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Fall 2020 - **Finals week**

Fall 2020 - LIFESCI7A-3 - MALOY

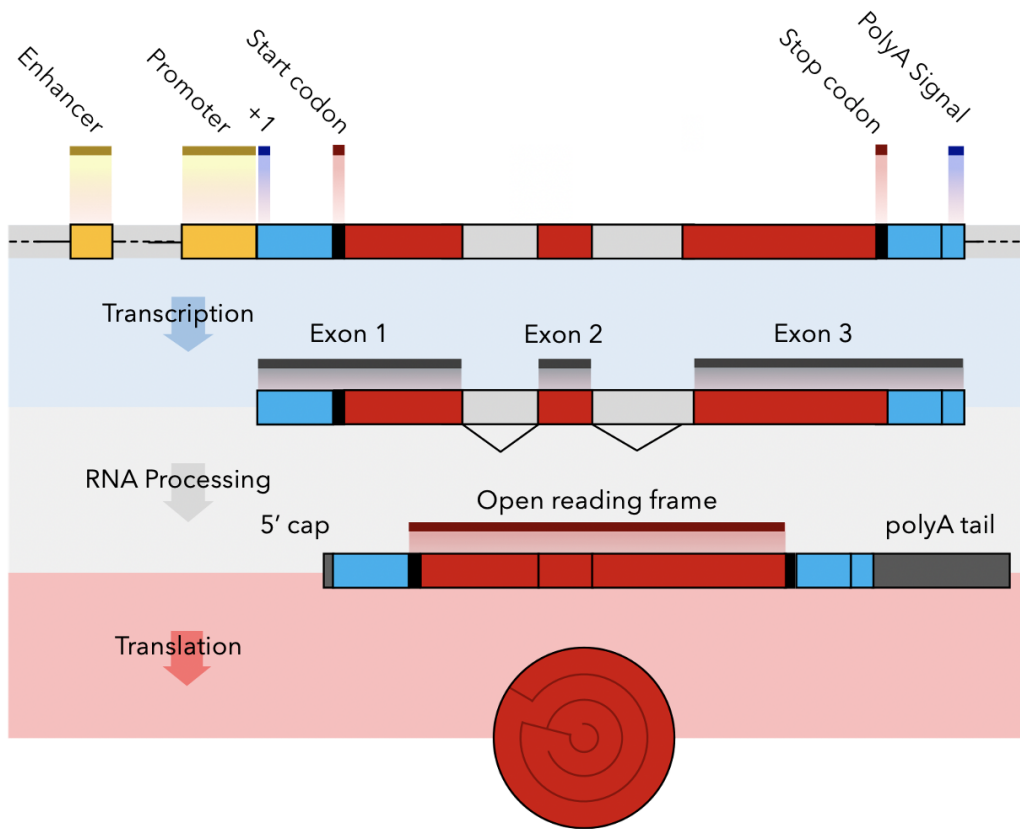
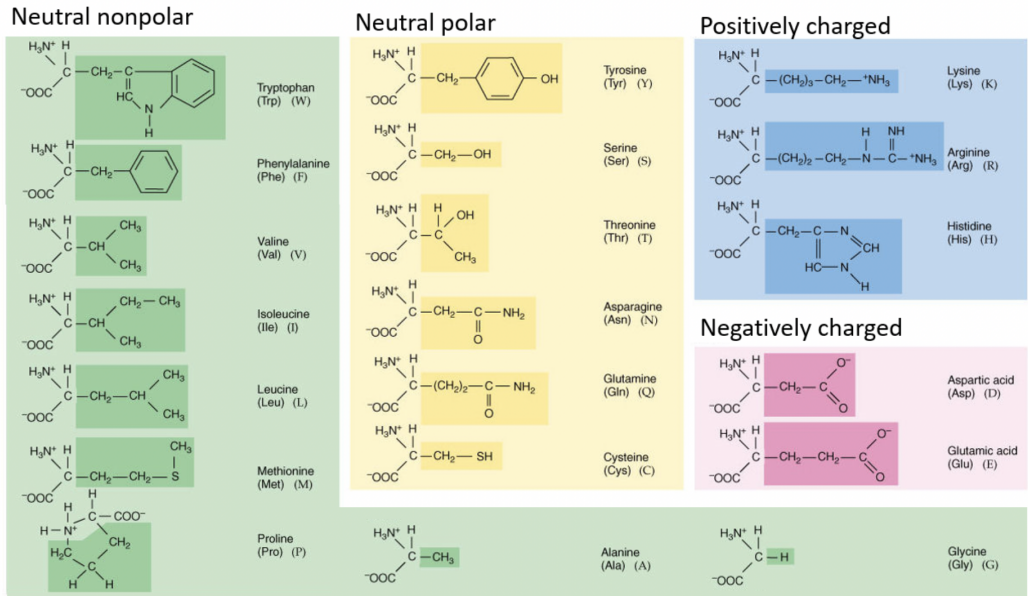
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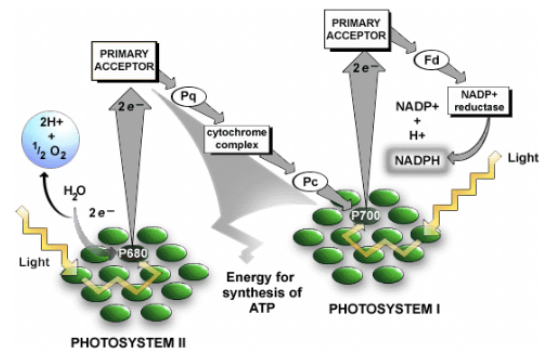
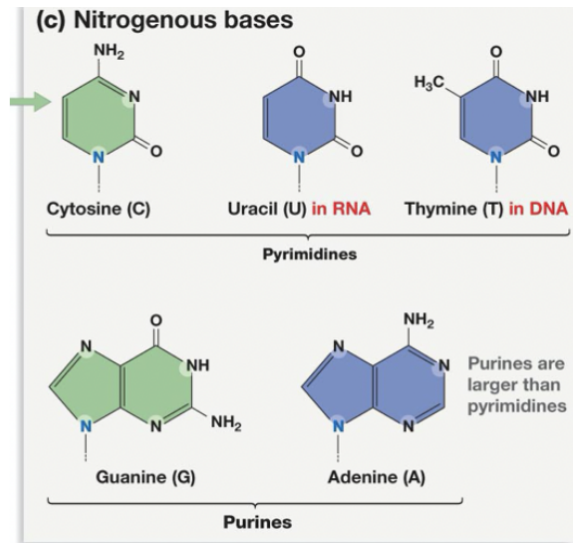
