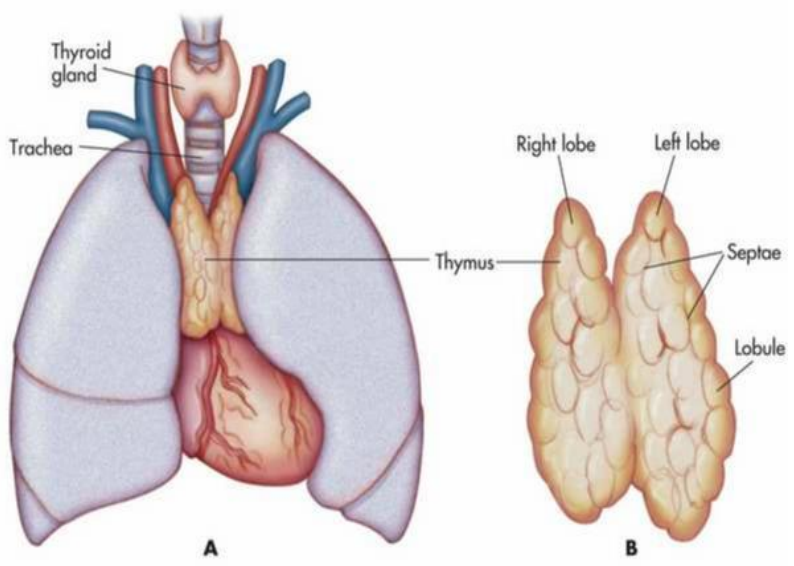
Lymphoid organs
2

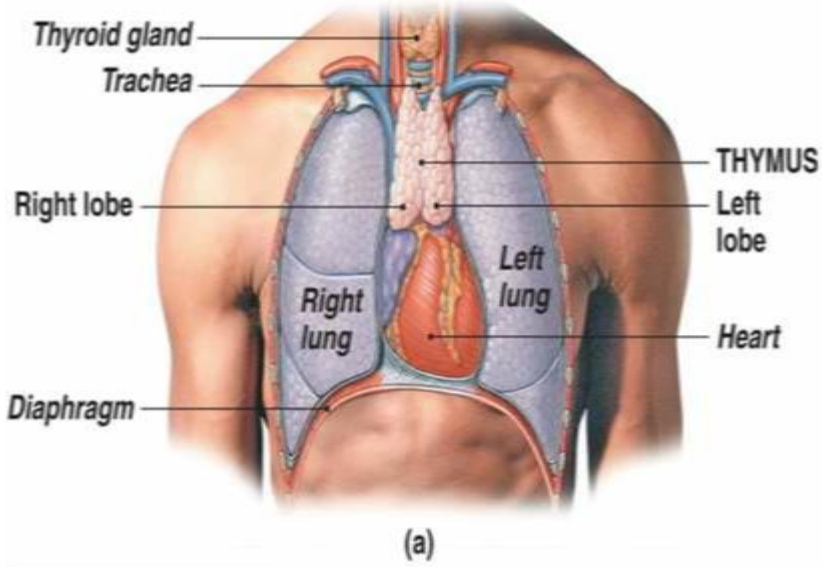
Dr. Shahab Associate Professor
Anatomy KGMC

THYMUS

THYMUS

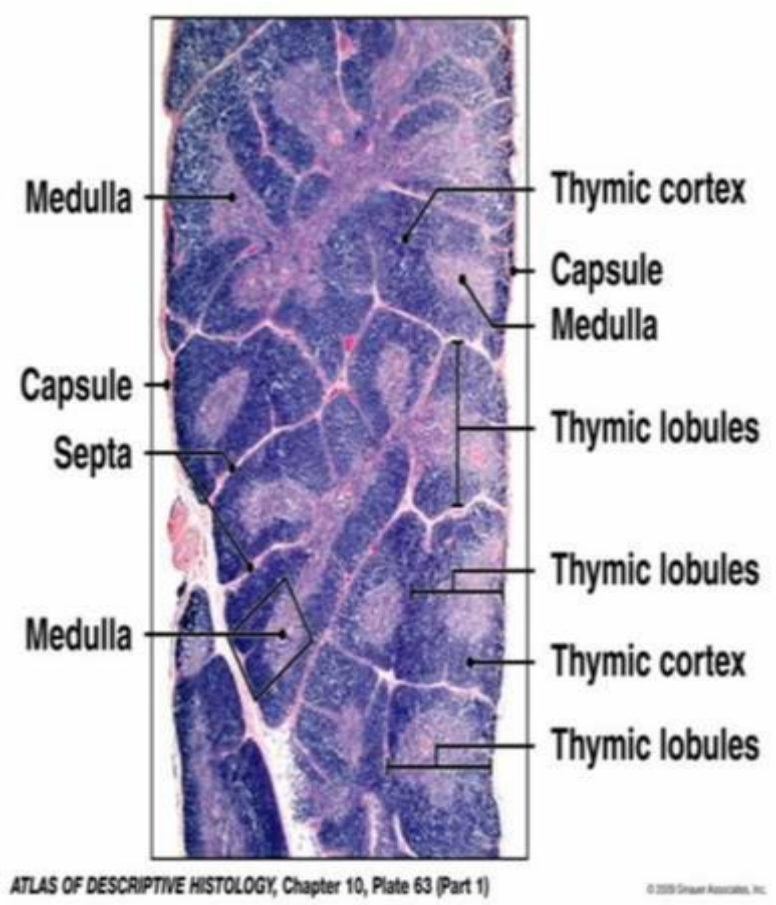
- Present in thorax
- 2 lobes connected by fibrous tissue.
- Develops from endodermal epithelium of III Pharyngeal pouch
- Fully formed & Functional at birth
- After puberty replaced by adipose tissue
- Lymphoepithelial Organ

