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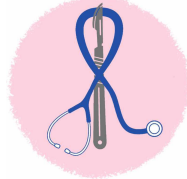


Histology team

OSPE (Female+male)

- Color index :
Main text
Important
Female slide
Male slide
DR.Notes
extra

Revised & Reviewed
by
Abdulaziz & Bahammam
Faye Wael Sondi



Foundation Block | Histology



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1957



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Cell Structure



The Nucleus

- Identify the structure :
Nucleus

- Identify the features :

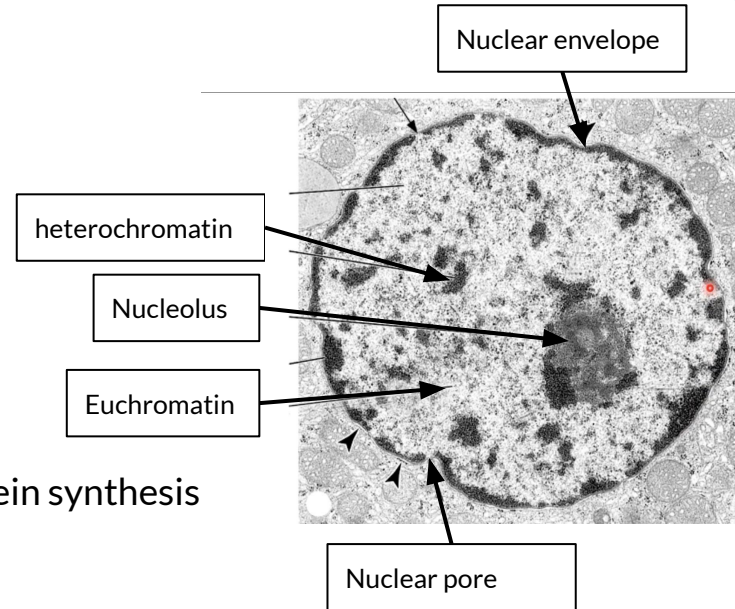
- Nucleolus (The Biggest Dark Region)
- Heterochromatin (Dark - Inactive)
- Euchromatin (Pale - Active)
- The nuclear envelope (Lining The Nucleus)
- Nuclear pores : (Openings in the nuclear envelope)

- What is the the function of Nucleolus?

- Formation of Ribosomal RNA (rRNA) For Protein synthesis

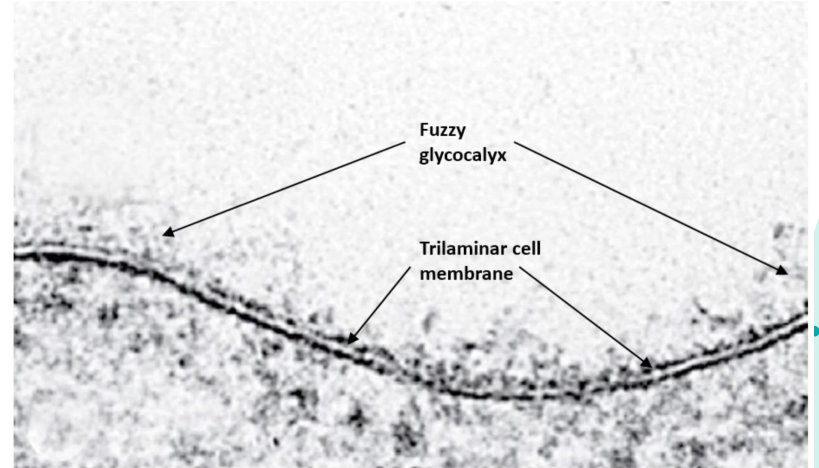
- What is\are the the function(s) of Nucleus?

- Formation of the three types of RNA
- Vitality and Division of the cell.
- Store the genetic information.



Cell membrane

- Identify the structure :
Cell membrane
- Identify the features of this structure ?
 - trilaminar appearance : can be seen only under the EM
 - Glycocalyx (cell coat)
- What is the the function of it ?
 - Glycocalyx: Cell protection , Cell recognition , Cell adhesion
 - Cell Membrane : (Selective barrier)



mitochondria

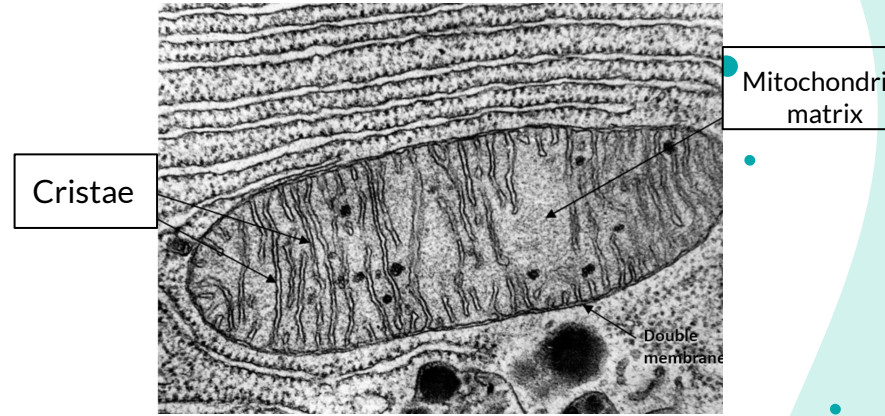
- Identify the structure :
Mitochondria

- Identify the features of this structure ?

