UNIVERSITY MEDICINE • EXERCISE SHEET

8.4 Fungi and parasites

Name: _____ Class: _____ Date: _____ **Total: 24 marks**

KEY WORDS sporozoite • merozoite • dimorphic fungus

Objective

Read eukaryotic life cycles off a film and a thermostat.

1 Key knowledge and worked examples

■ The malaria clock

Mosquito injects sporozoites → liver schizonts → erythrocytic merozoites → gametocytes taken up by the next mosquito ✓. Synchronous bursting every 48 h (tertian) or 72 h (quartan): the parasite's clock is the symptom's clock.

■ Worked example: dimorphism

A dimorphic fungus grows as a mould at 25 °C and a yeast at 37 °C ✓. Opportunists follow the defect map: T-cell failure → *Pneumocystis*, *Candida*; neutrophil failure → *Aspergillus*.

2 Practice

2.1 Which species pattern is quartan, and what is its period? [3]

2.2 A culture grows as a mould at 25 °C and a yeast at 37 °C – what is it, and what is the switch called? [3]

2.3 Which fungus follows neutrophil failure? [3]

3 Exam-style questions

3.1 A fictional returned traveller: thick film shows ring forms in 3 % of erythrocytes plus crescent-shaped gametocytes.

Name the species (with the morphological evidence) and grade the parasitaemia. Explain why the fever chart is LESS regular than the textbook tertian pattern (poor synchrony) and why this species is the killer (cytoadherence/sequestration of infected cells). [8]

3.2 A fictional farmer's pneumonia after dust exposure: culture at 25 °C grows a mould; at 37 °C a yeast.

Explain the dimorphic switch as the organism's identity card (mould in the environment, yeast in tissue). Explain why knowing the environmental form matters for exposure questions and why the tissue form matters for diagnosis. [7]

Solutions

2.1

- *P. malariae* – quartan, bursting every 72 h ✓.

2.2

- A dimorphic fungus; the switch is thermal dimorphism ✓.

2.3

- *Aspergillus* ✓.

3.1

- Crescent (banana) gametocytes → *P. falciparum* ✓.
- Parasitaemia 3 % of erythrocytes – graded from the film in one look ✓.
- Falciparum synchronises poorly → irregular fevers, not textbook tertian.
- Cytoadherence sequesters infected cells in deep vasculature → organ disease: the killer ✓.

3.2

- 25 °C mould = environmental form; 37 °C yeast = tissue form ✓.
- The mould in soil/dust names the exposure route (inhalation of spores from disturbed environment).
- The yeast is what grows in the patient – diagnostics (culture at 37 °C, tissue forms) must target the tissue phase ✓.