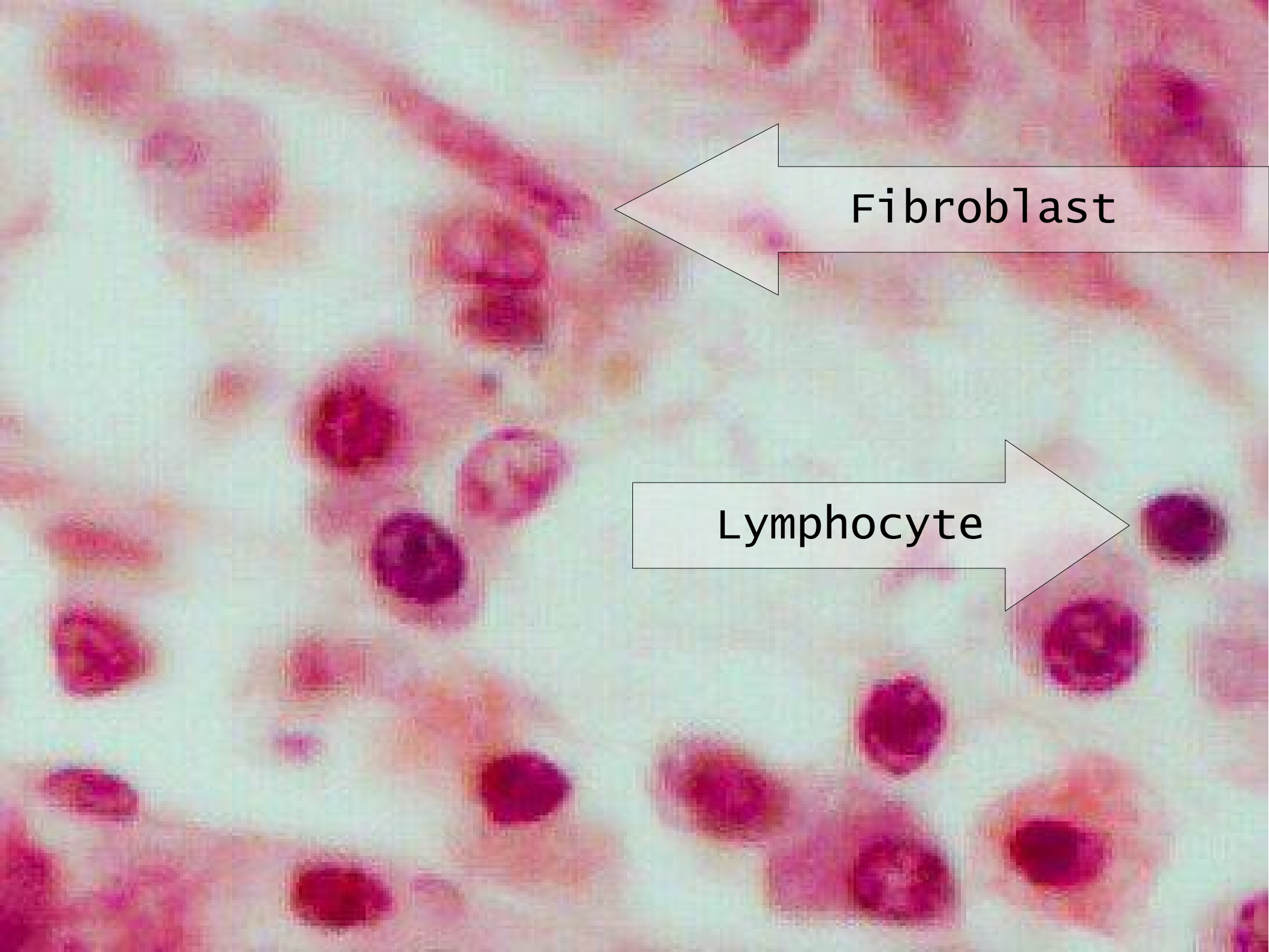


Eosinophil

Bilobed nucleus

Eosinophilic granules

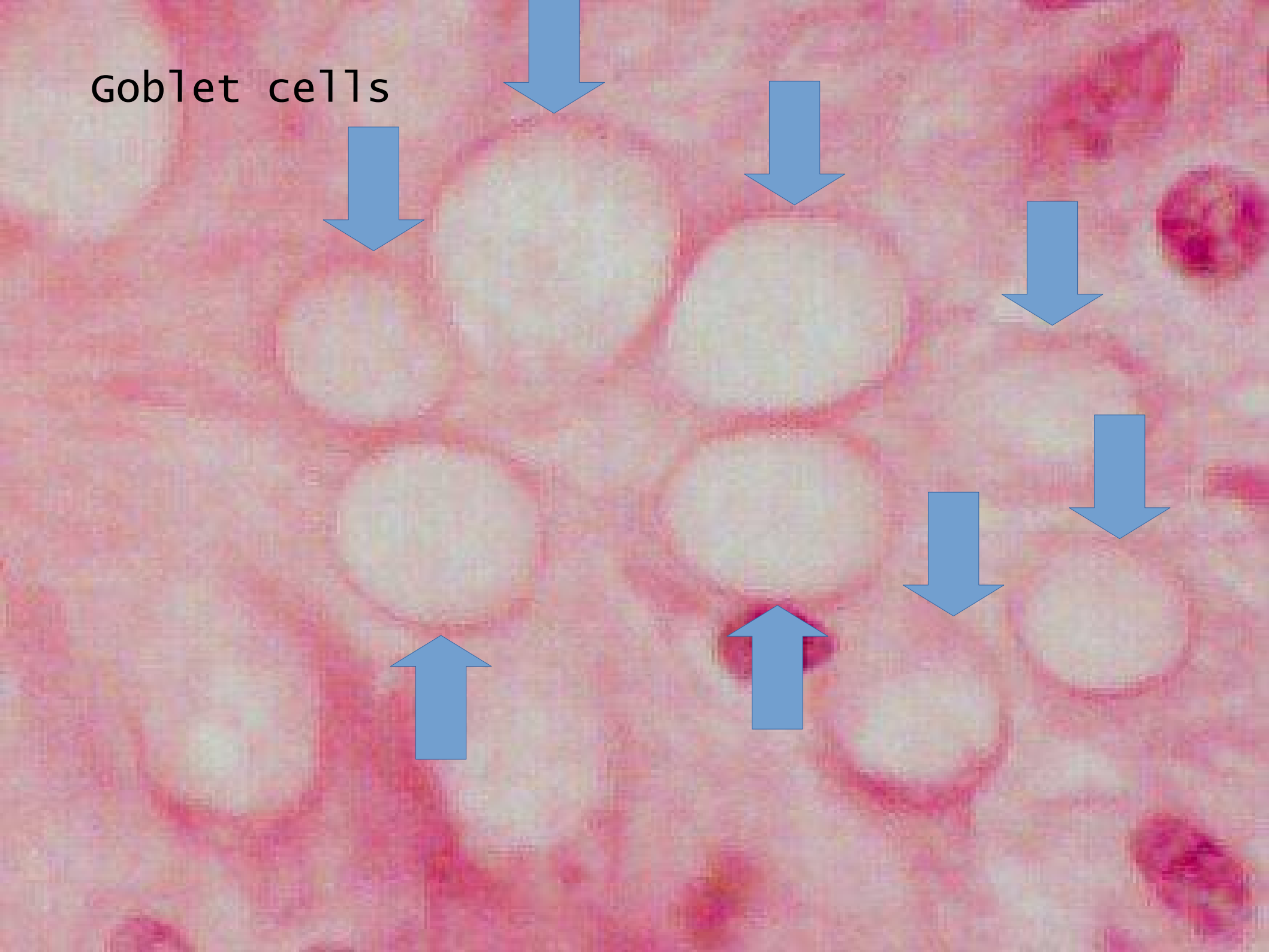




Fibroblast

Lymphocyte

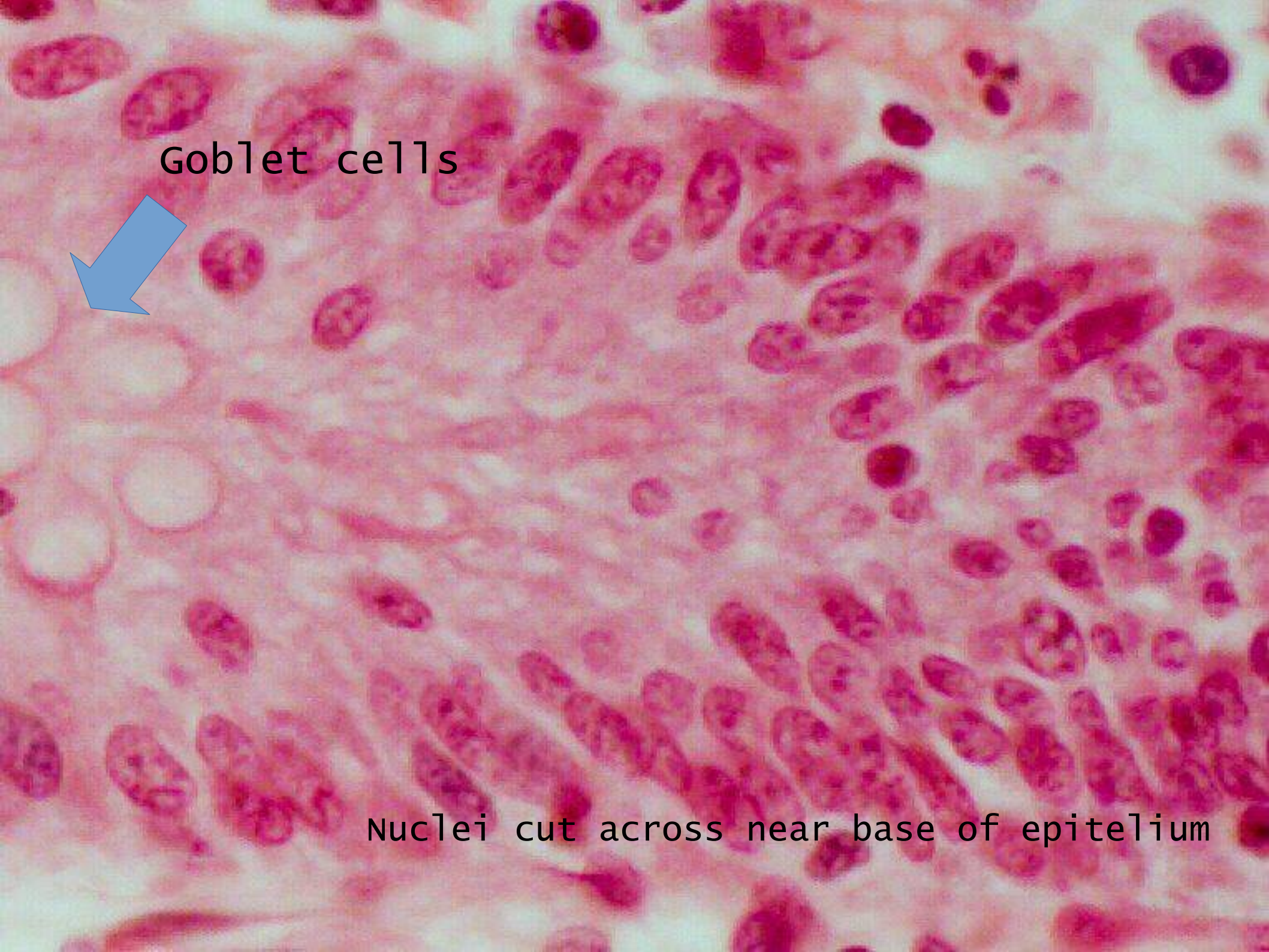
Goblet cells



Goblet cells



Nuclei cut across near base of epithelium





Squamous cell

Red blood cells



Lymphocyte
Aggregation

Secretory units

Mucinous

Serous

Secretory units

- Serous
- Protein
- Sticky
- Dark stained
- Mucinous
- Mucin
- Watery
- Light stained
- Mixed
- Both types
- Demi-lunes