- Rod shaped.
- Double membrane
- Cristea
- mitochondrial matrix

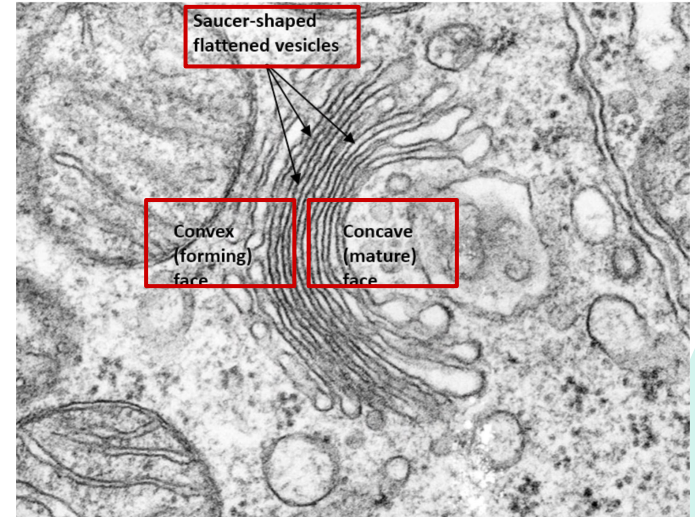
- What is the the function of it ?

- ATP Synthesis
- Self Replication



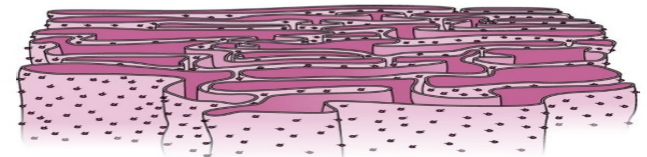
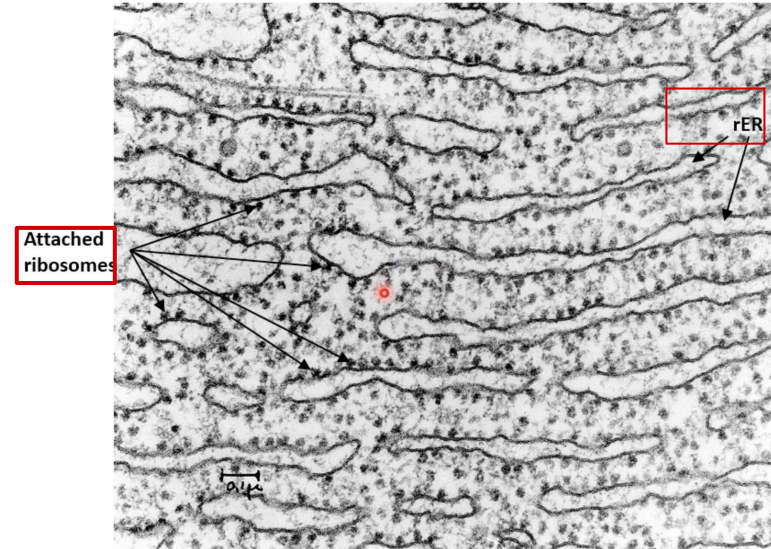
Golgi apparatus

- Identify the structure :
Golgi apparatus
- Identify the features of this structure ?
 - A Stack of saucer-shaped flattened vesicles.
 - Convex(forming) face
 - Concave (mature) face
- What is the the function of it ?
 - Sorting, modification & packaging of **proteins**.
 - Secretory vesicles formation.
 - Formation of lysosomes.



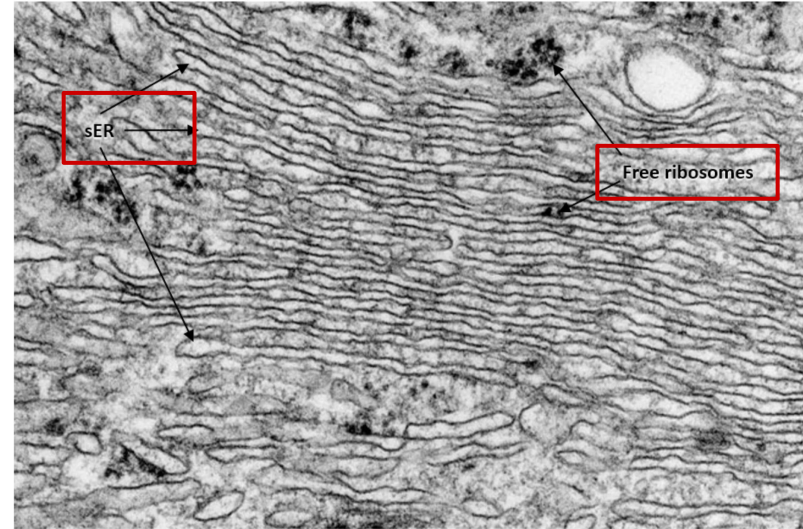
Rough Endoplasmic Reticulum

- Identify the structure :
Rough endoplasmic reticulum
- Identify the features of this structure ?
 - Membranous sheets of flattened tubules & vesicles .
 - Attached ribosomes
 -
- What is the the function of it ?
 - Synthesis Of Proteins By ribosomes on its outer surface
 - Transfer protein to golgi apparatus