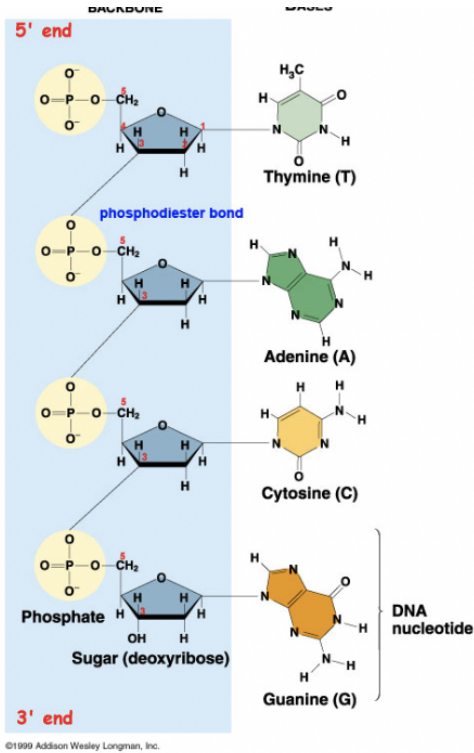
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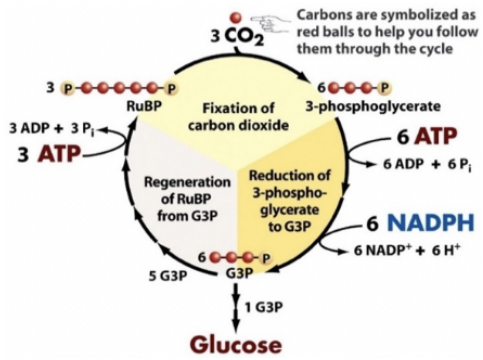
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In addition to the figures associated with different problems throughout the exam, you may refer to the following figures if you find them useful:





		Second letter					
		U	C	A	G		
First letter	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
	C	CUU } CUC } Leu CUA } CUG }	CCU } CCC } Pro CCA } CCG }	CAU } His CAC } CAA } Gln CAG }	CGU } Arg CGC } CGA } CGG }	U	C
	A	AUU } Ile AUC } AUA } Met AUG }	ACU } ACC } Thr ACA } ACG }	AAU } Asn AAC } AAA } Lys AAG }	AGU } Ser AGC } AGA } Arg AGG }	U	C
	G	GUU } Val GUC } GUA } GUG }	GCU } Ala GCC } GCA } GCG }	GAU } Asp GAC } GAA } Glu GAG }	GGU } Gly GGC } GGA } GGG }	U	C
		Third letter					



Information

[Questions 1-3] You are interested in joining a lab at UCLA to study SARS-CoV-2, the coronavirus that causes COVID. Your lab is hoping to learn more about the virus to develop new treatments. To study this virus in the lab, you plan on infecting cells obtained from mice. You learn from your new lab mates that the mouse genome follows the same rules of DNA base composition and base pairing that you learned about in class. Given this information, what can you conclude about the genome of your mouse cells?



Complete

Not graded

Mouse DNA must contain equal amounts of thymine and guanine.

Select one:

- a. True **22% adenine, 22% thymine**
 b. False **28% cytosine, 28% guanine**

Question 2

Complete

Not graded

Mouse DNA must contain the same number of purines and pyrimidines.

Select one:

- a. True **22% adenine, 22% thymine**
 b. False **28% cytosine, 28% guanine**
purines—> A +G
pyrimidines—> T+C
“mouse genome follows same rules of DNA base composition”

Question 3

Complete

Not graded

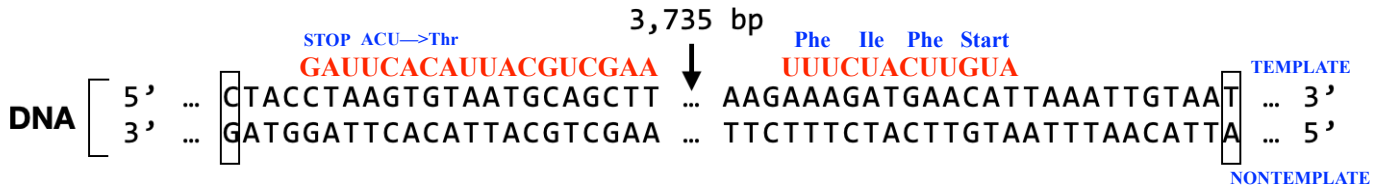
Mouse DNA must contain the same cytosine/thymine ratio as humans.

Select one:

- a. True **different organisms have different levels of purines and pyrimidines**
 b. False

[Questions 4-12] SARS-CoV-2 uses a protein on its surface called "S Protein" to bind to and infect human cells. To study this protein, you create a double stranded DNA sequence that contains the gene for S Protein. Since you learned in LS 7A that a double stranded piece of DNA can contain multiple genes that are transcribed in opposite directions, you also include the sequence for another unrelated gene (Gene X) on the opposite strand. Your double stranded DNA sequence is shown below.

This DNA sequence contains no introns. The three dots in the middle of the sequence indicate that there are an additional 3,735 base pairs in the middle of this DNA sequence that are not shown here, which can be assumed to not contain any stop codons. The boxed base pairs represent the +1 transcription start site for the two genes. The three dots on either side of the DNA sequence indicate that this sequence can be assumed to extend beyond your computer screen on both sides, and the promoter(s) for the S Protein gene and Gene X are located somewhere off of your computer screen. Use this figure and the codon chart below to answer the following questions.



		Second letter					
		U	C	A	G		
First letter	U	UUU } Phe	UCU } Ser	UAU } Tyr	UGU } Cys	U	Third letter
	UUC } Leu	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 } Met	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			



Complete

Not graded

The amino acid sequence of S Protein begins Met-Phe-Ile-Phe. Which strand is the template strand for the S Protein gene?

- a. The top strand shown in the diagram
- b. The bottom strand shown in the diagram

Question 5

Complete

Not graded

What is the last amino acid in S Protein?

- a. Ile
- b. Thr
- c. Lys
- d. Met
- e. None of these

Question 6

Complete

Not graded

T/F: When transcribing the S Protein gene, RNA polymerase will read the DNA sequence from the left side of your computer screen to the right side of your computer screen.

Select one:

- a. True **it will read right to left 3'—>5'**
- b. False

Question 7

Complete

Not graded

The S Protein gene and Gene X most likely share the same promoter region on your DNA sequence.

Select one:

- a. True **RNA has to read DNA from 3'—>5' so the promoter regions will begin on the 3' side for both genes which are on opposite sides of the screen**
- b. False



Complete
Not graded

RNA polymerase will read the sequence for Gene X from the 5' end to the 3' end of the template strand.

Select one:

- a. True **RNA always reads DNA from 3'—>5'**
- b. False

Question 9

Complete
Not graded

The primary structure of the proteins expressed from each of these genes will be the same.

Select one:

- a. True
- b. False

Question 10

Complete
Not graded

The tertiary structure of S Protein and the protein expressed from Gene X will most likely be the same.

Select one:

- a. True
- b. False

Question 11

Complete
Not graded

How many total amino acids would you find in S Protein?

Select one:

- a. 47
- b. 1,255
- c. 1,256
- d. 3,765
- e. 3,768
- f. A different number not shown above
- g. Not possible to say without more information



