



FACULTY OF ENGINEERING & TECHNOLOGY

TOPIC

BRAND GUIDELINES

Topic

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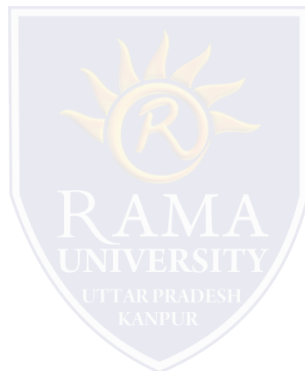
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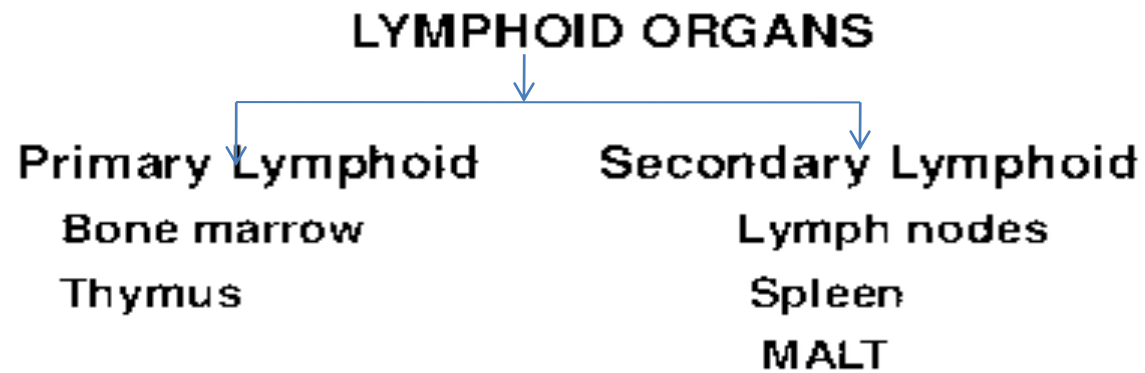
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Lymphoid Organs



PRIMARY LYMPHOID ORGANS

Lymphoid stem cells undergo proliferation differentiation and maturation into T and B cells.

- ⇒ Acquire antigen specific reception.**
- ⇒ After maturation T and B cells migrate to secondary lymphoid organs.**
- ⇒ In mammals - Thymus, Bone marrow
In Birds -Thymus, Bursa of Fabricius**
- ⇒ Major sites of Lymphopoiesis
T cell - Thymus, B cell - Bone marrow**
- ⇒ Control Peripheral Lymphoid Organs.**

Thymus

Bilobed organ.

Situated above the heart.

Each lobe enclosed by capsule

Each lobule separated by connective tissue called trabeculae.

