Solutions

2.1

- Absence (bacteria) and timing (cancer) ✓.

2.2

- S-phase (DNA synthesis) ✓.

2.3

- The alkylators – DNA damage regardless of phase ✓.

3.1

- Methotrexate: S-phase (antifolate, blocks nucleotide synthesis) ✓.
- Vinca: M-phase – spindle assembly fails ✓.
- Alkylator: any phase ✓.
- Fractionation: cells arrive in S over time; spread dosing meets more of them ✓.
- Tissues that pay: marrow, gut mucosa, hair follicles ✓.

3.2

- β-lactamase hydrolyses the ring before the target ✓.
- PBP2a: the target reshaped, binding lost ✓.
- Combinations: two independent mutations multiply to ~10^{-14}–10^{-18} – effectively none in the culture ✓.