Solutions

Marking: **M1** a correct method, **A1** the correct answer, **B1** an independent mark.

Each answer shows the steps, then the **result**.

2.1

amoxicillin: **cell wall**

ciprofloxacin: **DNA gyrase**

doxycycline: **ribosome** (protein synthesis)

2.2

amoxicillin acts on the cell wall

Mycoplasma has no cell wall, so there is no target

2.3

bone marrow: **infection** (low neutrophils), bleeding or anaemia

gut lining: **mucositis** (mouth ulcers) or diarrhoea

hair follicles: **hair loss**

2.4

it is switched on by a viral enzyme (thymidine kinase), found only in infected cells

it then blocks the viral DNA polymerase more than ours

3.1

(a) its penicillin-binding protein is changed (PBP2a), so the β-lactam cannot bind and the wall is still built

(b) **vancomycin** (or linezolid)

(c) any two of: enzymes break the drug (β-lactamase); pumps push it out; the cell wall keeps it out

(d) resistance genes pass on plasmids

(e) hand hygiene, screening and isolation, or decolonisation

3.2

(a) the antibiotic killed normal gut bacteria, so *C. difficile* grew and made toxins that damage the colon

(b) use the narrowest drug for the shortest time, or review at 48–72 h

(c) *C. difficile* makes spores that alcohol does not kill; washing removes them

3.3

(a) about **day 10** (lowest count)

(b) neutropenic sepsis: IV broad-spectrum antibiotics within **1 hour**

(c) it is an antibody that binds HER2 on the tumour cells, blocking growth signals and marking the cells for immune attack

(d) there is no HER2 target on those cells

(e) they release the brakes on T cells, so T cells may also attack the body's own tissues

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