Outer Cortex –

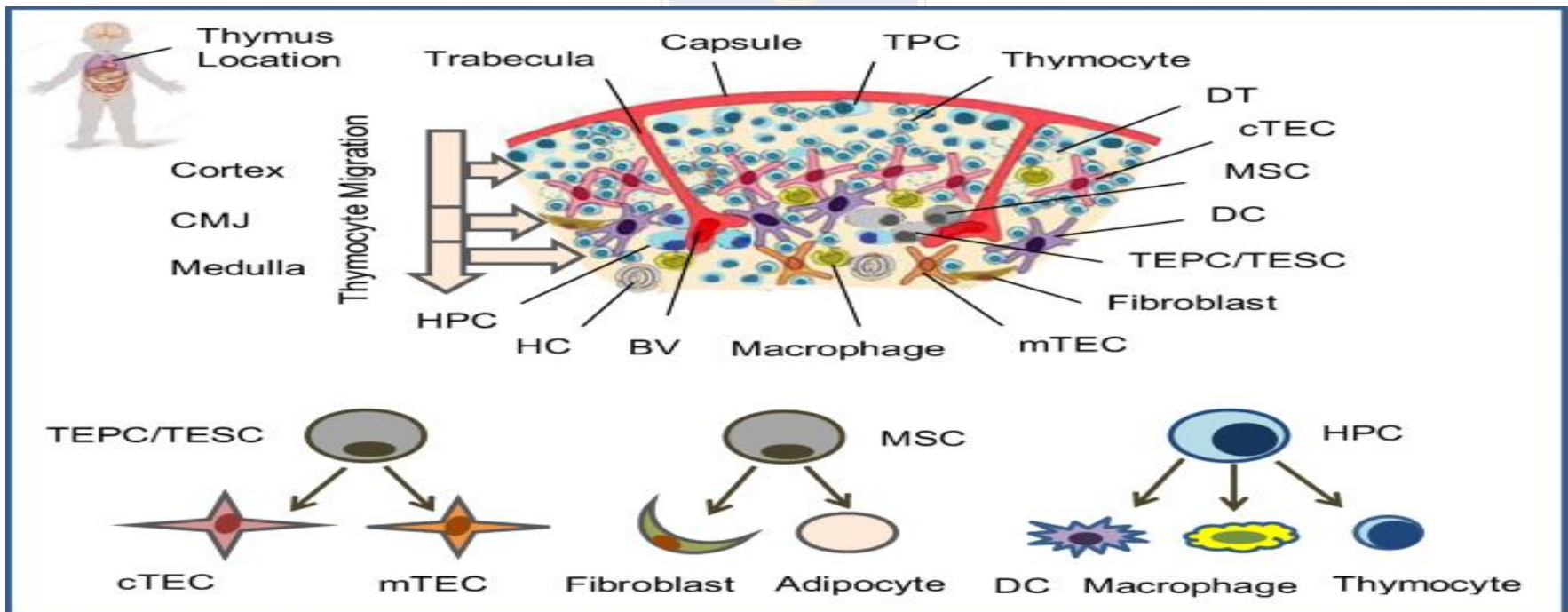
Inner Medulla –

⇒ **Immature T cells in called – Thymocytes**

⇒ **Thymic epithelial cells in outer cortex called Nurse cells.**

⇒ **Hassall's corpuscles – contain degenerating epithelial cells.**

- ⇒ Site of T cell development and maturation.
- ⇒ Development of cell mediated immunity.
- ⇒ Thymic epithelial cells produce hormones thymosin and thymopoietin.
- ⇒ T cell receptor generated.
- ⇒ Recognizing antigen MHC complex.
- ⇒ T cells protect body from infection.



Bone Marrow

Site of **blood cell formation.**

B cell origin and mature

E.g. Humans and Mice

Fat cells, bony tissue, dendritic cells

⇒ **Stomatal cells interact with B cells**

⇒ **Secrete cytokines.**

⇒ **Selection process occur.**

⇒ **It is not the site of B cell development in all species.**

Bursa Of Fabricius

- ⇒ Gut associated lymphoid organs.
[Birds]
- ⇒ Lymph epithelial tissue.
- ⇒ Hindgut of chicken.
- ⇒ Multiply and differentiate into B lymphocytes.
- ⇒ Immuno globulins synthesis.
- ⇒ Described by Fabricius in 1621.
- ⇒ Humoral immunity in birds.
- ⇒ Absent in mammals (primates, rodents).

Secondary Lymphoid Organ

- ⇒ **Organs in which antibodies are formed.**
- ⇒ **Antigen trapping and lymph filtration mechanism.**
 - Receive immuno competenal cells (primary lymphoid
- ⇒ **gan for making them and active).**
- Spleen**
- ⇒ **Lymph nodes**
- ⇒ **Mucosa associated lymphoid tissue.**
- ⇒

Lymph Nodes

Solid encapsulated bean shaped structure.

Seen in Armpits, Mesenteries.

Network packed with lymphocytes, macrophages, dendritic cells.

Three concentric regions :-

Cortex , Para cortex, Medulla

CORTEX :-

Outer most layer

Contains lymphocytes, macrophage, follicular dendritic cells arranged in primary follicle

⇒ **Lymphoid tissues organized into structures - lymphoid follicle.**

⇒ **Lymphoid follicle activated by antigen – primary follicle
[Follicular Dendritic Cell, Resting B Cell]**

- ⇒ Primary follicle develop into secondary follicle.
- ⇒ In children with B cell deficiency cortex lack primary follicles and germinal centers.

PARACORTEX :-

[T lymphocytes, interdigitating dendritic cells].

