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TD01 correction – Molecular & Cellular Immunology

Exercise 1: True or False Statements

- ☐ The thymus enlarges with age.
➡ ☐ ☐ False — It *atrophies* with age (thymic involution).
- ☐ Bone marrow produces and matures T lymphocytes.
➡ ☐ ☐ False — It produces them, but they mature in the thymus.
- ☐ The spleen contains red pulp and white pulp.
➡ ☐ ☐ True.
- ☐ Lymph nodes filter blood directly.
➡ ☐ ☐ False — They filter *lymph*, not blood.
- ☐ MALT includes Peyer's patches and tonsils.
➡ ☐ ☐ True.
- ☐ B cells and T cells are both formed in the thymus.
➡ ☐ ☐ False — Both originate in bone marrow, but only T cells mature in the thymus.
- ☐ Lymphatic sinuses are found in lymph nodes.
➡ ☐ ☐ True.

Exercise 2:

Part I

- a) Thymus.
- b) The thymus is essential for T-cell maturation. If defective (e.g., in *DiGeorge syndrome*), T-cell-mediated immunity is impaired, leading to viral susceptibility.
- c) Flow cytometry to measure CD3⁺, CD4⁺, and CD8⁺ T-cell populations.

Part II

- a) Lymphoma (likely Hodgkin or non-Hodgkin).
- b) Lymphocytes (either B or T cells depending on the lymphoma subtype).
- c) Immunohistochemistry for CD20 (B cells) or CD3 (T cells).

Exercise 3: “Cause and Effect” Reasoning Chains

Event 1: Thymic aplasia → ?

- ☐ Effect chain: ↓ T-cell maturation → ↓ cellular immunity → recurrent viral/fungal infections.

Event 2: Splenectomy → ?

- ☐ Effect chain: ↓ blood filtration → ↑ infection risk by encapsulated bacteria (e.g., *Streptococcus pneumoniae*).

Event 3: Blocked lymphatic vessel → ?

- ☐ Effect chain: ↓ lymph drainage → edema → impaired antigen presentation.

Event 4: ↓ Hematopoiesis → ?

- ☐ Effect chain: ↓ production of lymphocytes (B & T precursors) → general immunodeficiency → ↑ infection susceptibility (especially bacterial infections).

Event 5: ↓ new T-cell output → ?

□ Effect chain: ↓ new T-cell output → immune memory dominates but fewer naive T cells → slower immune response to new pathogens → higher infection and cancer risk in elderly.

Event 6: ↓ antigen sampling in gut → ?

□ Effect chain: ↓ antigen sampling in gut → ↓ activation of GALT → ↓ IgA production → ↑ susceptibility to intestinal infections.

Event 7: Defective positive/negative selection → ?

□ Effect chain: Defective positive/negative selection → autoreactive T cells escape → autoimmune diseases.

Exercise 4: Who am I?

- 1. *Spleen***
- 2. *MALT***
- 3. **Bone marrow****
- 4. **Lymph node****