Solutions

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

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

2.1

furosemide: **falls**

bendroflumethiazide: **falls**

spironolactone: **rises**

2.2

ACE also breaks down bradykinin; ramipril blocks this

bradykinin builds up in the airways and causes a cough

2.3

atorvastatin: **HMG-CoA reductase**

clopidogrel: platelet **P2Y$_{12}$** receptor

apixaban: **factor Xa**

2.4

aspirin blocks platelet COX permanently

platelets have no nucleus and cannot make new COX, so the effect lasts for their life (7–10 days)

3.1

(a) it blocks the Na^+/K^+ pump, so more Ca^{2+} stays in heart cells and beats are stronger; it slows conduction through the AV node

(b) digoxin and K^+ compete for the same site on the pump, so with low K^+ more digoxin binds

(c) digoxin is cleared by the kidney, so it builds up

(d) slow heart rate or arrhythmias, confusion or vomiting

(e) **spironolactone** (or amiloride)

3.2

(a) it blocks the recycling of vitamin K (vitamin K epoxide reductase), so the liver makes fewer active factors II, VII, IX and X

(b) any two of: fixed dose, no INR checks; fewer food and drug interactions; works within hours

(c) **warfarin** (DOACs are not used with metal valves)

3.3

(a) it lowers BP and lowers pressure in the glomerulus, so less protein leaks and the kidneys are protected

(b) $(99 - 90) \div 90 \times 100 = \mathbf{10\%}$

(c) yes: a rise under 30% is expected and acceptable

(d) less angiotensin II means less aldosterone, so less K^+ is excreted

(e) both raise potassium, so hyperkalaemia can be dangerous

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