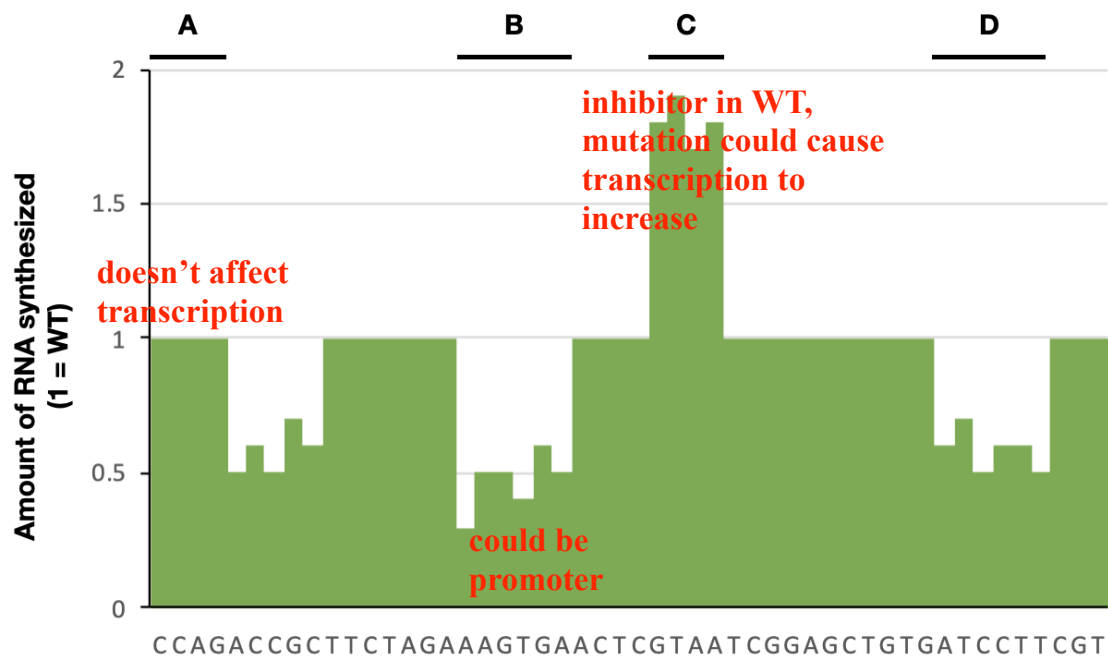
Which of the following changes to a codon would you expect to be LEAST damaging to the resulting protein (all codons are written 5'->3')?

Select one:

- a. GCC -> CUG **look at polarity chart, GCC—>CUG remains neutral nonpolar, least damaging bc no significant change in composition**
- b. GAG -> AAG
- c. AGC -> AGA
- d. CAA -> GAA

Information

[Questions 13-16] You suspect that regulation of the transcription of the SARS-CoV-2 S Protein gene might play an important role in infection. To identify important regulatory elements for this gene, you isolate a piece of DNA that includes the sequence before the transcribed region of the gene. You change the first nucleotide in this region to a different nucleotide and measure how much the gene is transcribed, relative to how much was transcribed before you made a mutation. You then change the second nucleotide and measure how much the gene is transcribed. You then change the third nucleotide, and so on. The results from your experiment are shown below, with certain regions of the graph labeled for reference (A, B, C, and D). Using these data, mark each of the following statements true or false.





Complete

Not graded

T/F: Region C could be a promoter sequence.

Select one:

- a. True
 b. False

Question 14

Complete

Not graded

Region A does not appear to play a role in transcription.

Select one:

- a. True
 b. False

Question 15

Complete

Not graded

Region B could be a promoter sequence.

Select one:

- a. True
 b. False

Question 16

Complete

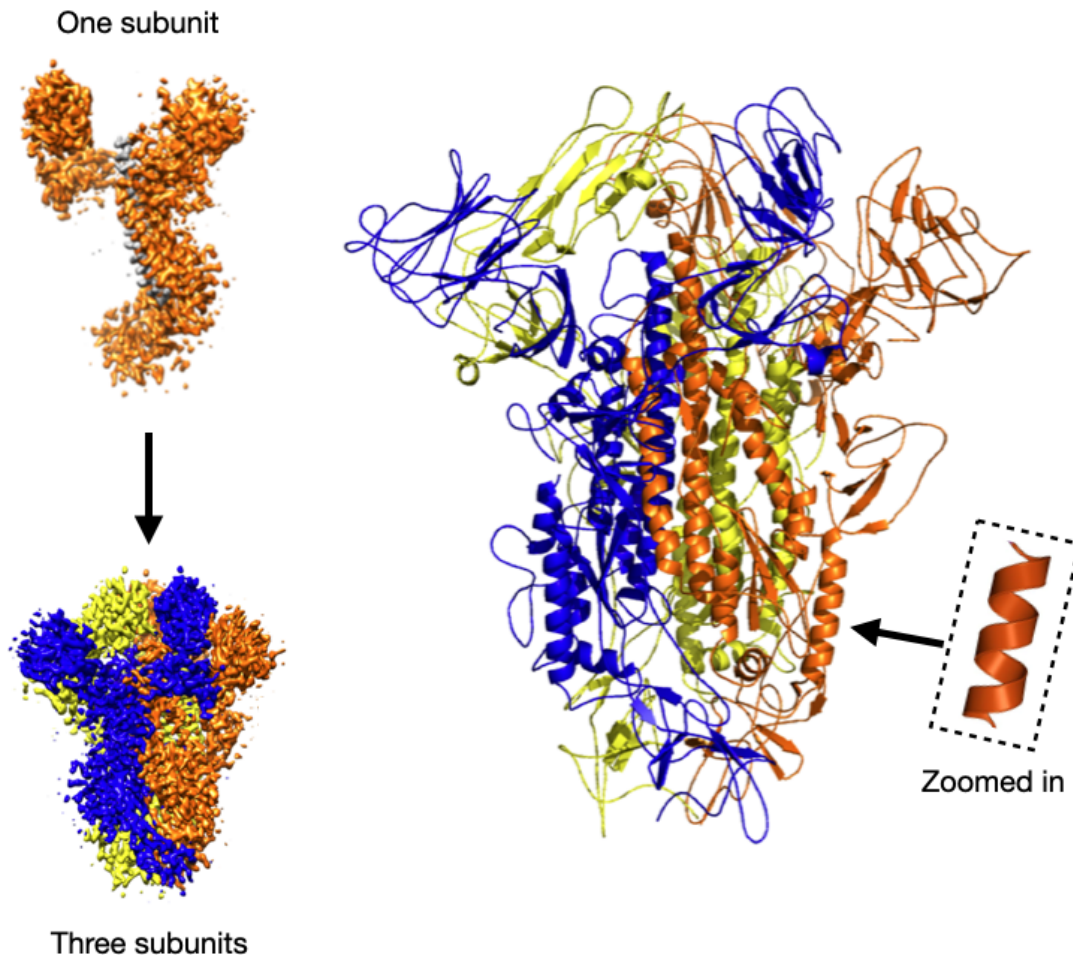
Not graded

When the nucleotides in region C are mutated, transcription of this gene increases.

Select one:

- a. True
 b. False

[Questions 17-20] The image below depicts the structure of the SARS-CoV-2 S Protein. S Protein is made up of three identical polypeptide chains, or subunits, that associate with each other and form a spike-like structure on the surface of SARS-CoV-2. The left side of this image shows the structure of a single subunit (top) and the assembled S Protein spike structure (bottom). The right side of this image is a different model of the same S Protein structure that shows more detail of the protein structure. The arrow on the right side of the image points to a specific part of this structure, and a zoomed in view of that part of the structure is shown to the right of the arrow in a dotted box. Use this information to answer the following questions.

**Question 17**

Complete

Not graded

What is the highest level of protein structure visible anywhere in this image?

Select one:

- a. Primary
- b. Secondary
- c. Tertiary
- d. Quaternary



Complete

Not graded

T/F: If heat were added to S Protein, the primary structure would be the first level of structure to be disrupted.

Select one:

- a. True **it would denature (secondary structure would unravel)**
- b. False

Question 19

Complete

Not graded

T/F: Addition of one nucleotide in the open reading frame of the S Protein gene would likely result in a nonfunctional S protein.

Select one:

- a. True
- b. False

Question 20

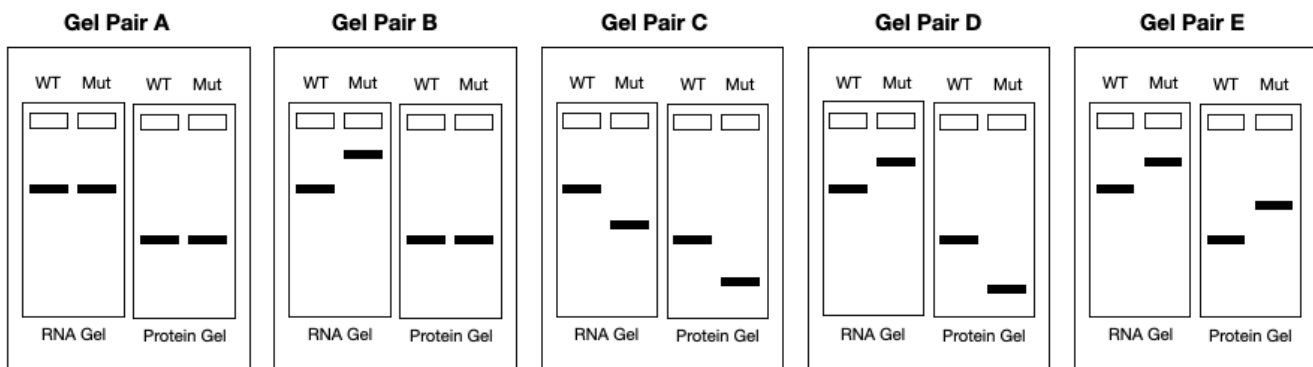
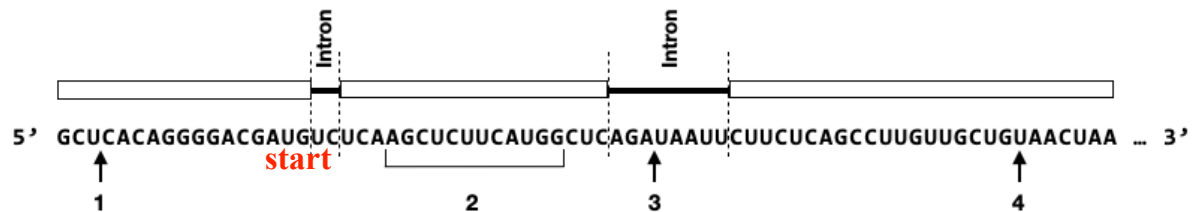
Complete

Not graded

What level of protein structure is shown in the boxed zoomed in region?

