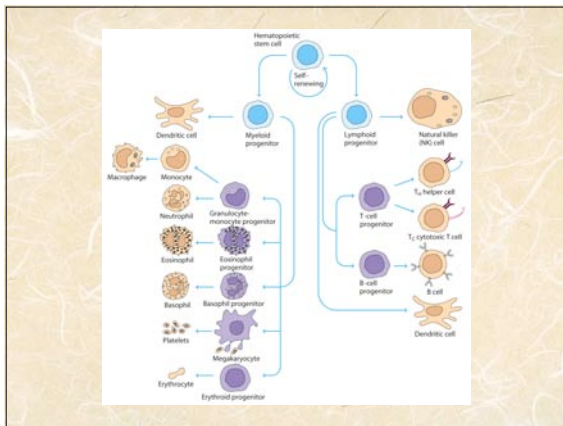


Cells and Organs of the Immune System

- Hematopoiesis
- Organs of the Immune System
 - Primary Lymphoid Organs
 - Secondary Lymphoid Organs
 - Tertiary Lymphoid Organs



Regulation of Hematopoiesis

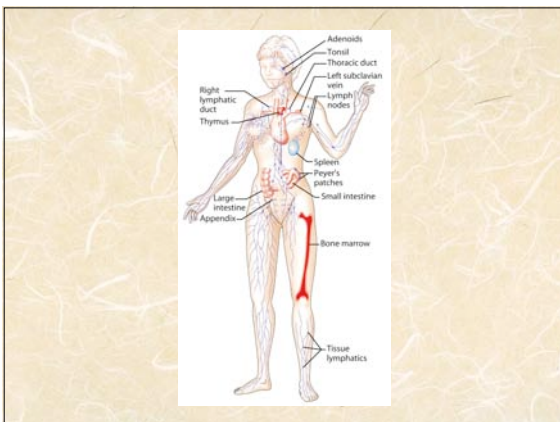
- Amount, Type of cytokine produced locally by bone marrow stromal cells
- Inflammatory production of growth factors/ cytokines by other cell types
- Receptor expression by stem cells during development
- Induction of Cell Death

Organs of the Immune System

- **Primary Lymphoid Organs** are the sites of development of T and B lymphocytes
 - HSC develop in the **Bone Marrow**
 - T cells develop in the **THYMUS**
 - B cells develop in the **bone marrow (humans, mice), Bursa of Fabricius (birds), ileal Peyer's patches (cows, sheep, swine) or appendix (rabbits)**

Organs of the Immune System

- **Secondary lymphoid organs** are the sites of immune function
 - **Lymph Nodes**
 - **Spleen**
 - **Peyer's patches (in cows, sheep, swine-jejunal Peyer's patches)**
 - **MALT (Mucosal Associated Lymphoid Tissue, including BALT).**

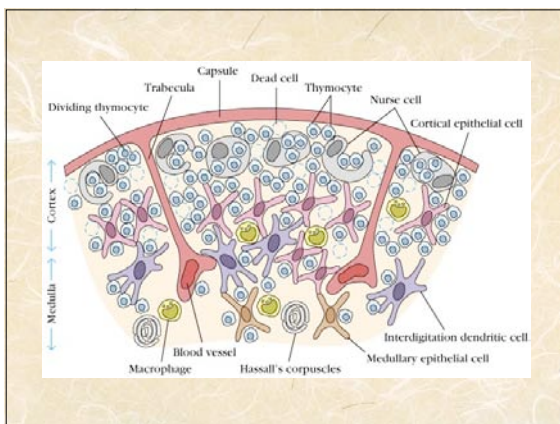


Primary Lymphoid Organs

- HSC lead to the production of monocytes, granulocytes, T cell precursors and B cell (precursors) in the bone marrow.
- These committed precursors either migrate to the thymus or remain in bone marrow to become “educated” and fully functional.
- They express functional cell surface T or B cell antigen receptors when leaving the bone marrow.

Thymus

- Immature T cells arrive in the CORTEX of the thymus as CD4+ / CD8+ cells.
- During education, thymocytes (pre-T cells) are positively and negatively selected to develop into mature T cells.
- 95-99% of immature T cells will die within the thymus.