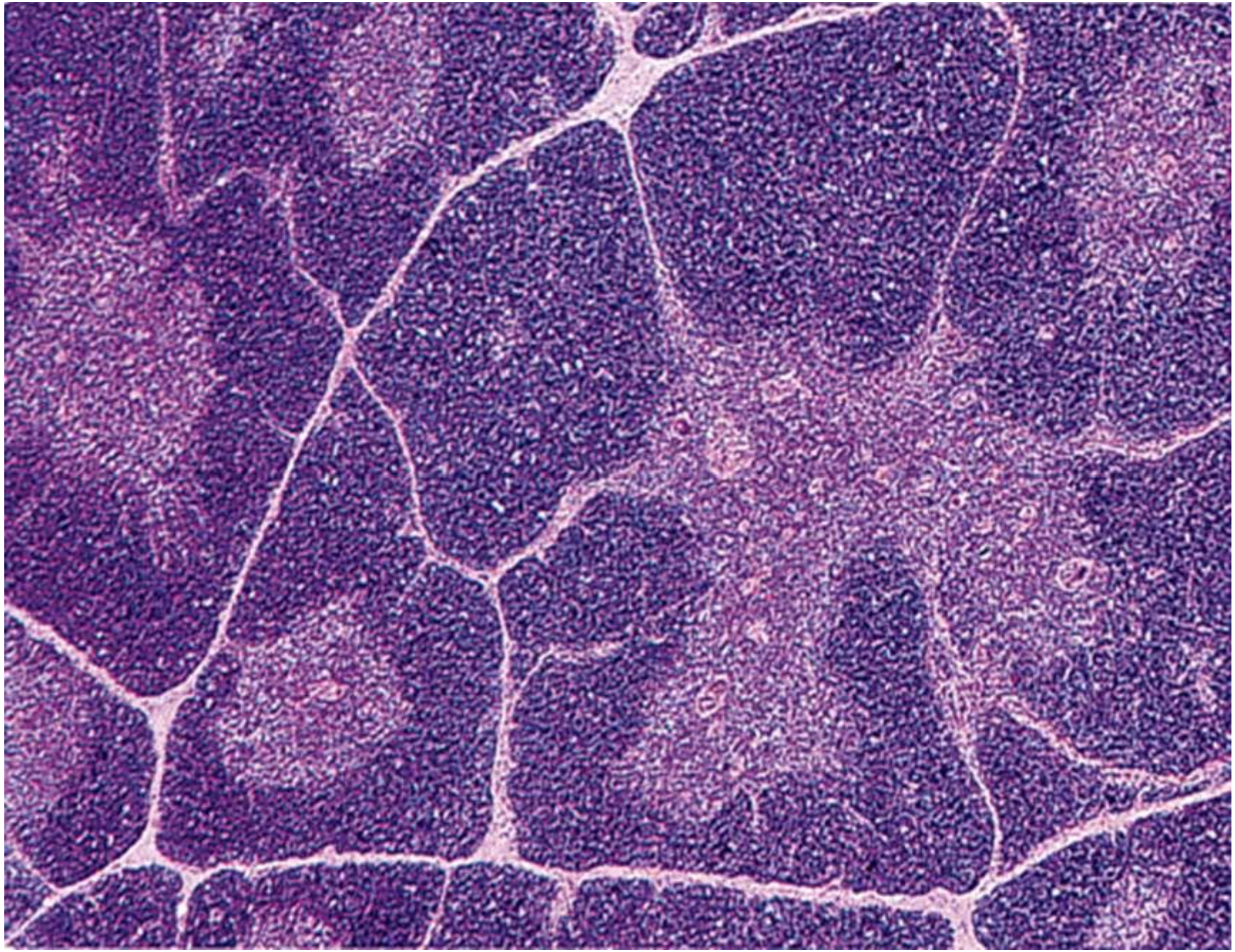




THYMUS - FEATURES

- Capsule- which sends septa that divide the lobes into Thymic lobules.
- Cortex – High concentration of lymphocytes, Basophilic, Small lymphocytes
- Medulla- Lymphocytes are less in number and larger, stains lightly
- Hassall's corpuscles in medulla.
- Trabeculae does not form true lobule
- Cortical caps over portions of continuous medullary tissue

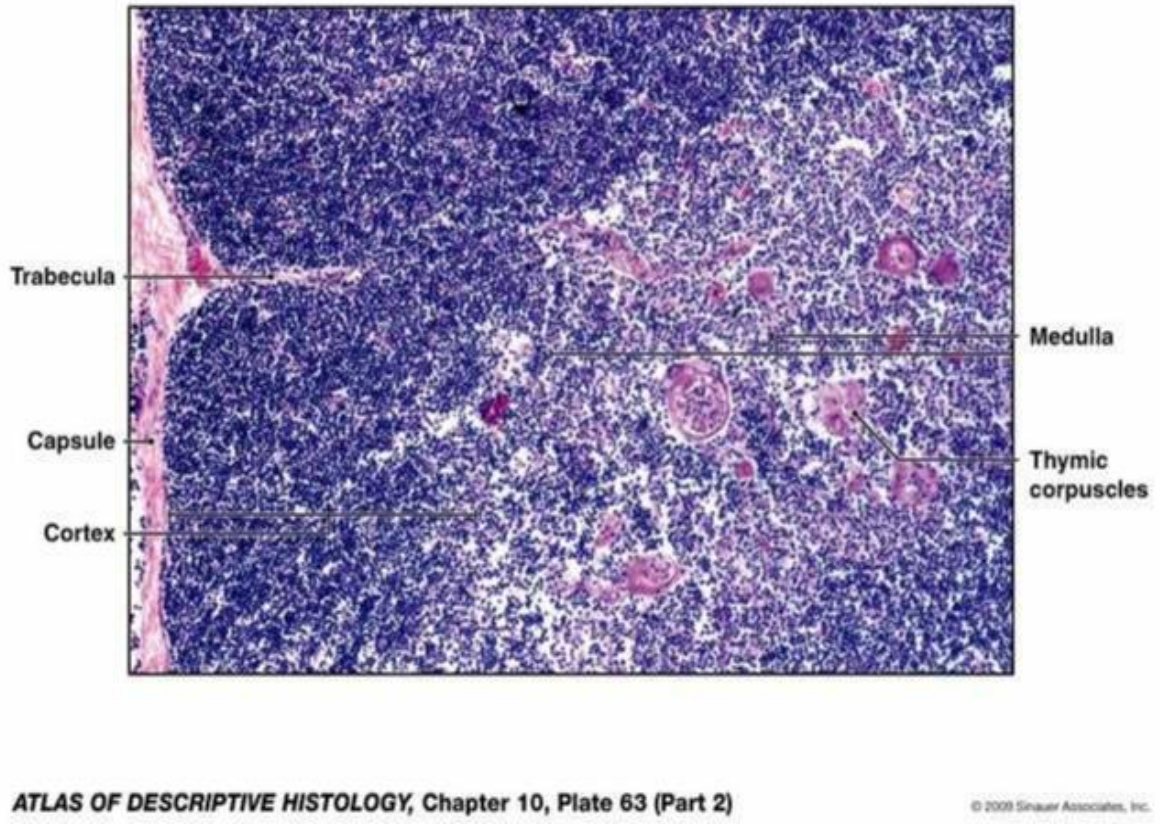




THYMUS

- Cells of Thymus are–

1. Epithelial cells,
2. Lymphocytes &
3. Macrophages.



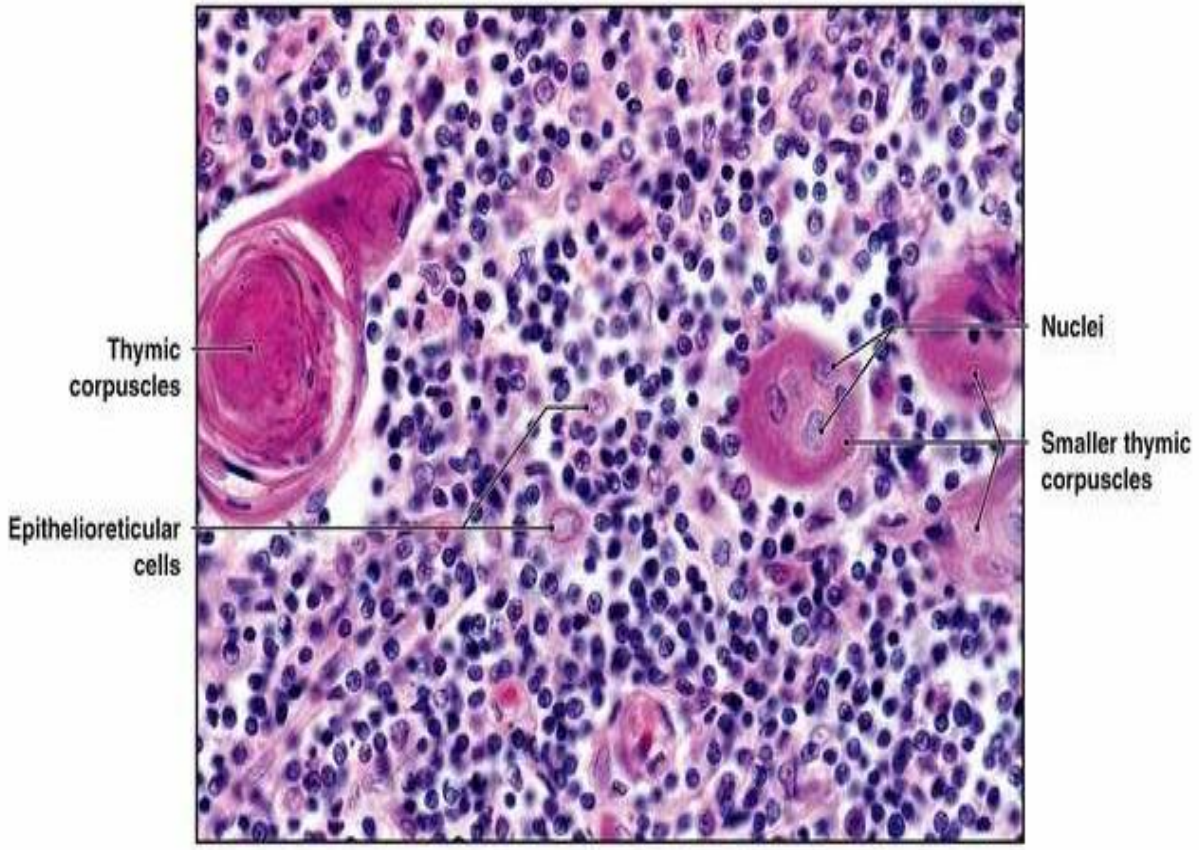
ATLAS OF DESCRIPTIVE HISTOLOGY, Chapter 10, Plate 63 (Part 2)