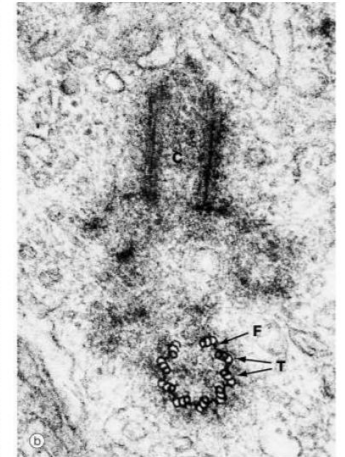
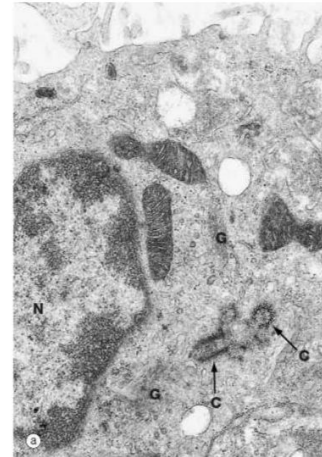
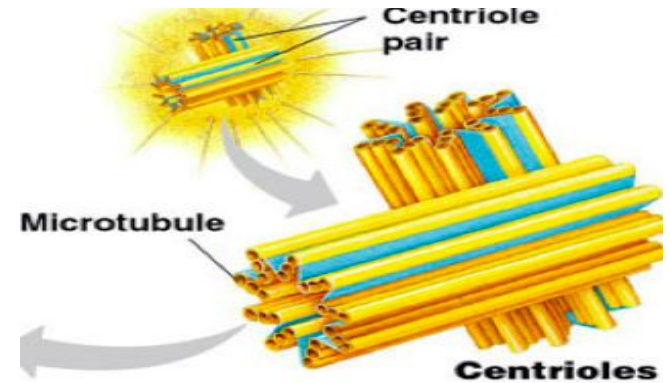
Smooth Endoplasmic Reticulum

- Identify the structure :
Smooth endoplasmic reticulum
- Identify the features of this structure ?
 - Membranous sheets of flattened tubules & vesicles.
 - **NO ribosomes** on its surface.
- What is the the function of it ?
 - Synthesis of **lipids & cholesterol**.
 - Synthesis of **steroid hormones**
 - **Muscle contraction**
 - **Detoxification** of drugs & toxins.



Centrioles

- Identify the structure :
Centrioles
- Identify the features of this structure ?
 - 2 **Cylinders** which are perpendicular to each other.
 - Their wall is made of 9 triplets of microtubules (27)
 - **Non-Membranous Organelle**
- What is the function of it ?
 - **Cell Division**
 - **Formation of Cilia and Flagella**



Cilia

- **Identify the structure :**

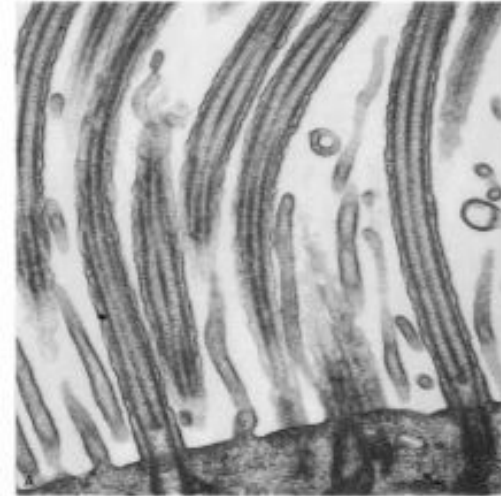
Cilia

- **Identify the features of this structure ?**

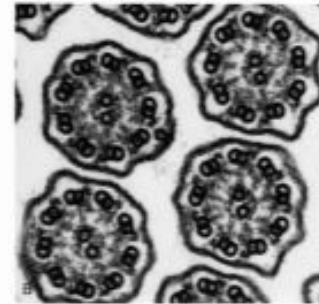
- Hair-like projections from apical surface
- Shaft is formed of 9 peripheral doublets and 2 central singlets of microtubules (20 microtubules)

- **What is the function of it ?**

- Movement of particles or fluids in one direction



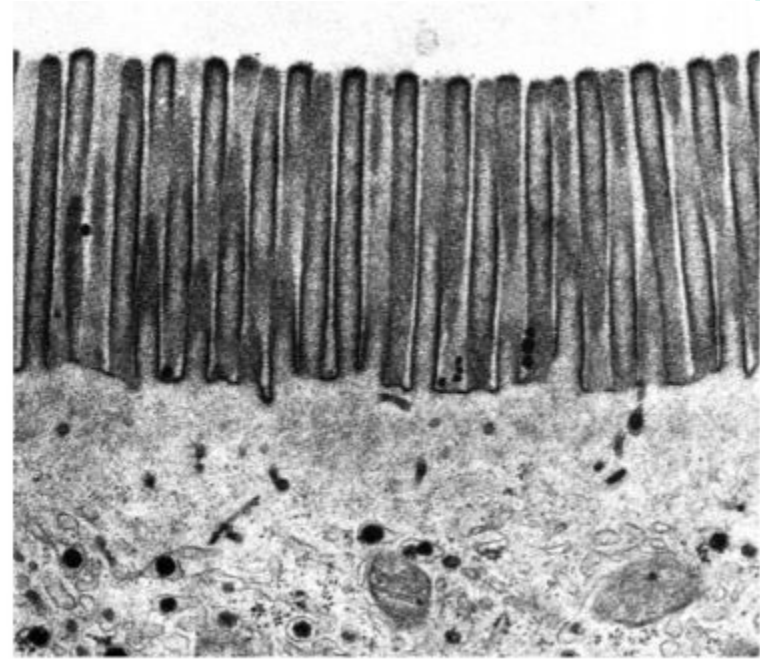
LS



TS

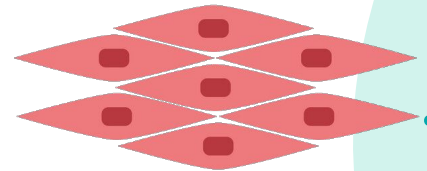
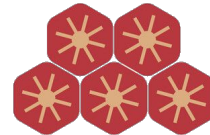
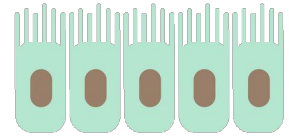
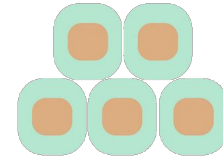
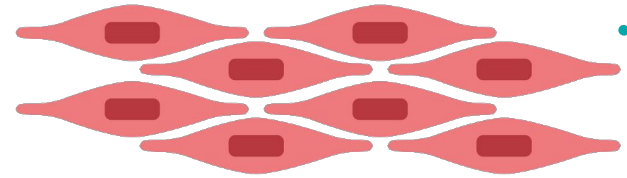
Microvilli

- Identify the structure :
Microvilli
- What is the characteristics of it ?
 - Cylindrical cytoplasmic projections of apical surface to increase surface area
 - Contain Actin filament (Microfilaments).
- What is the the function of it ?
 - Increase surface area for more absorption.





