
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

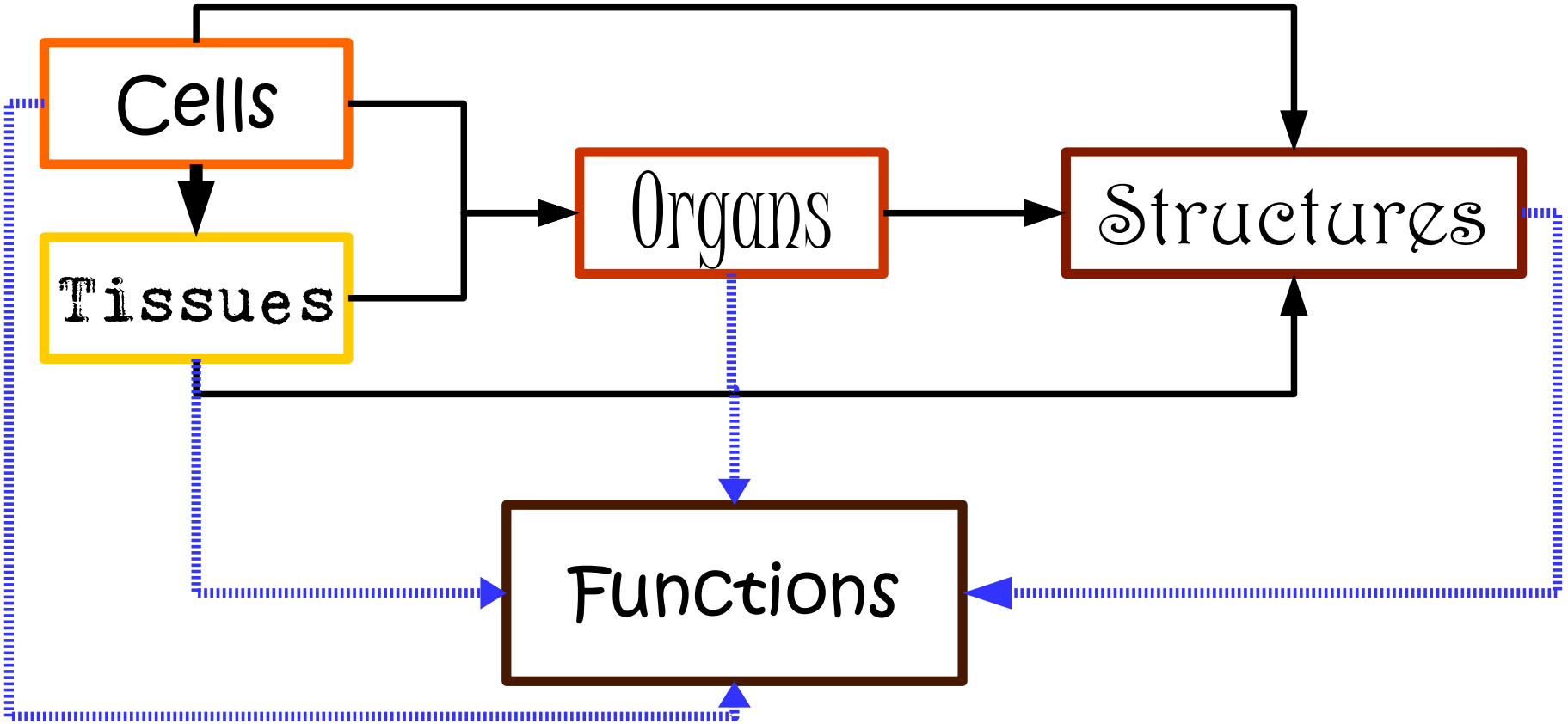
If Not Excellence, What?

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

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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

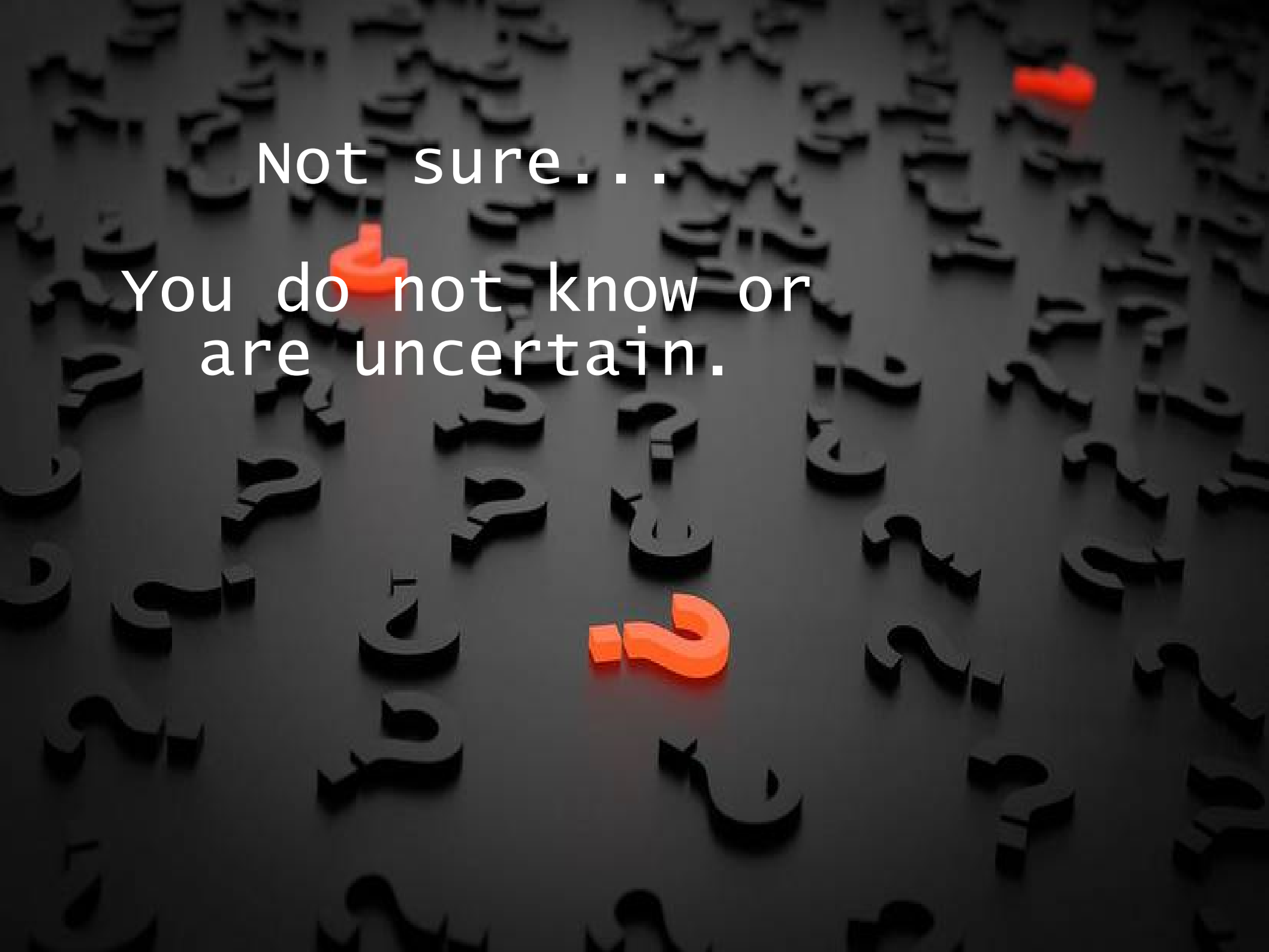

Google
https://www.google.com
Search
Images
Maps
Play
YouTube
News
Gmail
Drive
Calendar
More
Google
Google Search
I'm Feeling Lucky

Assess yourself

Nailed it

Not sure

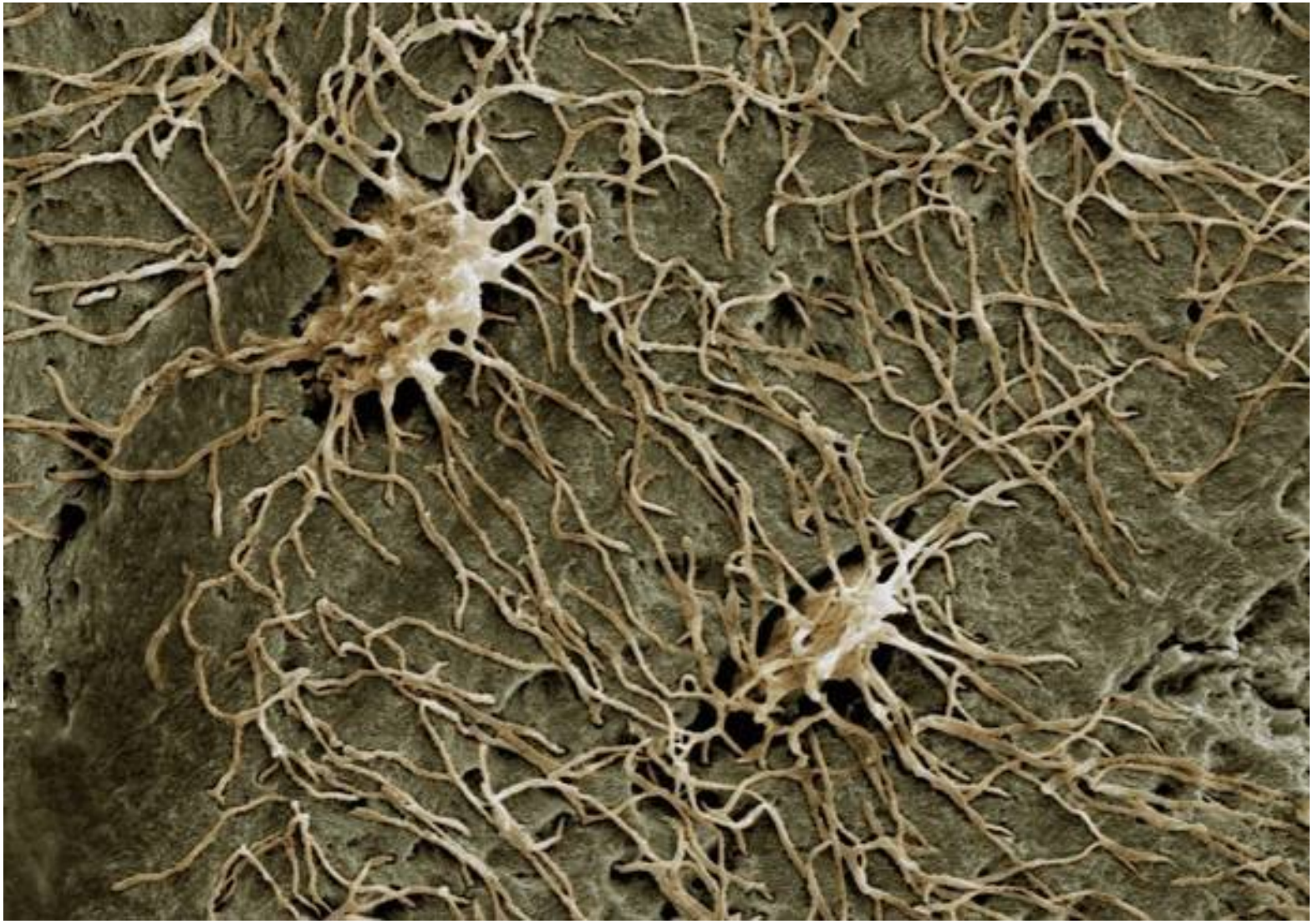

Nailed it!
You are confident about your answer.


Not sure...
You do not know or are uncertain.

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

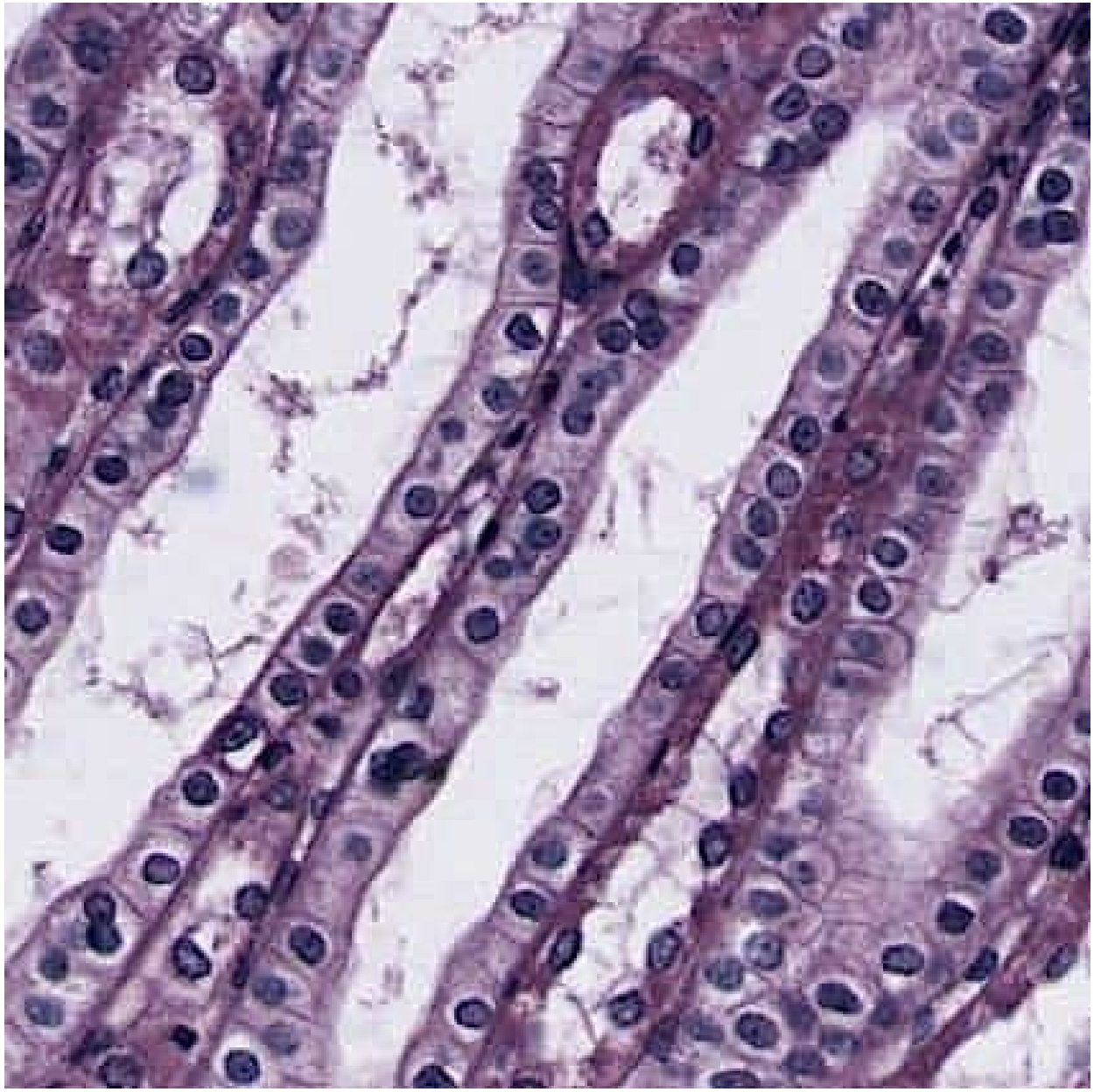
= 1

2. Which microscope was used to produce the image?



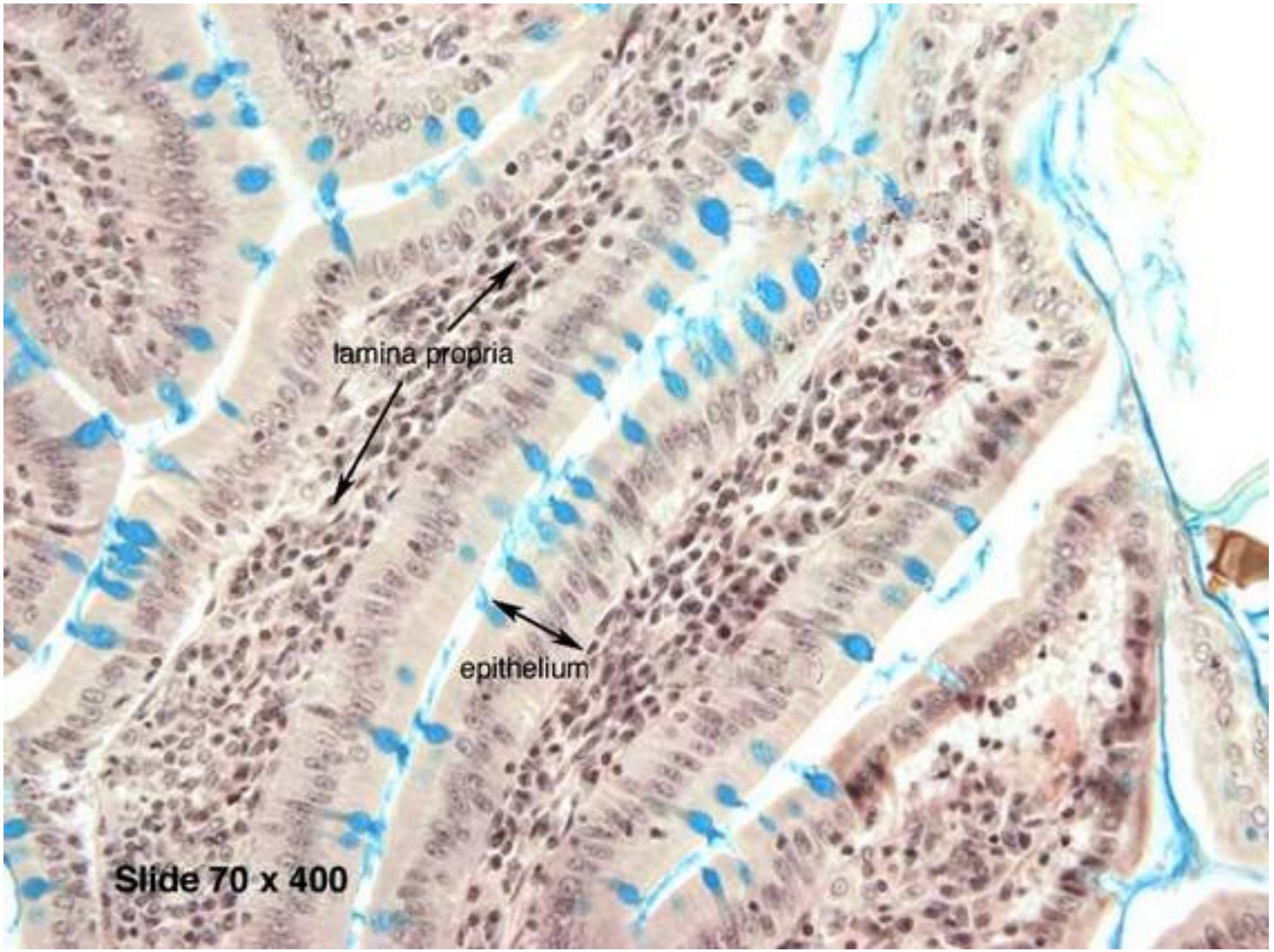
= 1

3. Identify the epithelium.



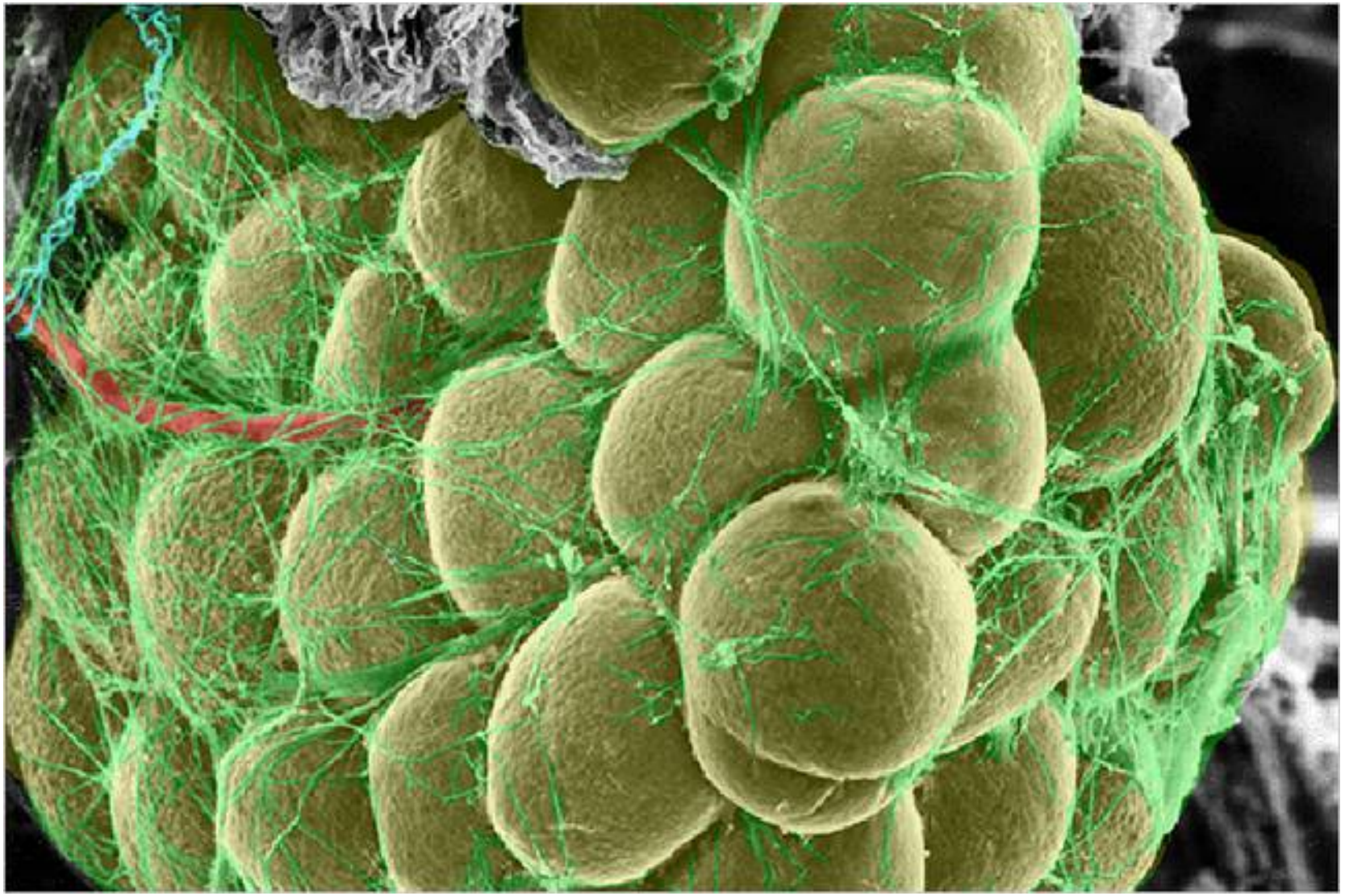
= 1

4. Identify the epithelium cell stained selectively by alcian blue



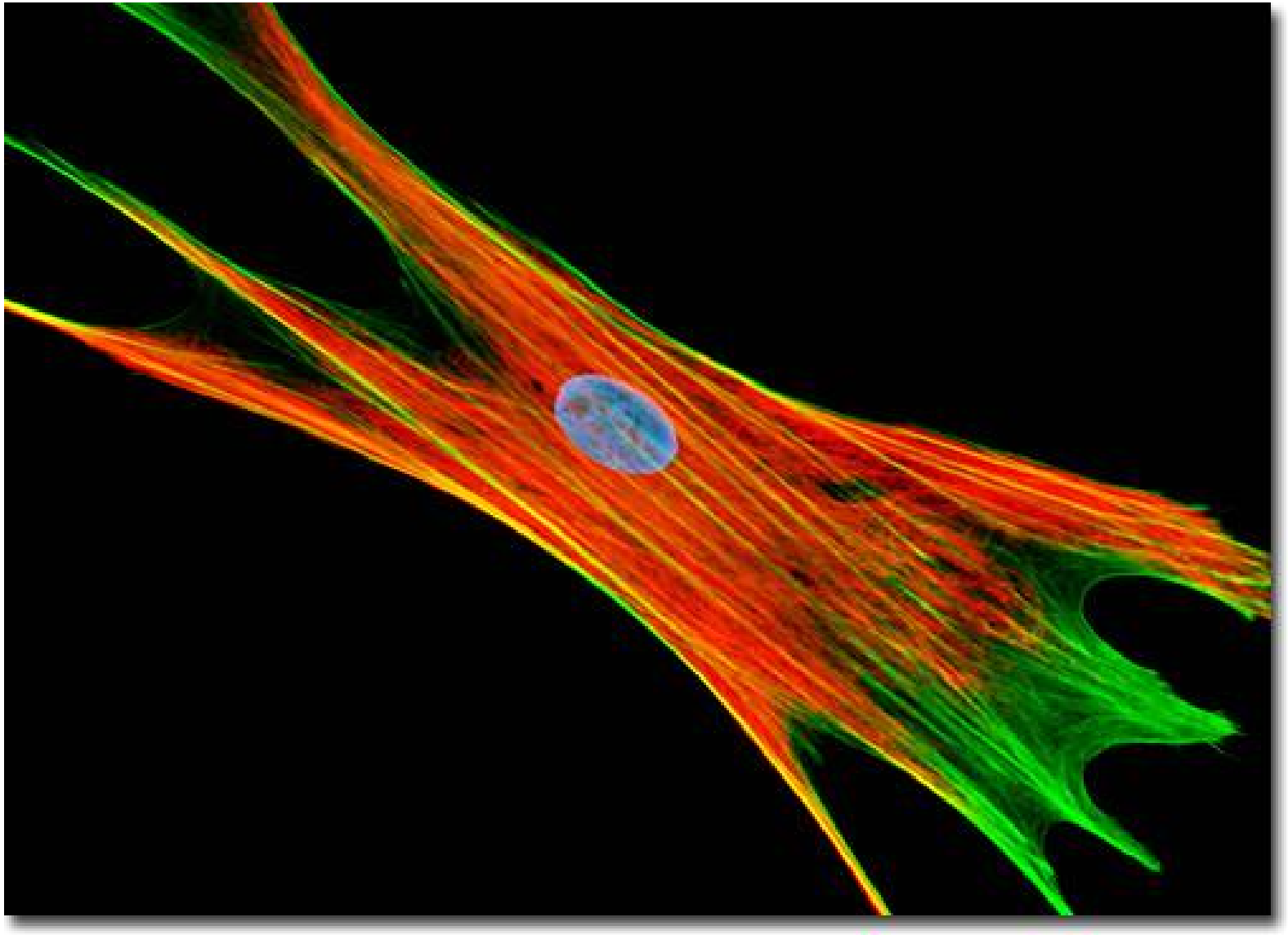
= 1

5. Identify the support tissue



= 1

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



= 1

Grade your answers

Community of Truth

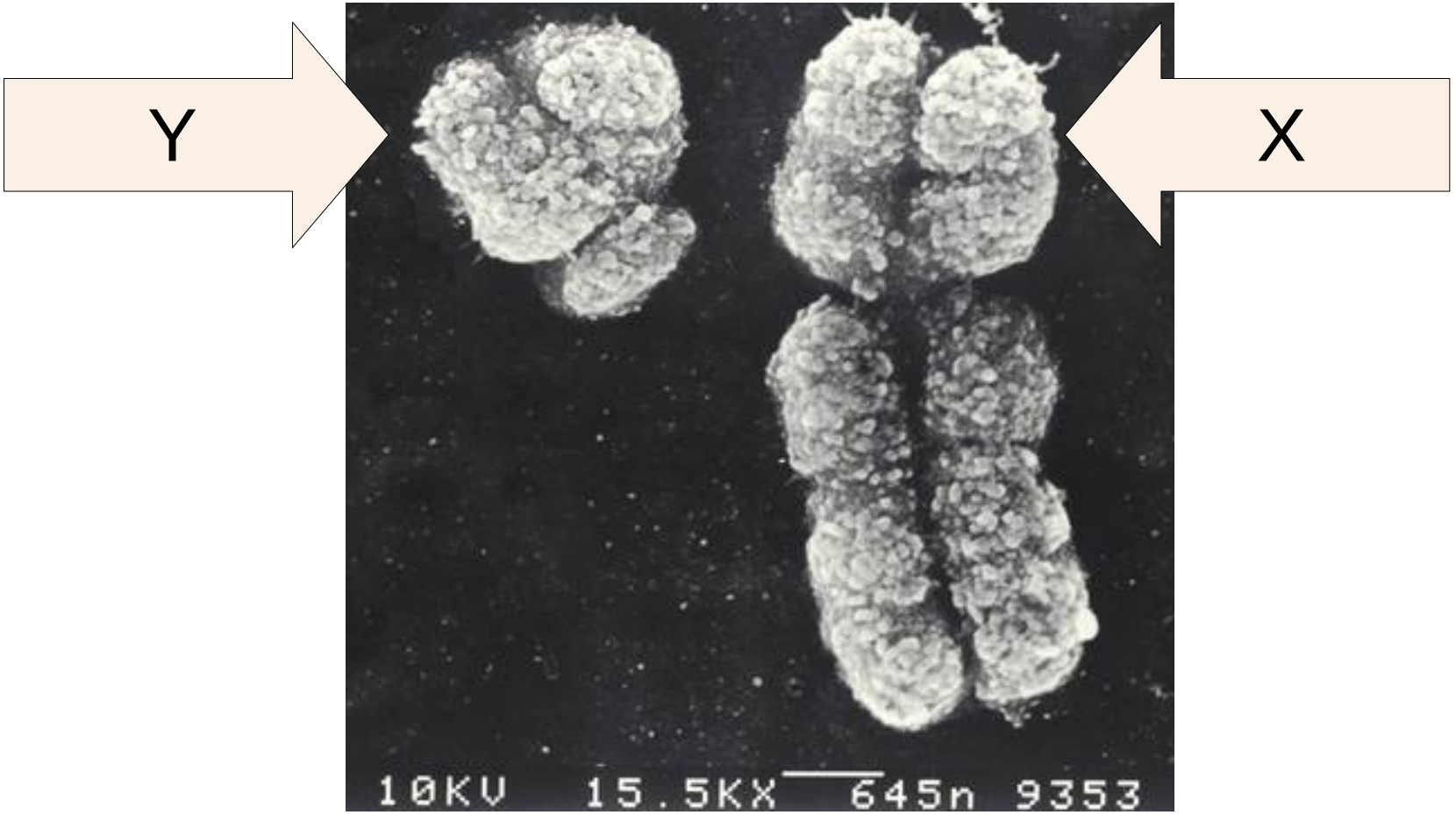
What is my answer?

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?