Epithelial cells

- Flattened & branch out to form sheets covering the inner surface of capsule, septa, blood vessels.
- Cells in deeper layer have processes which join processes of similar cells to form a reticulum.
- No reticular fibres
- Are not phagocytic.
- They promote ‘T’ cell differentiation & proliferation.
- Cortical epitheliocytes – Thymic nurse cells – destroy lymphocytes that react against self antigens

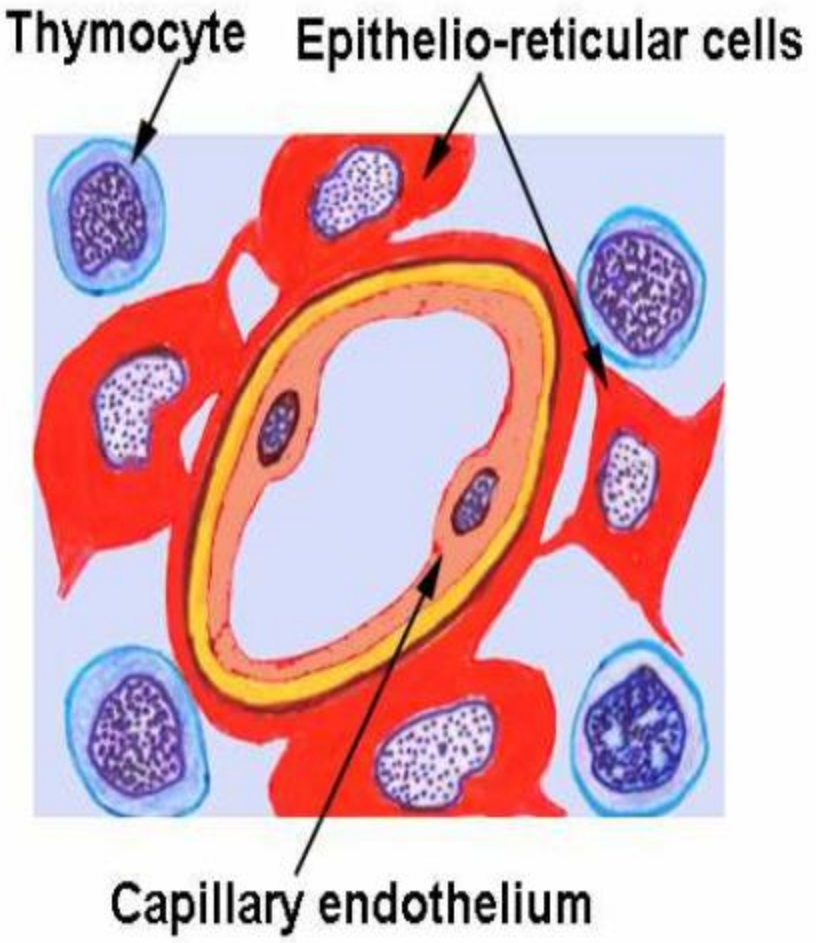
Hassall's corpuscles

- Small, round structures-medulla.
- Central core- epithelial cells & macrophages that have degenerated- form a pink staining hyaline mass.
- Around this mass epithelial cells arranged concentrically



Blood-thymus barrier/Haemo-thymic barrier

- Blood vessel from trabeculae enters medulla
- Covered by Perivascular connective tissue sheath
- Lined by Epithelial cells



Function

- Immature lymphocytes from bone marrow reach Thymus
- Undergoes antigen independent proliferation and differentiation
- Forms T-lymphocytes
- Enters circulation and occupy the thymus dependent areas of secondary lymphoid organs
- Confers Cell mediated Immunity

Function of the thymus

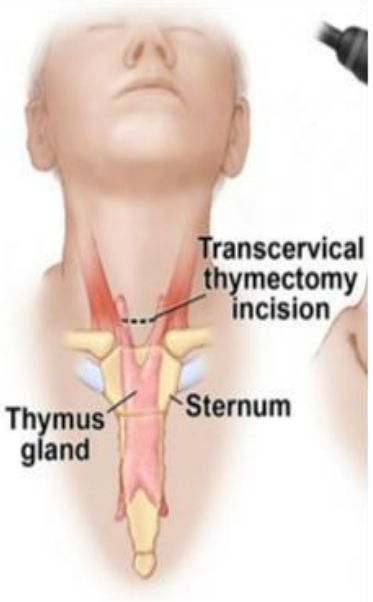
- Generate and select T- cells

- Through clonal selection mechanism , thymus cause the death of those T- cells that cannot recognize Ag- MHC- complexes and those that react with self Ag- MHC & stop danger of causing autoimmune diseases.
- Thus about 95% of all T cells die in the thymus.

Role Of Thymus In Immune Function

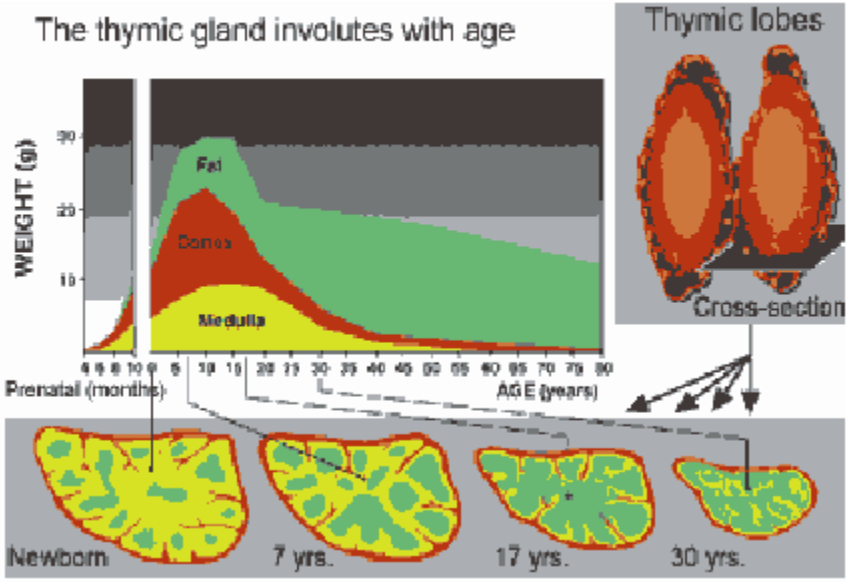
Thymectomy.

- Thymectomy is the surgical removal of thymus
- Thymectomized mice show decrease in circulating lymphocytes & absence of cell mediated immunity



Aging and thymic function

- Thymus diminishes in size with age
- Thymus attains maximum size at puberty
- Then degenerates with decrease in both cortical & medullary cells
- An increase in total fat content
- In infants the average wt. of thymus is 70g
- In elders the average wt. is 3g
- The age dependent involutions leaves an organ the reduced wt.