Epithelial Tissues



Simple Squamous Epithelium

- Identify the structure?

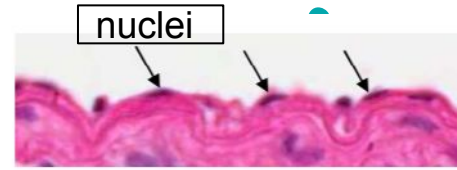
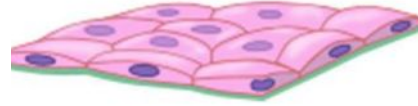
Simple squamous epithelium

- Identify the features?

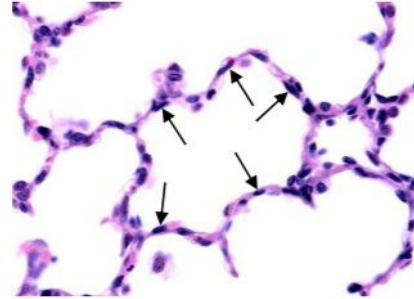
- One layer
- Flat cells
- flattened nuclei

- Mention the organs (Distribution , site & examples)?

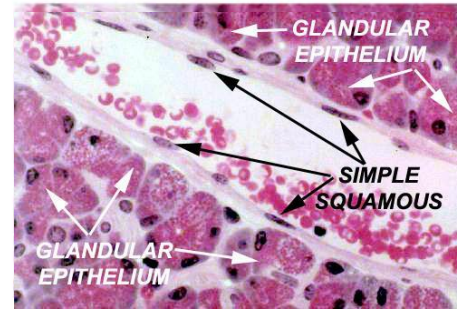
- CVS - Endothelium
- Alveoli



Simple squamous epithelium (**Endothelium**) lining an artery.



Simple squamous epithelium lining **lung alveoli**.



Simple squamous epithelium (**Endothelium**)
Lining of a vein

Simple Cuboidal Epithelium

- Identify the structure ?

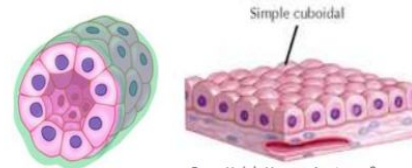
Simple cuboidal epithelium

- Identify the features?

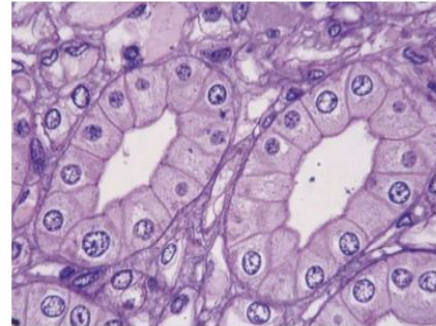
- One layer of cells
- Central rounded nuclei
- Cuboid shaped cells

- Mention the organs (Distribution , site & examples)?

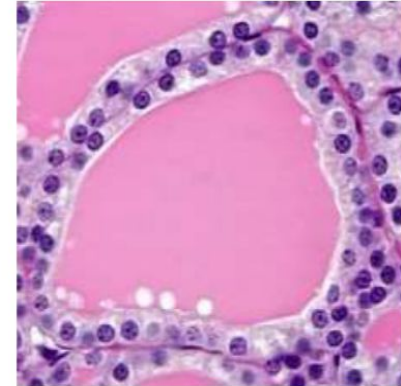
- **Thyroid follicles.**
- Collecting tubules of the **kidney**



From Hole's Human Anatomy & Physiology 15th ed.:



Simple cuboidal epithelium lining collecting tubules of the kidney.



Simple cuboidal epithelium lining thyroid follicles.

Simple Columnar Epithelium

- **Identify the structure?**

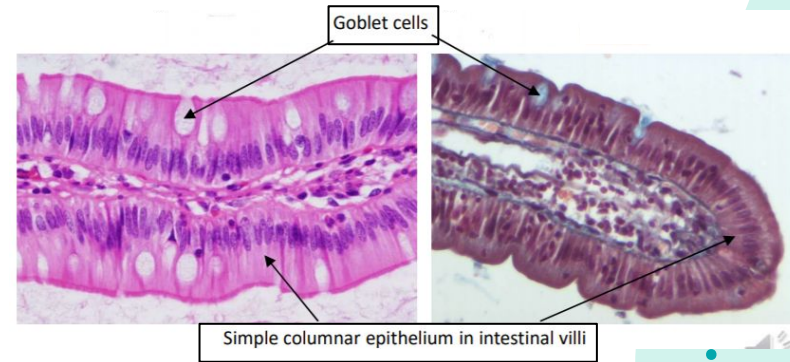
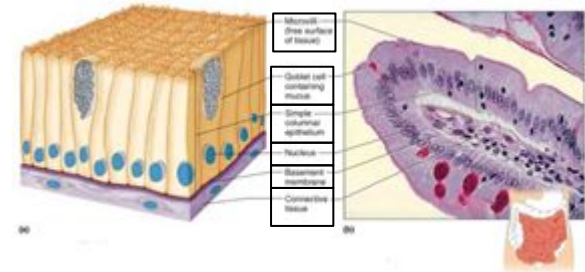
Simple columnar epithelium

- **Identify the features?**

- One layer of cells
- Columnar cells
- Basal oval nuclei

- **Example of Site?**

- **Stomach** (without goblet cells)
- **Intestines** (with goblet cells)(secrete mucus)



Pseudostratified Columnar Ciliated Epithelium with Goblet Cells

● Identify the structure?

