Cell recognition and the immune system 2

Level: OCR A Level H420
Subject: Biology
Exam Board: Suitable for all boards
Topic: Cell recognition and the immune system 2
Type: Mark Scheme

To be used by all students preparing
for OCR A Level Biology H420 foundation or
higher tier but also suitable for students of
other boards.

Mark schemes

1   (a)   A = envelope/membrane/phospholipid (bilayer);
         B = capsid / nucleocapsid / capsomere / protein;

                 2

       (i)   (HIV is) invading cells which make new viruses;
            Cells release viruses into blood;

                 2

       (ii)   Virus remains dormant/exists as provirus/exists as DNA in host DNA;
               Accept virus stays in cells

                 1

   (c)   HIV destroys T cells;
         More (free) viruses produced leads to fall in T-cells;
         (So fewer) T-cells activate B-cells/memory cells;

         Reduced/no antibody production;
         Immune system not working properly/inability to fight infection;
         Opportunistic infections;

               4 max

                    [9]

2   (a)   Nucleus;

                 1

   (b)   Enables organism to remain in area (of food source) / prevent its removal;
            Q *'To attach' is not sufficient unless qualified*

                 1

   (c)   (i)   Correct answer of 222(%);;

            Incorrect answer that clearly identifies difference in number of cases as 5800
            −1800 or 5.8 − 1.8;
              Correct answer gains two marks

                 2

       (ii)   More water-related activities / more 'organisms' with increased temperature;
             Q *Allow any reference to growth or replication of 'organisms'. Do
             not penalise reference to bacteria.*
             Q *Do not allow increase in water consumption.*

                 1

   (d)   (i)   All have same shape / only binds to *Giardia* / one type of / specific antigen;

                 1

(ii)   Has complementary (shape) / due to (specific) tertiary structure / variable region (of antibody);

          ***Q** Binds / fits not sufficient unless qualified;*

          1

(iii)   Enzyme / second antibody would remain / is removed by washing;

     Enzyme can react with substrate (when no antigen is present);

          2

          [9]

3   (a)   Phagocytes engulf / ingest pathogens / microorganisms / bacteria / viruses;

        Phagocytes destroy pathogens / microorganisms / bacteria / viruses;

        Lung diseases are caused by pathogens / microorganisms / bacteria / viruses;

               ***Q** Allow description of process of engulfing*

          2 max

   (b)   (i)   Alveoli / lungs will not inflate / deflate fully / reduced lung capacity;

        Breathing out particularly affected / no longer passive;

          2

       (ii)   <u>Alveolar</u> walls thicken;

        Longer <u>diffusion</u> pathway;

        Scarred / fibrous tissue;

        Reduces <u>surface area</u> (for gaseous exchange);

           ***Q** Diffusion is essential for 2nd point and surface area for 4th point.*

          4

   (c)   (i)   Cancer develops 20 – 30 years after exposure (to asbestos);

          1

       (ii)   Smoking / air pollution / specified industrial source;

          1

          [10]

4   (a)   Phagocytes engulf pathogens / microorganisms;

        Enclosed in a vacuole / vesicle / phagosome;

        Lysosomes have enzymes;

        That digest / hydrolyse molecules / proteins / lipids / microorganism;

          3 max

(b) (i) Get another strain / there are different strains;

Therefore does not have memory cells against second strain;
   Q *The second marking point should only be awarded in the context of memory cells.*

2

(ii) Vaccines only work against certain strains because the antigens they possess are different;

Enables company to target strain likely to be prevalent later / most common strain;

2

[7]

5 (a) (i) Many people do not go to the doctor;

1

(ii) 36000;
   No marks awarded for working here as calculation is very straightforward

1

(b) Same sugars / antigens on bacteria / nerve cells;
   Do not accept references to same shape as equivalent to complementary.

