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: **type I**

B: **type IV**

C: **type II**

2.2

histamine and leukotrienes make the airway smooth muscle contract

blood vessels widen and leak, so blood pressure falls

2.3

$0.5 \div 1$

$=$ **0.5 mL**, given IM

2.4

type IV

memory T cells must travel to the site and release cytokines

these call in macrophages, which takes 2–3 days

3.1

(a) **type I**

(b) **adrenaline**, **0.5 mg**, **IM into the outer thigh**

(c) a raised level confirms that mast cells released their contents

(d) the first exposure made IgE against peanut (sensitisation); the IgE sat on mast cells, so this time the allergen cross-linked it and they released their contents

3.2

(a) **type II**

(b) fetal red cells entered her blood at the first birth, and she made anti-D; anti-D is IgG, crosses the placenta and destroys the baby's red cells

(c) give the mother **anti-D immunoglobulin** at about 28 weeks and after birth or any bleed, so fetal cells are cleared before she makes her own anti-D

3.3

(a) **type III**

(b) antibodies bind streptococcal antigen to form immune complexes; these lodge in the glomeruli; they activate complement and call in neutrophils, inflaming the glomeruli

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(c) it is used up by complement activation

(d) it takes time to make enough antibody

(e) red cells leak through the inflamed glomeruli; less filtration means salt and water are kept, causing swelling