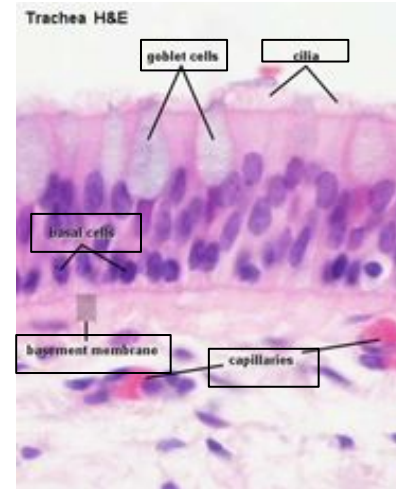
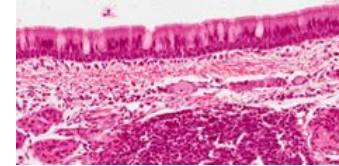
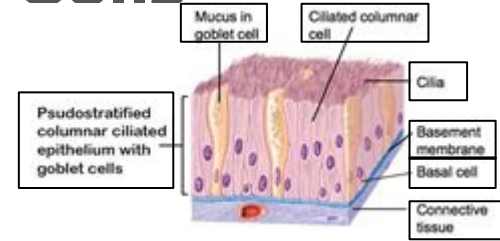
Pseudostratified columnar Ciliated epithelium with Goblet cells

● Identify the features?

- One layer of **columnar cells**.
- All cells rest on the basement membrane.
- Some cells are short and don't reach the surface (basal cells).
- Nuclei appear at different levels.
- Gives the false impression of being stratified.

● Example of Site?

- **Trachea & Bronchi** (Ciliated & Goblet cells).



Keratinized Stratified Squamous Epithelium



- **Identify the structure?**

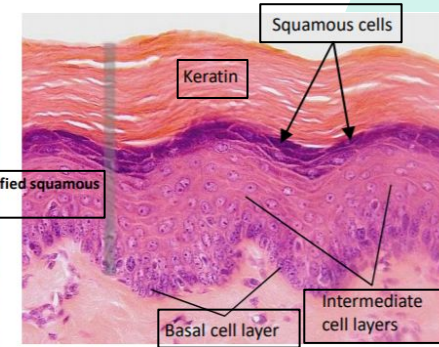
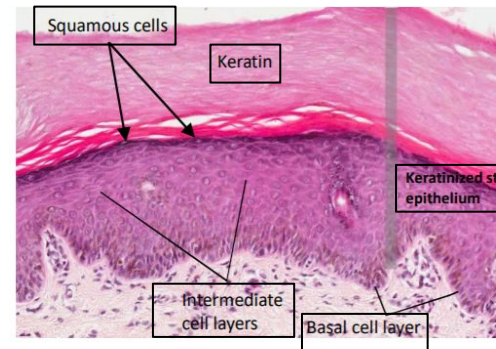
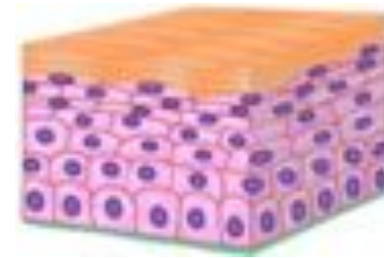
Keratinized Stratified squamous epithelium

- **Identify the features?**

- Multiple layers of cells.
- A layer of keratin on the surface
- Only the basal layer of cells are in contact with the basement membrane A layer of keratin on the surface.
- Superficial cells are flat with flat nuclei.
- Intermediate cells are polygonal with central rounded nuclei
- Basal cells are columnar with basal oval nuclei

- **Mention the organs (Distribution , site & examples)?**

- ○ Epidermis of skin .



Non-keratinized Stratified Squamous Epithelium

- Identify the structure?

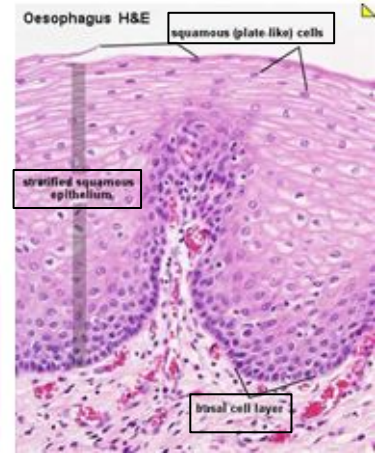
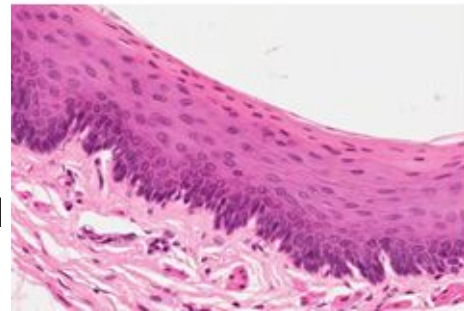
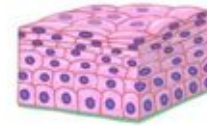
Non-keratinized stratified squamous epithelium

- Identify the features?

- Multiple layers of cells.
- **NO** layer of keratin on the surface
- Only the basal layer of cells are in contact with the basement membrane.
- Basal cells are columnar with basal oval nuclei.
- Intermediate cells are polygonal with central rounded nuclei.
- Superficial cells are flat with flat nuclei.

- Mention the organs (Distribution , site & examples)?

- Esophagus



Transitional Epithelium

● Identify the structure?