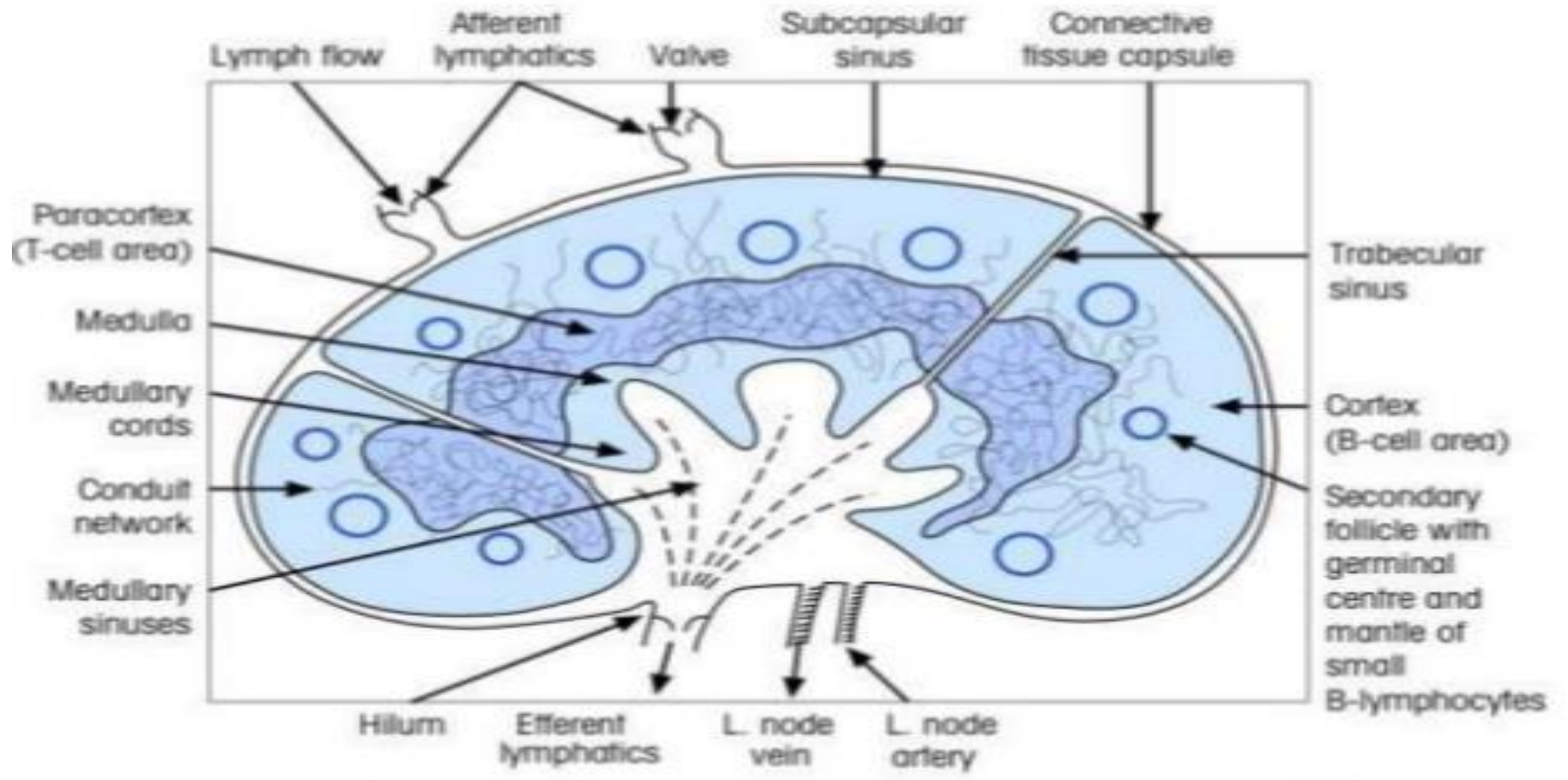
Thymus dependent area – Para cortex

Thymus independent area – Cortex

Class II MHC present.