Evidence for the effect of age on the immune function

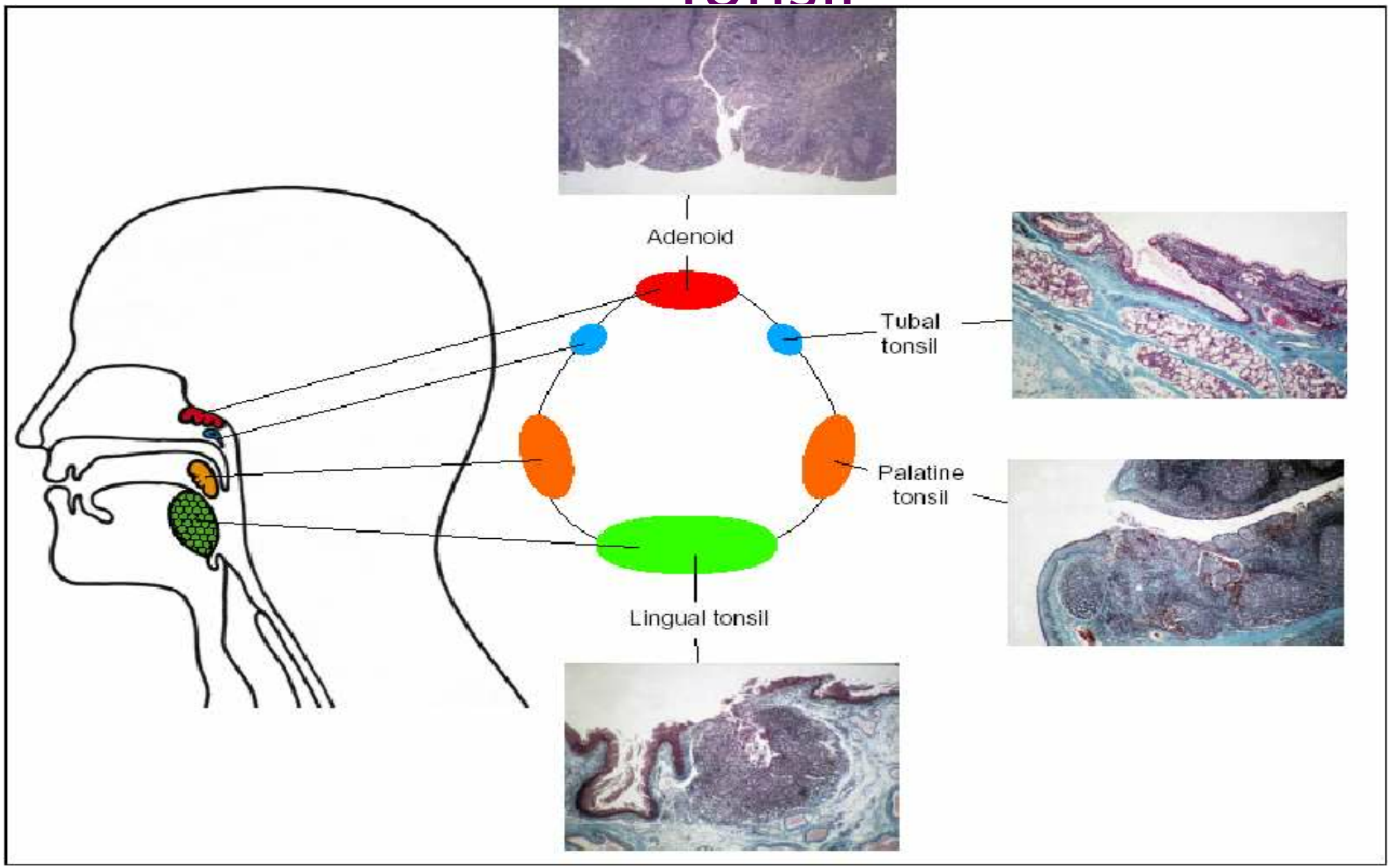
Thymus from 1day old mouse and 33 month was removed and grafted to thymectomized adult.

Thymus form 1day –old- mouse showed large improvement in immune function than mice receiving the 33 month old thymus

Tonsils

- Simplest lymphoid organs; form a ring of lymphatic tissue around the pharynx
- Location:
  - **Palatine tonsils** – either side of the posterior end of the oral cavity
  - **Lingual tonsils** – lie at the base of the tongue
  - **Pharyngeal tonsil** – posterior wall of the nasopharynx
  - **Tubal tonsils** – surround the openings of the auditory tubes into the pharynx

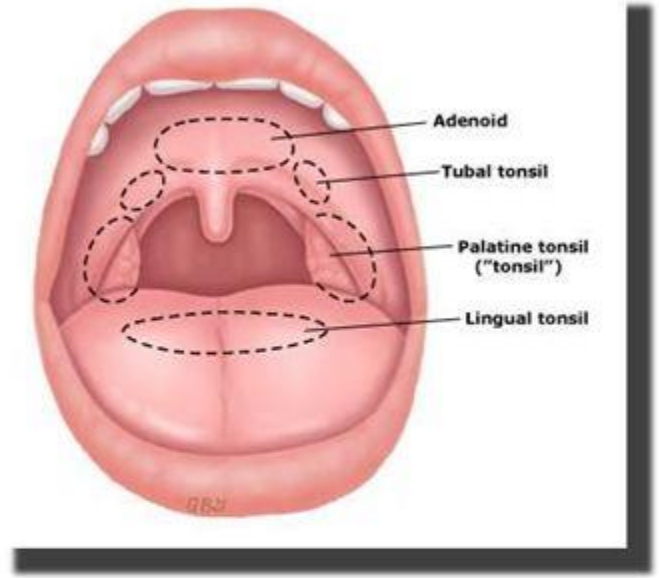
Tonsil



Peripheral organs of immune system –

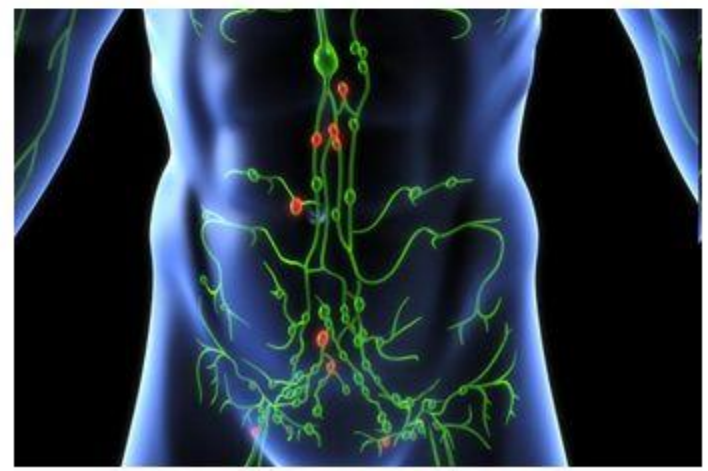
Waldeyer's ring

- lingual,
- two (palatine) tonsils
- adenoids (nasopharyngeal tonsil),
- lymphoid tissue on the posterior pharyngeal wall