- a. Primary
- b. Secondary
- c. Tertiary
- d. Quaternary

[Questions 21-25] Angiotensin Converting Enzyme 2 (ACE2) is a membrane protein on the surface of human cells in the lungs, arteries, and heart. To infect human cells, SARS-CoV-2 uses its S Protein to bind to ACE2 on cell surfaces in the lungs. The first part of the sequence of the primary RNA transcript encoding ACE2 is shown below (the full sequence is actually much longer and extends beyond your computer screen, as indicated by the three dots to the right of the sequence). A diagram above the sequence highlights certain features of this primary RNA transcript. Exons are depicted as white boxes, and introns are indicated by lines. The numbered regions represent areas of this gene where mutations will be made. Each of the questions below describes a different mutation that could occur in the ACE2 gene. Below the sequence are five possible gel pairs showing the potential consequences of different mutations in the ACE2 gene. The gel pairs each contain an RNA gel showing the mature mRNA product and a protein gel showing the protein produced from that mRNA. On each gel, "WT" is the normal wild type version of ACE2 and "MUT" is the mutated version. Assume any difference in size of a molecule (even one nucleotide!) from WT is detectable on a gel. Use the gel pairs as answer choices to describe the result you would be most likely to observe as a consequence of each mutation. Answer choices may be used more than once or not at all.



Question 21

Complete

Not graded

Gel pair that could result from the addition of AAUAC at point 1.

Select one:

- a. Gel Pair A **RNA gets longer so towards top**
- b. Gel Pair B **doesn't affect transcription so protein is same bc it's before the start codon**
- c. Gel Pair C
- d. Gel Pair D
- e. Gel Pair E
- f. None of these



Complete

Not graded

Gels that could result from the deletion of the region indicated at point 2.

Select one:

- a. Gel Pair A
- b. Gel Pair B
- c. Gel Pair C
- d. Gel Pair D
- e. Gel Pair E
- f. None of these

RNA and protein get shorter so towards bottom

Question **23**

Complete

Not graded

Gel pair that could result from inserting AAUUGU at point 3

Select one:

- a. Gel Pair A
- b. Gel Pair B
- c. Gel Pair C
- d. Gel Pair D
- e. Gel Pair E
- f. None of these

RNA and protein stay same bc it's an intron (it's cut out of mRNA)

Question **24**

Complete

Not graded

Gel pair that could result from changing the U at point 4 to an A.

Select one:

- a. Gel Pair A
- b. Gel Pair B
- c. Gel Pair C
- d. Gel Pair D
- e. Gel Pair E
- f. None of these

RNA and protein stay the same



Gel pair that could result from a mutation making the spliceosome nonfunctional.

