

- 3 (a) Fig. 3.1 shows a type of virus called a T2 phage. It consists of a protein coat enclosing a DNA molecule. T2 infects bacteria by attaching to the surface of a bacterium and injecting phage DNA into its cytoplasm. This DNA causes the bacterial cell to make new copies of the T2 phage. The protein coat of the phage is left loosely attached to the surface of the bacterium.

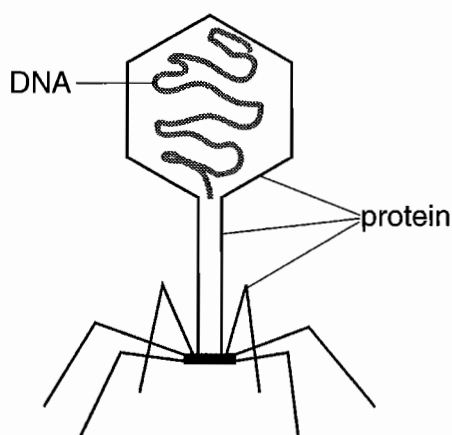


Fig. 3.1

- (i) State **two** ways in which the structure of the protein coat of T2 differs from the structure of its DNA.

1 .....

2 .....[2]

- (ii) A bacterium is a prokaryotic cell. List **three** features of a bacterium that T2 **does not** share.

1 .....

2 .....

3 .....[3]

T2 phages were used in experiments in 1952 to find out whether protein or DNA is the genetic material responsible for inheritance. The protein molecules in the coat were labelled with a radioactive isotope of sulphur,  $^{35}\text{S}$ , and the DNA inside was labelled with a radioactive isotope of phosphorus,  $^{32}\text{P}$ .

- (b) (i) Name the bond in protein that joins two sulphur atoms.

.....[1]

- (ii) Name the part of the DNA nucleotide to which phosphorus atoms are bonded.

.....[1]



(c) The experiments proceeded as shown in Fig. 3.2, **on the insert**.

(i) Explain why the isotopes of phosphorus and sulphur used in this experiment had to be radioactive.

.....  
.....  
.....  
.....[2]

(ii) Explain how the two experiments demonstrate that DNA, not protein, is the genetic material of the T2 phage.

.....  
.....  
.....  
.....  
.....  
.....  
.....[3]

[Total: 12]



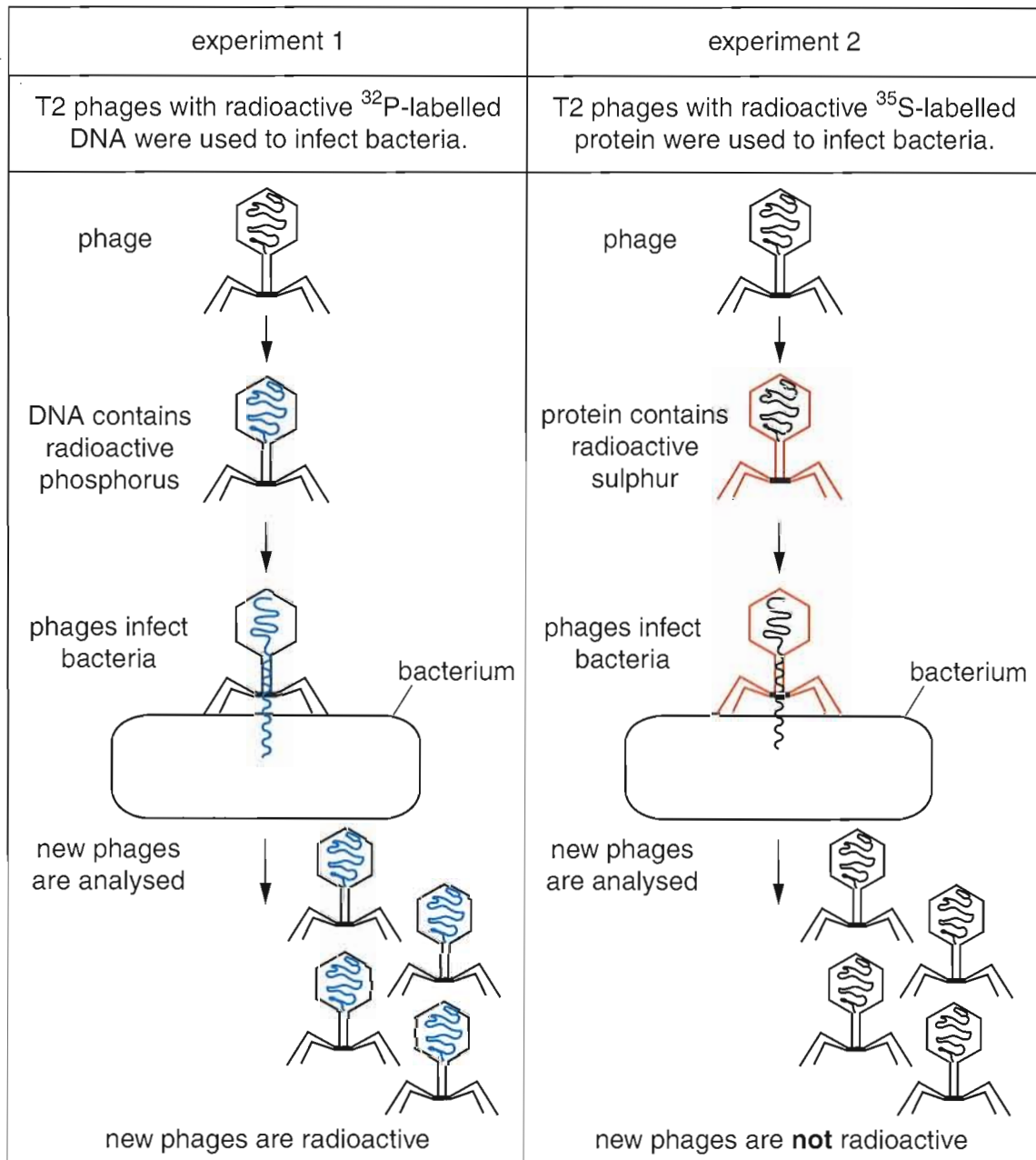


Fig. 3.2

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