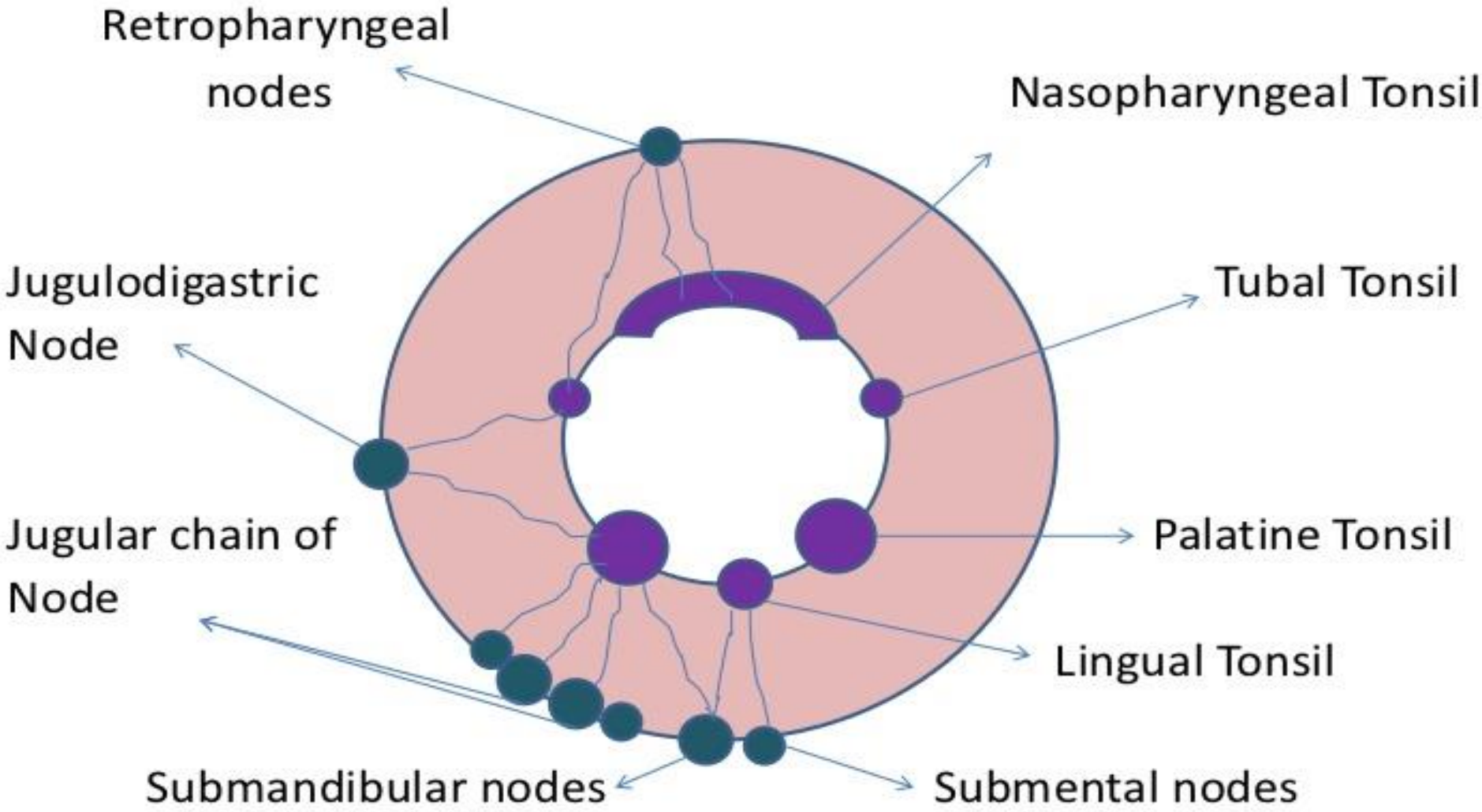


Payer's patches

•lymphoid follicles located in the wall of the small intestine

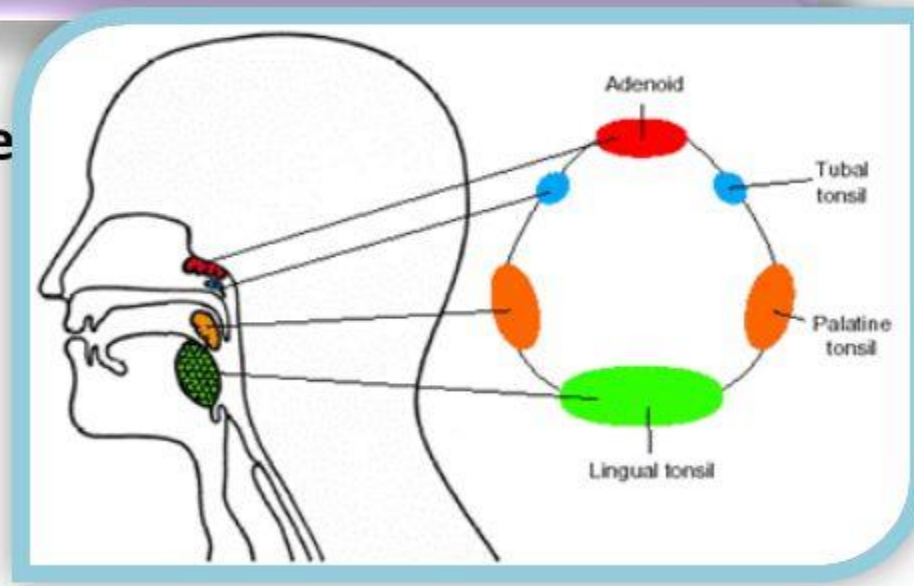


In relation to Oropharyngeal Isthmus there are several aggregations of Lymphoid Tissue that constitute WALDEYER'S LYMPHATIC RING.



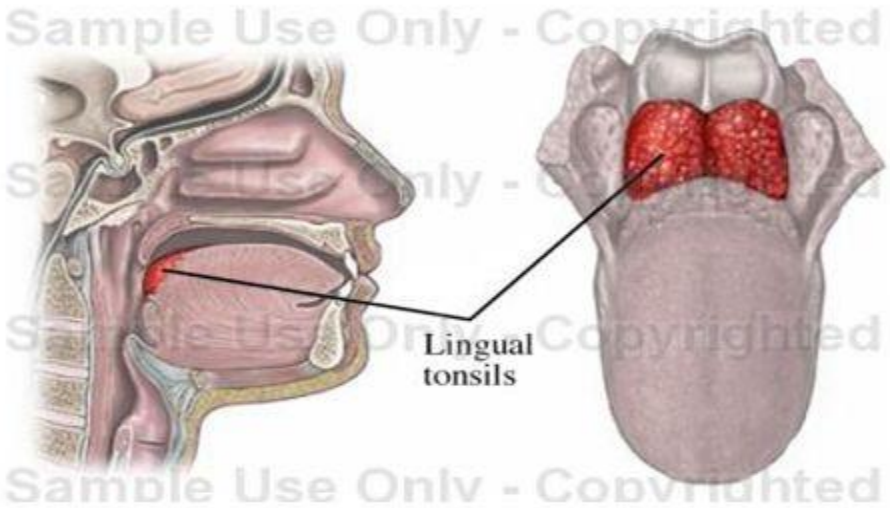
The Tonsils

Waldeyer's ring is a continuous band of lymphoid tissue that surrounds the upper pharynx.



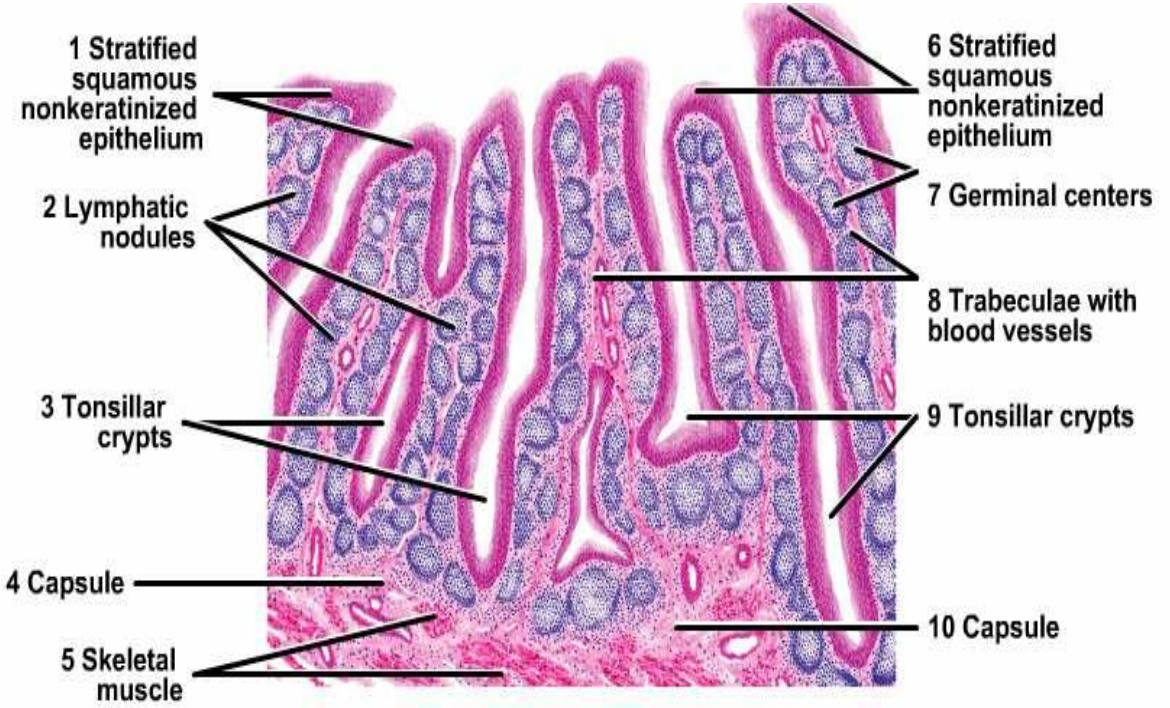
The superior portion of the ring is located in the nasopharynx and is composed of the adenoids, Laterally the palatine tonsils and, Anteriorly the lingual tonsils to complete the ring.

Tonsillar crypts extend deeply into the body of the tonsil and are surrounded by lymphoid nodules. Debris and foreign particles collect within the crypts.



