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Level: SL IB in Biology  
Subject: Biology  
Topic: IB SL Biology  
Type: Topic Question

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All International Baccalaureate IB Topic Questions SL Biology

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**BIOLOGY**

**SL - IB**

Key skills



**Question 1.**

The nucleotide base sequence and the associated sequence of four amino acids can be seen below:

AGG ACA CCT GGA  
Serine Tyrosine Glycine Proline

The table shows the mRNA codons and their associated amino acids.

		Second Letter								
		U	C	A	G					
First Letter	U	UUU } Phe	UCU } Ser	UAU } Tyr	UGU } Cys	U				
		UUC } Phe		UCC } Ser			UAC } Tyr	UGC } Cys	C	
		UUA } Leu		UCA } Ser			UAA – STOP	UGA – STOP		A
		UUG } Leu		UCG } Ser			UAG – STOP	GGU – Trp		
	C	CUU } Leu	CCU } Pro	CAU } His	CGU } Arg	U				
		CUC } Leu		CCC } Pro			CAC } His	CGC } Arg	C	
		CUA } Leu		CCA } Pro			CAA } Gln	CGA } Arg		A
		CUG } Leu		CCG } Pro			CAG } Gln	CGG } Arg		
	A	AUU } Ile	ACU } Thr	AAU } Asn	AGU } Ser	U				
		AUC } Ile		ACC } Thr			AAC } Asn	AGC } Ser	C	
		AUA } Ile		ACA } Thr			AAA } Lys	AGA } Arg		A
		AUG – Met		ACG } Thr			AAG } Lys	AGG } Arg		
	G	GUU } Val	GCU } Ala	GAU } Asp	GGU } Gly	U				
		GUC } Val		GCC } Ala			GAC } Asp	GGC } Gly	C	
		GUA } Val		GCA } Ala			GAA } Glu	GGA } Gly		A
		GUG } Val		GCG } Ala			GAG } Glu	GGG } Gly		

A single mutation occurred in the original base sequence of the DNA which resulted in only one amino acid from the sequence being produced.

Which of the following would represent the correct nucleotide base sequence which was found in the DNA after the mutation occurred?

- A. AGT ACA CCT GGA
- B. AGG ACT CCT GGA
- C. AGG ACC CCT GGA
- D. AGG ACA UGA GGA

[1 mark]

**Question 2.**

In a gene editing experiment using CRISPR-Cas9, a researcher introduces a double-strand break in a specific gene. Which of the following repair mechanisms could result in a gene knock-out?

- A. Non-homologous end joining (NHEJ)
- B. Homologous recombination (HR)
- C. Base excision repair (BER)
- D. Nucleotide excision repair (NER)

[1 mark]

**Question 3.**

A researcher is studying a new gene-editing technique that uses an engineered nuclease to create specific double-strand breaks in the DNA. The researcher finds that the technique exhibits higher precision and fewer off-target effects compared to traditional CRISPR-Cas9. Which technique is the researcher most likely using?

- A. TALENs (Transcription Activator-Like Effector Nucleases)
- B. ZFNs (Zinc Finger Nucleases)
- C. Meganucleases
- D. RNA-guided endonucleases



**[1 mark]**