Bind with antibody / form antigen-antibody complex;
   Reject react

Have complementary shape / fit binding site;
   Reject active site

3

(c) Diaphragm will not move down / flatten / contract;
   Ignore references to breathing out

Thoracic cavity / lung volume not increased so cannot breathe in;

2

[7]

6 (a) molecule / part of molecule / protein / glycoprotein / named molecule;
that stimulates an immune response / eq;

2

(b) divide by mitosis / form clones; produce plasma cells; (plasma cells) make antibodies;
(plasma cells) produce memory cells;

4

(c) (i) glycoprotein AND
different shape to body proteins / RNA and reverse transcriptase
inside virus / phospholipids same as body's / on the surface
of the virus;

1

(ii) 187.5;;

Accept 187 – 188

1 mark for HIV = 80nm;

2 max

[9]

7 (a) divide by mitosis / form clones;
produce plasma cells;
(plasma cells) make antibodies;
(plasma cells) produce memory cells;

4

(b) glycoprotein;
different shape to body proteins / body phospholipids are the same /
located on the outside of the cell / the haemoglobin is located
inside the cell;

2

[6]

8 (a) Injection of antigens / toxoids;

(Antigen from) attenuated microorganism / non-virulent
microorganisms / dead

microorganisms / isolated from microorganism;

Stimulates the formation of memory cells;

max 2

(b) (i) Antibodies are specific to mumps antigen;
2nd antibodies specific to mumps antibody;

1

(ii) Removes unbound 2nd antibodies;
Otherwise enzyme may be present / may get colour change
anyway / false positive;

2

(iii) No antibodies to bind (to antigen);
Therefore 2nd antibody (with the enzyme) won't bind / no enzyme /
enzyme-carrying antibody present
(after washing in step 4);

2

[7]

9   (a)   Stimulates memory cells;

Secondary response, so antivenom / antibodies produced quicker;

2

(b)   Passive immunity; so no memory cells produced;

Antivenom breaks down / destroyed;

2

(c)   Could transfer disease / Allergy / Immune response to antibodies from animal;

1

[5]

10   (a)   add antibodies / enzyme;
wash to remove unbound antibodies;
add (colourless) solution;
                (mark correct responses sequentially)

3

(b)   antibodies specific / shape only fits one antigen;
other antigens different shape and would not bind to antibodies;

2

[5]

11   (a)   (i)   protein / immunoglobulin;
specific to antigen;
idea of 'fit' / complementary   <u>shape</u>;

2 max

(ii)   1. virus contains antigen;
2. virus engulfed by phagocyte / macrophage;
3. presents antigen to B-cell;
4. memory cells / B-cell becomes activated;
5. (divides to) form clones;
6. by mitosis;
7. plasma cells produce antibodies;
8. antibodies specific to antigen;
9. correct reference to T-cells / cytokines;

6 max

(b)   1. antibody gene located using gene probe;
2. cut using restriction enzyme;
3. at specific base pairs;
4. leaving sticky ends / unpaired bases;
5. cut maize / DNA / vector using same restriction enzyme;
6. join using DNA ligase;
7. introduce vector into maize / crop / recombinant DNA into maize;

4 max

(c)   passive / person is not making own antibodies / antibodies not replaced;
memory cells not produced;

2

(d)   fewer ethical difficulties / less risk of infection;

1

[15]

12   (a)   To prevent contamination of apparatus with other microorganisms / bacteria;
To prevent personal contact with bacteria;
To prevent release of bacteria into air;

max 2

(b)   (i)   Diffuses slowly;

1

        (ii)   B;
               Produces inhibition zone greater than the minimum diameter;

2

[5]

13   (a)   Publicity about vaccination / better health education / risks of 'flu epidemics;
               *(Accept: now free on NHS (though only since 2000) / better
               awareness / more commonly available)*

1

(b)   (i)   1990: 26% of 7.4million = 1.92million *and* 2000: 64% of 7.8 million =
               4.99million;
               increase = 3.07 million;

2

               (Correct reading of all 4 figures from graph = 1)
               (Correct answer but no 'millions' = 1)
               (Correct method resulting from wrong graph reading = 1)

        (ii)   Over 50% of population being vaccinated;
               But only from 2000 onwards;
               (Principle of more people being vaccinated each year = 1)

2

        (iii)   Different strain / type of virus each year / virus mutates;
               With different antigens;
               Influenza antibodies / memory cells (rapidly) destroyed / need replacing;

max 2

(c)   (Protein coat) carries antigens which stimulates B-cells / production of antibodies;
Production of memory cells;