Slide 7 – Tongue

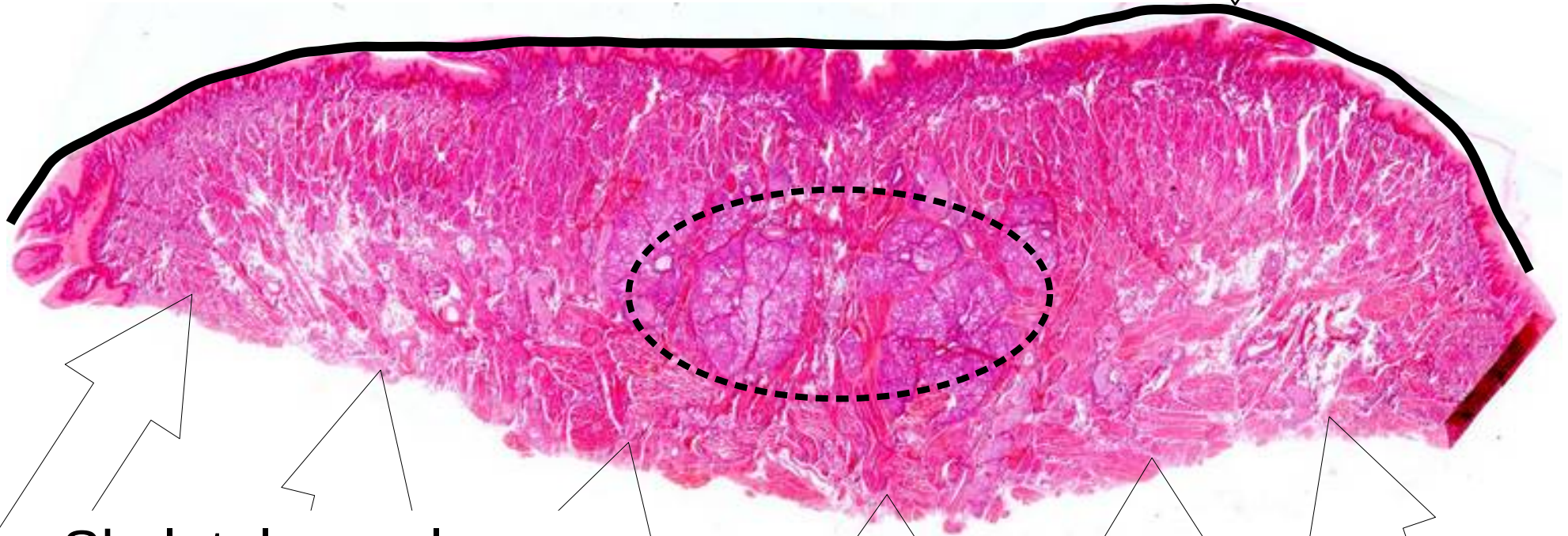
Mucinous

Serous demilunes

Tongue

Lumen = Oral Cavity

Stratified
squamous
keratinized
epithelium



Skeletal muscle

Skeletal muscle

This histological image shows a cross-section of the stomach wall. At the top, a thick layer of skeletal muscle is visible. Below it, the mucosa contains muciniferous units (glands) and serous units. These units are separated by connective tissue septa. An artery is also present in the lower part of the image.