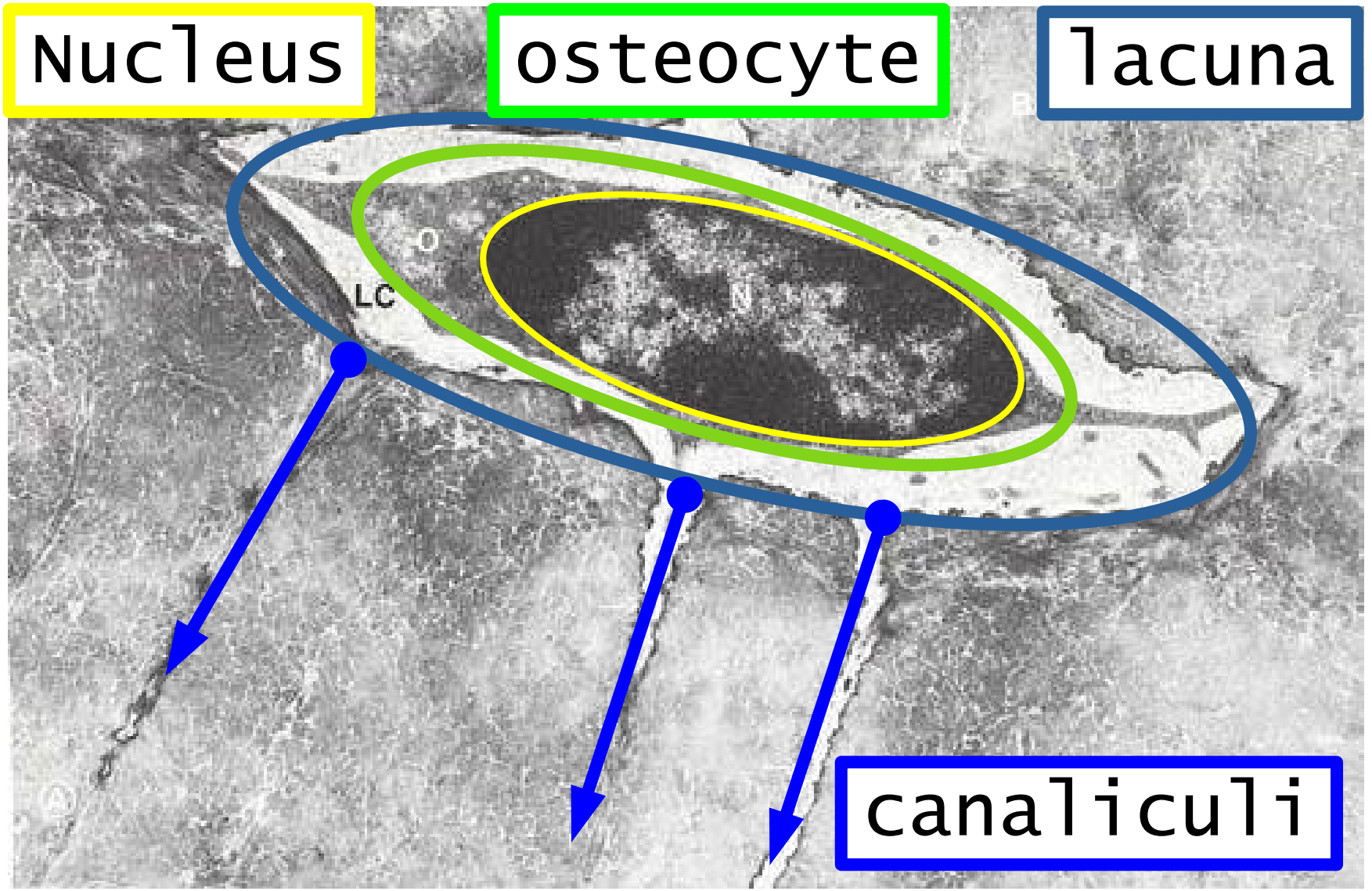


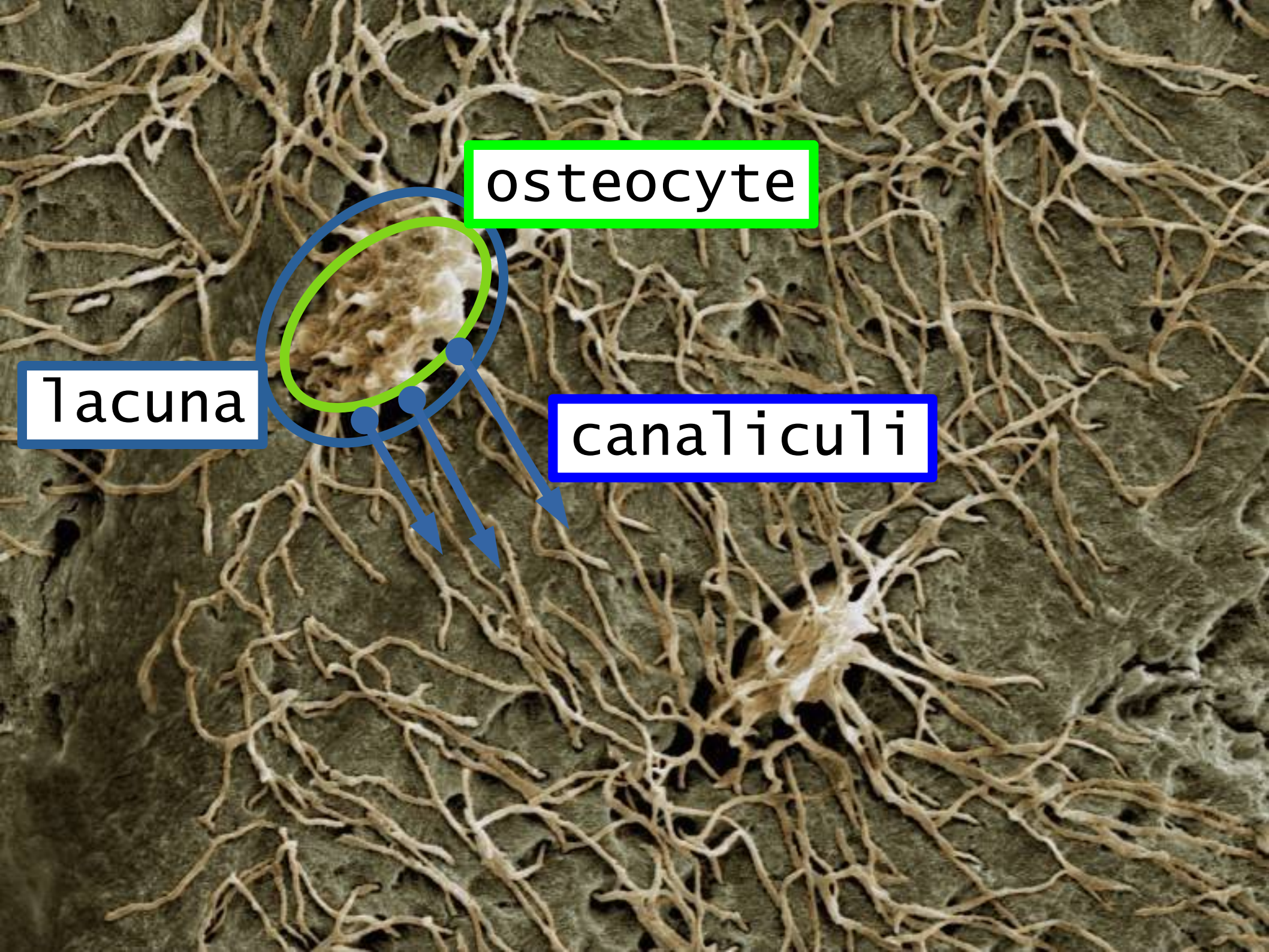
= 1 = Metaphase or Anaphase

2. Which microscope was used to produce the image?

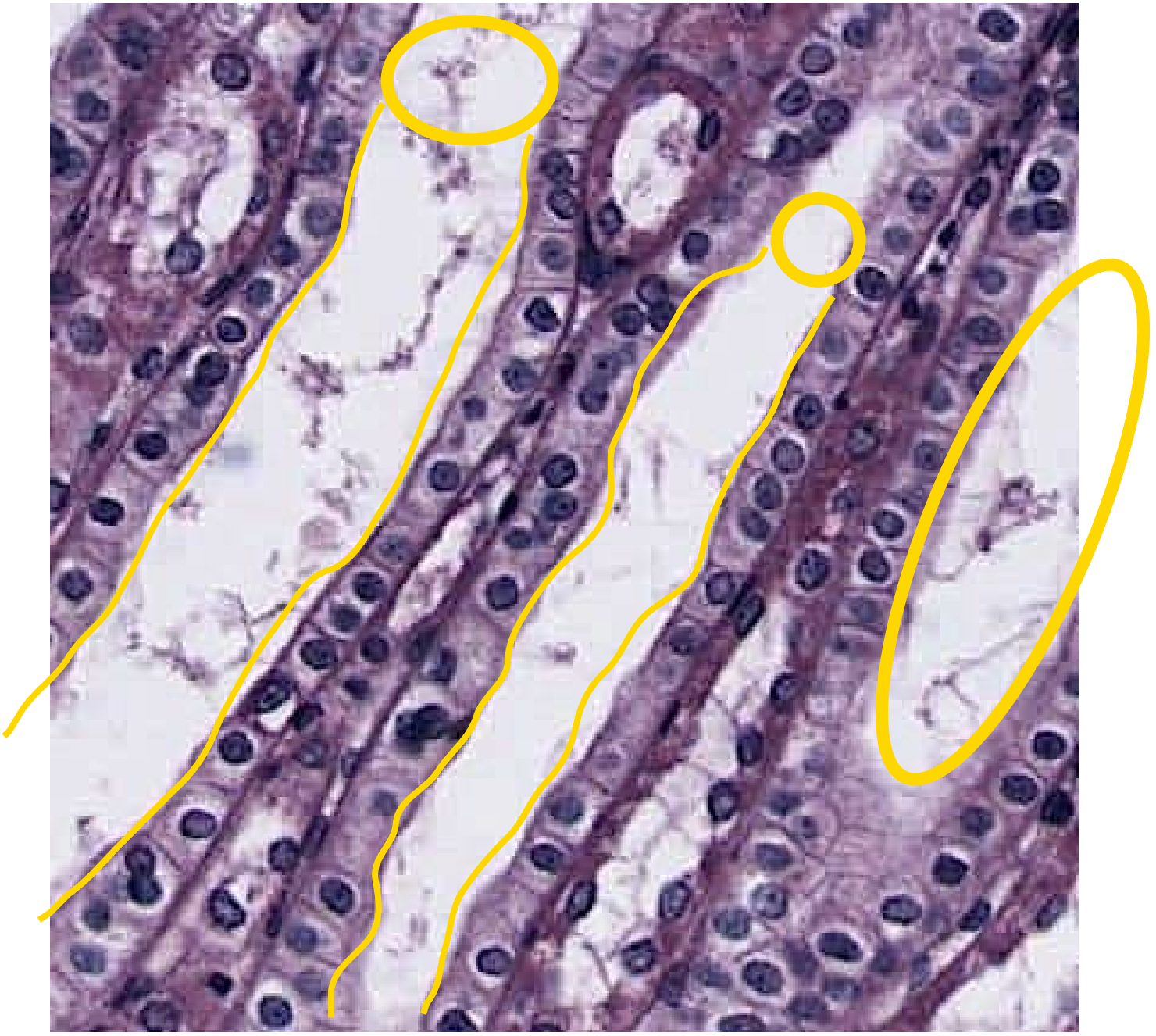
= 1 = Scanning electron microscope

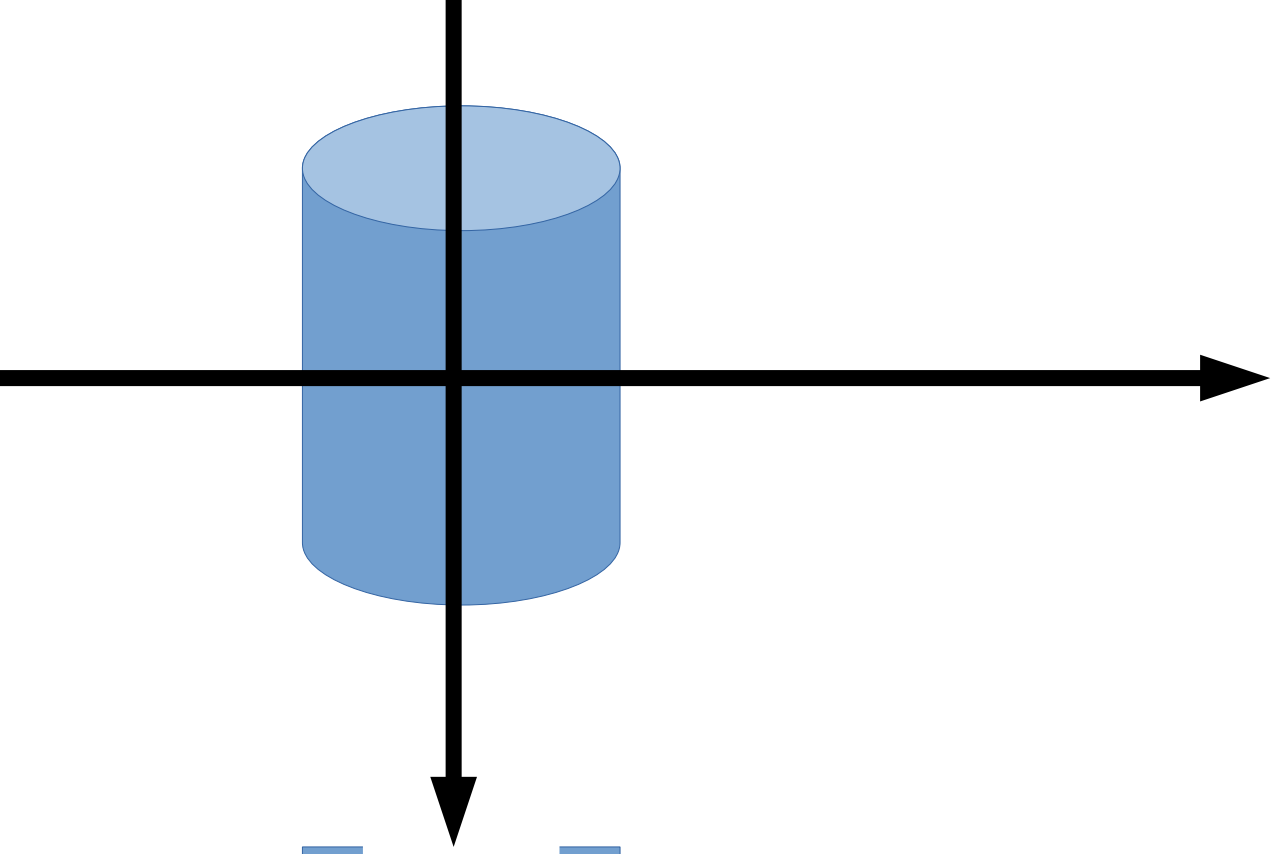
Osteocyte

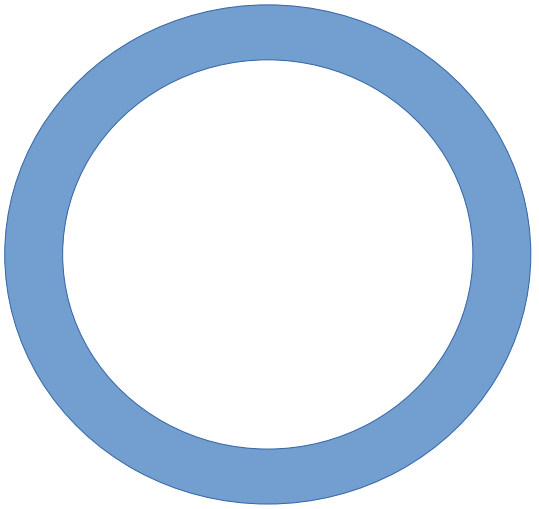


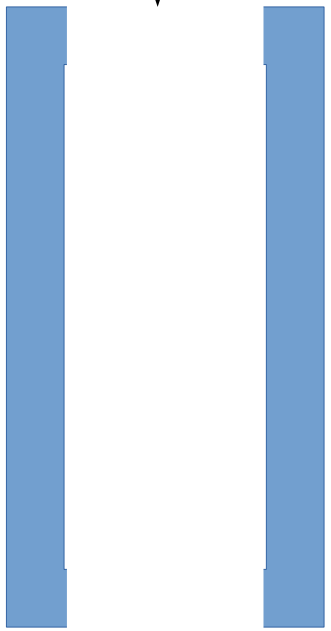

osteocyte
lacuna
canaliculi

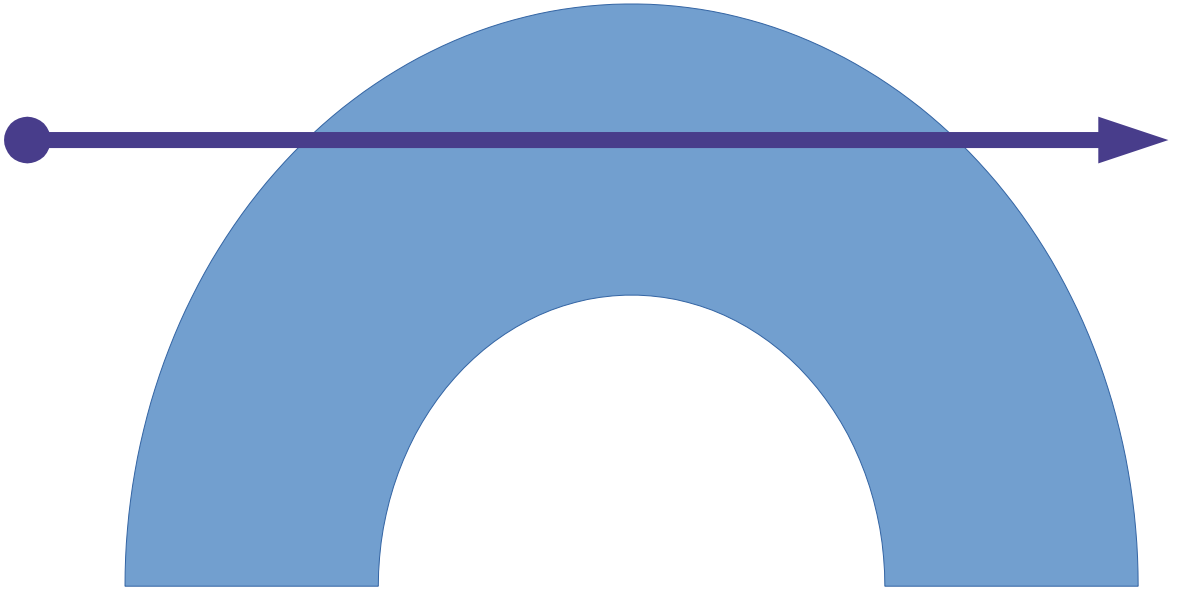
3. Simple cuboidal epithelium

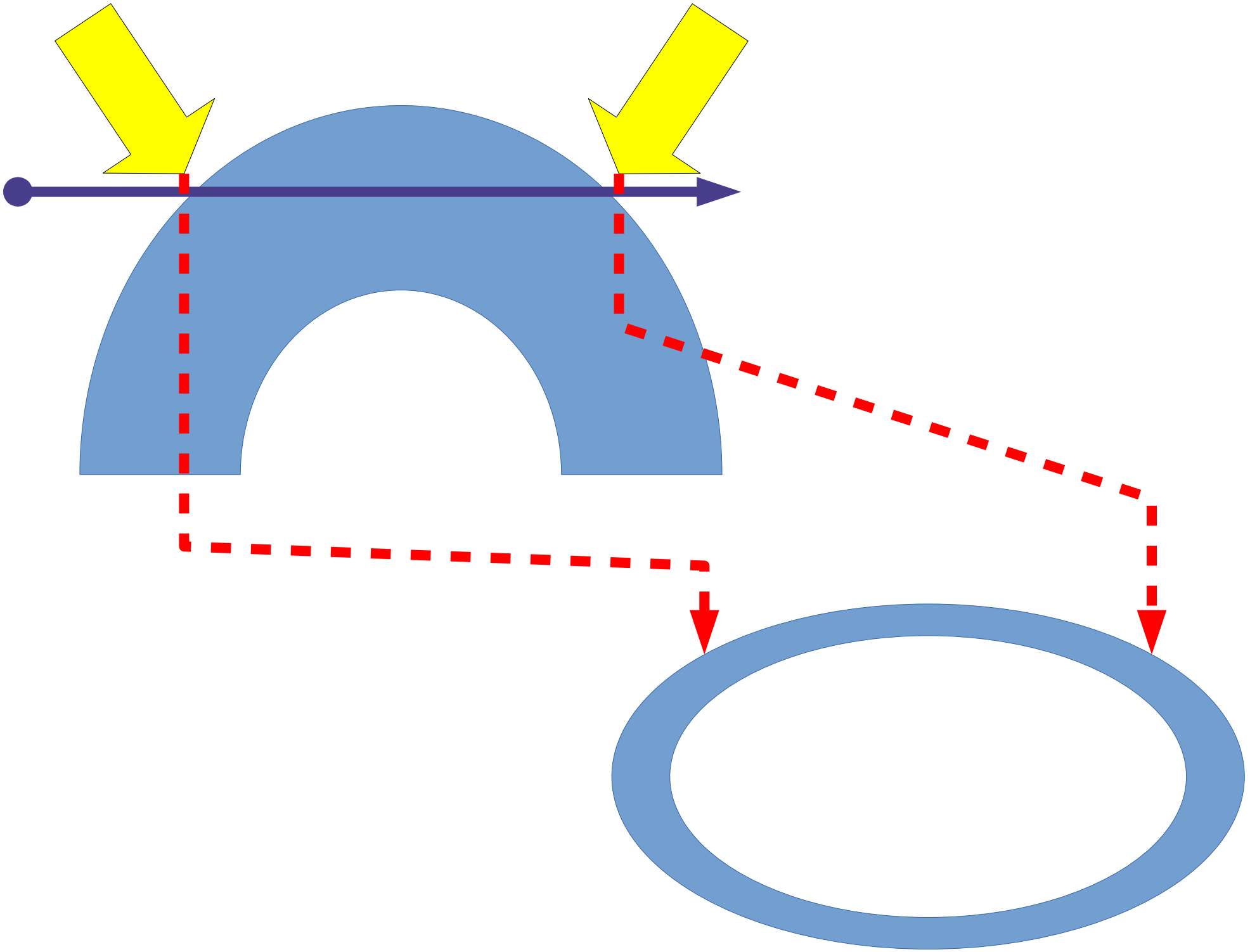




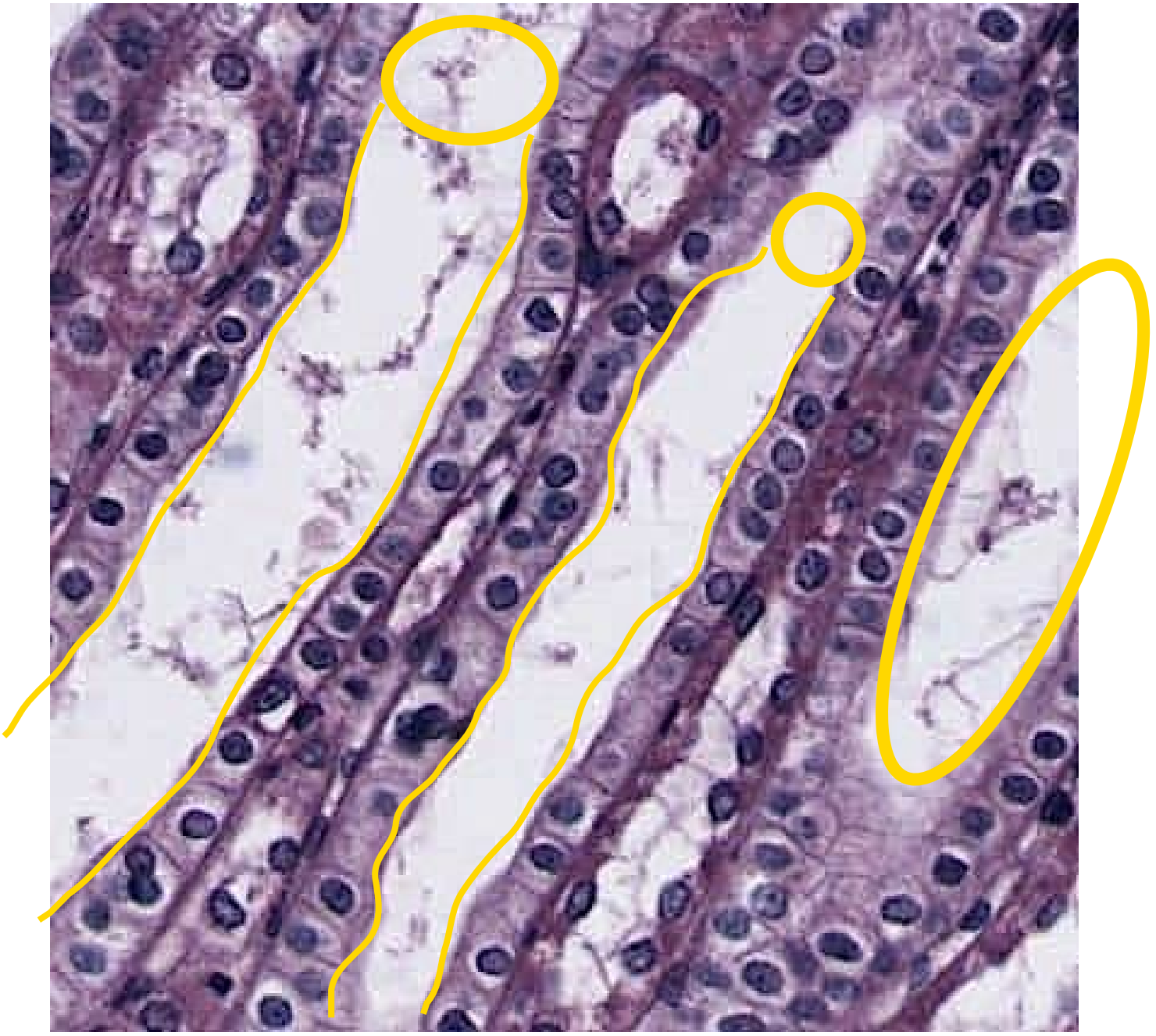




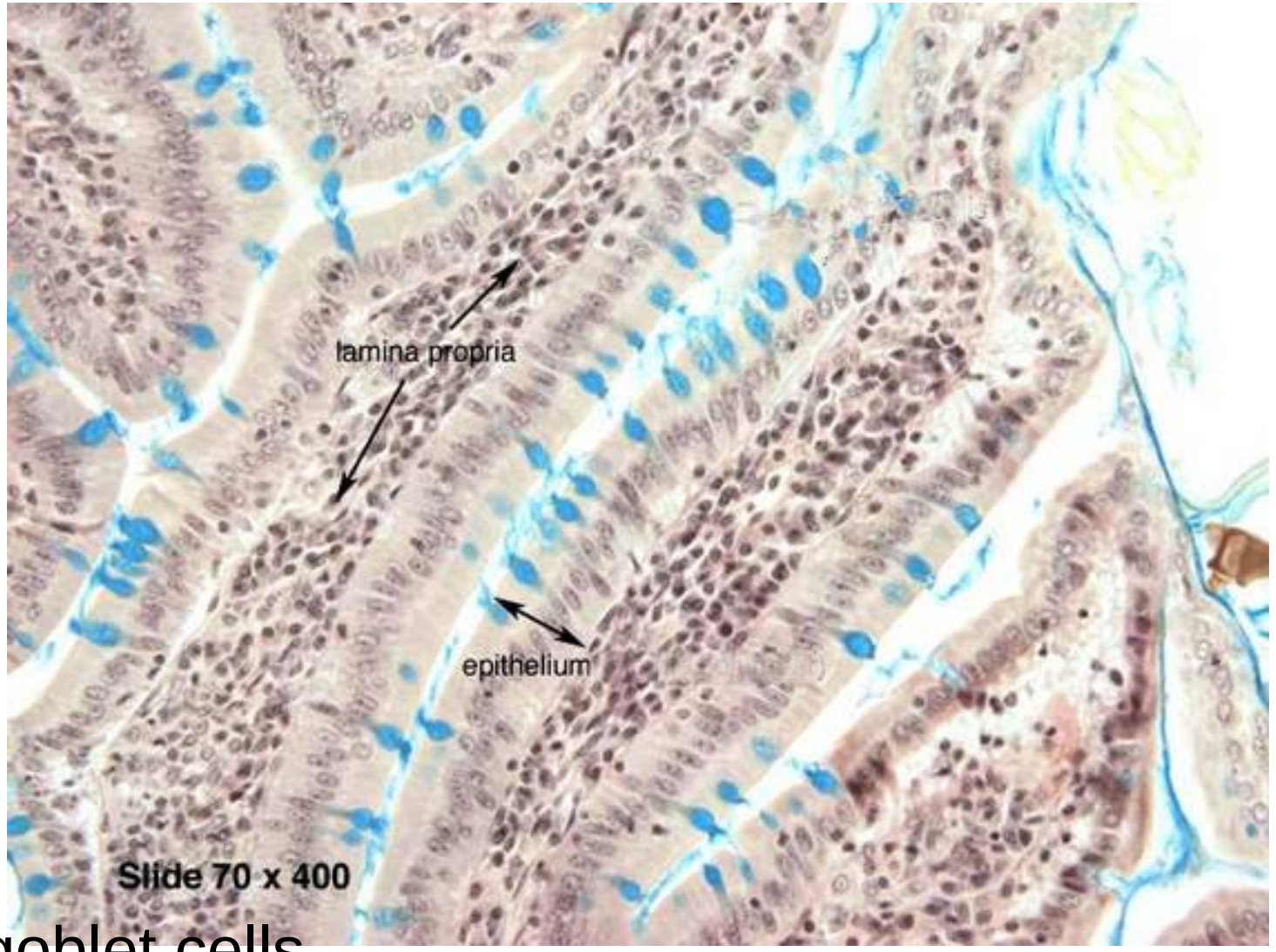




3. Simple cuboidal epithelium

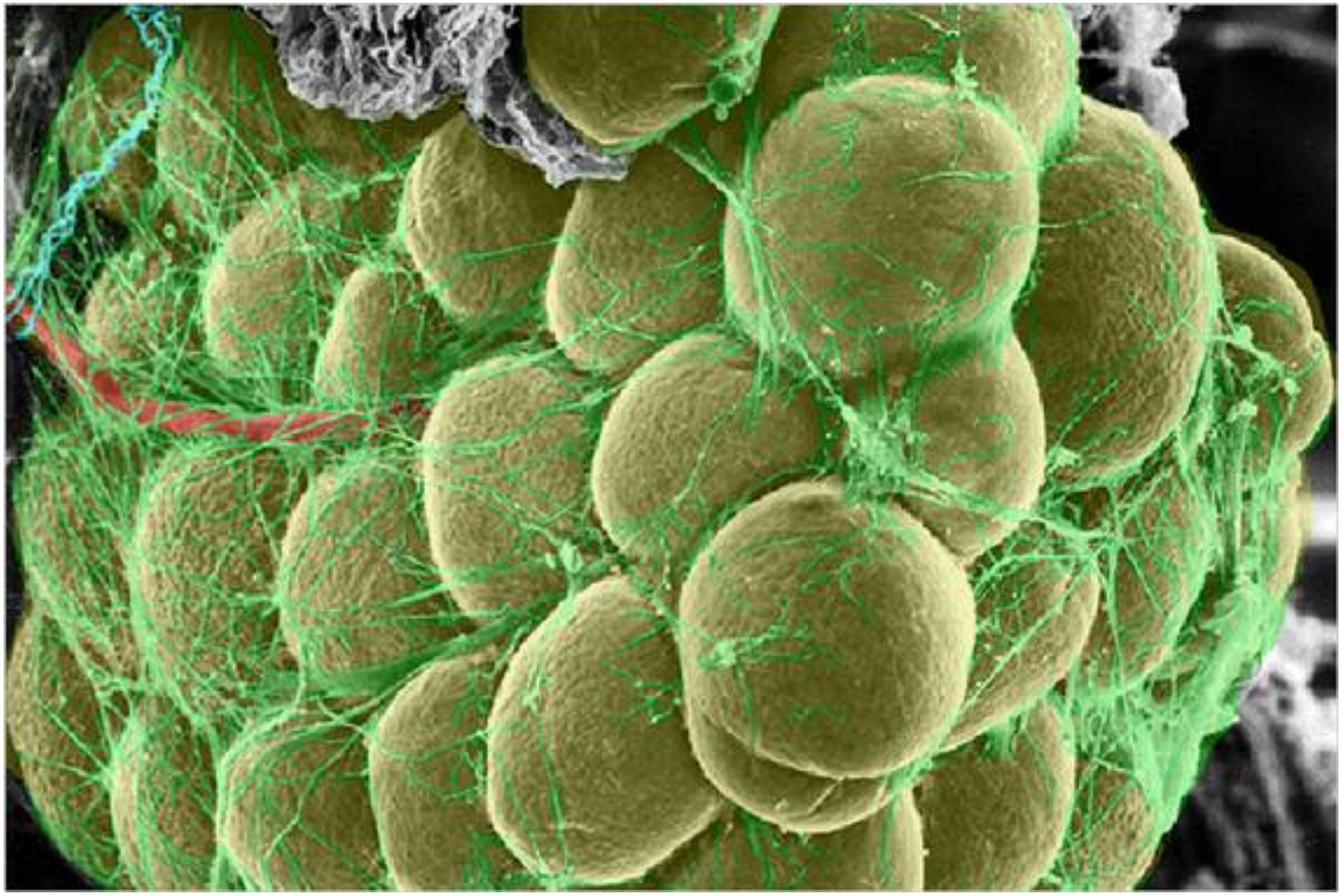


4. Identify the epithelium cell stained selectively by alcian blue



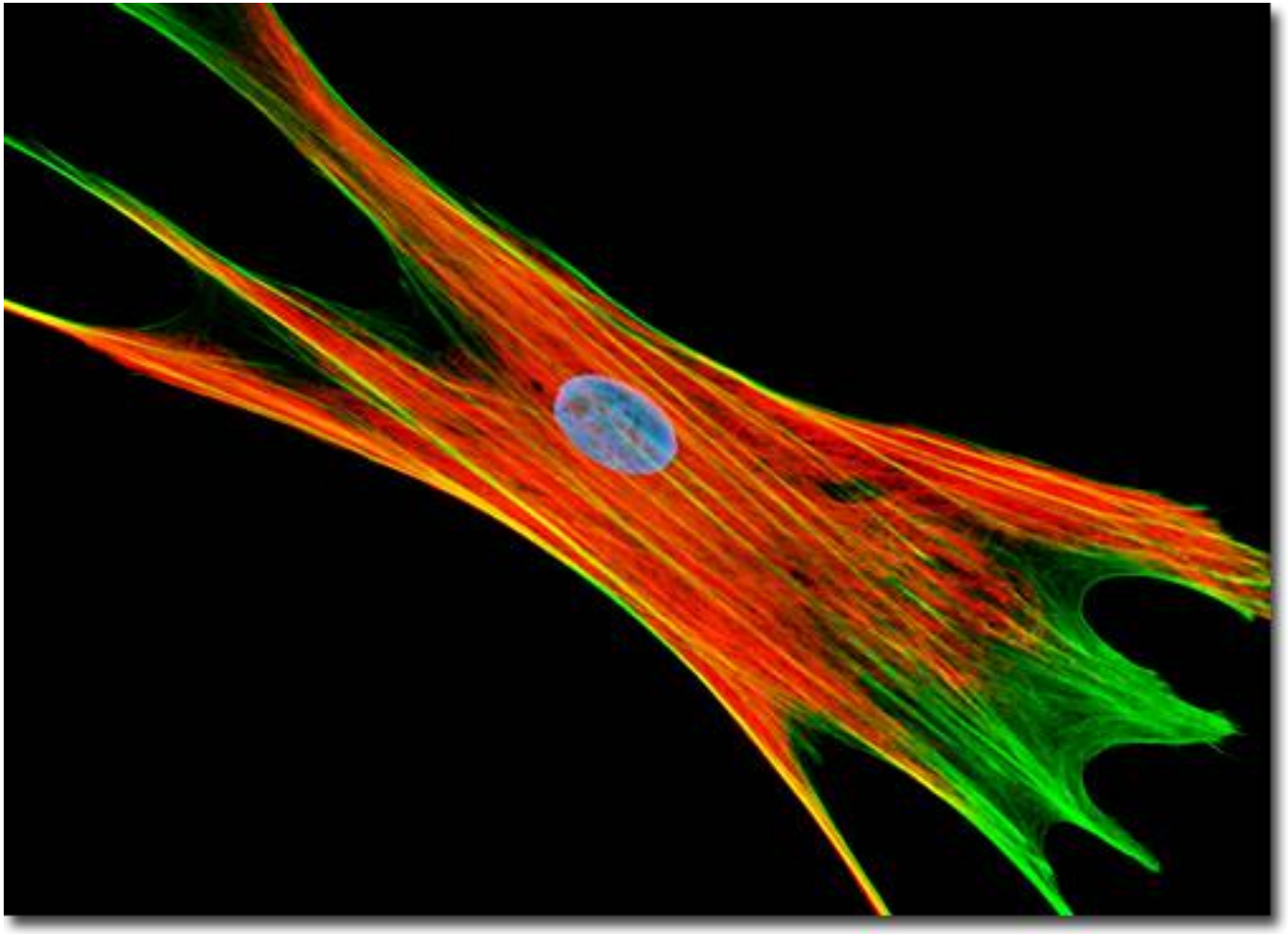
= 1 = goblet cells

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

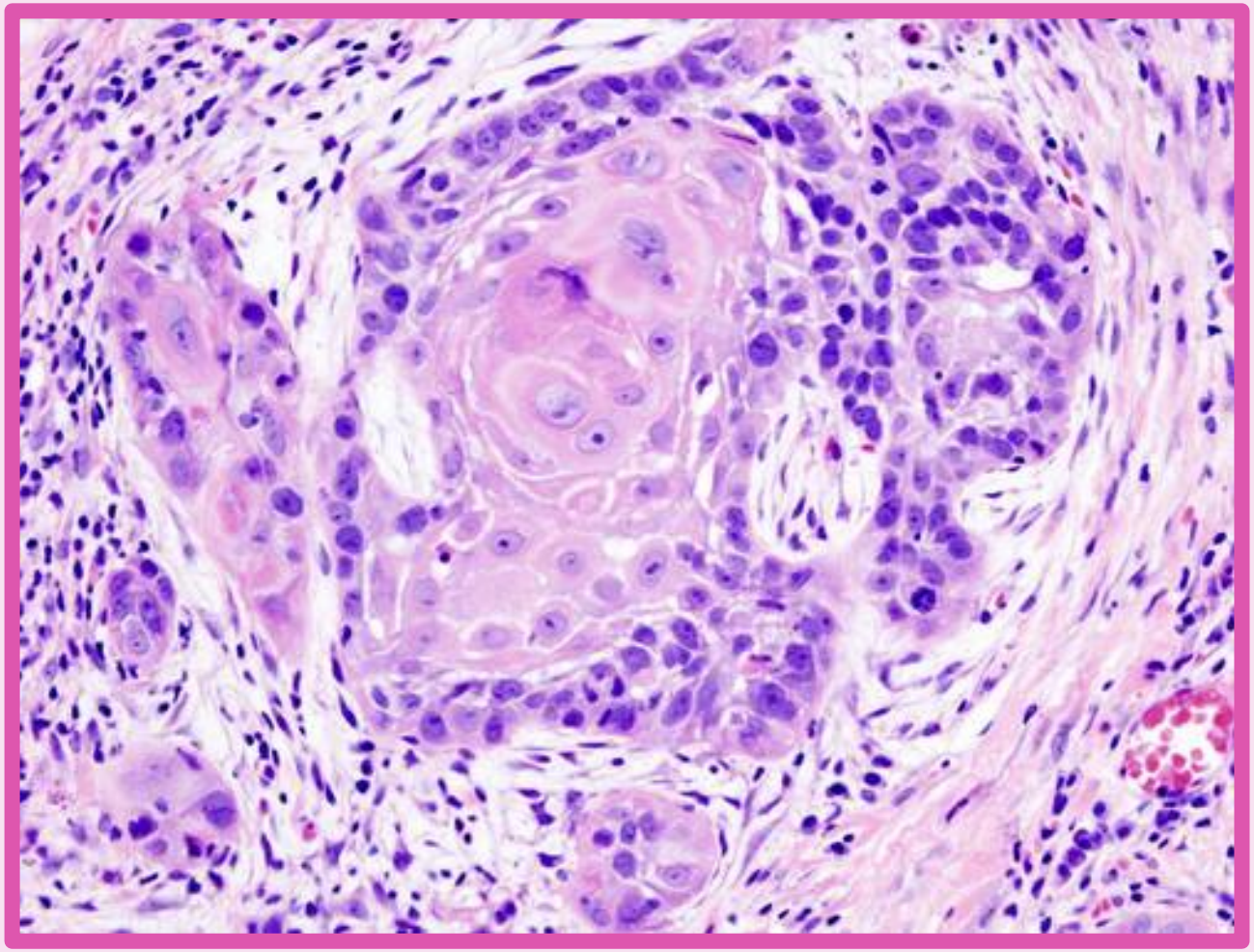
Write today's Date
The current Topic

Epithelia – What?

Epithelia – Why?

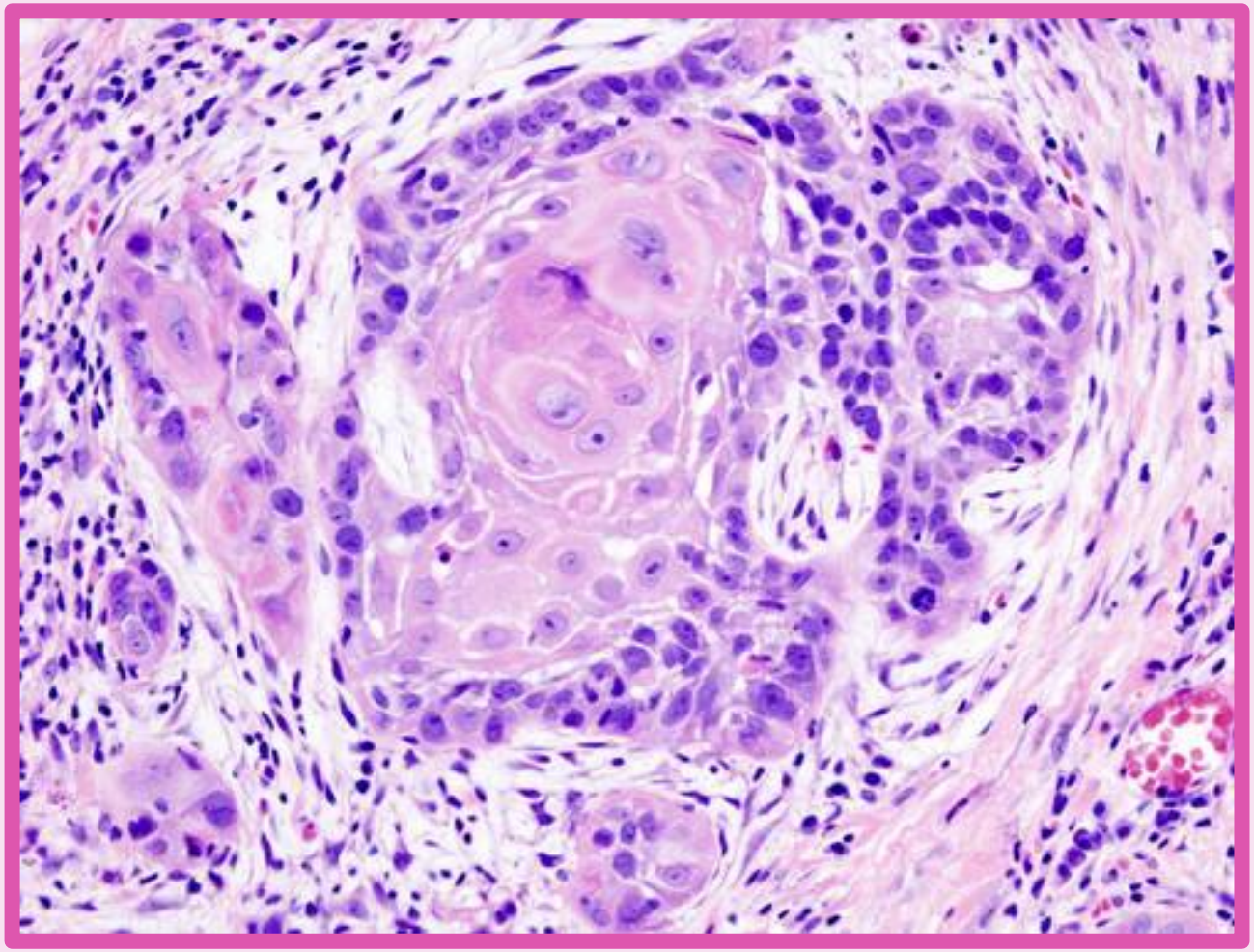
Carcinomas

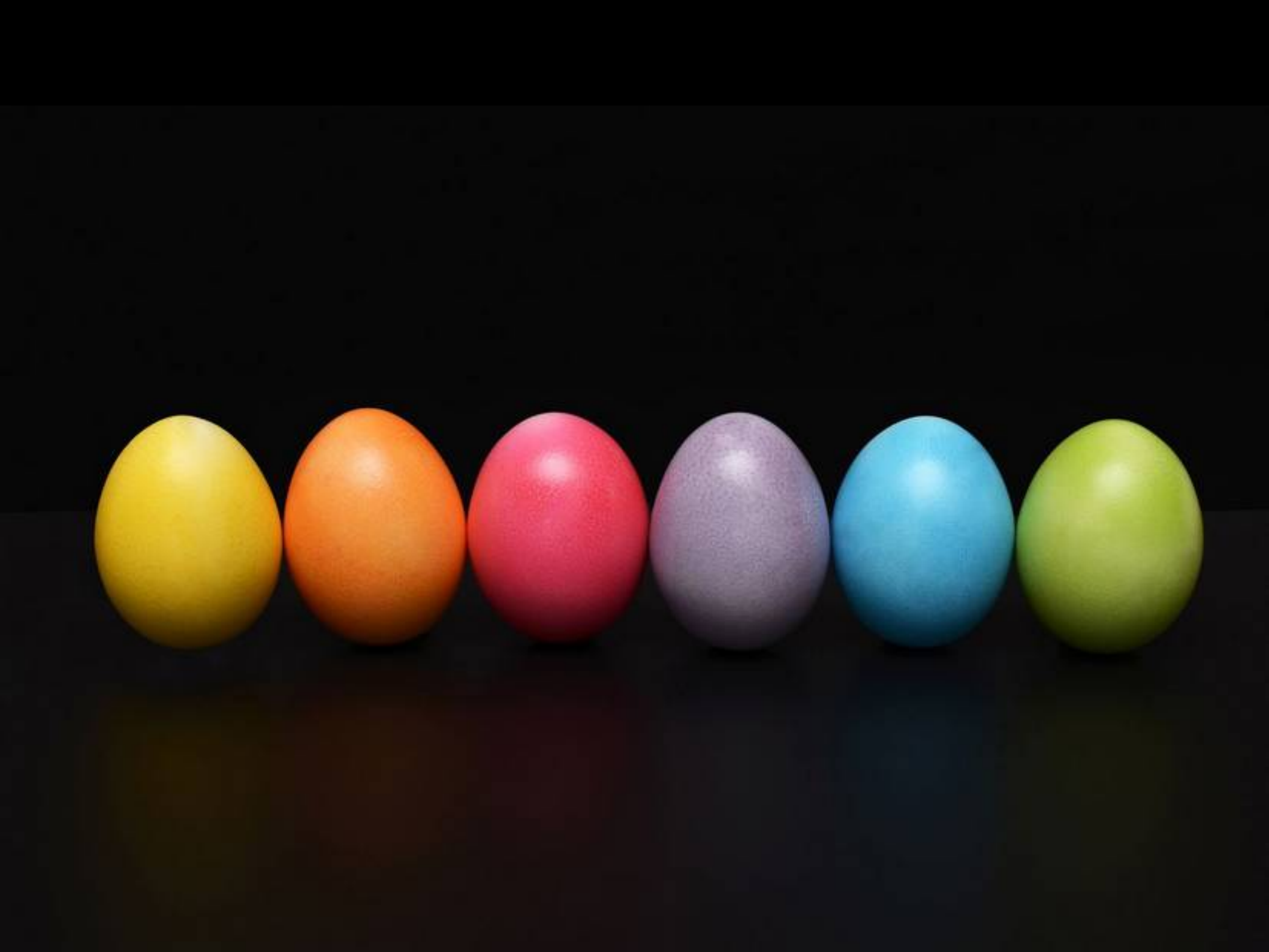
80 – 90% of all cancers are from?

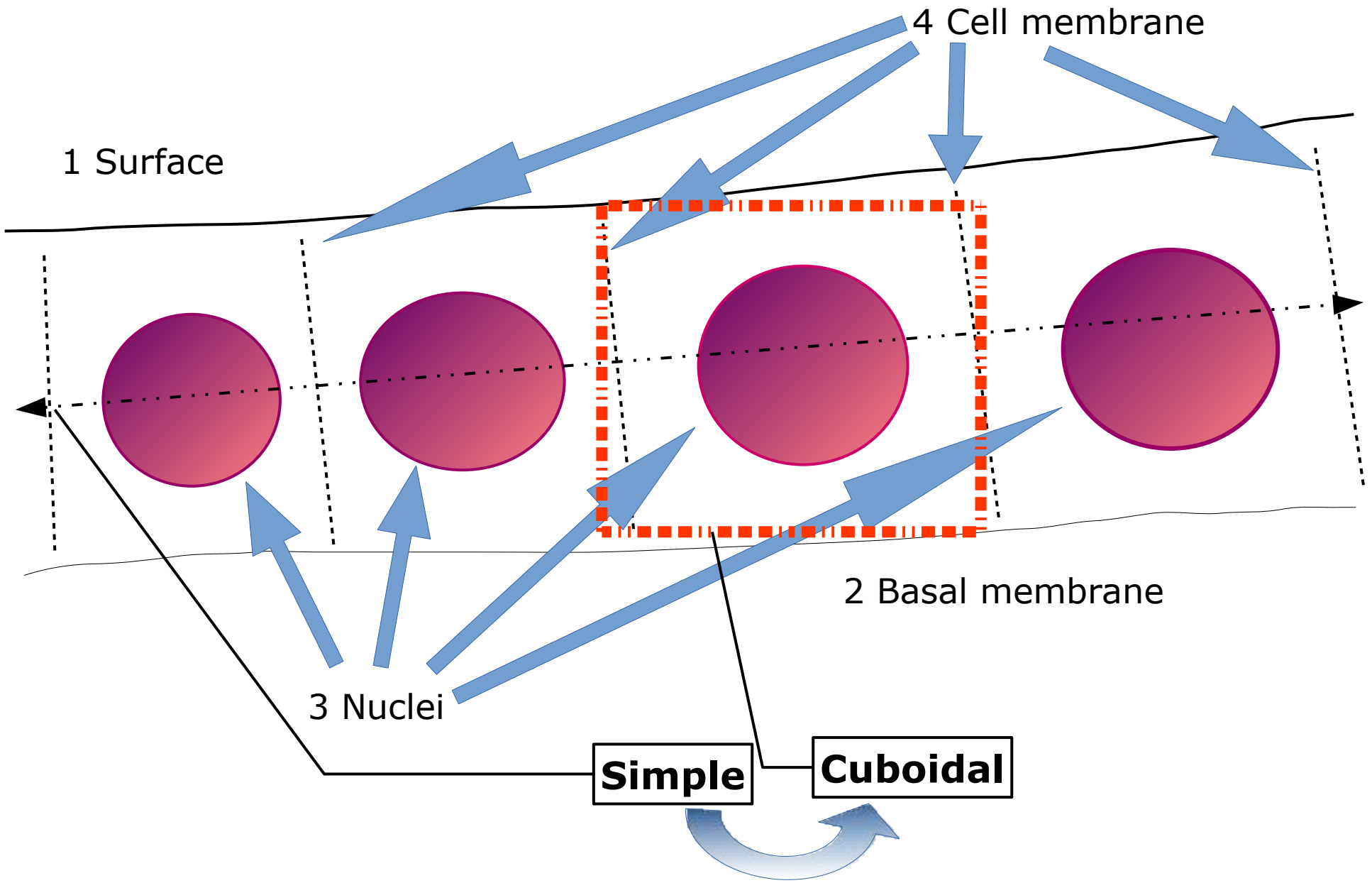


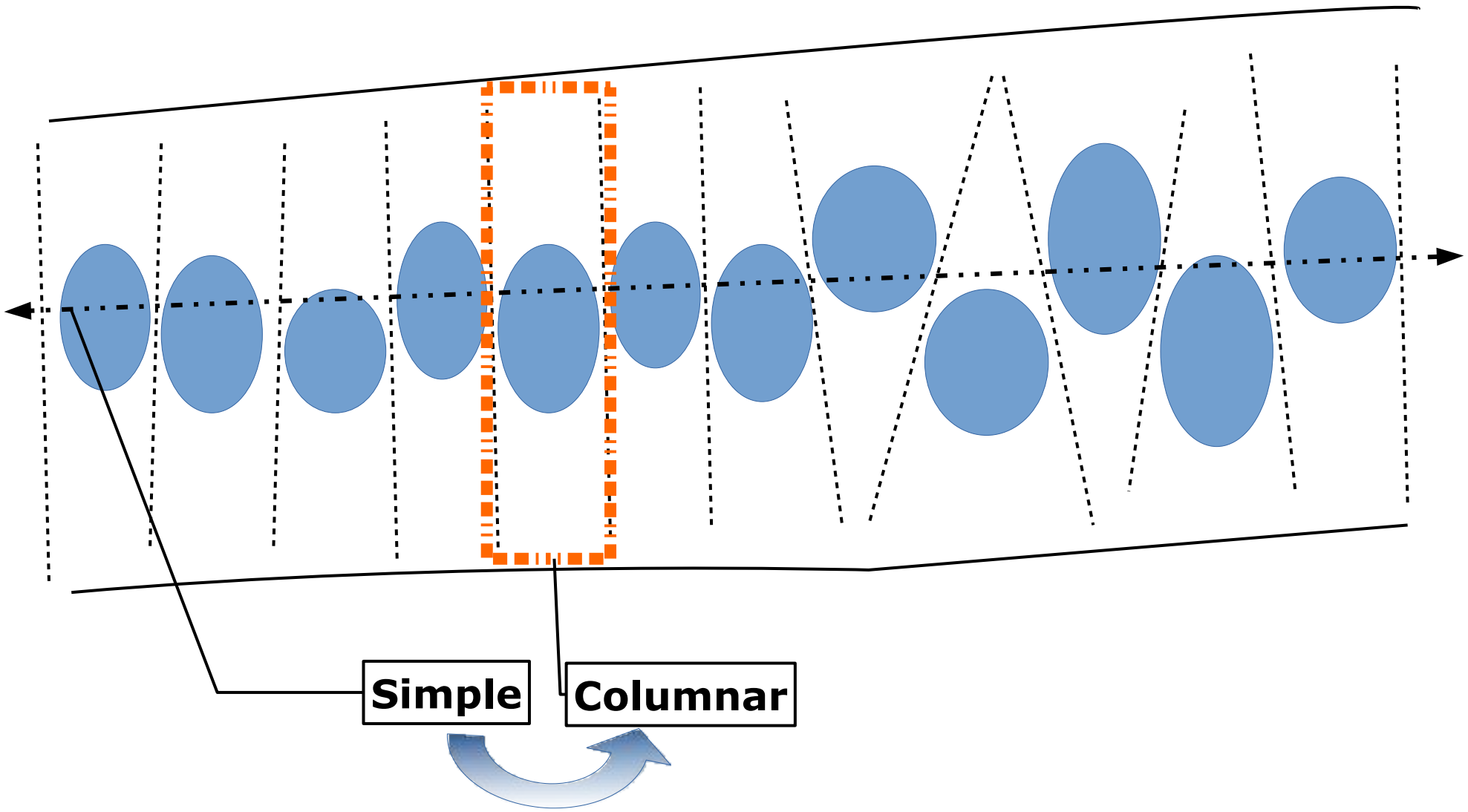
Carcinomas

80 – 90% of all cancers are from epithelial cells

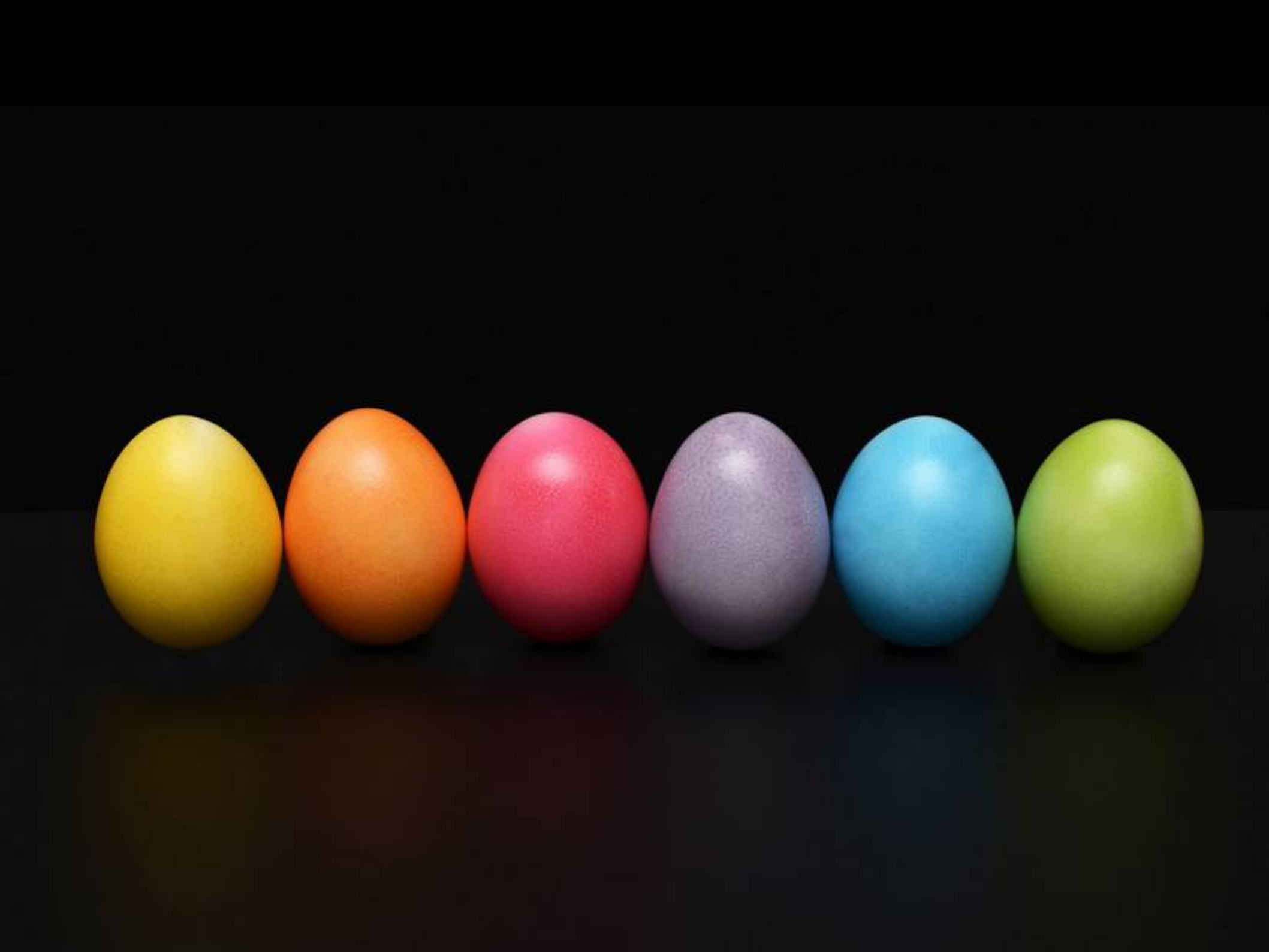




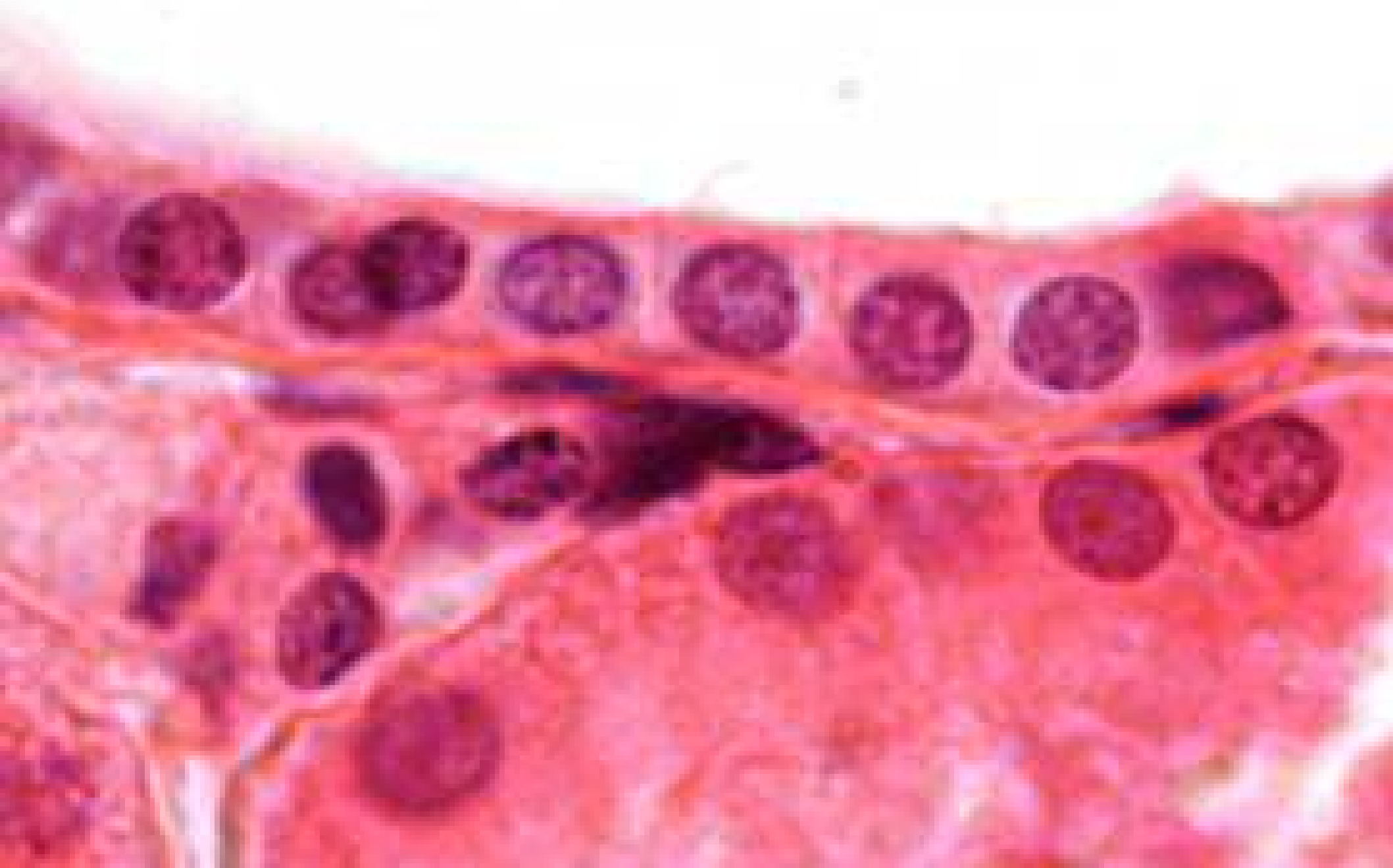

4 Cell membrane
1 Surface
2 Basal membrane
3 Nuclei
Simple
Cuboidal


Simple
Columnar

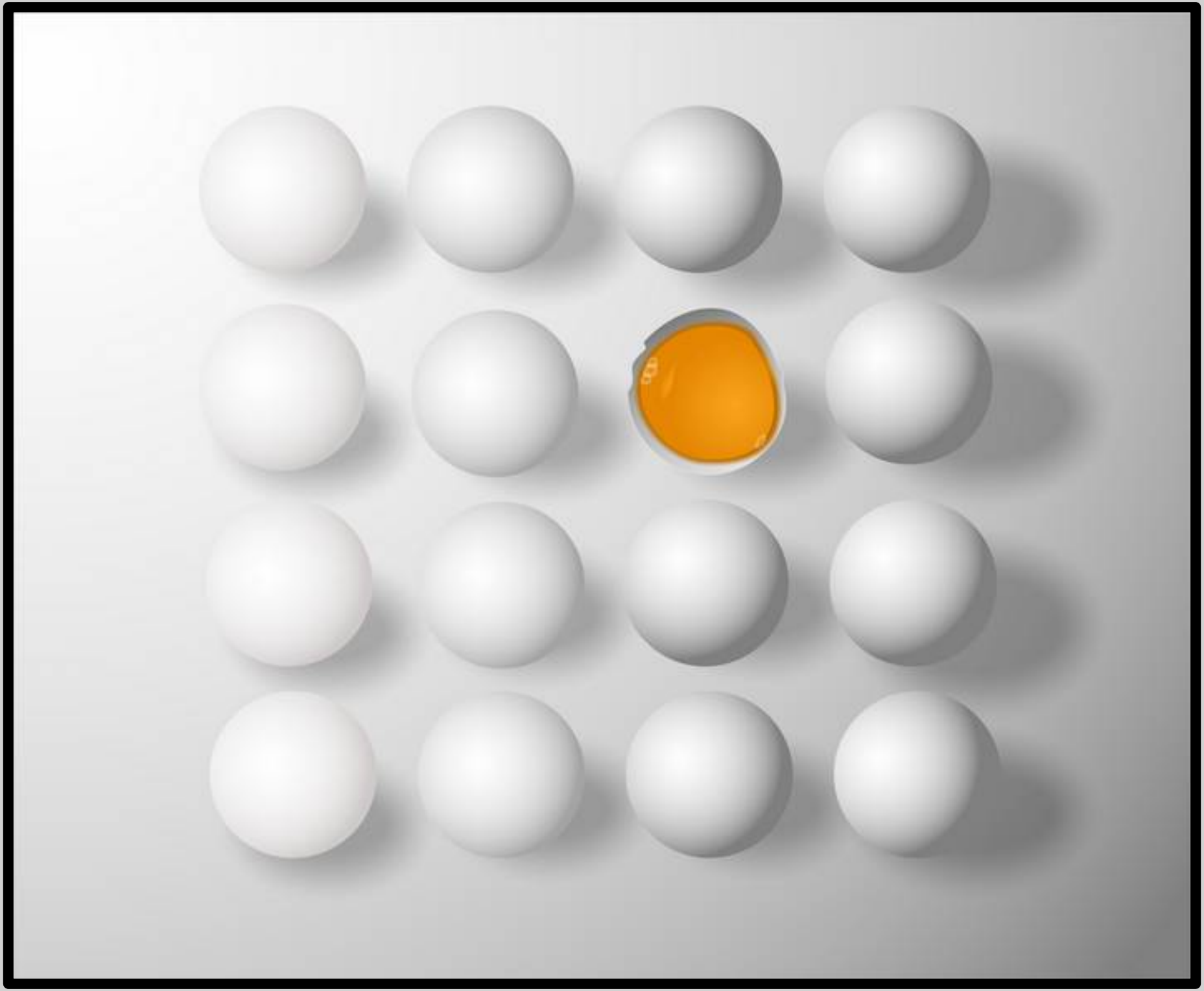
Simple = single layer

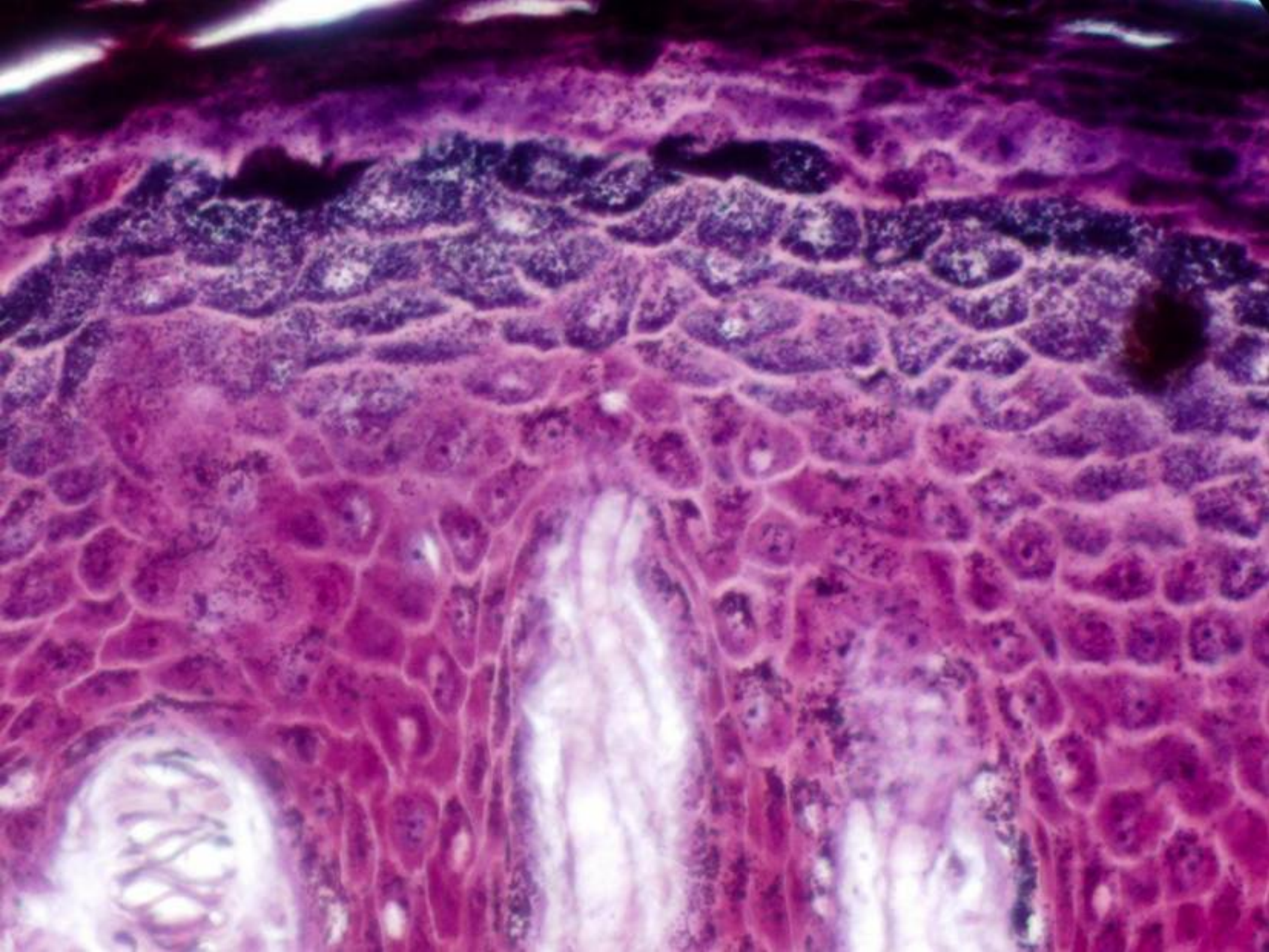


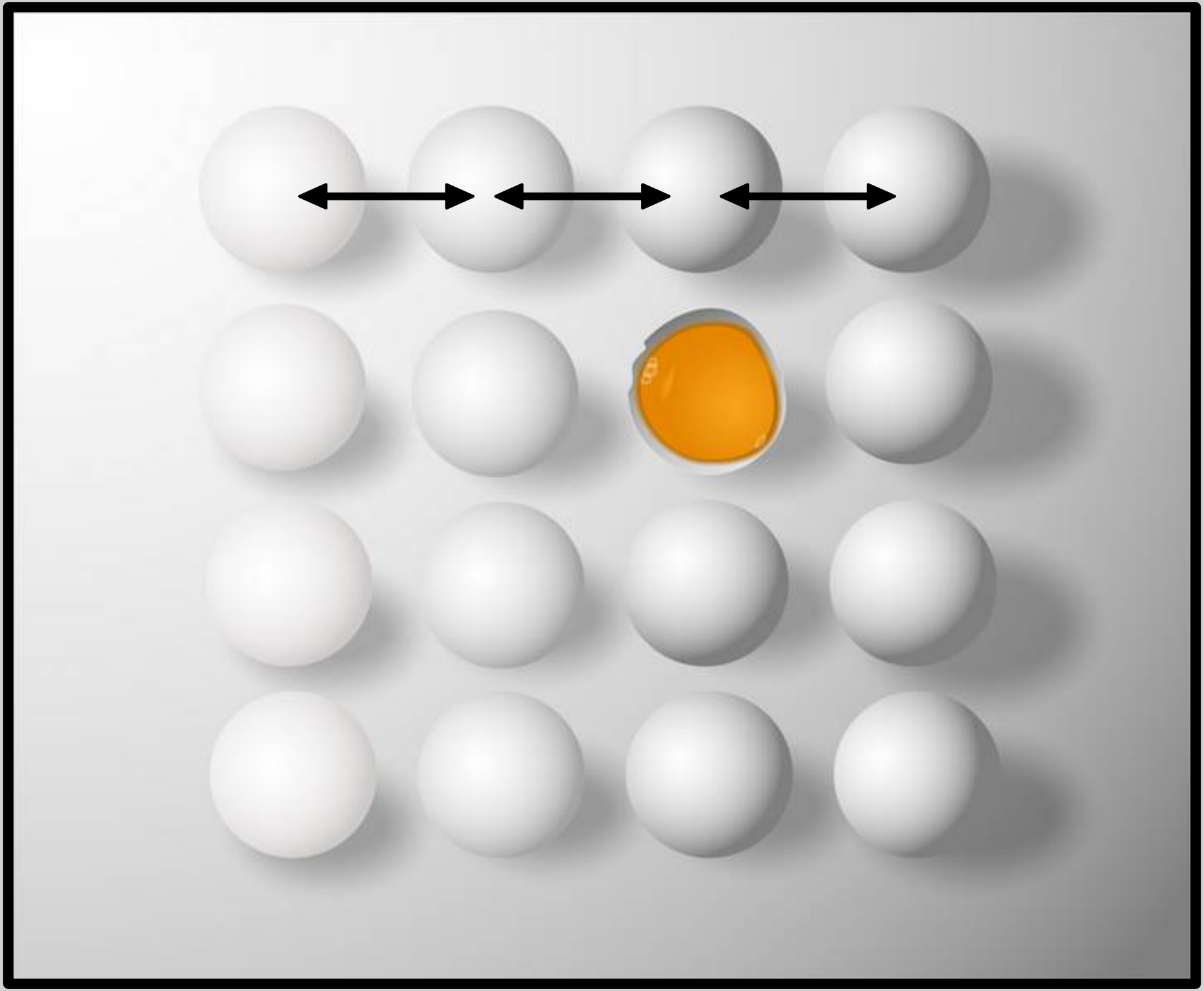
LUMEN



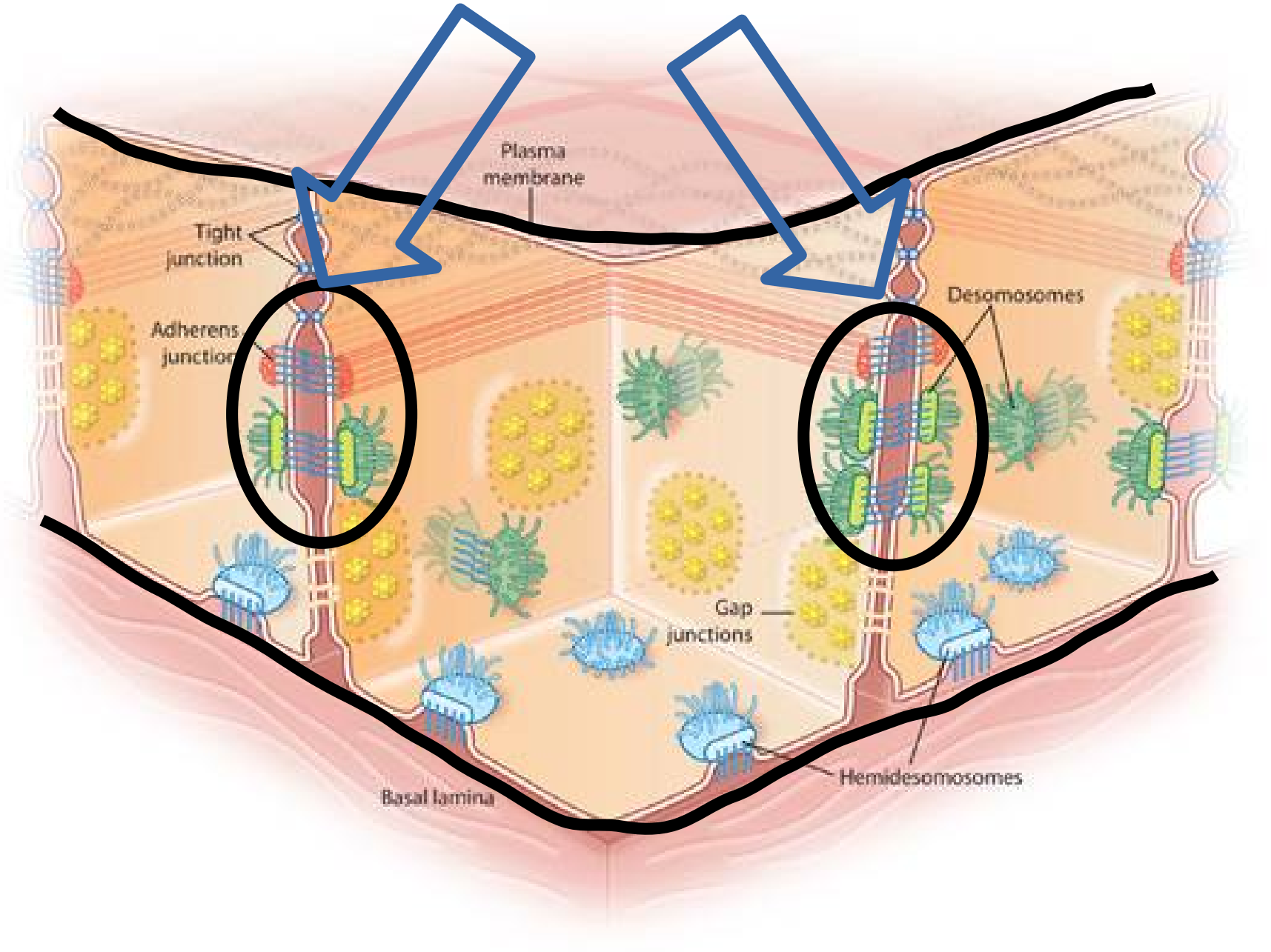
Stratified = multiple layers

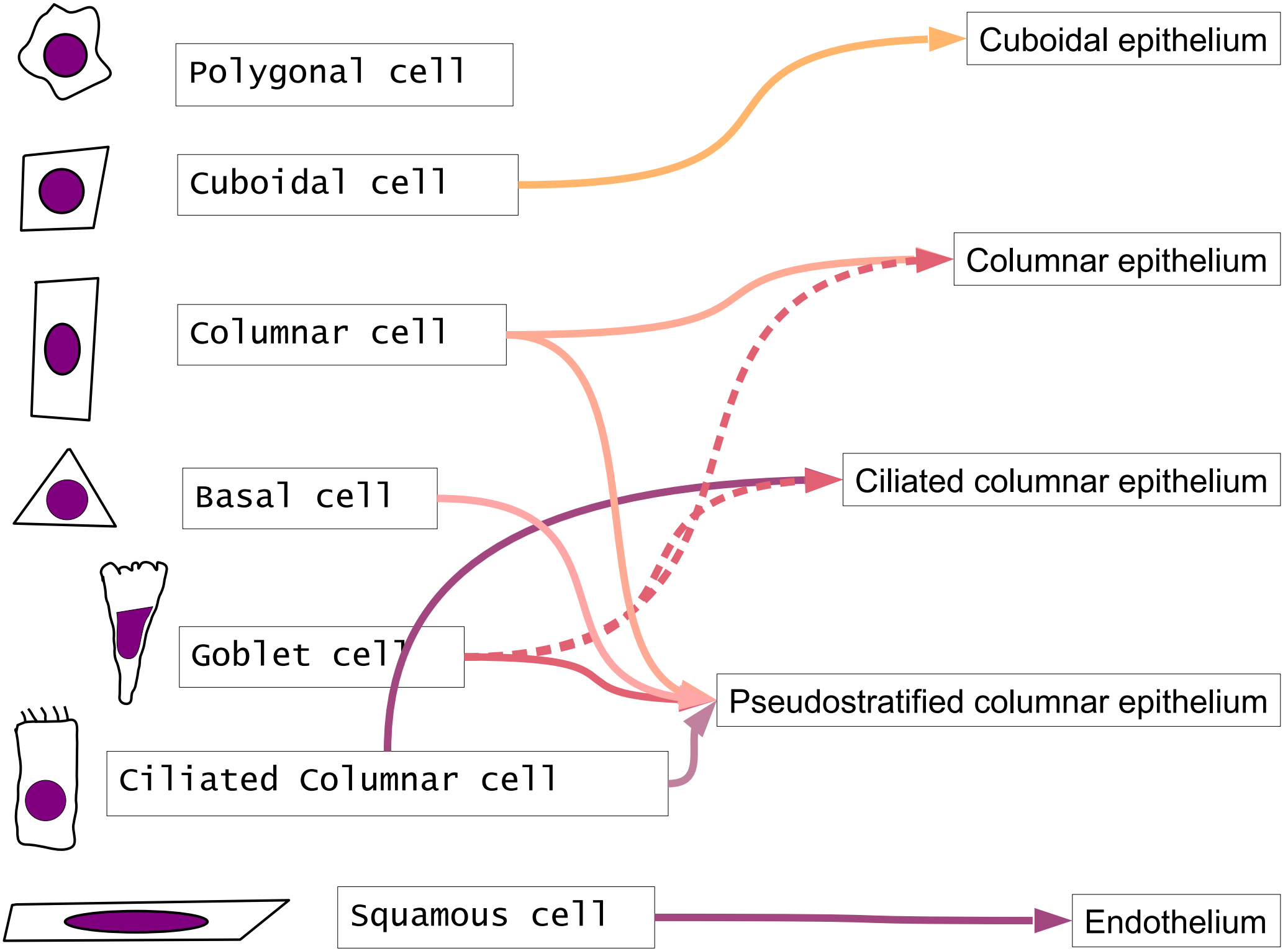


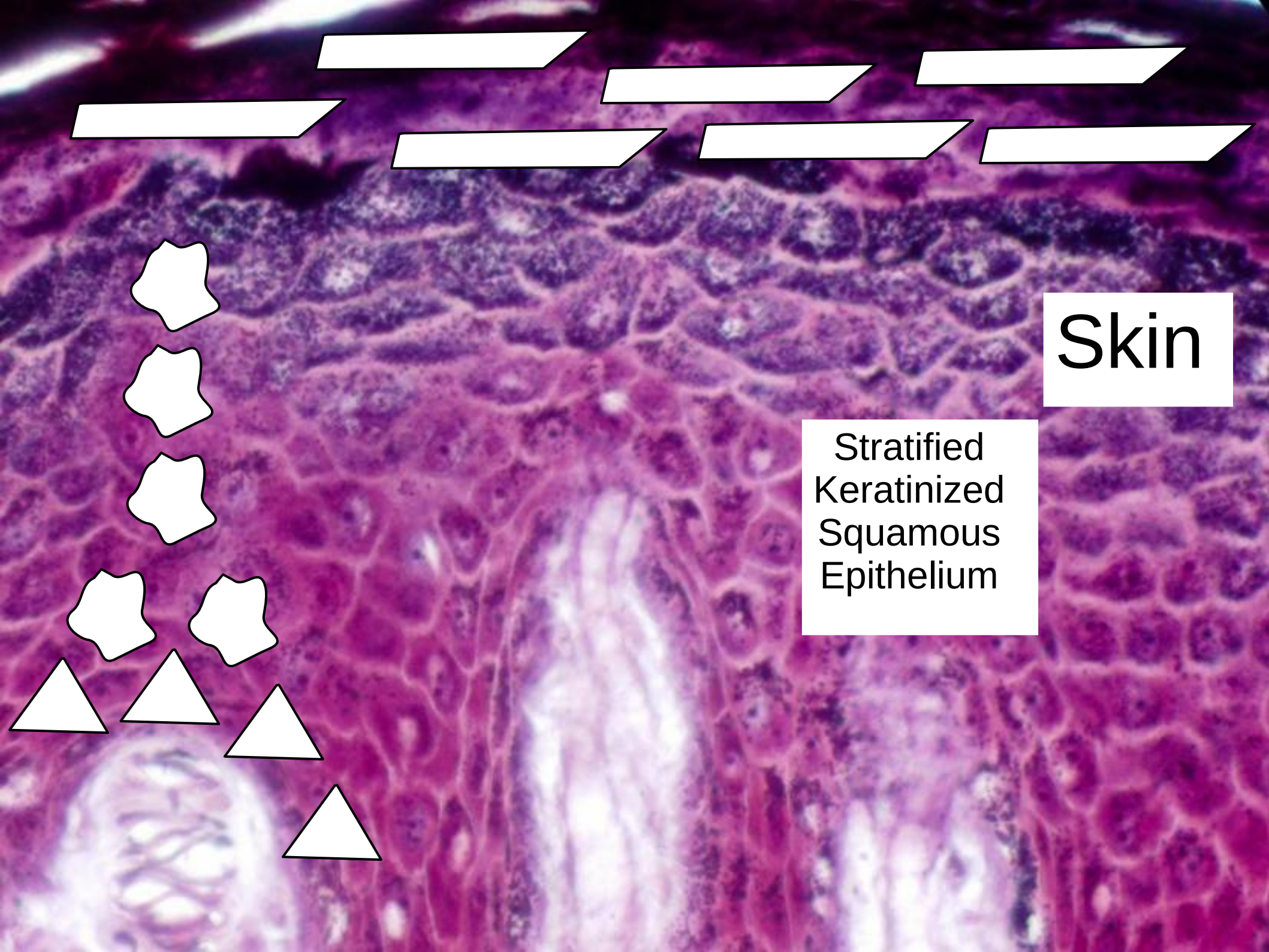




Adherens complexes



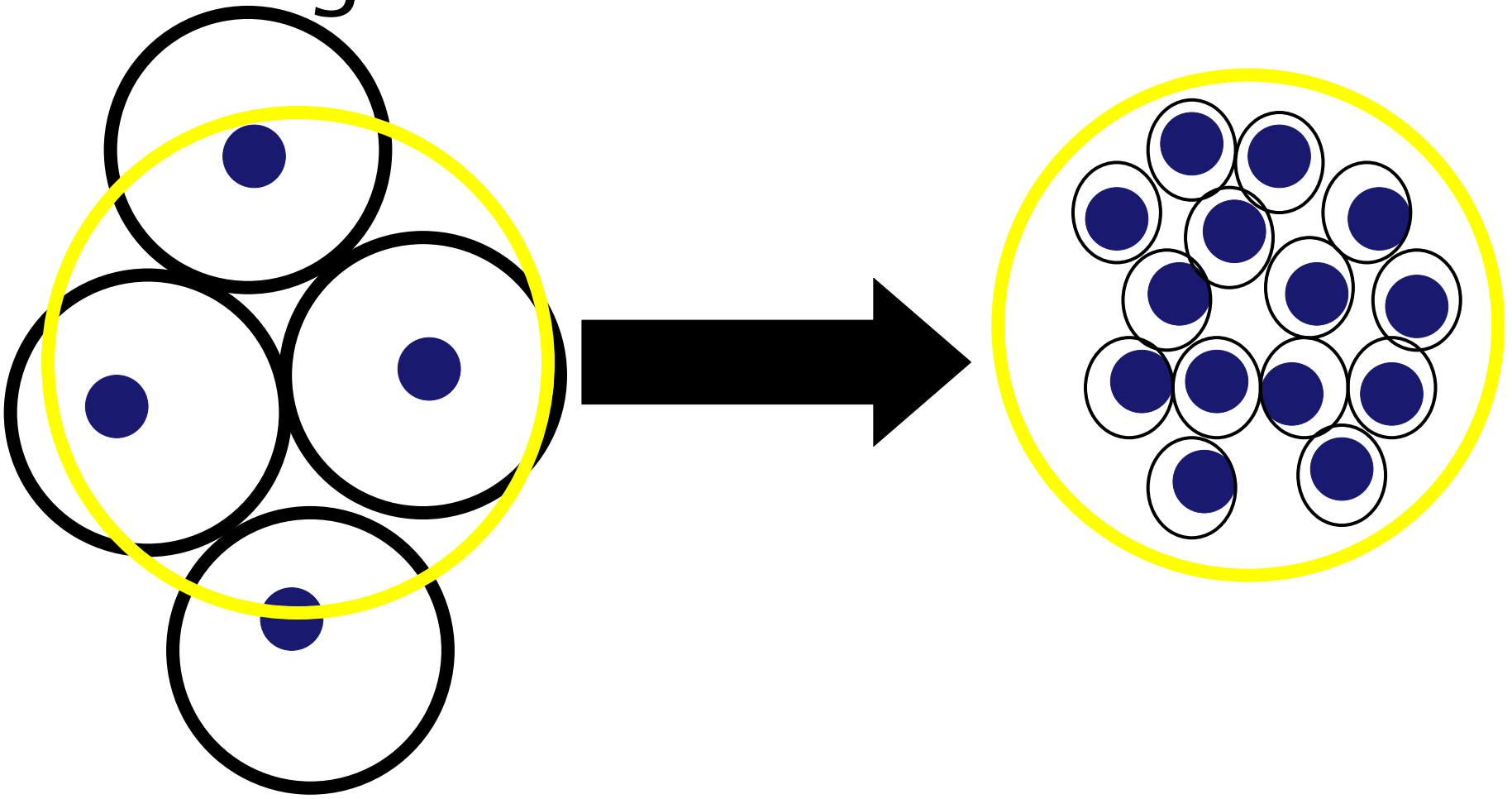

Polygonal cell
Cuboidal cell
Columnar cell
Basal cell
Goblet cell
Ciliated Columnar cell
Squamous cell
Cuboidal epithelium
Columnar epithelium
Ciliated columnar epithelium
Pseudostratified columnar epithelium
Endothelium


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?

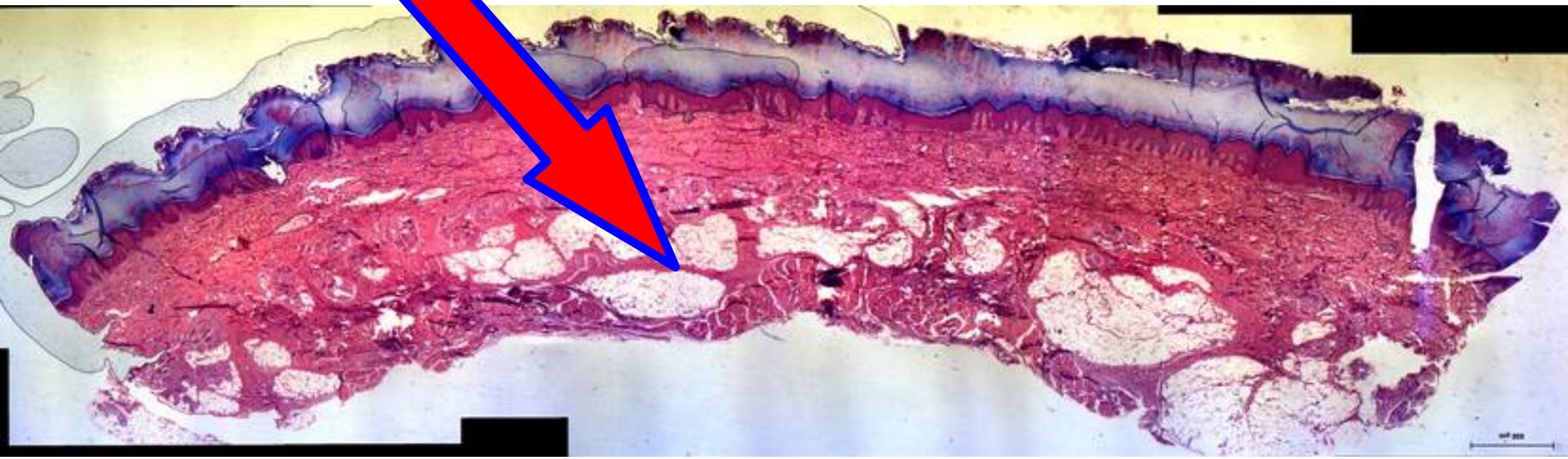
ALL
of
them

Skin

Consider a needle penetrating skin.

Describe the layers.

Up to and including the vein.



