Solutions

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

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

2.1

A: **hypertrophy**

B: **metaplasia**

C: **atrophy**

2.2

any two of: necrosis affects groups of cells, apoptosis single cells; necrotic cells swell and burst, apoptotic cells shrink into bodies; necrosis causes inflammation, apoptosis does not; apoptosis is programmed (caspases)

2.3

heart infarct: **coagulative**

brain infarct: **liquefactive**

tuberculosis: **caseous**

2.4

less ATP is made, so the Na^+/K^+ pump fails

Na^+ builds up inside and water follows it in

3.1

(a) it was too early: troponin rises 3–4 hours after the injury

(b) the membranes of dying muscle cells break, so their contents leak into the blood

(c) **coagulative**

(d) returning oxygen forms free radicals, and Ca^{2+} floods into the cells, damaging them further

(e) it is still high from the first attack, as it stays raised for 7–14 days

3.2

(a) **metaplasia** (Barrett oesophagus)

(b) columnar cells make mucus, which resists acid better than squamous cells

(c) it can change to dysplasia, and then to adenocarcinoma, which can be found early

3.3

(a) **intrinsic** (mitochondrial, cytochrome c); **extrinsic** (death receptors such as Fas)

(b) **caspases**

(c) BCL2 blocks the intrinsic pathway, so B cells that should die live on and build up

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(d) the cell breaks into membrane-wrapped bodies that macrophages eat, so nothing leaks out

(e) changes of the nucleus in a dying cell: it shrinks, breaks into pieces and fades