2

[9]

14   (a)   (i)   protein / glycoprotein / glycolipid / polysaccharide / molecule;
on surface / membrane (of cell);
causes immune response / description / triggers antibody
production;

                                                                                    max 2

(ii)   reference to hybrid cell from tumour / cancer and
B-lymphocyte / hybridoma;
antibodies all the same / from one type of plasma cell;
specific to / complementary to / fits only one antigen;

                                                                                    max 2

(b)   (i)   antibodies specific / only binds to PSA;
PSA only associated with prostate cancer / not with other
diseases;

                                                                                    2

(ii)   antibody with enzyme only attaches if PSA present / washed
away if no PSA;
no colour change without enzyme;

                                                                                    2

                                                                                    [8]

15   (a)   molecule (on cell surface);
that triggers immune response;

                                                                                    2

(b)   (i)   axes right way round and labelled;
2nd peak drawn higher;
steeper gradient on second rise;

                                                                                    3

(ii)   because one dose does not give a high enough level of
antibody to be effective / because the antibody falls after a while;

                                                                                    1

(iii)   antigens are only single molecules / part of parasite;
do not actually cause disease;

                                                                                    2

(c)   malaria sufferers would have parasites in red blood cells;

                                                                                    1

                                                                                    [9]

16   (a)   Presence of resistant and non-resistant varieties / mutation produces resistant variety;
Resistant ones survive / non-resistant ones killed by treatment;
These will reproduce and produce more resistant parasites / pass on resistance allele;

                                                                                    3

(b)   Likelihood of being infected (by strain resistant to both drugs) is less;
1/500 × 1/500/1/250 000;
Drug has longer effective life;

                                                                                    max 2

(c)　(i)　As comparison / to show that nothing else in the treatment was responsible;

　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　1

　　(ii)　Given injections of saline / injection without SPf66;
　　　　　(otherwise) treated the same as experimental group;

　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　2

(d)　(i)　100%;

　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　1

　　(ii)　10%;

　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　1

(e)　(i)　Different lengths of DNA have different base sequences / cut at specific
　　　　　sequence;
　　　　　Results in different shape / different shape of active site;
　　　　　Therefore (specific sequence) will only fit active site of enzyme;

　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　3

　　(ii)　Recognition sites contain only AT pairs;
　　　　　Which would occur very frequently;

　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　2

　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　[15]

17　(a)　side effects / allergic reactions / low toxicity to cells;
　　　　interaction with other drugs / effective in conditions of use / reasonably stable;
　　　　should only act on the problem bacteria / narrow spectrum;
　　　　how much resistance the bacteria have built up;

　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　2 max

　　(b)　(i)　tetracycline
　　　　　　　prevents tRNA binding to ribosomes / amino acid / mRNA;

　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　1

　　　　　　　amino acids not available / brought / picked up;

　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　1

　　　　　　　chloramphenicol
　　　　　　　prevents <u>amino acids</u> being joined / prevents primary structure forming;

　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　1

　　　　　　　no enzymes / no structural proteins formed;
　　　　　　　　　*(accept cell wall formation if qualified) (prevents protein synthesis
　　　　　　　　　gains one mark in either section, once only)*

　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　1

　　(ii)　only prevents tRNA binding to 70S / prokaryotic / bacterial
　　　　　<u>ribosomes</u> / human <u>ribosomes</u> are different sizes / shapes / structure;

　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　1

　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　[7]

18 (a) 1 macrophages present antigens to B lymphocytes;
2 antigen binds to / is complementary to receptors on lymphocyte;
3 binds to a specific lymphocyte;
4 lymphocytes become competent / sensitised;
5 (B) lymphocytes reproduce by <u>mitosis</u> / (B) lymphocytes <u>cloned</u>;
6 plasma cells secrete antibodies;

4 max

(b) 1 restriction enzyme / endonuclease;
2 to cut plasmid / to form sticky ends in plasmid;
3 (use) ligase(to join) <u>gene</u> to <u>plasmid</u>;
4 culture bacteria with (in medium containing) plasmids
5 to allow uptake of plasmids / transformation;
6 use of cold shock / chemical treatment (to enhance uptake) / heat shock;
(ignore bullets / electroporation / microinjection)