List the layers

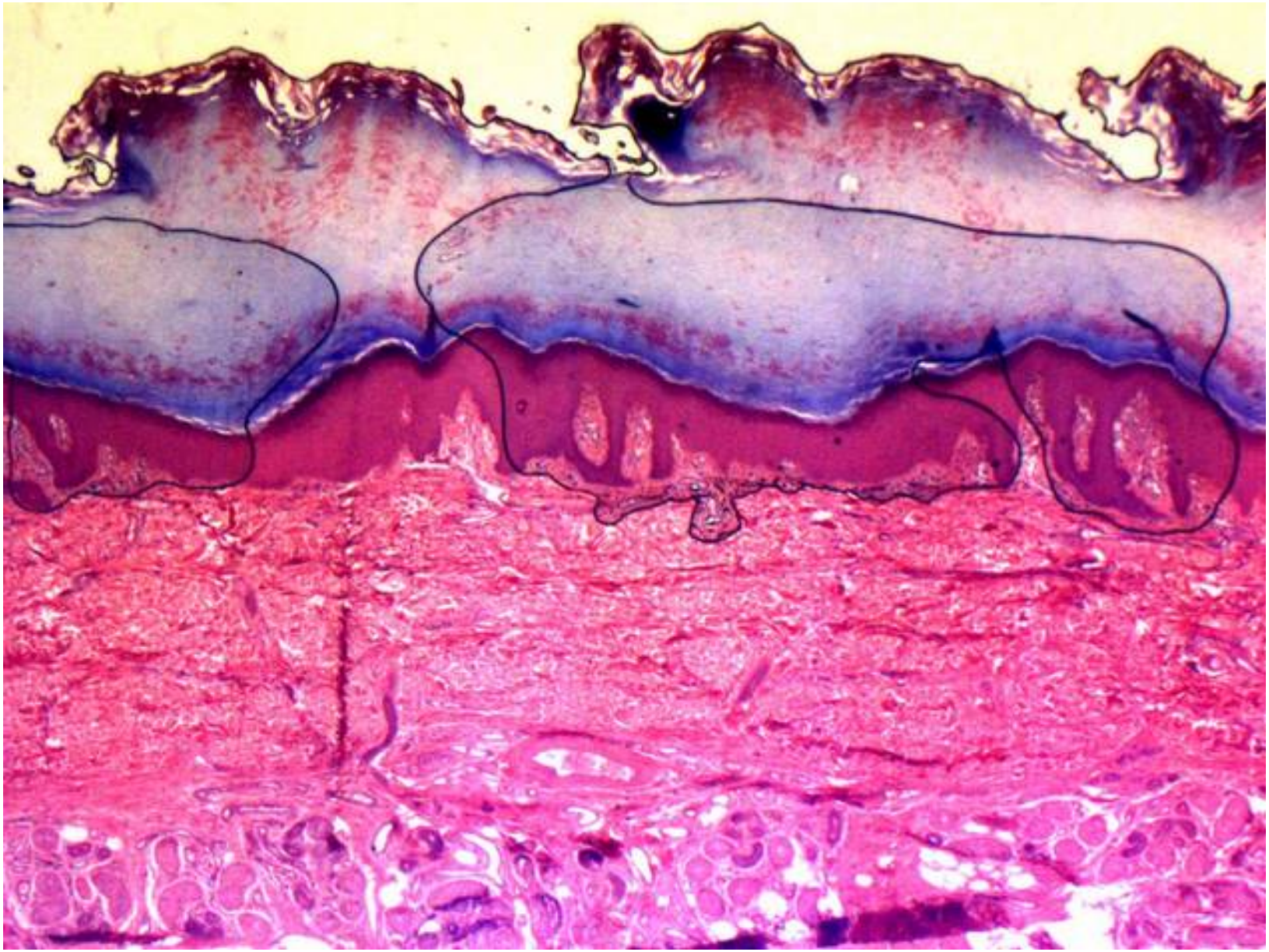
Which layers of cells are penetrated?

What do they look like?

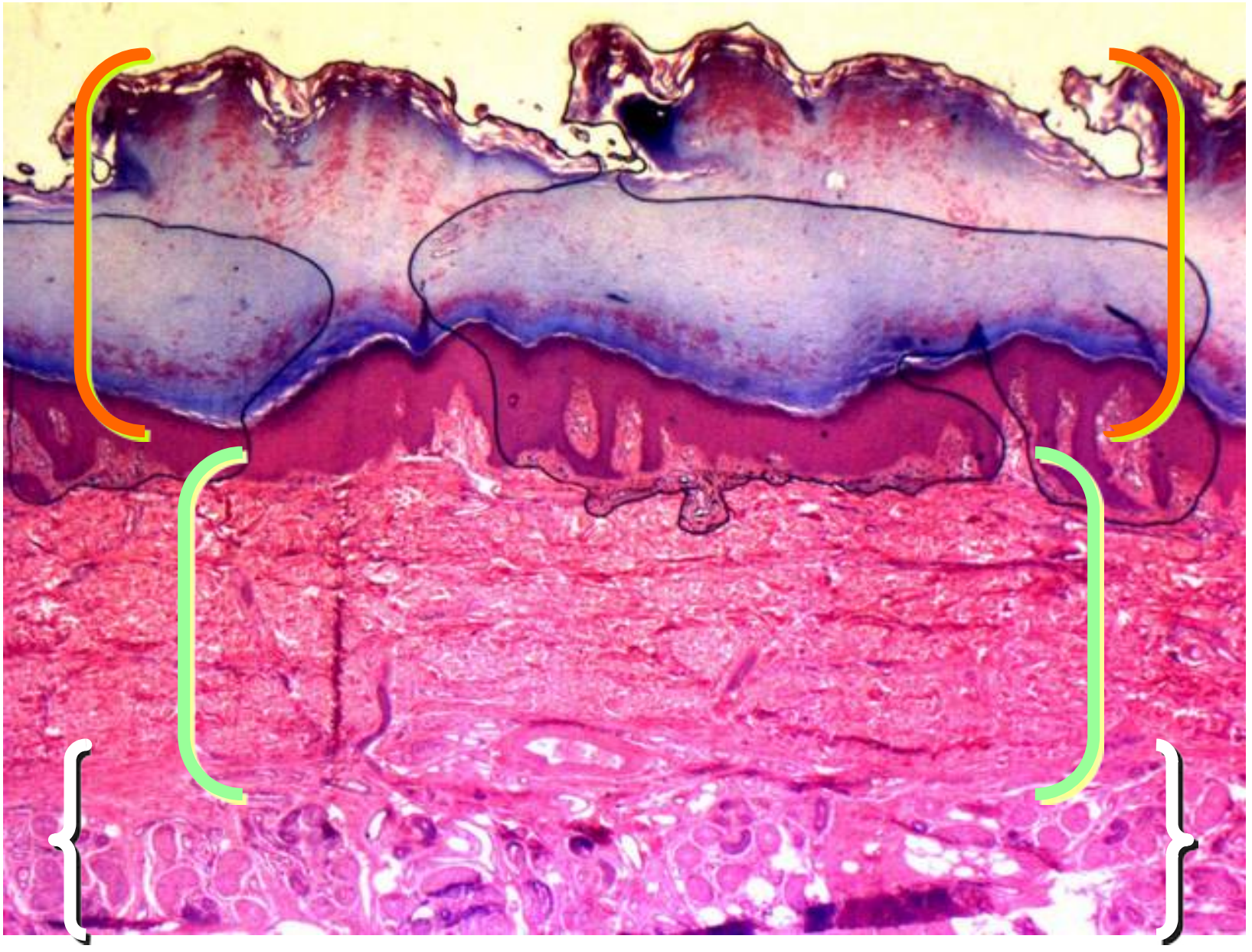
What is the function of each layer?

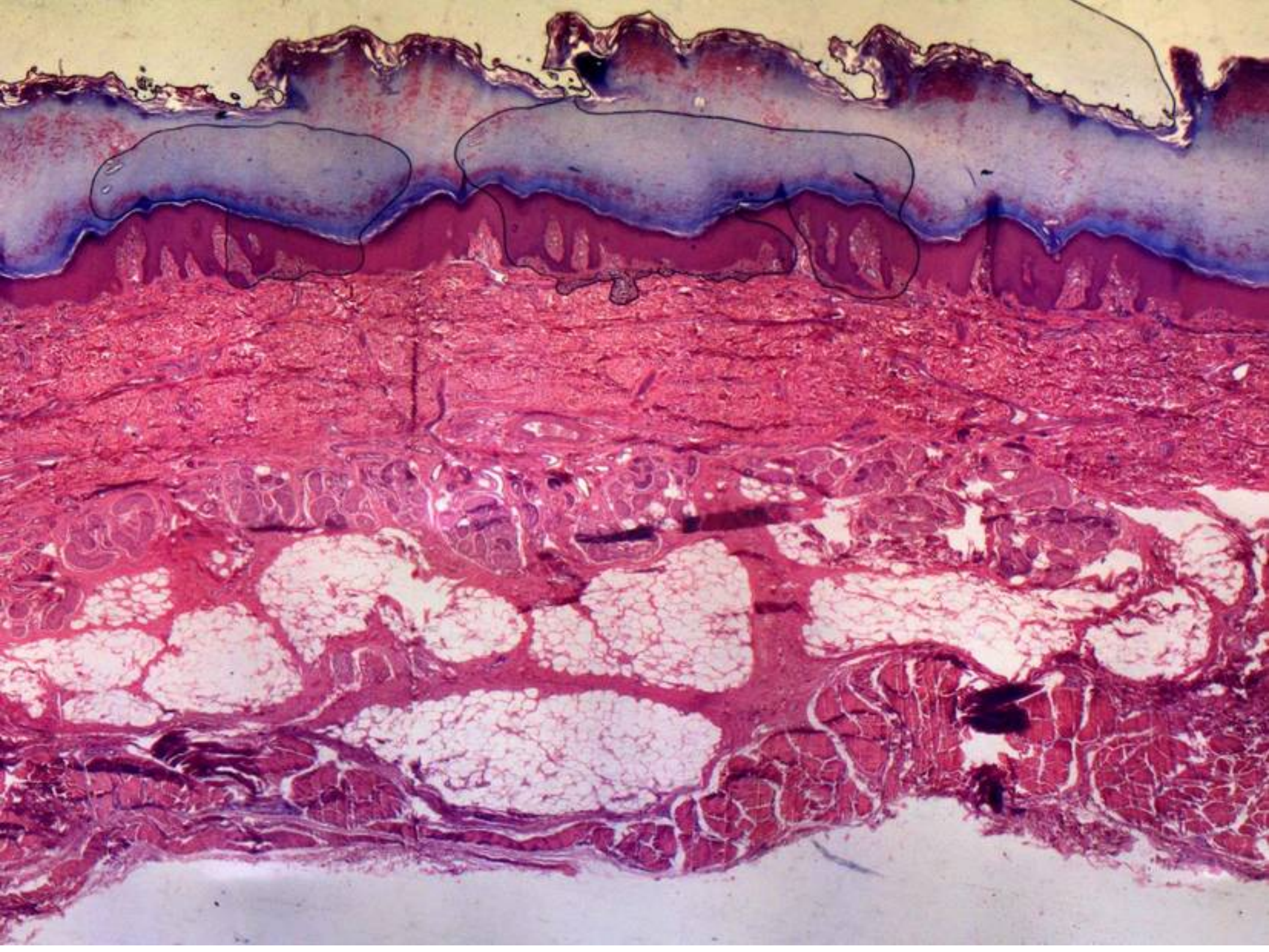
What is the function of each type of cell?

3 main layers seen.



Epidermis, Dermis, Hypodermis

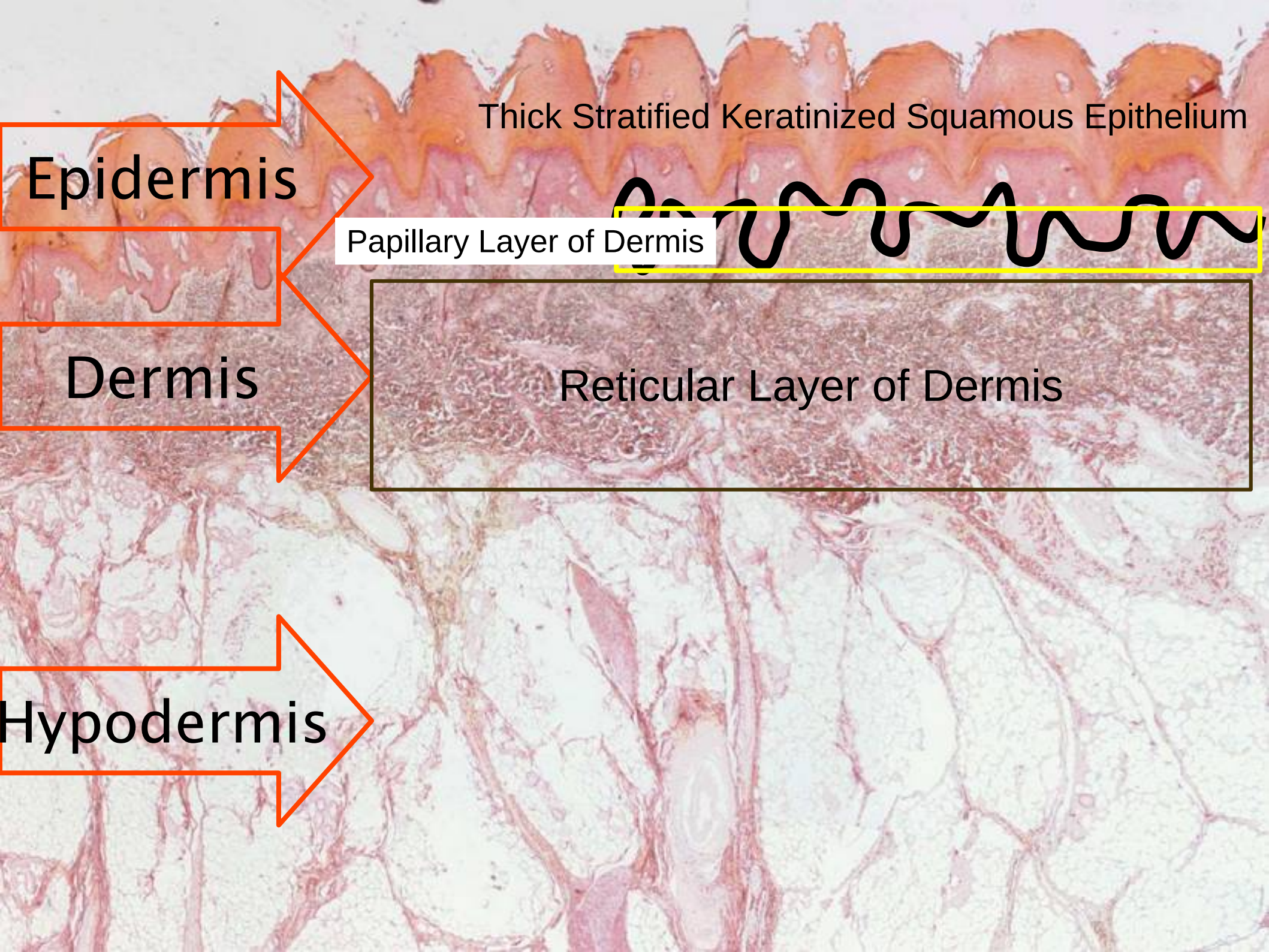




Slide 93: Thick skin – this slide is a section through the skin of the palm of the hand.

View the slides at low magnification. You should be able to see several layers, stained different colours and intensities. For a standard haematoxillin 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.

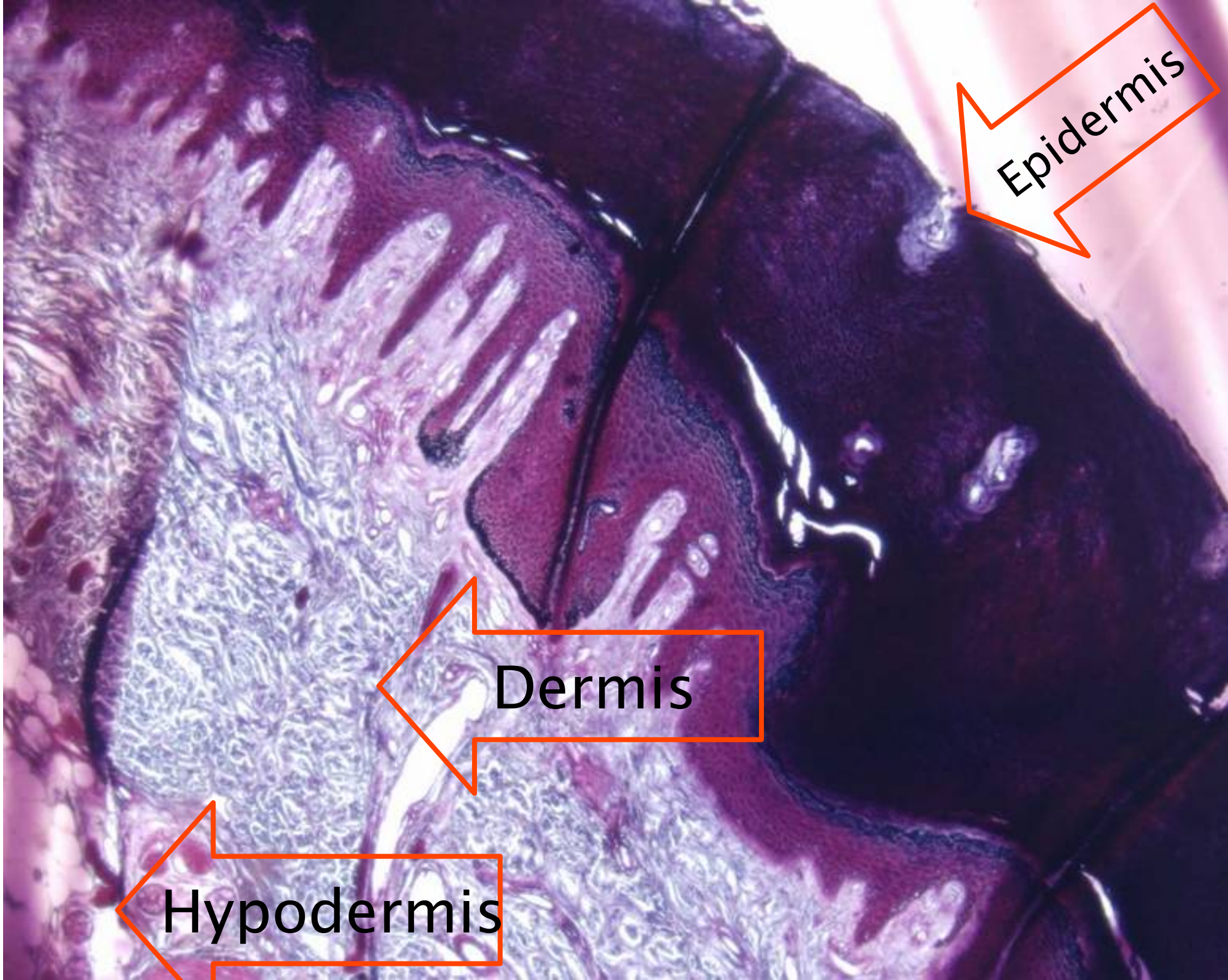

Thick Stratified Keratinized Squamous Epithelium
Epidermis
Papillary Layer of Dermis
Dermis
Reticular Layer of Dermis
Hypodermis

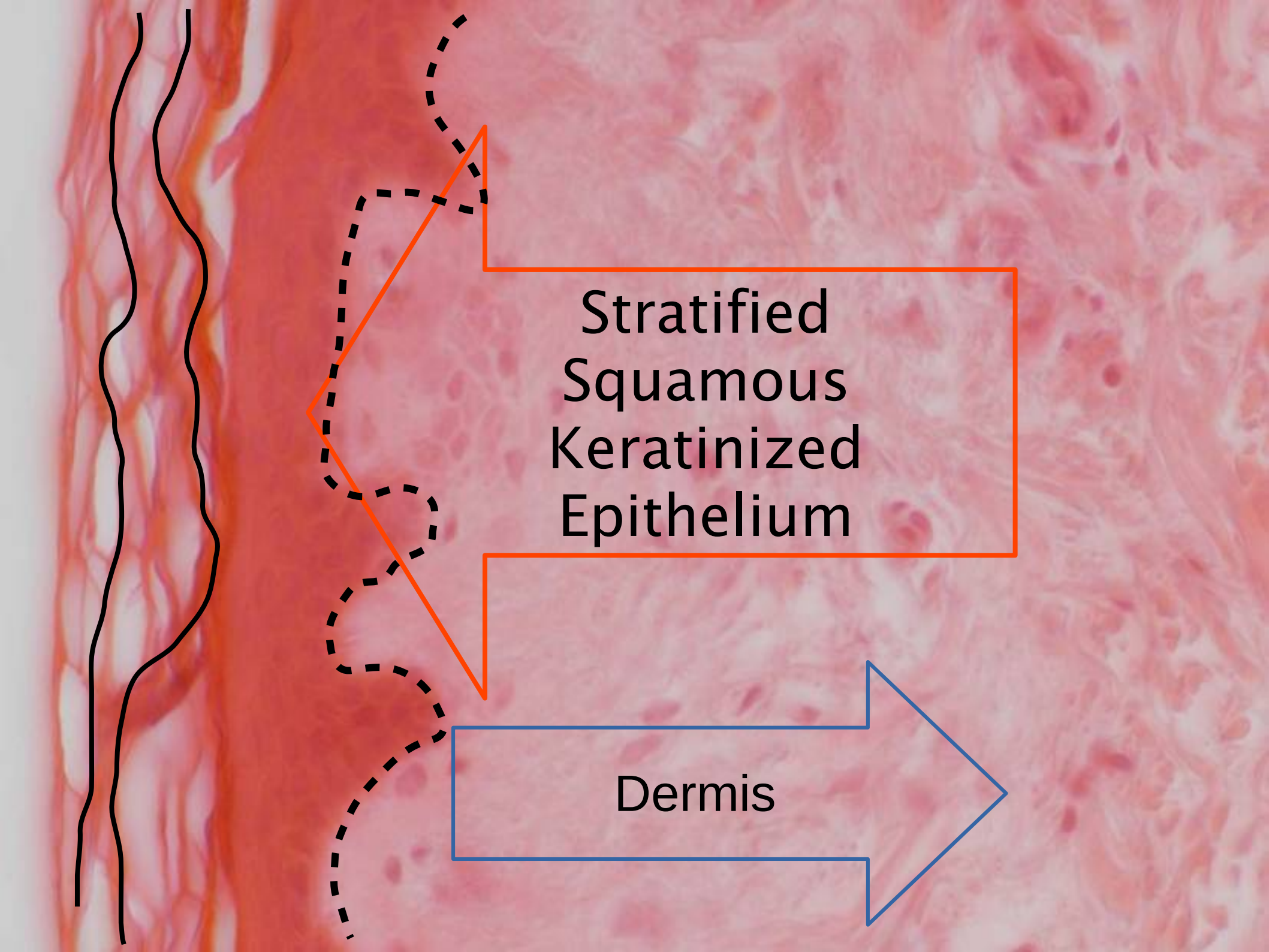
Contextual questions

- 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.

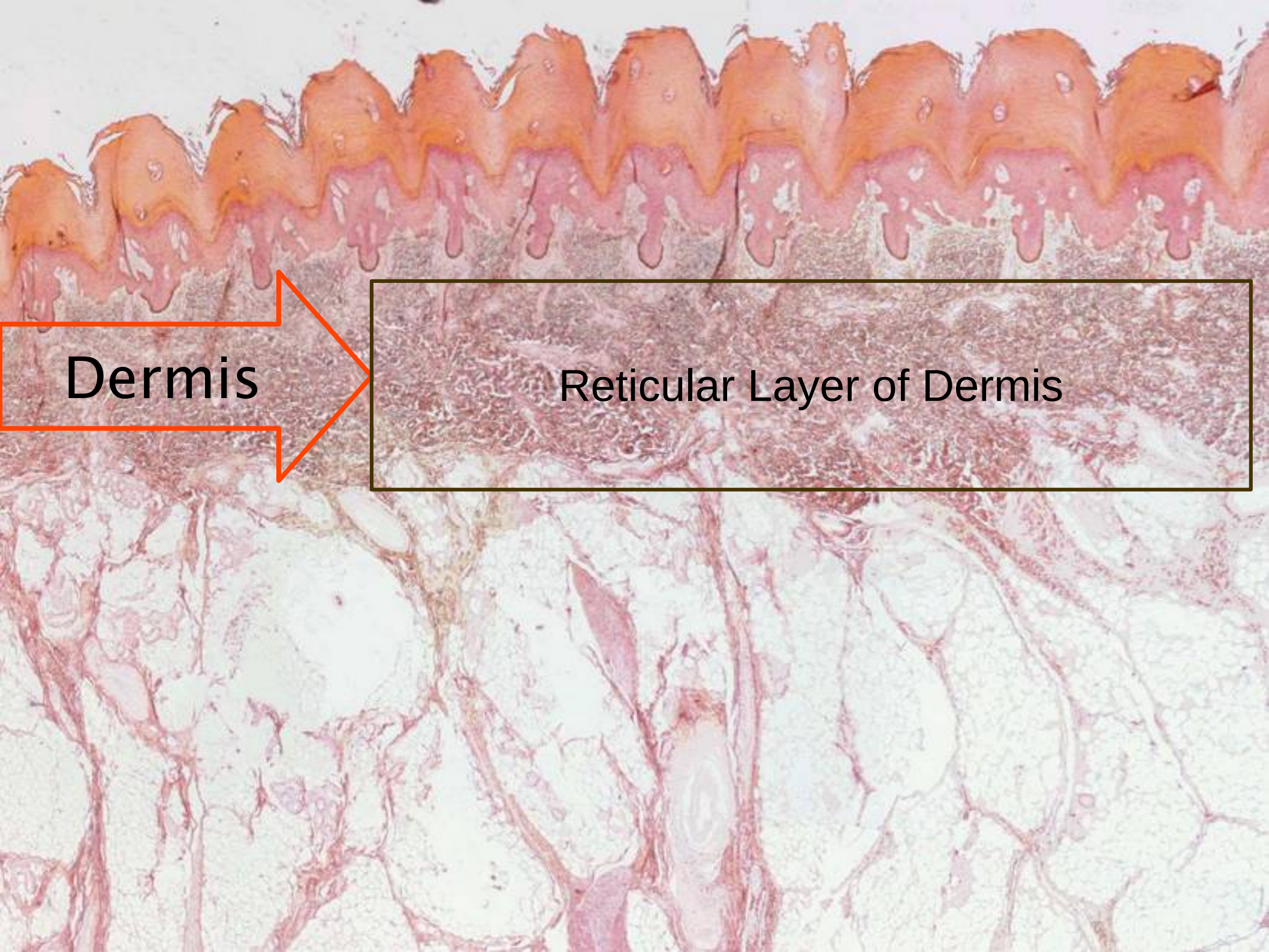
- Make a list of structures you expect to find in skin using the microscope.