Mucinous Unit

Serous Unit

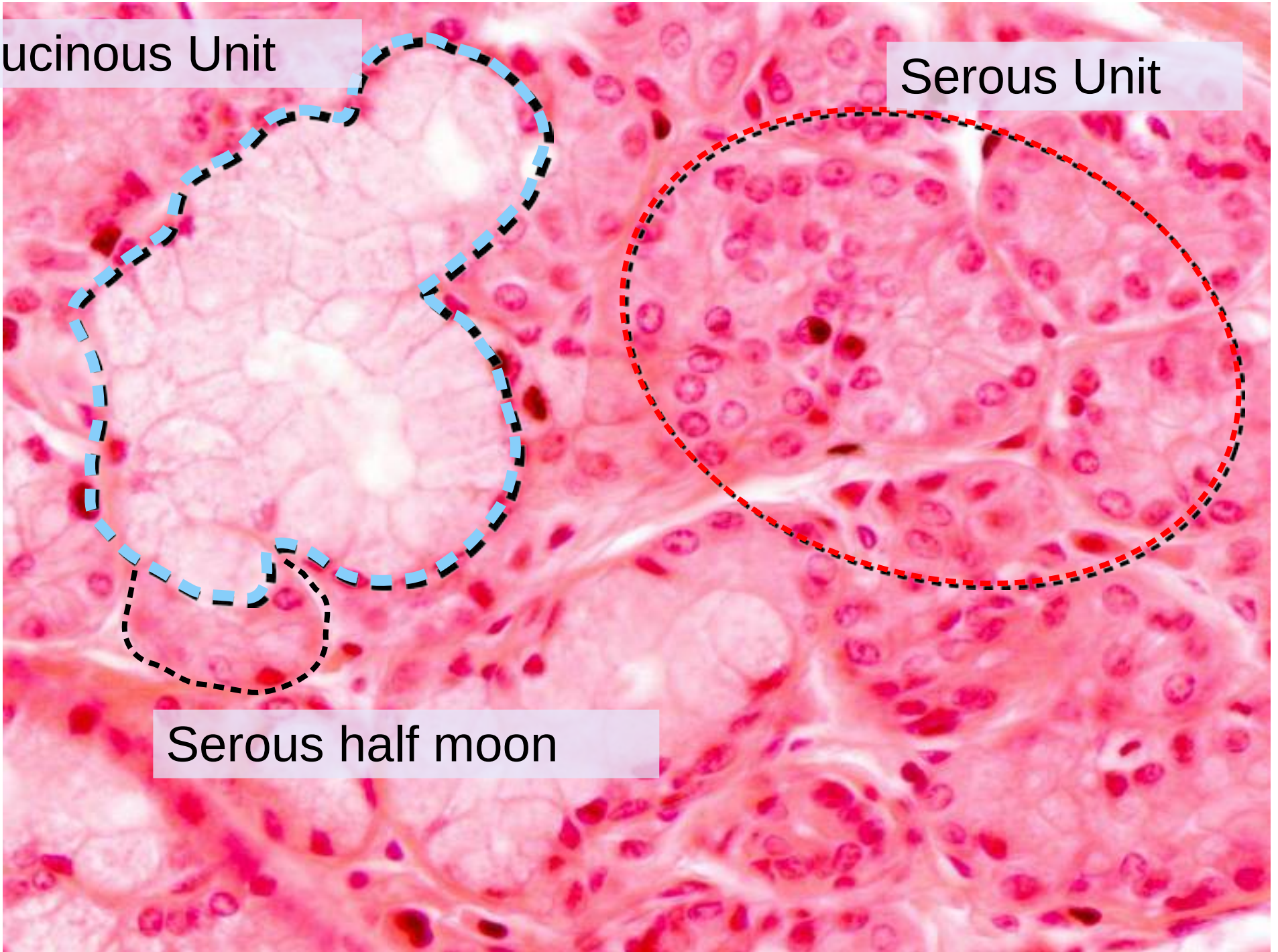
Connective Tissue Septum

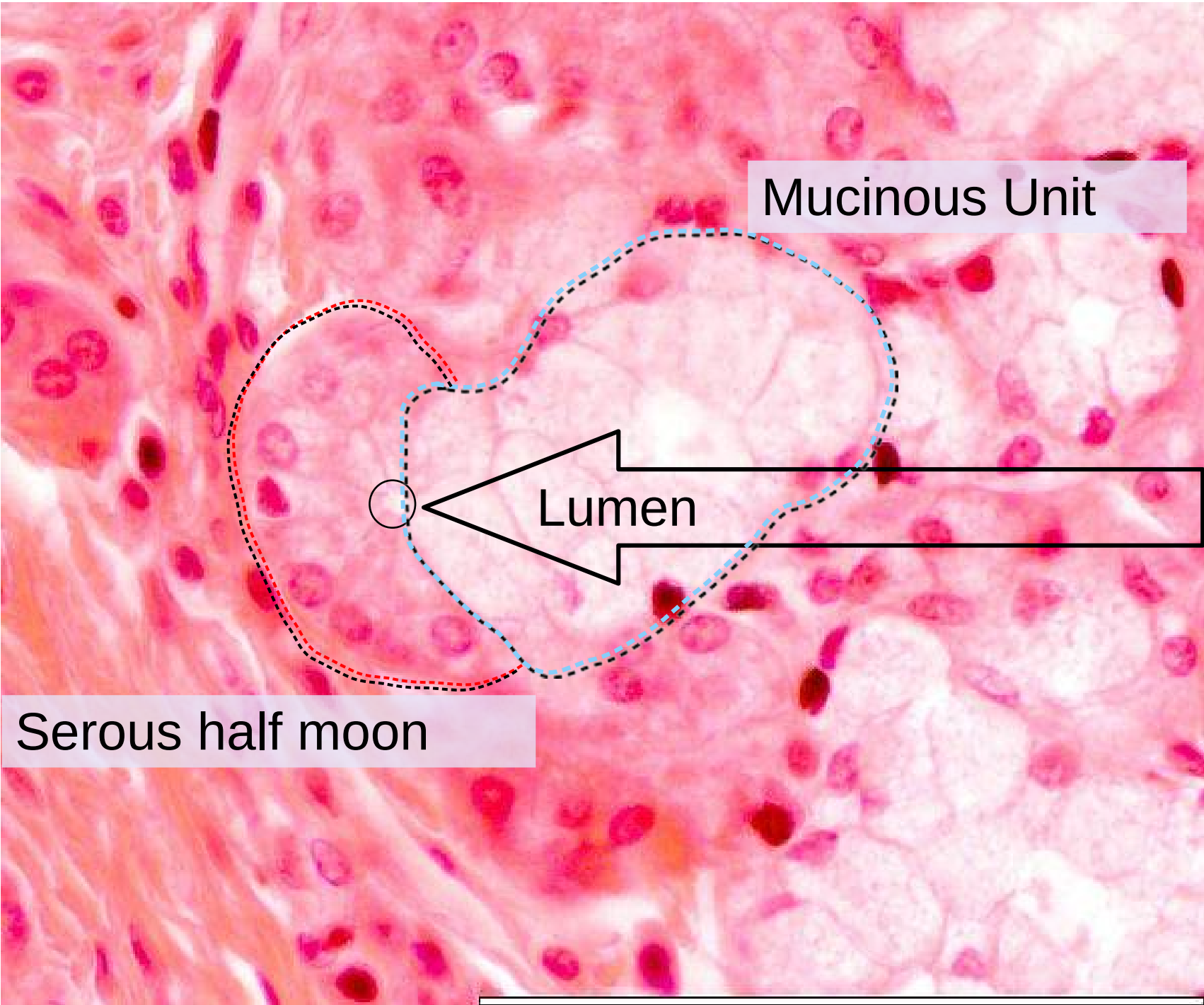
Artery

Mucinous Unit

Serous Unit

Serous half moon





Mucinous Unit

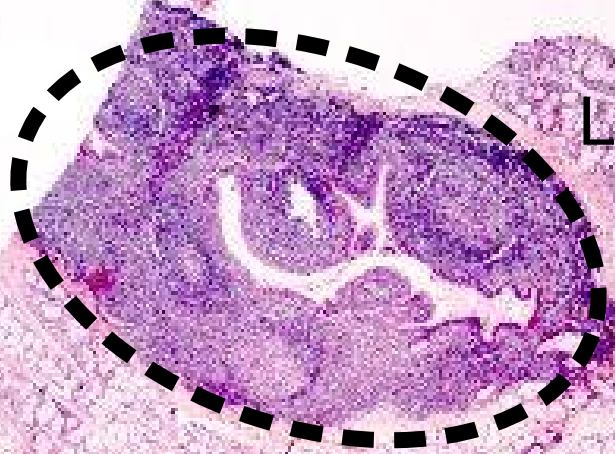
Lumen

Serous half moon

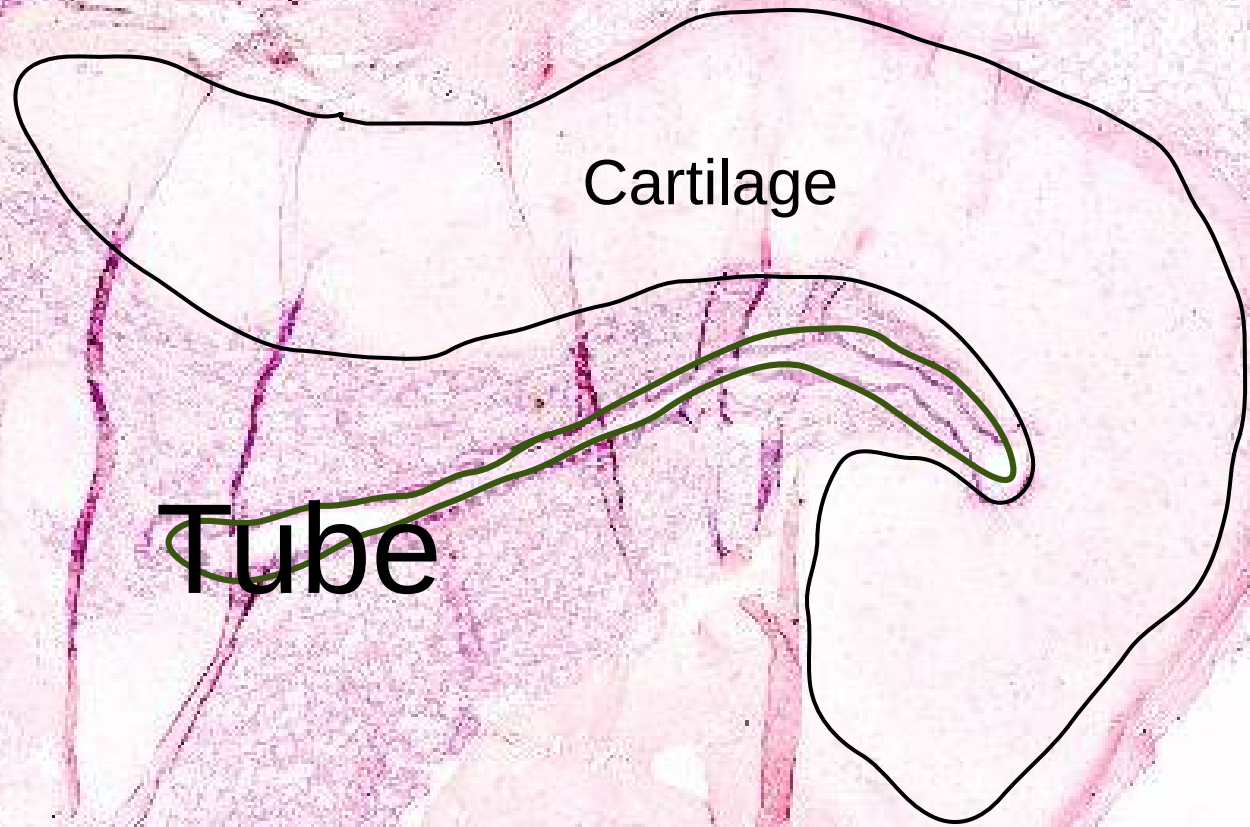
Slide 39 – Pharyngeal tube

Mucinous

Serous demilunes



Lymphoid tissue



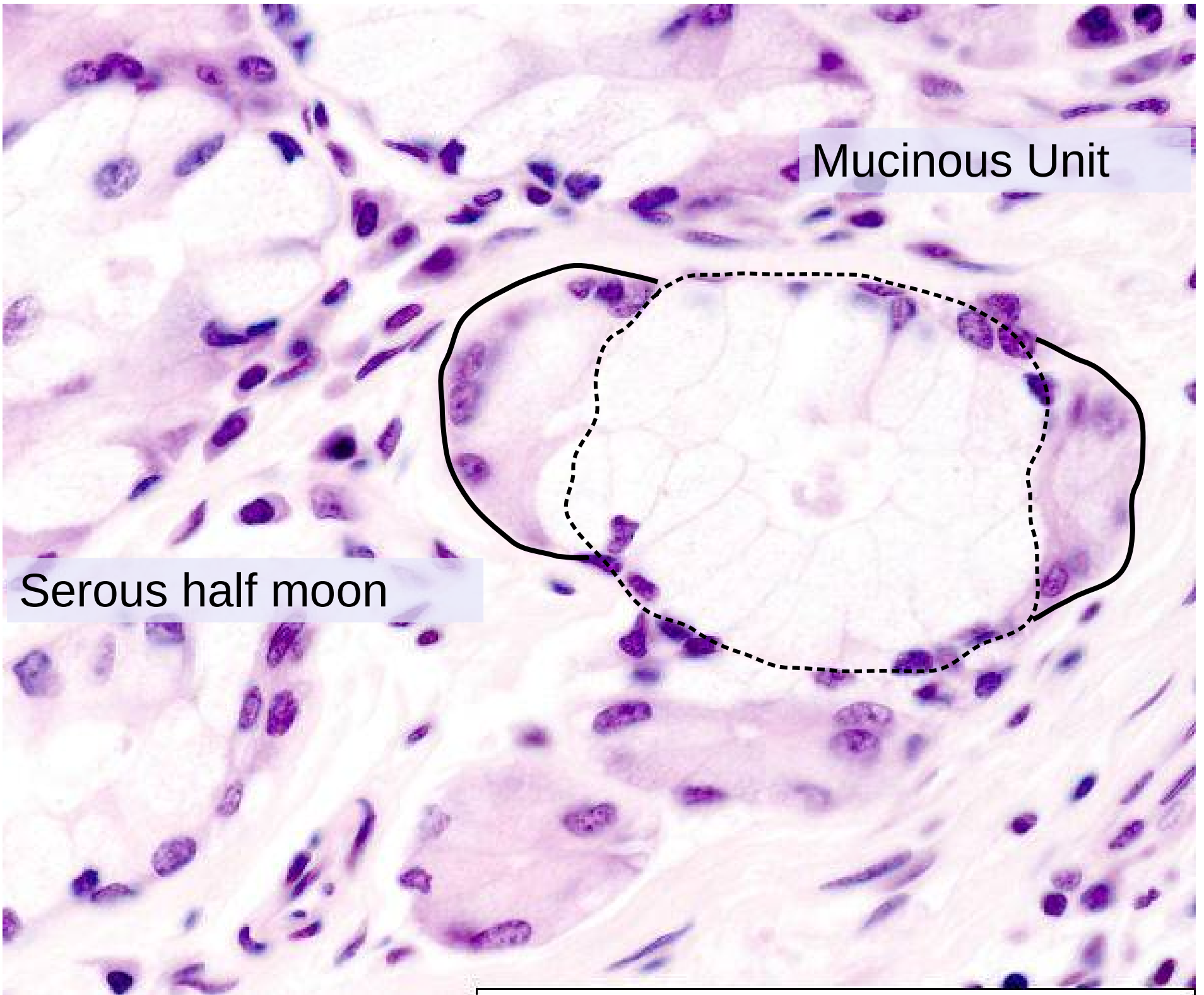
Cartilage

Tube



Mucinous Unit

Serous half moon



Endocrine



Endocrine

- Follicles
- Cords
- Groups
- Islands

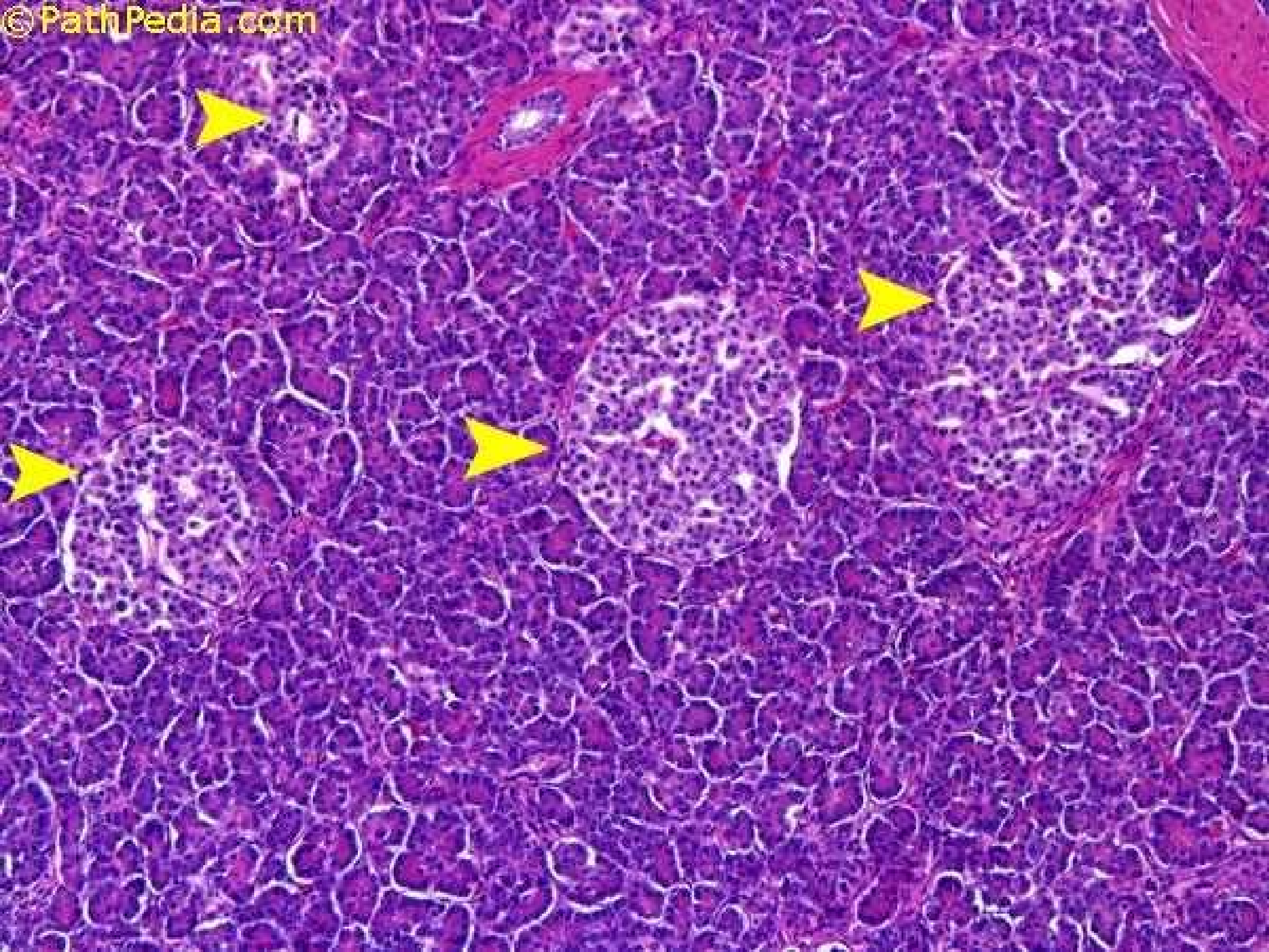
Slide 50 - Pancreas

- Exocrine + Endocrine
- Acinar / Tubulo-acinar
- Simple epithelium of pyramidal serous cells
- Basal basophilia
- Duct starts inside acinus
- Centro-acinar cells
- Endocrine islands