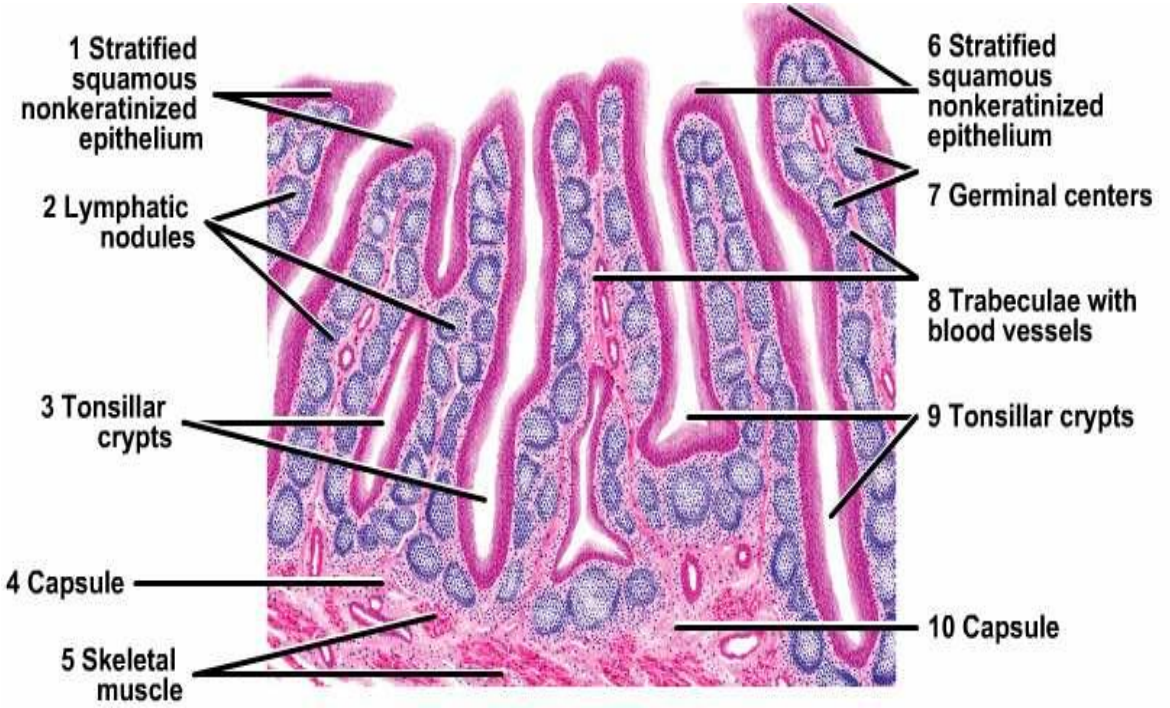
PALATINE TONSIL

- Lymphoid tissue associted with oropharyngeal mucosa
- Supported internally by reticulin fibres
- Lymphoid follicles
- Mucosa are invaginated into crypts which are covered by Stratified squamous non-keratinised epithelium(oral cavity)



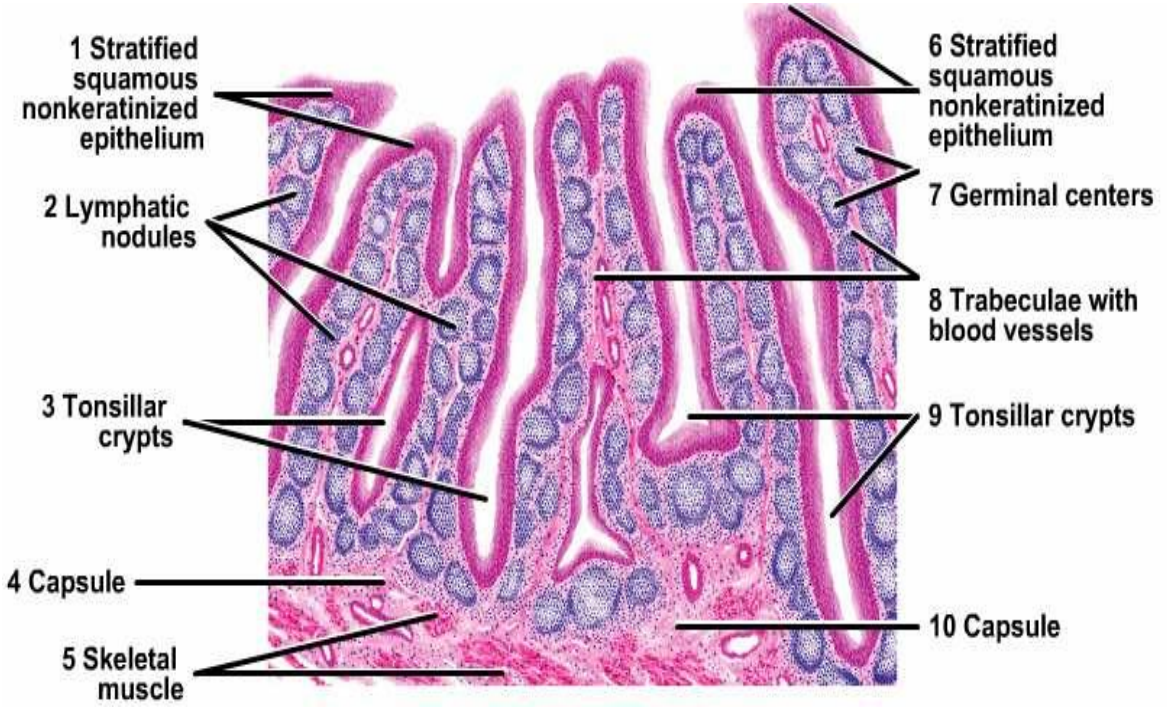
Palatine Tonsil

- Mucous acini open into the crypts.
- Desquamated epithelial cells & bacteria seen in the lumen of crypts.
- Reticulated epithelium , basal lamina discontinuous
- Interdigitating dendritic cells - APCs