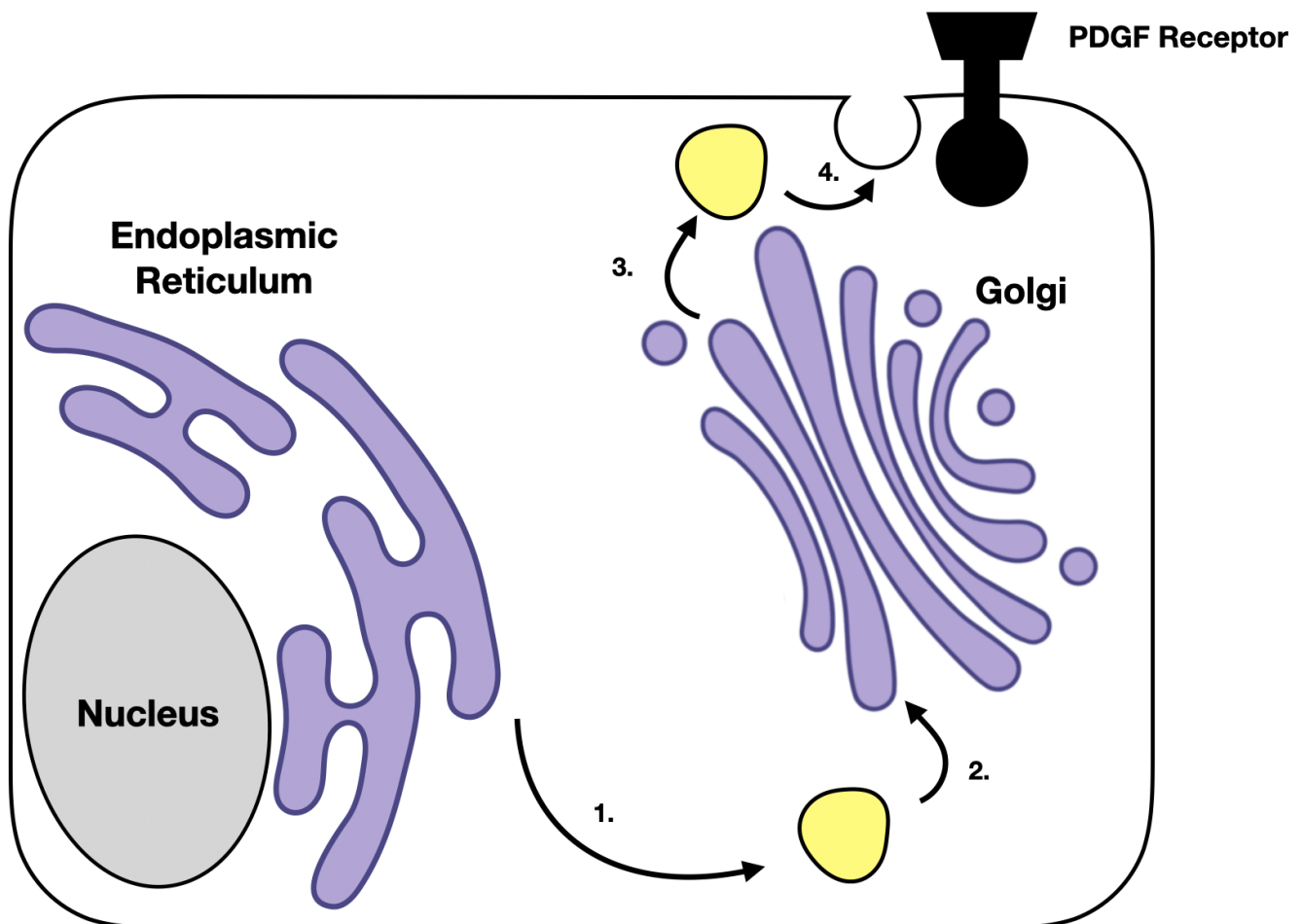
Select one:

- a. Gel Pair A
- b. Gel Pair B
- c. Gel Pair C
- d. Gel Pair D
- e. Gel Pair E
- f. None of these

RNA and protein get longer bc can't cut out introns

Information

Platelet-derived growth factor (PDGF) is a small molecule signal that binds to the surface of cells and subsequently promotes cell growth and division. To respond to the PDGF signal, cells must express a PDGF receptor on their cell surface in a specific orientation. The diagram below shows the process of protein trafficking in the endomembrane system. The PDGF receptor is shown on the cell surface, with its receptor domain facing outward and its signaling domain facing inward. Use this information to answer the following questions.





T/F: A ribosome initially became bound to the mRNA encoding PDGF Receptor in the cytosol.

Select one:

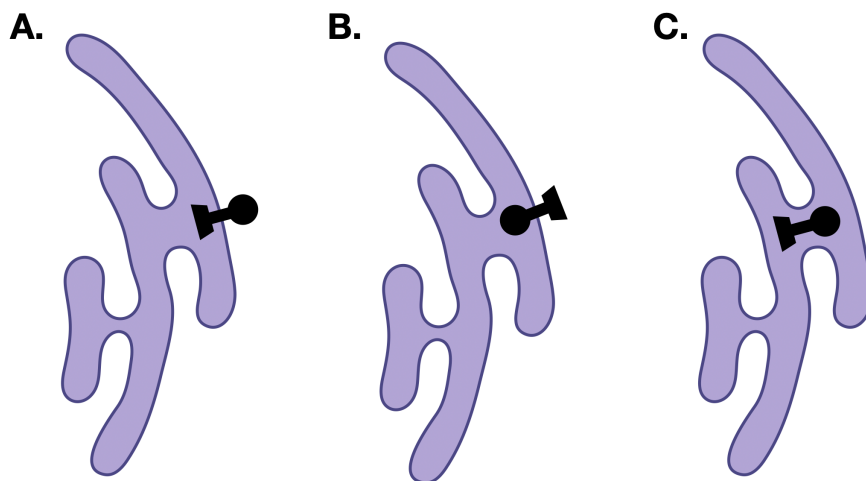
- a. True **initially binds to the endoplasmic reticulum**
- b. False

Question 27

Complete

Not graded

Which of the following images correctly depicts the configuration of the PDGF Receptor protein in relation to the endoplasmic reticulum following translation?



Select one:

- Image A
- Image B
- Image C
- None of these

You are working on reproducing this vaccine by expressing the SARS-CoV-2 S Protein in a different kind of plant cell. However, you are becoming frustrated because your experiments aren't working. Your lab mate tells you that your experiments aren't working because the plant cells that you are working with have a mutation that prevents them from forming any vesicles. Where would you expect to find accumulation of S Protein in these plant cells?