Epidermis
Dermis
Hypodermis

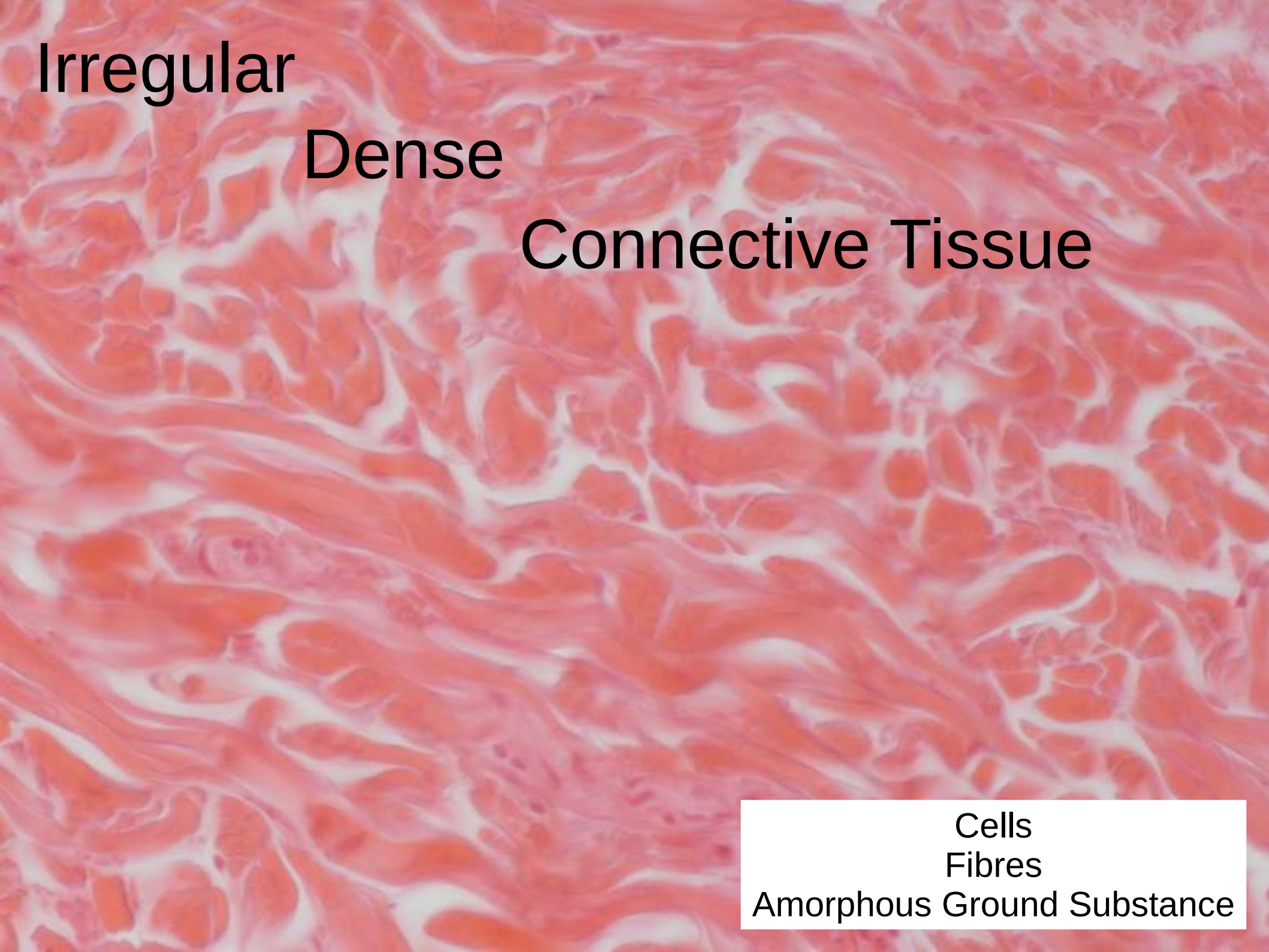

Stratified
Squamous
Keratinized
Epithelium
Dermis

All Connective Tissues

3 Components

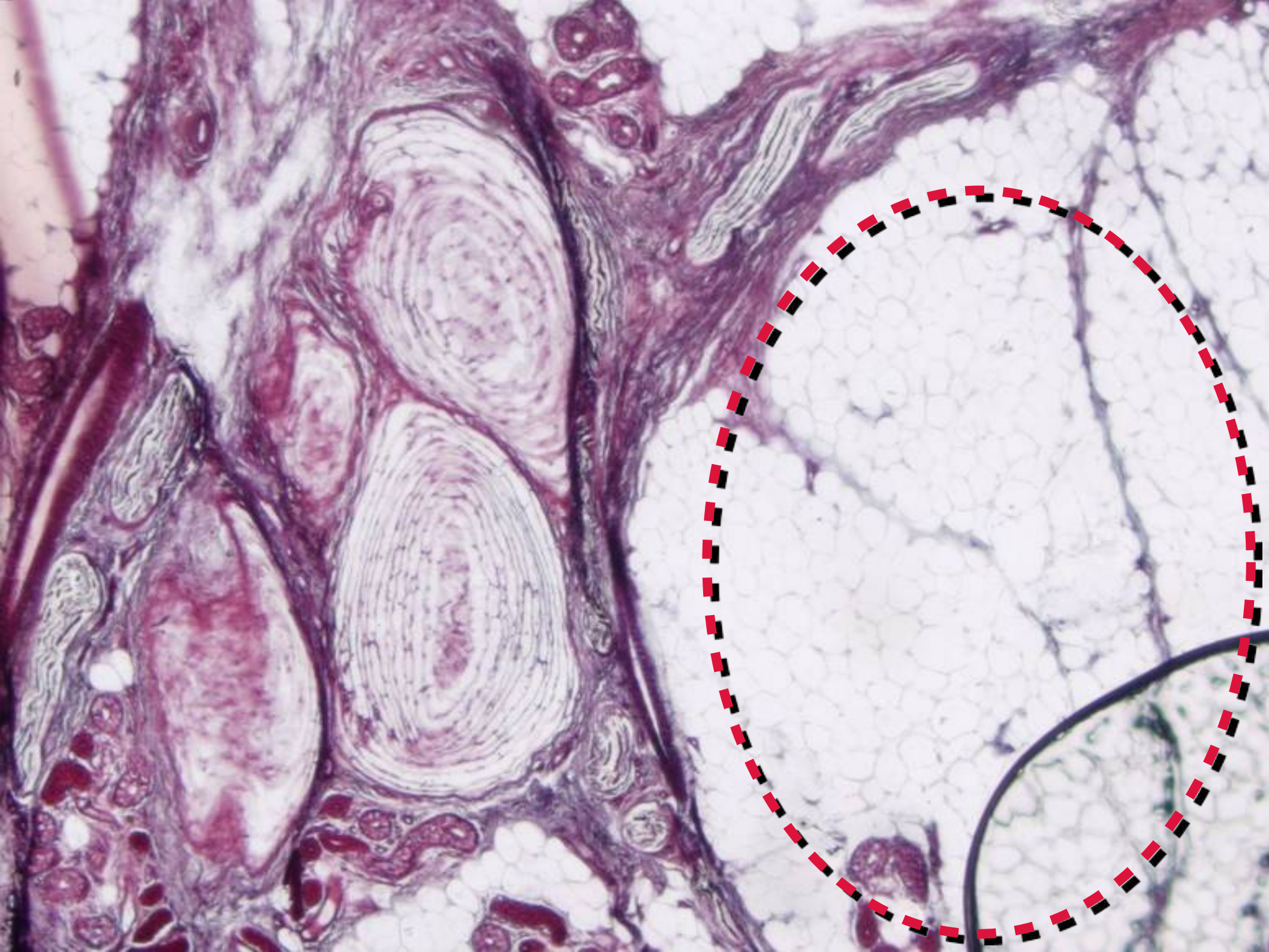

Dermis
Reticular Layer of Dermis

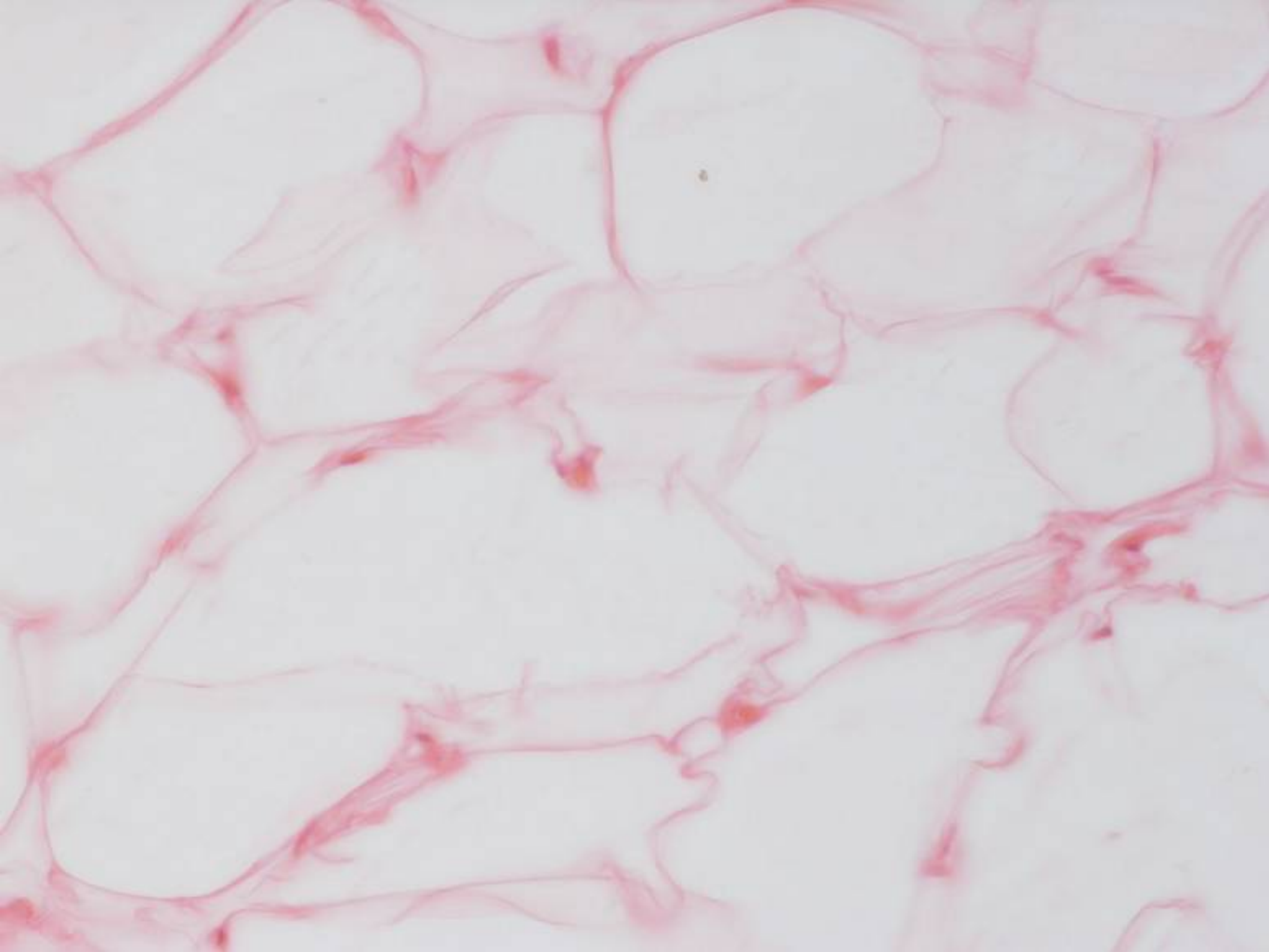
Irregular Dense Connective Tissue

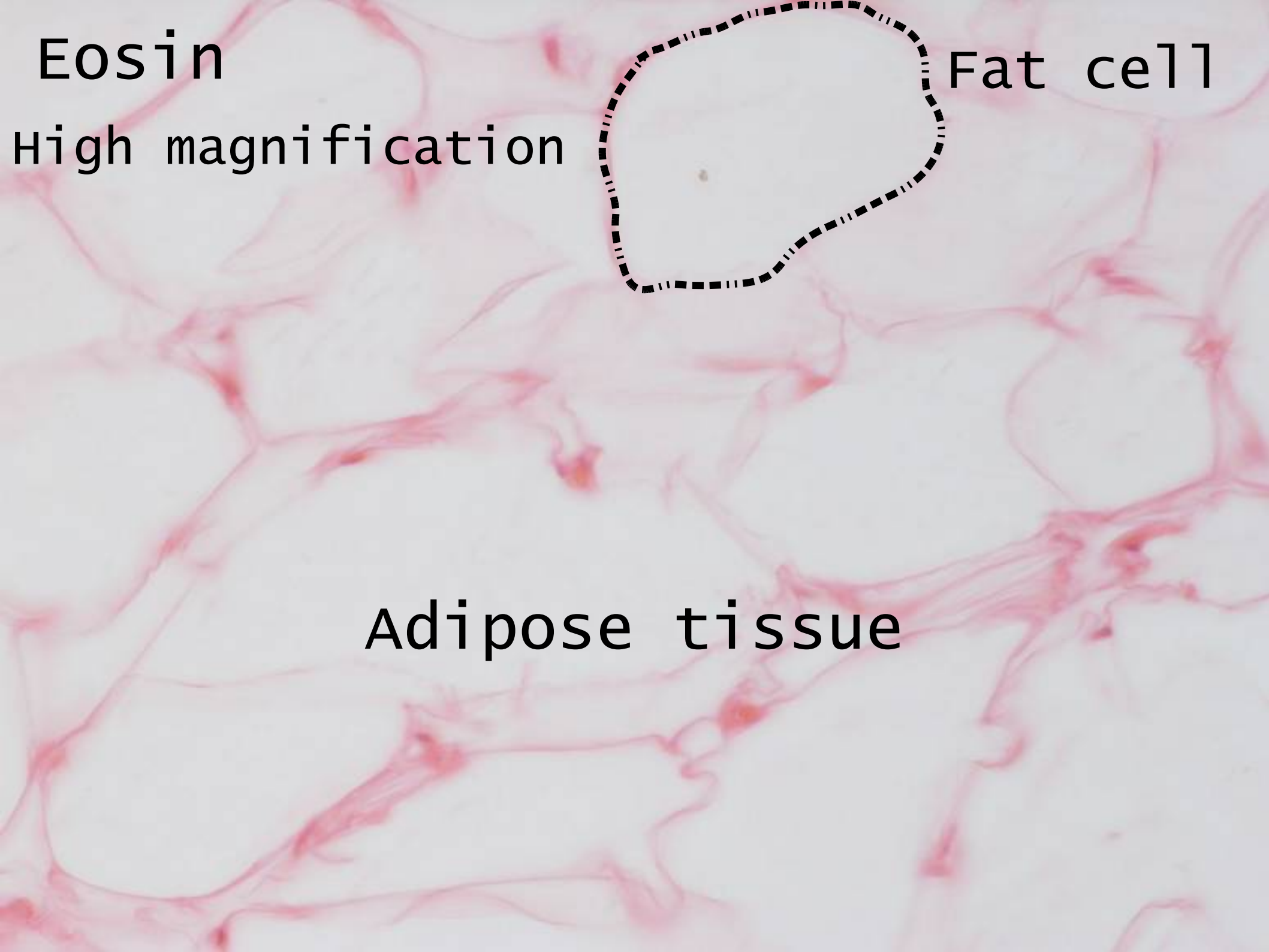


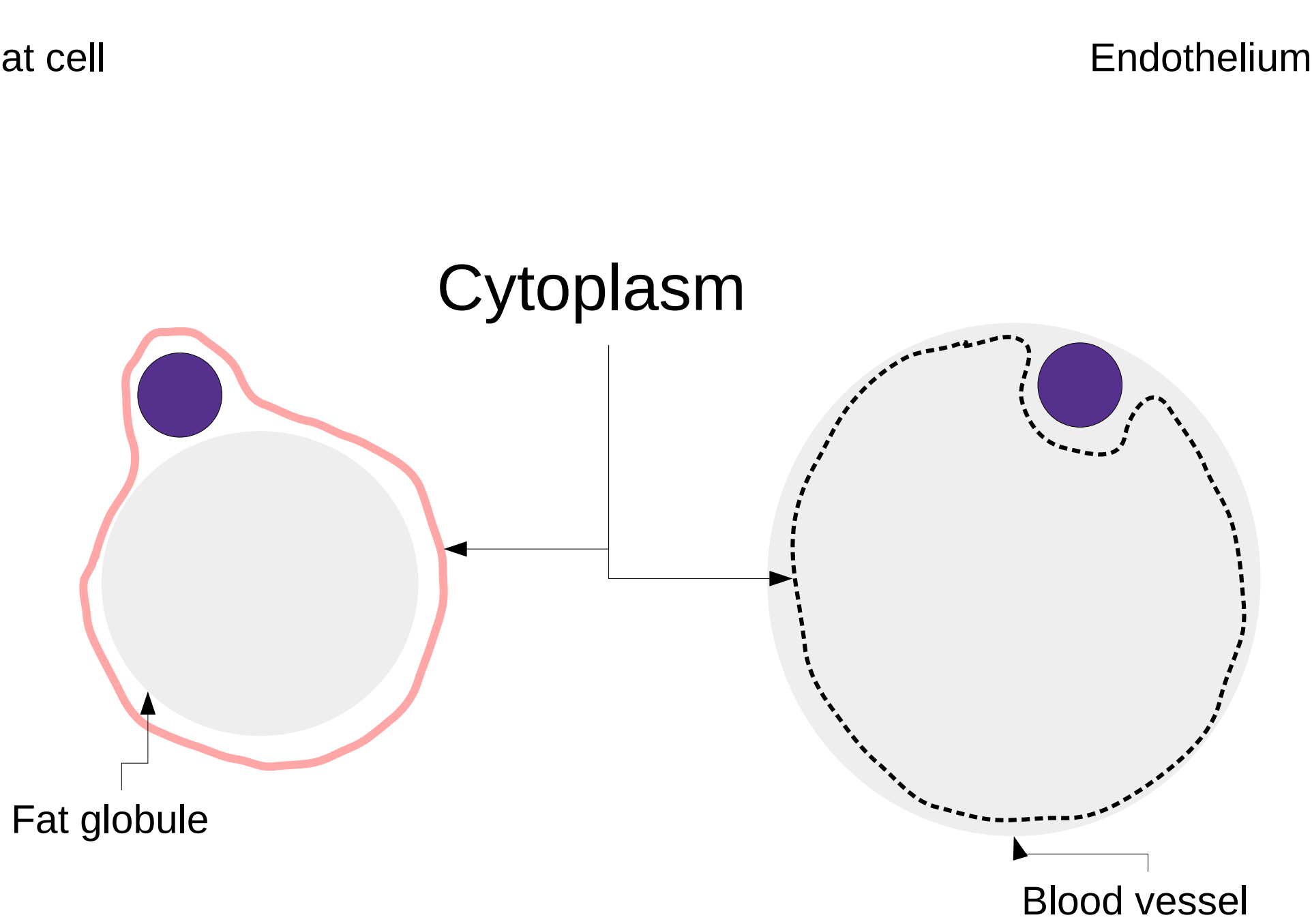
Cells
Fibres
Amorphous Ground Substance

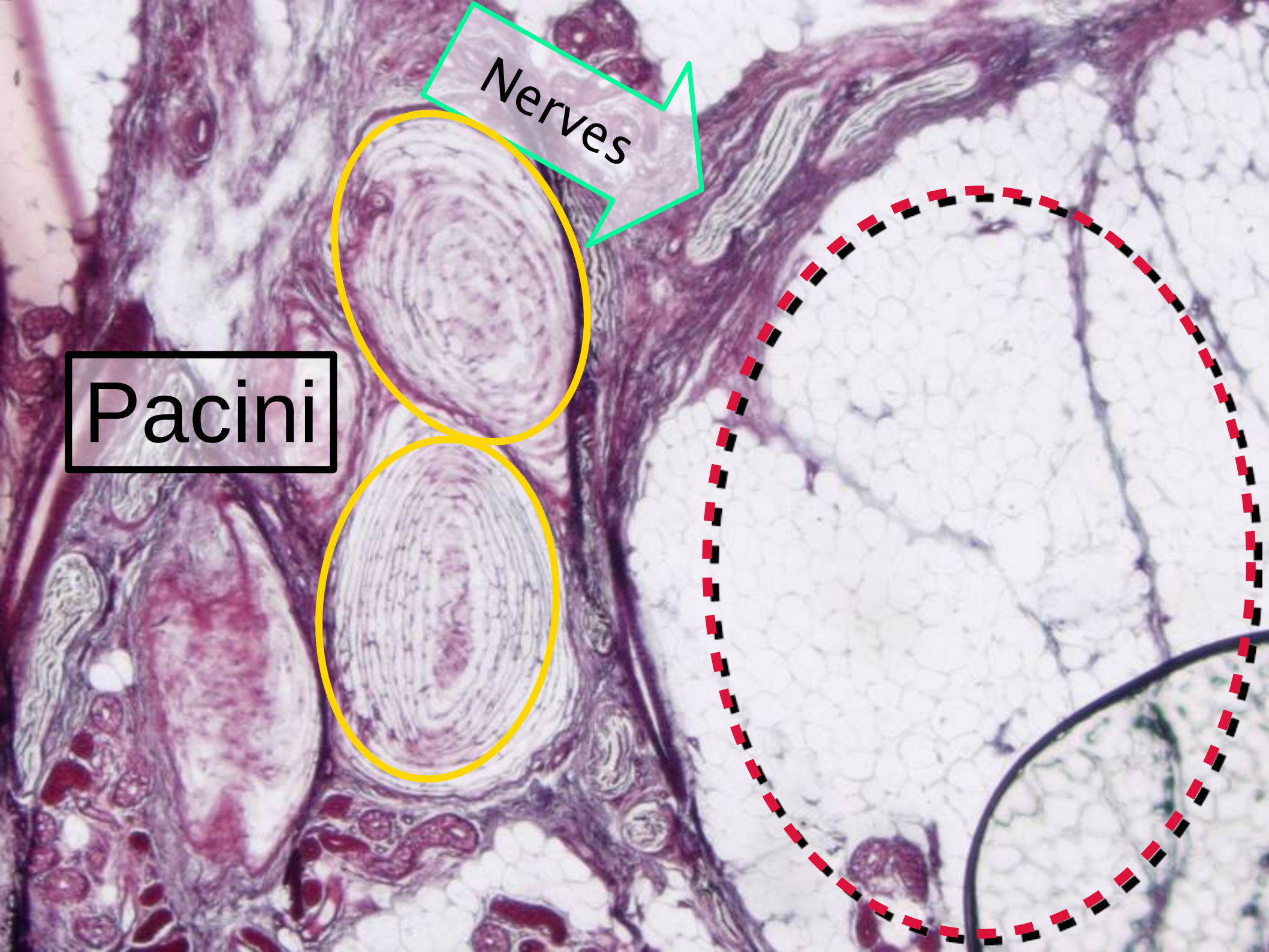
Hypodermis

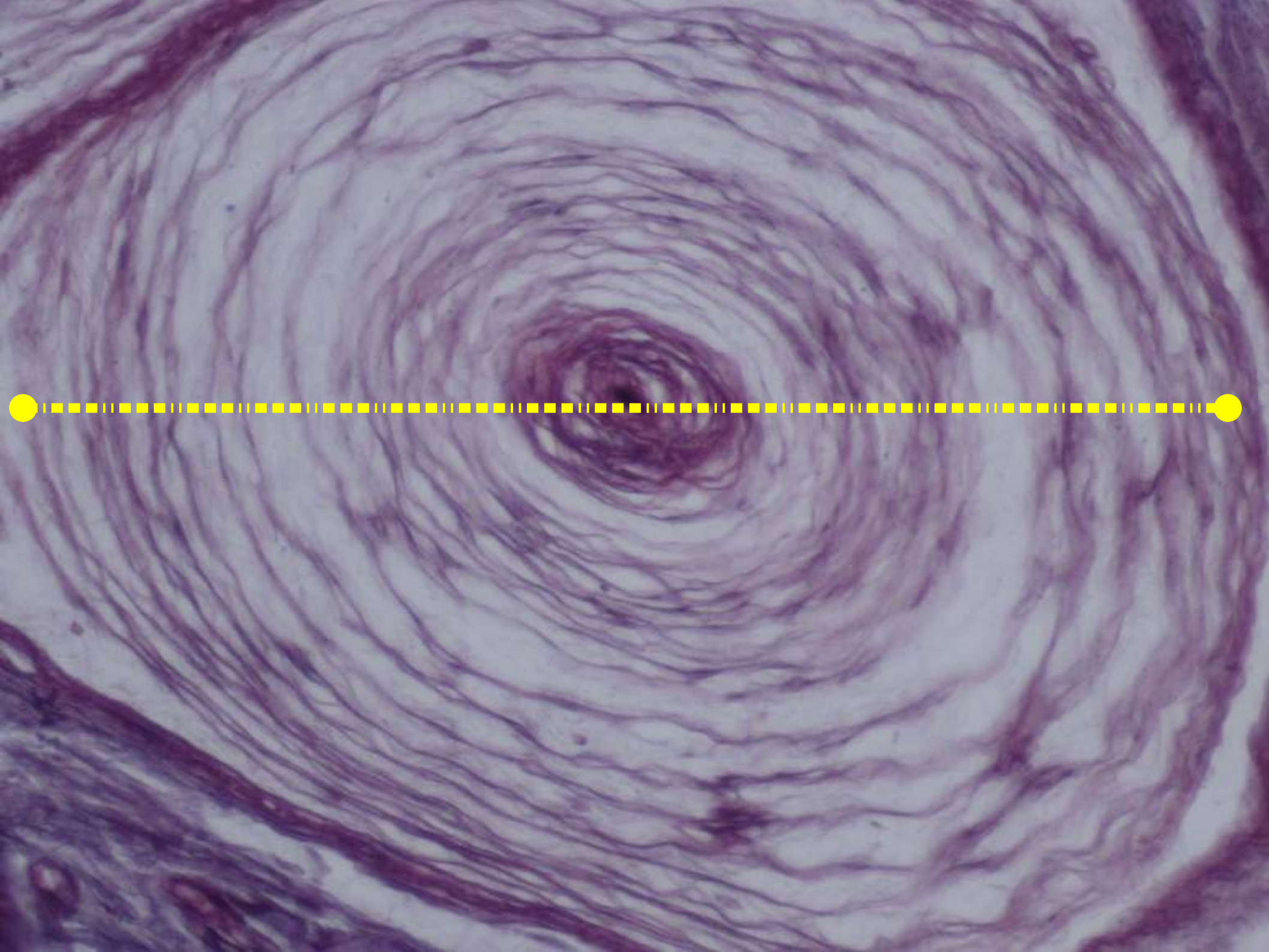


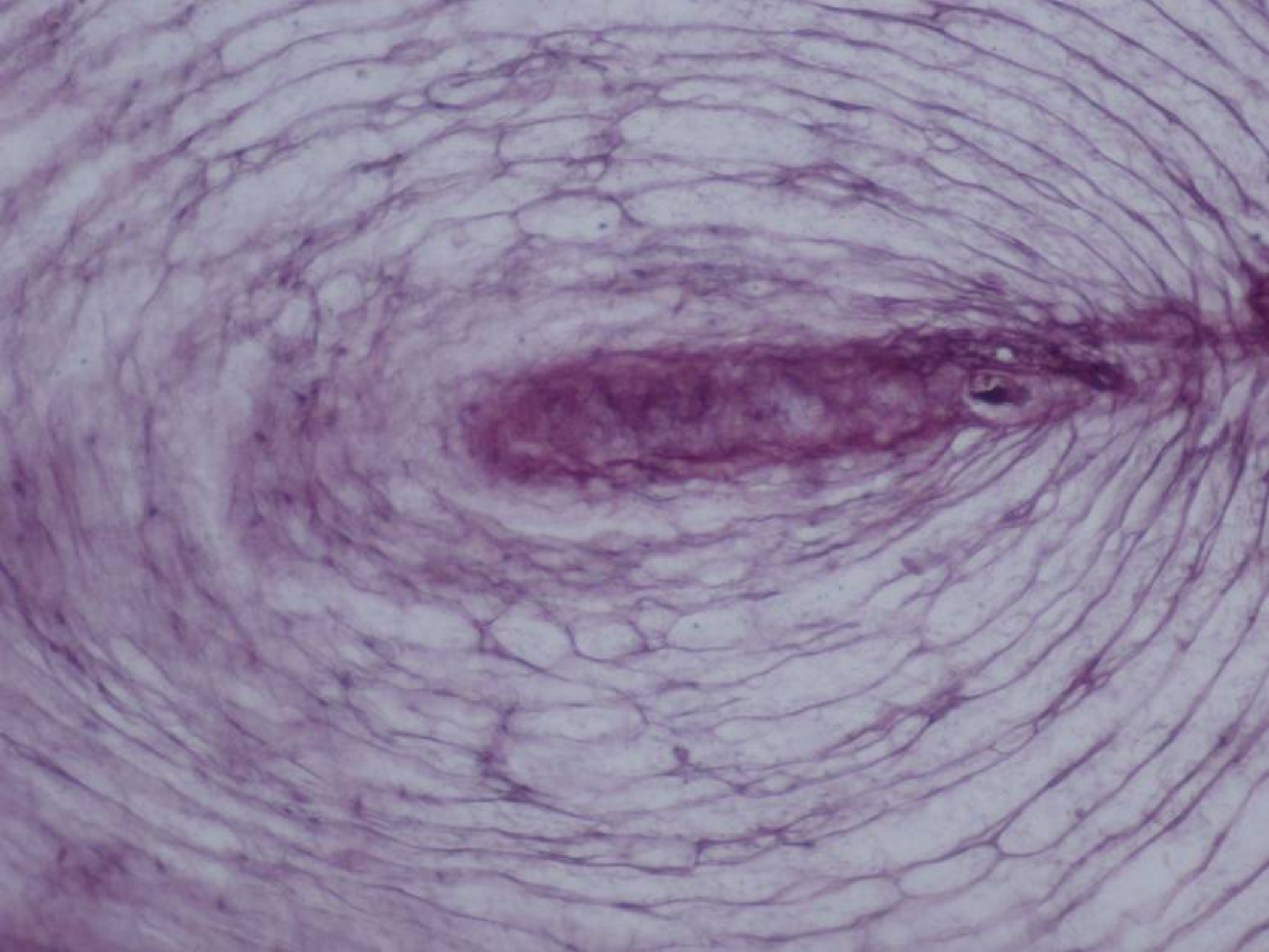


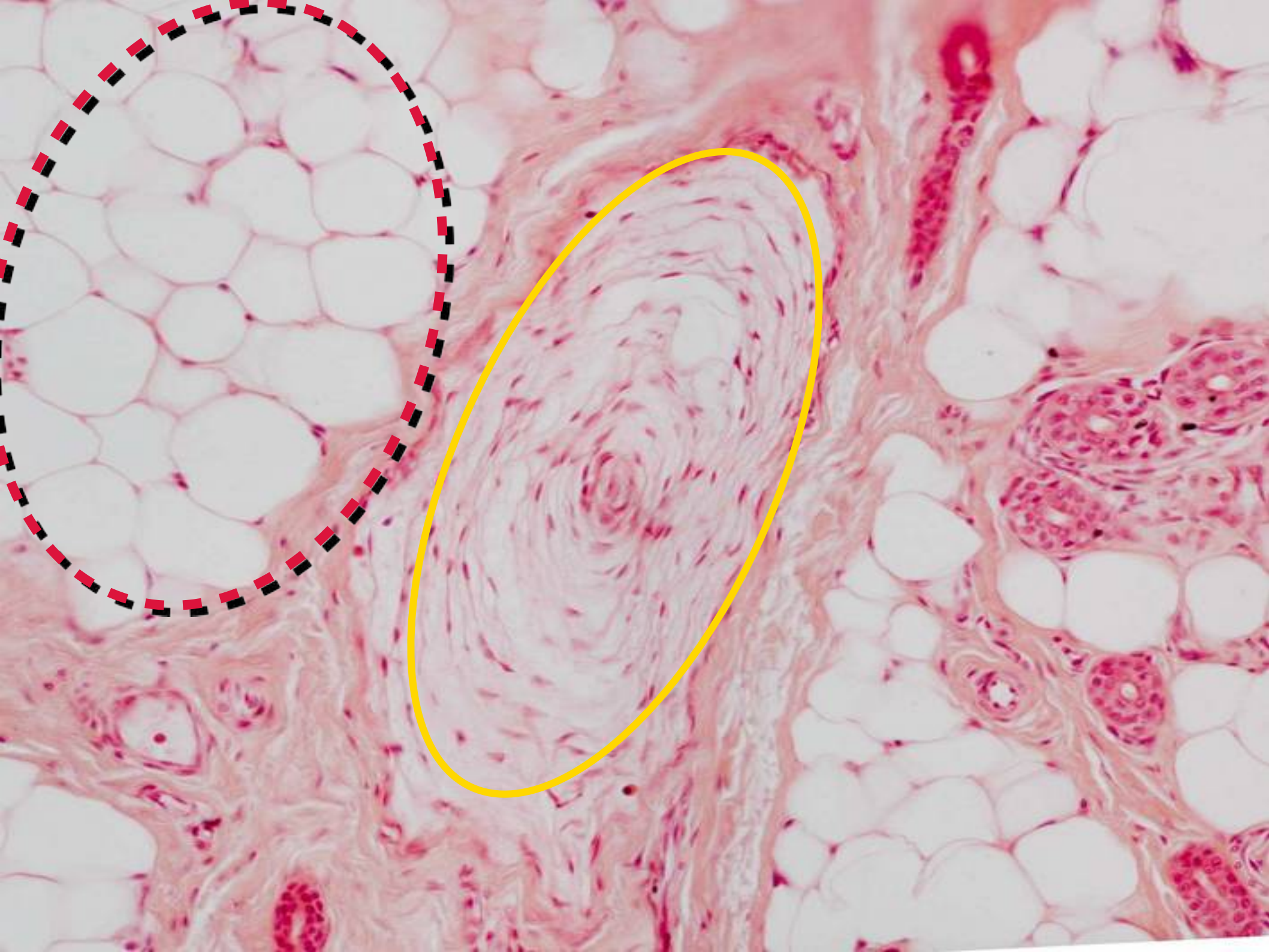

Eosin
High magnification
Fat cell
Adipose tissue

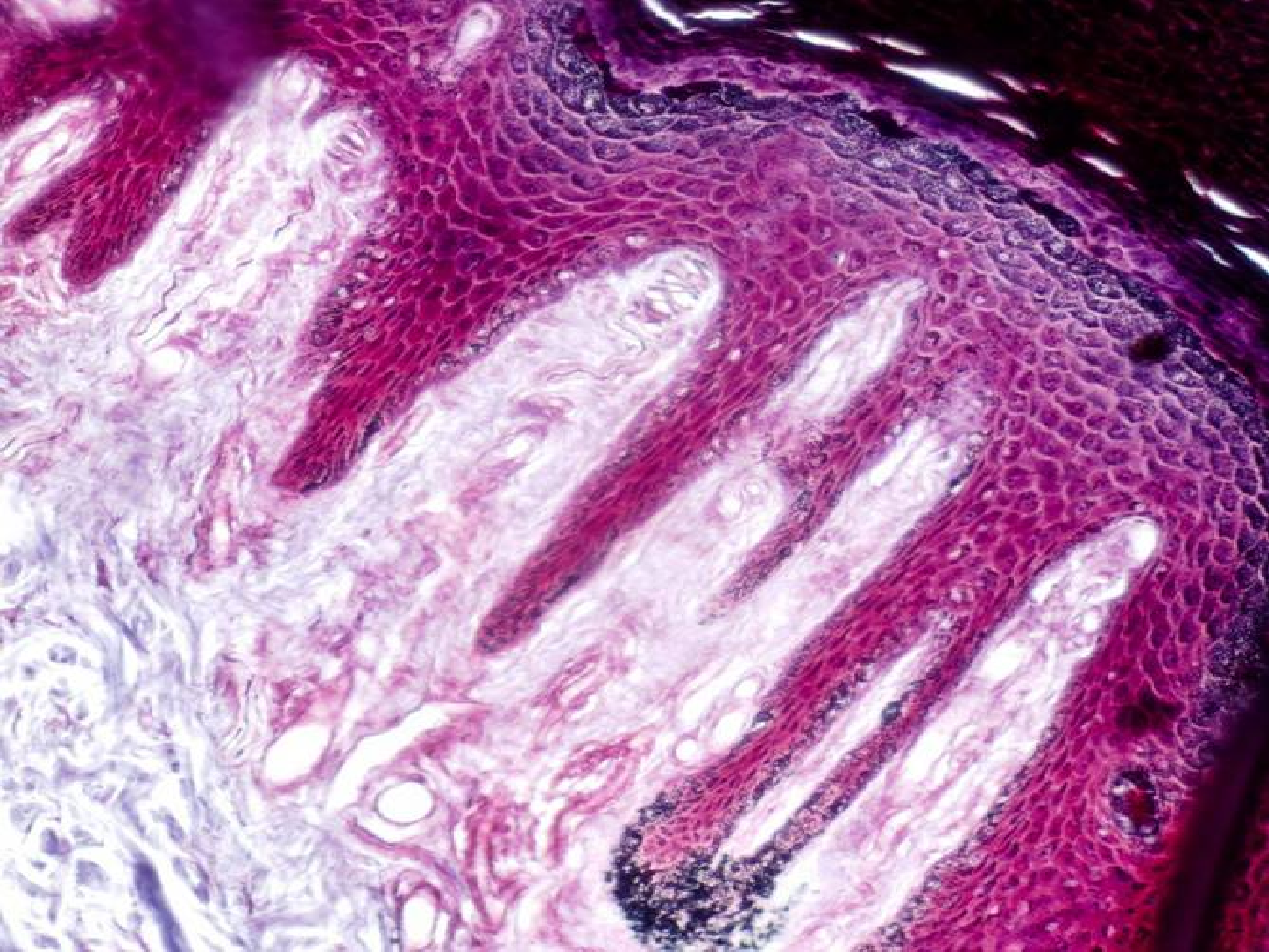

Fat cell
Endothelium
Cytoplasm
Fat globule
Blood vessel

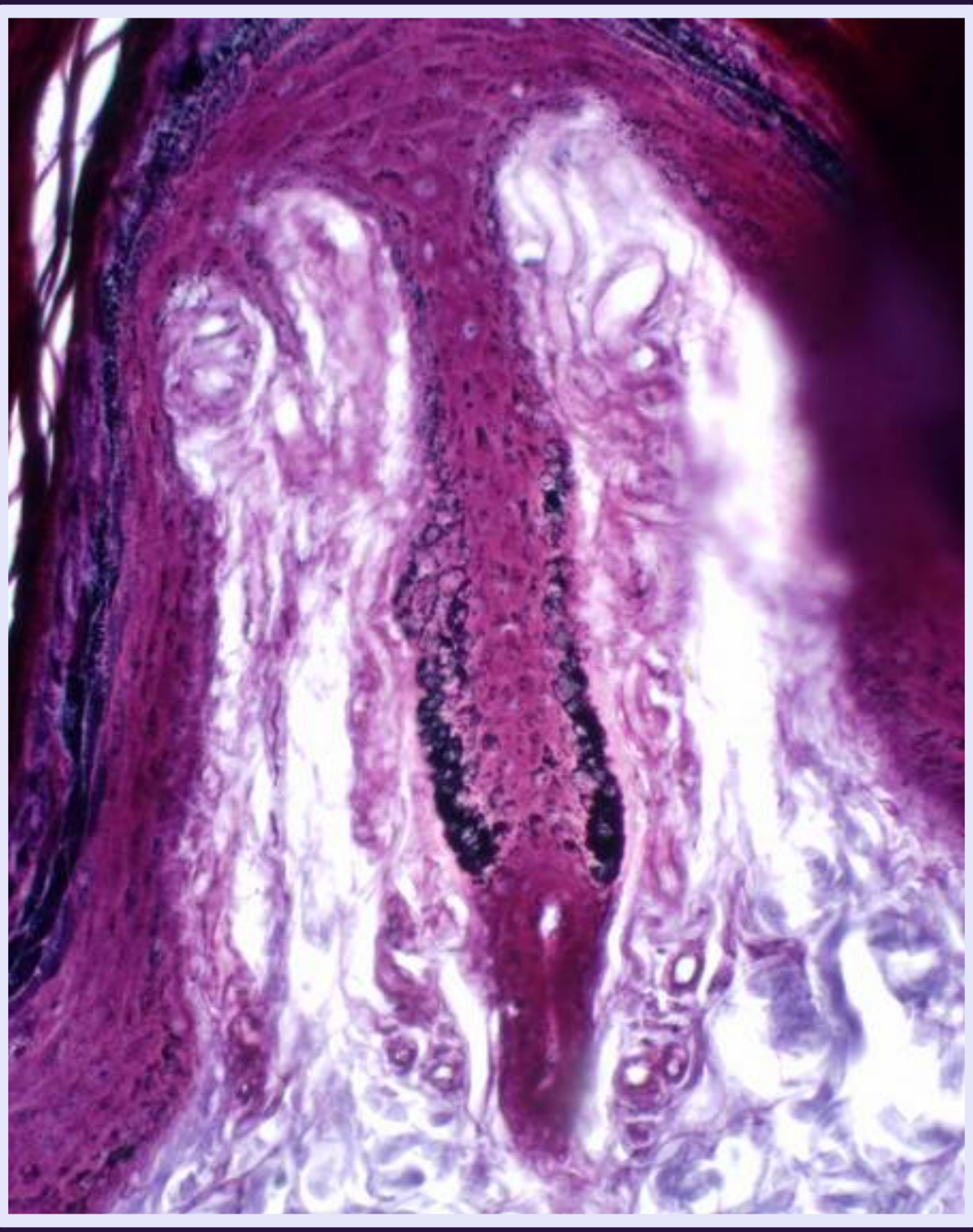

Nerves
Pacini

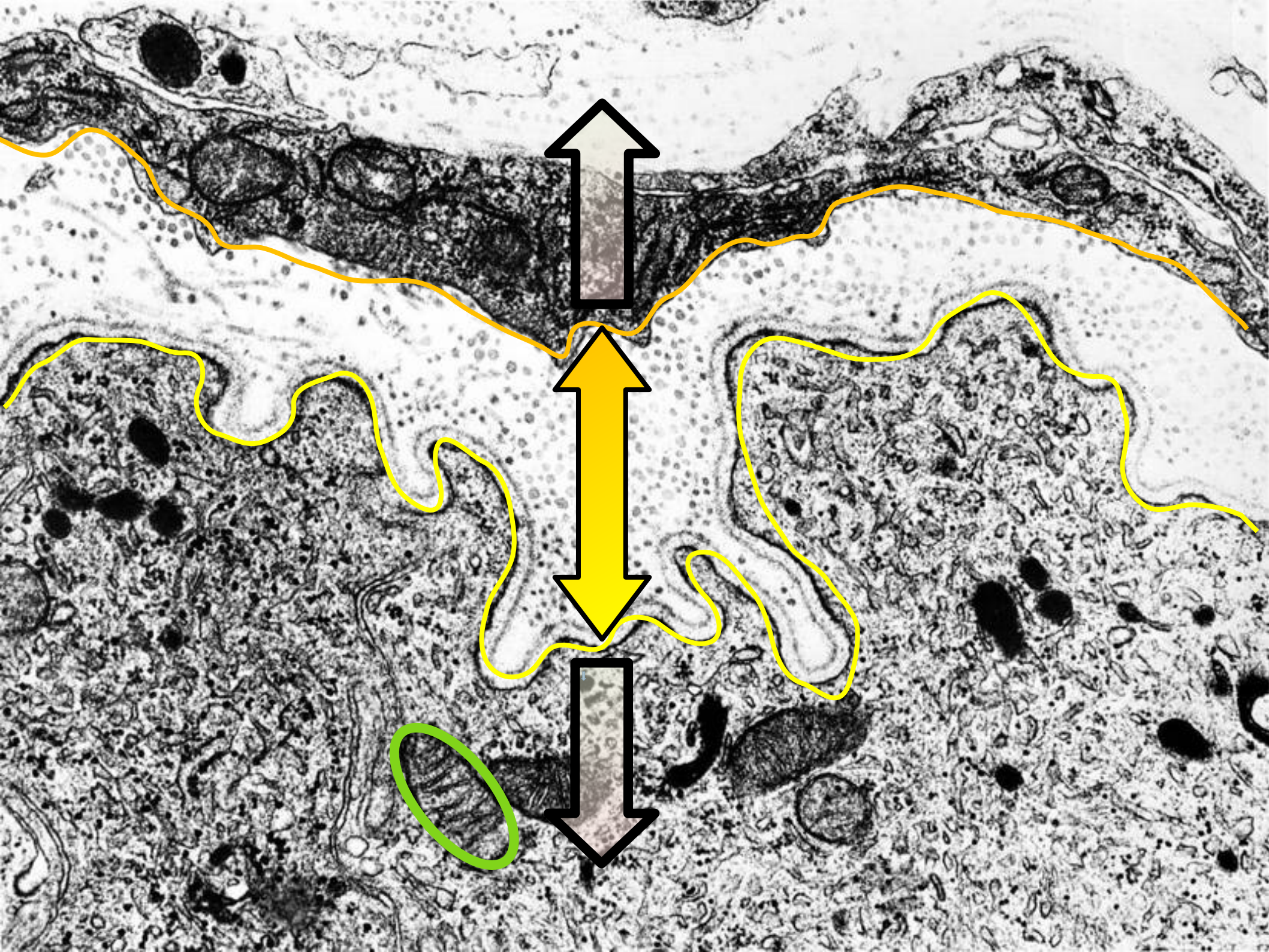


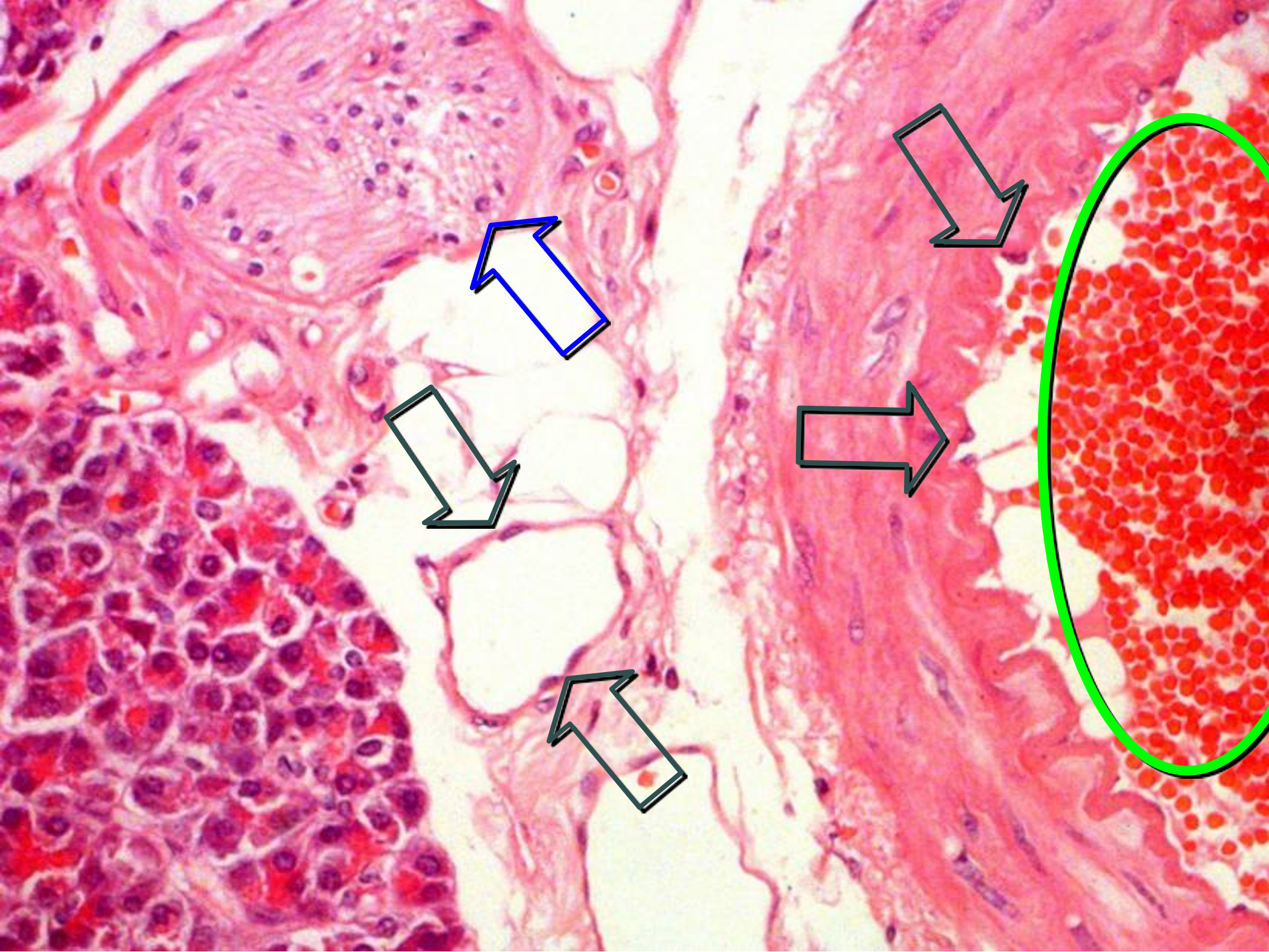




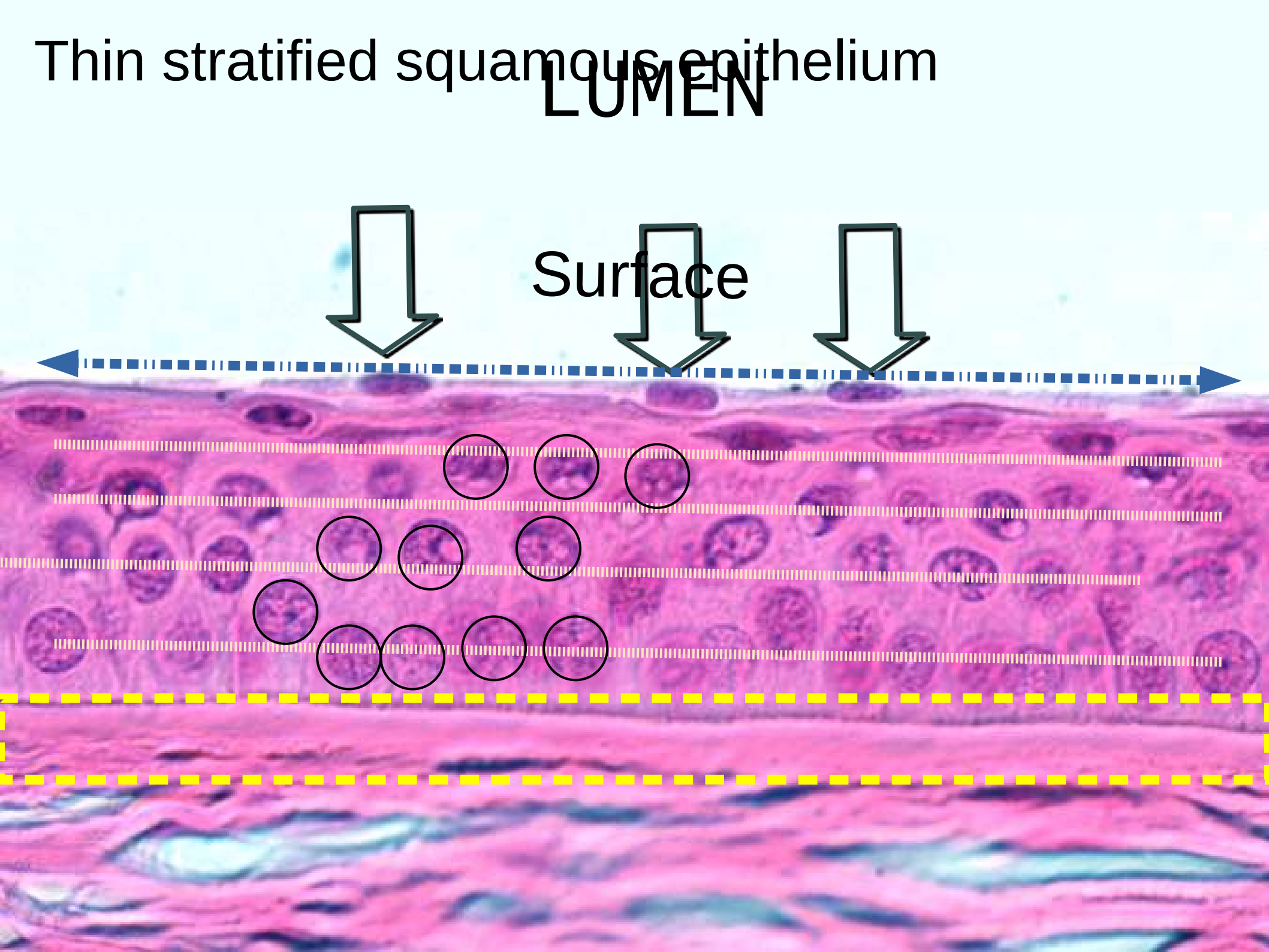




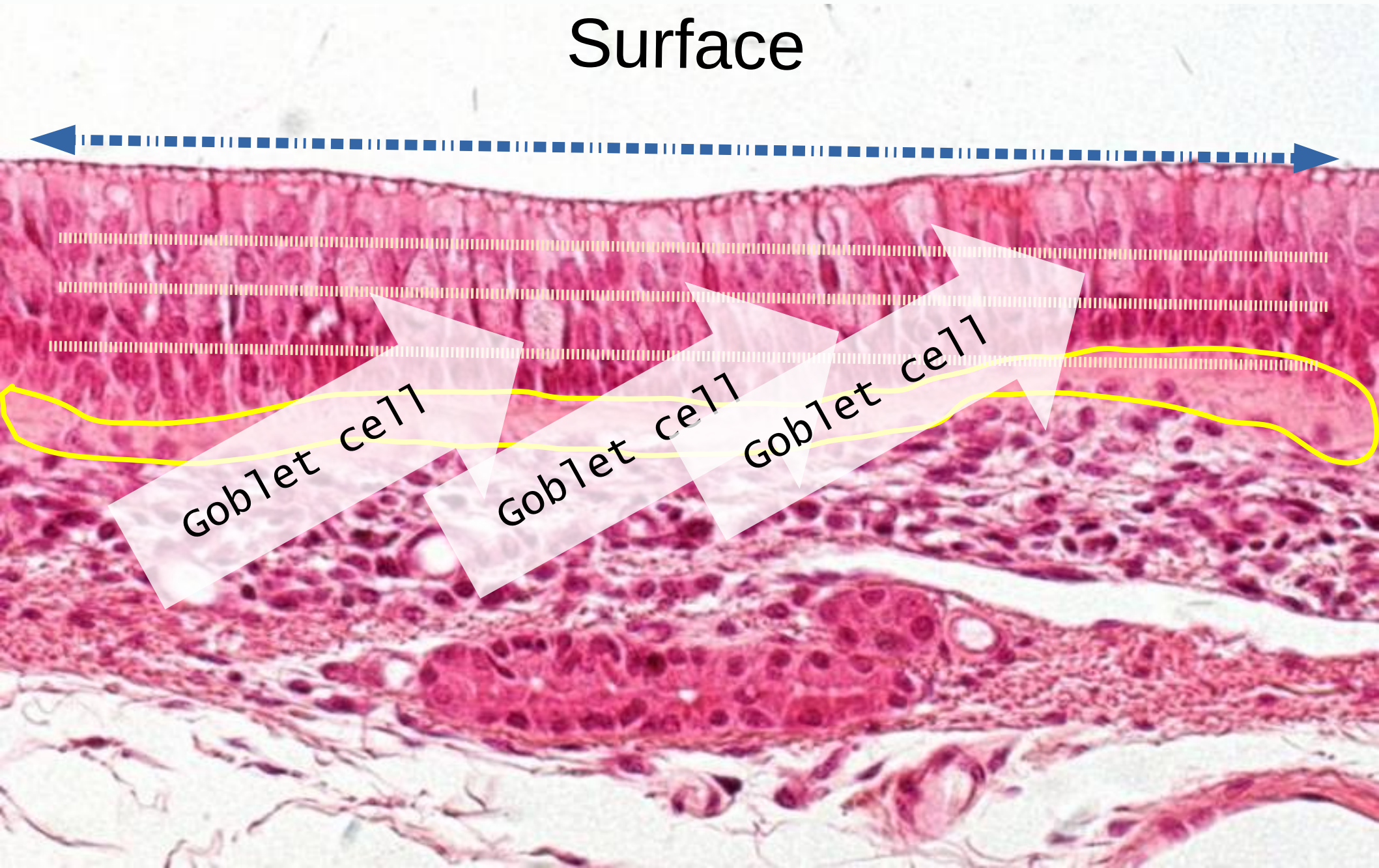




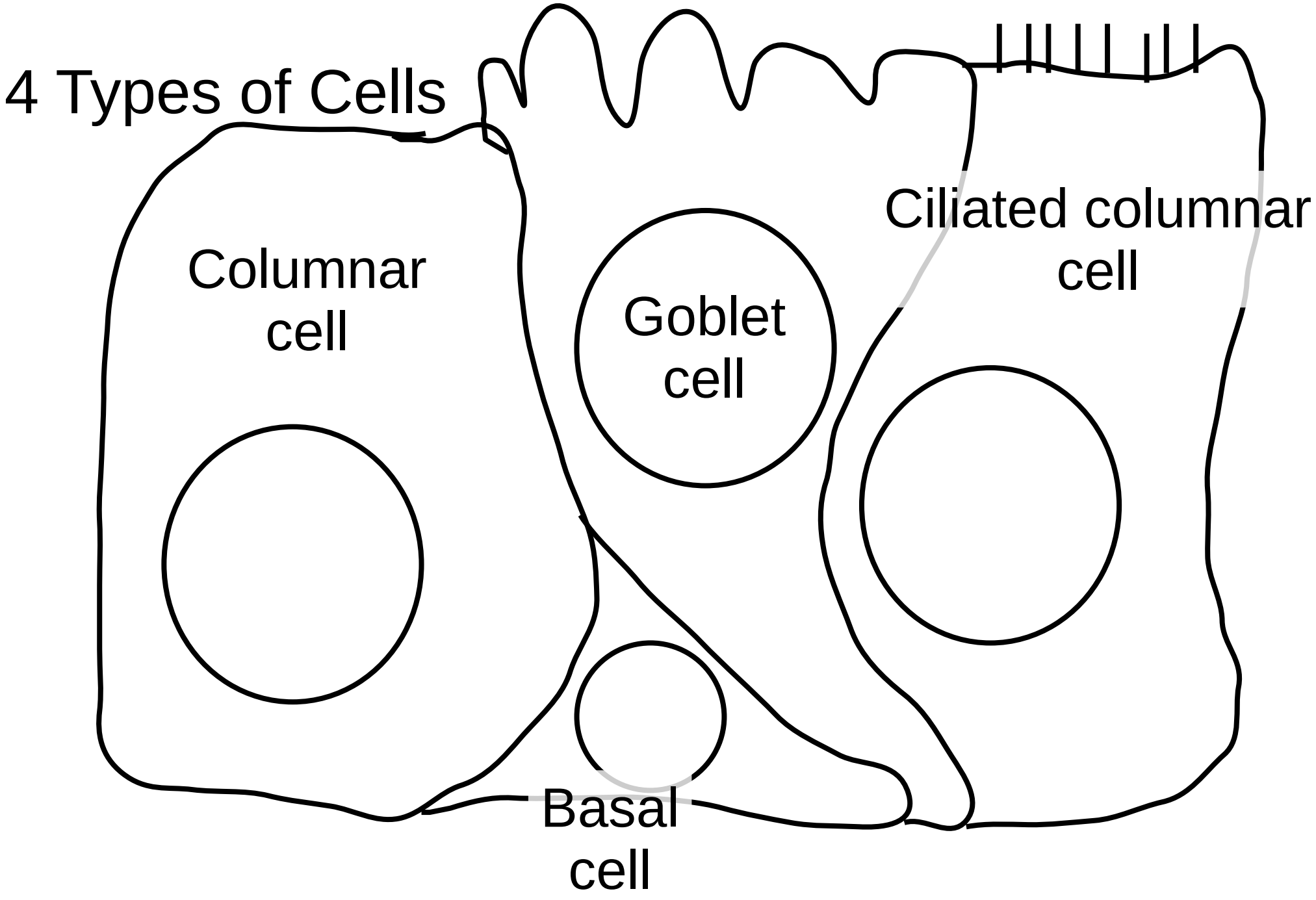
Thin stratified squamous epithelium

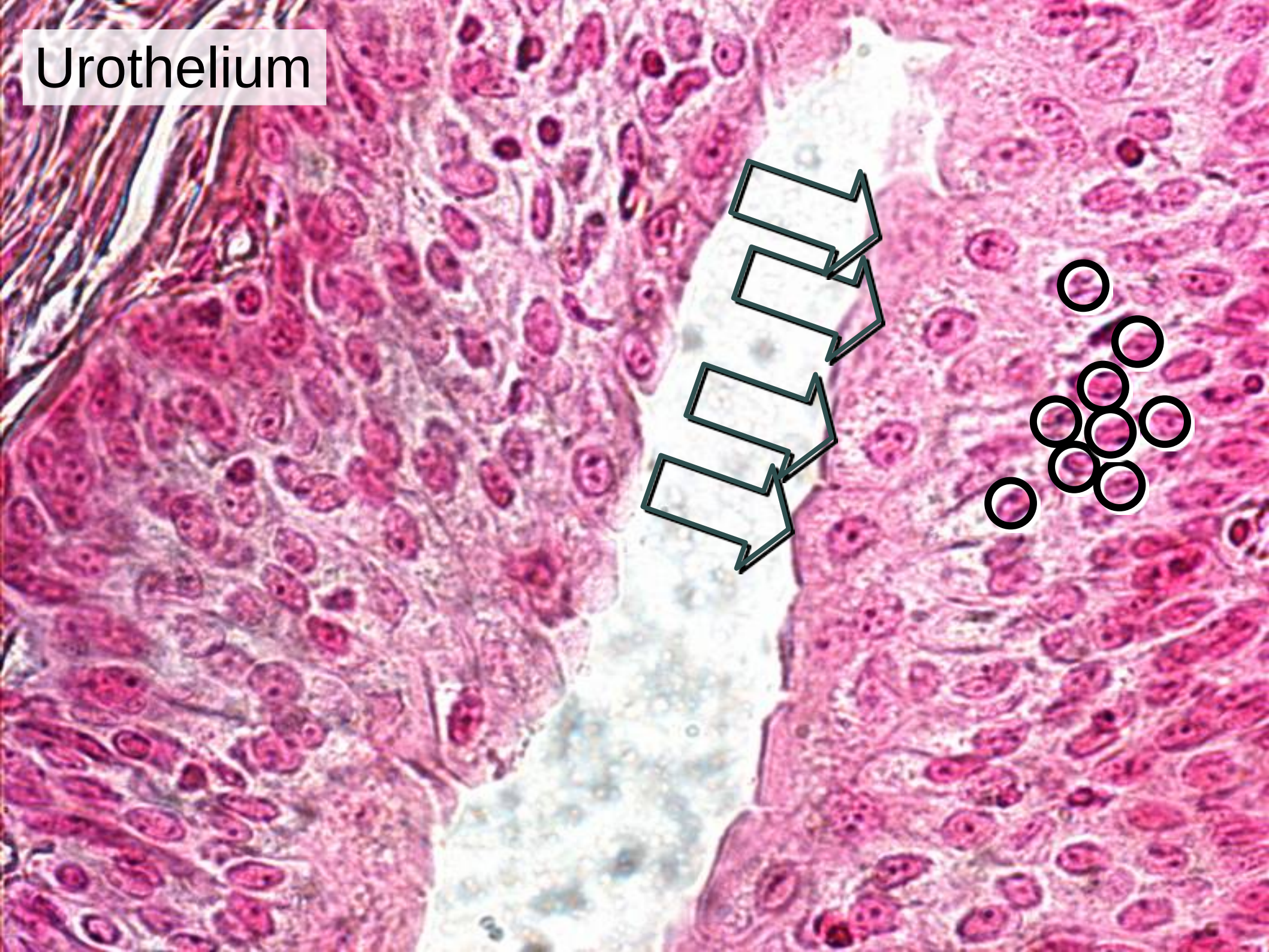


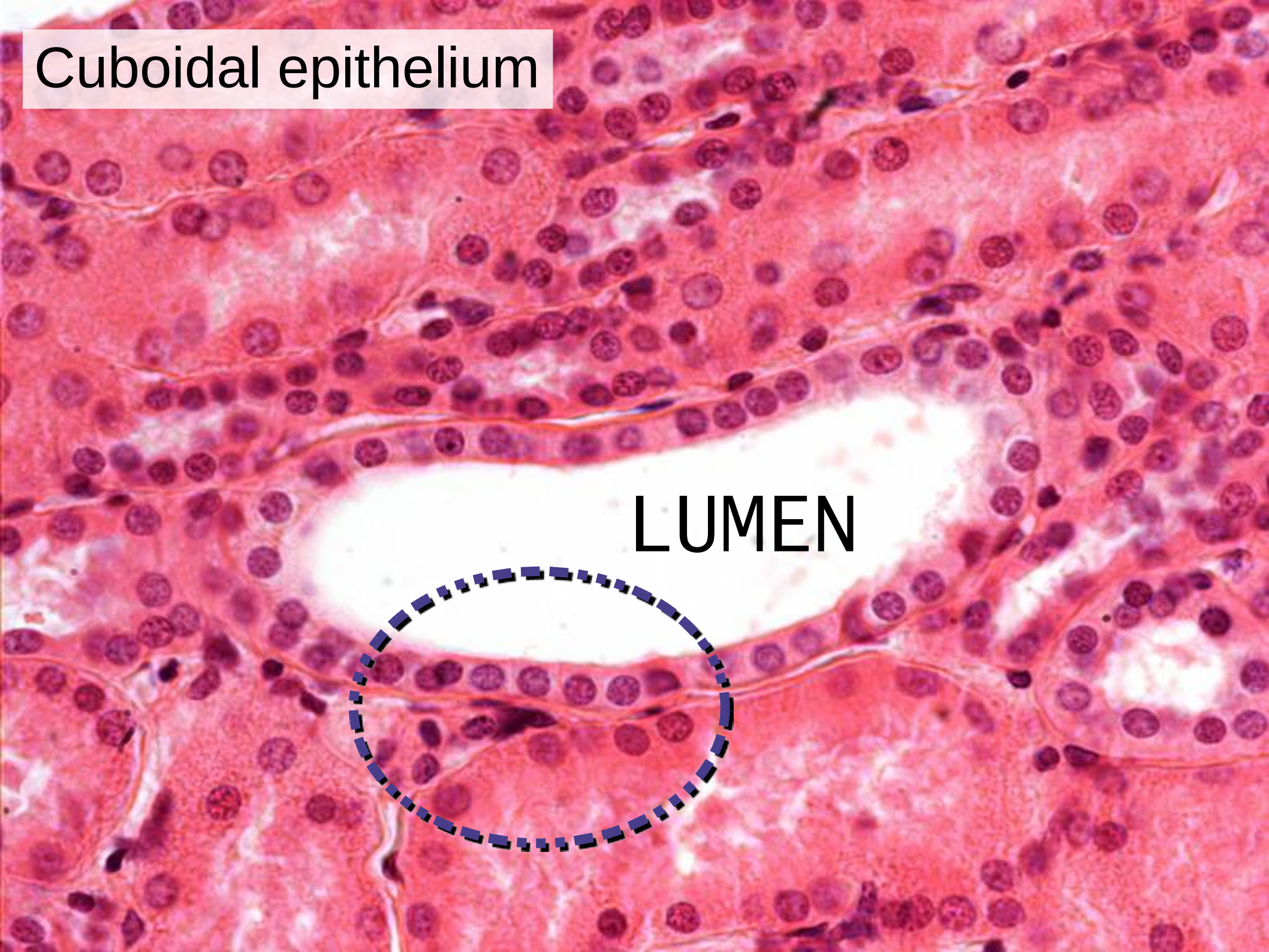
Pseudostratified columnar epithelium

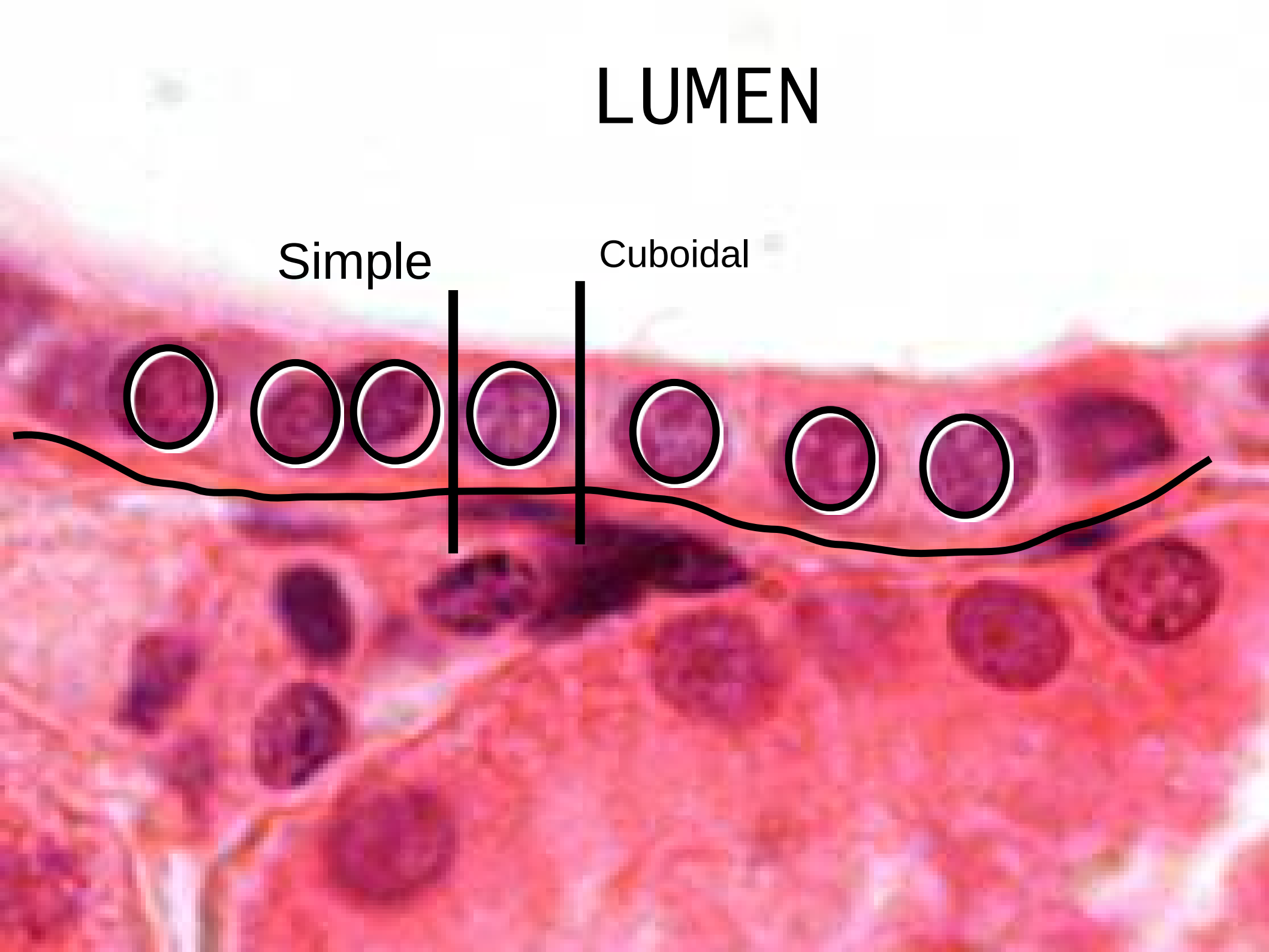


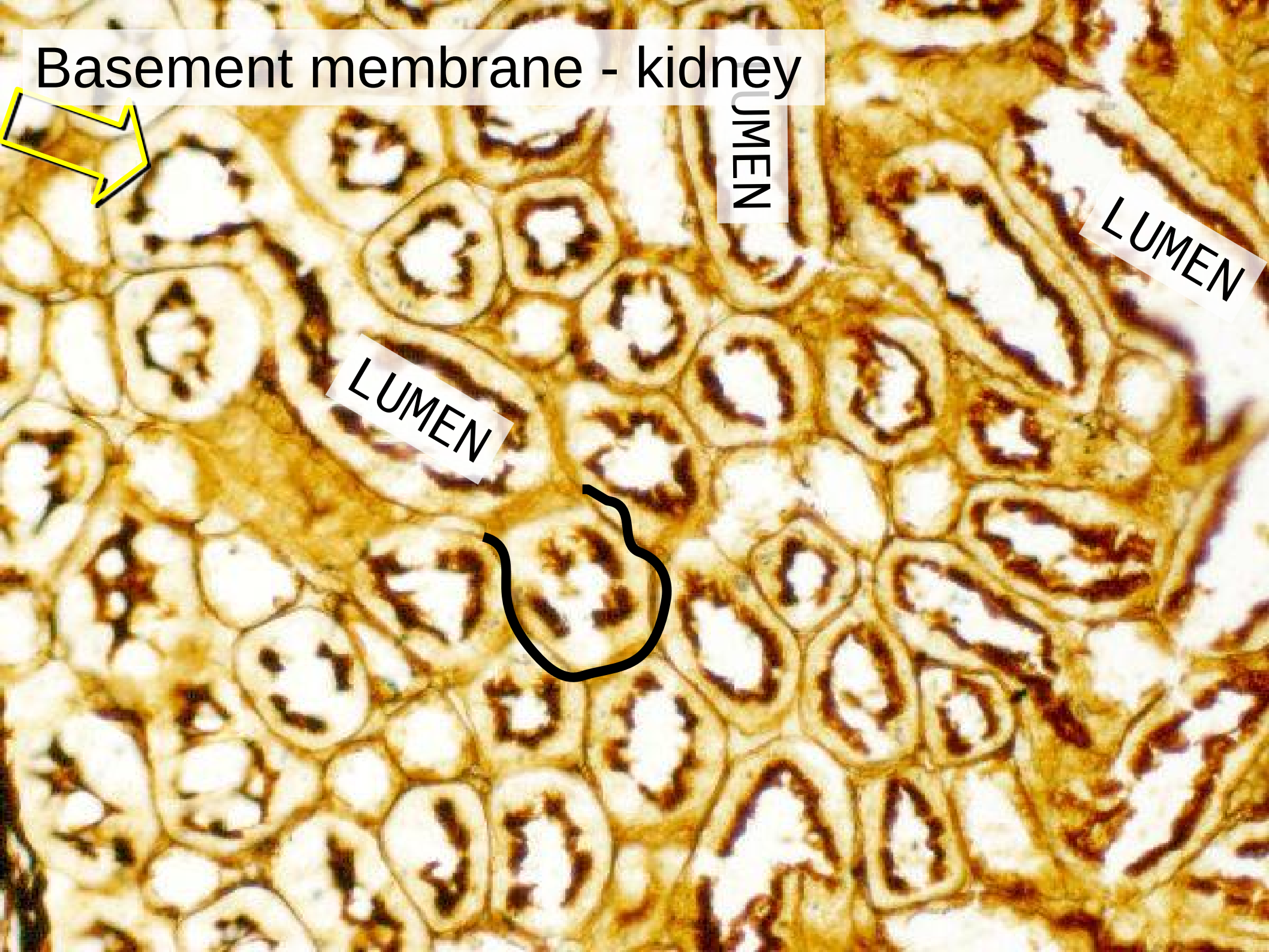
Pseudostratified columnar epithelium

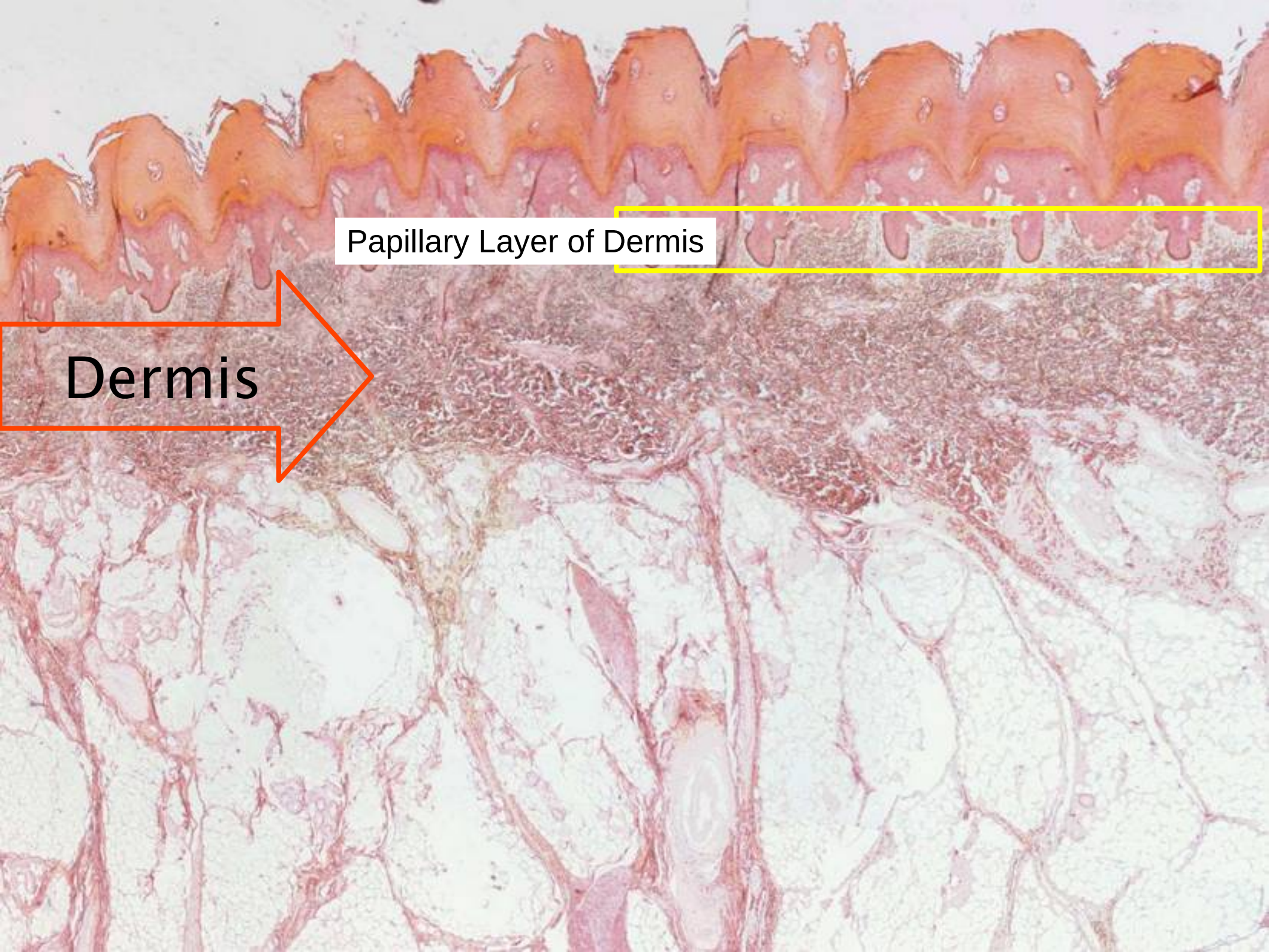


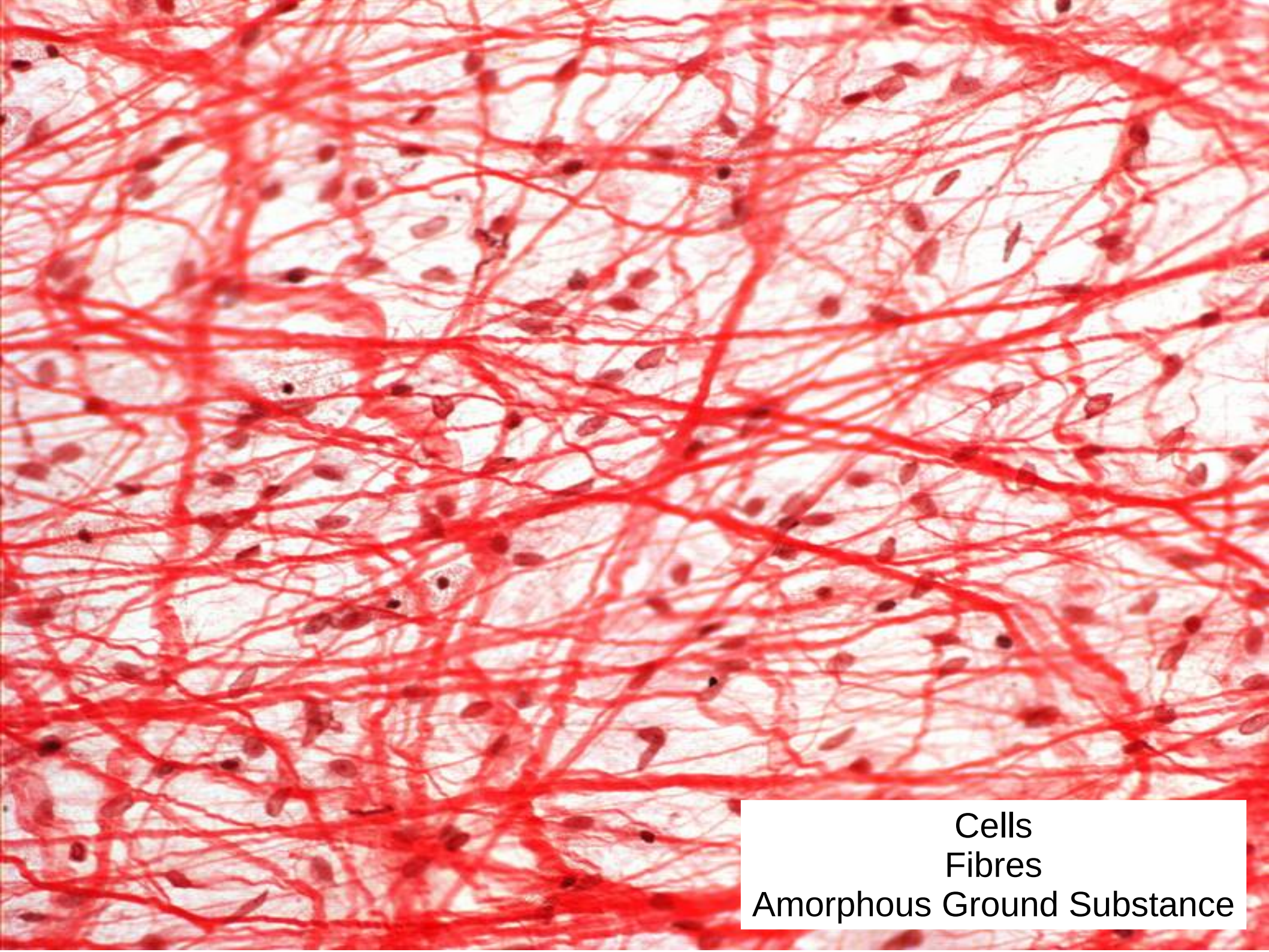

Urothelium


Cuboidal epithelium
LUMEN

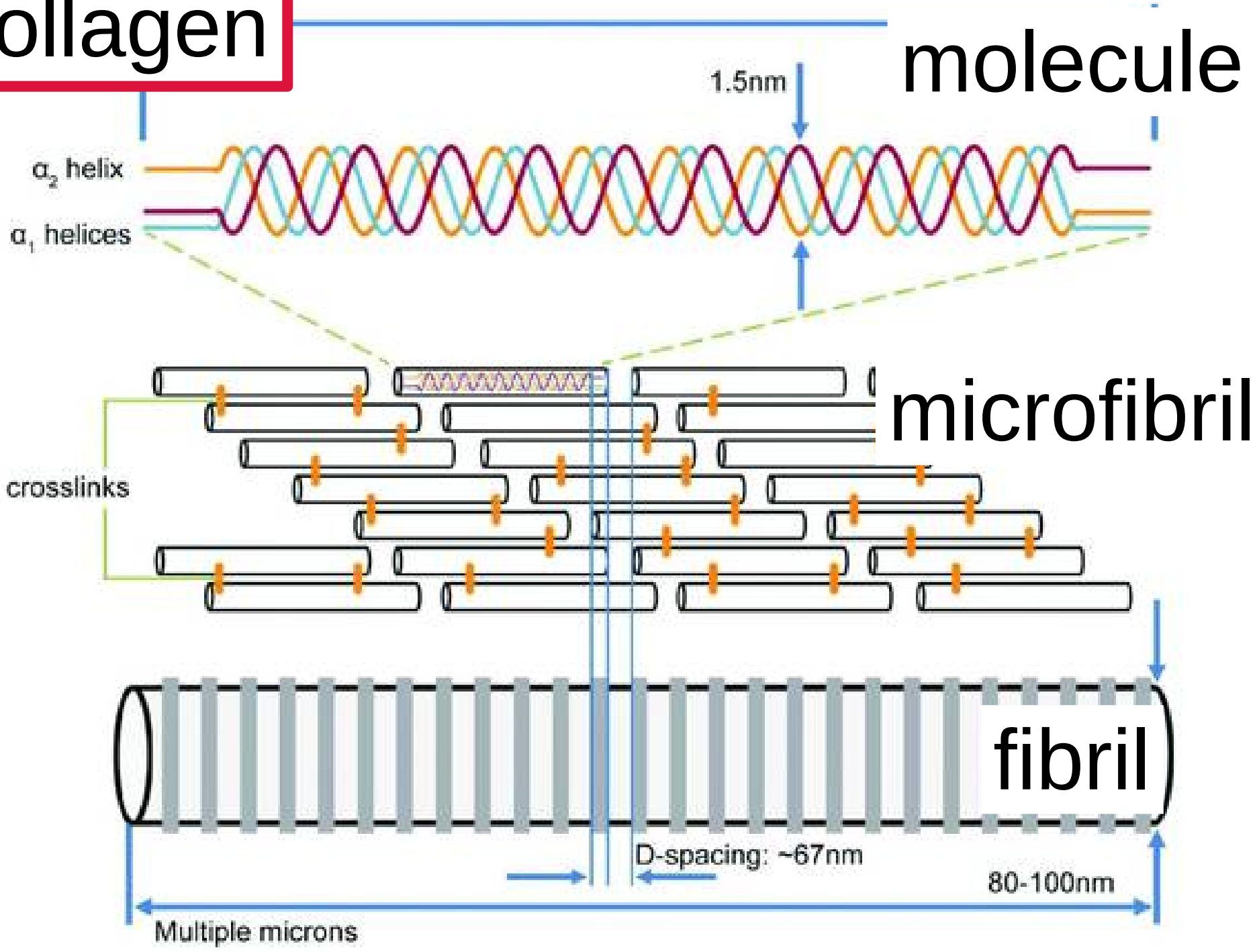

LUMEN
Simple
Cuboidal


Basement membrane - kidney
LUMEN
LUMEN
LUMEN

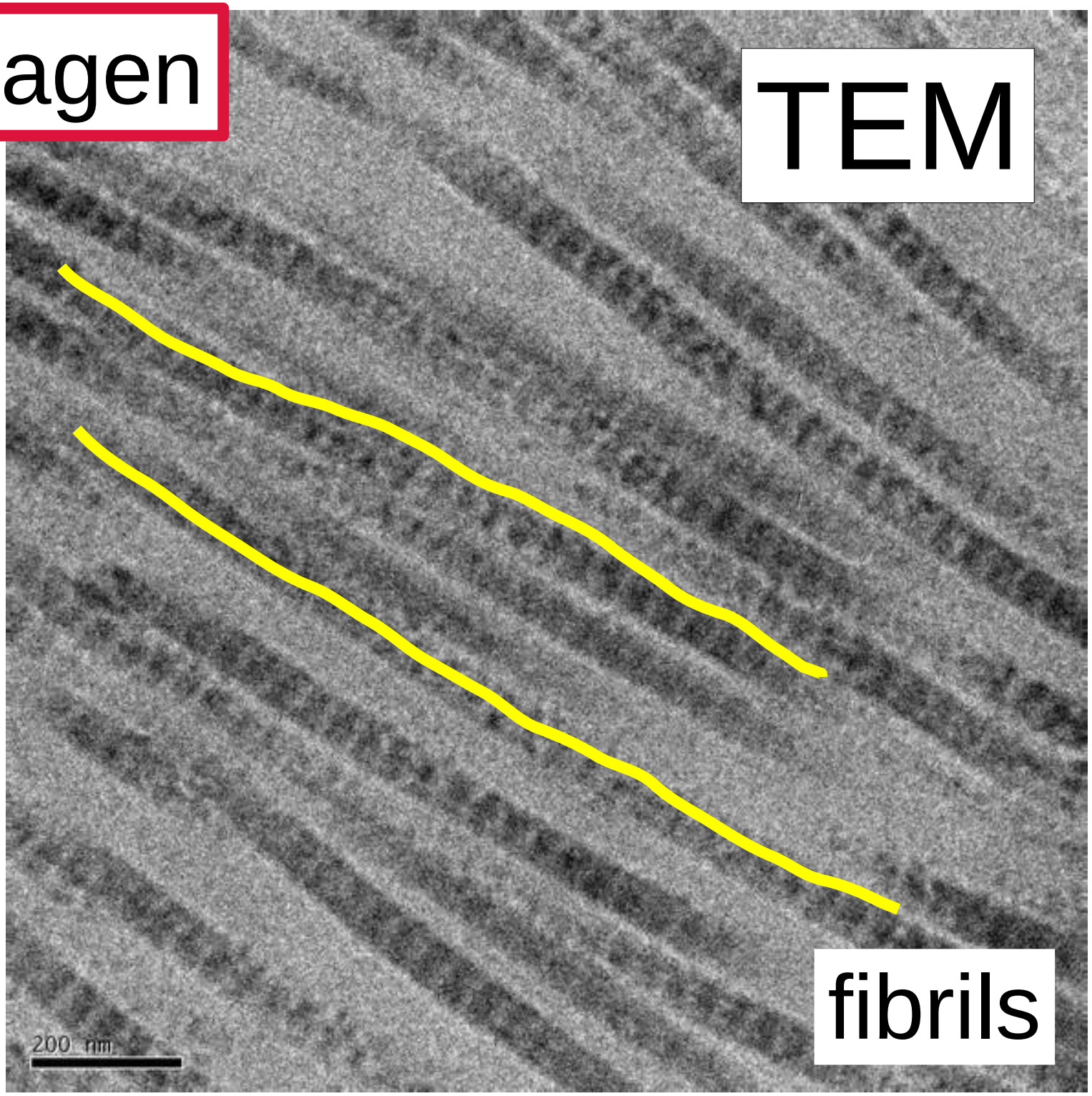

Papillary Layer of Dermis
Dermis

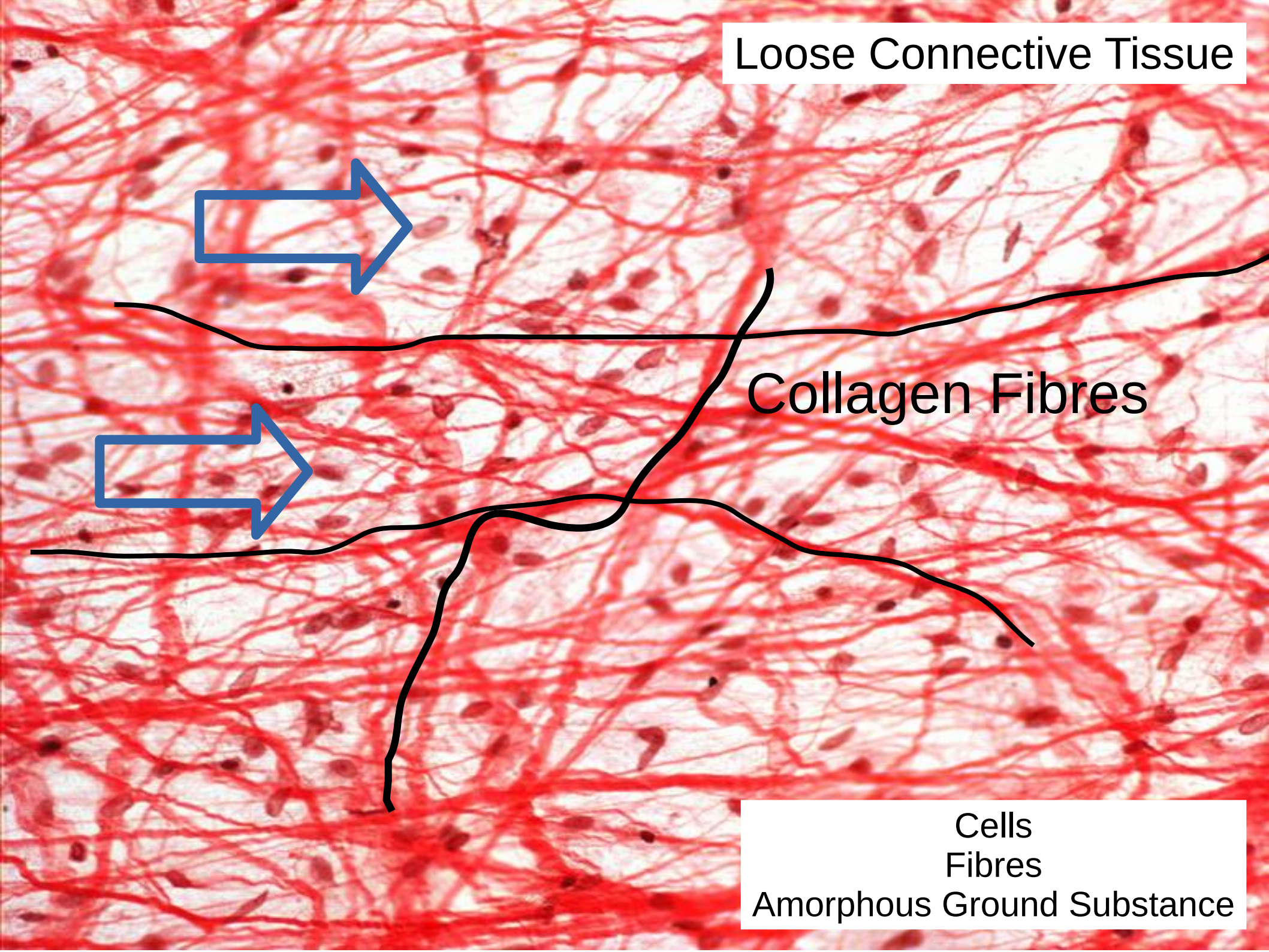

Cells
Fibres
Amorphous Ground Substance

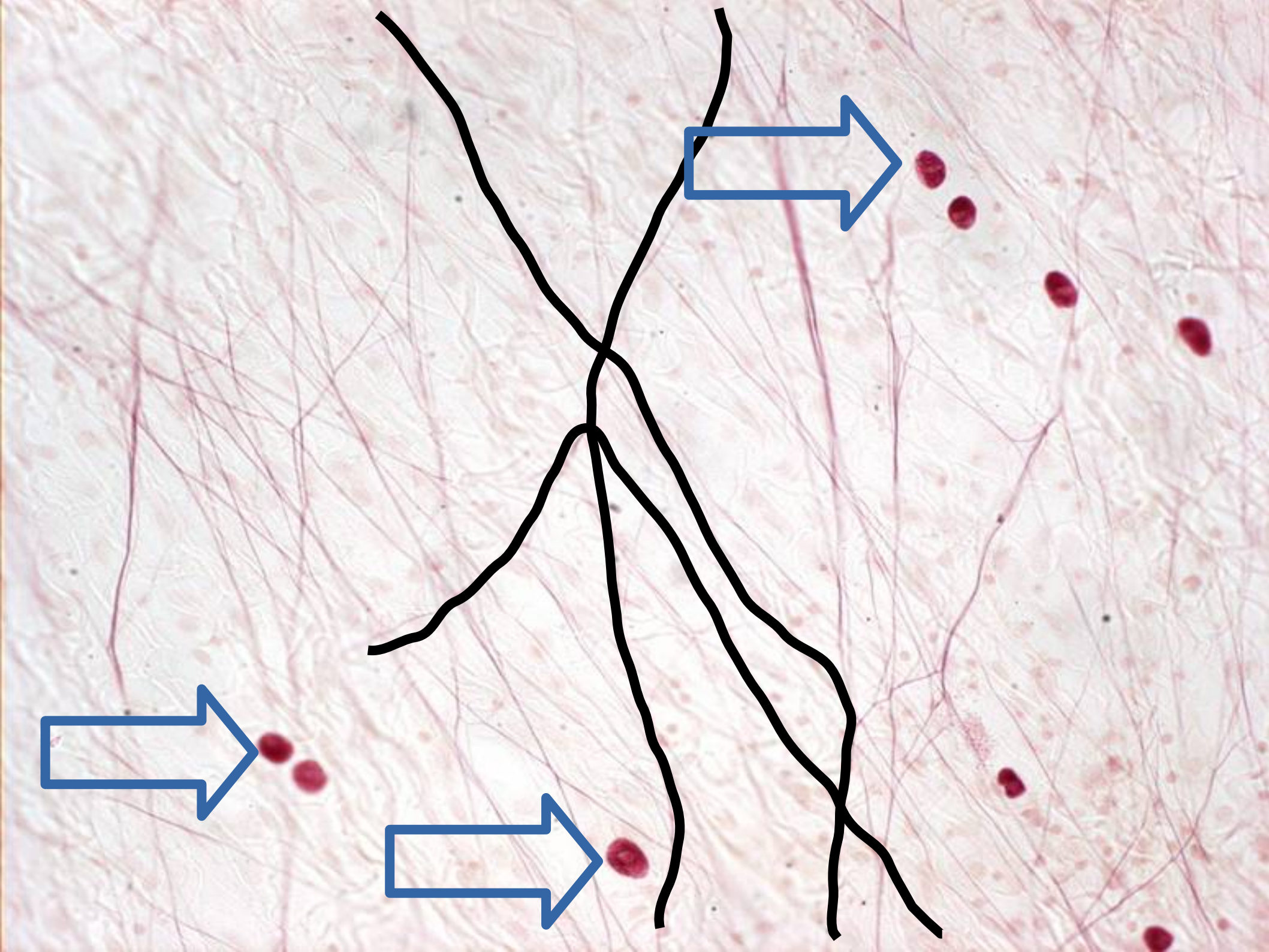
Collagen

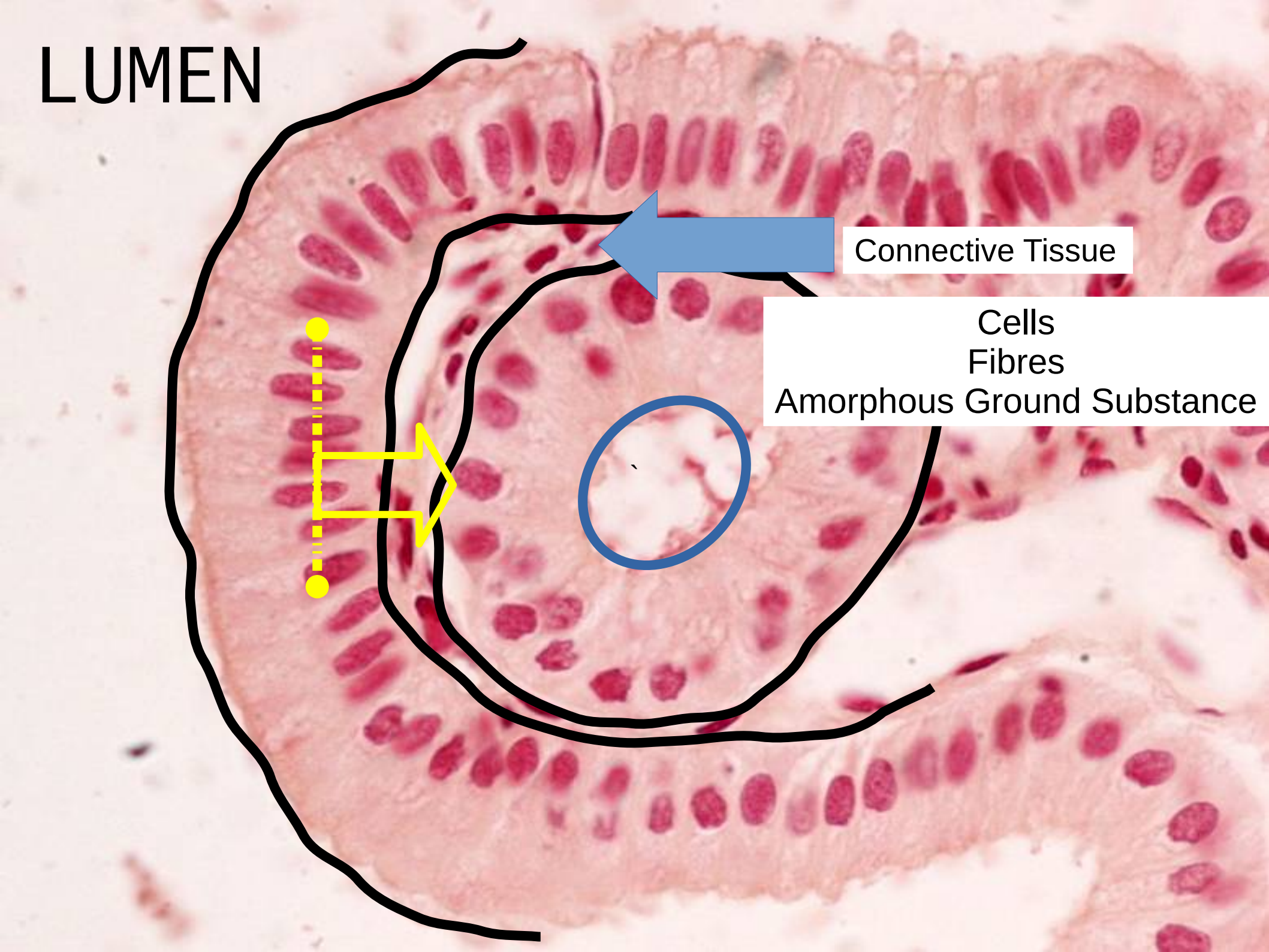

molecule
1.5nm
α2 helix
α1 helices
microfibril
crosslinks
fibril
D-spacing: ~67nm
80-100nm
Multiple microns

