

22 The gene that codes for protein R is 130 kb long.

Protein R is 220 kDa in mass.

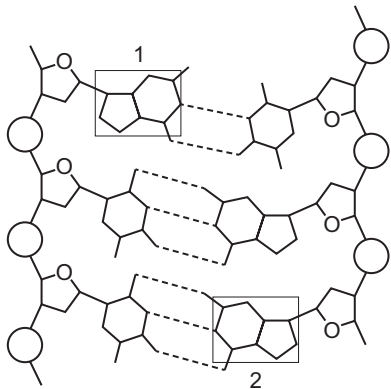
The typical mass of an amino acid is 110 Da.

(1000 base pairs = 1 kb, 1000 Da = 1 kDa)

Which row is correct?

	approximate length of introns in this gene/ base pairs	approximate length of mRNA for this gene/ base pairs
A	6000	6000
B	6000	130 000
C	124 000	6000
D	124 000	130 000

23 The diagram shows a section of DNA. Two of the bases in this section are labelled 1 and 2.



Which row correctly identifies the bases 1 and 2?

	base 1	base 2
A	purine	adenine
B	purine	guanine
C	pyrimidine	adenine
D	pyrimidine	guanine

24 Which row describes the role of the enzymes DNA polymerase and DNA ligase?

	DNA polymerase	DNA ligase
A	adds nucleotides in a 5' to 3' direction	joins sections of DNA together on the lagging strand
B	adds nucleotides in a 3' to 5' direction	joins sections of DNA together on the leading strand
C	adds nucleotides in a 3' to 5' direction	joins sections of DNA together on the lagging strand
D	adds nucleotides in a 5' to 3' direction	joins sections of DNA together on the leading strand

25 The table shows some of the DNA triplet codes for some amino acids.

amino acid	DNA triplet code	amino acid	DNA triplet code
arginine	GCA	glycine	CCA
arginine	GCC	glycine	CCG
arginine	GCG	glycine	CCT
asparagine	TTA	lysine	TTC
asparagine	TTG	lysine	TTT
cysteine	ACA	proline	GGA
cysteine	ACG	proline	GGC
STOP	ATC	valine	CAC

The base sequence on the template DNA strand coding for part of a polypeptide is shown.

CCA TTC ACG GCG TTA GCA

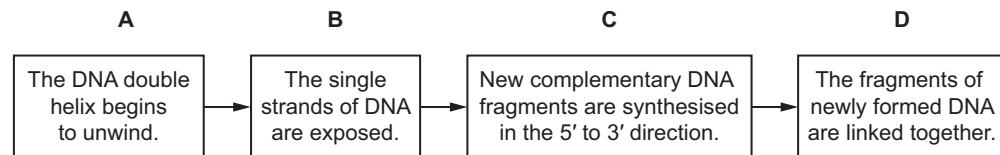
Two mutations occur in this sequence during DNA replication.

Which mutated DNA would result in two different amino acids?

- A CCA ATC ACG GCG TTG GCA
- B CCA TTC ACA GCA TTA GCA
- C CCA TTC ACG CCG TTA GCC
- D CCA TTC ACG GCG TTC GGA

24 The flow diagram shows some of the stages in the replication of a lagging strand of DNA.

Which stage of DNA replication uses the enzyme DNA ligase?



25 In a gene, the 20 common amino acids are each coded for by three bases in adjacent nucleotides.

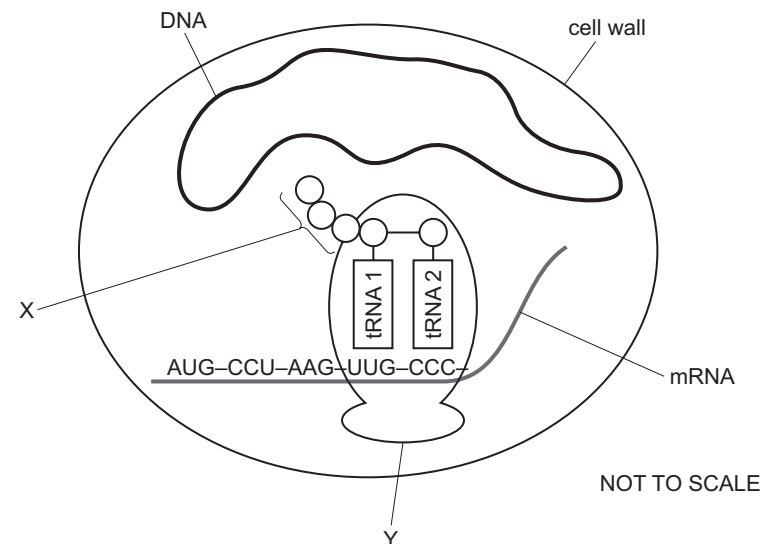
Why is there a difference between the number of amino acids and the number of possible triplet codes?

- A** 44 triplets have **no** functions.
- B** Some amino acids are coded for by more than one triplet.
- C** Some triplets have unknown functions.
- D** There are 44 'start' and 'stop' triplets.

26 How is a primary transcript modified to form mRNA?

- A** It becomes longer as exons are joined together.
- B** It becomes shorter as exons are removed.
- C** It becomes longer as introns are joined together.
- D** It becomes shorter as introns are removed.

27 The diagram shows protein synthesis in a prokaryote.



Which row is correct for molecule X, structure Y and the anticodon of tRNA 1?

	molecule X	structure Y	anticodon of tRNA 1
A	amino acid	80S ribosome	AAC
B	polypeptide	80S ribosome	UUG
C	polypeptide	70S ribosome	AAC
D	protein	70S ribosome	UUG

25 Which statements about complementary base pairing are correct?

- 1 It occurs during translation.
- 2 Purines and pyrimidines are the same size.
- 3 The base pairs are of equal length.
- 4 Uracil forms three hydrogen bonds with adenine.

- A** 1 and 2
- B** 1 and 3
- C** 2 and 3
- D** 3 and 4

26 Which statement is correct for protein synthesis?

- A** During translation, the strand of DNA used is the template strand.
- B** mRNA is formed when introns are removed from the primary transcript.
- C** The DNA primary transcript is modified by removing exons.
- D** tRNA has codons which attach to anticodons on the mRNA.