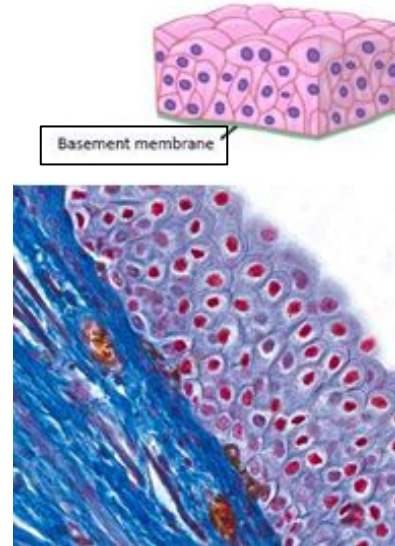
Transitional epithelium

● Identify the features?

- Multiple layers of cells.
- Basal cells are columnar.
- Intermediate cells are polygonal.
- Superficial cells are large cuboidal with **convex free surface** (dome-shaped) and may be **binucleated**

● Mention the organs (Distribution , site & examples)?

- Ureter
- Urinary bladder



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Connective tissue



Dense Regular collagenous C.T

- Identify the structure?
 - Dense collagenous **Regular** C.T
- What is the type of fibers?
 - Collagen fiber (collagen type I)
- What is the type of cells?
 - Fibroblasts cells
- Identify the features of this structure?
 - Predominance of collagen fibers and fibroblasts
 - Bundles of collagen fibers run **parallel** and close to each other with rolls of compressed fibroblasts between them
 - Consists of collagen type I
- Mention the organs(distribution, site & example) ?
 - Tendons
 - Ligaments

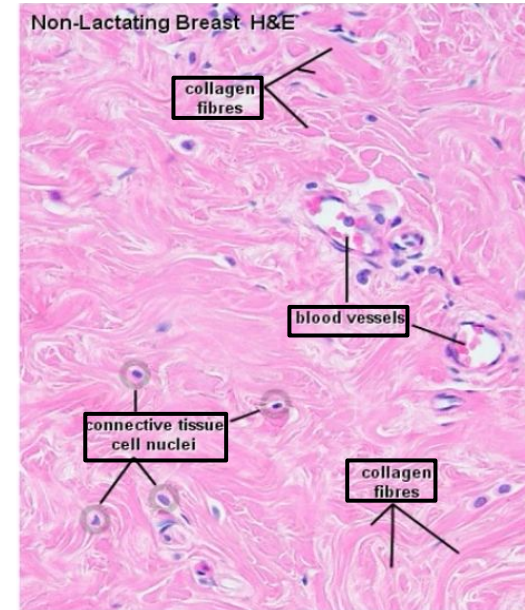


From Blue Histology (<https://w>)

Dense Regular Collagenous C.T.

Dense Irregular collagenous C.T

- **Identify the structure?**
 - Dense collagenous **Irregular** C.T
- **What is the type of fibers?**
 - Collagen fiber (collagen type I)
- **What is the type of cells?**
 - Fibroblasts cells
- **Identify the features of this structure?**
 - Predominance of collagen fibers and fibroblasts
 - **Bundles** of collagen fibers run **irregularly** without a definite orientation
 - Consists of collagen type I
- **Mention the organs(distribution, site & example) ?**
 - Dermis of the skin
 - Capsules of organs



lab.anhb.uwa.edu.au/mb140/

Dense Irregular Collagenous C.T.

Elastic C.T

- Identify the structure?

- Elastic C.T

- What is the type of cells?

- Fibroblasts cells

- What is the type of fibers?

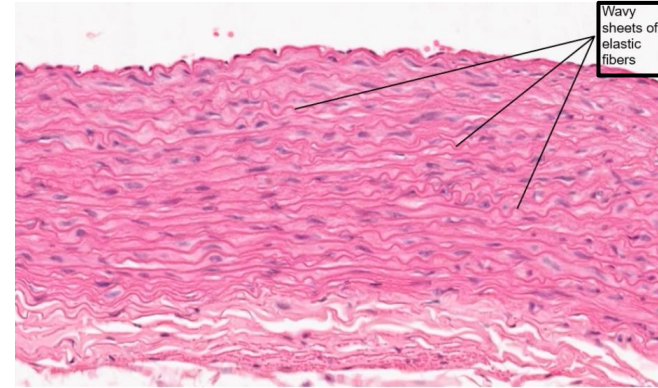
- Elastic fibers

- Identify the features of the structure?

- Predominance of Elastic fibers (sheets or membrane) and fibroblasts
- Elastic fibers form wavy sheets or membrane

- Mention the organs (distribution, site & example)?

- Large arteries like aorta



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Elastic Connective Tissue

Loose(Areolar) C.T

- Identify the structure?

- Loose C.T

- What is the type of cells?

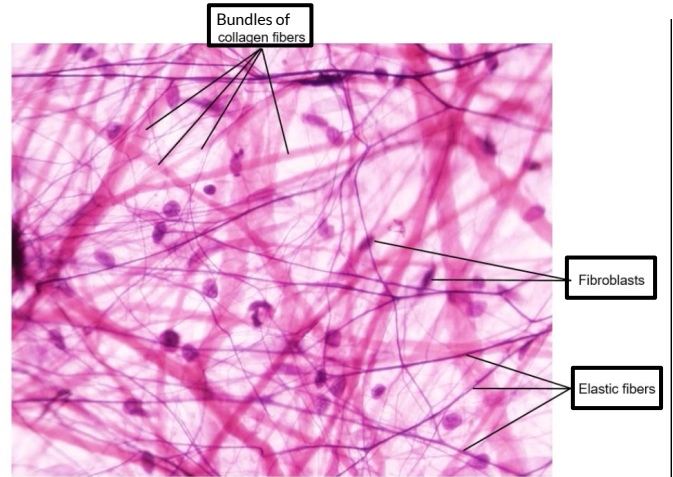
- All types of C.T

- What is the type of fibers?