Islands

LONG ISLAND ICED TEA

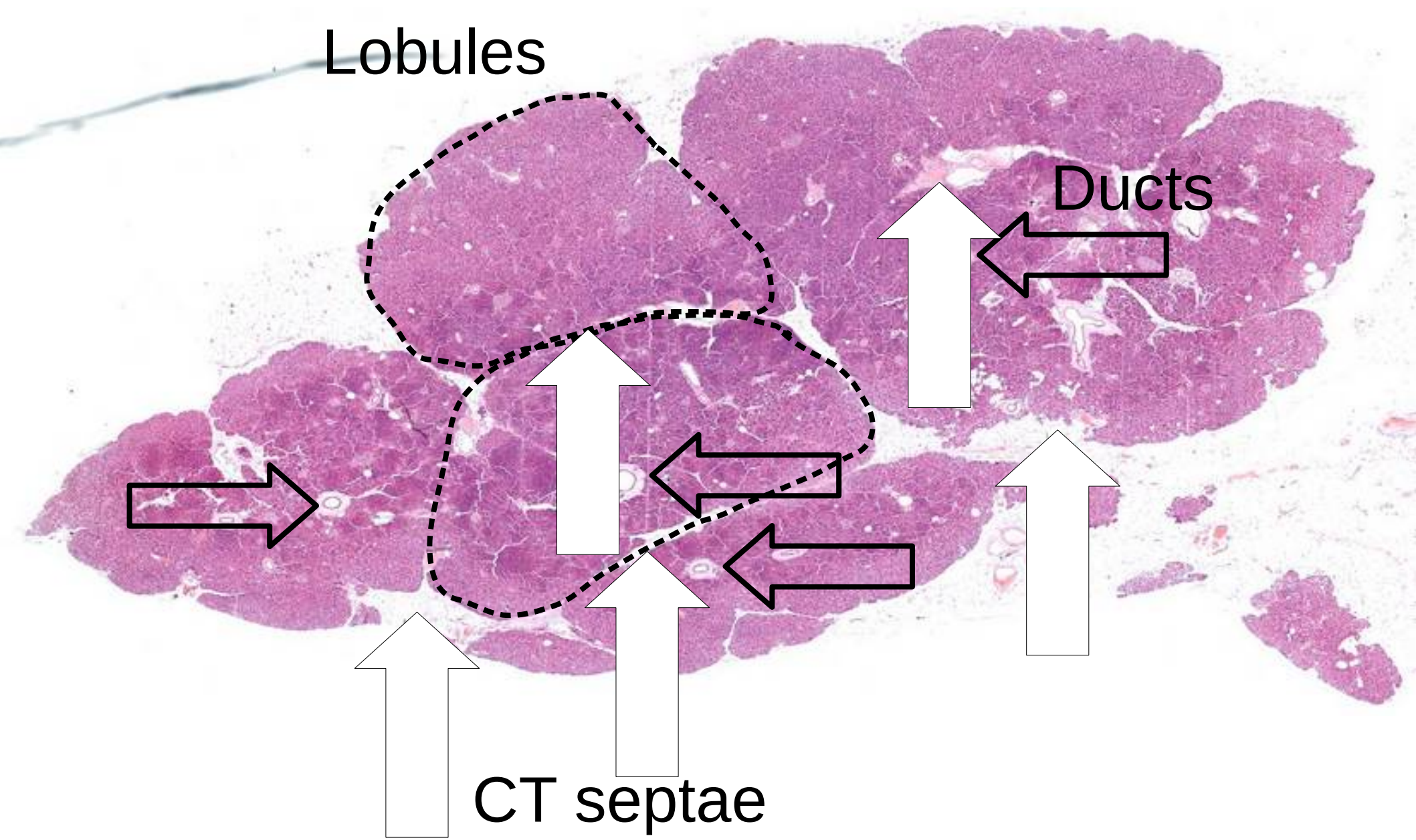


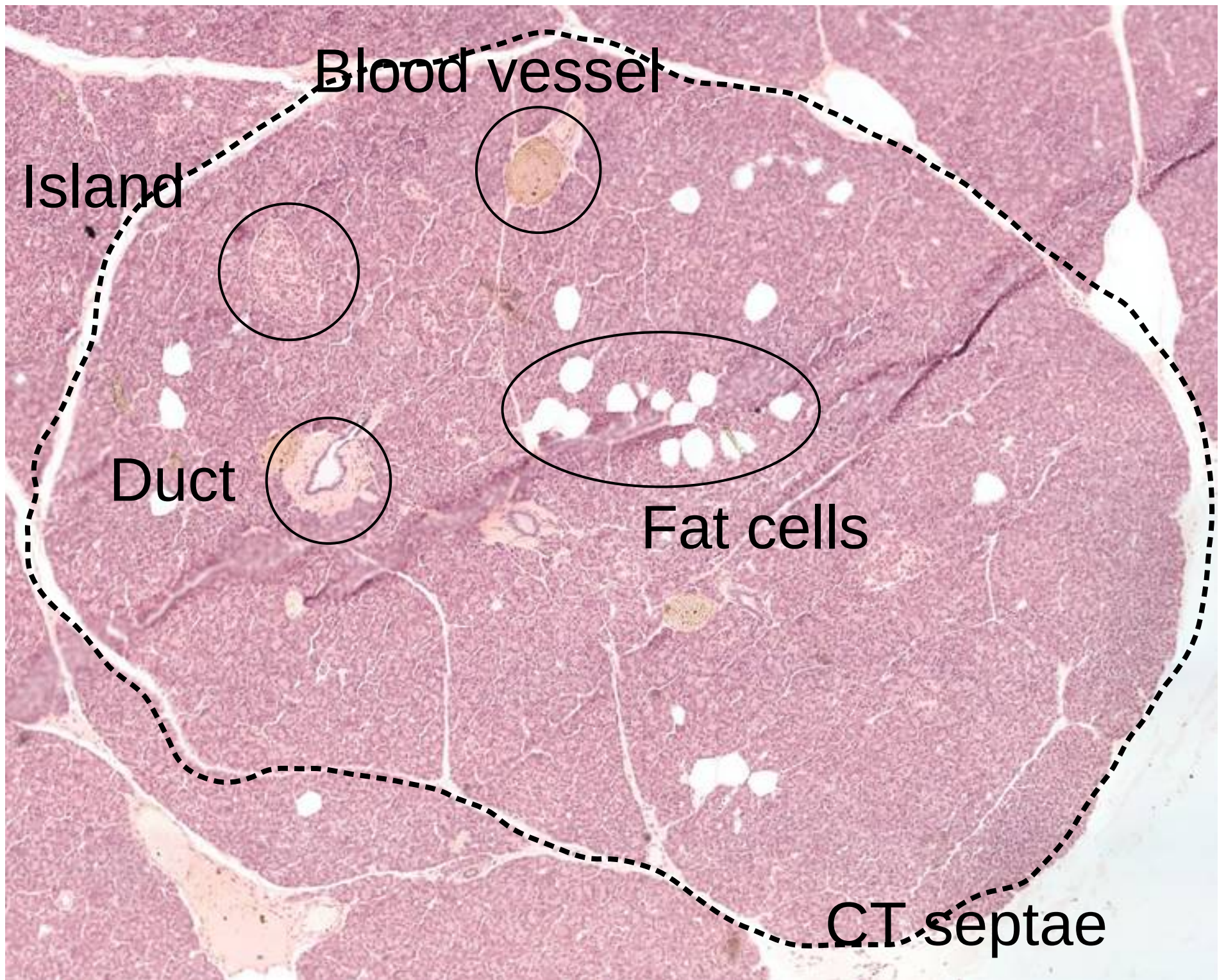


Lobules

Ducts

CT septae





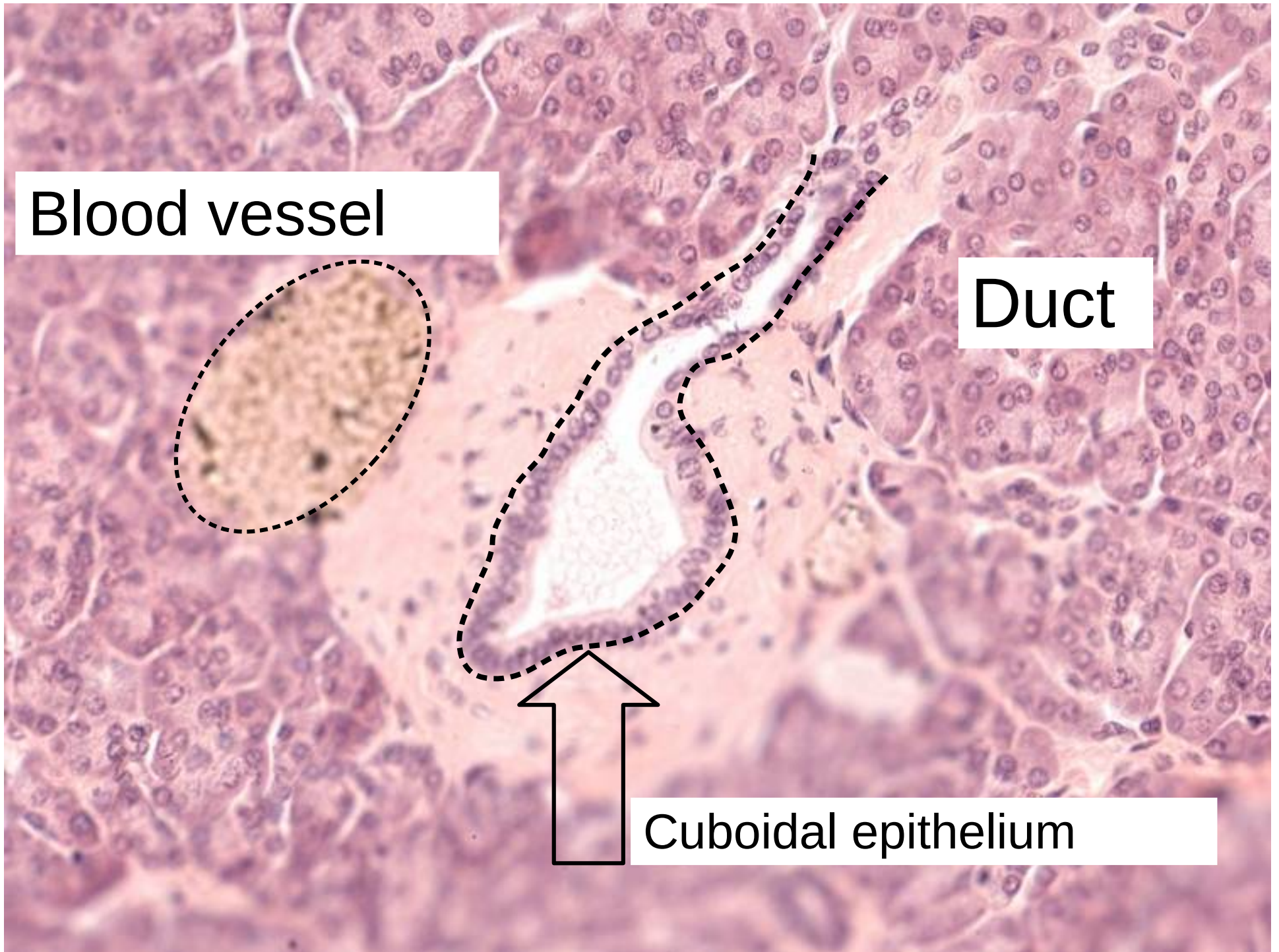
Blood vessel

Island

Duct

Fat cells

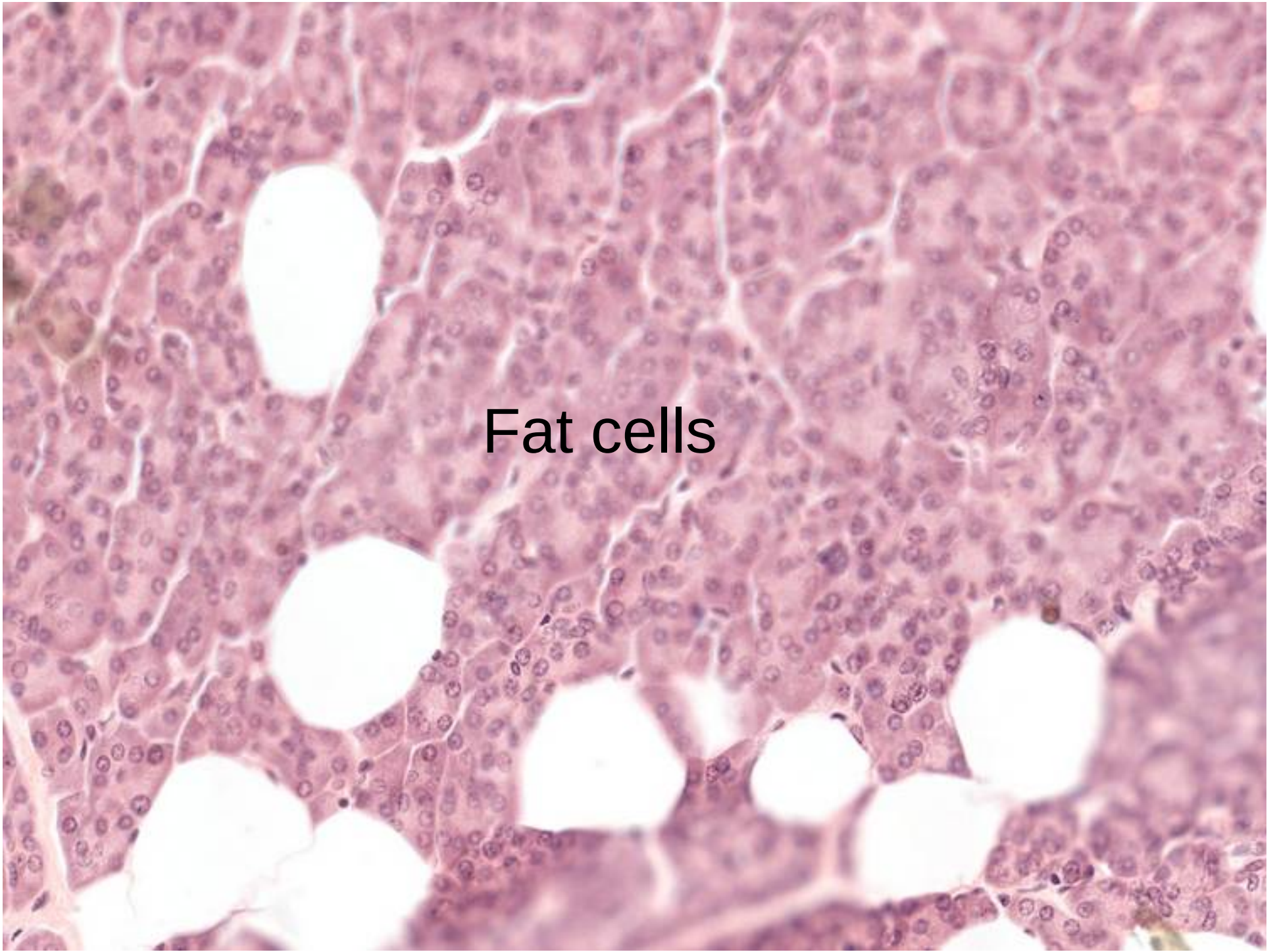
CT septae



Blood vessel

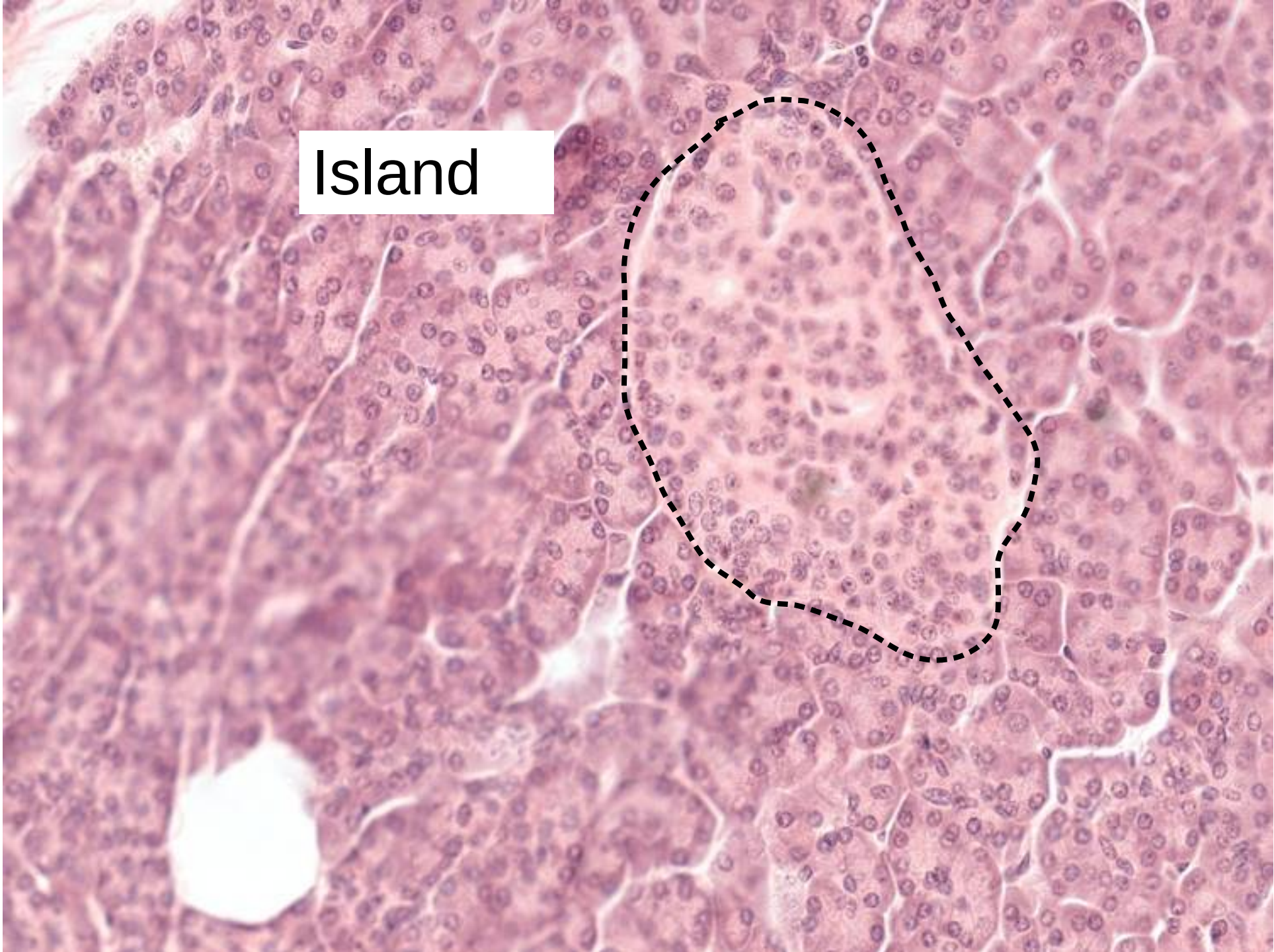
Duct

Cuboidal epithelium



Fat cells

Island

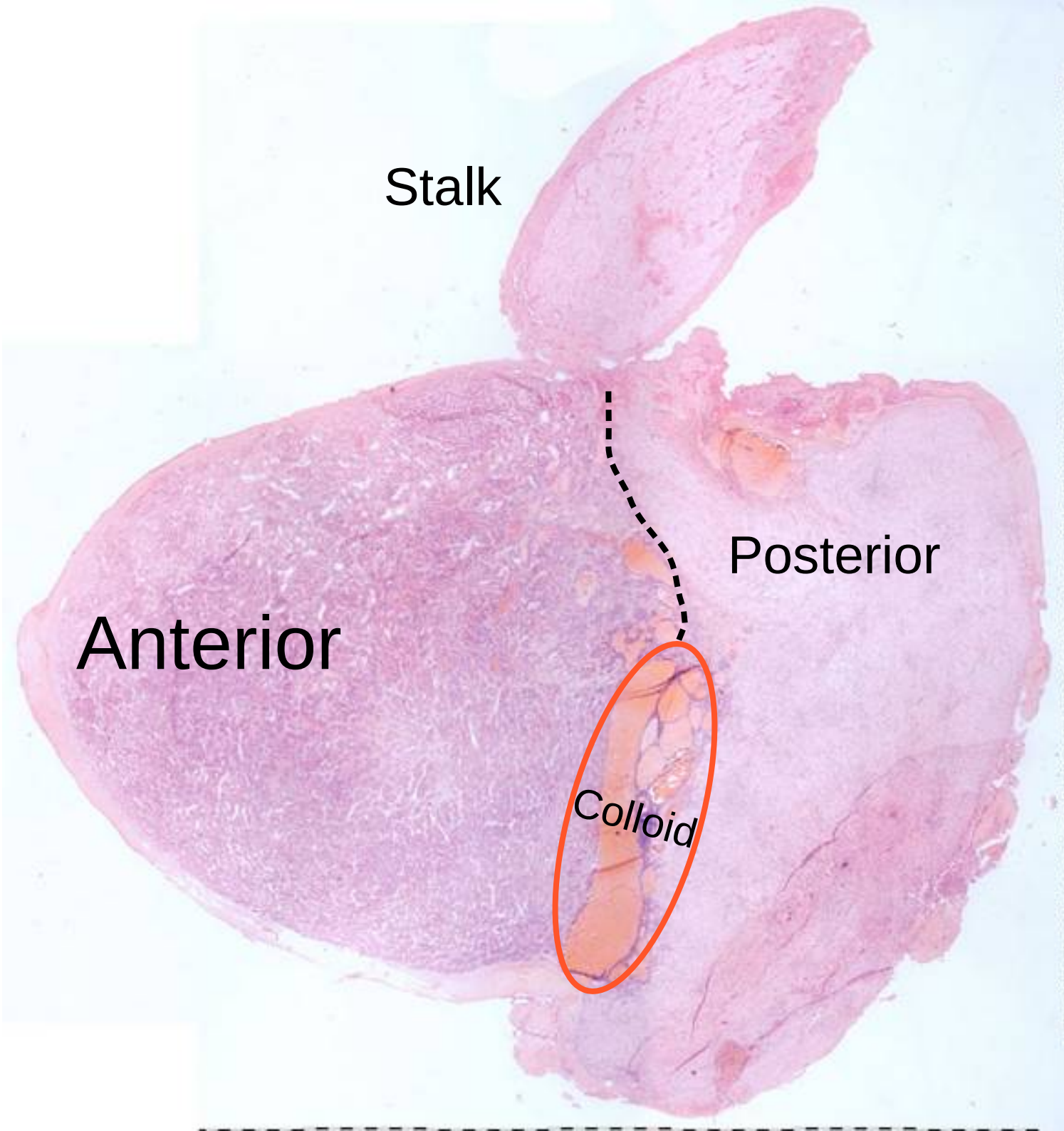


Slide 52 – Pituitary gland

Groups

Groups





Stalk

Anterior

Posterior

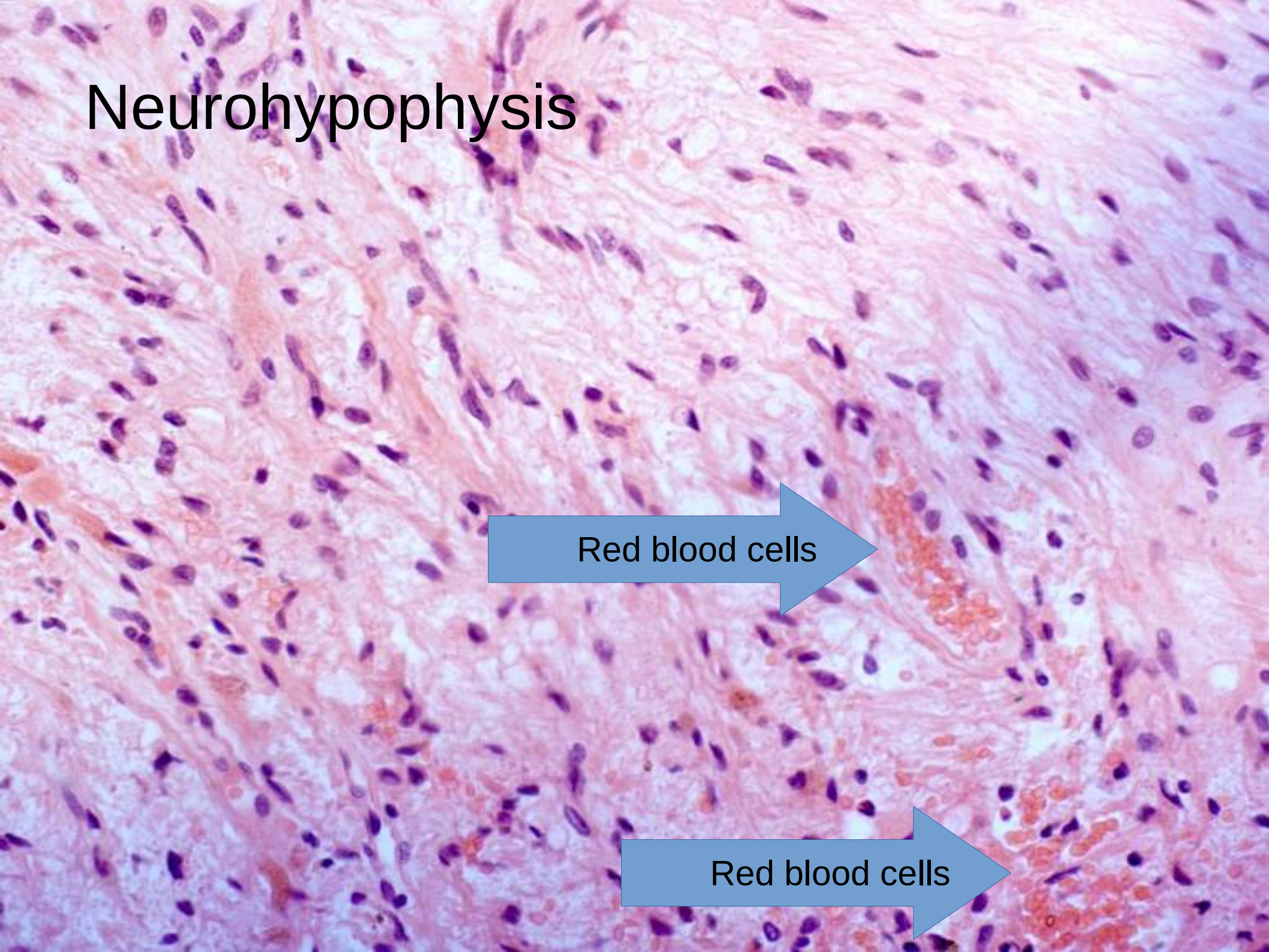
Colloid



Colloid

This is a high-magnification light micrograph of thyroid tissue. The image shows several thyroid follicles of varying sizes. Each follicle is bounded by a single layer of cuboidal epithelial cells, which are stained with hematoxylin and eosin (H&E). The nuclei of these cells are dark purple, and the cytoplasm is pink. The interior of each follicle is filled with a clear, pink-stained substance called colloid, which is the site of thyroglobulin synthesis and storage. The follicles are arranged in a somewhat irregular pattern, and the overall appearance is that of a typical thyroid gland.