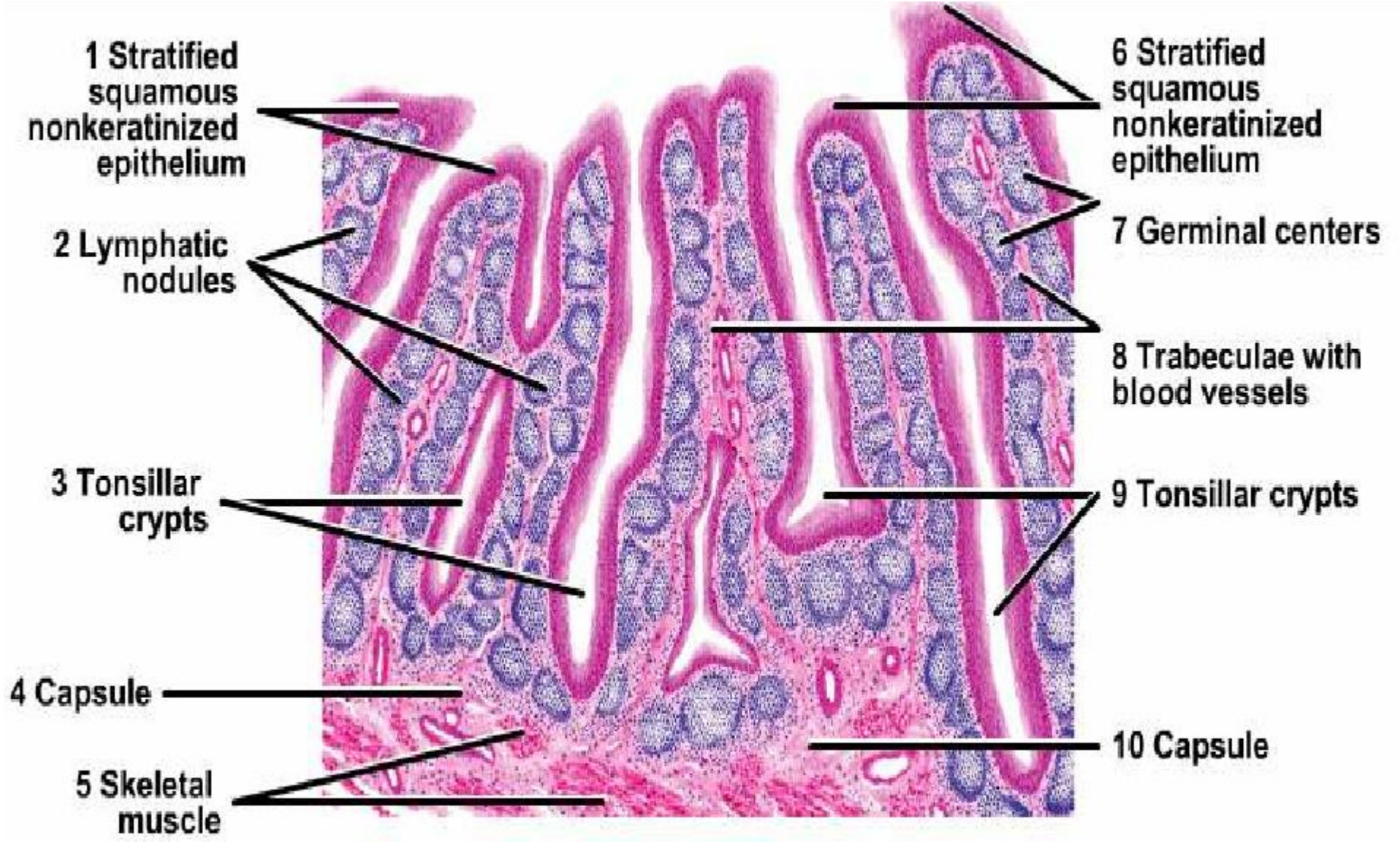


PALATINE TONSIL

- Lymphoid tissue
- Germinal centres
- Mantle zones
- Reticulated Crypt epithelium – IgG - & IgA – producing B lymphocytes, T cells & APCs



Palatine Tonsil



Applied Histology

- Tonsillitis
- Tonsillar abscess

Mucosa Associated Lymphoid Tissue (MALT)

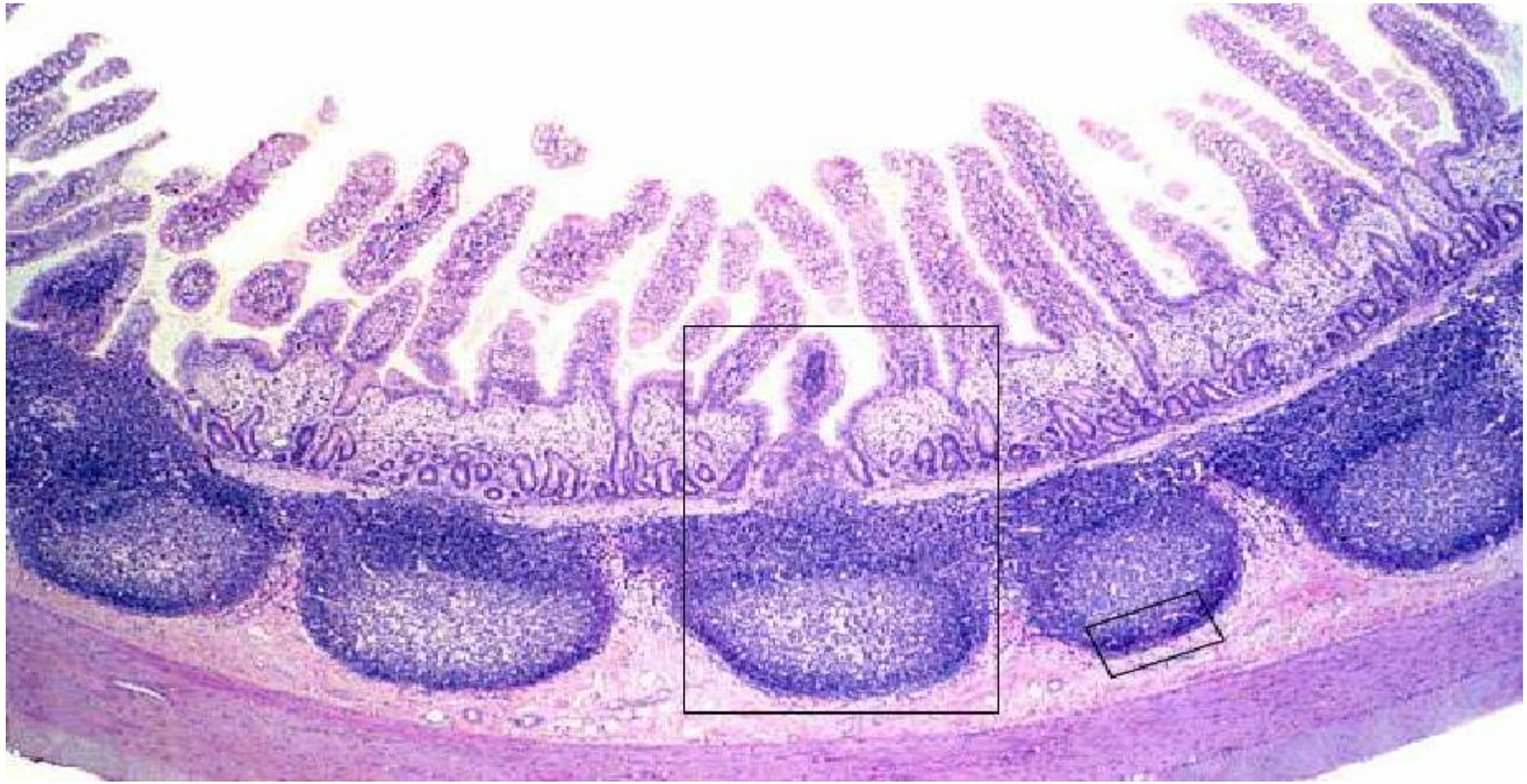
- Gut associated lymphoid tissue.
- Tonsils – Palatine tonsil, Pharyngeal tonsil, Lingual tonsil & Tubal tonsil.
- In GIT – Solitary lymphoid follicles & Aggregated lymphoid follicles (Peyer's patches) seen.
- 'B' lymphocytes present in GIT, mature into plasma cells & produce IgA antibodies.

- The components of MALT are subdivided into the following:
- **GALT** (gut-associated lymphoid tissue. Peyer's patches are a component of GALT found in the lining of the small intestines.)
- **BALT** (bronchus-associated lymphoid tissue)
- **NALT** (nasal-associated lymphoid tissue)
- **CALT** (conjunctival-associated lymphoid tissue)
- **O-MALT** (organized mucosa-associated lymphatic tissue); specifically, the tonsils of Waldeyer's tonsillar ring are O-MALT.
- **D-MALT** (diffuse mucosa-associated lymphatic tissue); MALT that is not organized as a separately macroscopically anatomically dentifiable mass, tissue or organ (such as the aforementioned O-MALT) is diffuse MALT.
- **LALT** (larynx-associated lymphoid tissue)
- **SALT** (skin-associated lymphoid tissue)