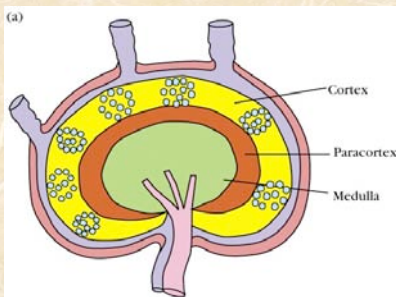
Bone Marrow / Bursa / IPP

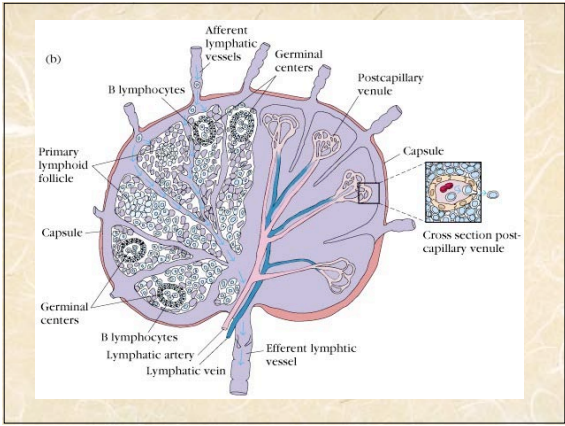
- B cell development progresses in the bone marrow, Bursa, or IPP similar to T cell development.
- Self-reactive B cells are "identified" and
 - A) eliminated - IPP are sites of massive B cell death
 - B) rendered anergic / unable to function.

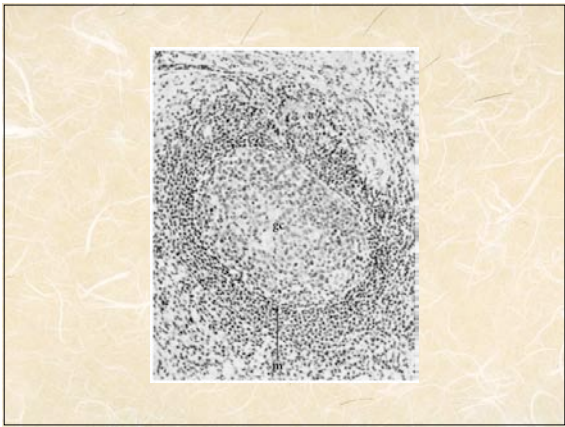
Lymph Nodes

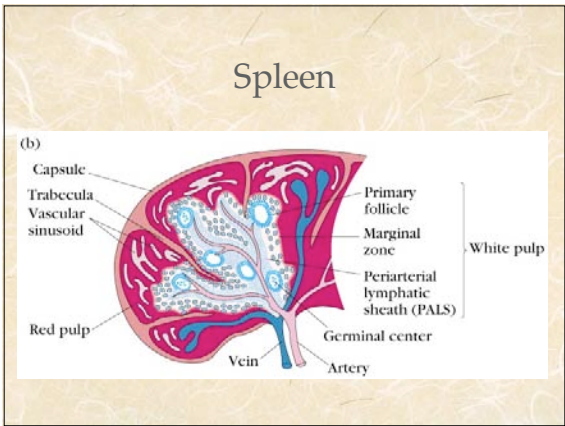
- Interspersed at fixed locations throughout the body, organized along the lymphatic vessels
- The PRINCIPAL FUNCTIONAL UNIT of the immune system
- Organized into a CORTEX (B cell area), a PARACORTEX (T cell area), and a Medulla (T, B, granulocytes).

Lymph Nodes cont'd



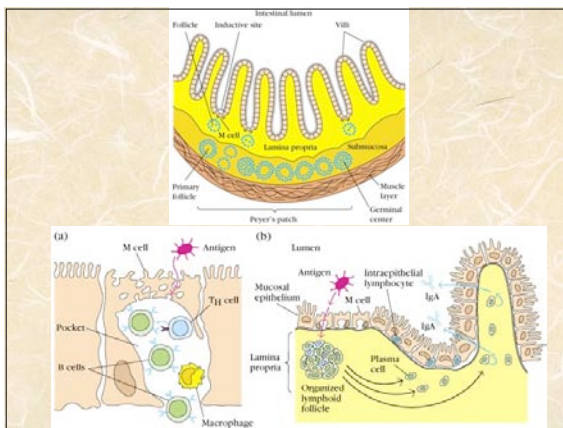






MALT

- Includes the tonsils, Peyer's patches, intra-epithelial lymphocytes within the gut.
- Characterized as organized lymphoid tissue (i.e. contains primary and secondary lymphoid follicles)
- Large site of production for secretory antibody (secretory IgA)



Next Lecture

- Leukocyte Migration/Homing
 - Chapter 15, pp371-379
