Day 9 (Immunology)

① T cells

- develop from premature $CD3^+$ thymocytes in the paracortex of thymus

$CD3^+$ T cells → $CD4^+$ T_H
$CD3^+$ T cells → $CD8^+$ T_C

Why are $CD8^+$ T cells responsible for combating viral infections?

$CD8^+$ T_C cells recognise MHC Class-I molecules, which are expressed by all cells. T_C cells can therefore recognise antigen-MHC I complexes that are presented by virus-infected cells, since viruses are obligate intracellular pathogens.

- T_H cells recognising antigen-MHC complex

T_H1	T_H2
• intracellular pathogens	• extracellular pathogens
• inflammation & releases cytokines for activating T_C & macrophages	• activates B cells.

- T_H-17 → releases IL-17 & T_{FH} in germinal centers
- T_{reg} → from autoreactive Tcells and regulates immune response.

Hematopoiesis

- HSC → all blood cells ⇒ hematopoiesis
- HSC → pluripotent cells
- early HSCs are found in yolk sac and fetal liver
- isolated as $Lin^{\ominus}$ & then purified as CD34 expressing cells

Stromal cells & microenvironment

- provide microenvironment to stem cells for differentiation into a particular lineage.
- e.g. macrophages, endothelial cells, epithelial cells, fibroblasts, adipocytes.
- need direct contact with stem cells to influence development
- within fetal liver, thymus, bone marrow, different stromal cells create different foci → different cell types develop
- SCF, IL-1, IL-3 - required for differentiation of HSC into cell types

Thymus

- cortex & medulla
- thymus is responsible for development & selection of T cells in the paracortex
- there might be organs apart from thymus, responsible for T cell development
- thymosin, thymopoietin & cytokine for thymocyte → T cell