WEEK NO. 2

MICROBIOLOGY & IMMUNOLOGY

DOCTOR 2019 | MEDICINE | JU

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SCIENTIFIC CORRECTION :

GRAMMATICAL CORRECTION :

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Lecture 3

Antigen Presenting cells (APC) ⟹ Link the two parts of the immune system

Capture → **Degrade** → **Present**

the microbe — it — it for lymphocytes

- **Dendritic cells** ⟹ from the bone marrow monocytes
  important of T-cells

- **Follicular Dendritic cells** ⟹ Not really dendritic, They activate **B cell**, found in germinal centres, originat from mesenchymal cells
  - spleen
  - lymph nods
  - mucosal lymph tissues

- **Macrophages** ⟹ Digest microbes & represent them for **Helper** T-cells
  activated → secrete things that further activates macrophages

- **B cells** ⟹ Present to **helper** T-cells
  Responsible for **humoral immunity**
  ↖ in the blood & fluids

Major Histocompitability Complex (MHC)

To distinguish infected from healthy cells ⟹ MHC I & MHC II

MHC I → in all cells, check if frgments from **inside** the cell are self or non-self

MHC II → in proffessional APCs, the antigen is from **outside**

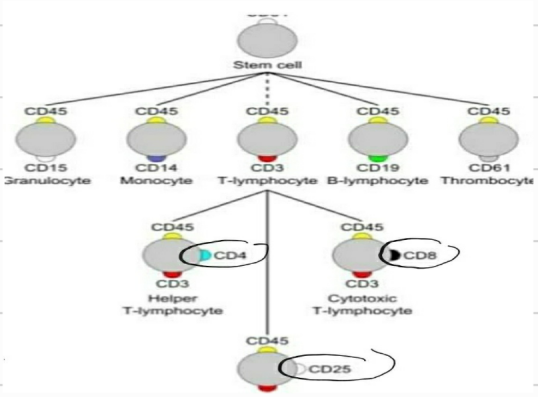
[2] Lymphocytes ⇒ B, C, different function same morphology.

* B cells ⇒ early maturation in bone marrow
  Antibodies production [Plasma cells]
  Humoral immune response, extracellular antigens
* T cells ⇒ Originate from the bone marrow, mature in the thymus gland
  Cell-mediated immune response, intra & extra cellular antigens

T-cells

- **Helper**: extracellular, helps macrophages, secrete cytokines
- **Cytotoxic**: intracellular, toxic, secret enzymes to kill the pathogen
- **Regulator**: Regulate the immune response to prevent harming the body

* Cluster of Differentiation ⇒
  To distinguish them from each other



* Perforin & Granzymes ⇒ Induce apoptosis
  - Perforin ⇒ Pore forming enzyme
  - Granzyme ⇒ structurally related serine proteases stored in the cytotoxic granules

* How can the body produce sufficient receptors for the millions of antigens we have?
  - DNA combination
* How can the body deal with the limited number of lymphocytes that have the same receptor?
  - Clonal expansion

* Antigen receptors → Bound antibodies

Antibodies → secreted

* Natural killer cells (NKC) ⟹ innate response against bacteria & microbes
  kill the cells that hide their MHC1

* Neutrophils
  - Conventional: Capture, process, present
  - Plasmacytoid: synthesise & release type1 interferon

- Neutropenia → low concentrations of neutrophils

Lecture 4

lymphatic system
- cells: T, B, APCs
- tissues: collection of
- Organs
  - Generative
  - Secondary

① Generative organs

a) Bone Marrow: Generate most of the cells in the blood [hematopoiesis]
Synthesis is limited in flat bones in adults.

b) Thymus: T-cells maturation
2 lobes → become mostly adipose tissue after puberty
Thymic medullary epithelial cells found in the medulla of the thymus, present self antigens for T-cells.

- Central tolerance: early training of T-cells
- Peripheral tolerance: training of T-cells after the atrophy of the thymus.

② Secondary organs → Fluid homeostasis
→ Immune responses.

a) lymph nodes ⇒ capsuled vascularised
initiate the adaptive response
B cell zone → follicles.
T cell zone → parafollicular cortex.
depending on chemokines → direct the migration of lymphocytes

↓

This ensures that each lymphocyte is in close contact with the appropriate APC.

- Because of this, below the capsid of lymph nodes there's
  - Sub capsular macrophages → B cells
  - = = Dendritic cells → T cells
- Antigen destination depends on the MW → High : B cell response
  low : T cell response

b) The spleen → Blood filteration.
Highly vascularised

Red pulb	White pulb
↓	↓
Macrophags for blood filteration	Adaptive immune response organised by PALP

- Splectomy → lacking the spleen → very vulnrable for infections
- Marginal zone → the boundary between red & white pulp

C) Regional immune response → each major epithelial barrier

- Mucosa associated lymphoid tissue [MALT] : immune response against ingest or inhaled antigens

- Peyer's patches : under the villie of small intestines