

A certain genetic disorder is caused by a single base mutation in the DNA of a certain gene. The mutation changes the amino acid glutamate (Glu) to aspartate (Asp).

- a. Identify the type of macromolecule (carbohydrate, lipid, nucleic acid, protein) that changes when Glu changes to Asp. Explain your answer.

A portion of the amino acid sequence that includes this mutation is shown below.

**Val-Ser-Ala-Arg-Asp**

The sample of DNA below is being analyzed to determine if a patient has the genetic disorder.

**3' CAA-TCG-CGG-TCT-CTT 5'**

- b. Determine the mRNA sequence from the patient's DNA sequence.
- c. Using the information in the codon table below, determine the amino acid sequence that is coded for by the mRNA sequence you determined in part (b).
- d. Determine whether the patient has the genetic disorder. Explain your answer.

		Second Base of mRNA Codon					
		U	C	A	G		
First Base of mRNA Codon	U	UUU Phe	UCU Ser	UAU Tyr	UGU Cys	Third Base of mRNA Codon	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	UGG Trp		G
	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	G	
	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	
	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	G	