

Mark schemes

Q1.

- (a) 1. Mutation in the viral DNA/RNA/genome/genetic material;
Accept named examples mutations
2. Altered (tertiary structure of the) viral attachment protein;
Accept 'antigen' for 'attachment protein'
Accept causes antigenic variability
3. Allows it/attachment protein/virus to bind (to receptors of other species);
Accept descriptions of binding eg is complementary
- 2 max**
- (b) For **one** mark, accept any **two** of the following:
- The polymerase chain reaction
 - Genetic/DNA fingerprinting
 - (Gel) electrophoresis
 - DNA/genome sequencing;
- Accept PCR for polymerase chain reaction*
Accept autoradiography
Accept DNA hybridisation
Accept compare DNA/base sequence for 'DNA sequencing'
Ignore compare mRNA base sequence
Ignore compare amino acid sequence
Ignore DNA probes
- 1**
- (c) 1. (The scientists) could identify proteins (that derive from the genetic code)
- OR**
- (The scientists) could identify the proteome;
2. (They) could (then) identify potential antigens (to use in the vaccine);
Reject if answer suggests vaccine contains antibodies
- 2**
- (d) 1. B cell (antibody) binds to (viral) specific/complementary receptor/antigen;
Accept B cell forms antigen-antibody complex
2. B cell clones
- OR**
- B cell divides by mitosis;

3. Plasma cells release/produce (monoclonal) antibodies (against the virus);
4. (B/plasma cells produce/develop) memory cells;
Accept B cell undergoes clonal selection/expansion

3 max

[8]

Q2.

- (a) (All) the DNA in a cell/organism;

*Accept**'(all) the 'genes'/alleles' 'genetic material/code' in a cell/organism/ person'**'the total number of DNA bases in a cell/organism'**Reject all the DNA/ genes within a species*

1

- (b) 1. (Transcriptional factor/antibody) has a specific/tertiary structure/shape;

*Accept (antibody) has a specific variable region**Accept (transcription factor/antibody) has a specific binding site**Reject active site but only once.*

2. Complementary (shape/structure);

Reject active site but only once.

2

- (c) DNA, transcription factor and antibody;

*Accept Nucleotides for DNA**Ignore 'reference to chemicals'*

1