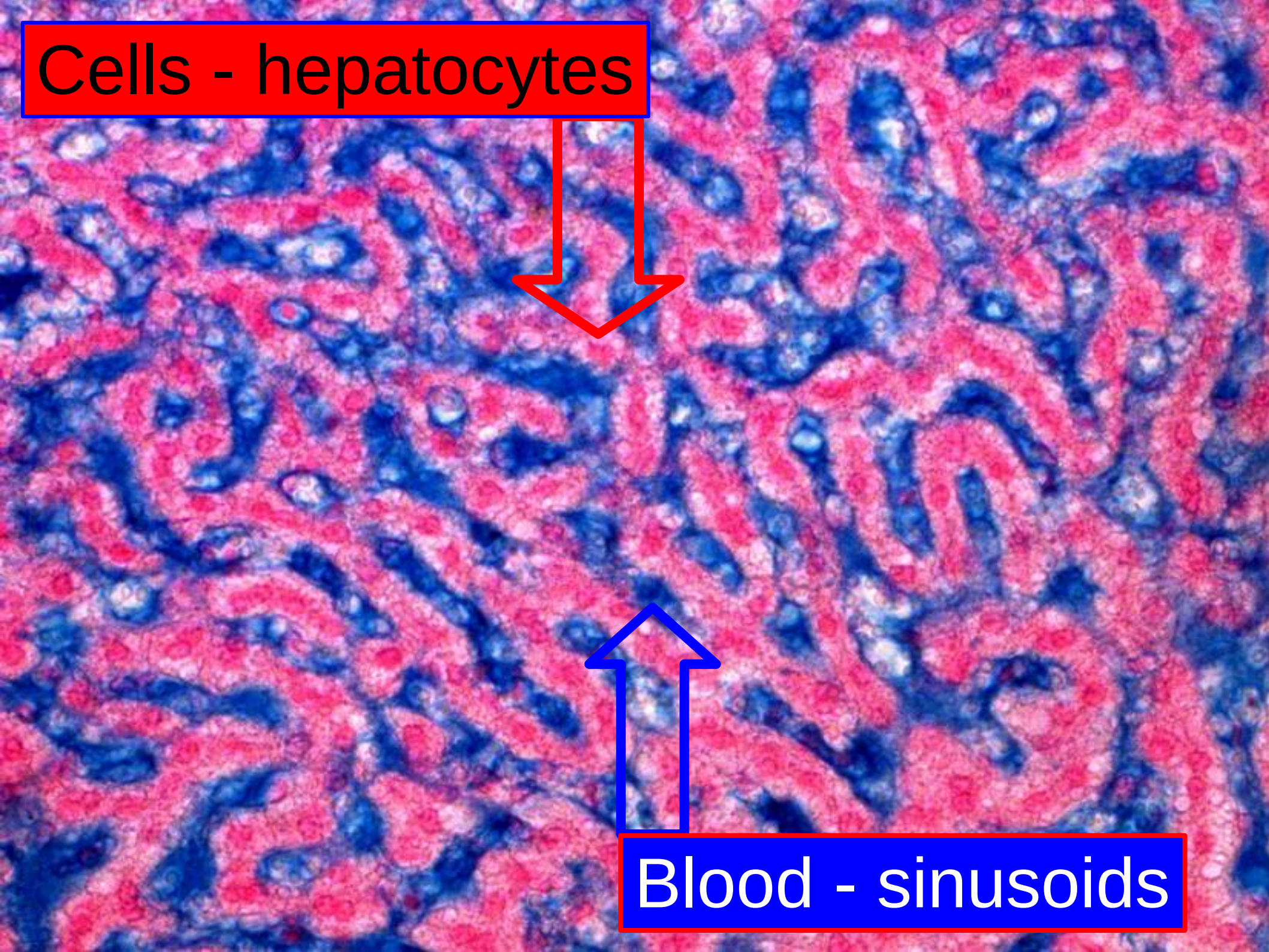
Collagen

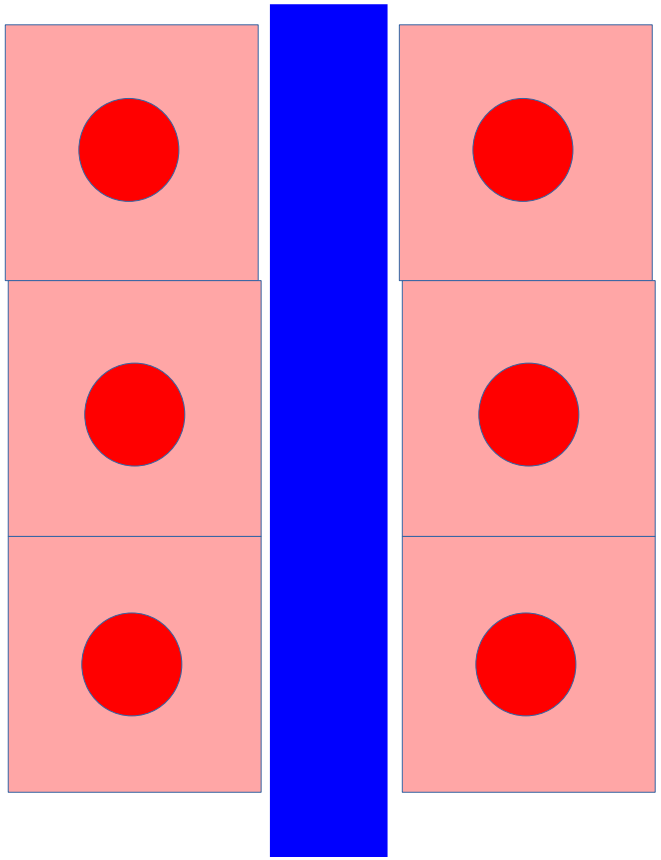


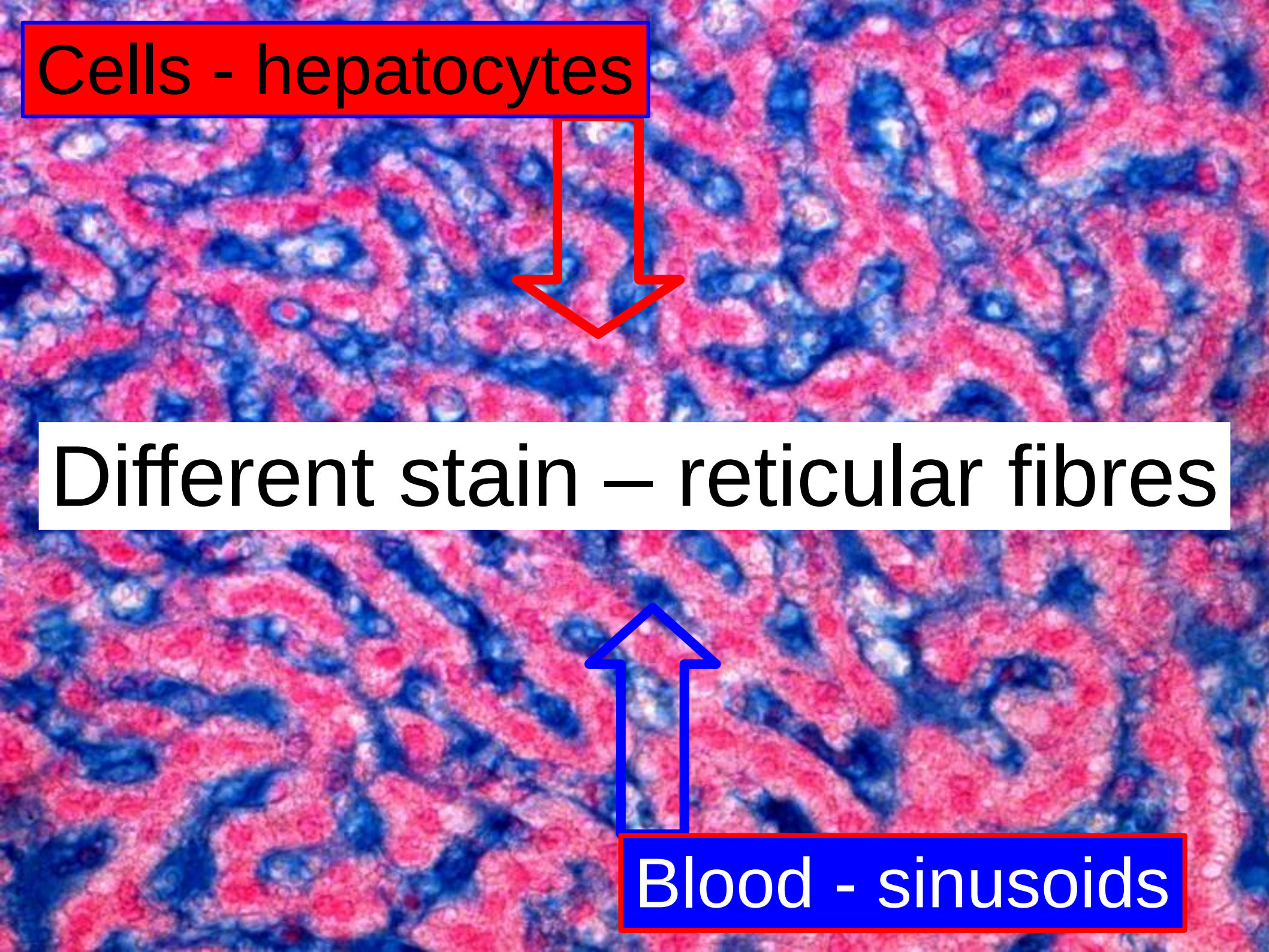

Loose Connective Tissue
Collagen Fibres
Cells
Fibres
Amorphous Ground Substance

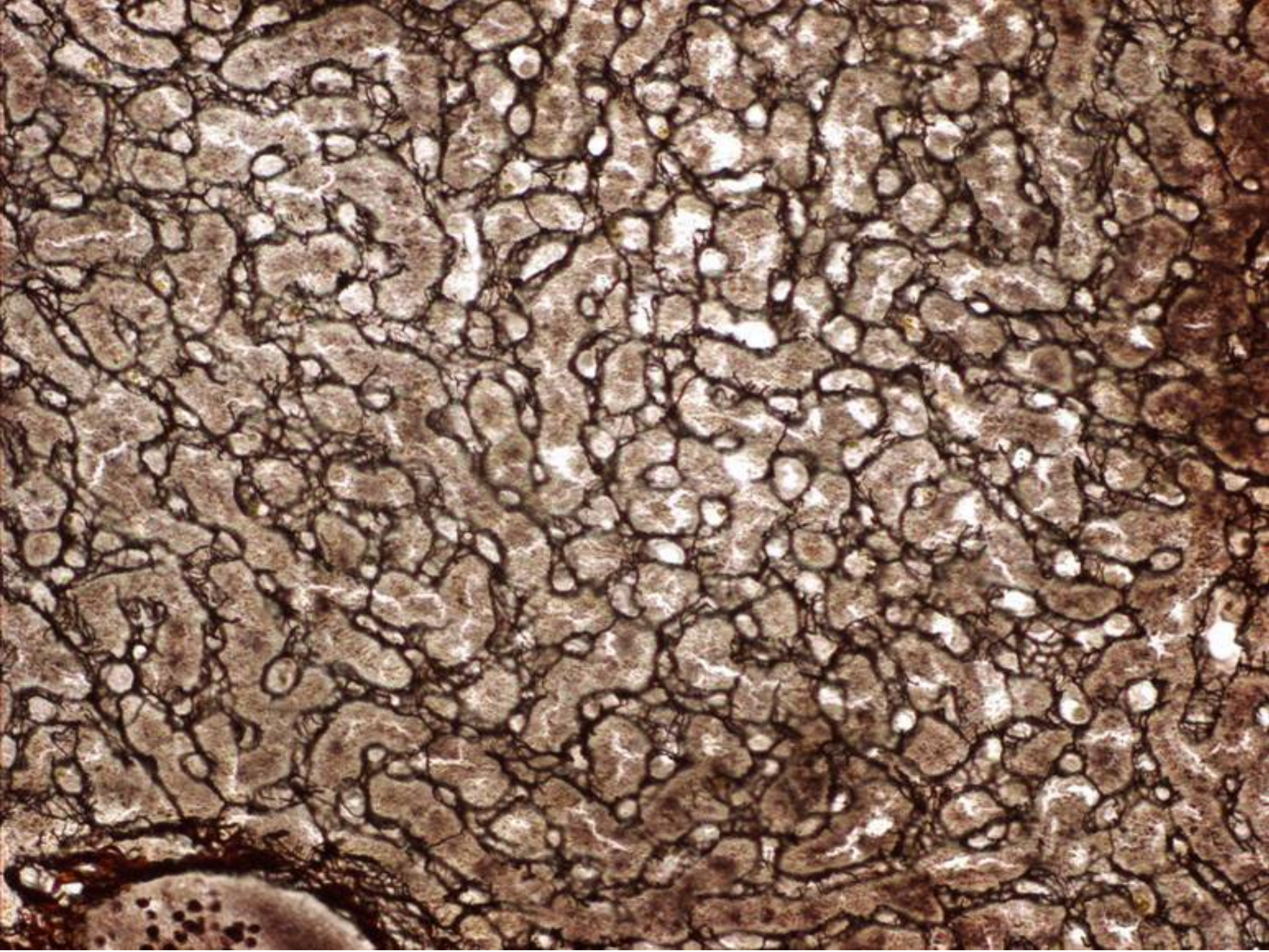


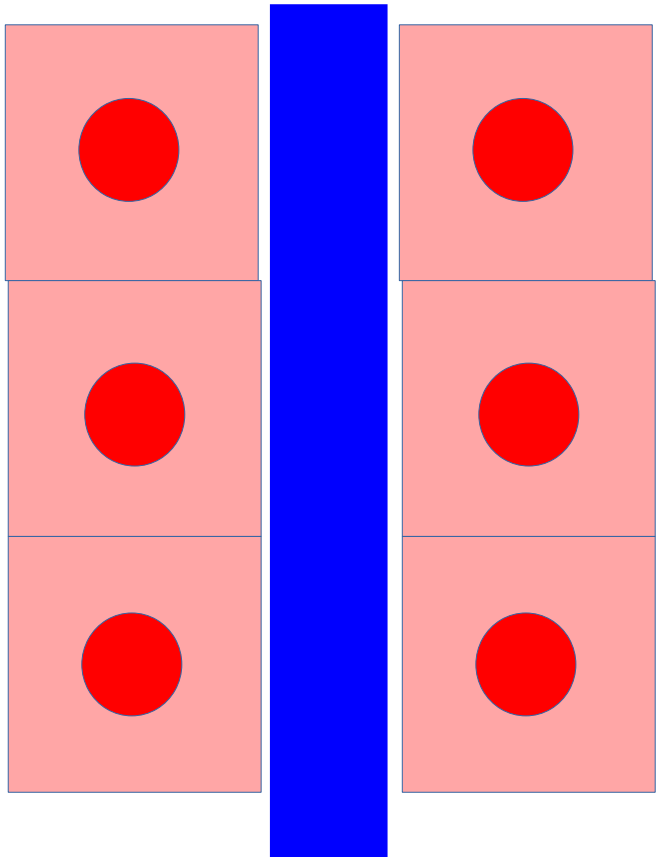

LUMEN
Connective Tissue
Cells
Fibres
Amorphous Ground Substance

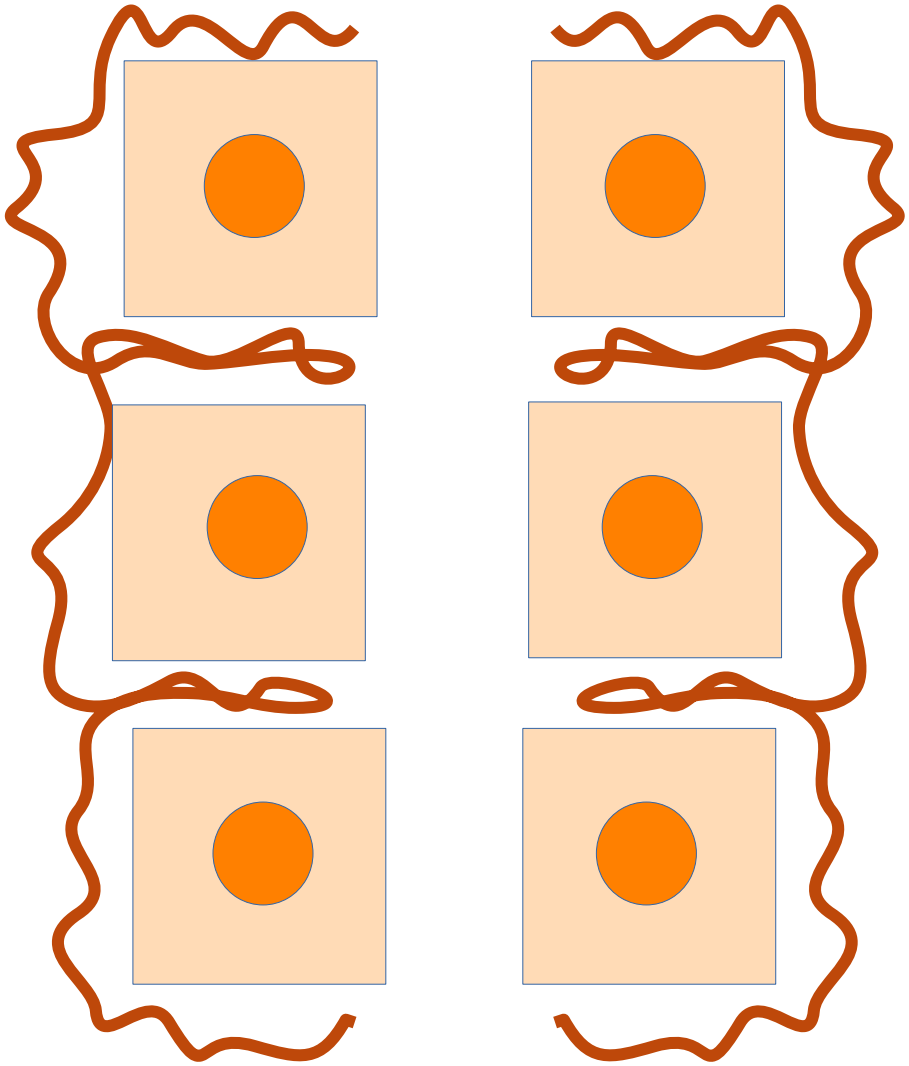

Cells - hepatocytes
Blood - sinusoids

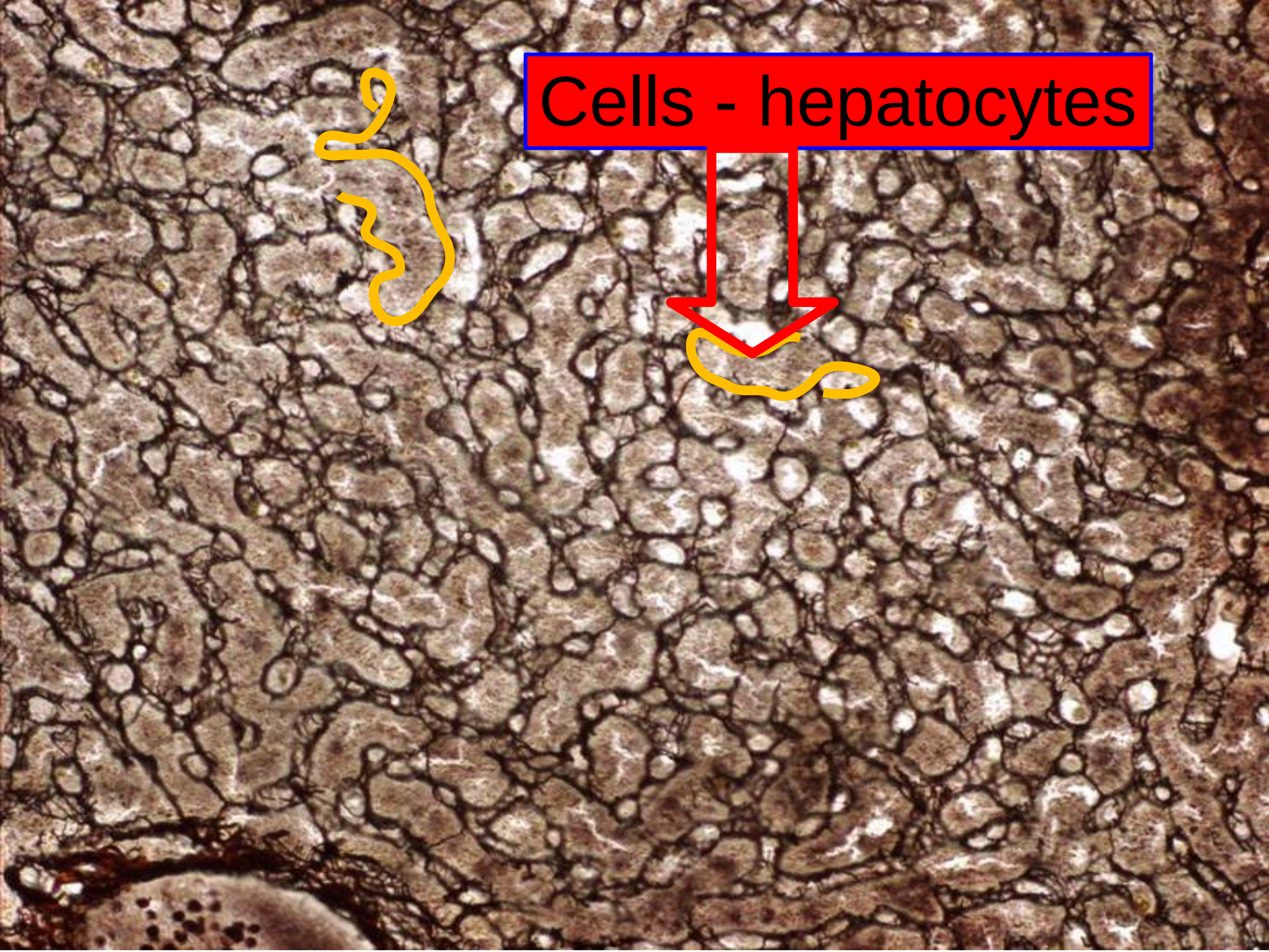



Cells - hepatocytes
Different stain – reticular fibres
Blood - sinusoids

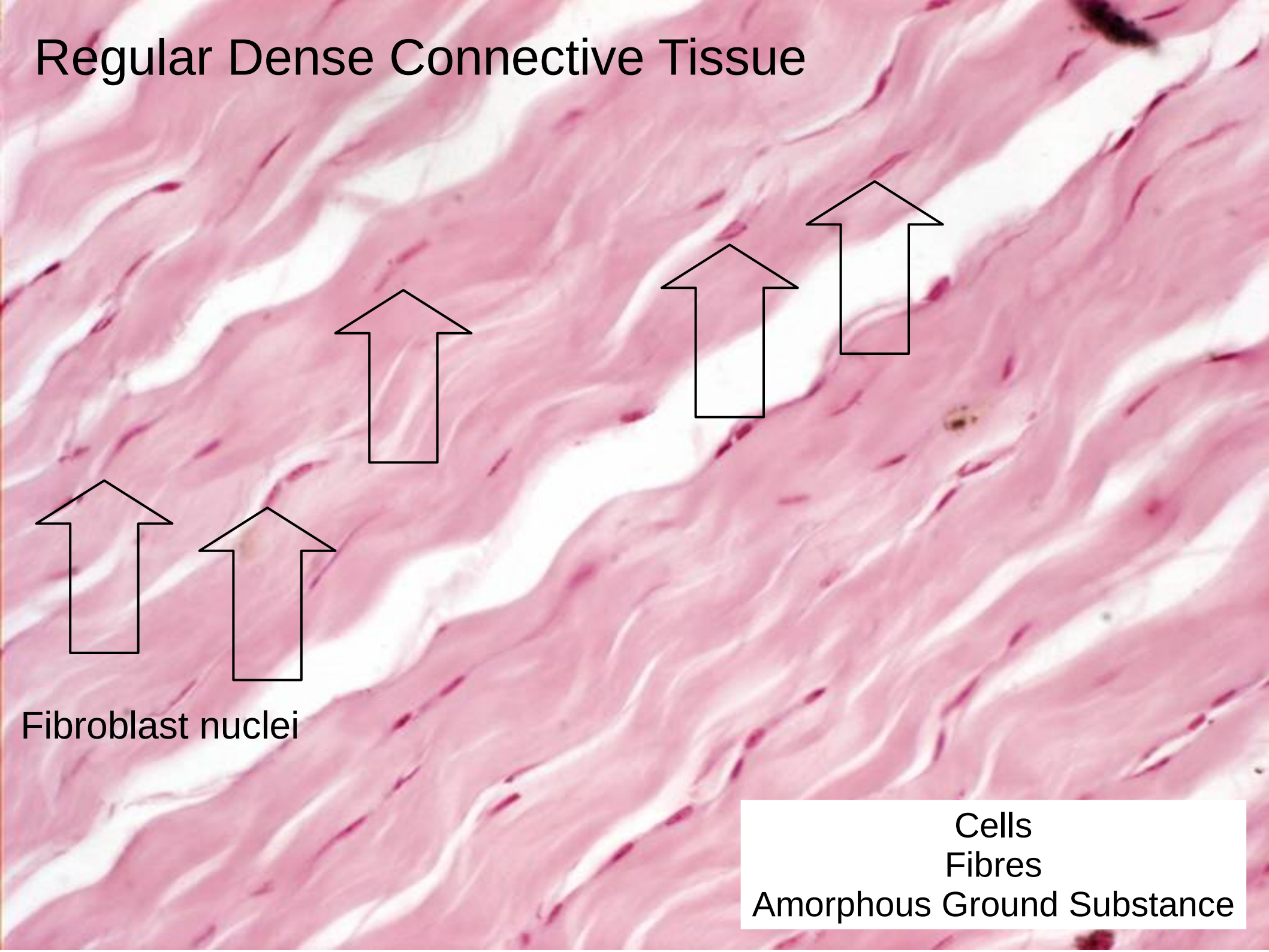






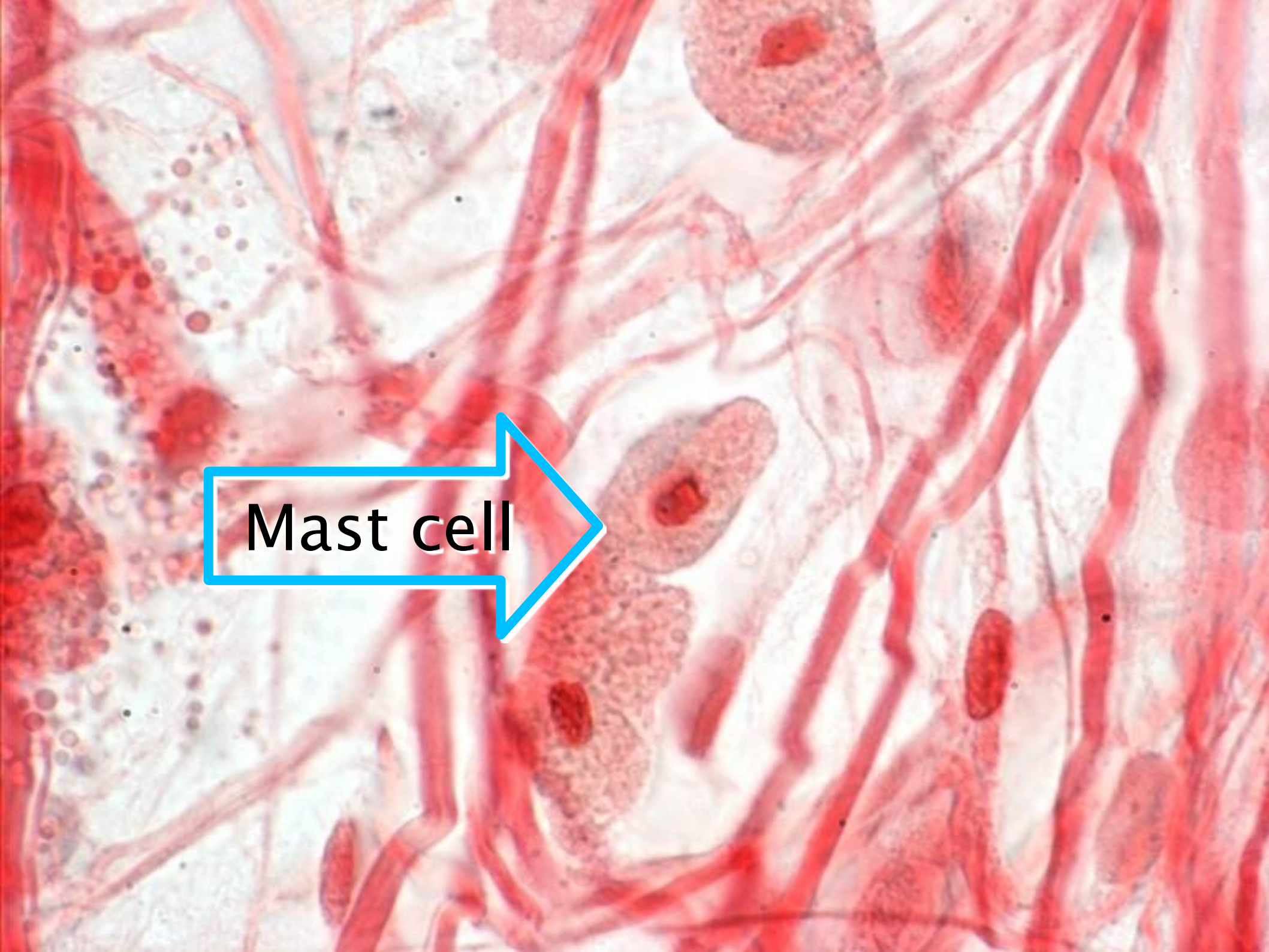

Cells - hepatocytes

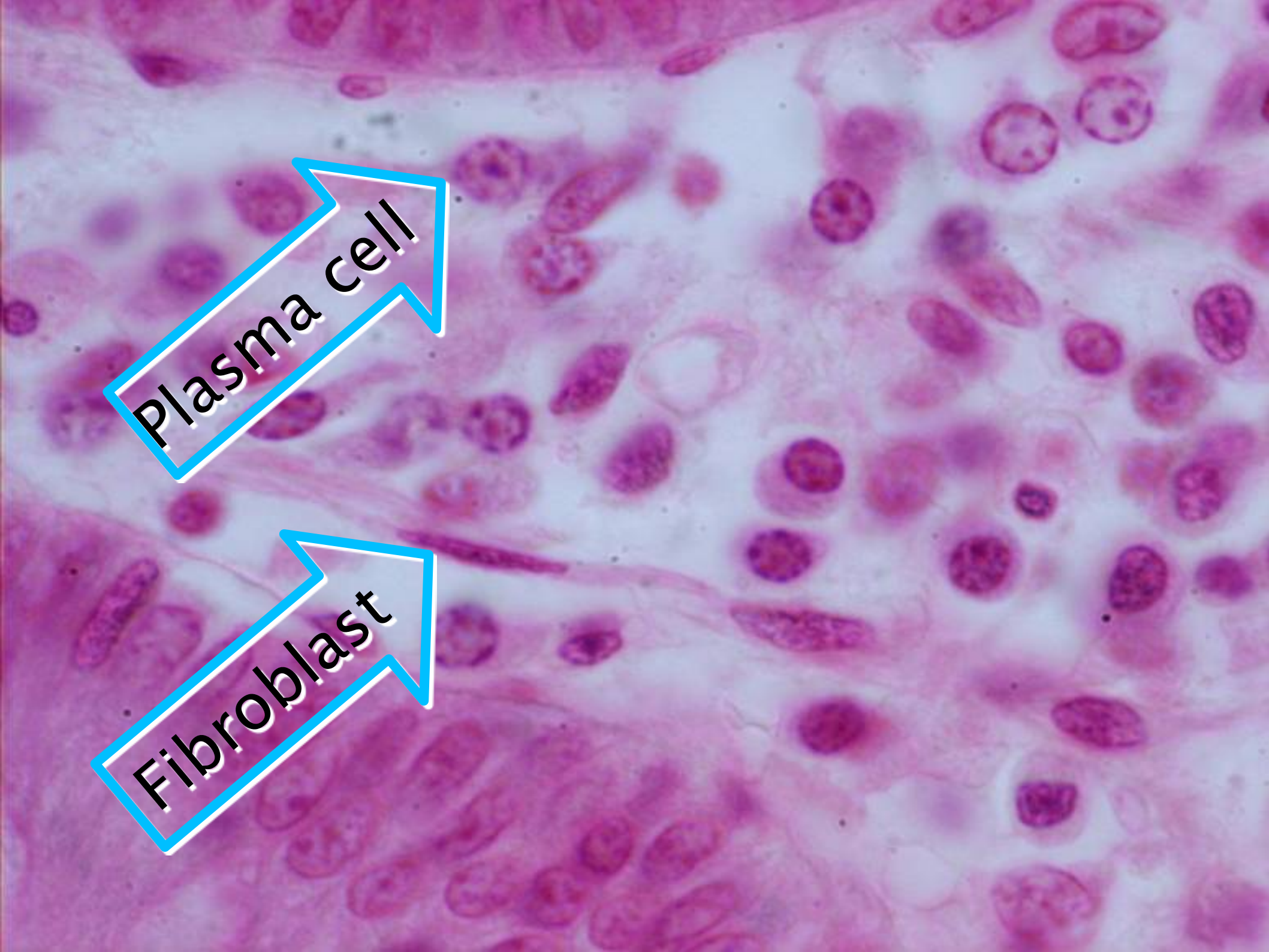
Regular Dense Connective Tissue



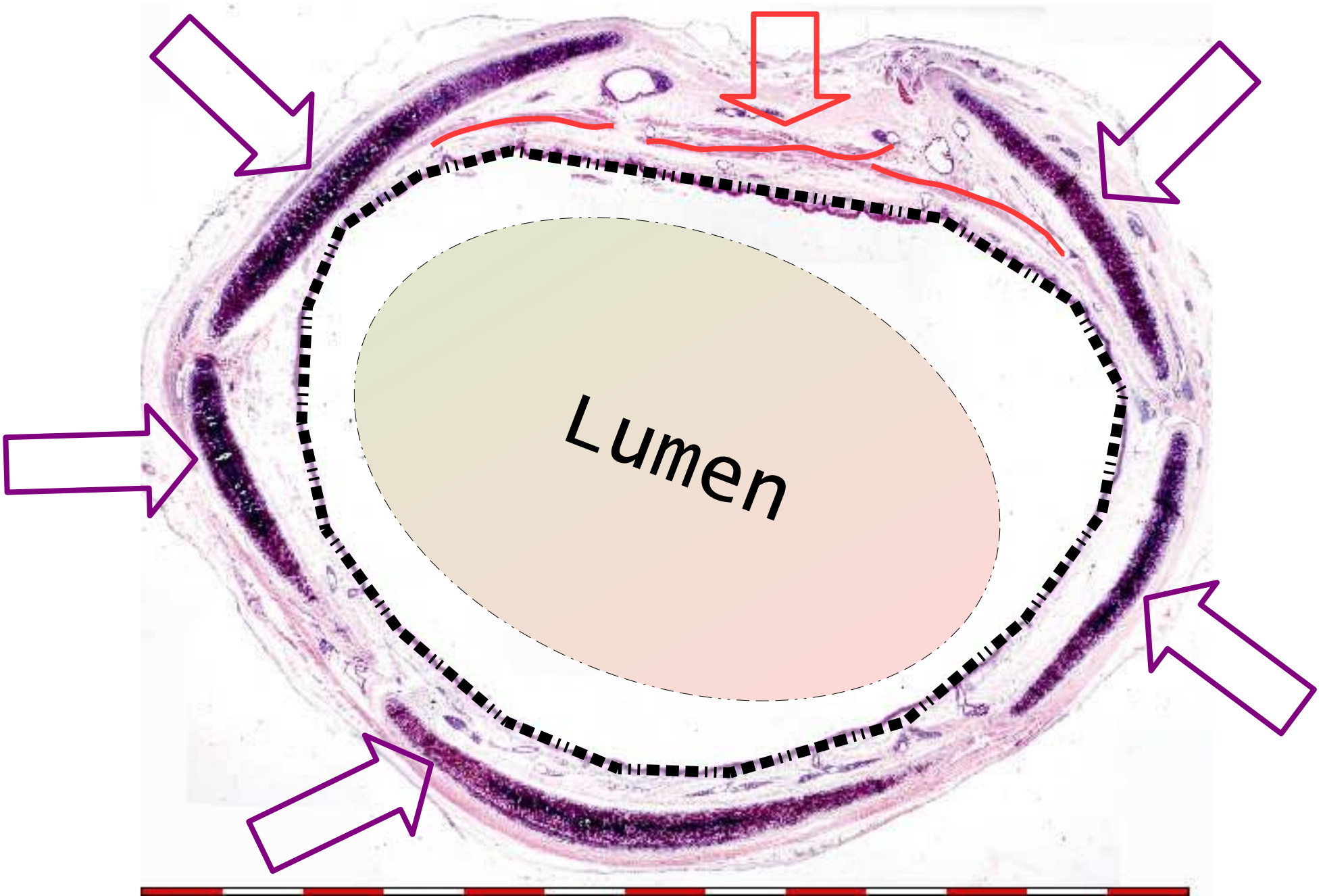
Fibroblast nuclei

Cells
Fibres
Amorphous Ground Substance

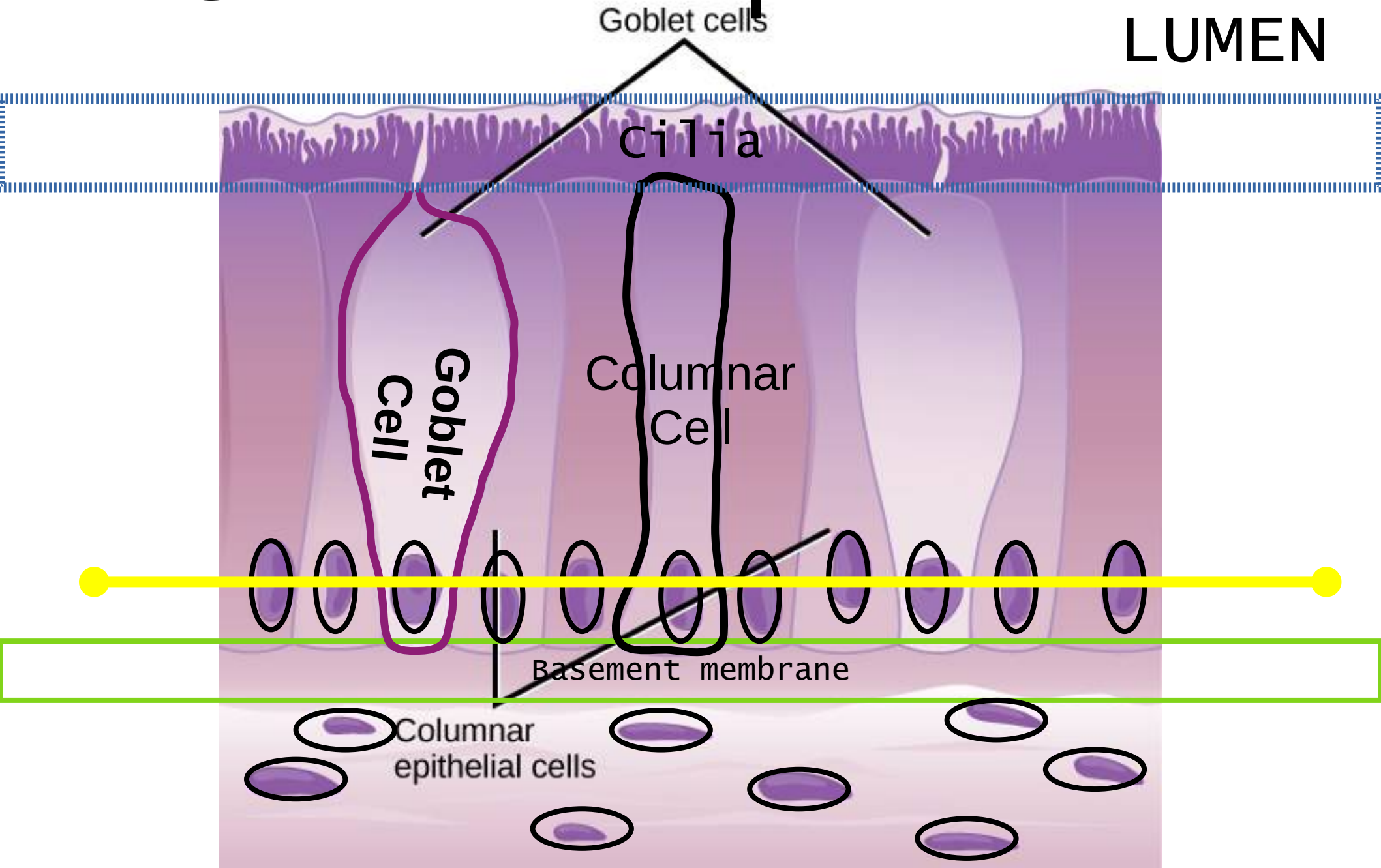

Mast cell


Plasma cell
Fibroblast

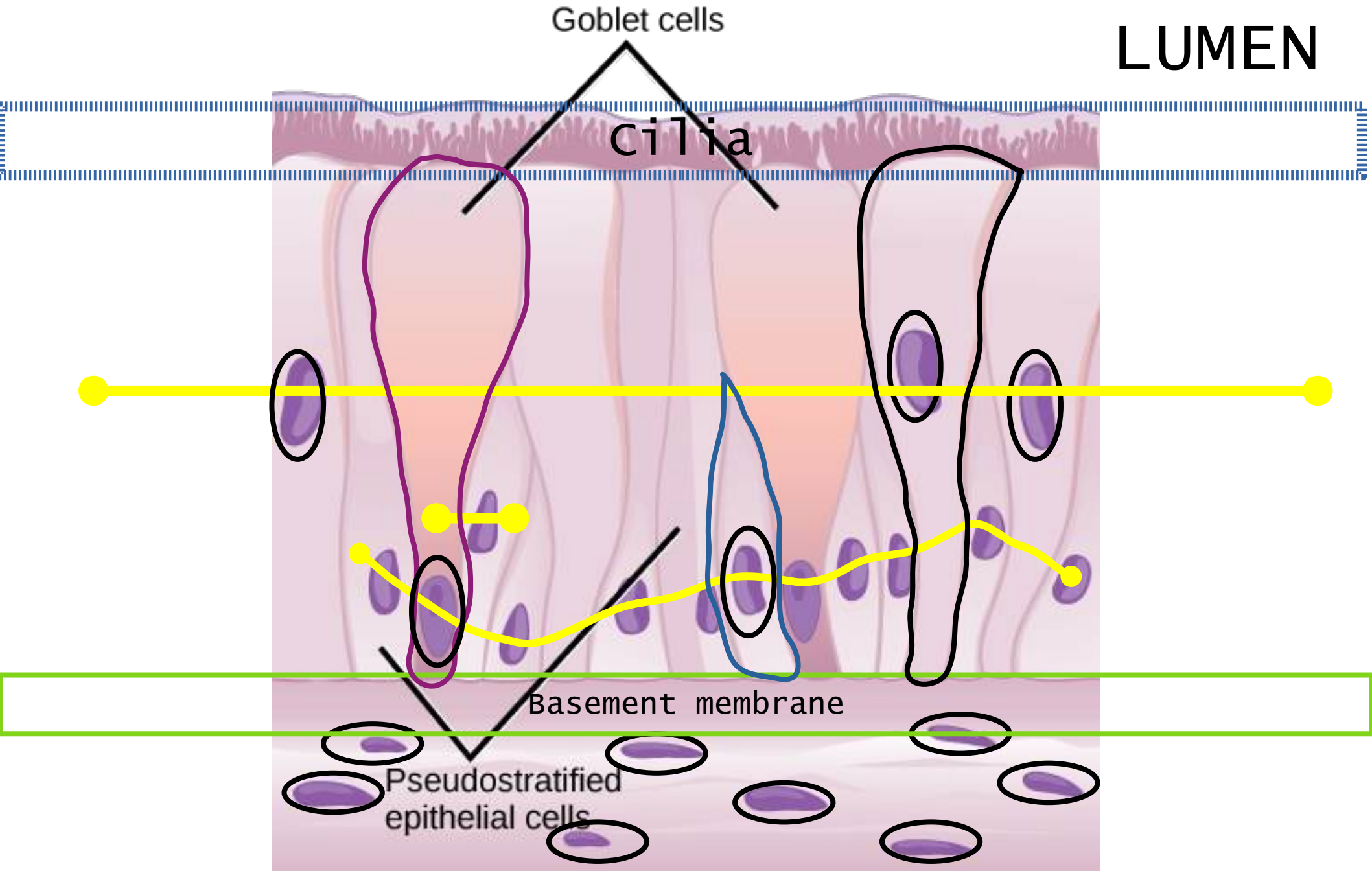
Slide 73: Macroscopic view of the trachea



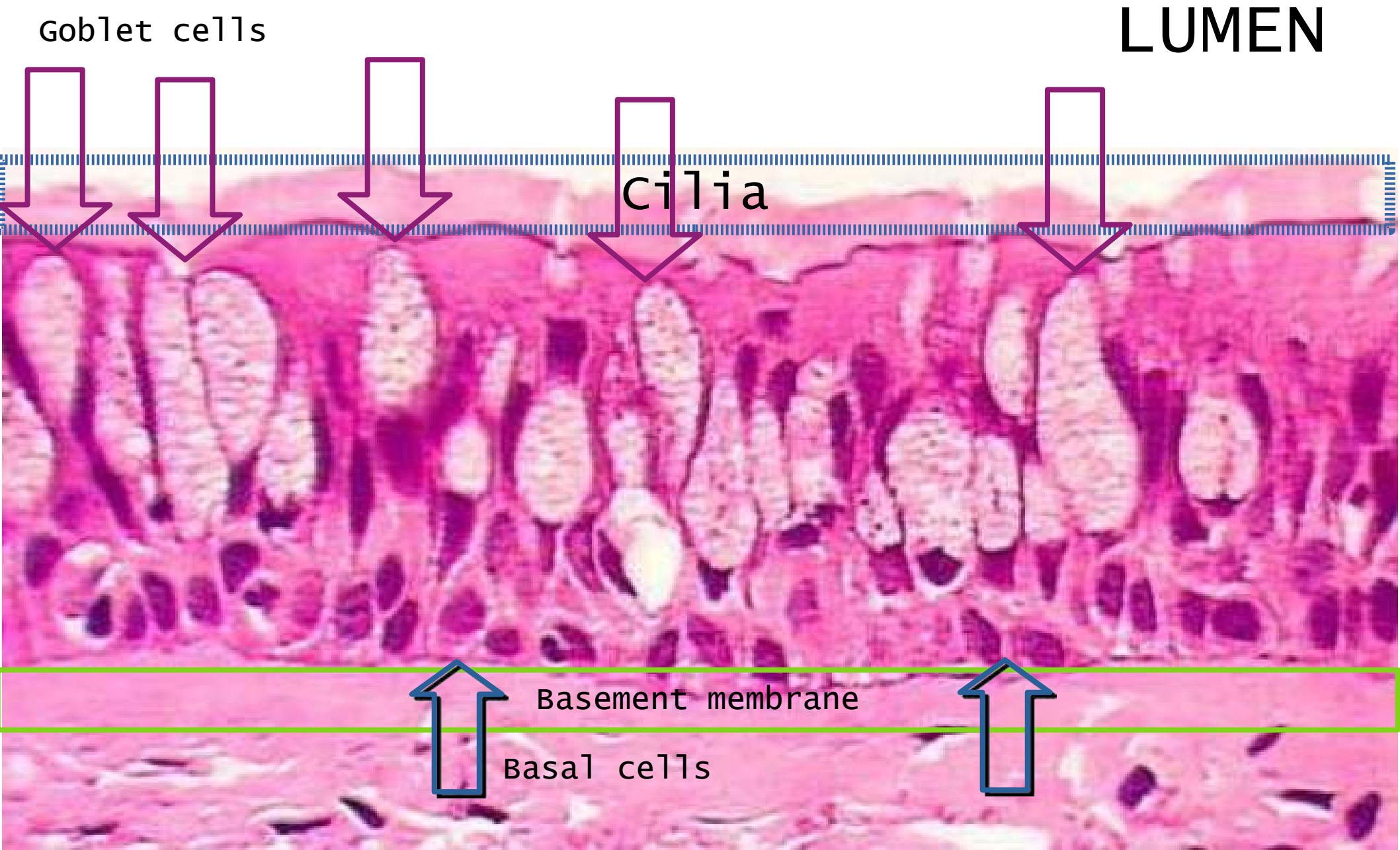
Columnar epithelium



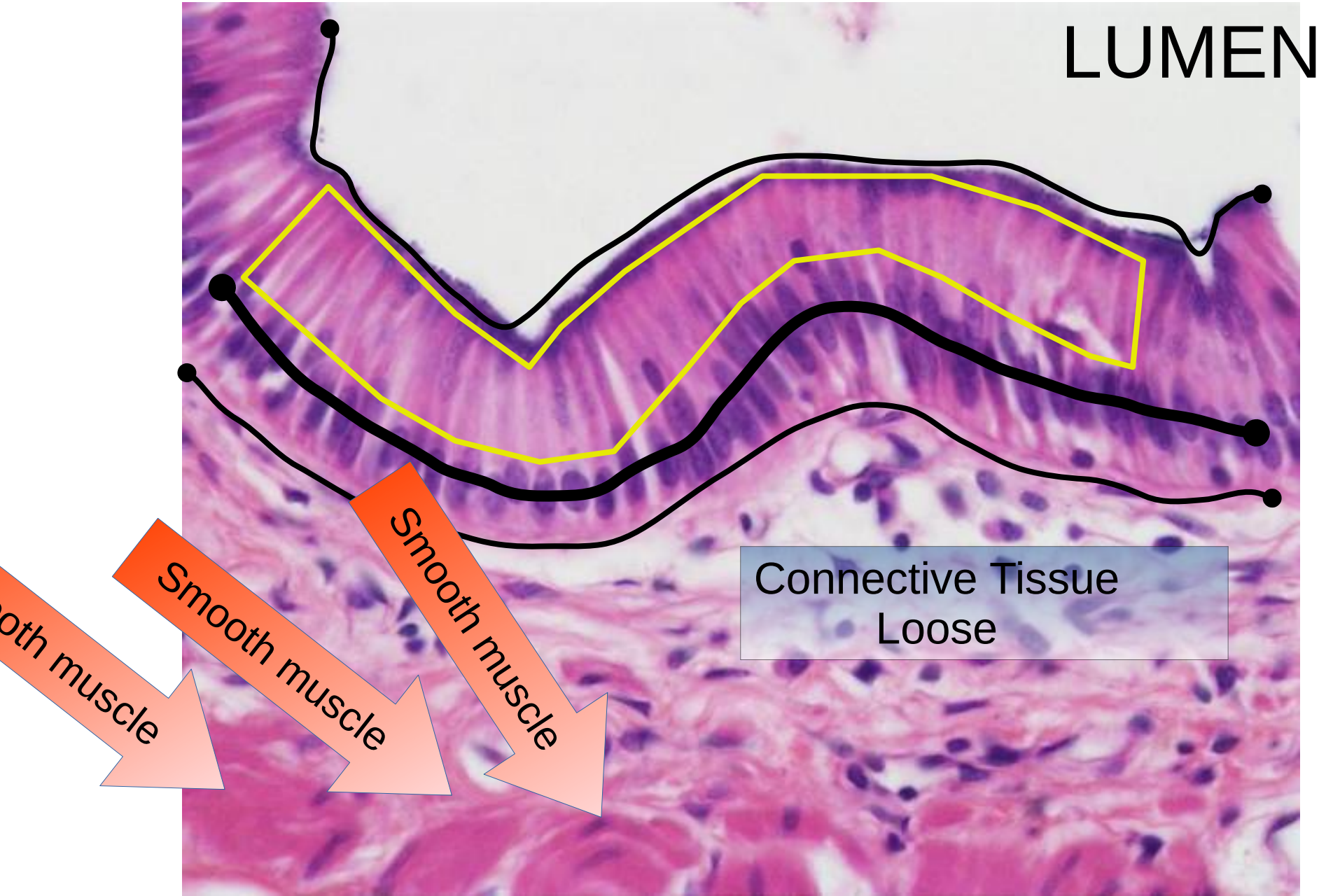
Pseudostratified columnar



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 epihelium: 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