3 max

[7]

19 (a) bacteria have ligands / antigens / proteins / glycoproteins / polysaccharides (on membrane / wall);

1

complementary to receptors / fits / binds / attaches to specific receptor

1

(b) enzymes denatured / tertiary / secondary structure altered / altered active sites / breaks hydrogen bonds;

1

prevents named chemical reactions / metabolic pathways;

1

(c) inhibits / kills other bacteria / fungi / decomposers / reduces competition;

1

(d) 1 prepare a bacterial lawn / culture / sample;
(accept mix bacteria with agar / medium)
2 with oil and one with control / water / range of concentrations;
3 appropriate method of standardising how sample applied,
e.g. discs / wells;
4 appropriate measure of effectiveness / size / diameter of clear zone;
5 the larger the zone the greater the effectiveness;
6 use of aseptic technique;

(ignore haemocytometer)

4 max

[9]

20 (i) 1360 = 2 marks
(general principle 0.68 ÷ 0.05 x 100 gains 1 mark)

2

(ii) still have maternal antibodies;

1

[3]

21 (a) (i) fall in deaths due to rise in number of people with immunity / better care / targeting vaccination at vulnerable;

1

(ii) mutation of virus / new strain;
mutant form not recognised by memory cells (*allow antibodies*);

2 max

(b) (i) T lymphocyte receptors recognise shape of haemagglutinin / neuraminidase / viral antigen;
clone (*once only*);
destroy virus;

2 max

(ii) clone (*once only*);
produce antibodies;
effect of antibody e.g. stimulation of phagocytosis / precipitation of toxins;

2

(c) alter shape of active site of neuraminidase / block active site;
virus unable to leave host cells;

2

[9]

22 (a) memory <u>B</u> / <u>T</u> cells do not recognise (new antigens);
antibodies previously produced are not effective
as shape not complementary to new antigen;

2

(b) (i) <u>antigen</u> in <u>membrane</u> presented to lymphocytes / produce cytokinins;

1

(ii) mitochondria provide (more) ATP / energy;
(more) RER / ribosomes synthesise proteins;
(more) Golgi body secretes / modifies or packages proteins / produces glycoproteins;
(B lymphocytes) produces antibodies;

4

[7]

23 (a) 47 213;

1

(b) (i) there is no difference in the proportion / number of influenza cases between the 5 vaccines;

(reject vaccinated versus no vaccinated)

1

(ii) significant difference in proportion / number of cases of influenza between the vaccines / the null hypothesis should be rejected;

1

(c)   sample size small;
possible differences in exposure to infection;
exposure to different strains / mutants;
possible differences in existing immunity;
possible differences in sex / age;
possible differences in socio-economic status;

2 max

[5]

24   (a)   Microorganism alive/active;
But does not cause symptoms of disease/Avirulent;

               Accept does not make you ill/harm

2

(b)   (i)   (Takes time for) antigen to be recognised;

               Accept reference to presentation by macrophage
               for first marking point

         (Takes time for) T cells to be activated;

               Accept primary (immune) response

         B-cell activation/clonal selection/expansion;
         Plasma cells to make (specific) antibodies;
         Time for enough antibodies to measure;

2 max

       (ii)   Memory cells (present);

               Accept secondary (immune) response

         Respond immediately / can produce antibodies immediately;

2

[6]

25   (a)   Reverse transcriptase;

               Accept integrase/description of action of

Enzyme uses (HIV) RNA to make DNA (copy);

DNA joined to (host) cell's DNA/chromosome;

DNA used to make HIV RNA (copies);

               Accept (HIV) DNA replicated when (T) cell divides

And HIV capsid proteins/enzymes;

Made at (host) ribosomes;

Assembly of new virus particles;

Budding off from membrane (of host cell);

4 max

(b)   Not enough/no T-cells to activate B-cells/lead to antibody production/
activate immune system;

> *Accept death of T-cells weakens the immune system*

Person unable to fight /more prone to (opportunistic) infections/cancer;

> *Accept diseases*

Example of infection/cancer;

> *E.g. TB, pneumonia, cryptosporidium*

2 max

[6]

26   (a)   Zevalin/antibody binds to specific receptor/cell surface protein/antigen;

