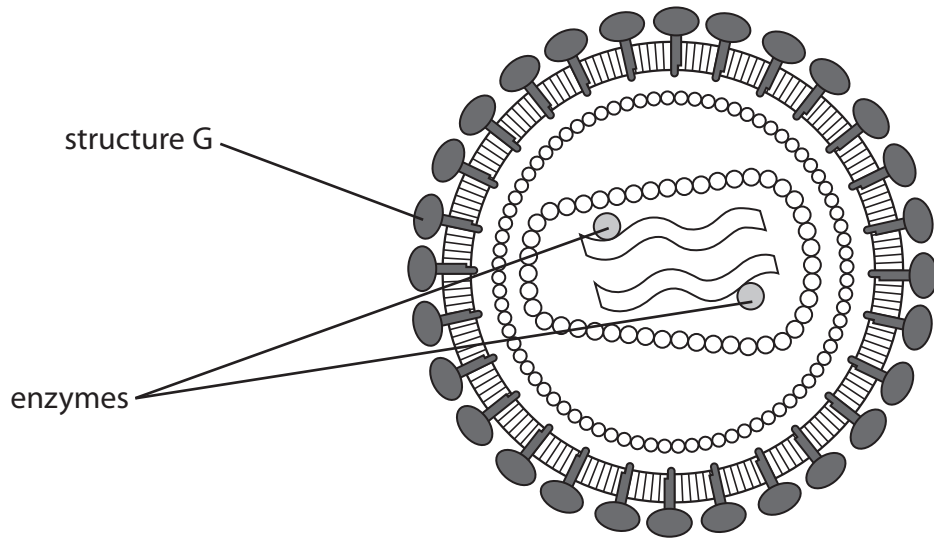


1 Anti-viral drugs have been developed to treat patients infected with Human Immunodeficiency Virus (HIV).

The diagram below shows the structure of HIV.



(a) Explain how **structure G** enables HIV to infect human cells.

(3)

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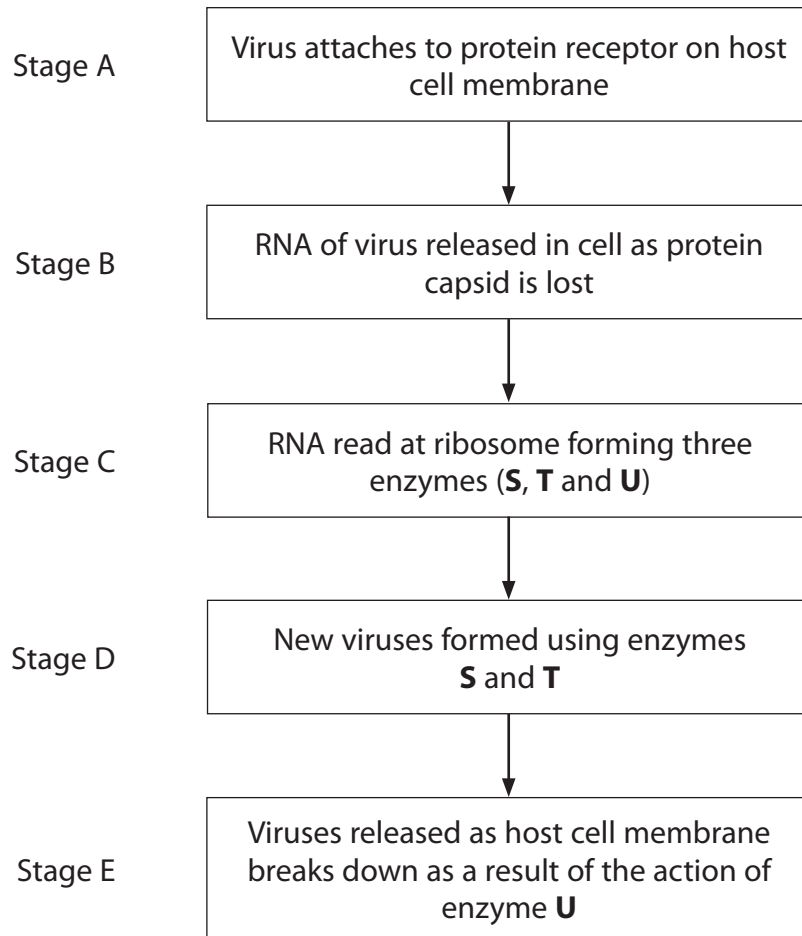
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2 The common cold is a disease caused by a variety of viruses.

The flow diagram below describes how common cold viruses attack the cells on the inside of the nose.



(a) Common cold viruses infect only the cells inside the nose.

(i) Suggest why common cold viruses cannot infect cells if they land on unbroken skin.

(2)

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(ii) Suggest why common cold viruses cannot infect cells if they enter the blood through a cut in the skin.

(2)

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(b) Compare the action of the RNA in the common cold virus with that found in HIV.

(2)

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(c) At Stage C, three enzymes are formed.

(i) Suggest why two of these enzymes, **S** and **T**, are needed at Stage D.

(2)

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(ii) Suggest how enzyme **U** might catalyse the breakdown of the host cell membrane at Stage E.

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(Total for Question 2 = 11 marks)

3 Eating food that is contaminated with microorganisms can cause food poisoning.

(a) Not all contaminated food causes food poisoning. Suggest explanations for this.

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(b) The norovirus causes a type of food poisoning, commonly called stomach flu. Norovirus is a non-enveloped RNA virus.

The virus stays in the small intestine and causes symptoms approximately 24 hours after eating the contaminated food.

Stomach flu can be caused by eating food containing as few as 20 viral particles.

(i) Suggest how new viral particles are formed inside the host cells.

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(ii) Suggest why so few viral particles are enough to cause symptoms after 24 hours.

(2)

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(iii) The risk of transmitting food poisoning microorganisms can often be reduced by using alcohol-based handwashes.

Suggest why alcohol-based handwashes do **not** reduce transmission of the norovirus.

(2)

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(Total for Question 3 = 11 marks)

4 Infection with human immunodeficiency virus (HIV) can lead to the condition known as AIDS. In this condition, part of the immune system is destroyed.

(a) The genetic material in HIV consists of two strands of RNA.

Place a cross in the box next to the term used to describe each of the sub-units in a molecule of RNA.

(1)

- A** amino acid
- B** inorganic phosphate
- C** nucleotide
- D** saccharide

(b) (i) Name **two** types of cell that HIV enters in the immune system.

(2)

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(ii) Explain how HIV is able to enter these cells.

(3)

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(iii) Describe the sequence of events following infection of these cells by HIV, that may lead to the death of the patient.

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(Total for Question 4 = 12 marks)