MEDULLA :-

Inner most layer

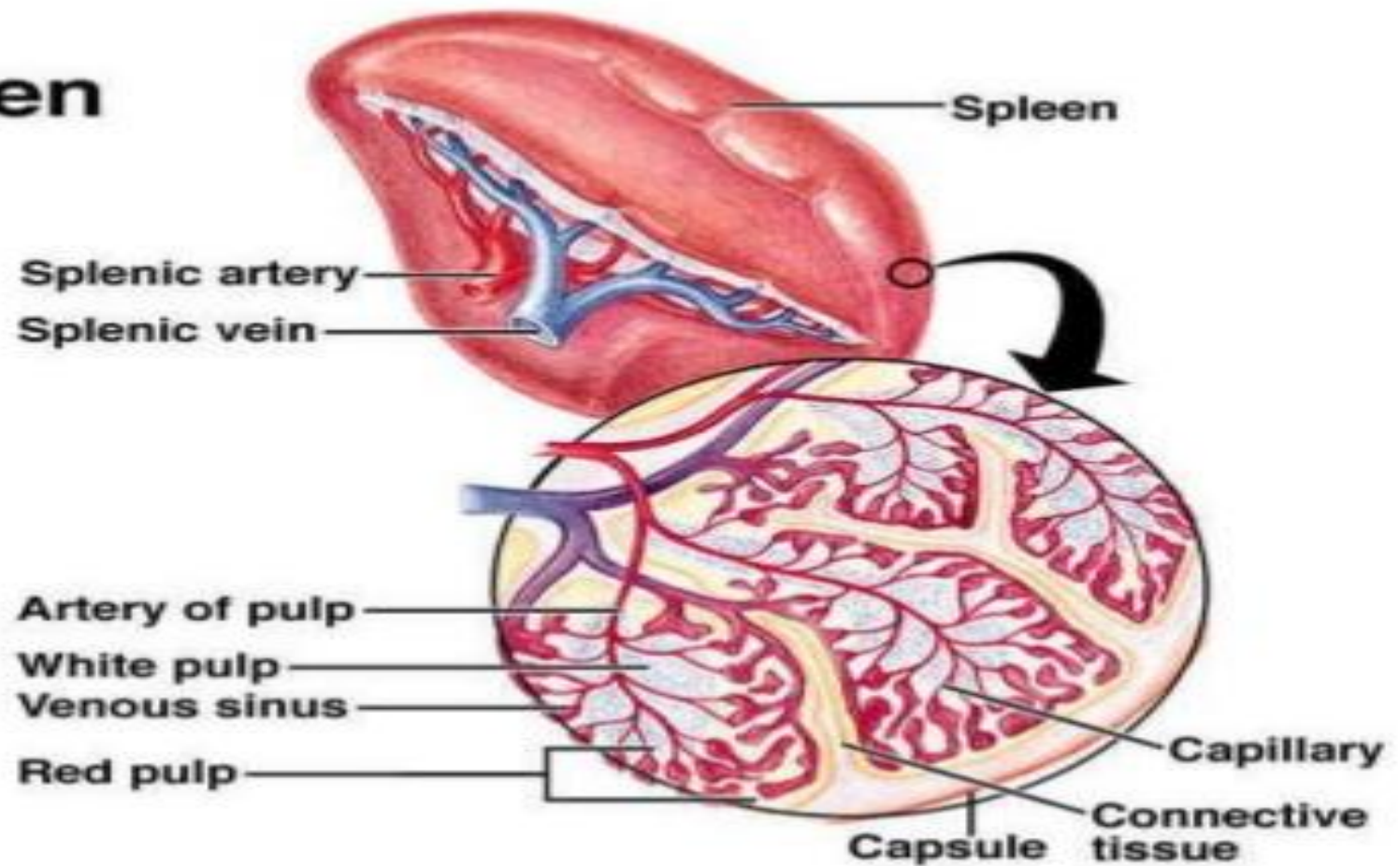


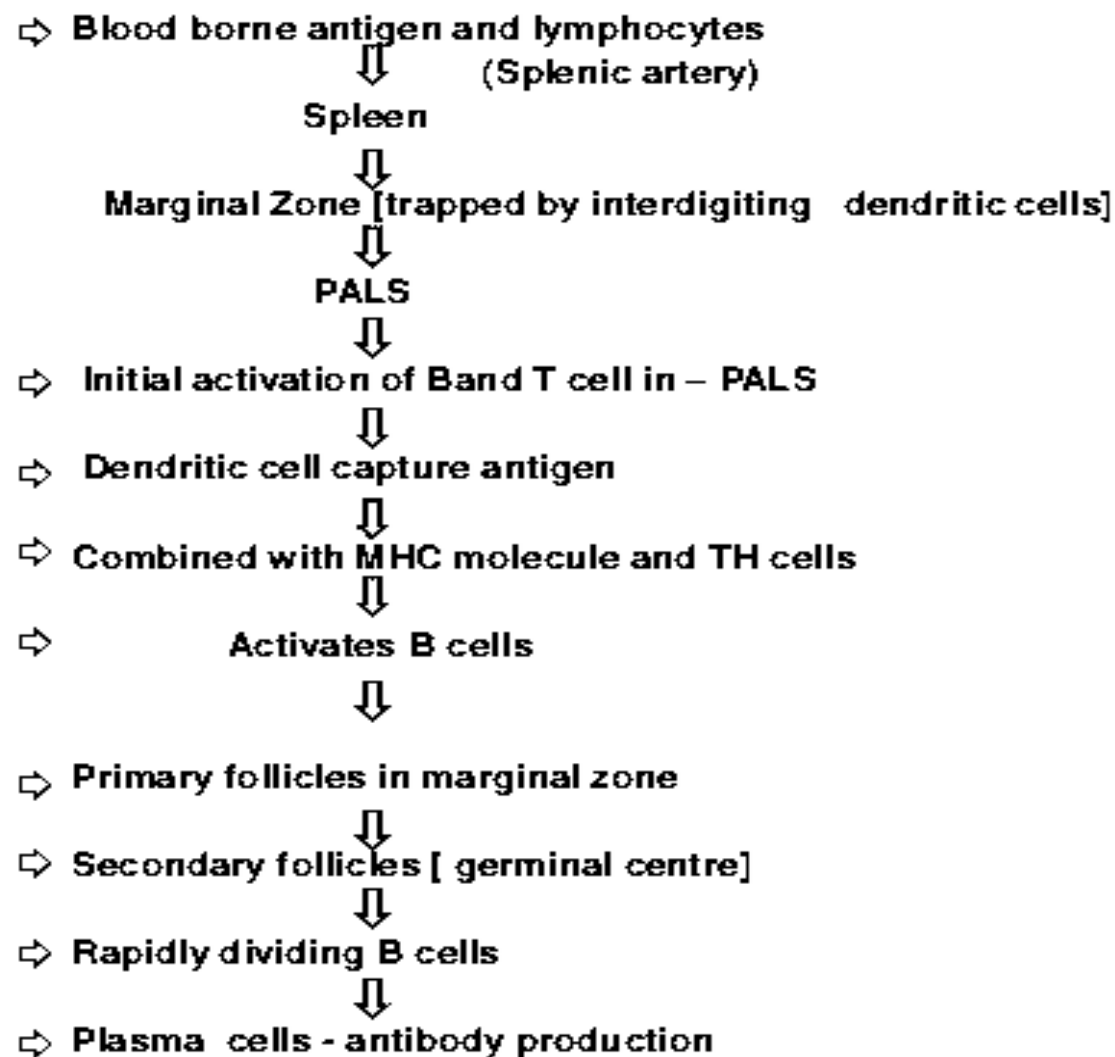
- ⇒ **Antigen reaches regional node (lymph)**
- ⇒ **It is trapped**
- ⇒ **Class II MHC molecules – Antigen (interdigitating dendritic cells)**
- ⇒ **Resulting activation of T_H cells.**
- ⇒ **Activation of B cells.**
- ⇒ **Initial activation of B cells take place within Para cortex.**
 - B cells differentiate into plasma cell.**
 - ⇒ **Secreting IgG.**
 - ⇒ **Secondary follicle develop.**
 - ⇒ **(Follicular dendritic cell, B cell, T_H cell)**

Spleen

- ⇒ **Bean shaped organ.**
- ⇒ **Left side of abdominal cavity.**
- ⇒ **Specializes in filtering blood and trapping blood borne antigens.**
- ⇒ **Blood borne antigens, lymphocytes into spleen through splenic artery.**
- ⇒ **Spleen surrounded by capsule.**
- ⇒ **Two types of compartment red and white pulp.**
 - Red pulp – network of sinusoids macrophage, RBC, lymphocyte.**
 - Old and defective RBC destroy.**
 - White pulp - consist of lymphoid tissue, T and B lymphocytes.**
- ⇒ **White pulps surrounds branches of splenic artery forming Per arteriolar Lymphoid Sheath (PALS).**
- ⇒ **Marginal zone located peripheral to PALS**
 - [Lymphocytes and Macrophages].**

Spleen





Mucosa Associated Lymphoid

Lymphoid tissue in mucosal epithelial surface – **MALT**

Antibody producing plasma cells.