(Only found) on B-cells;

2

(b)   Patient **P** treated with Zevalin/yttrium (no mark);

> *Assume 'Zevalin' means 'with yttrium' unless they state
> otherwise*

Where indium/antibody (only) on lymphatic system/groin and armpits;

So only (cancerous) B-cells killed;

In patient **P** high concentration of radioactivity/antibodies high enough
to kill cancer cells;

Patient **Q** – radioactivity in places where other body cells could be killed/
organs damaged/named example;

Could harm patient more than cancer;

Patient **Q** cancer has spread;

So too late to treat;

3 max

(c)   Patient **Q** – (cancerous) B-cells outside of lymphatic system/metastasis;

<u>So</u> antibody bound in other parts of the body (as well);

Patient **Q** – has different receptors/distribution of receptors compared
to patient **P**;

Other body cells (than B-cells) have receptors for antibody;

2 max

(d)   Might be allergic to mouse antibody/protein;

Mouse) antibody acts as an antigen;

Causes an immune response/antibody production;

Antibody destroys Zevalin;

Releases radioactivity into body/prevents activity against the cancer;

                                                                                                            2 max

                                                                                                            [9]

27   (a)   Correct answer: 1.25;
                        Ignore working

        OR   (if wrong answer)

$$\frac{\text{measurement in } \mu m}{40000} \bigg/ \frac{\text{measurement in mm}}{40} = 1 \text{ mark}$$

                125 but wrong order of magnitude = 1 mark

                                                                                                            2

        (ii)   **C** has myosin / thick (and actin / thin) filaments;

                OR

                A has only actin / thin (/ no myosin / no thick) filaments;

                                                                                                            1 max

    (b)   When contracted:

        Thick & thin filaments/myosin & actin overlap more;

        Interaction between myosin heads & actin / cross-links form;

        Movement of myosin head;

        Thin filaments / actin moved along thick filaments / myosin;

        Movement of thin filaments / actin pulls Z-lines closer together;

        Displacement of tropomyosin to allow interaction;

        Role of Ca^{2+};

        Role of ATP;
                        Allow ref. to 'sliding filament mechanism' /
                        described if no other marks awarded

                                                                                                            4 max

(c) (i)   8 has DMD but 3 and 4 do not / 12 has DMD but 6 and 7
            do not / neither parent has the condition but their child has;
                Allow parents 3 and 4 give 8, parents 6 and 7 give 12

1

     (ii)   4 **AND** 7;

1

     (iii) Parental genotypes: 6 = X^DY AND 7 = X^DX^d

            AND

            Gametes correct for candidate's P genotypes – e.g.

            X^D and Y + X^D and X^d;

            Offspring genotypes <u>correctly derived</u> from gametes e.g.

            $X^DX^D + X^DX^d + X^DY + X^dY$;

            Male offspring with MD correctly identified: X^dY;

            Probability = 0.25 / correct for candidates offsprings genotypes;
                Accept ¼ / 1 in 4 / 1:3 / 25%
                NOT '3:1' / '1:4'

4

(d) (i)   No gene fragment **G**;

1

     (ii)   Only one copy of gene fragment **F**;

            Male has only one X-chromosome / is XY
            (c.f. female has two / is XX);

2

     (iii) 10 has only one copy of gene fragment **G**;

            10 has only one normal X-chromosome / has one abnormal /
            has only one normal allele / has one X^d / is X^DX^d / is heterozygous;

            11 has two normal X-chromosomes / has 2 normal alleles /
            is X^DX^D / has not got X^d / has 2 copies of (F and) G;

3

(e) (i)   To prevent rejection / prevent antibody production vs. injected cells /
            injected cells have (foreign) antigen (on surface);

1

     (ii)   Shows effect of <u>cells</u> / not just effect of injection / not just effect of
            salt solution;

1

(iii)   Only one person tested so far – need more to see if similar results / need more to see if reliable;

Need to assess if new (dystrophin positive) muscle fibres are functional / if muscle becomes functional;

Can't tell how widespread effect is in the muscle / sample taken near injection site;

Need to test for harmful side effects;

Need to test if successful for other mutations of dystrophin gene;