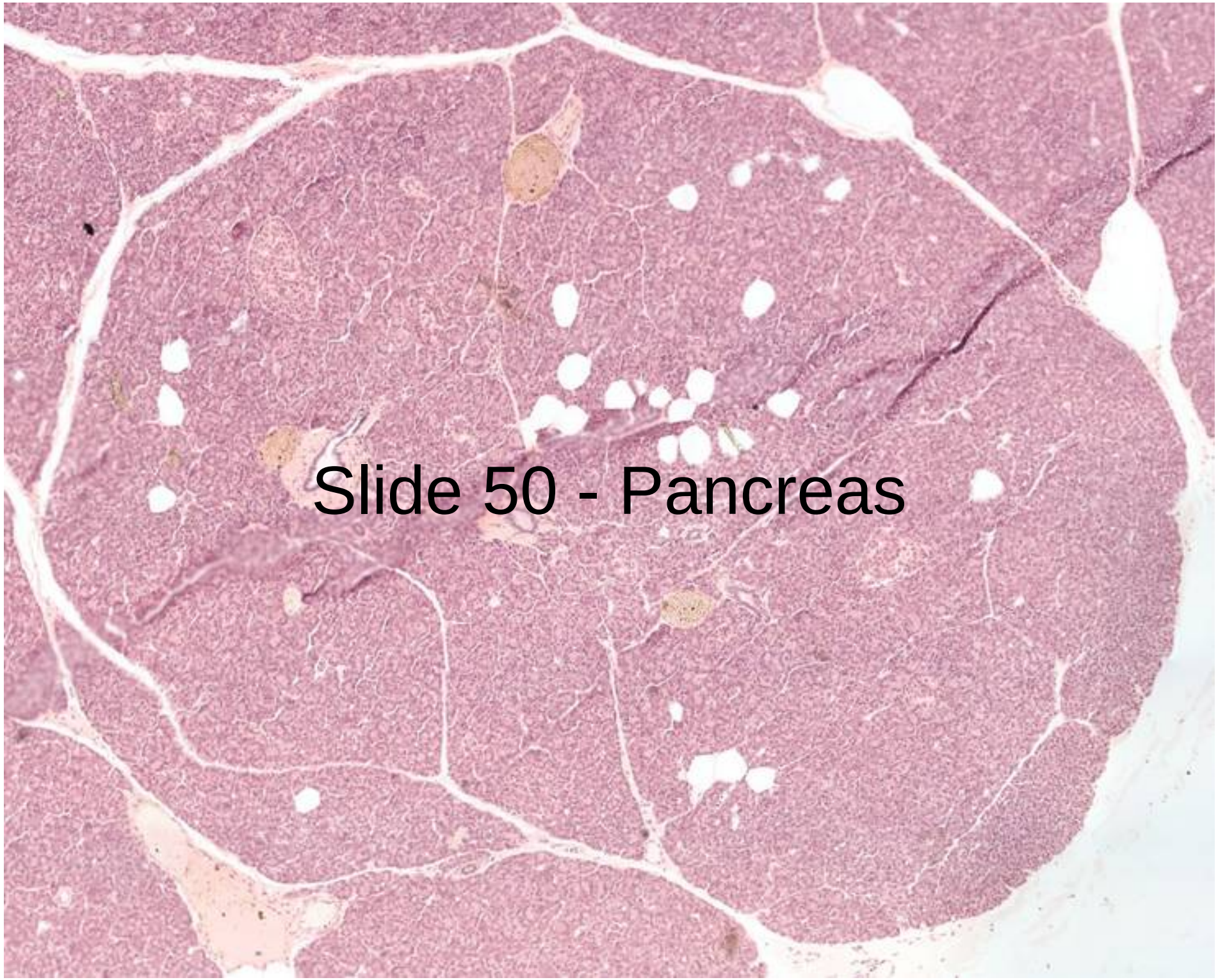
Glandular Epithelium

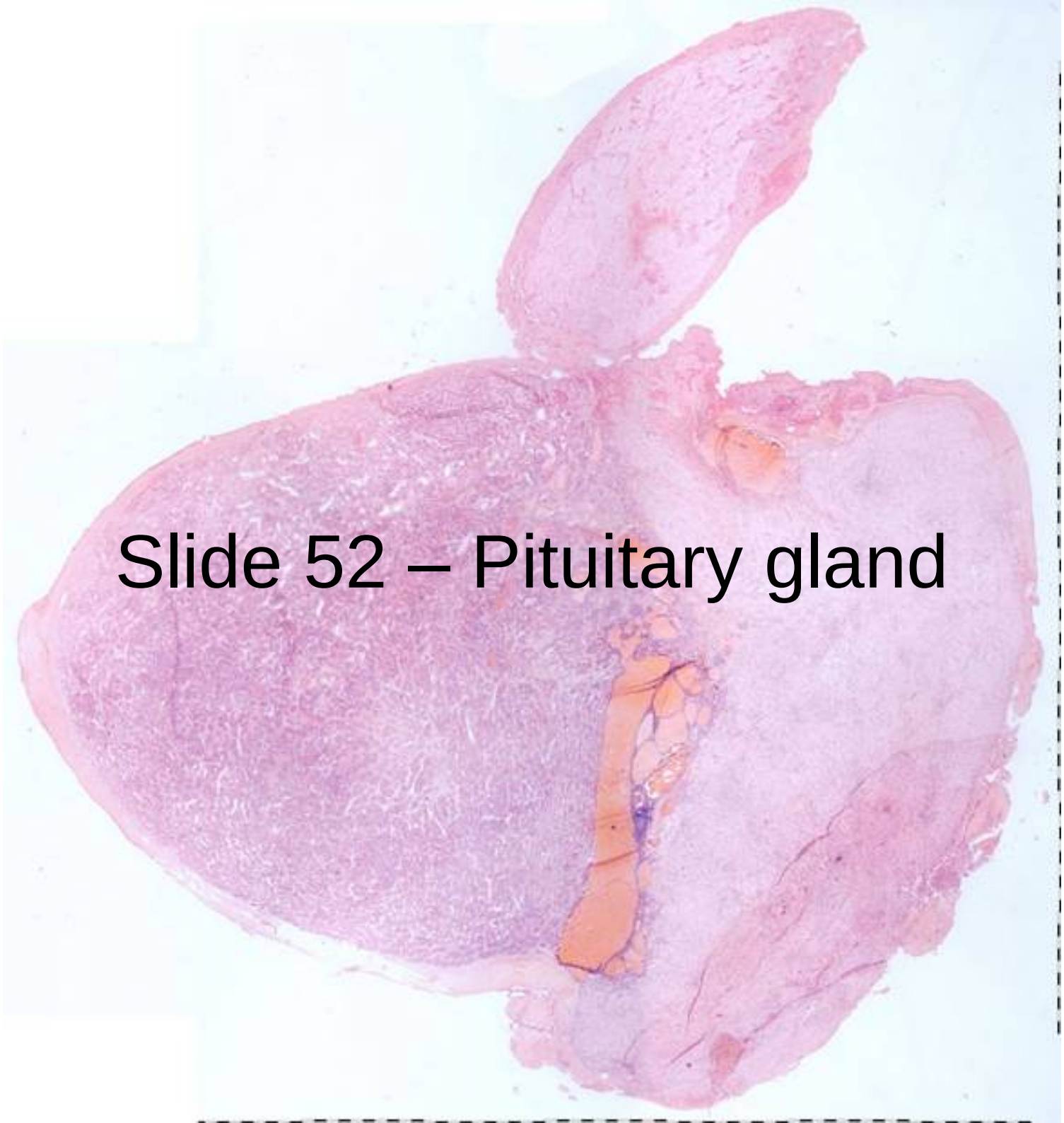
When can we

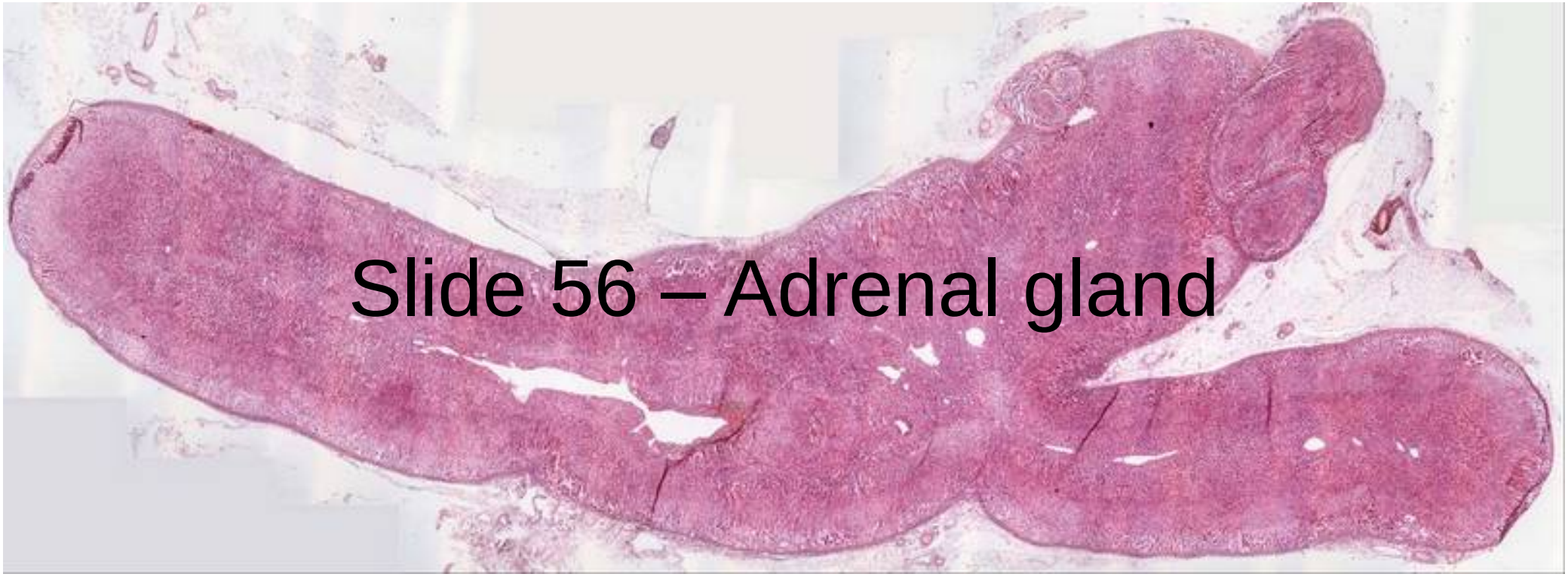

Slide 42 - Colon

Slide 7 – Tongue

Slide 39 - Pharyngeal tube


Slide 50 - Pancreas


Slide 52 – Pituitary gland



Slide 56 – Adrenal gland


Slide 55 – Thyroid gland

Analogies

Two systems

- Exocrine
- Endocrine

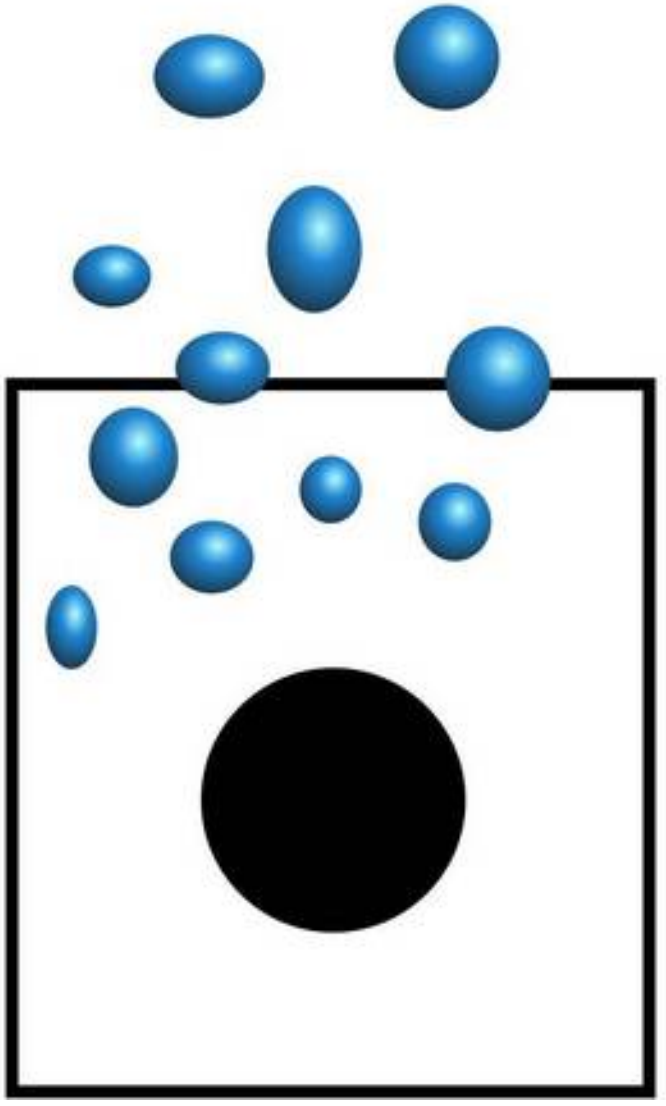
Exocrine

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

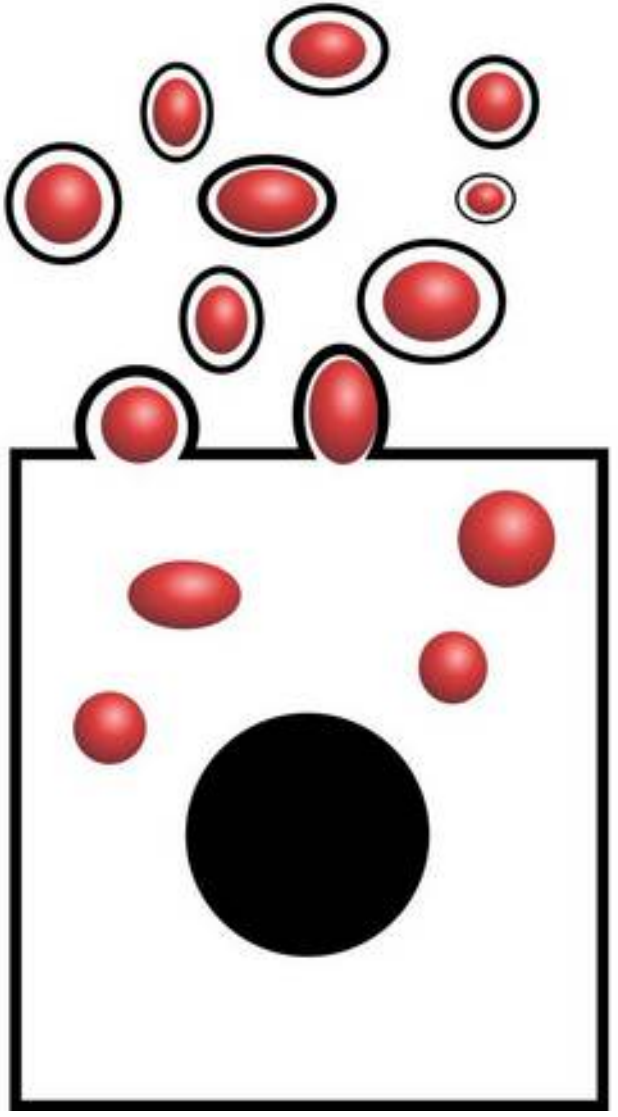
Modes of Secretion

- Merocrine
- Apocrine
- Holocrine

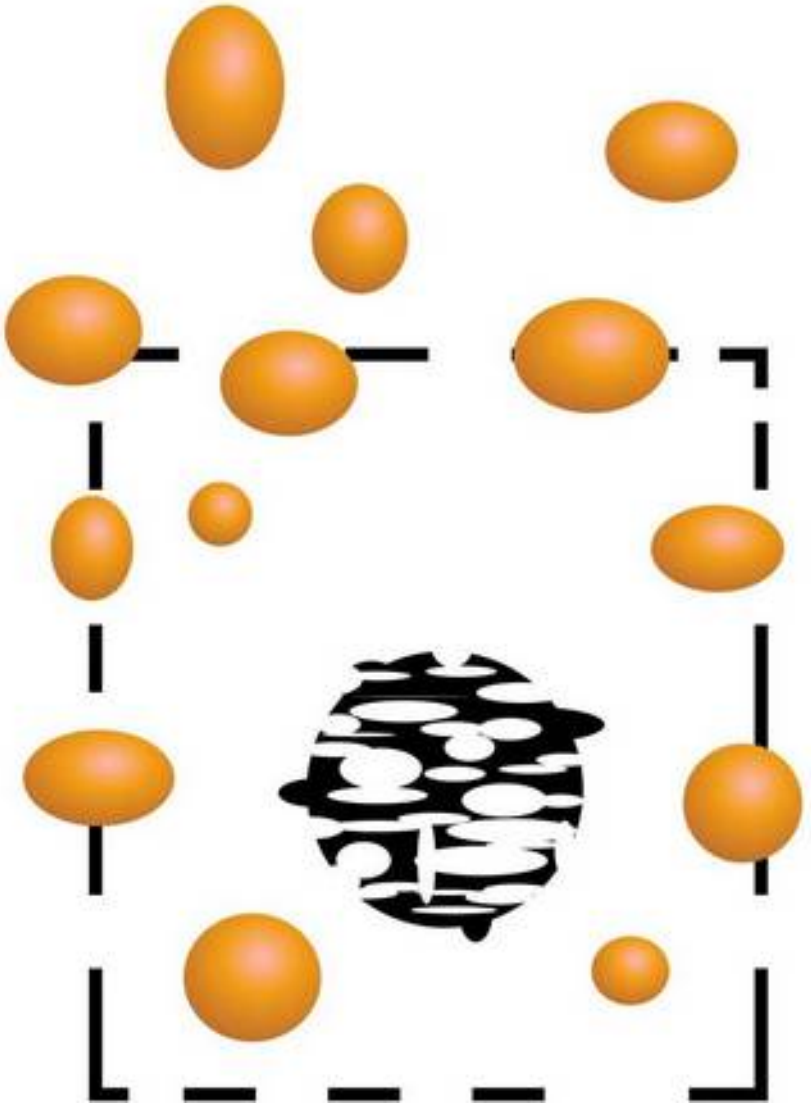
Merocrine



Apocrine

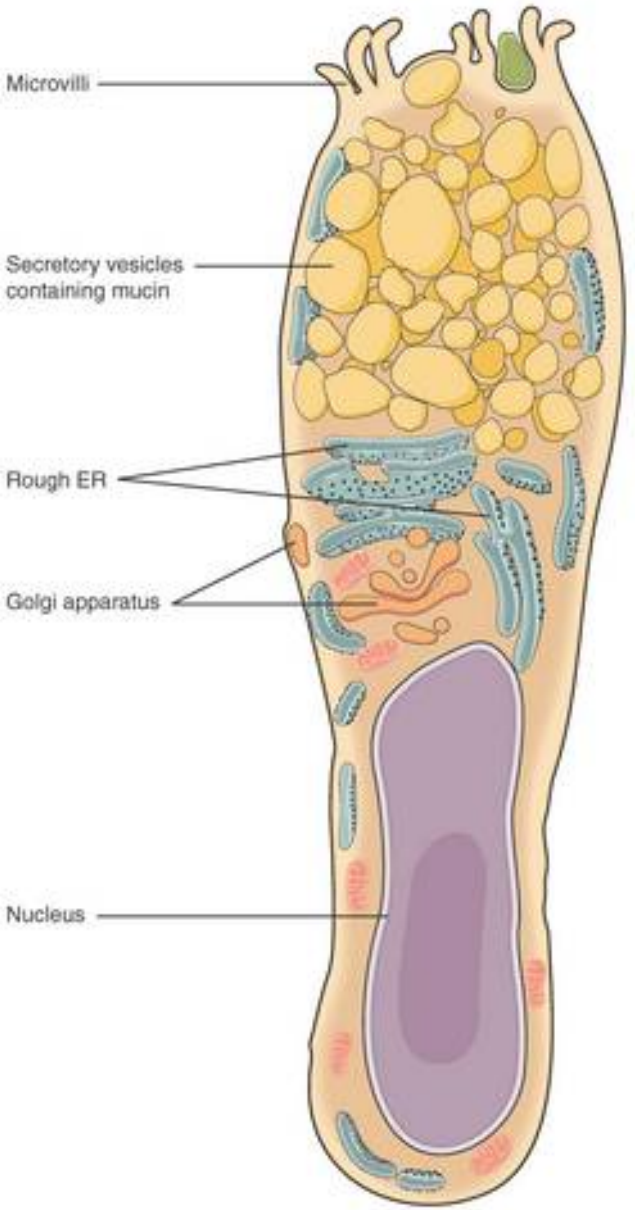


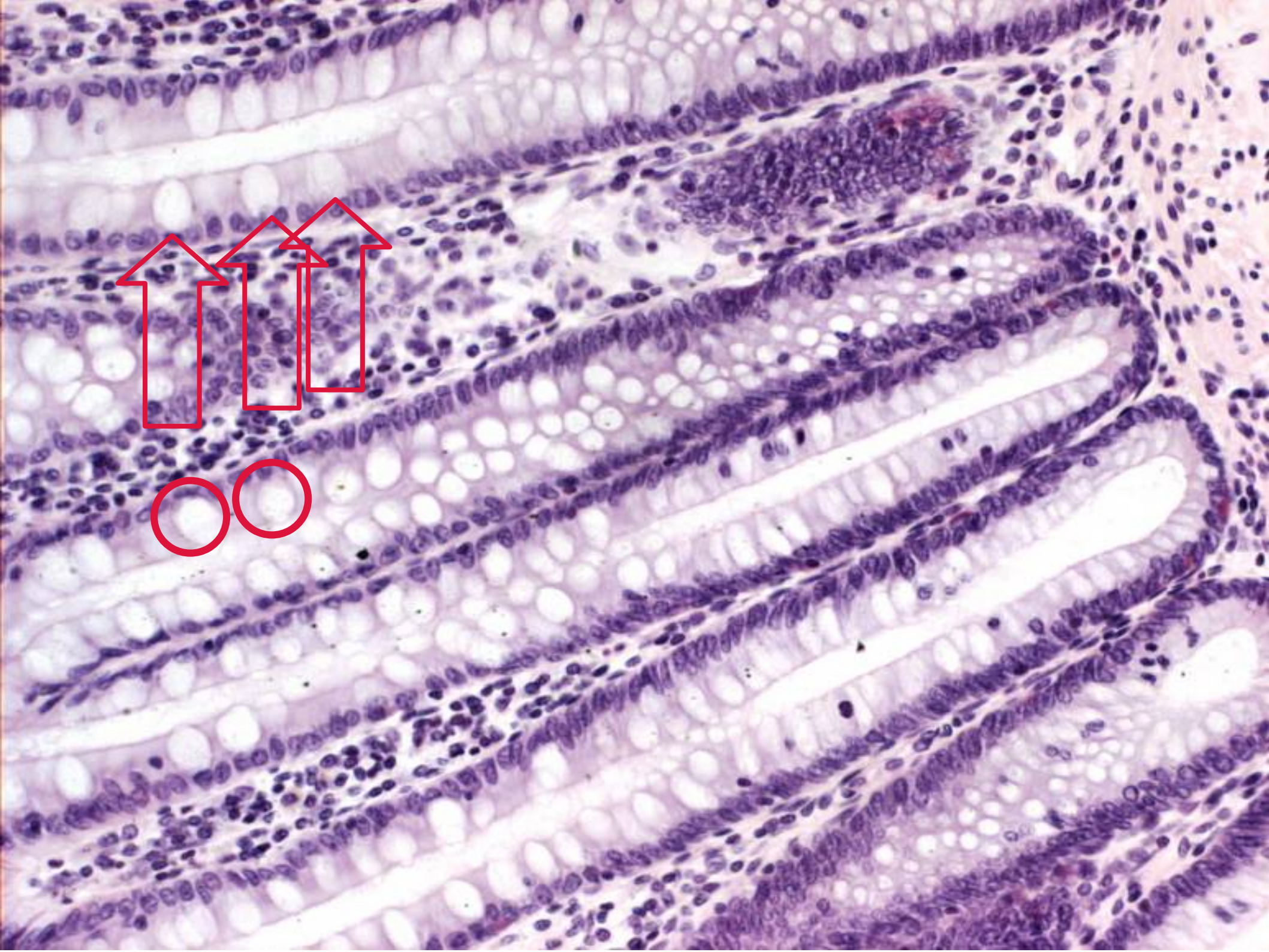
Holocrine



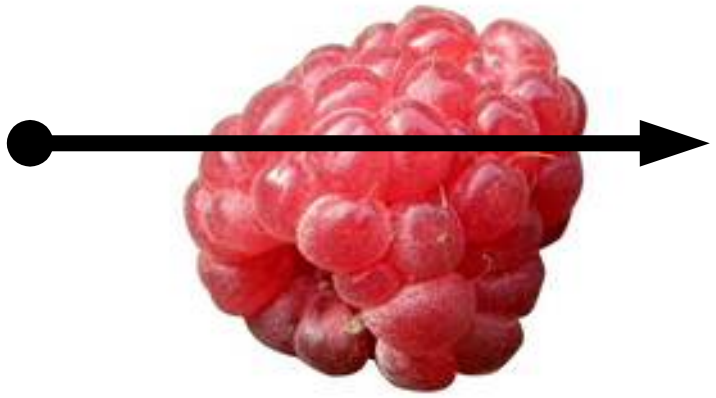
Epithelium Analogy

Single cell

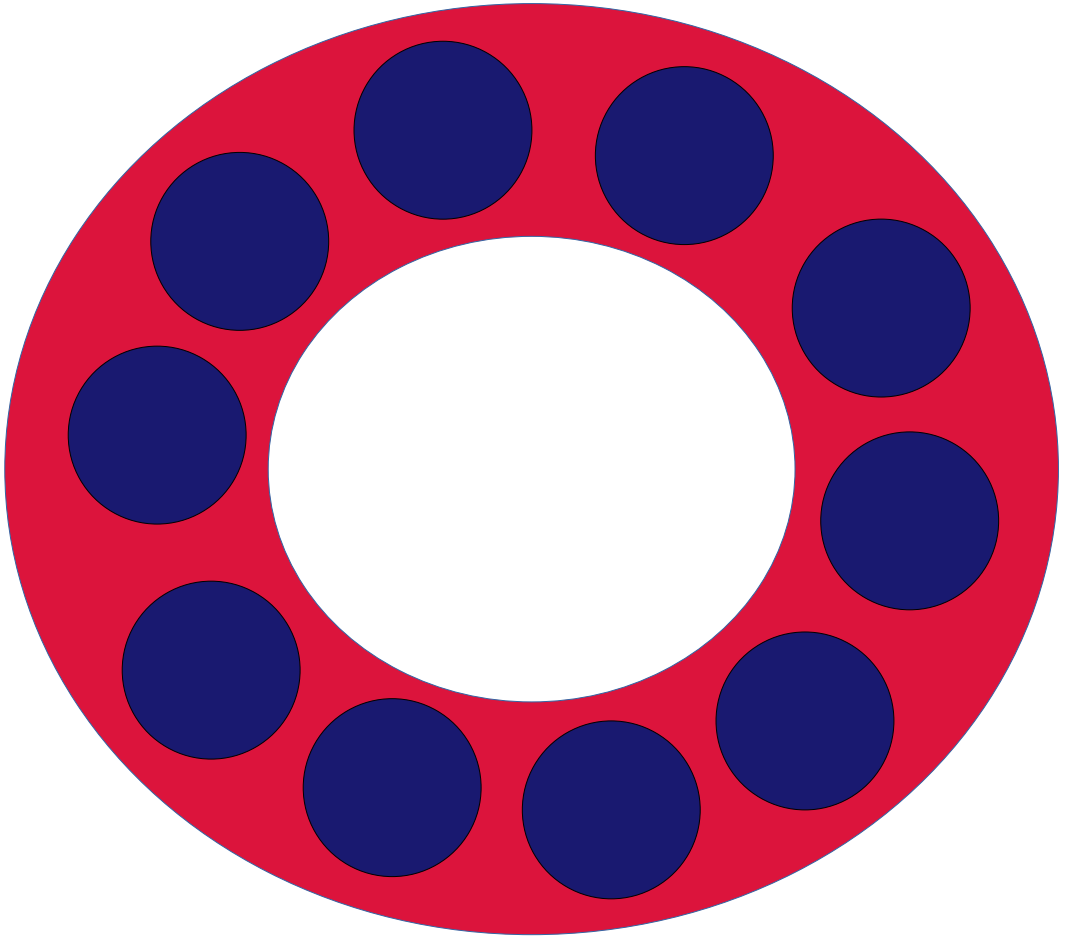

Microvilli
Secretory vesicles containing mucin
Rough ER
Golgi apparatus
Nucleus



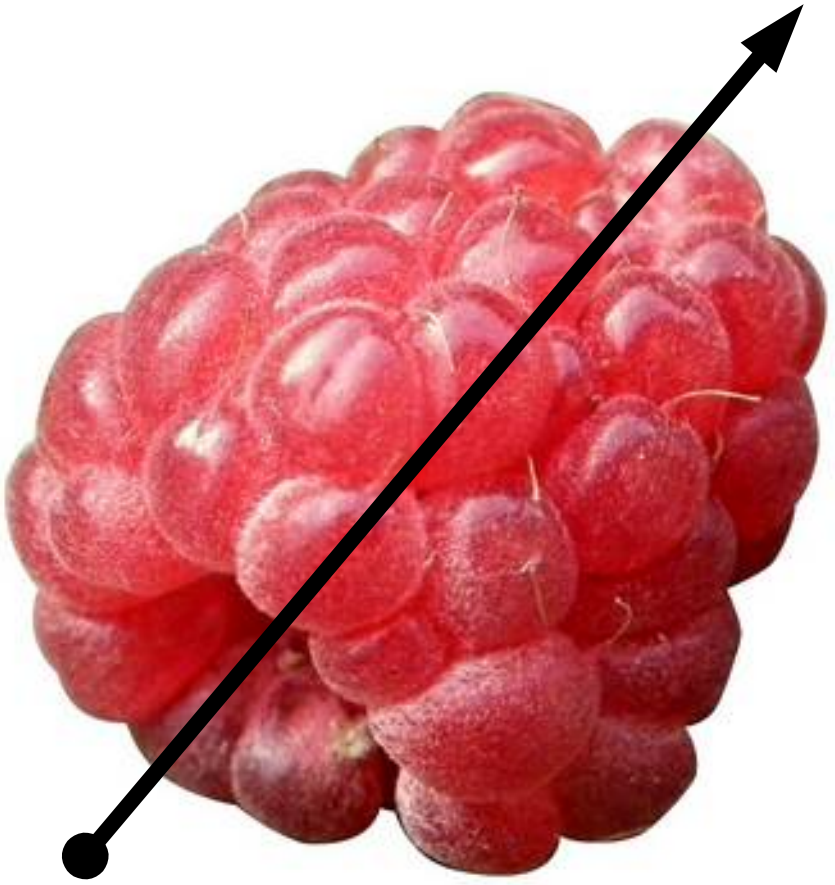
Alveolar

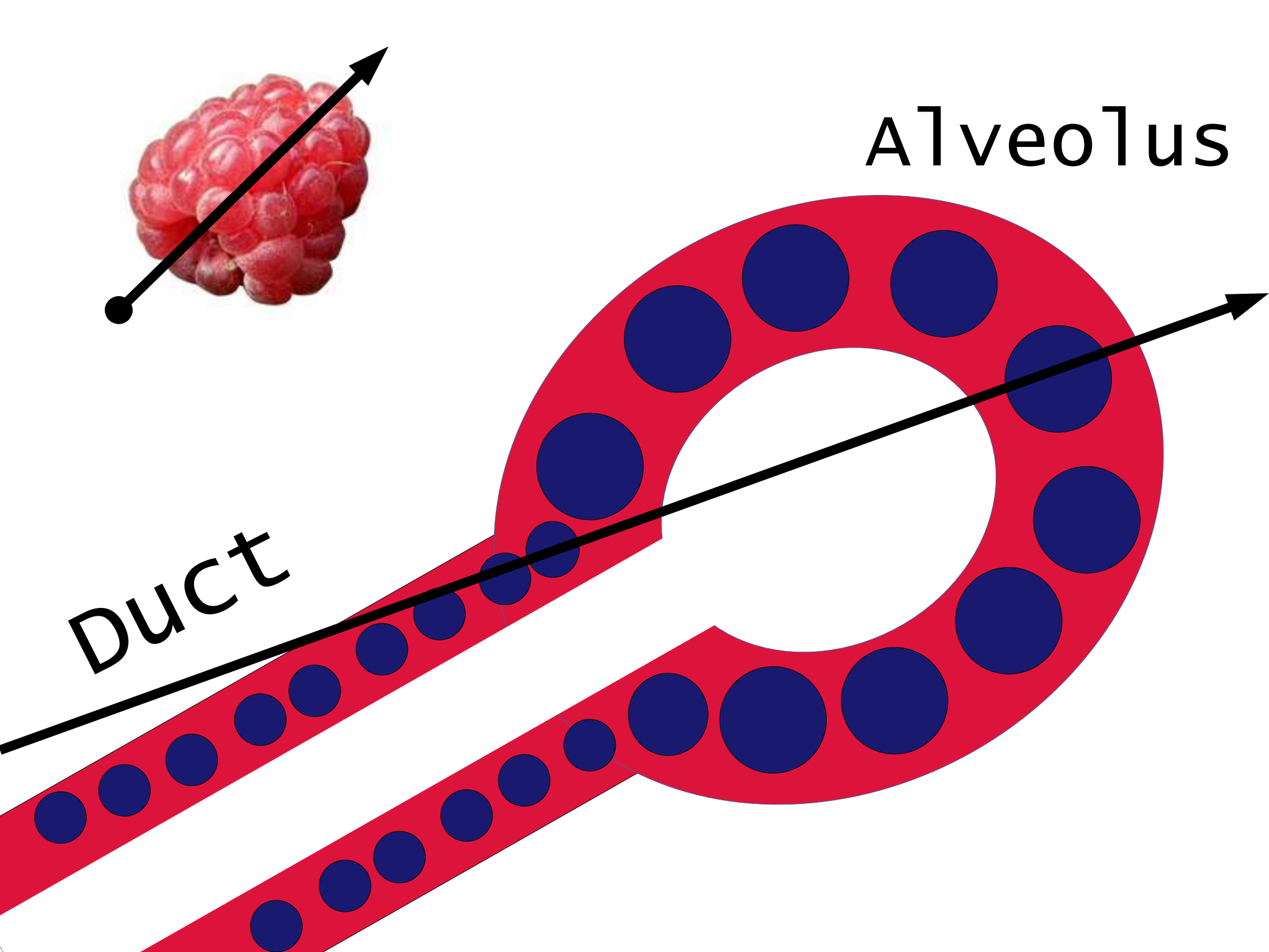


Alveolus



Alveolar

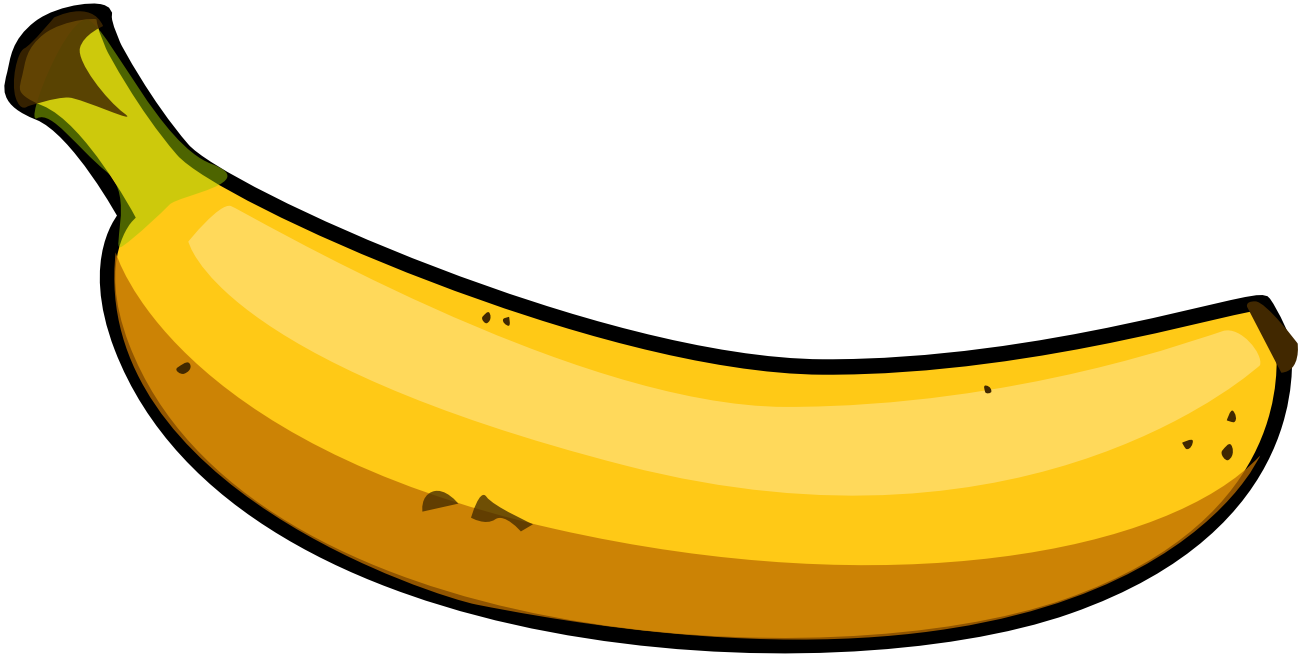



Alveolus
Duct

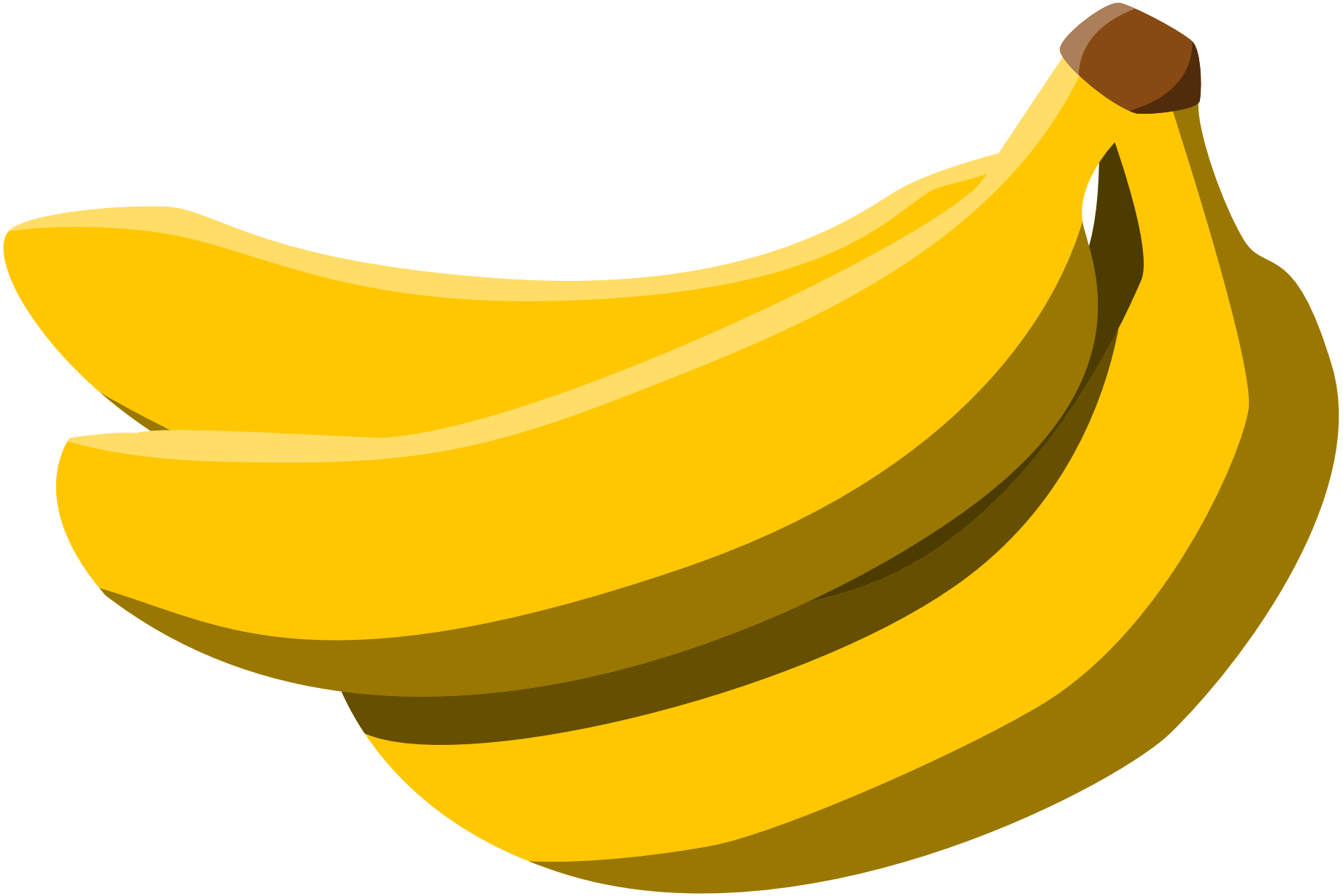
Compound Alveolar

Compound Alveolar

Tubular



Compound Tubular



Compound Tubular

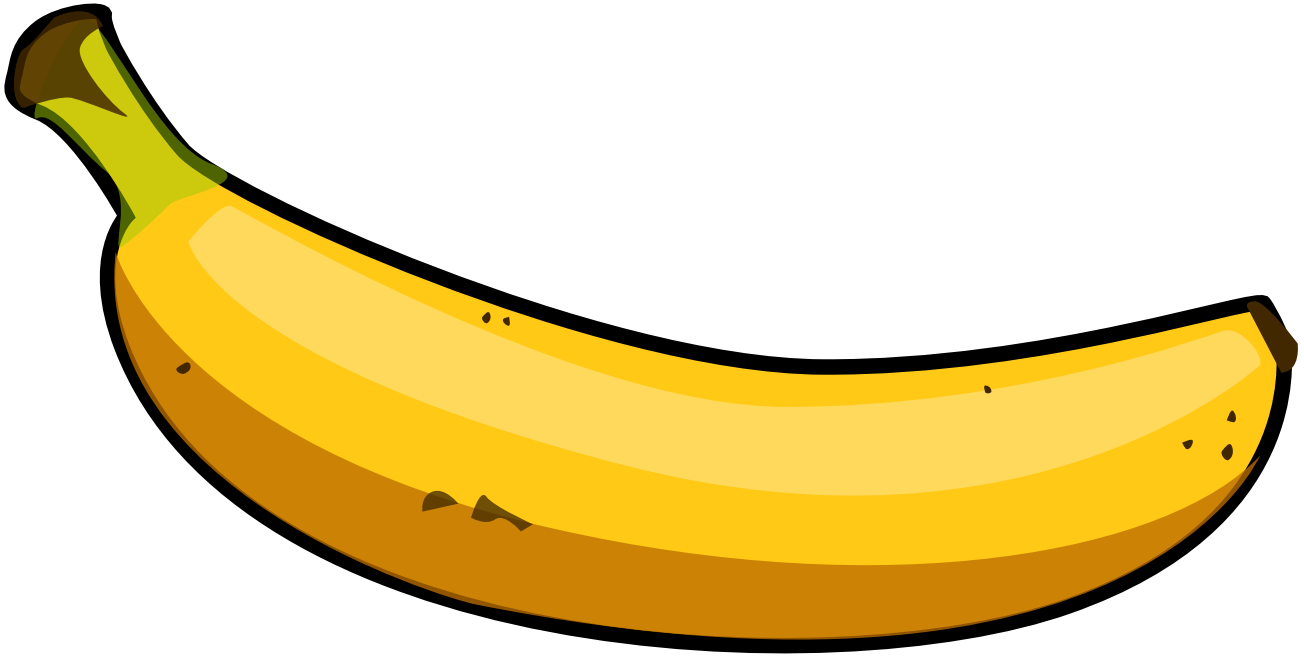
Slice and Dice

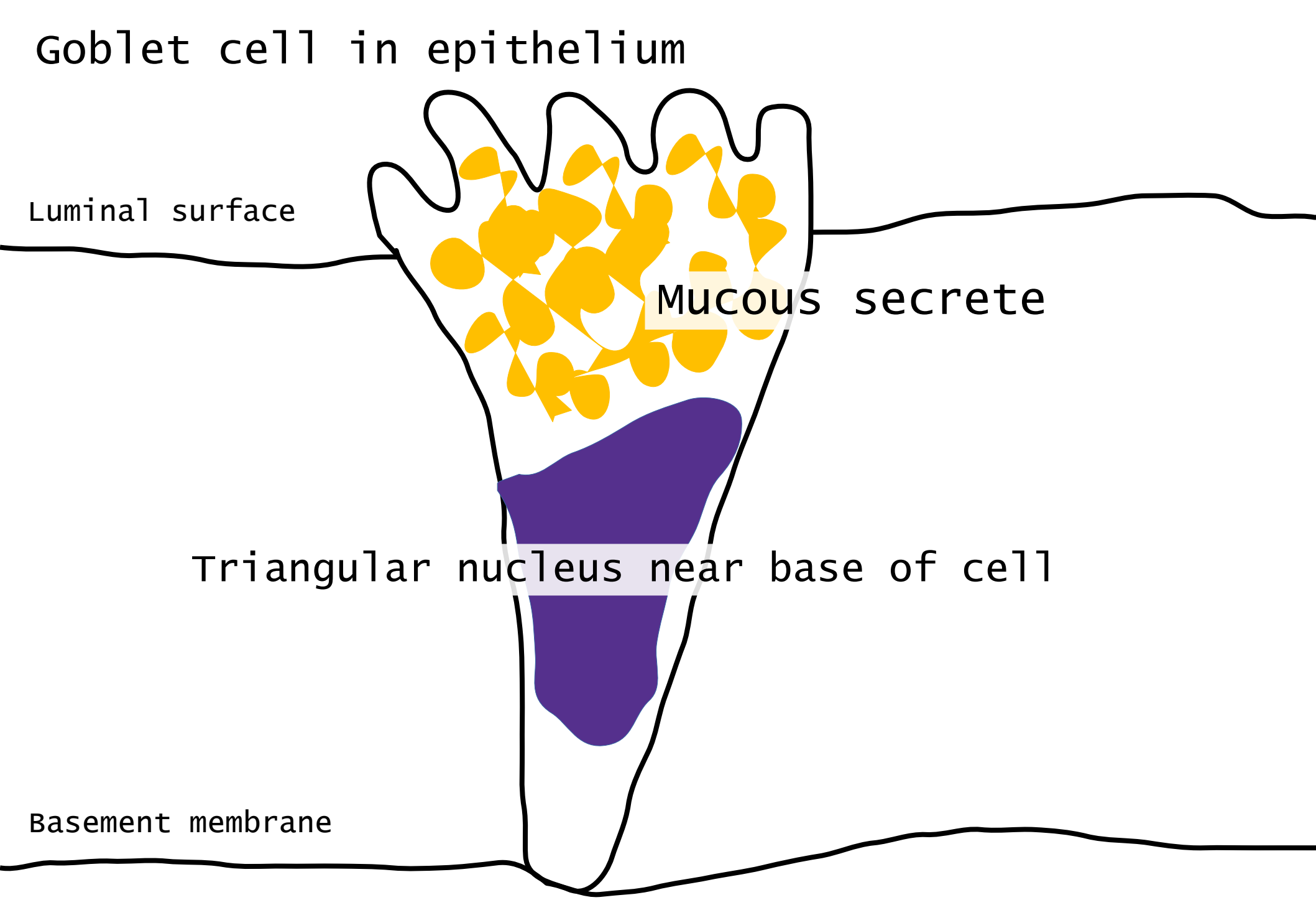
Slide 42 - Colon

Goblet cells
Simple tubular glands

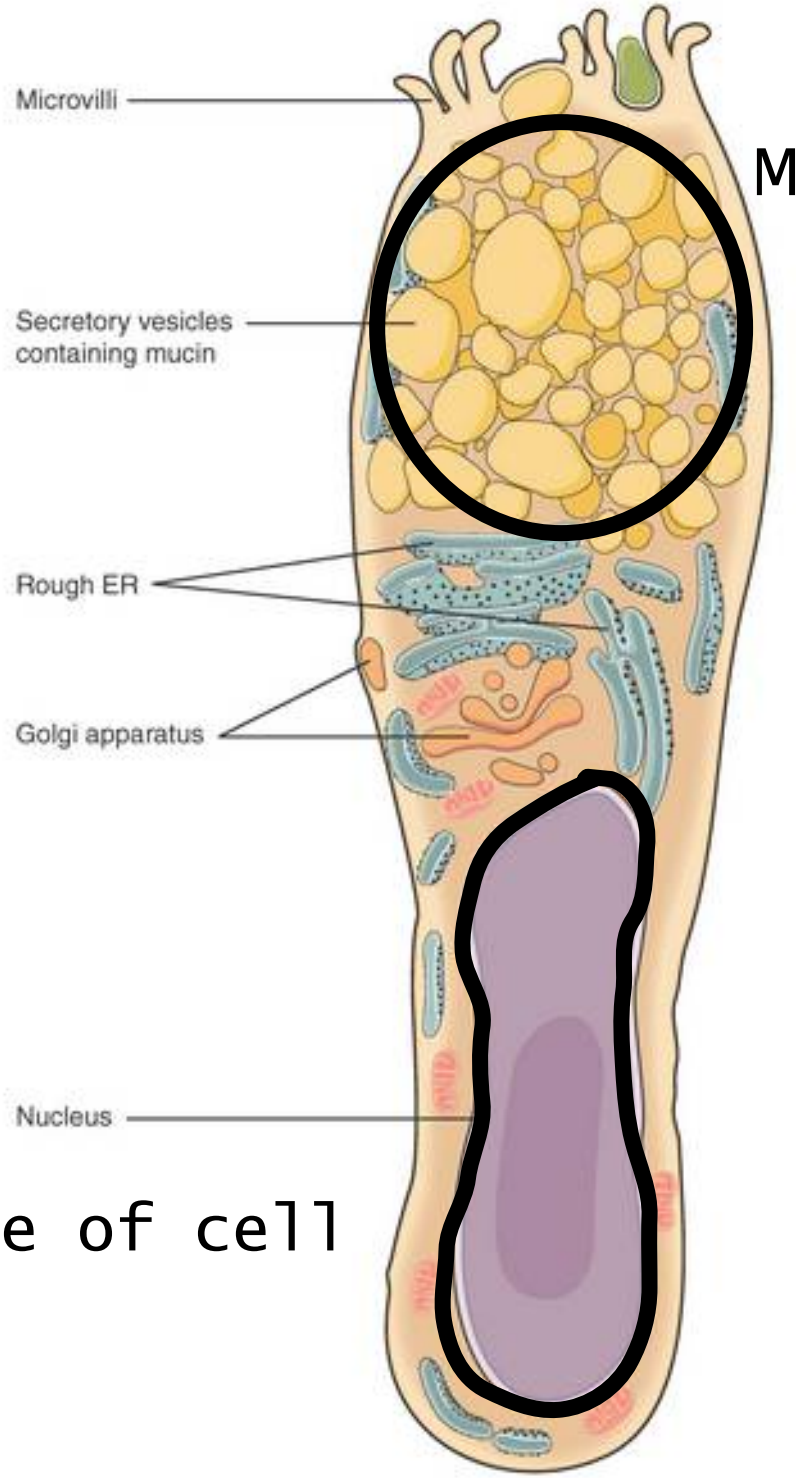
Epithelium Analogy

Tubular



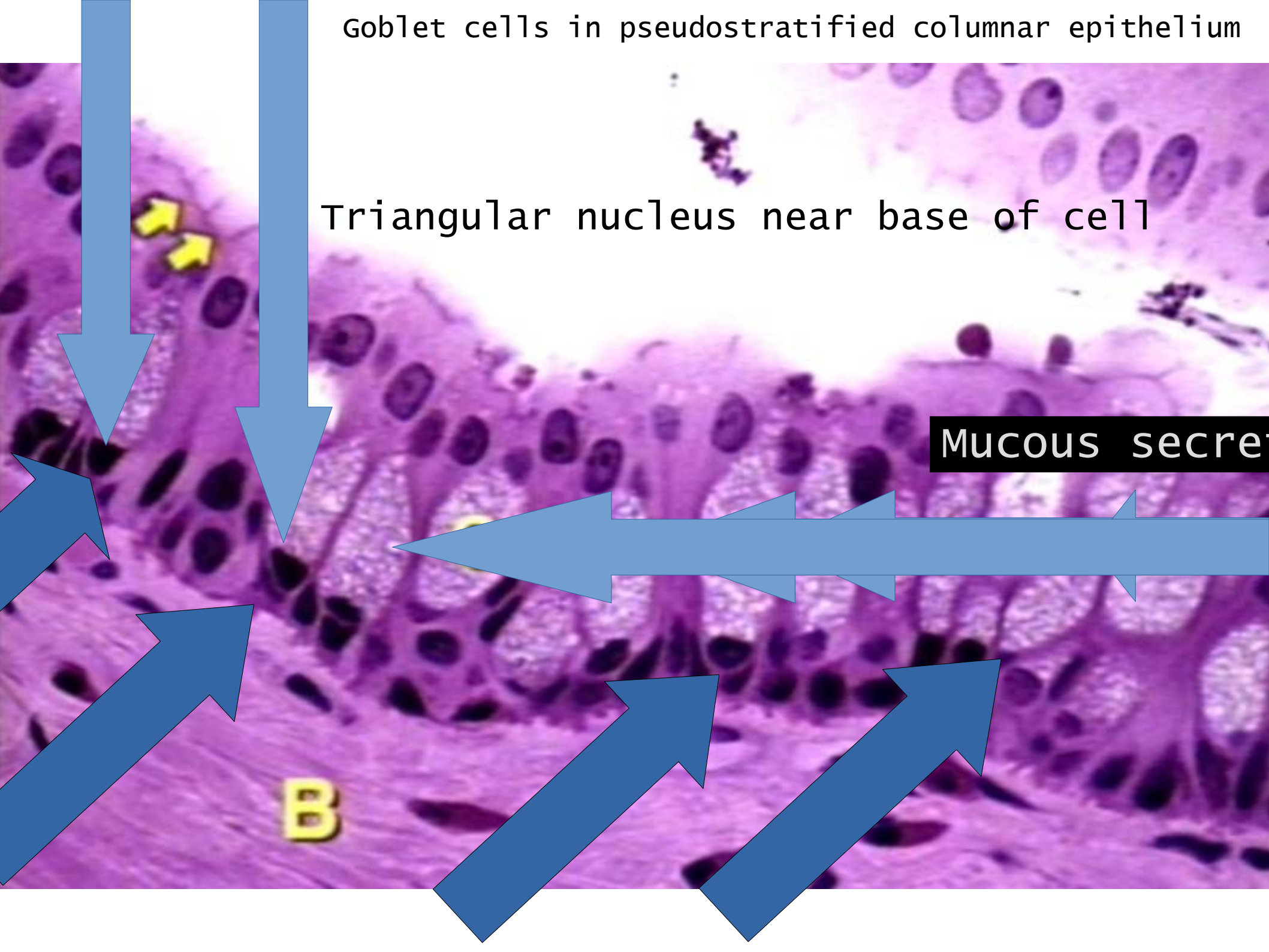

Goblet cell in epithelium
Luminal surface
Mucous secrete
Triangular nucleus near base of cell
Basement membrane

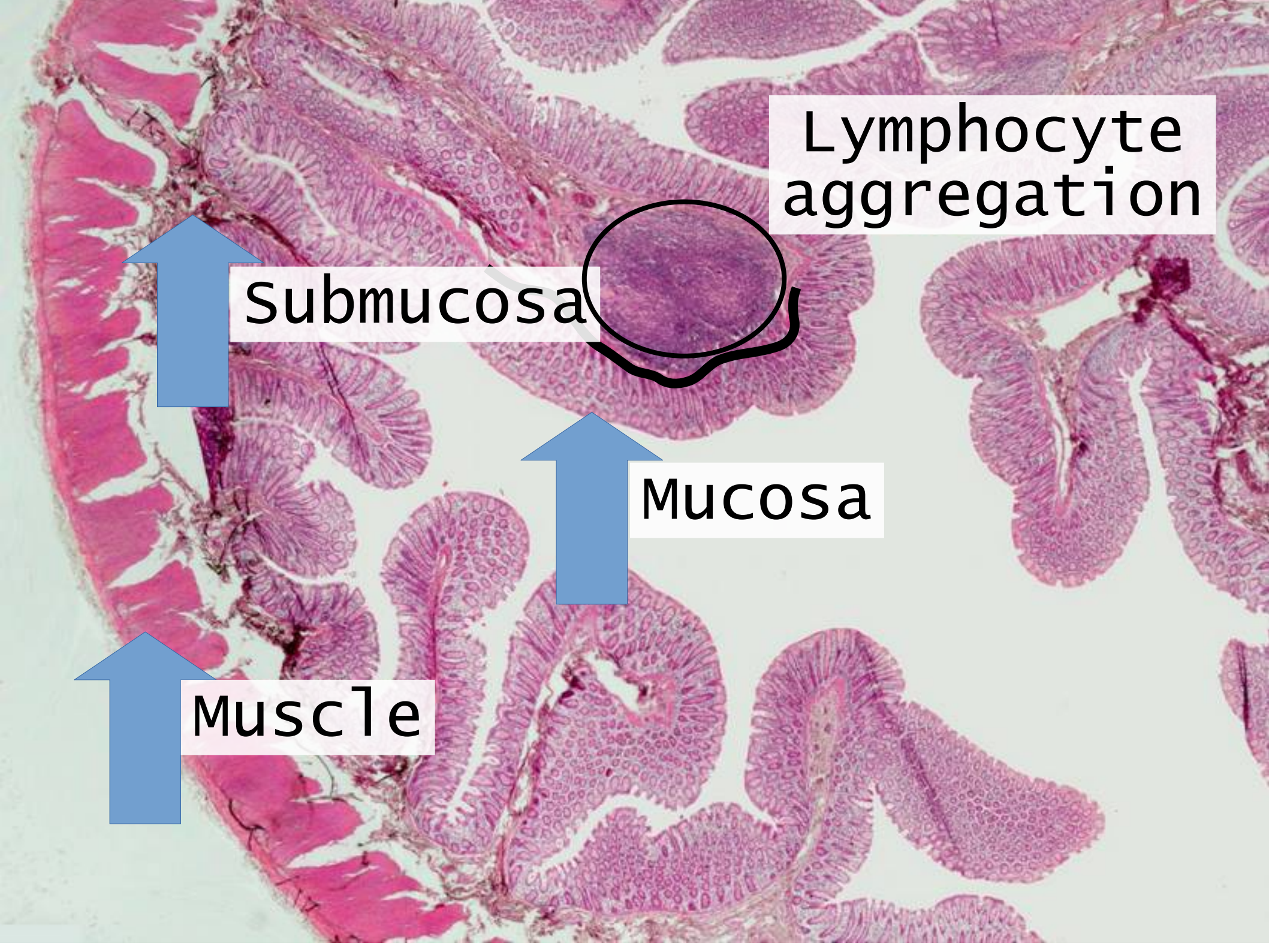
Goblet cell

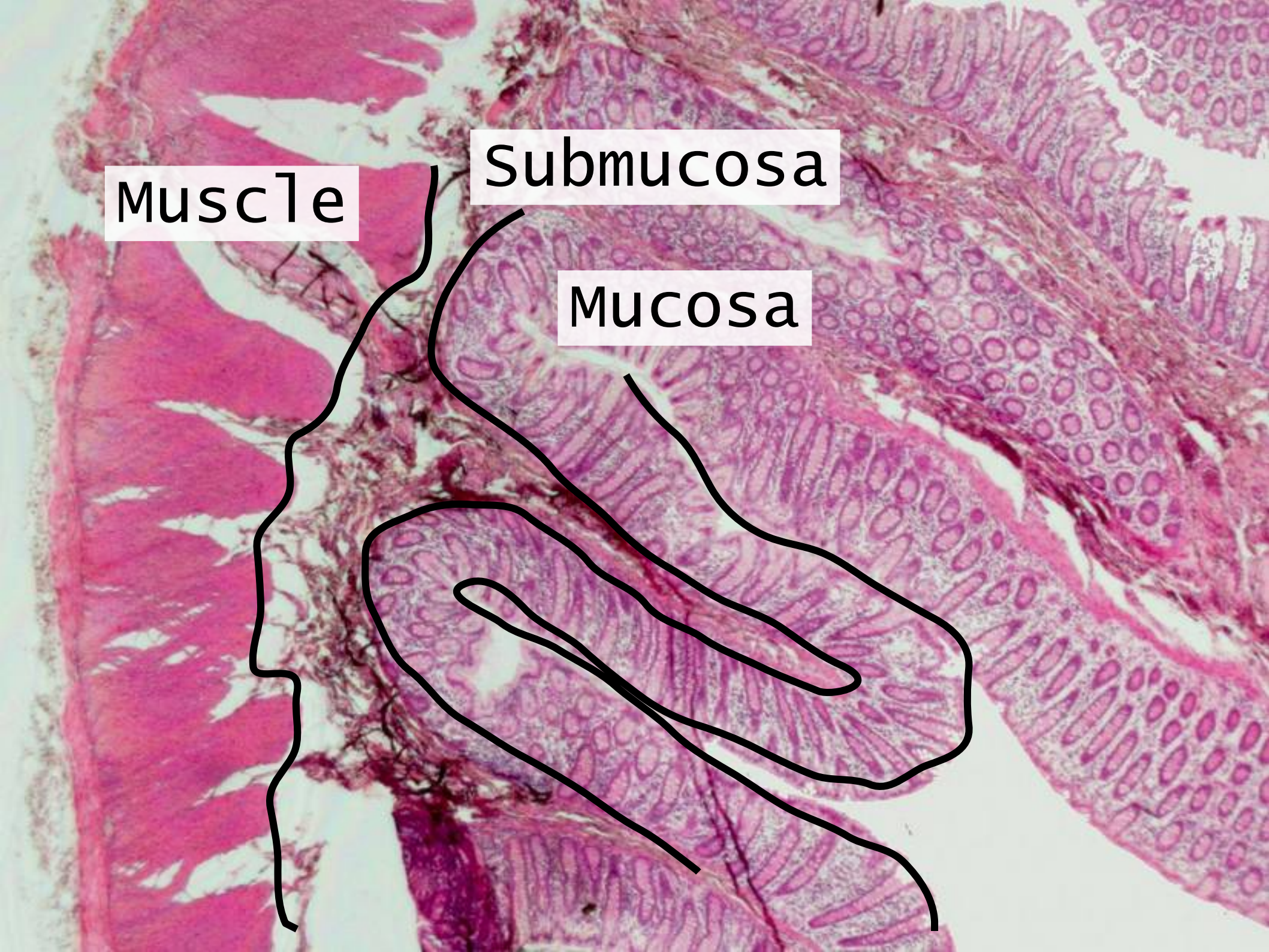


Mucous secrete

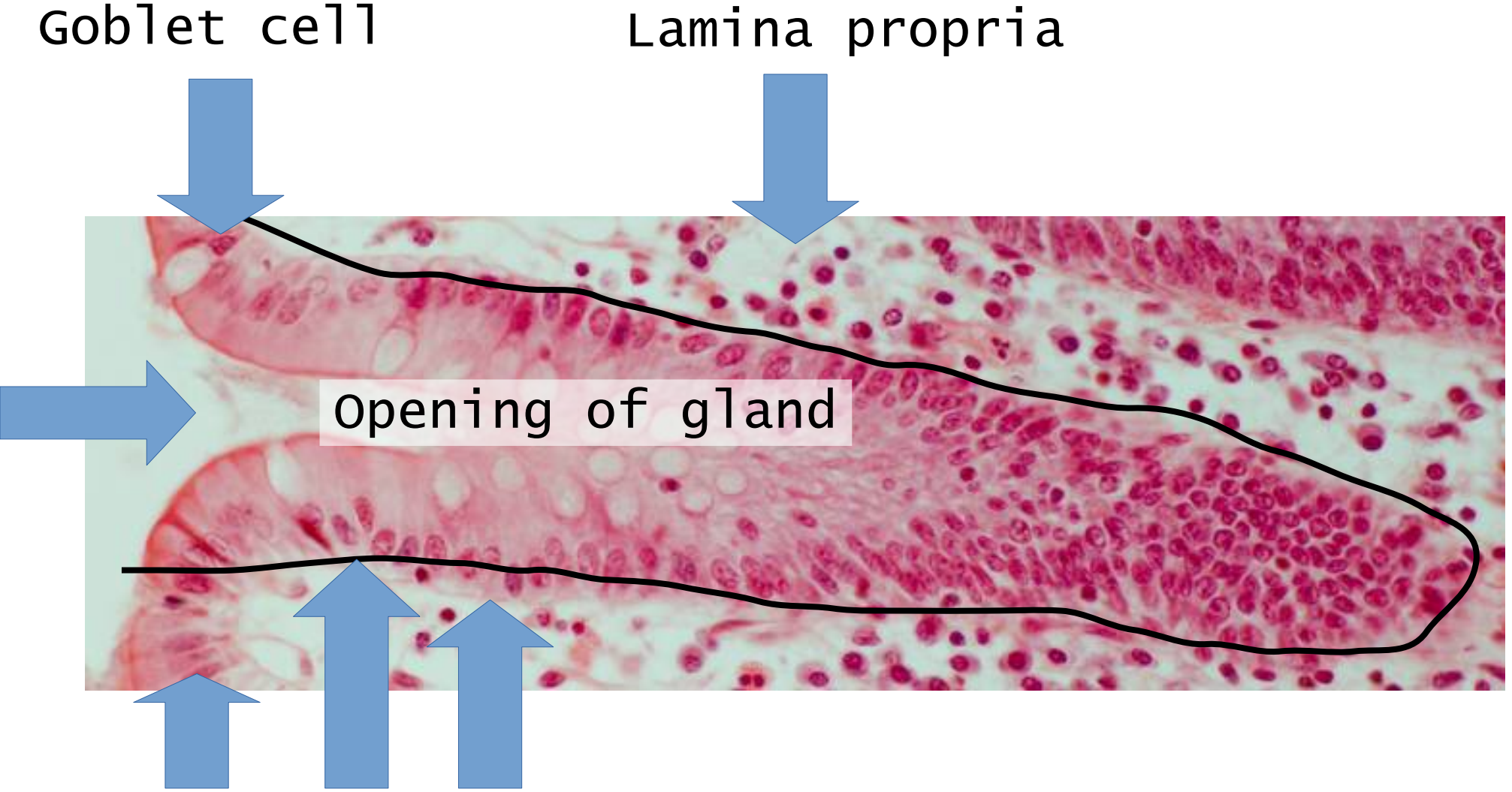
Nucleus near base of cell

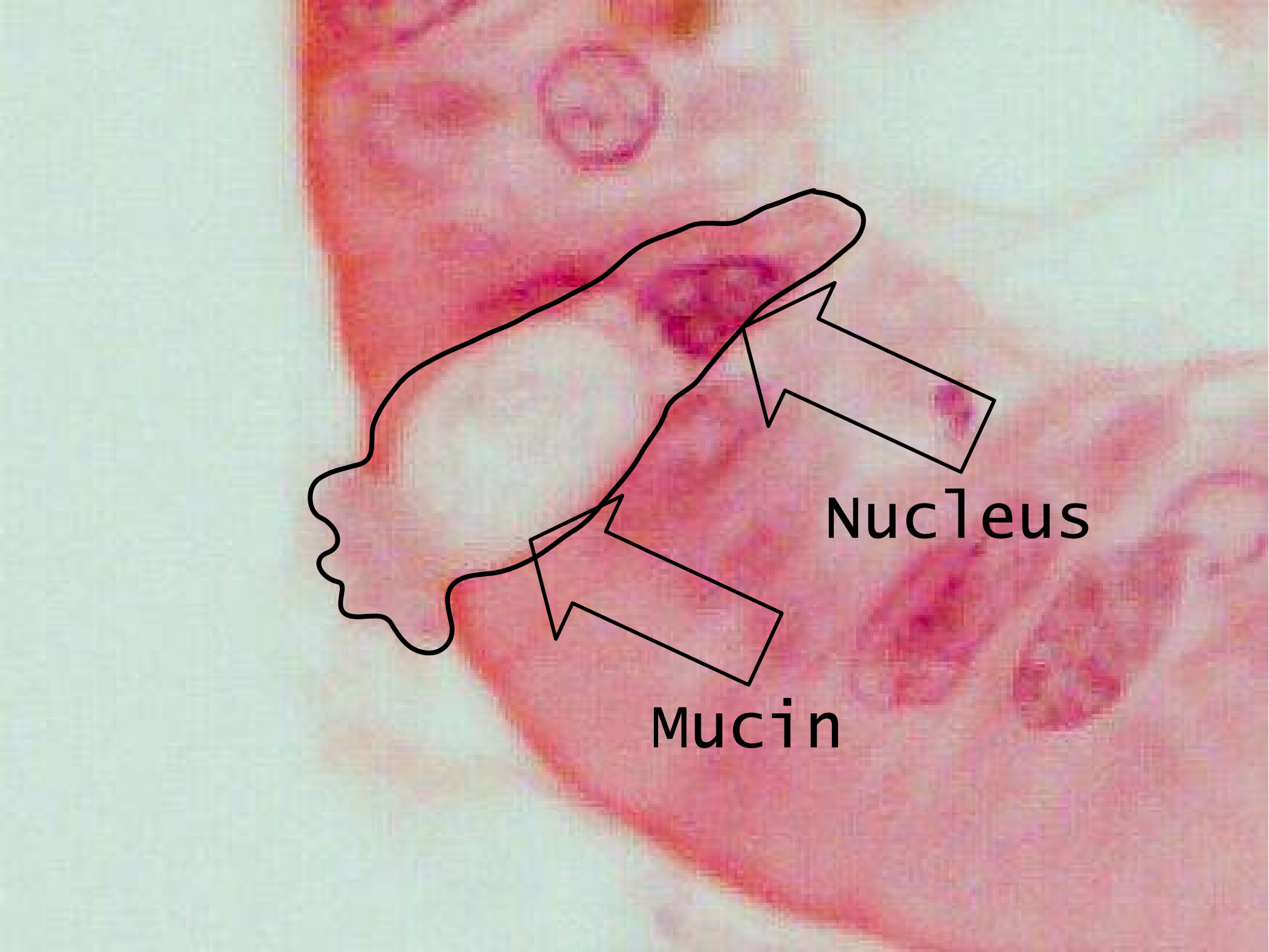

Goblet cells in pseudostratified columnar epithelium
Triangular nucleus near base of cell
Mucous secret
B

