

Study Guide for the DNA Test

Relax – we'll complete this over several days.

1. Structure of DNA

- What are the building blocks of DNA called? Nucleotides
What are the three parts? Sugar, phosphate, and Nitrogen base.
- What is the sugar of DNA? Deoxyribose of RNA? Ribose
- What two parts of the nucleotide are in the backbone? Sugar and Phosphate.
- What is the correct name for the shape of DNA? Double helix.
- What are the four nitrogen bases in DNA? Adenine, Thymine, Cytosine, and Guanine. Which one replaces thymine in RNA? Uracil.
What base pairs with G? C A? T U? A
- What is the process when DNA makes an exact copy of itself? Replication.

2. Function (use) of DNA

- The process of transcription produces? RNA.
- The process of translation produces? Protein.
- What are the three types of RNA? mRNA, tRNA, and rRNA.
How does each of the three types of RNA help the cell in building proteins according to the DNA?
 - mRNA- "messenger" – take the message to the Ribosomes from the DNA
 - tRNA- "transfer/translate"-takes amino acids to ribosomes/ translates the "code"
 - rRNA- "ribosomal" – makes up ribosomes, helps manufacture proteins.
- With what organelle do proteins get built? Ribosomes
- If the codon on the mRNA strand that was being read was CUA, what would the anticodon that could bond to it be? GAU (think about this one)
What type of RNA has an anticodon? tRNA

3. Cancer

- How can a mutation affect the function of cells to make them cancer cells?
change in DNA, shuts off # of mitosis cycles, cell divides uncontrollably
- What is cancer? Disease caused by mutation where cells grow & divide uncontrollably
- What is a tumor? Mass of abnormal cells that develops when cancer cells divide and grow
- Why is fighting cancer more difficult than fighting bacteria? Antibiotics target certain bacteria. Cancer cells are your cells, Chemo can't tell the difference between good & bad cells.

If the following stretch of DNA gets transcribed what will the resulting mRNA look like?

ATTCGGGGCATAT

UAAGCCCCGUAUA

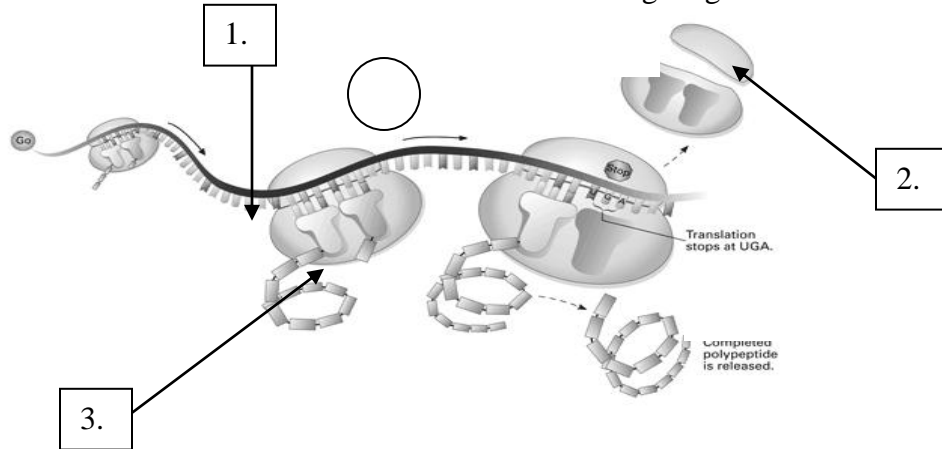
Using the chart beside this question, if the following mRNA sequence would be converted to Amino Acids what would the chain of amino acids be? Place a hyphen between each amino acid.

AUGAAACAUCUCUGA

Start – Lys – His – Leu – Stop

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

Label the 3 different kinds of RNA in the following diagram.



1.m 2.r 3.t

Vocabulary for the test – be able to compare/contrast related terms!

1. codon - 3 bases in mRNA that code for an amino acid
2. Anticodon - 3 bases in tRNA that match up to codon
3. deoxyribonucleic acid (DNA) - Double helix structure made of 4 nitrogen bases that contains the genetic code to make an organism.
4. mutation - A change in the DNA sequence.
5. nucleotide - building block of DNA, consists of a sugar, phosphate, & nitrogen base.
6. replication - process that produces two identical strands of DNA, is semiconservative, meaning each new DNA molecule contains one new and one old strand.
7. ribonucleic acid (RNA) - single strand molecule whose code comes from a part of DNA - has three kinds, & is used to build proteins.
8. transcription - Process that makes one strand of RNA from DNA.
9. translation - Process where RNA is translated to construct proteins using a ribosome.

Central Dogma

Fill in the following flowchart with information about the central dogma of Biology. *Hint: the arrows represent the names of a process*

DNA ----> Transcription ----> **RNA** -----> Translation -----> **Protein**