Need to assess permanence / longevity of result/insufficient time allowed in investigation;

(In this patient) only small response / %;

Further sensible suggestion;

4 max

[25]

28   (a)   (i)   P = membrane / lipid envelope / phospholipid bilayer;
Q = reverse transcriptase;
Accept (host) cell membrane;

2

(ii)   Carries genetic information / to make DNA;
Q *Do not accept 'information' on its own*
Accept genes, alleles,
to make (viral) protein;

1

(b)   DNA copy made (of viral RNA);
Inserted into host DNA / chromosomes;
(Uses viral DNA to) make viral proteins/particles;
Makes viral RNA;
(Host) cell makes new viruses;
"Budding off" / wrapped in cell membrane;
Accept reverse transcriptase makes DNA for 2 marks in correct context;

3 max

[6]

29   (a)   (i)   Molecule/protein/glycoprotein;
Stimulates immune response;
(That causes) production of antibodies;

2 max

(ii)   Antigens on HIV are different (shape);
So, antibody will not 'fit'/not complementary (to antigen);
Receptor sites on antibody specific to one antigen;

2 max

(iii)   (Has site with) same <u>shape</u> as salmonella antigen so binds
to anti-gal antibodies;
(Has site with) same <u>shape</u> as receptor molecule so that HIV will bind;
Binds to both molecules;

2 max

(b)   Salmonella pathogen has specific antigen on surface;
Salmonella pathogen engulfed by macrophage;
T-cells activate B-cells;
B-cell with complementary/specific receptor antibody activated/
clonal selection;
B-cells divide/form clone/clonal expansion;
<u>Plasma cells</u> make antibodies;
Specific to antigen/bind to salmonella bacterial antigen;

Accept macrophage presents antigen to T/B cells;

Accept T-cells release factors;

6 max

(c)   (i)   HIV binds to specific receptor;
Only present on certain cells / T-cells;

2

(ii)   Antibiotics stop metabolism, viruses don't have metabolism;
Viruses hide in cells, antibiotics can't reach;

Two suitable cell components antibiotics work against that
viruses don't have;
e.g. some antibiotics work against ribosomes, that viruses don't have

2

(d)   (i)   Adaptor molecule binds to HIV;
(This) prevents the HIV binding to the receptor;
Therefore few HIV available to infect cells;

2 max

(ii)   Would need to be complementary to MRSA (antigens);
MRSA has different antigens;
But would still need to have binding site for anti-gal;

2 max

[20]

30   (a)   Protein / molecule/glycoprotein;
On surface of cell/microorganism;
Stimulates immune response/production of antibodies;

2 max

(b) Zookeeper is not producing antibodies/passive immunity;
No memory cells made;

OR
Antivenom is an antigen/stimulates production of (anti-antivenom) antibodies;
(Antivenom) destroyed by zookeeper's own antibodies;

OR
Antibody destroys antigen/venom;
Before immune response/no immune response;

2

[4]

31 (a) Cotinine is an antigen;
Antigen/cotinine binds to (specific) T-cell/activates T-cell;
T-cell activates B-cells;
Specific B cell becomes activated;
(Specific) B cell divides/ clonal expansion;
Forms (clone of) plasma cells;
(Plasma) cell produces antibodies;

Accept macrophage presents antigen for one mark

Ignore references to memory cells and secondary
immune response

4 max

(b) Antibodies are proteins with tertiary structure/specific shape/binding sites;
Antibodies specific shape for cotinine;
Only cotinine fits;

Do not credit active site

2

[6]

32 (a) Damage / destruction of cells / tissues;
Production of toxins;

2

(b) Contains antigen / proteins / dead / weakened microorganism / pathogen / virus / bacteria;
Stimulates production of antibodies / plasma cells / memory cells;

> ***Q*** *Do not credit immune response unless qualified.*

2

(c) (i) Age;

Sex;

Ethnicity;

All healthy / not on other medication;

Not previously vaccinated / infected with TB;

> ***Q*** *Do not credit sample size.*
>
> ***Q*** *Allow any suitable reference to health not being affected for fourth marking point e.g. smoking, 'depressed immune system' etc.*

2 max

(ii) Contain the same antigens;

1

[7]