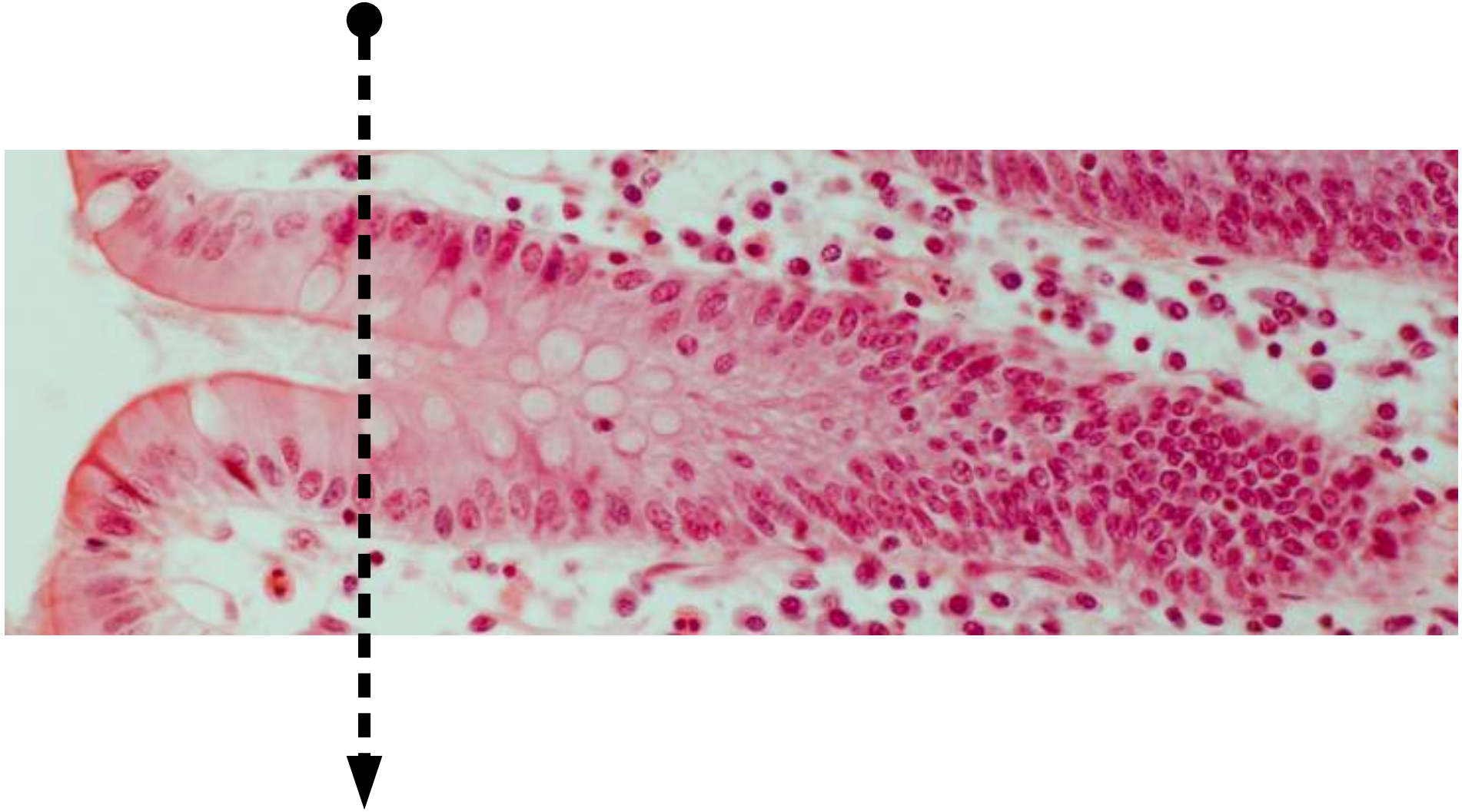

Lymphocyte aggregation
Submucosa
Mucosa
Muscle


Muscle
Submucosa
Mucosa

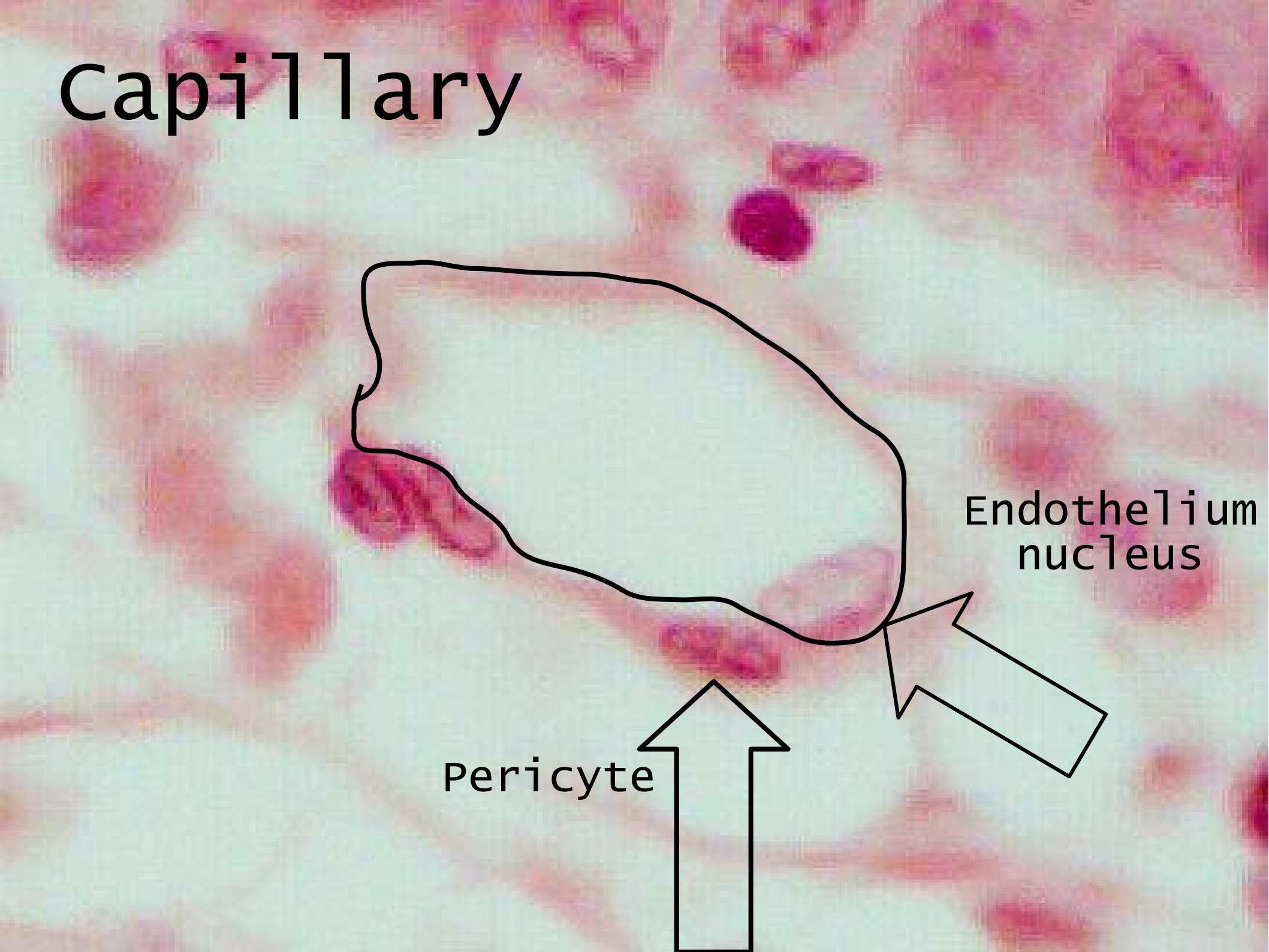

Simple
Tubular
Gland


Goblet cell
Lamina propria
Opening of gland
Columnar cells

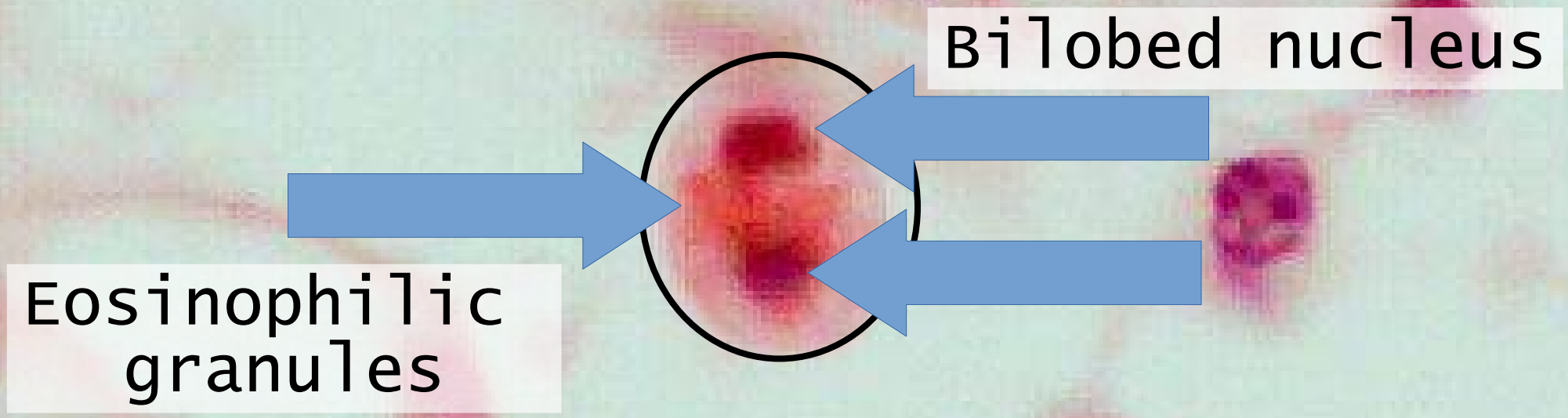

Nucleus
Mucin

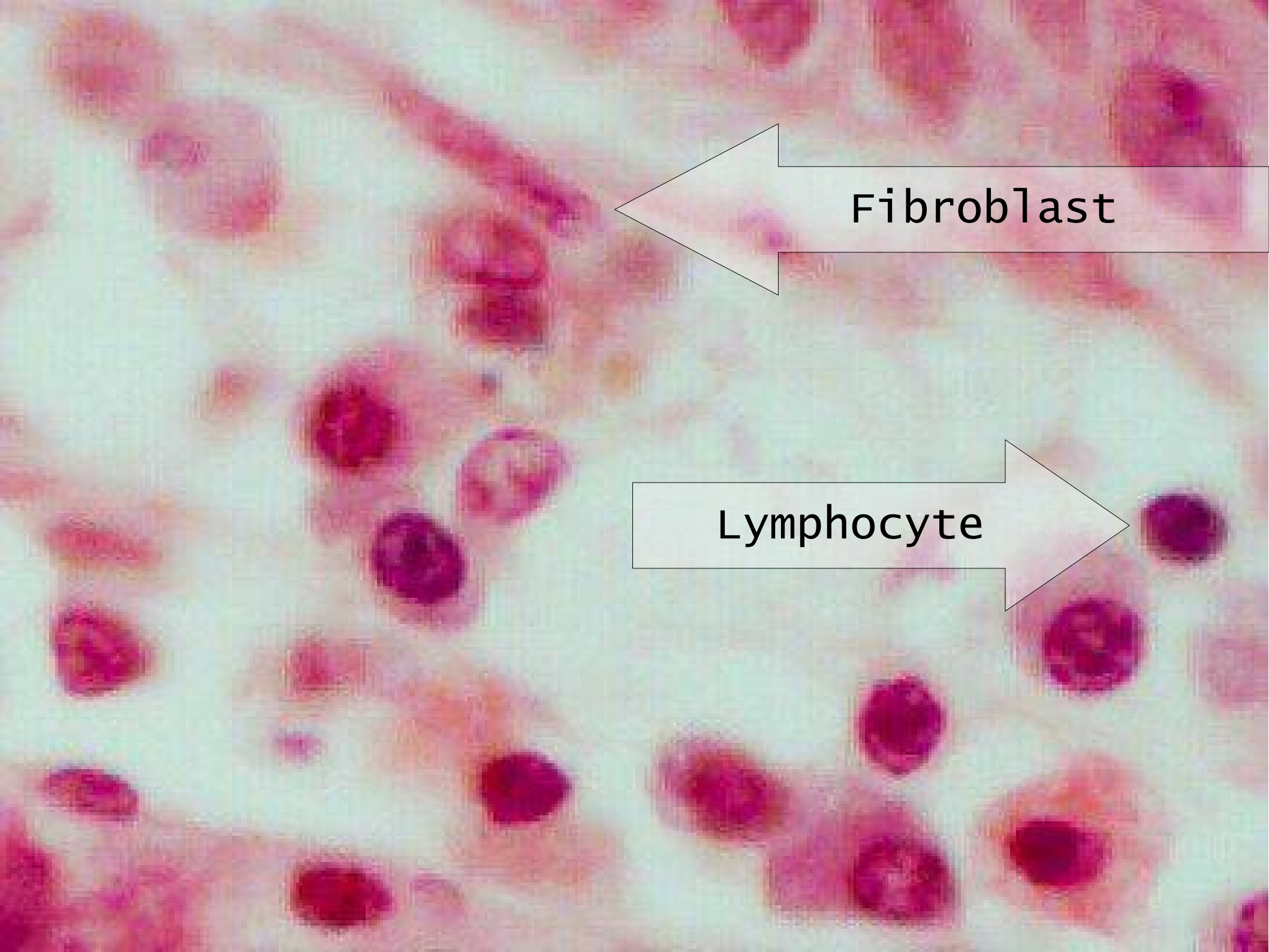


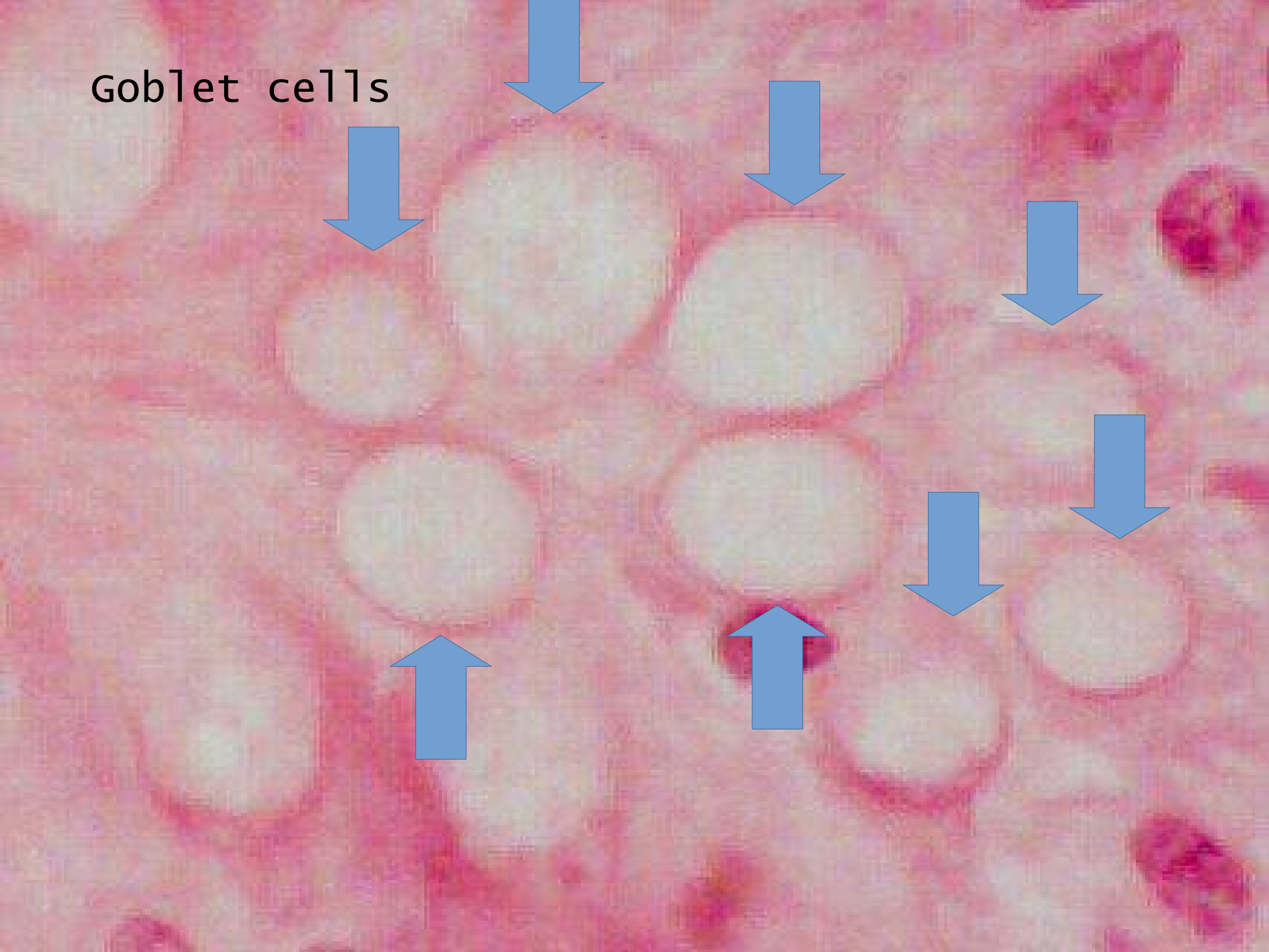

Lumen


Capillary
Endothelium nucleus
Pericyte

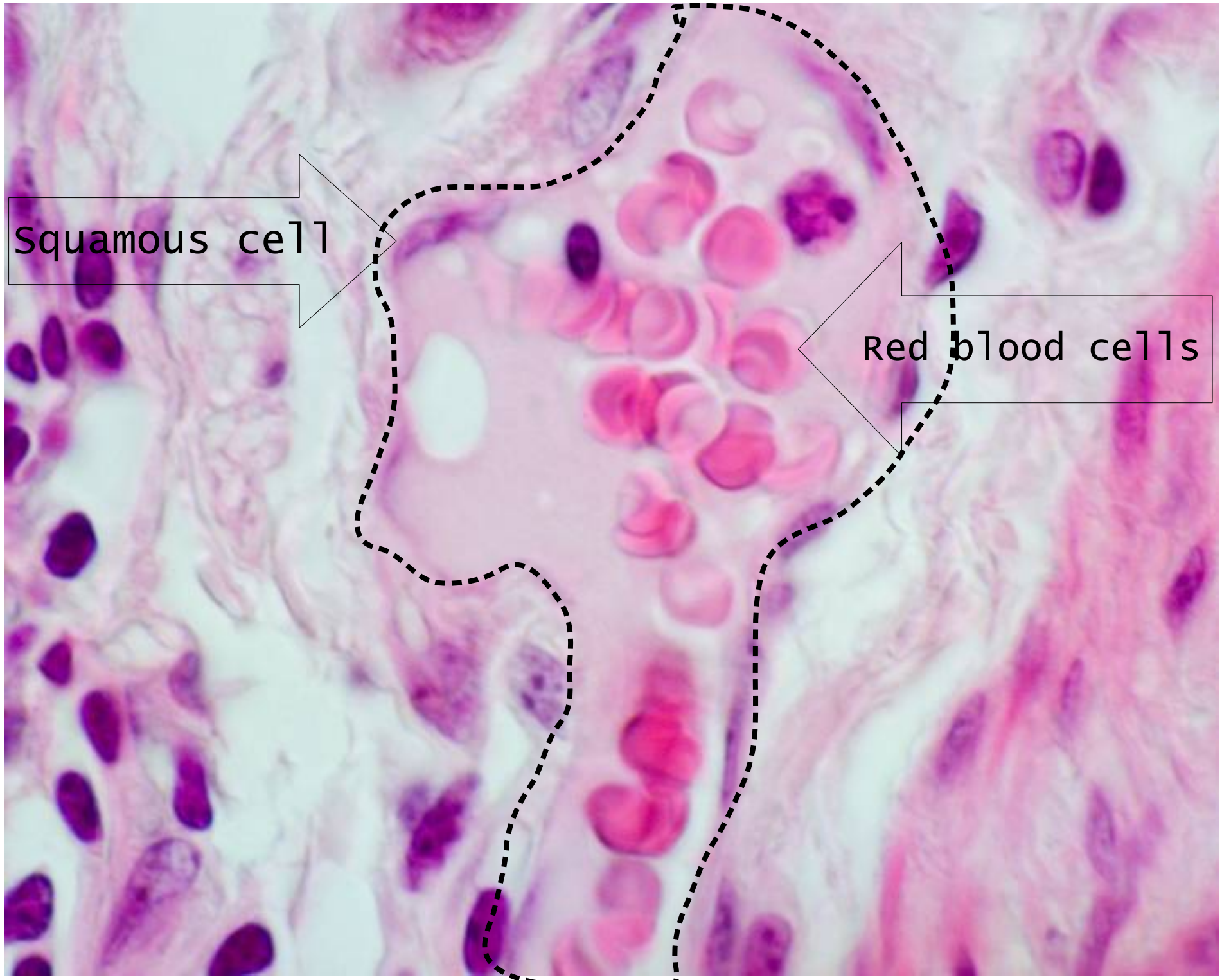
Eosinophil

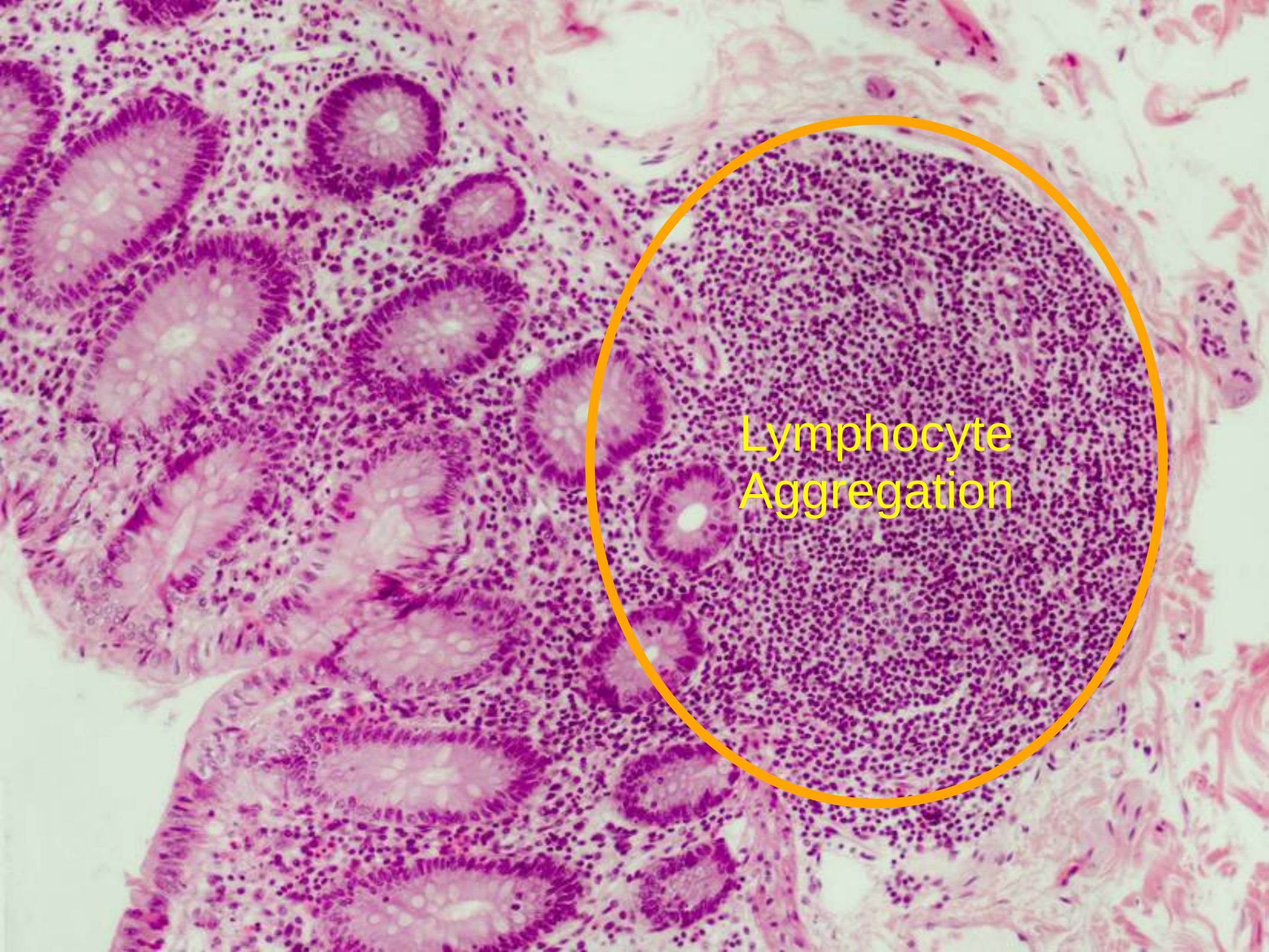



Fibroblast
Lymphocyte


Goblet cells


Goblet cells
Nuclei cut across near base of epitelium


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

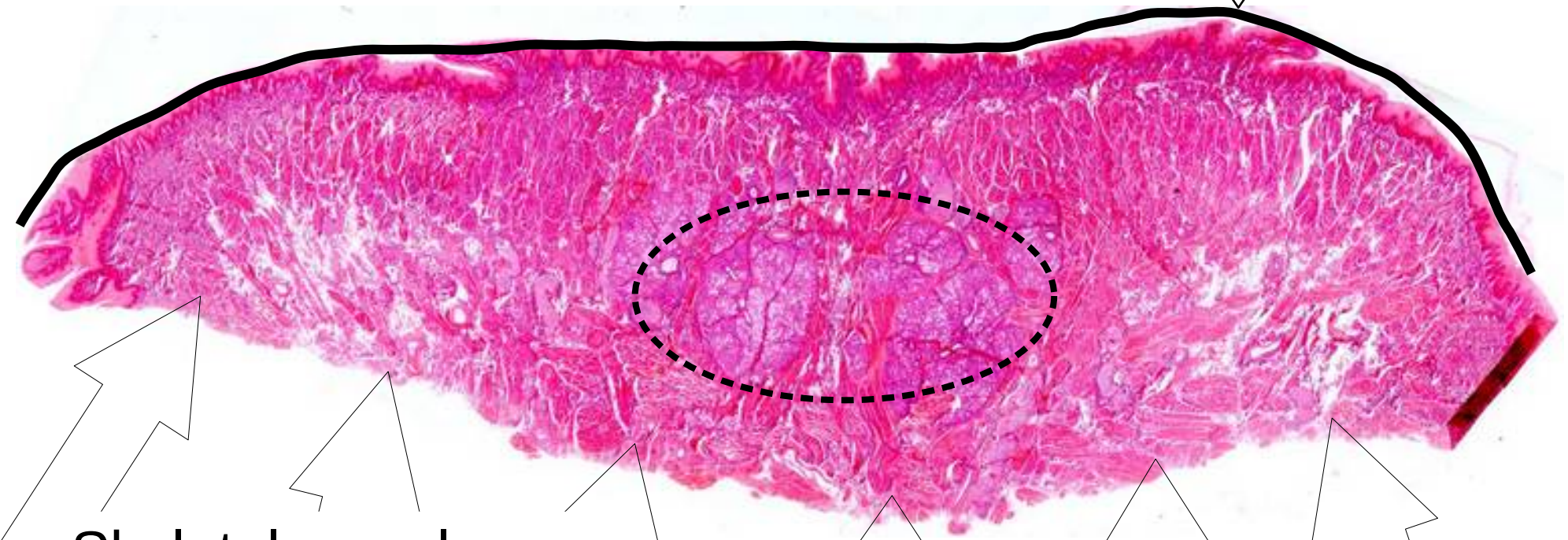
Mucinous

Serous demilunes

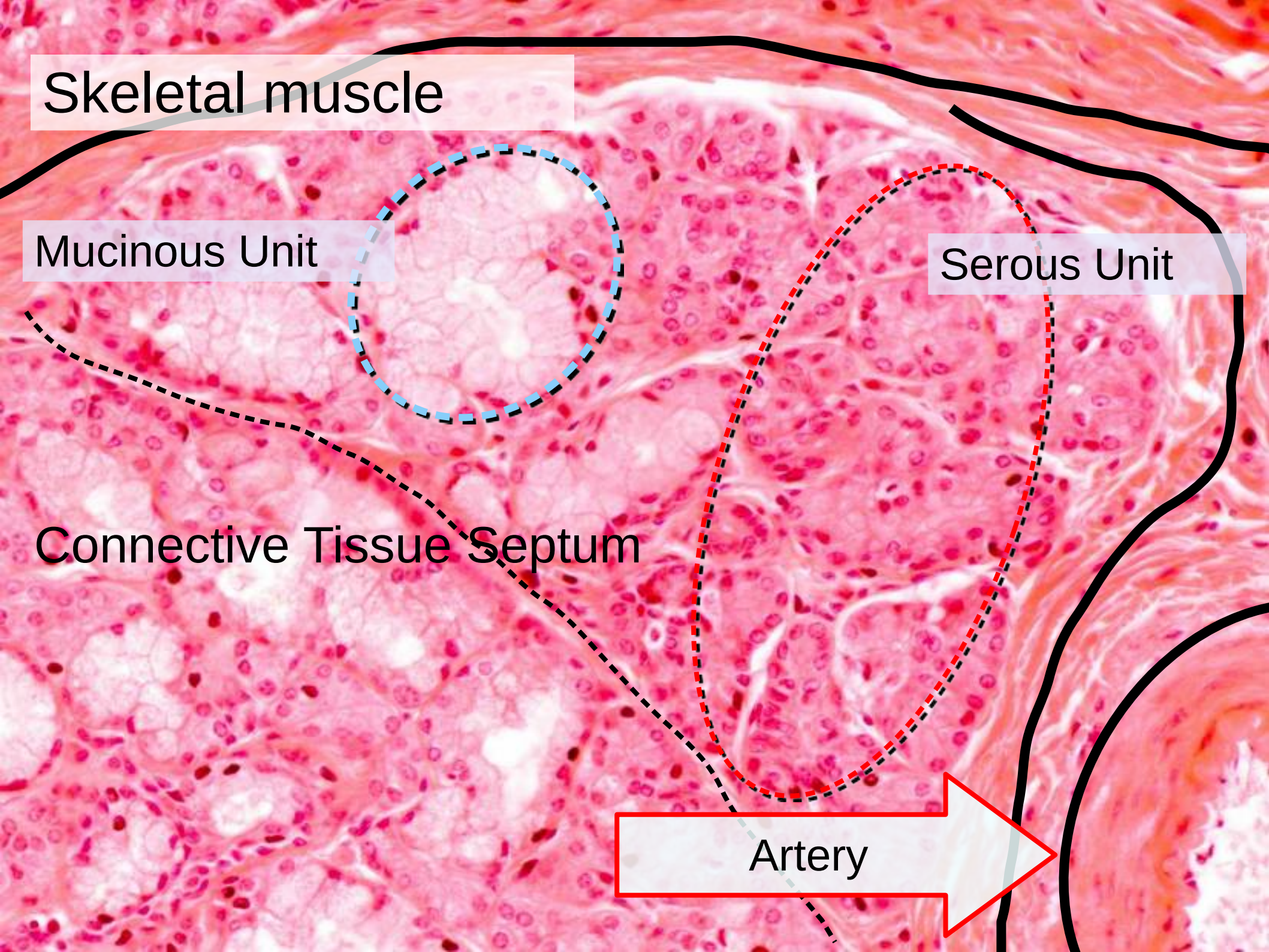
Tongue

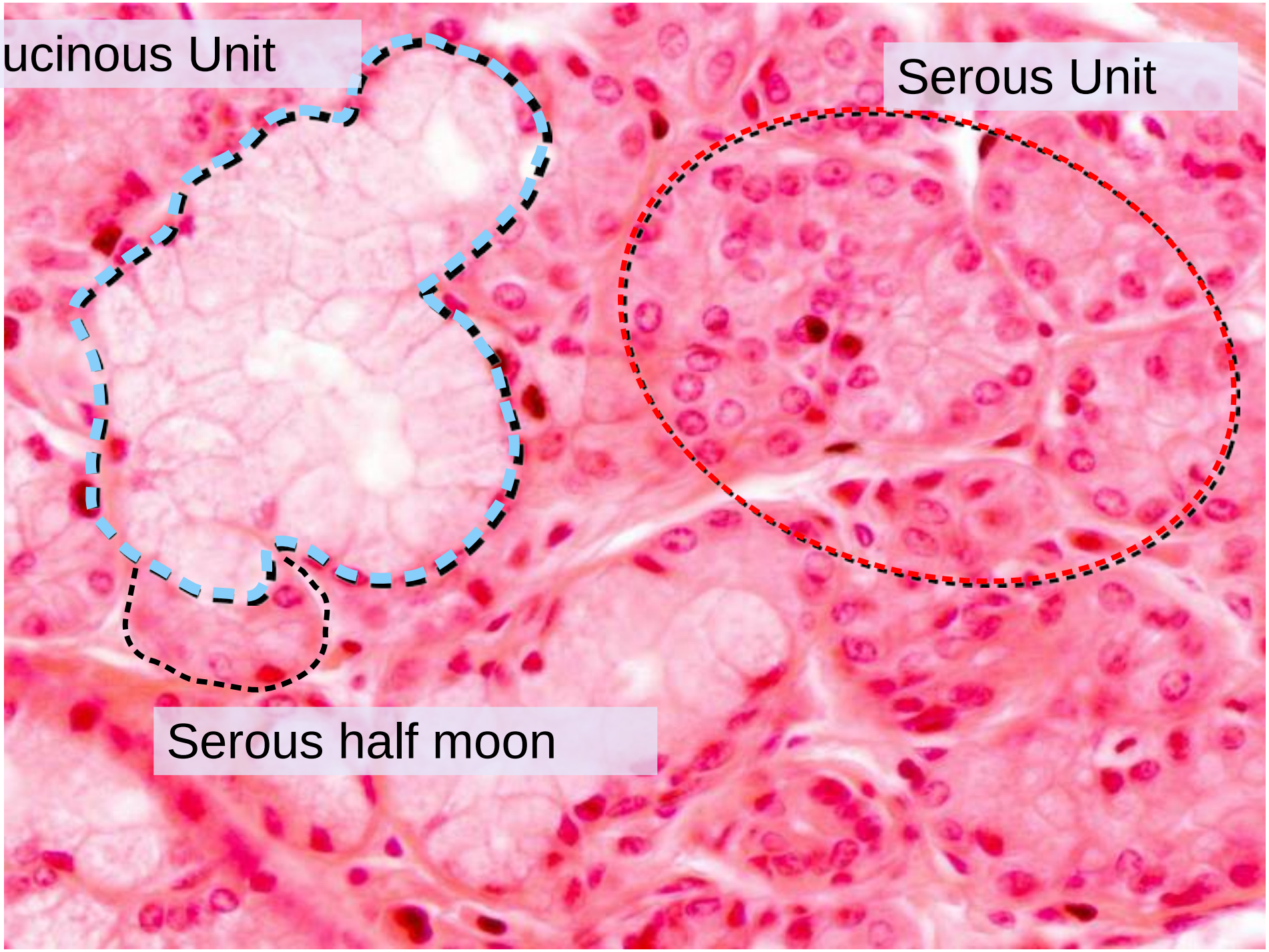
Lumen = Oral Cavity

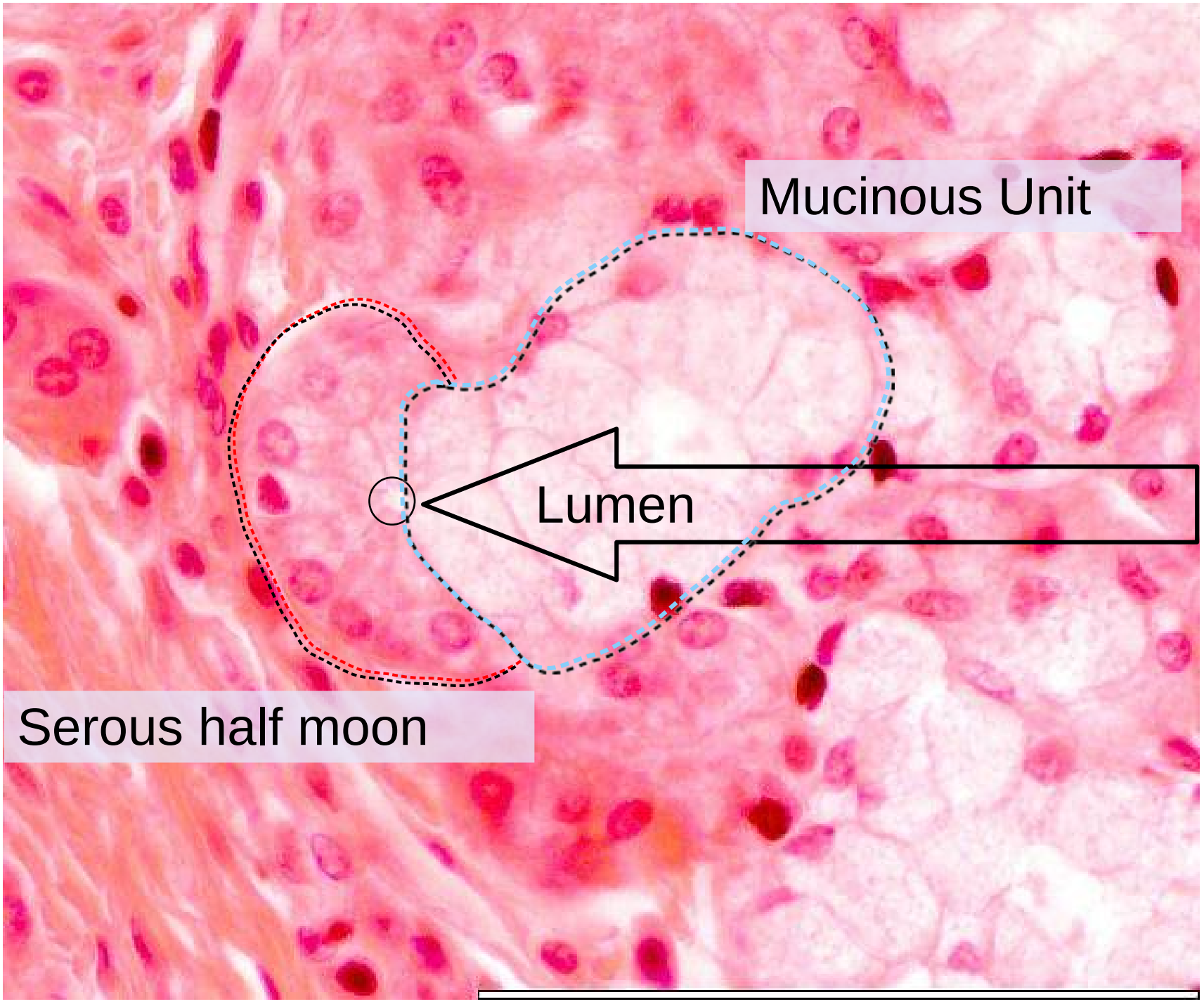
Stratified squamous keratinized epithelium



Skeletal muscle


Skeletal muscle
Mucinous Unit
Serous Unit
Connective Tissue Septum
Artery

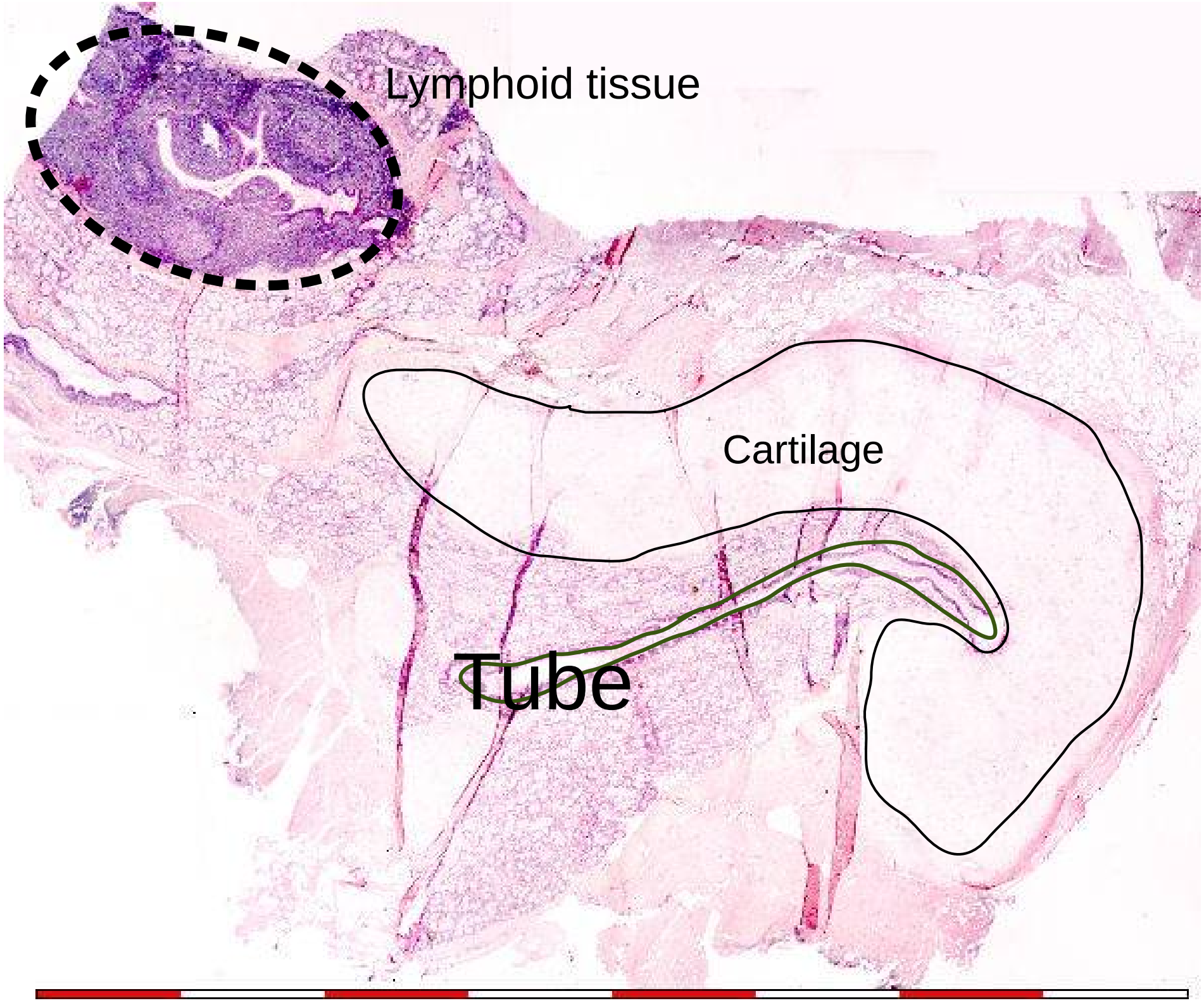

Mucinous Unit
Serous Unit
Serous half moon

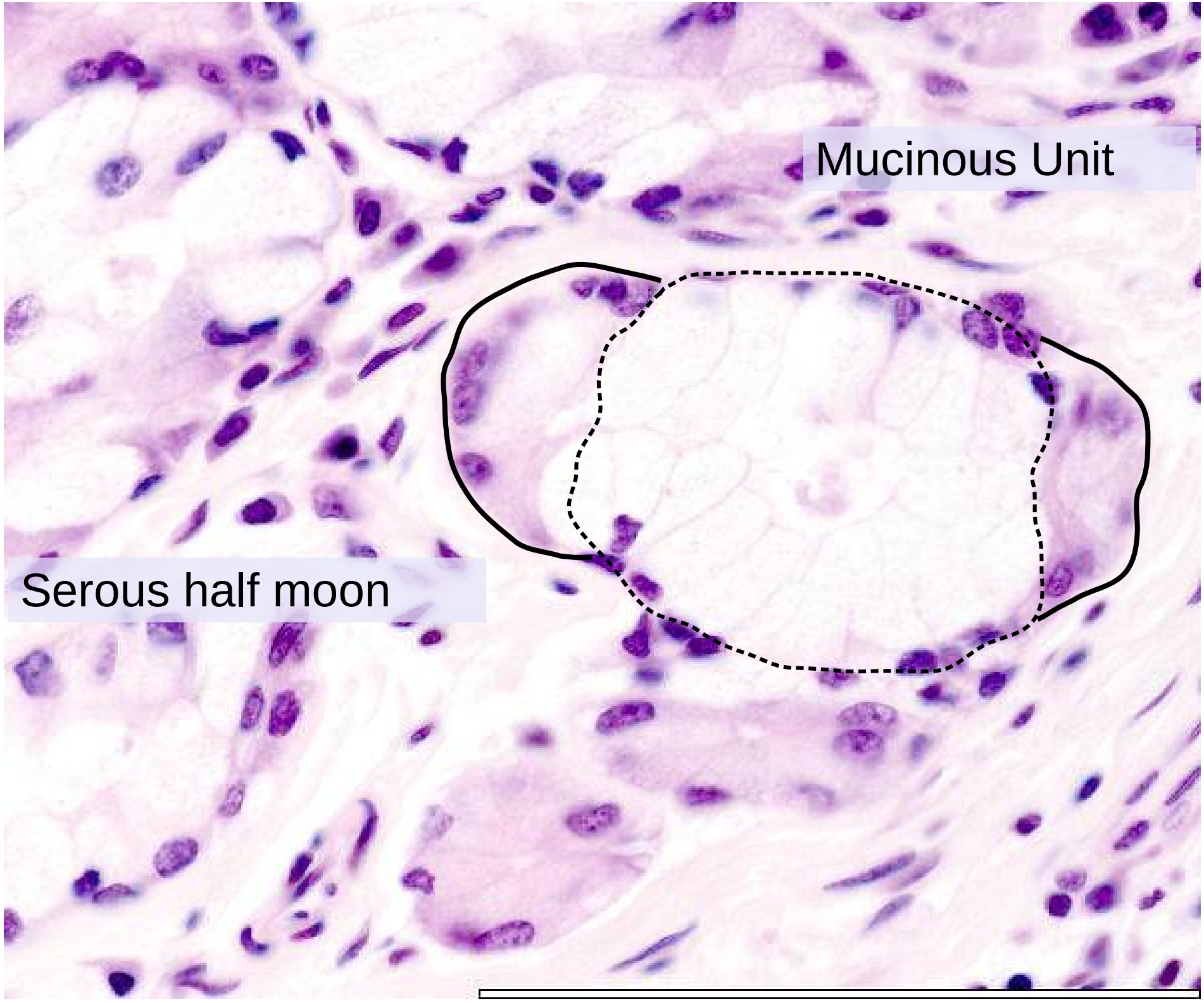

Mucinous Unit
Lumen
Serous half moon

Slide 39 - Pharyngeal tube

Mucinous

Serous demilunes


Lymphoid tissue
Cartilage
Tube


Mucinous Unit
Serous half moon

Endocrine

Endocrine

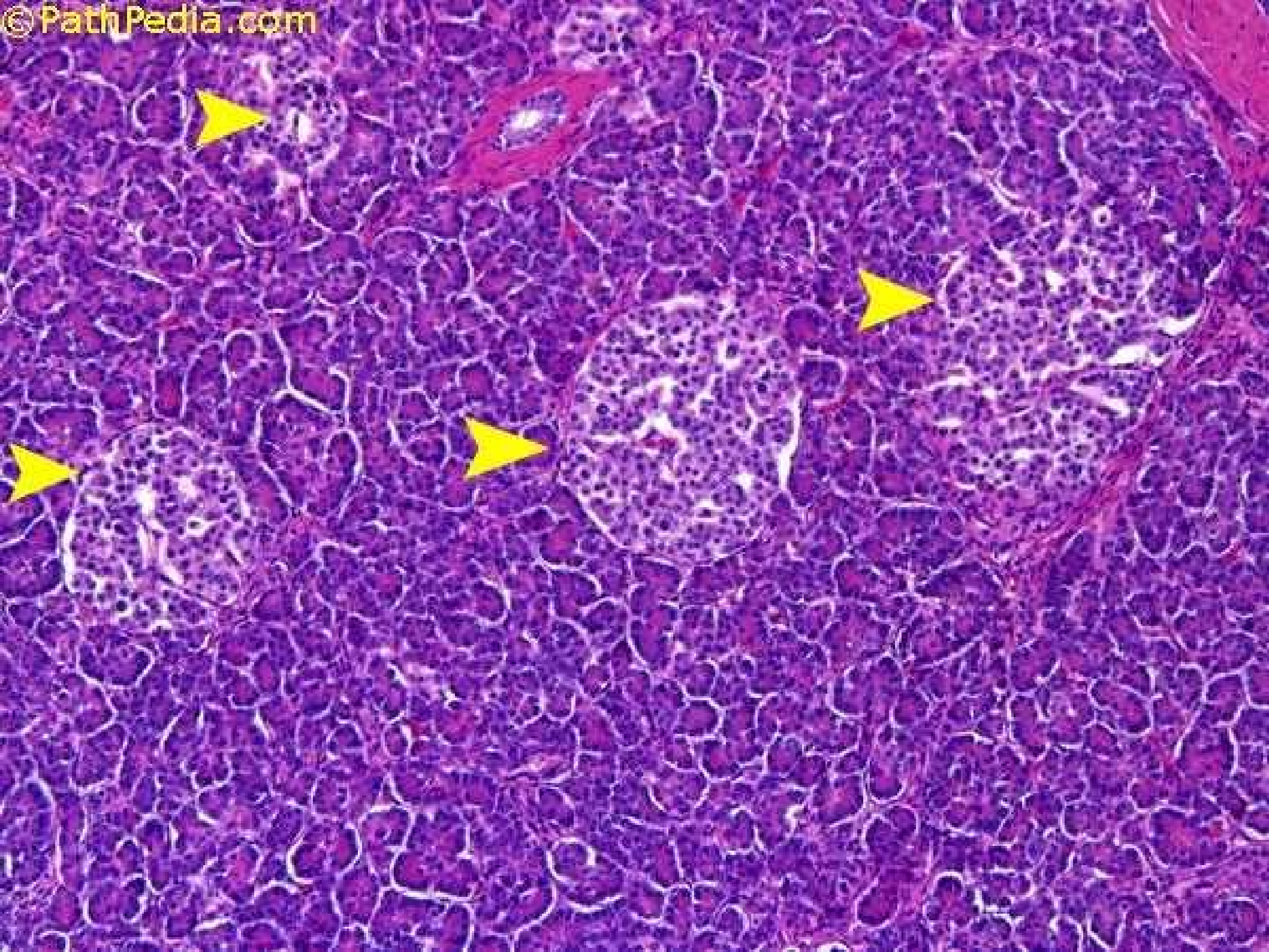
- Follicles
- Cords
- Groups
- Islands

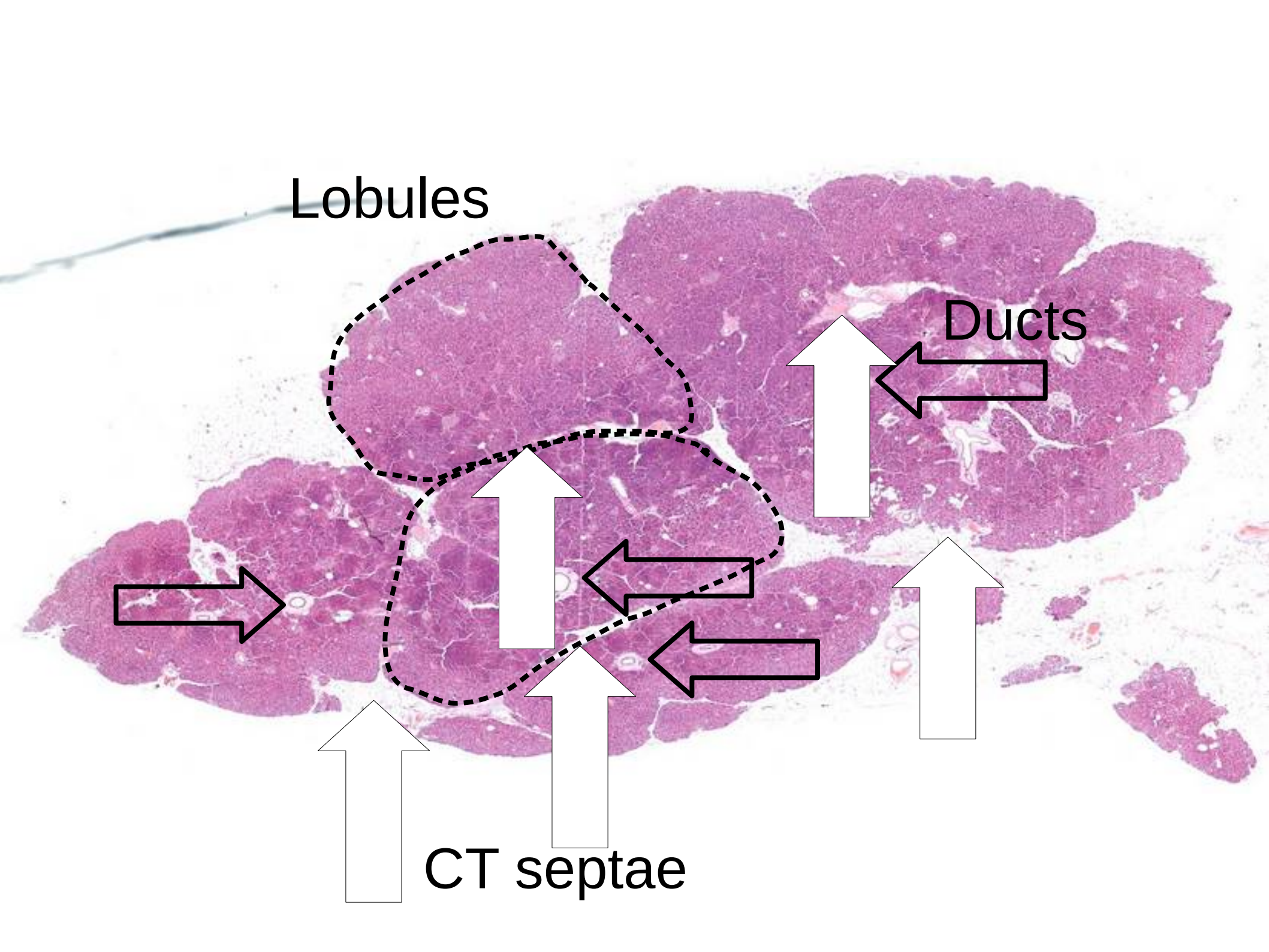
Slide 50 - Pancreas

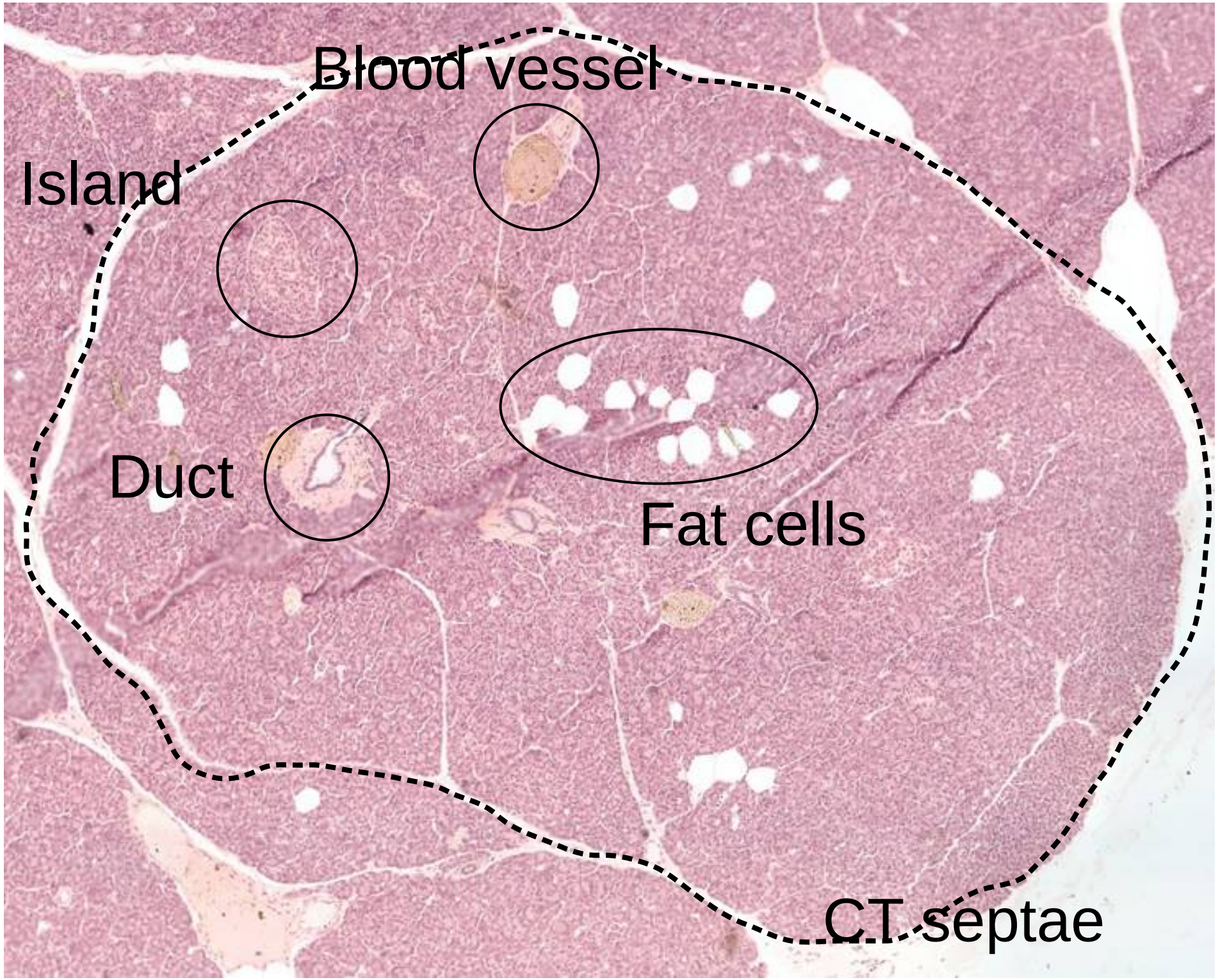
- Exocrine + Endocrine
- Acinar / Tubulo-acinar
- Simple epithelium of pyramidal serous cells
- Basal basophilia
- Duct starts inside acinus
- Centro-acinar cells
- Endocrine islands