- All types of fibers

- Identify the features of the structure?

- No predominant (element) in loose C.T
- Contains all the main components of C.T.P:all types of cells and fibers and abundant matrix
- Collagen fibers in different sizes run across each other
- Elastic fibers run singly and branch in anastomoses



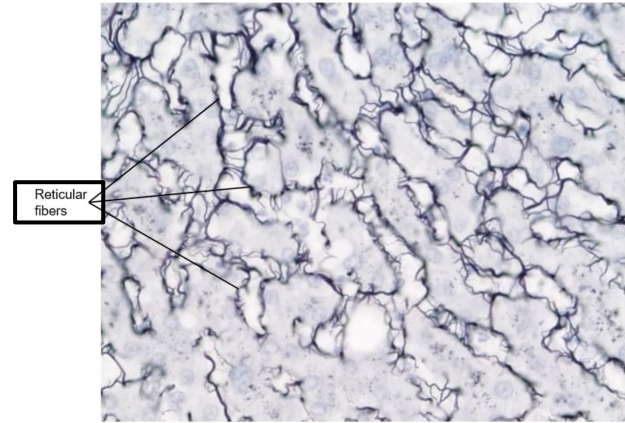
© 2020 KSU ANATOMY Loose Areolar Connective Tissue

- Mention the organs (distribution, site, examples)?

- Subcutaneous tissue

Reticular C.T

- Identify the structure?
 - Reticular C.T (Collagen type III)
- What is the type of cells?
 - Reticular cells
- What is the type of fibers?
 - Reticular fibers
- Identify the features of the structure?
 - Predominance of reticular fibers and reticular cells(specialized fibroblasts)
 - Reticular fibers need silver staining to appear as black lines
 - Forming a delicate 3D network that supports organs
- Mention the organs (distribution, site & example)?
 - Stroma of organs:(Liver - Lymph nodes - Spleen)



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Reticular Connective Tissue

Unilocular adipose tissue (White adipose cells)

Identify the structure?

- Unilocular adipose tissue

What is the type of cells?

- Unilocular adipose cells (Adipocytes, Fat cells)

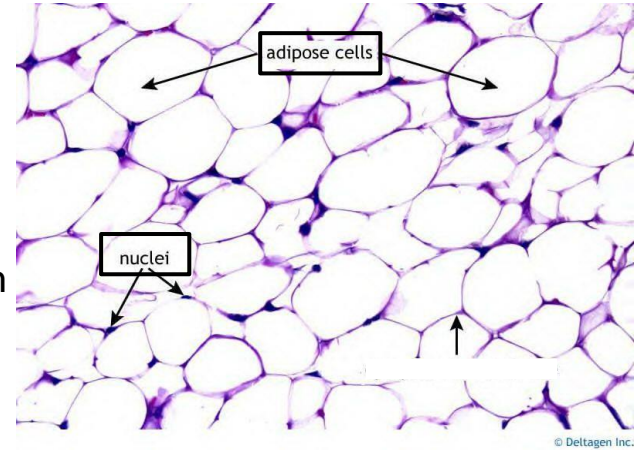
Identify the features of the structure?

- It has large spherical, with a single large fat droplet
- Because fat dissolves during preparation of the section it leaves an empty space thus the adipocytes look like bubbles
- Because of the pressure caused by the fat droplet the cytoplasm is reduced to a thin rim
- Nucleus is flattened and peripheral

Example of Site?

- Subcutaneous tissues:

- Buttocks
- Abdominal wall
- Female breast
- Around the kidney (perirenal pad fat)





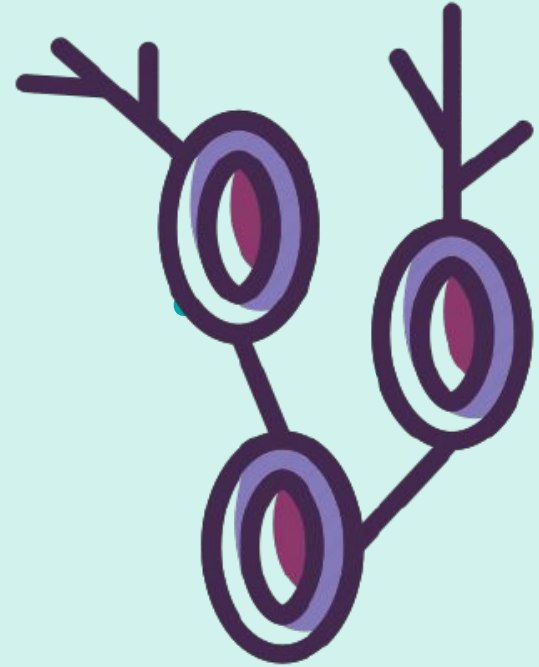
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Lymphoid tissue



Lymph Node

- Identify The structure

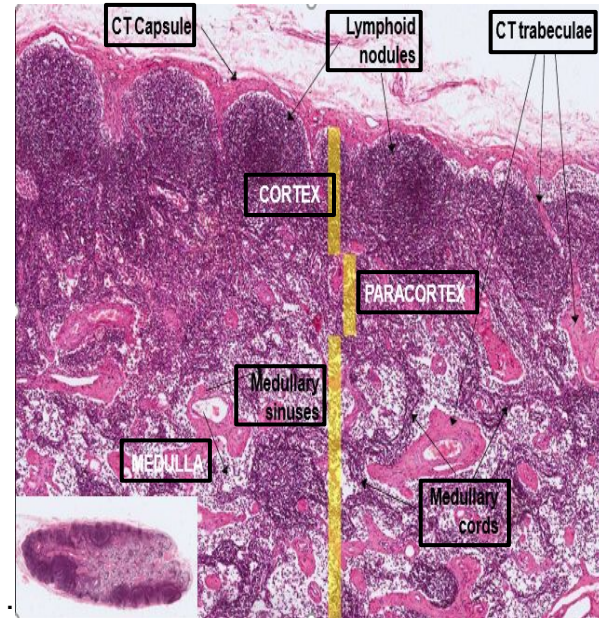
- Lymph Node (Ovoid - Kidney Shaped)

- What is The function of the structure?