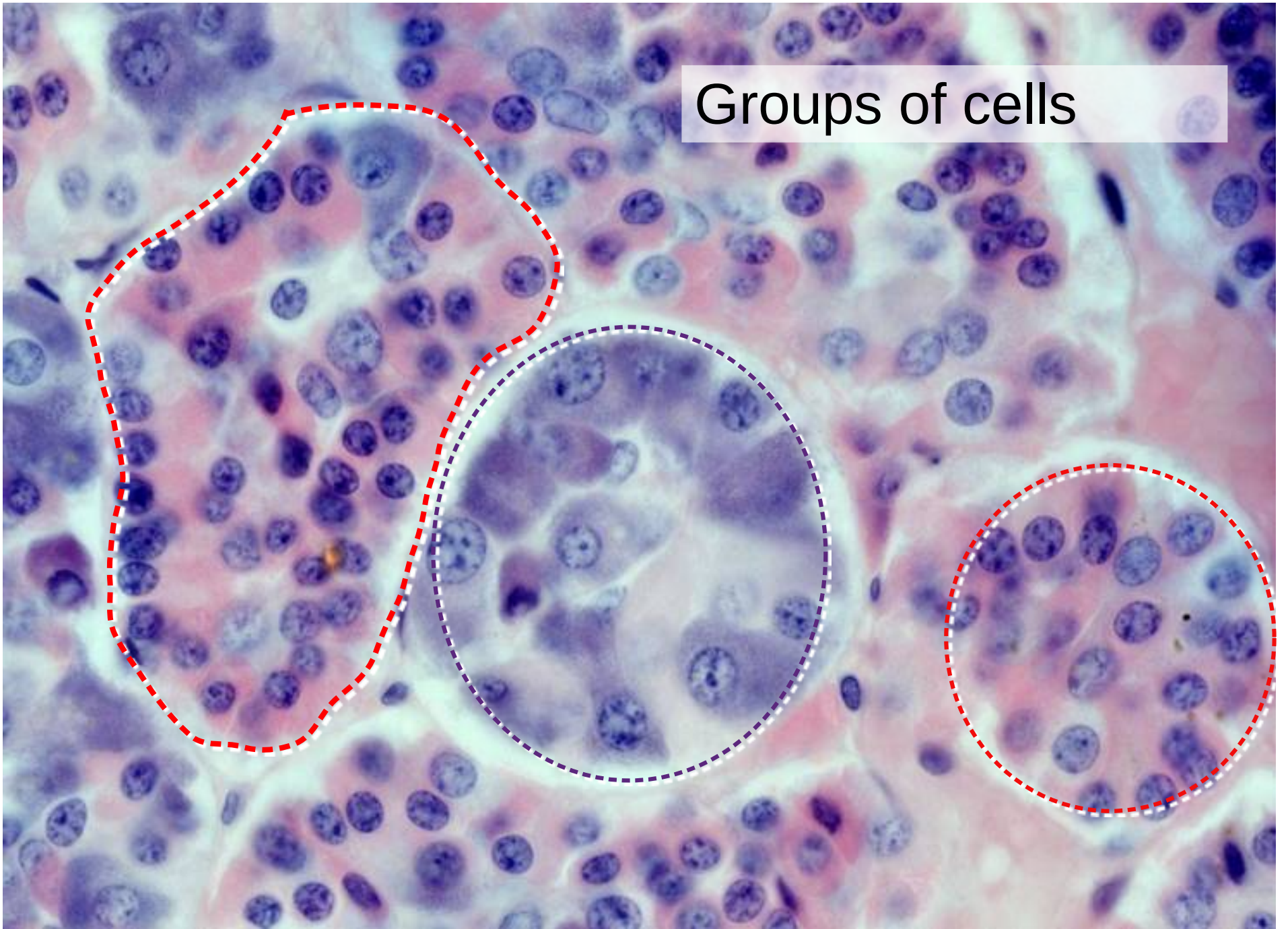
Neurohypophysis

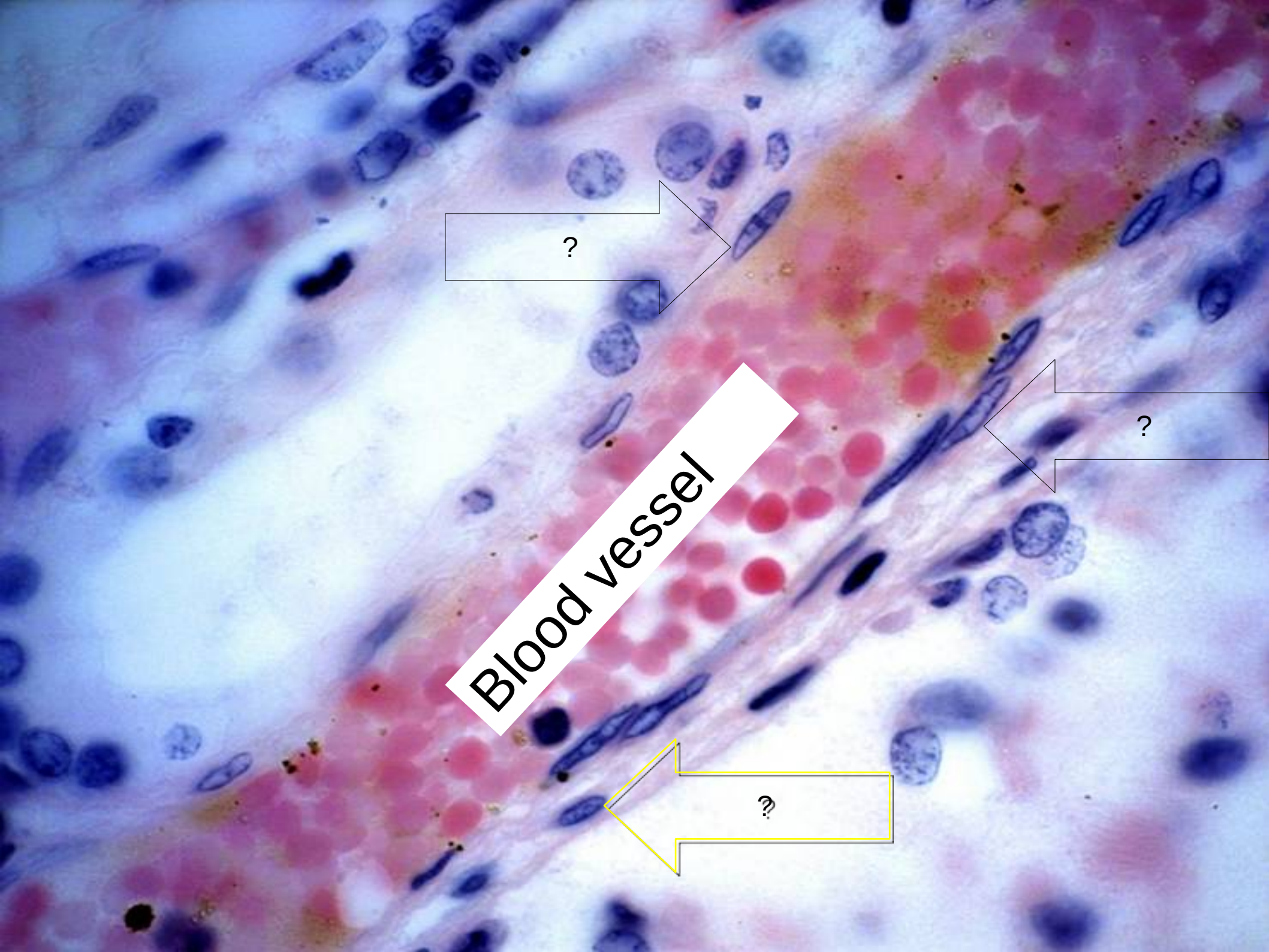


Red blood cells

Red blood cells

Groups of cells





?

Blood vessel

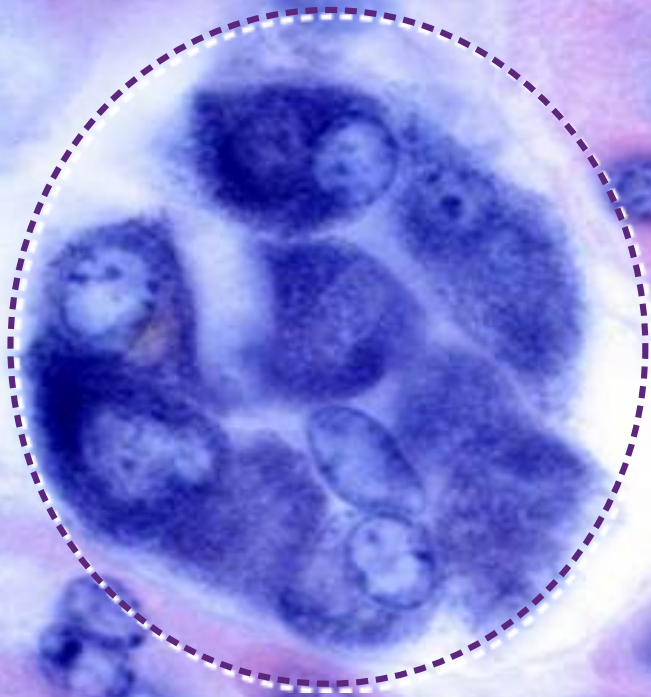
?

?