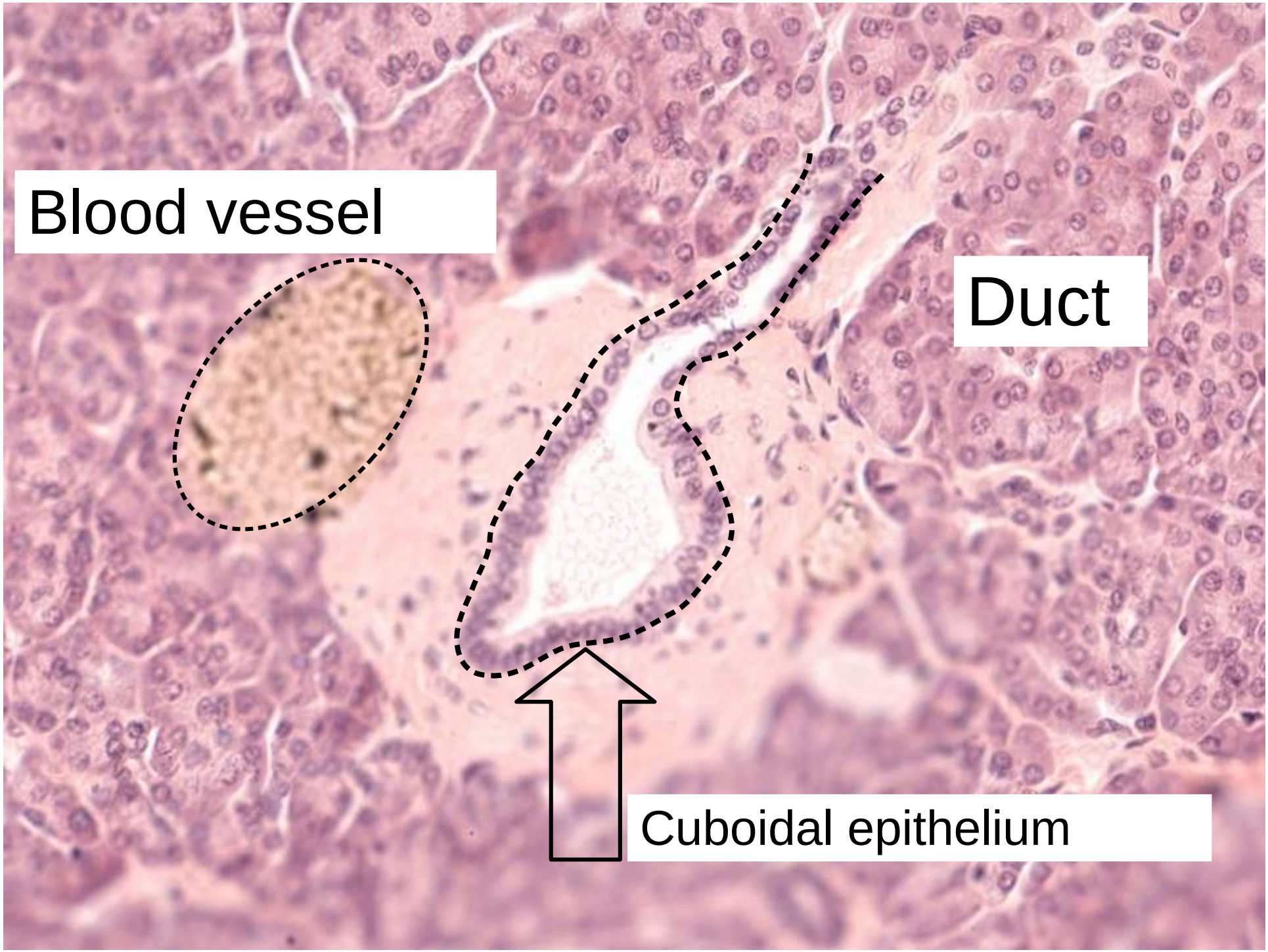
Islands

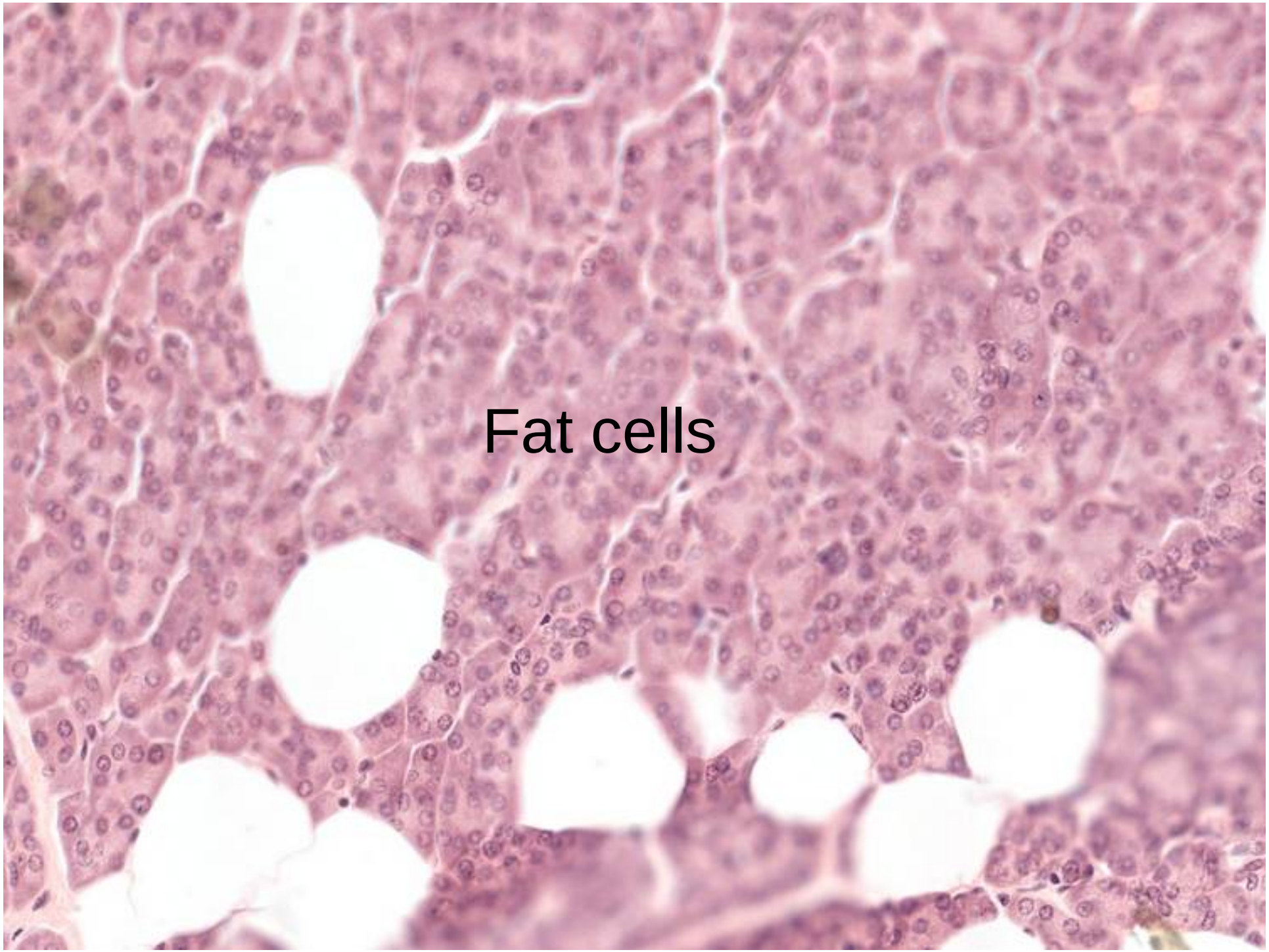

LONG ISLAND
ICED TEA
Ice cubes
Splash of soda
Triple sec
1oz.(30ml)
Gin 1oz.(30ml)
White rum 1oz.(30ml)
Lemon segment
Sweet/sour mix
1½oz.(45ml)
Tequila 1oz.(30ml)
Vodka 1oz.(30ml)

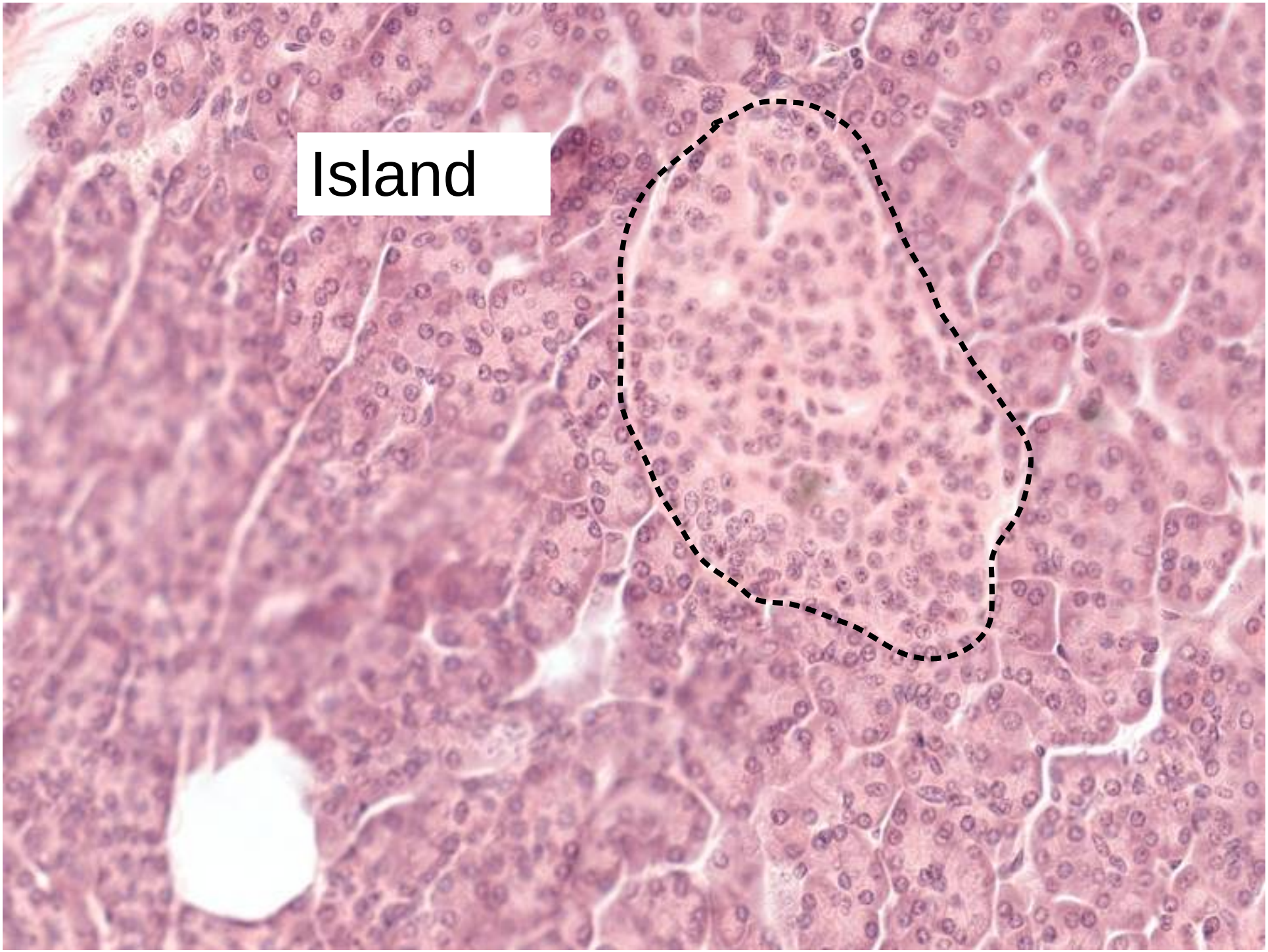

©PathPedia.com


Lobules
Ducts
CT septae


Blood vessel
Island
Duct
Fat cells
CT septae


Blood vessel
Duct
Cuboidal epithelium

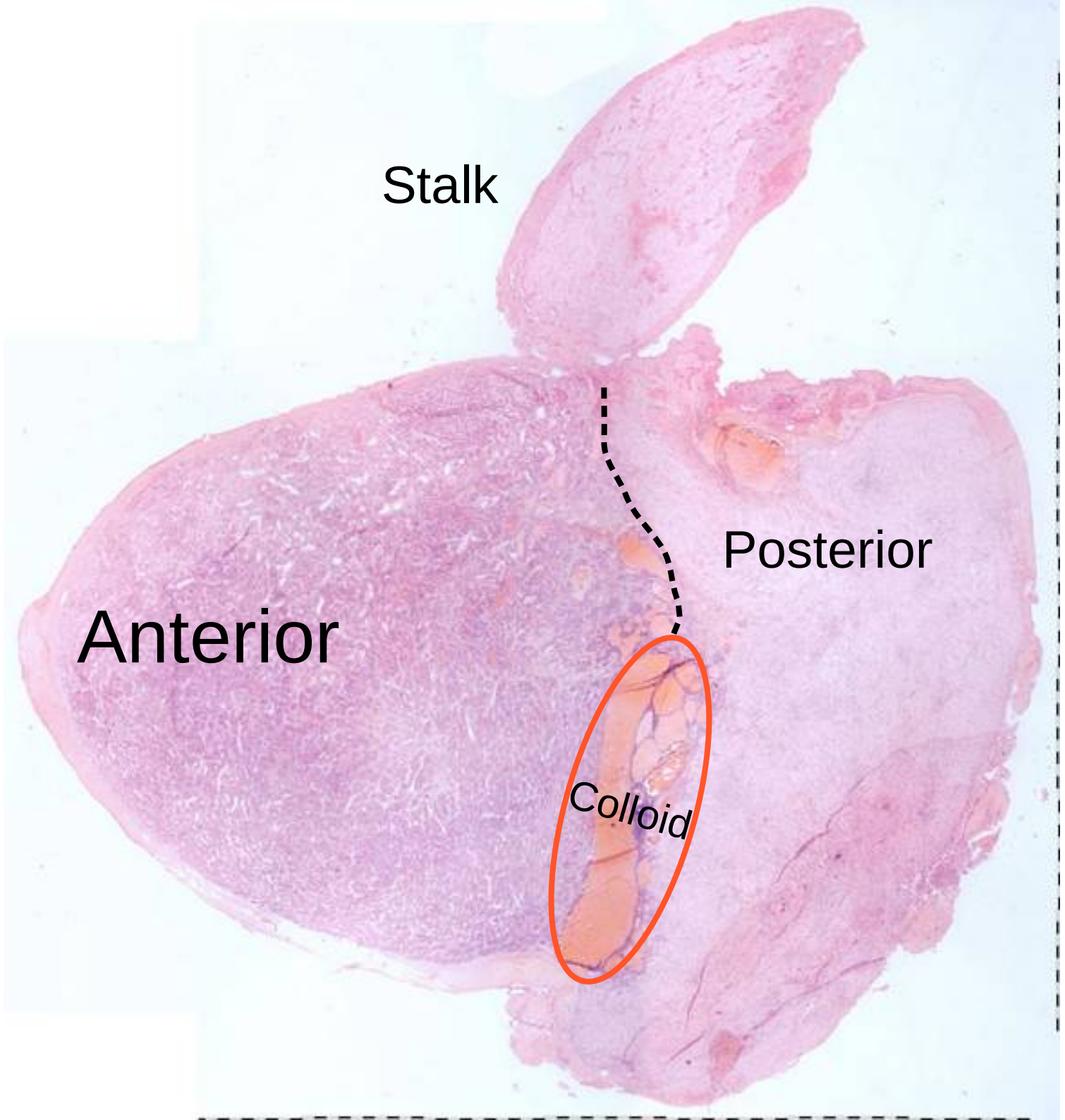

Fat cells

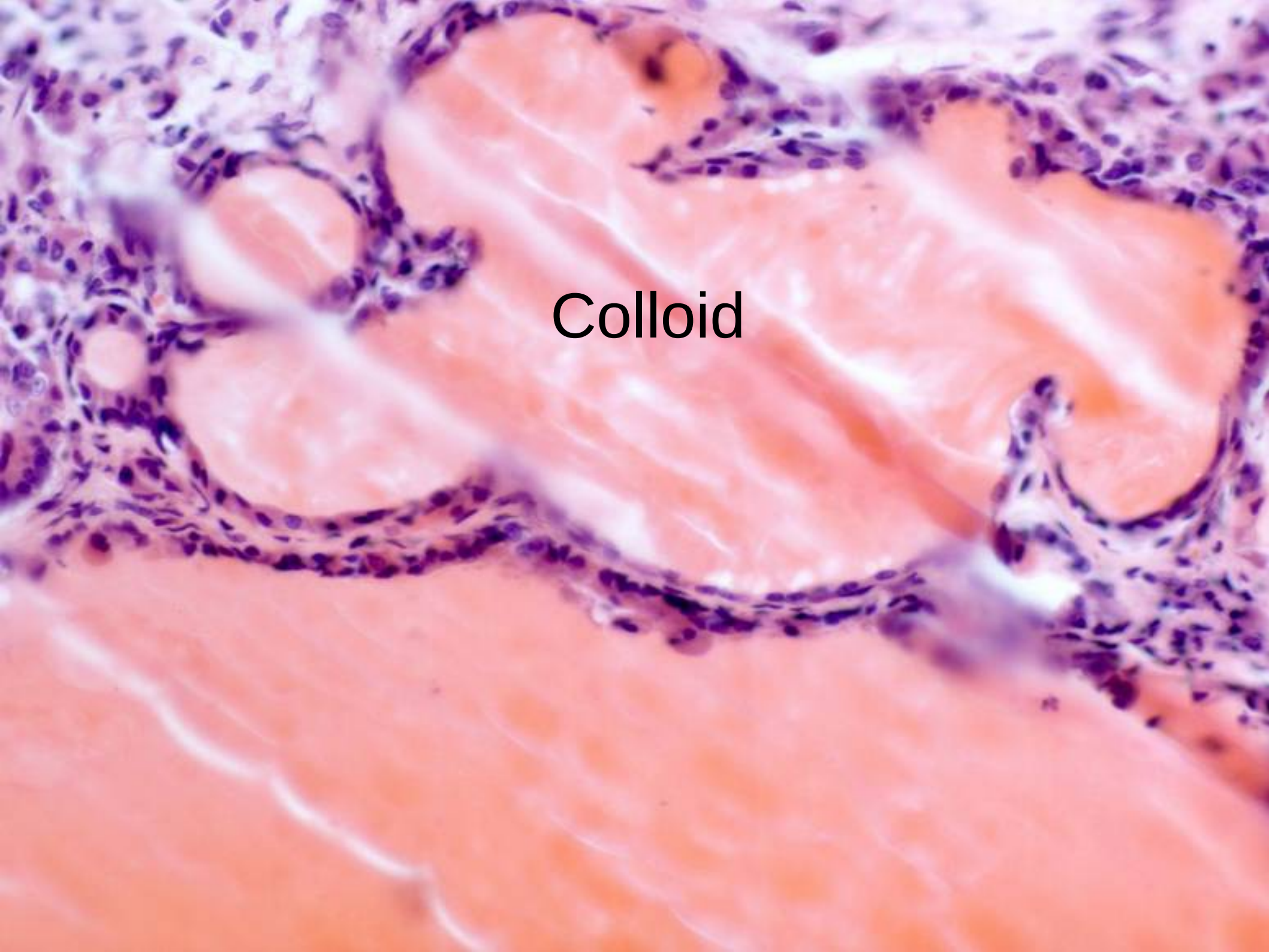

Island

Slide 52 - Pituitary gland

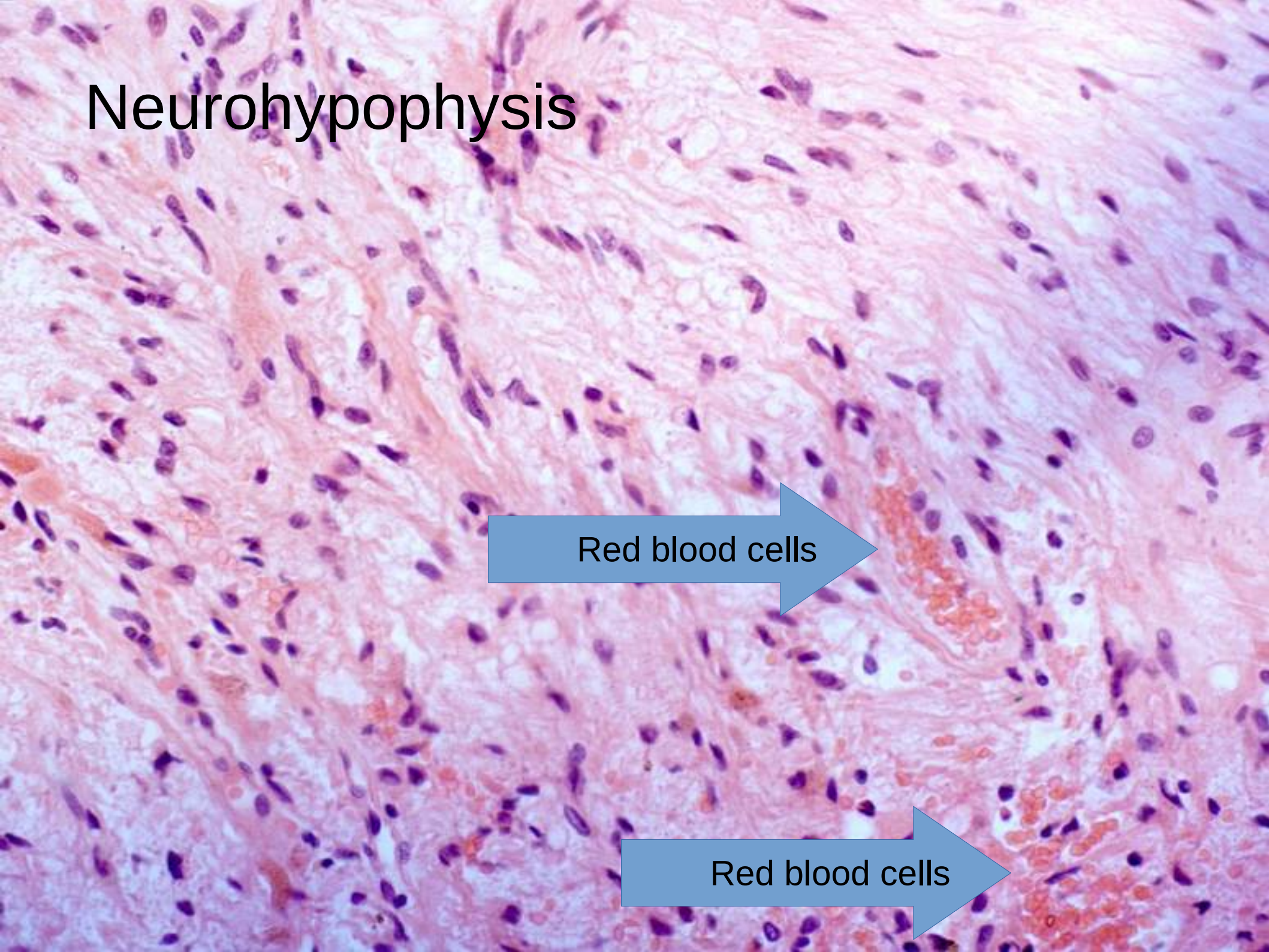
Groups

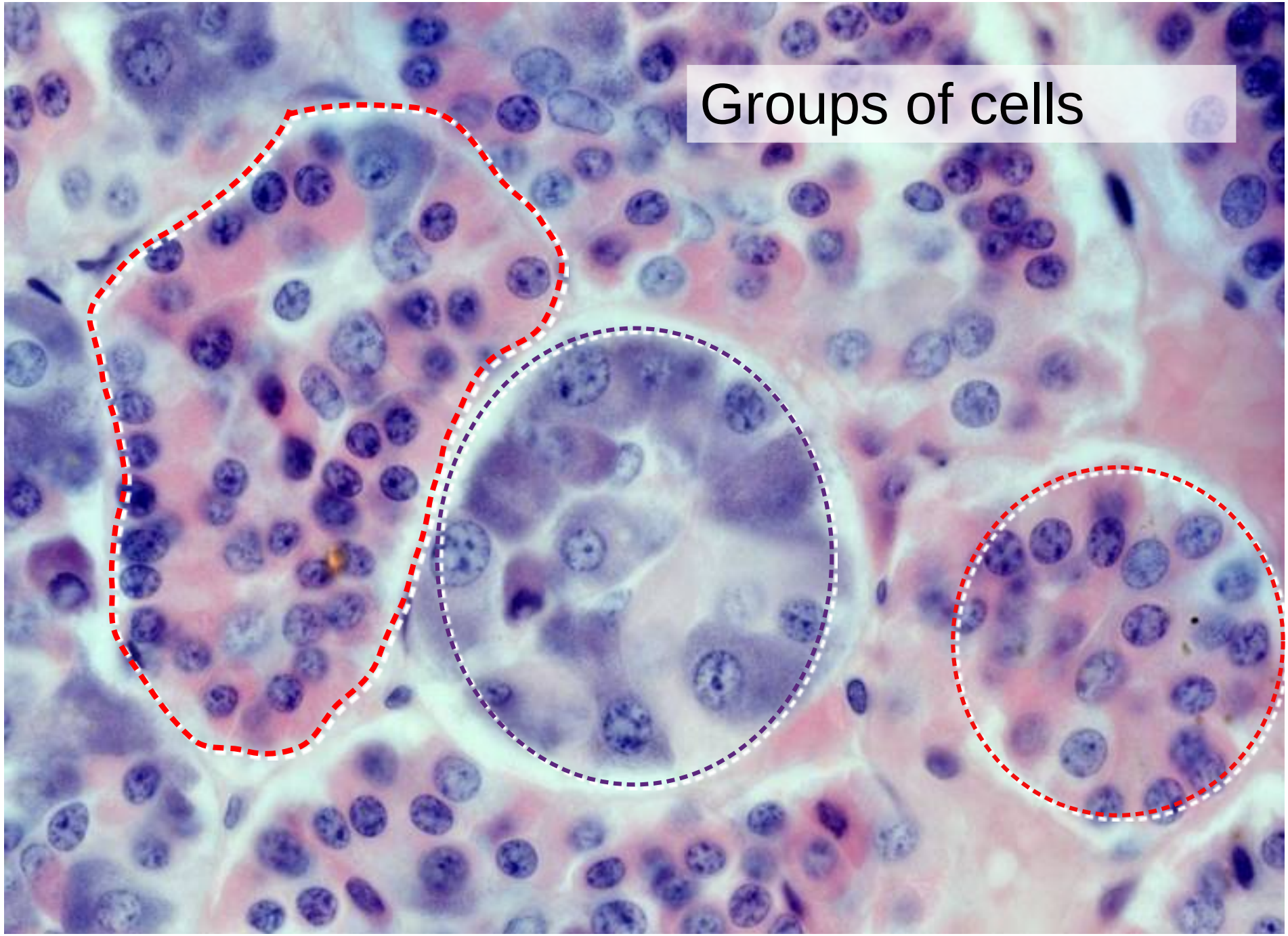
Groups

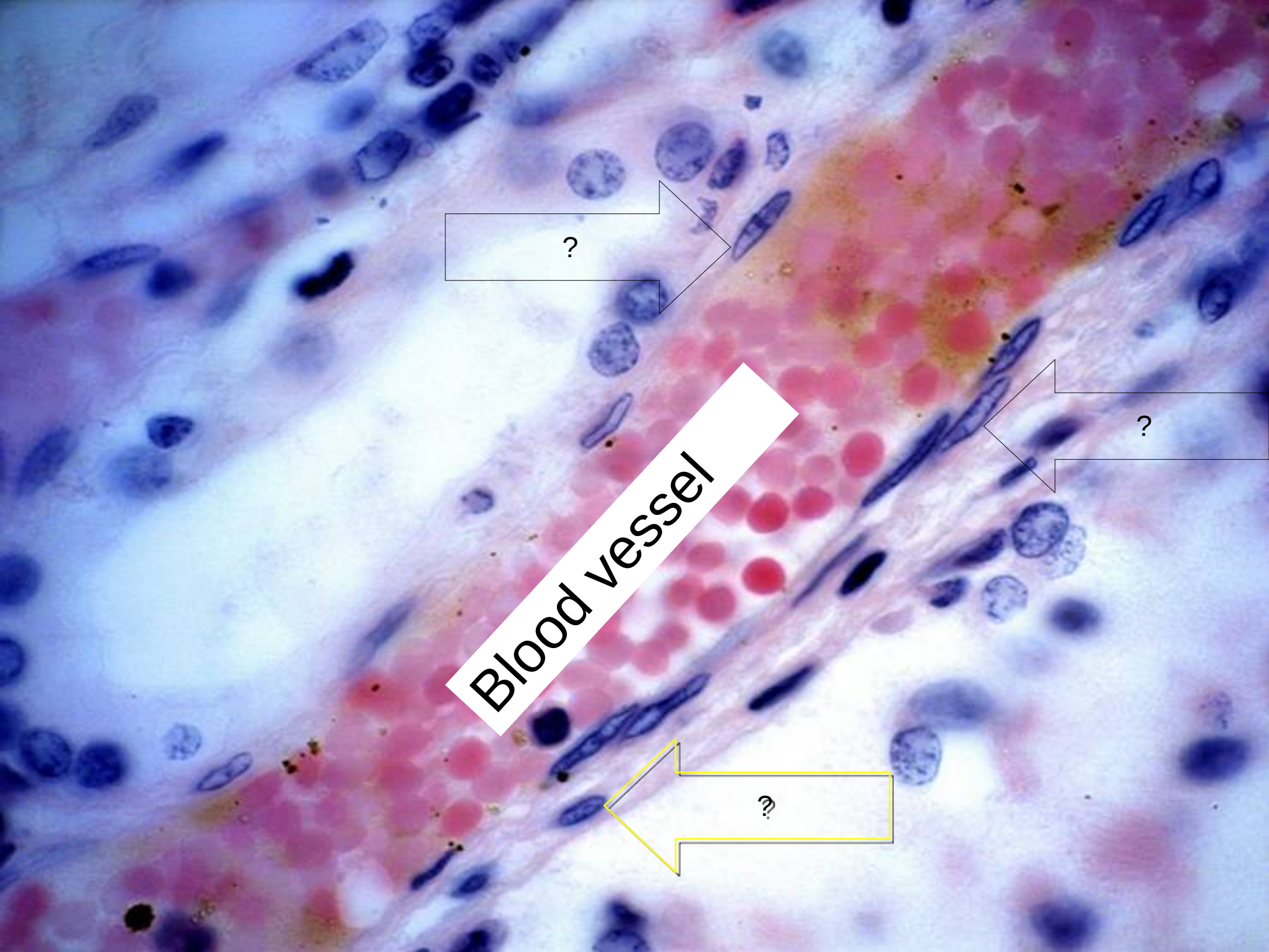

Stalk
Posterior
Anterior
Colloid


Colloid

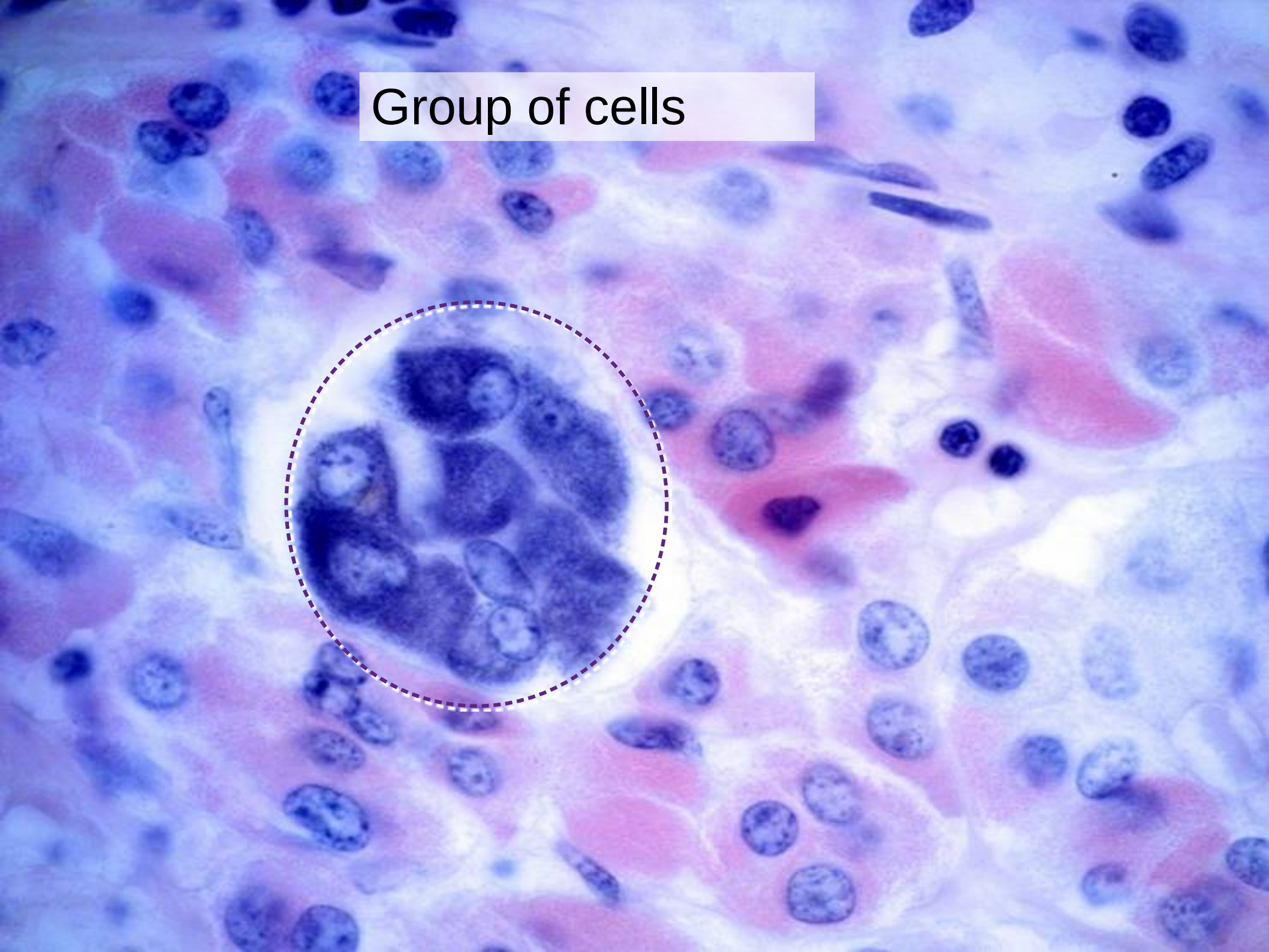
Neurohypophysis




Groups of cells


?
Blood vessel
?
?

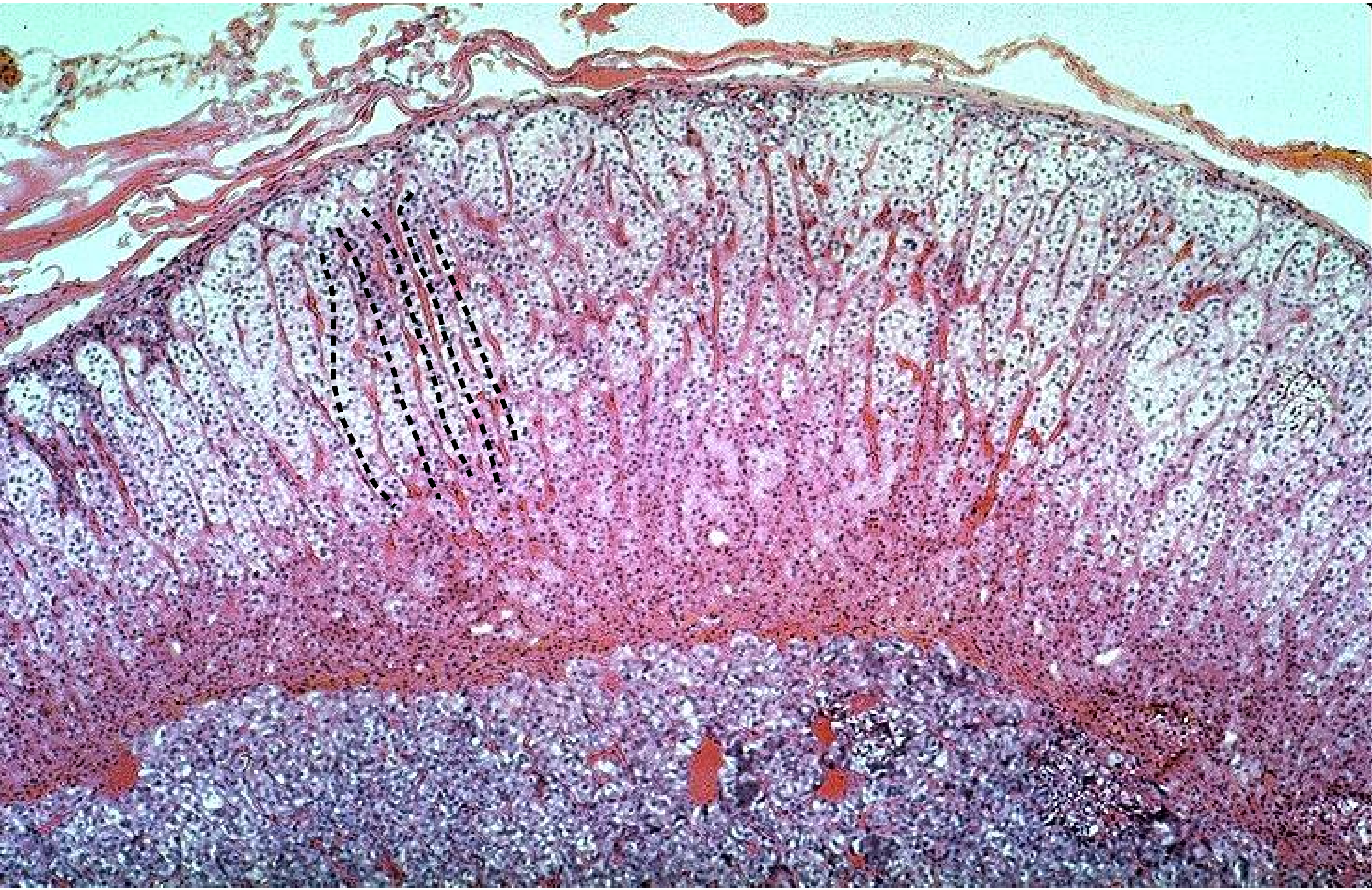

Blood vessel

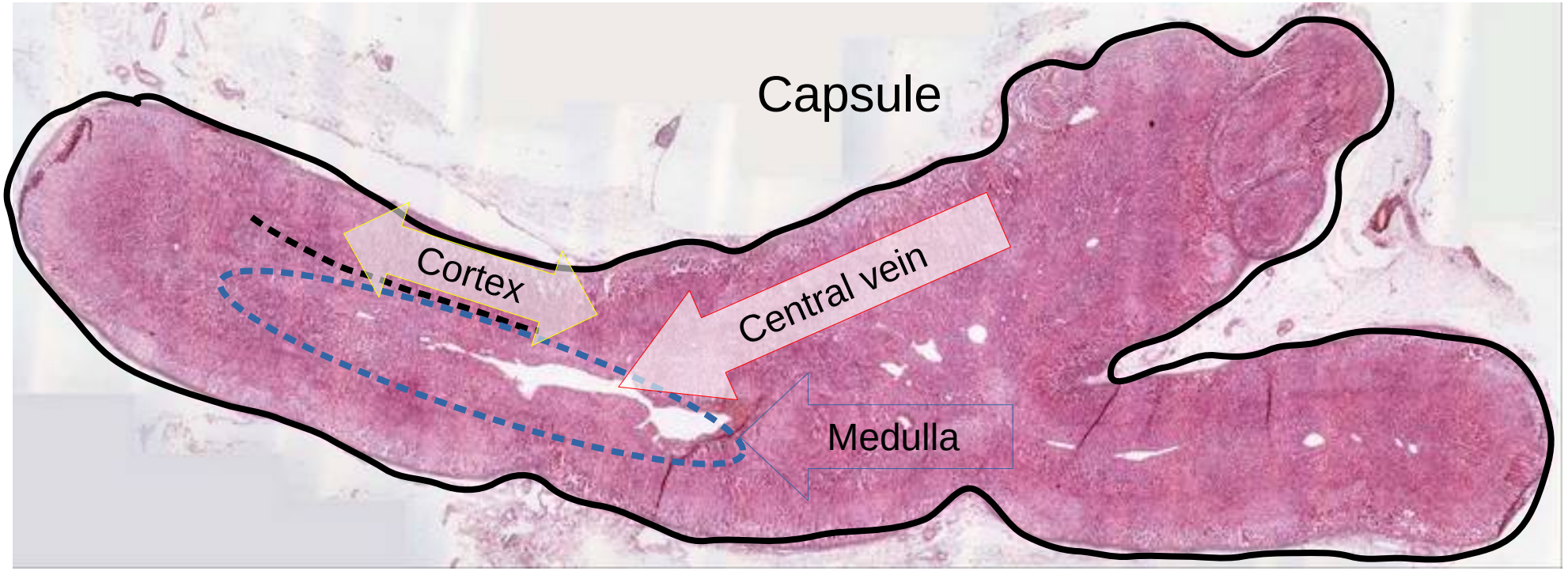

Group of cells

Slide 56 - Adrenal glands

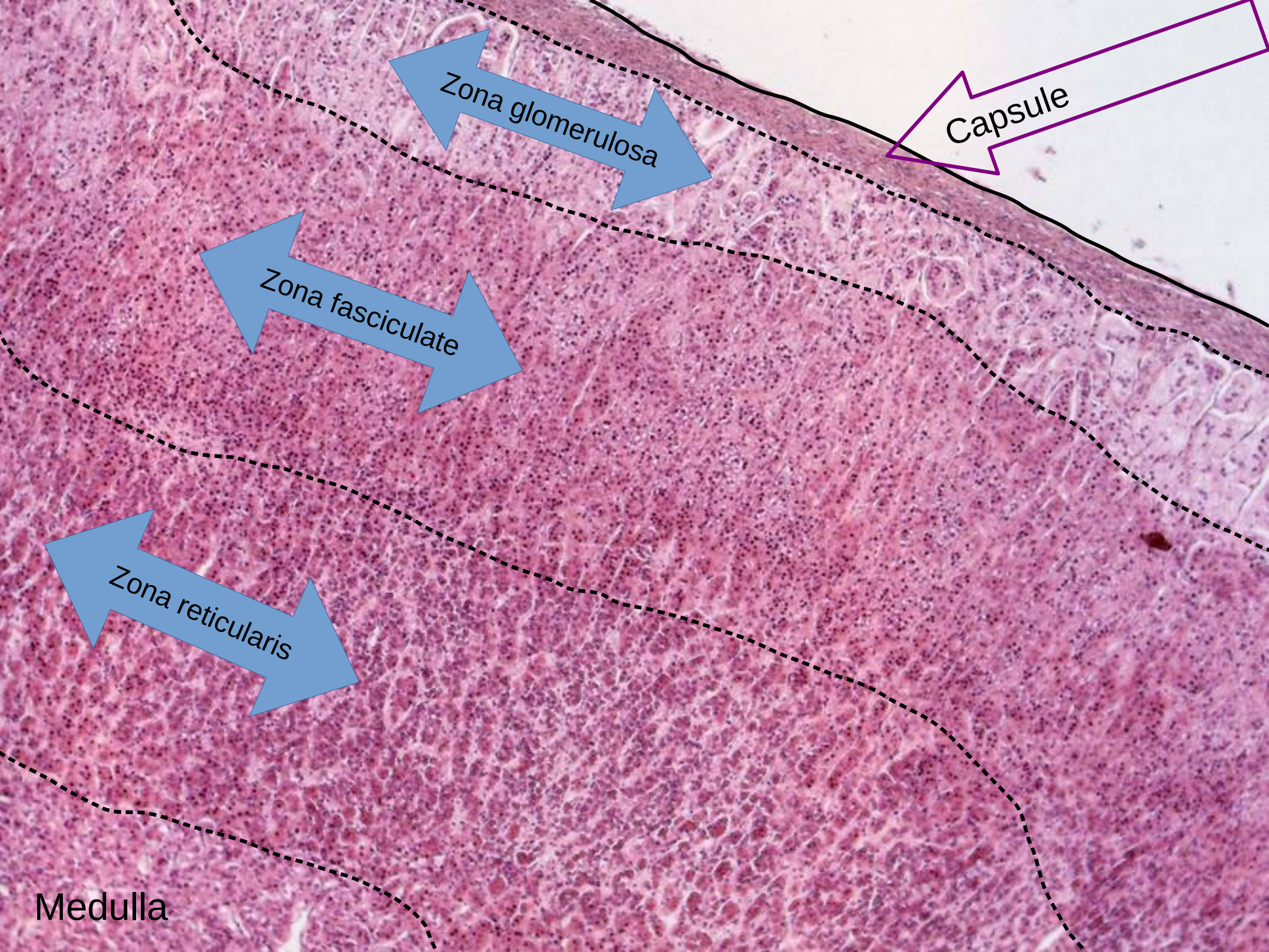
Cords

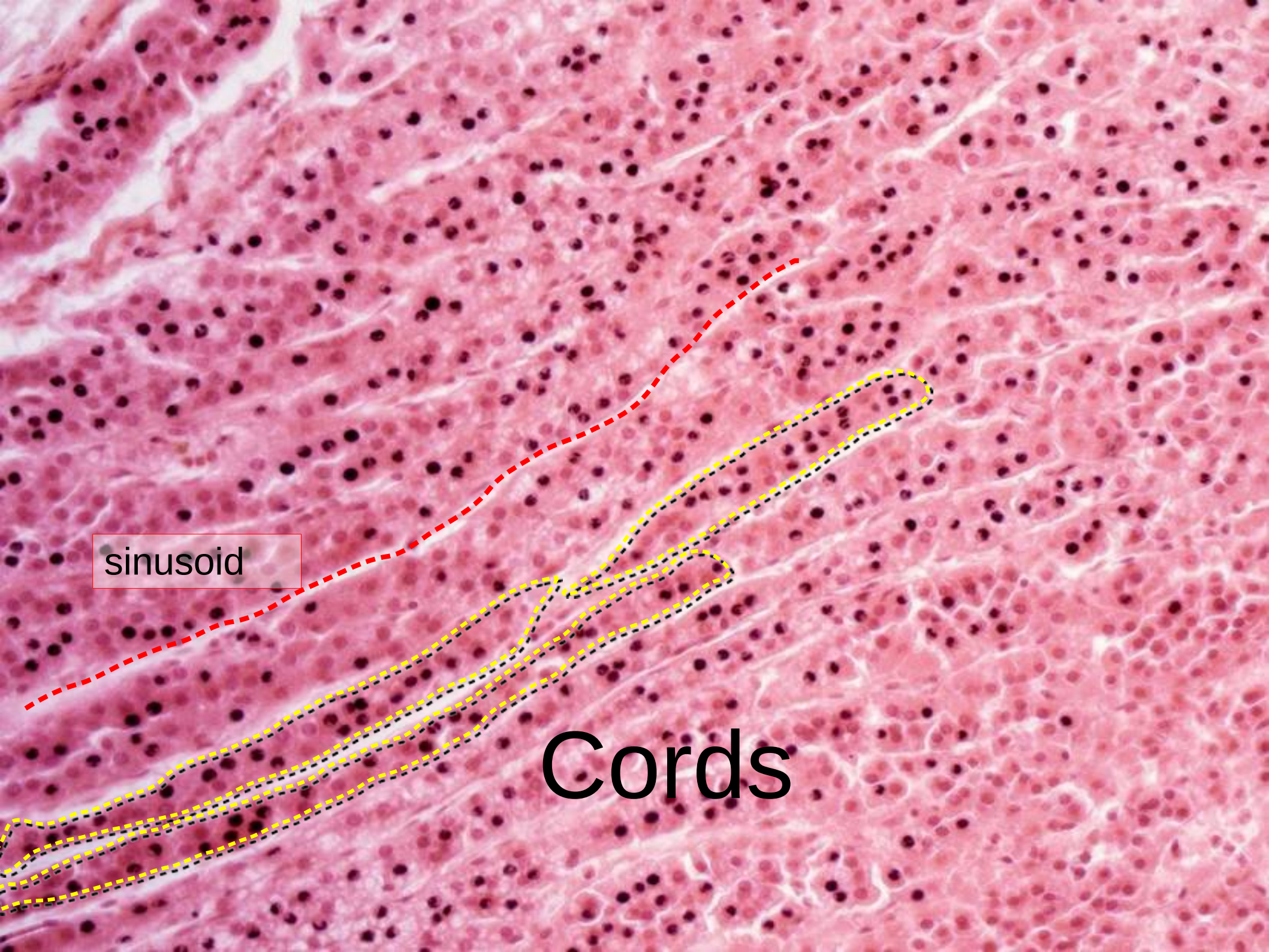
Cords

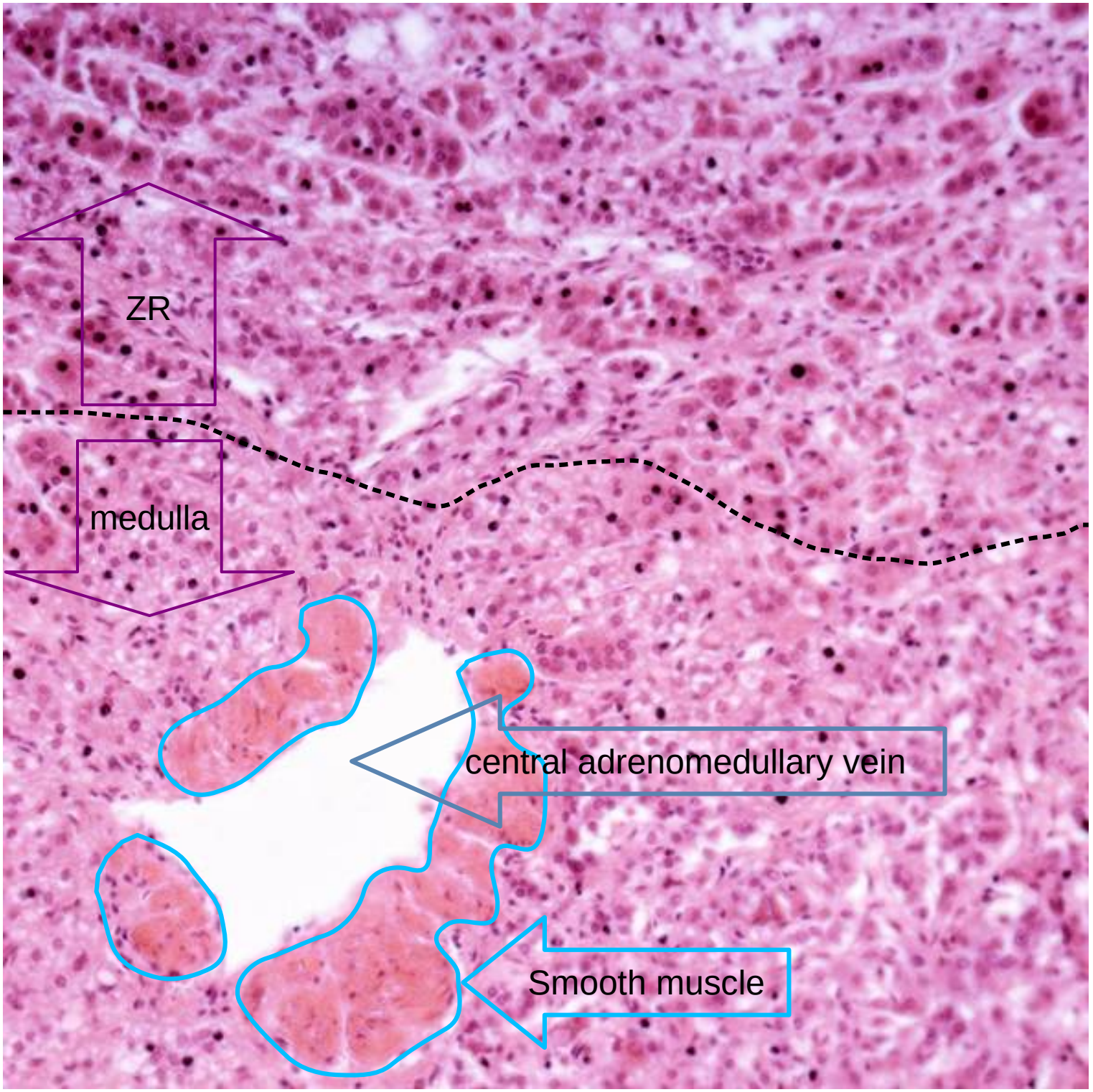



Capsule
Cortex
Central vein
Medulla


Connective tissue capsule
Cortex


Capsule
Zona glomerulosa
Zona fasciculate
Zona reticularis
Medulla

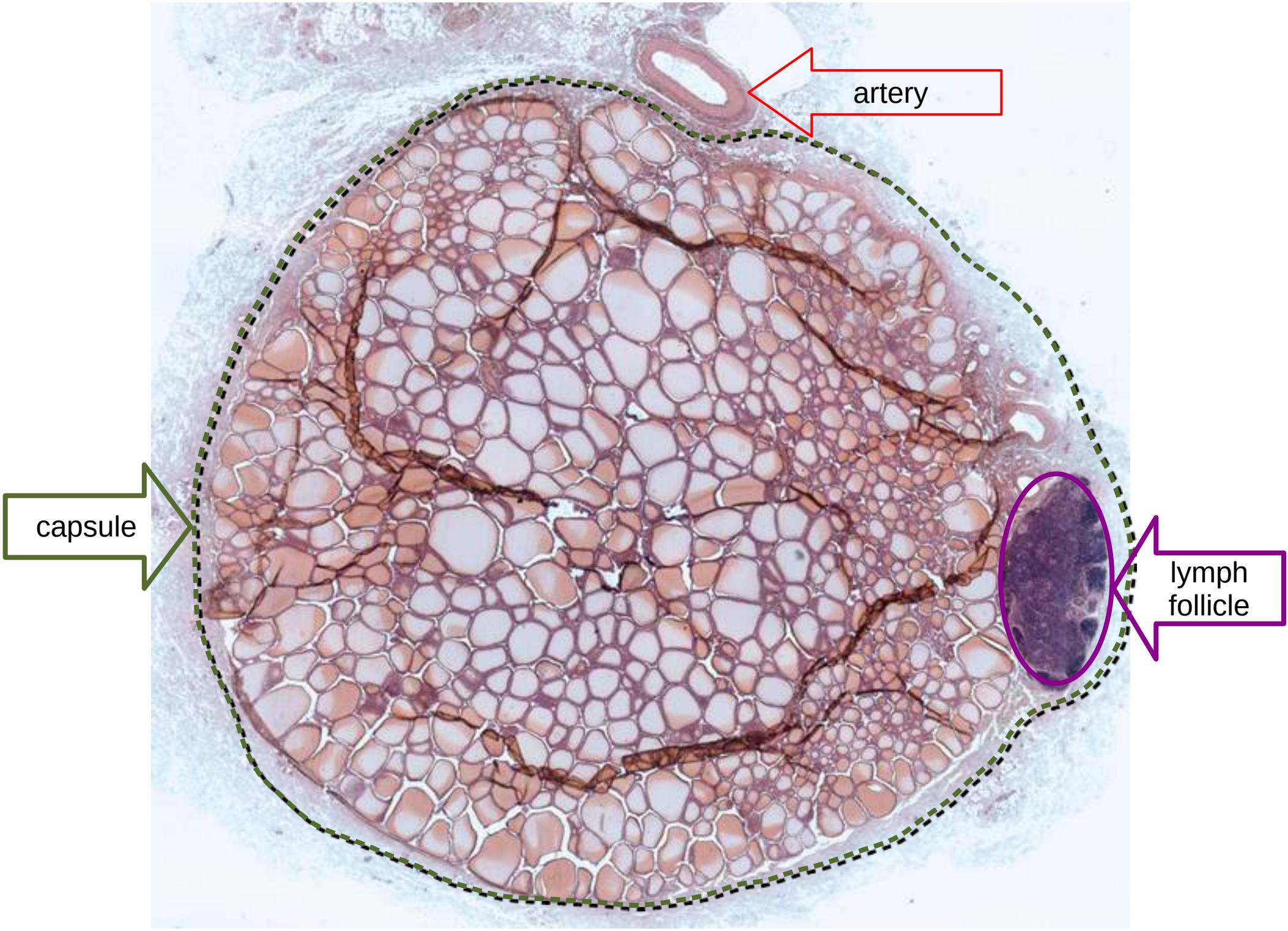

sinusoid
Cords

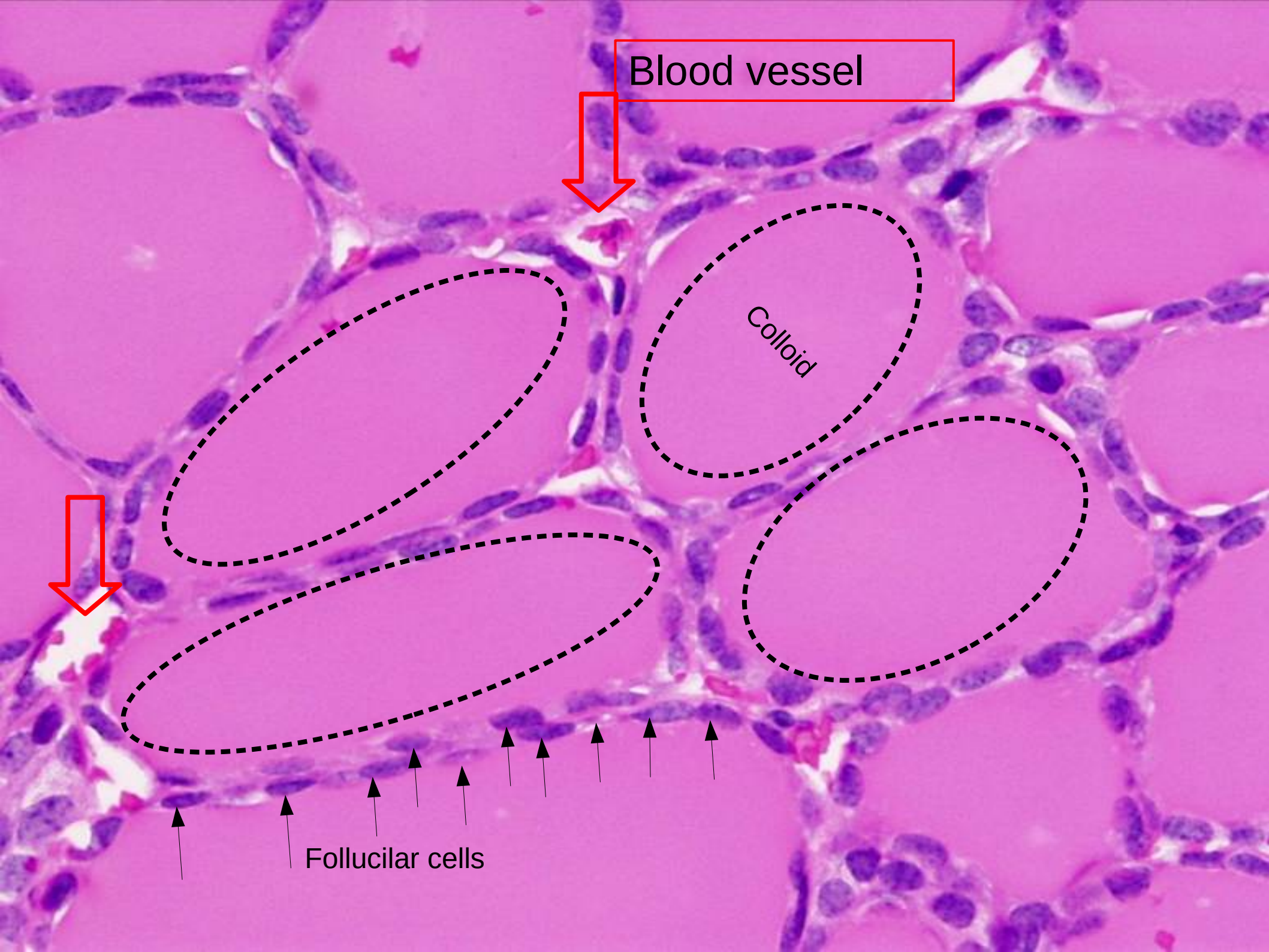

ZR
medulla
central adrenomedullary vein
Smooth muscle

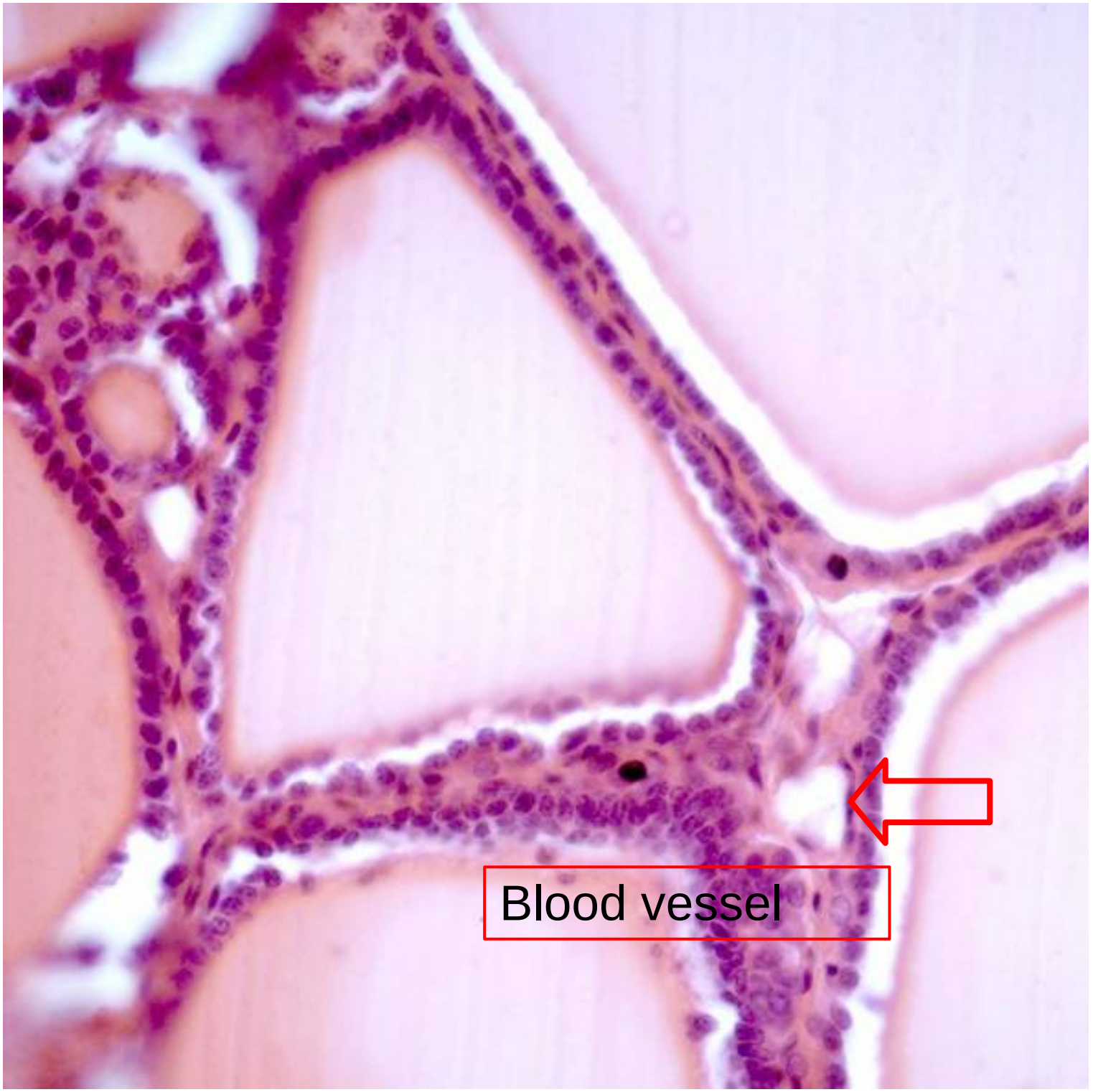

ZR
medulla

Slide 55 - Thyroid gland

Follicles


artery
capsule
lymph follicle


Blood vessel
Colloid
Follucilar cells


Blood vessel

Glandular Epithelium

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

Exocrine		
Slide name	*Slide number*	*Stain*
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?