- Proliferation of **B** and **T** Lymphocytes
- Filtration of **Lymph** from Bacteria and other
- foreing substances

- Identify the features of the structure

- C.T Capsule
- Cortex
- Para Cortex
- Lymphoid Nodules
- Medullary cords
- Medullary Sinuses



Thymus

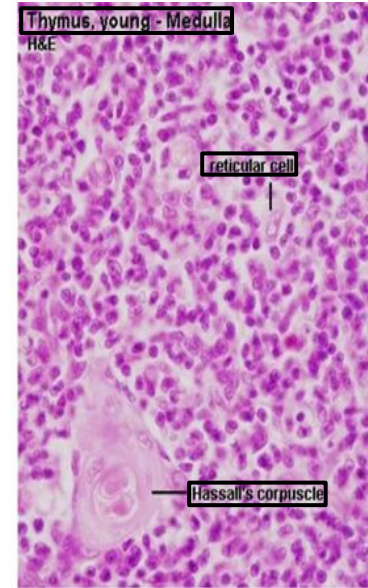
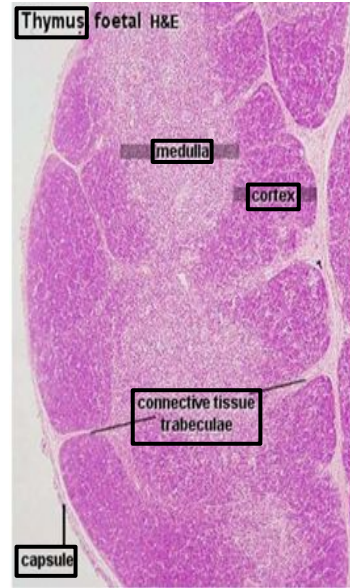
- **Identify the structure?**
 - Thymus (incomplete septum)
- **What is\are the main part(s) of the structure?**
 - Cortex : Immature T-lymphocytes
 - Medulla : Mature T-lymphocytes +(Hassall's corpuscles)
- **What is the main type of the cell?**
 - T Lymphocytes
- **What is\are the function(s) of it?**
 - Maturation of T lymphocytes
 - Involutes after puberty and becomes infiltrated by adipose tissue.
- **Remnants of thymus remain in adult to form T lymphocytes.**



Thymus

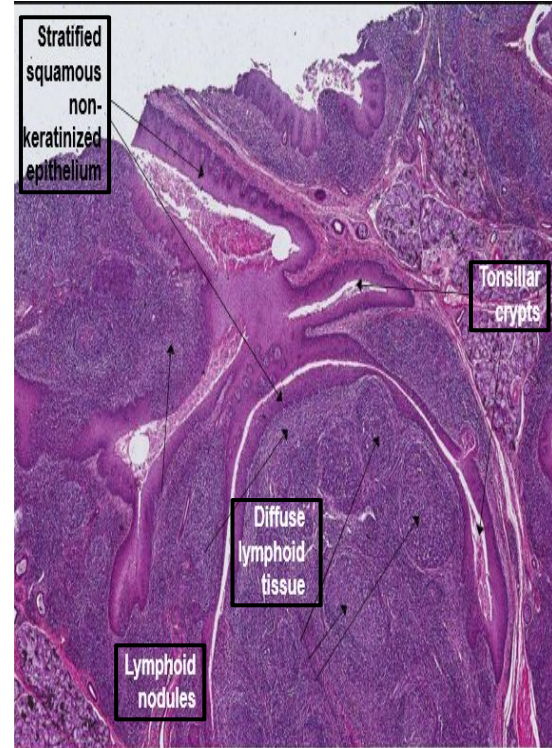
- Identify the Features:

- Thin CT capsule
- Incomplete lobules.
- Each lobule is divided into a cortex and a medulla
- Hassall's corpuscles in the medulla
- NO lymphoid nodules

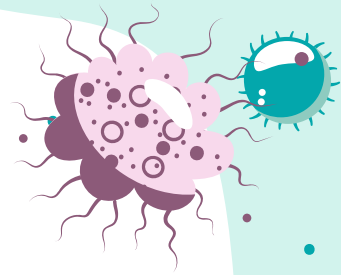


Palatine Tonsil

- **Identify the structure?**
 - **Palatine Tonsil** (incomplete capsule)
- **What is the type of epithelium?**
 - **Non-keratinized Stratified Squamous Epithelium**
- **Where is located ?**
 - At the entrance of **Oral Pharynx**
- **What is the main part of the structure ?**
 - **Stratified squamous non-keratinized epithelium.**
 - **Tonsillar crypts**
 - **Lymphoid nodules**
 - **Diffuse lymphoid tissue**
- **What is the function of it ?**
 - Production of Antibodies



The Creative Crew!



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Boys Captain

Alwaleed Alnasser



Girls Captain

Norah Alawlah



• **Abdullah Alqarni**

- **Abdulrahman Mukhtar**
- **Abdulmajeed Alharbi**
- **Mansor Aldoajy**
- **Mohammed Alhaqbani**
- **Ziyad Al-Abduljabbar**

• **Aya Alhussain**

- **Hussah Alshareef**
- **Lobna Altimimy**
- **Zahraa Alsultan**
- **Fay Alluhaidan**
- **Sarah Al-homaydy**
- **Sara Al-Majed**