Blood vessel

Group of cells

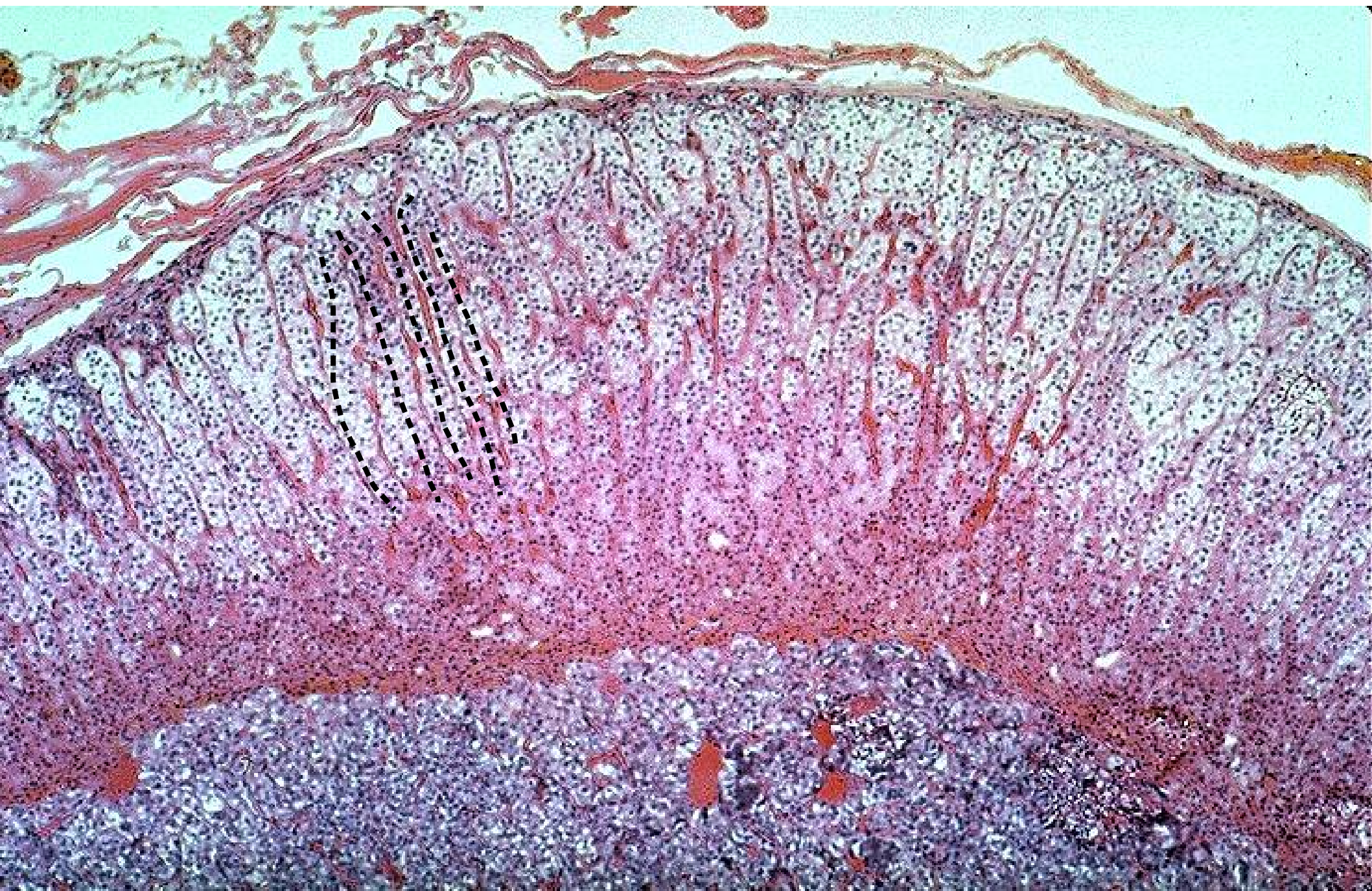


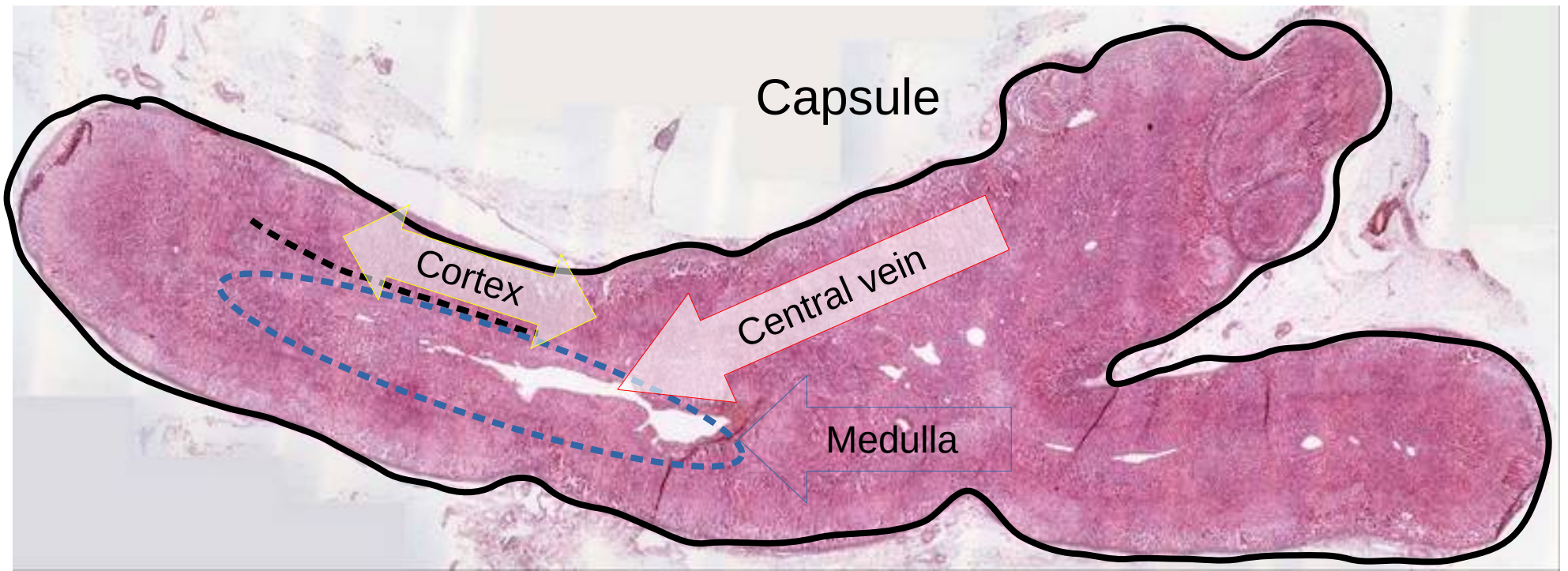
Slide 56 – Adrenal glands

Cords

Cords



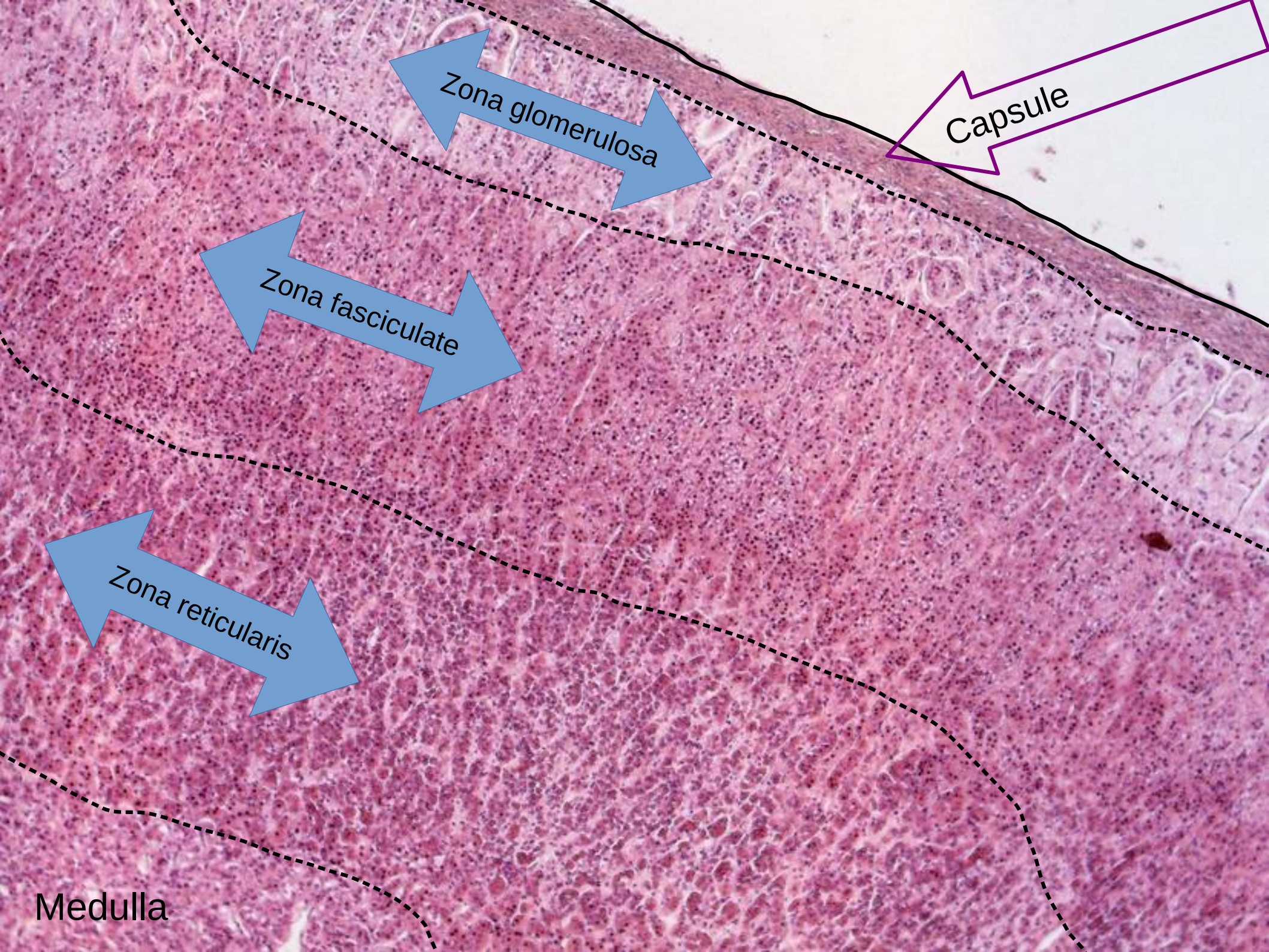






Connective tissue capsule

Cortex



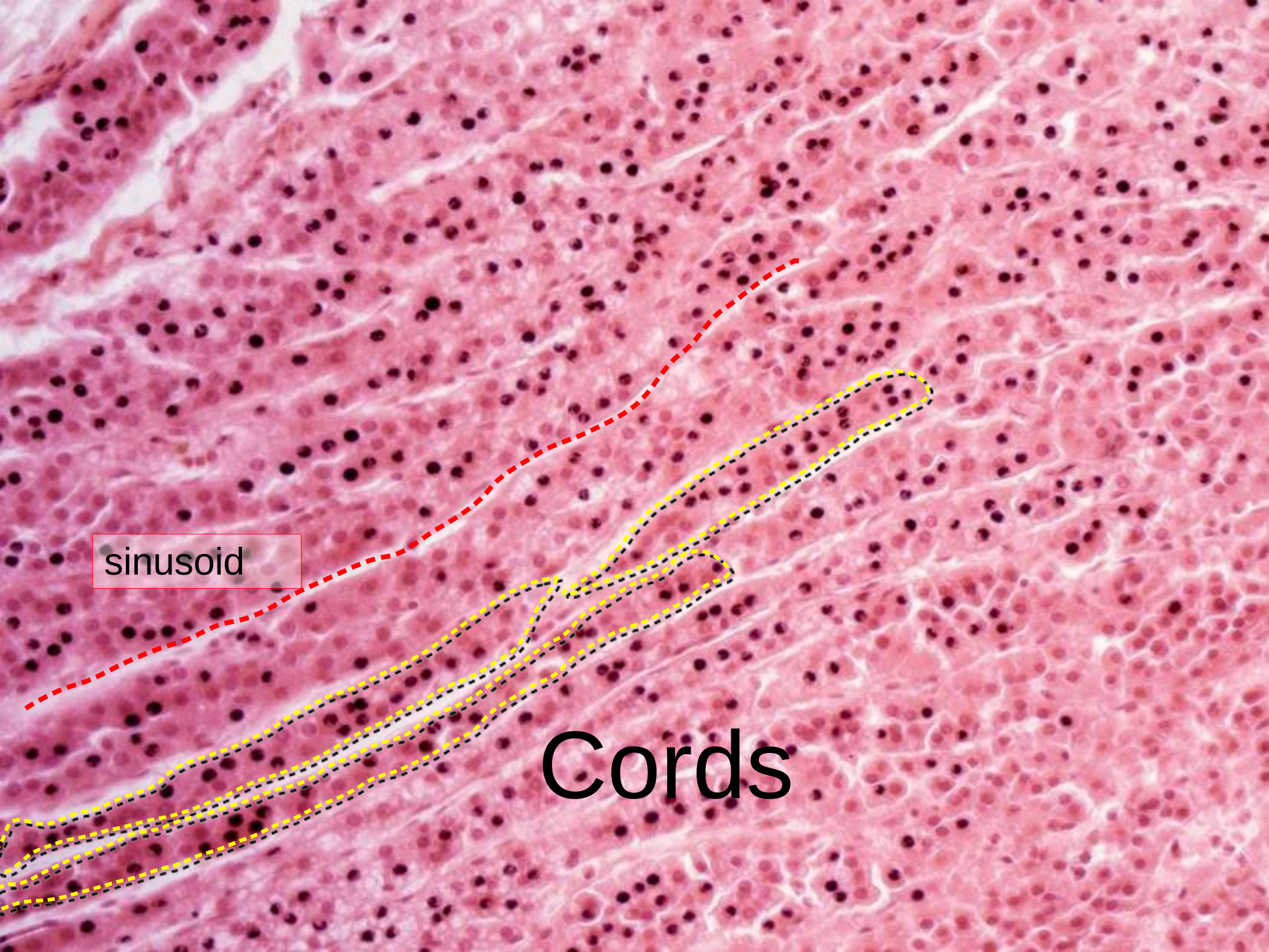
Capsule

Zona glomerulosa

Zona fasciculata

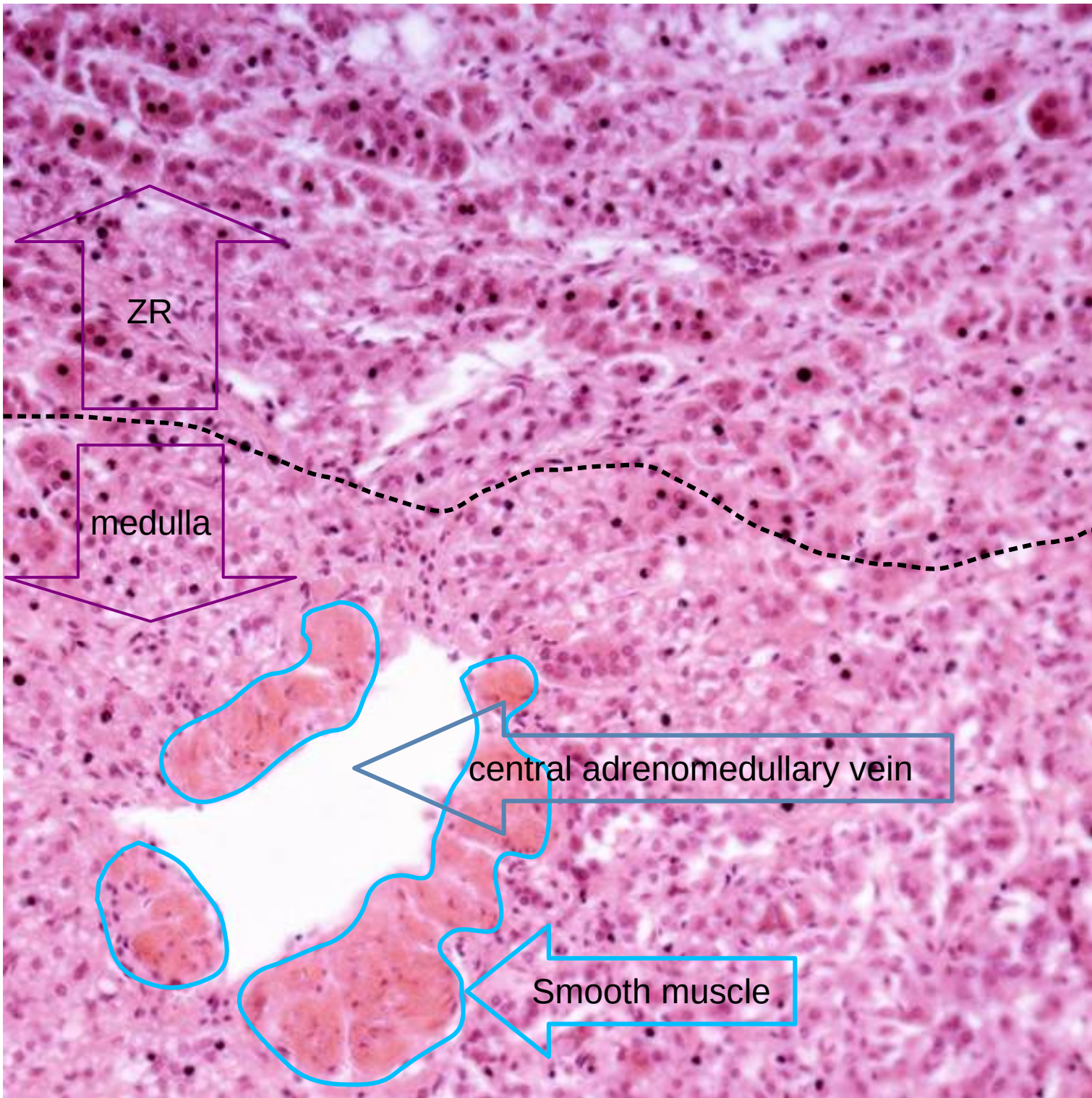
Zona reticularis

Medulla



sinusoid

Cords





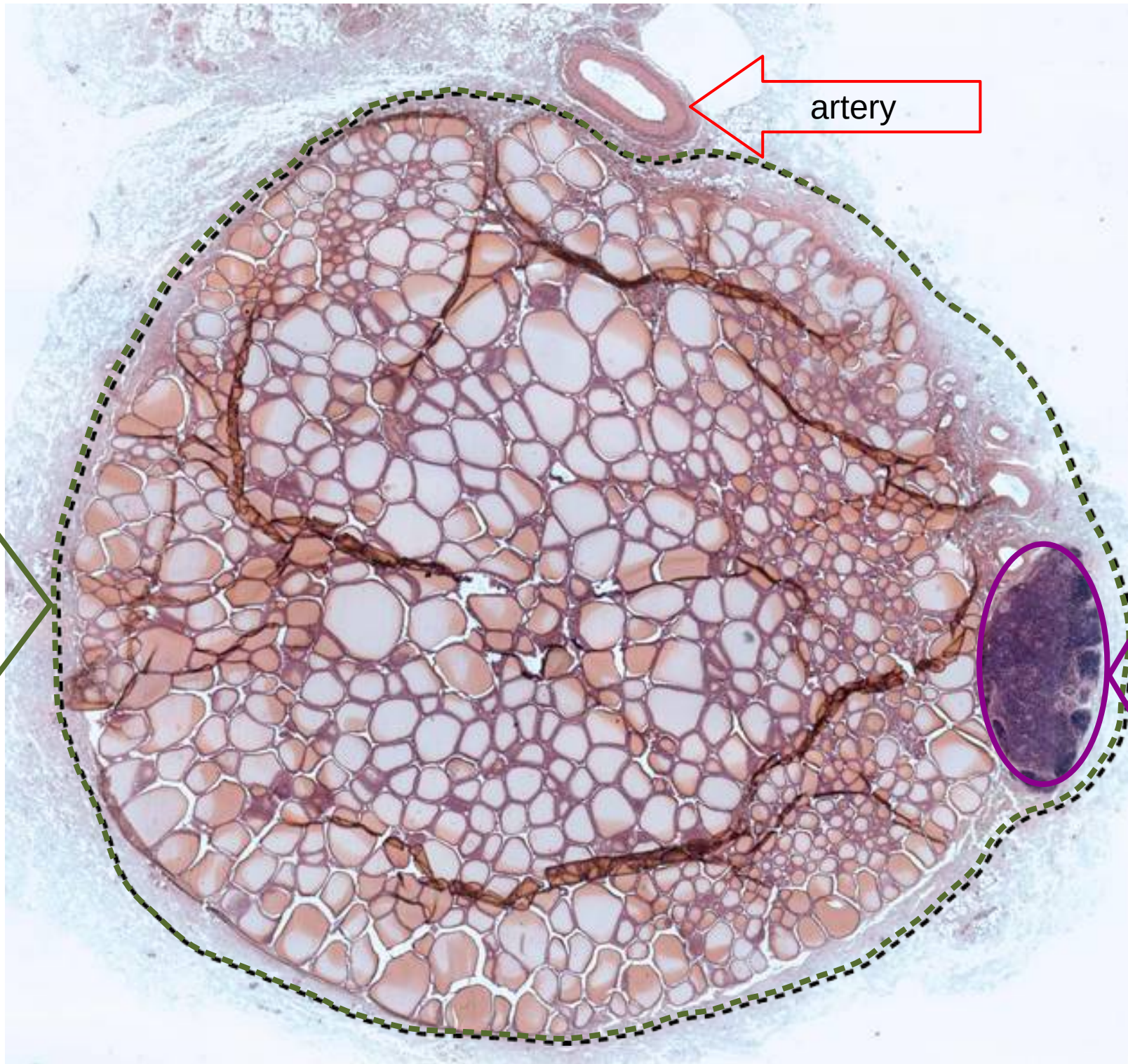
medulla

ZR

Slide 55 – Thyroid gland

Follicles

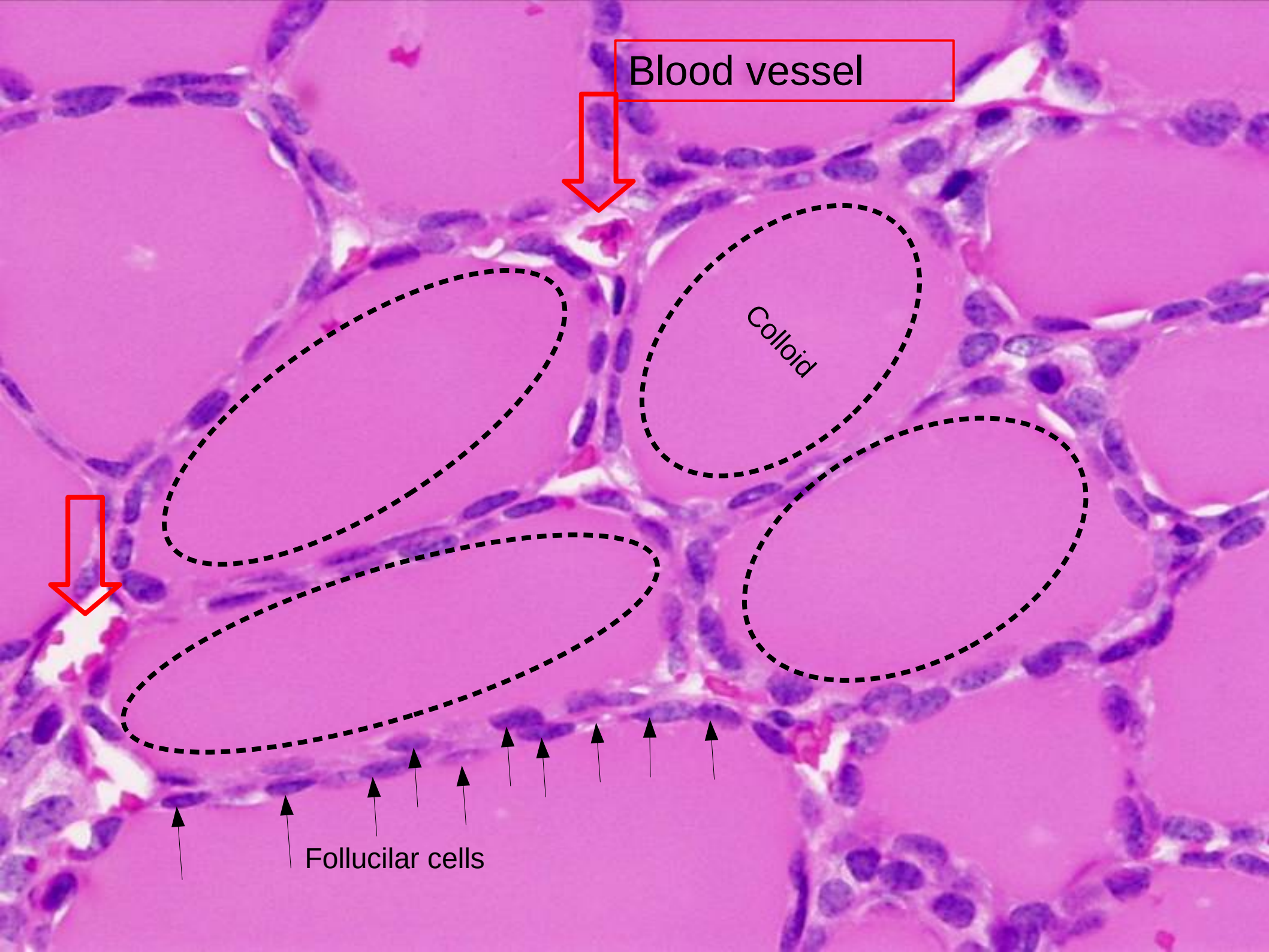




artery

capsule

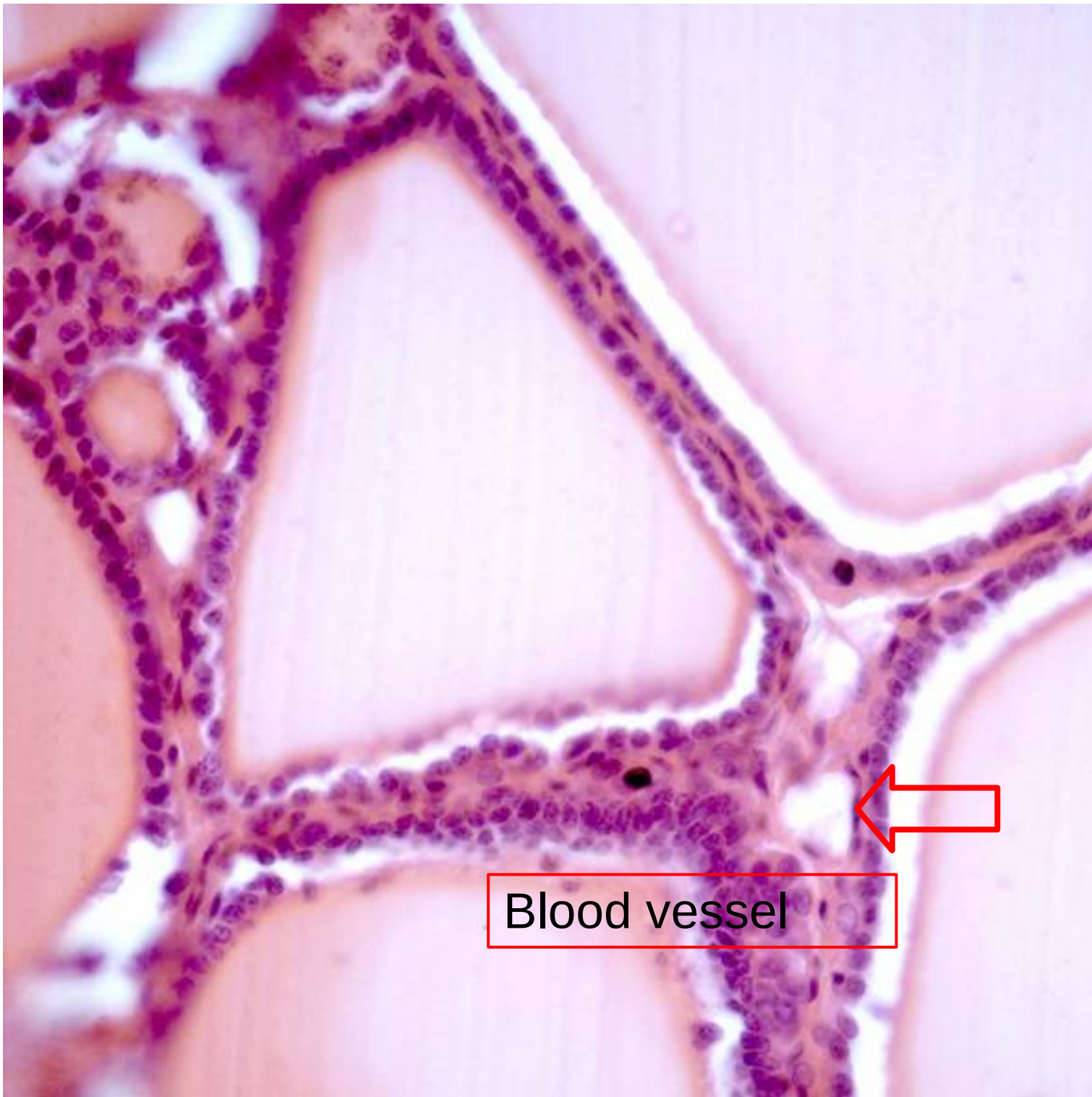
lymph follicle



Blood vessel

Colloid

Follicular cells



Blood vessel

Glandular Epithelium

- Slides
- Exocrine
- 42
- 50
- 39 or 7
- Endocrine
- 50, 52
- 56 & 55
- Education

Exocrine		
<i>Slide name</i>	<i>Slide number</i>	<i>Stain</i>
Goblet cells & simple tubular glands	42	H/E
Compound tubulo-alveolar glands	50	H/E
Secretory units	39	H/E
Secretory units	7	H/E
Endocrine		
Islands (pancreas)	50	H/E
Groups (pituitary gland)	52	H/E
Cords (adrenal gland)	56	H/E
Follicles (thyroid gland)	55	H/E

When can we



Mandatory



Memory is the
residue of thought

...Daniel Willingham

What stuff could there be?

