

7.1 Innate immunity

Name: _____ Class: _____ Date: _____

Total: 23 marks

KEY WORDS neutrophil

Objective

Map innate cells to timelines and read the neutrophil count.

1 Key knowledge and worked examples

■ The map

Barriers → complement → neutrophils (30–60 min) → macrophages (~24 h) → NK → dendritic cells ✓. PRRs: fixed, generic, no memory.

■ Worked example: the counts

Neutrophils 50–70 % of white cells; marrow reserve $\sim 10^{11}$ cells; febrile neutropenia $< 0.5 \times 10^9/\text{L}$ is an emergency ✓.

2 Practice

2.1 Which cell carries innate news to the adaptive tier? [3]

2.2 Give the neutrophil arrival and peak times. [3]

2.3 Why do NK cells belong to innate immunity? [3]

3 Exam-style questions

3.1 A patient on chemotherapy has a temperature of 38.6 °C with neutrophils $0.3 \times 10^9/\text{L}$ (fictional).

Explain why this is an emergency within hours (first tier gone, adaptive too slow). State the immediate management principle. Explain why the usual localising signs may be BLUNTED. [7]

3.2 A splenectomised patient (fictional) asks about infection risk.

Explain which arms of innate-style clearance the spleen supported (opsonised-cell filtering). Predict the organisms (encapsulated). State the standard prophylaxis and its rationale. [7]

Solutions

2.1

- The dendritic cell.

2.2

- Arrival 30–60 min; peak ~6 h ✓.

2.3

- No rearranged receptor: germline recognition of stressed cells.

3.1

- Neutrophils are the first tier; without them bacteria spread unchecked while the adaptive response needs days.
- Immediate broad-spectrum antibiotics after cultures – minutes matter.
- Neutrophils generate much of the inflammatory localisation (pus, margins): signs are blunted despite bacteraemia.

3.2

- The spleen filters opsonised bacteria from blood (macrophage-rich pulp) – an innate-style clearance organ.
- Encapsulated organisms (pneumococcus, meningococcus, Hib) evade complement alone.
- Vaccination (pneumococcal, meningococcal, Hib) plus penicillin prophylaxis: antibodies restore opsonisation for the missing filter.