⇒ Nasal associated lymphoid tissue – back of nose, palate, base of tongue, tonsils

Handling airborne microbes

⇒ Tonsils defend against antigen entire through nasal and oral epithelial route

Respiratory, Uriogential, Gastrointestinal tract

⇒ The endocytose antigen from lumen

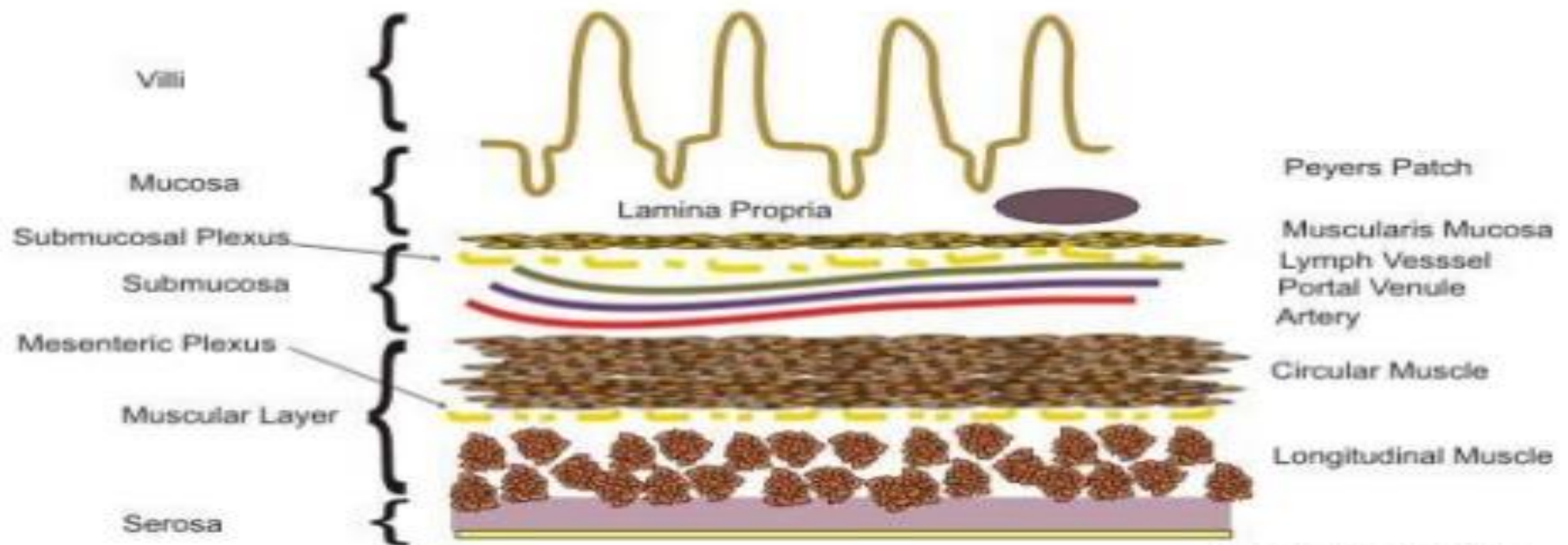
⇒

Mucous membrane – effective barrier

⇒ Non specific immunity

⇒

- ➔ Peyer's patches found in ileum.
- ➔ Round patches of lymphatic nodes
- ➔ Develop into secondary follicle in germinal center
- ➔ Antigen transport by specialized M cells.
- ➔ Pockets of M cells – B cells, T cells, Macrophages
- ➔ M cells locate in inductive sites



⇒ Antigen transported across mucous membrane by M cells

⇒ Activate B cells in follicle



⇒ Differentiate into plasma cells



⇒ Secrete IgA class of antibodies



⇒ Transported across epithelial cells



⇒ Secretory IgA into lumen



⇒ Interact with antigen