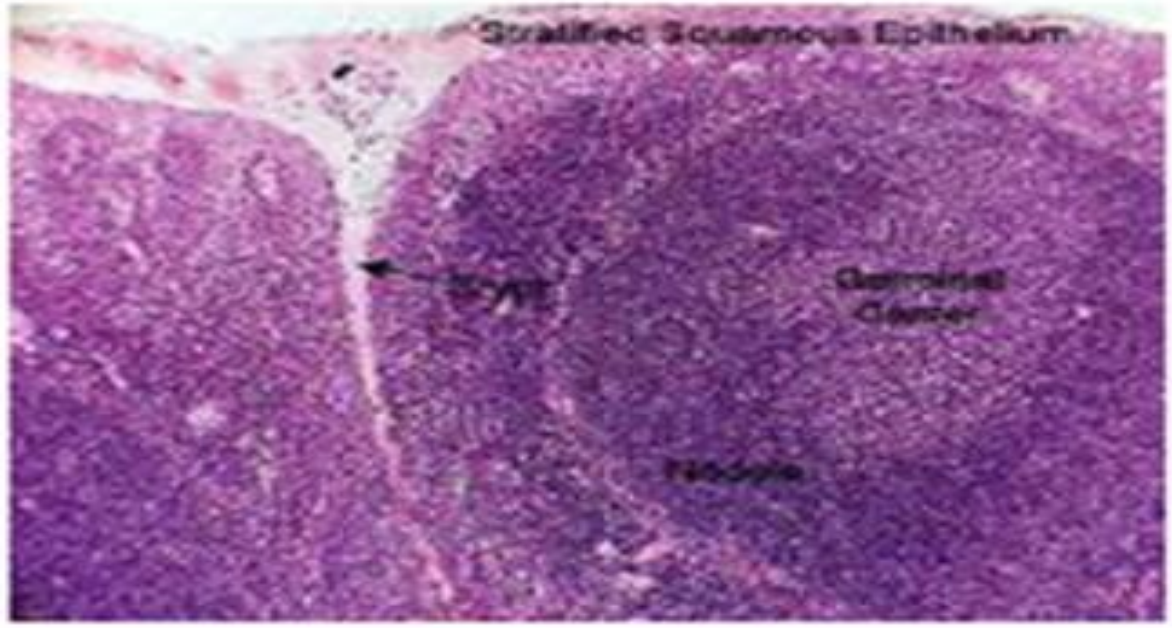
PEYERS PATCHES

- **Peyer's patches** (or **aggregated lymphoid nodules**) are organized lymphoid nodules.
- Microscopically, Peyer’s patches appear as oval or round lymphoid follicles (similar to lymph nodes) located in the lamina propria layer of the mucosa and extending into the submucosa of the ileum.
- In adults, B lymphocytes are seen to predominate in the follicles' germinal centers. T lymphocytes are found in the zones between follicles.

PEYERS PATCHES



IDENTIFY THE SLIDE



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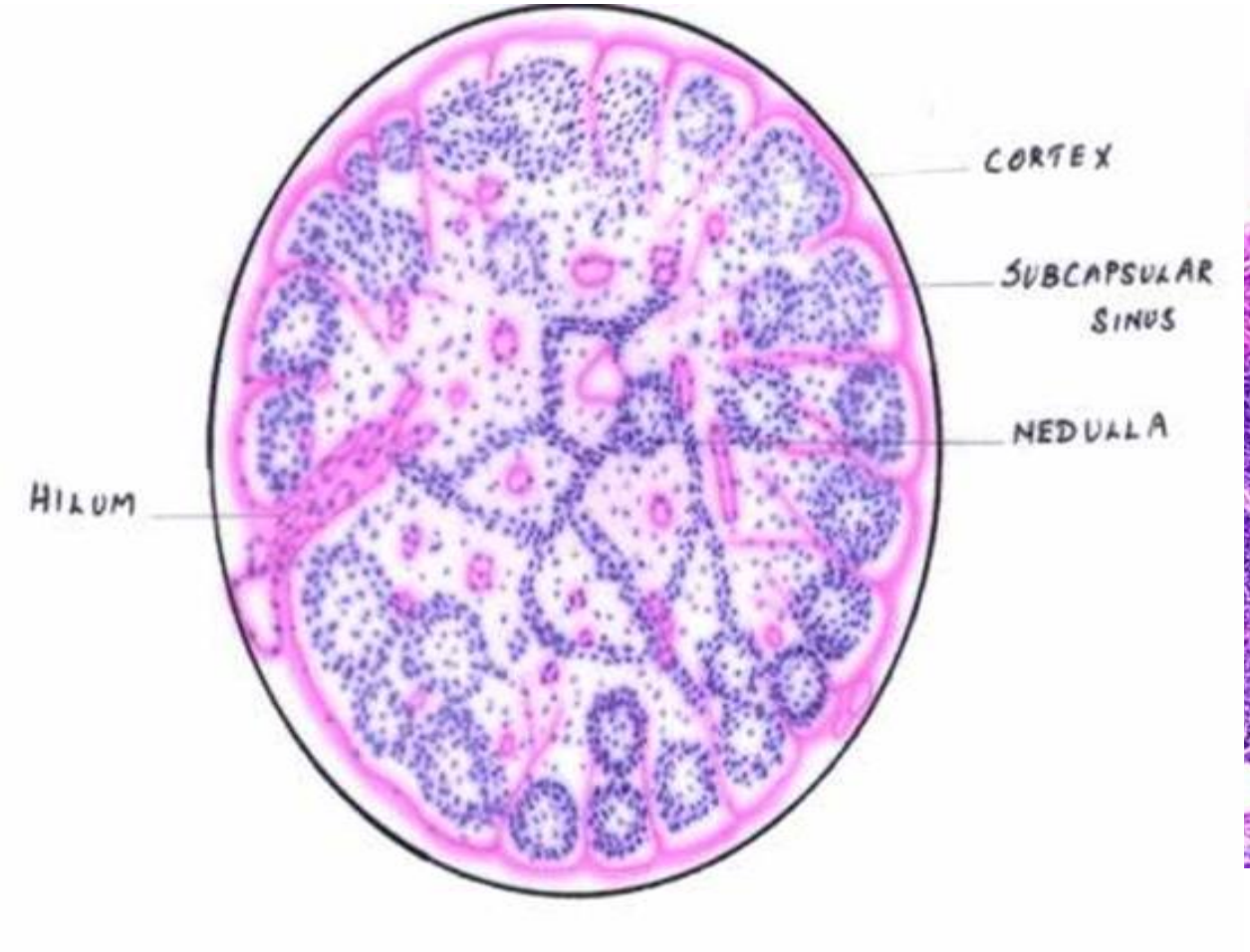

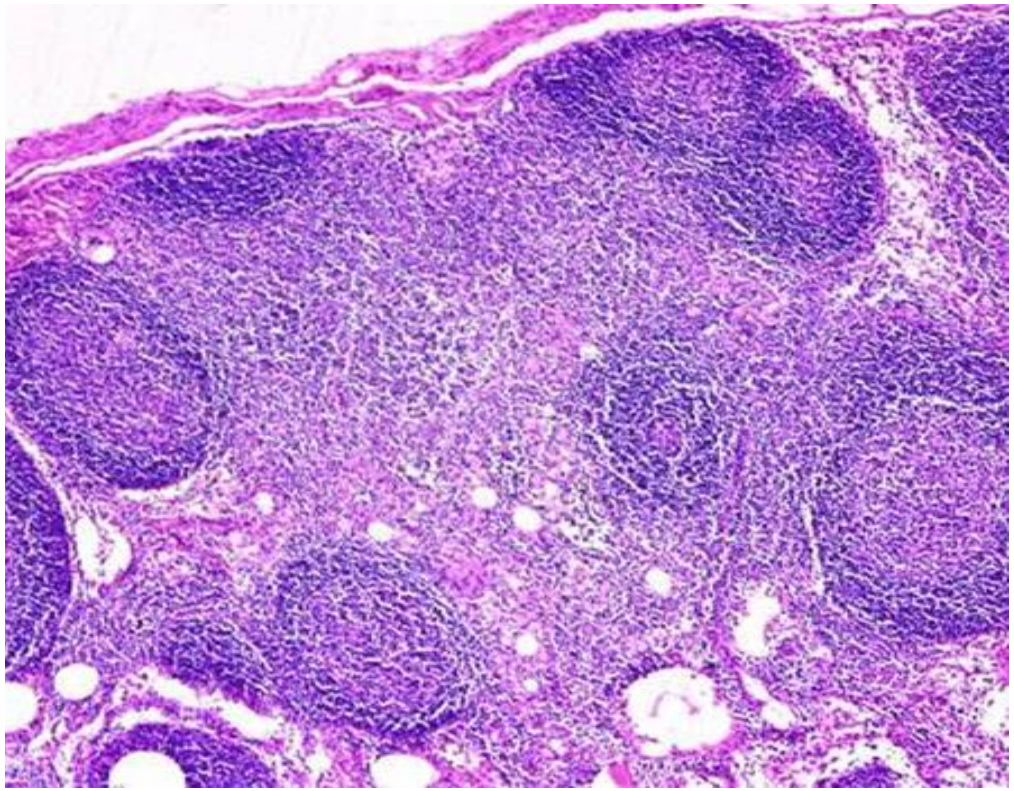


Thank you!