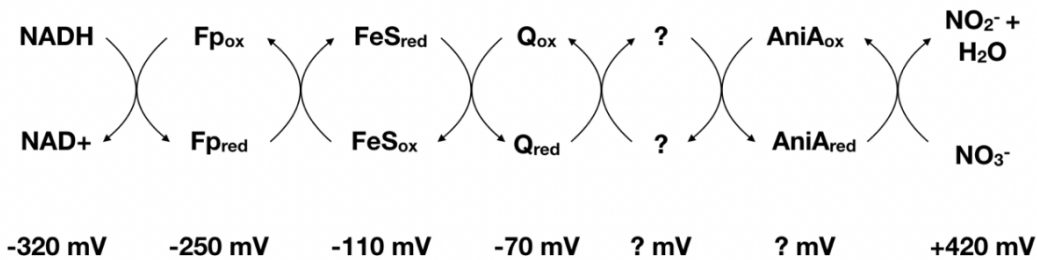
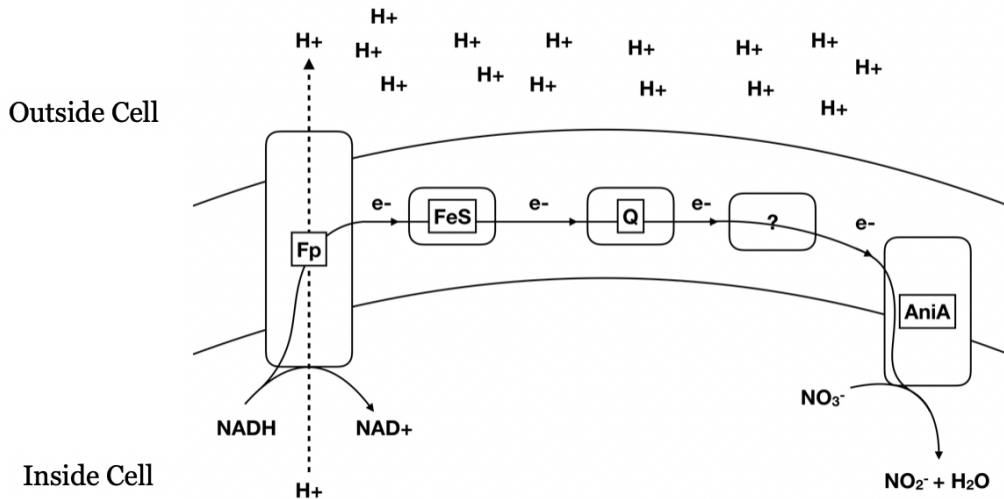
Select one:

- a. In the cytosol
- b. In the endoplasmic reticulum
- c. In vesicles
- d. In the golgi

proteins are synthesized in the ER and require vesicles to be transported to the golgi so no vesicals —> protein buildup in the ER

Information

[Questions 29-33] *Neisseria gonorrhoeae* is a bacterium that uses an electron transport chain like the one you learned about in humans to generate ATP. However, since *Neisseria* tend to live in environments without oxygen, they have evolved an electron transport chain that uses nitrate (NO_3^-) as a final electron acceptor rather than oxygen. The chemical principles that drive the electron transport chain in humans are the same principles that drive this electron transport chain in *Neisseria*. *Neisseria* uses an ATP synthase that is similar in structure and function to the ATP synthases you learned about in class. Below the diagram are the redox reactions involved in this electron transport chain, along with the redox potential (in mV) of each complex involved in the chain. Use this information to answer the following questions:





Complete

Not graded

Based on this diagram, the redox potential of ? could be ____ and the redox potential of AniA could be _____.

Select one:

- a. -90, -30
- b. -30, -90
- c. +30, -30
- d. -30, +30

has to continually increase

Question 30

Complete

Not graded

FpRed is an example of an oxidizing agent.

Select one:

- a. True
- b. False

oxidizing agents: reactant that oxidizes a product, takes electron from NADH and it oxidizes NAD+
****should be true****

Question 31

Complete

Not graded

Based on this diagram, you would expect to find ATP synthase in this bacterial membrane with its ATP-producing rotor domain facing toward the top of this exam page.

Select one:

- a. True
- b. False

rotor will face the bottom of the page because H+ ions are flowing from outside to inside the cell, from the thylakoid (more concentration) to the stroma

Question 32

Complete

Not graded

At the same time the total amount of NADH increases in a cell, the total amount of NAD+ in the cell will increase.

Select one:

- a. True
- b. False

the more NADH there is, the more NAD+ will be used up
—>less NAD+ as NADH increases



Complete

Not graded

Adding a drug that increase the pH inside the cell will cause ATP production to increase.

Select one:

- a. True
 b. False

if the inside of the cell is more basic and outside more acidic, H⁺ will flow from outside the cell to inside the cell, as ATP synthase uses this proton gradient more ATP will be made

Information

[Questions 34-35] A new drug to treat *Neisseria* infection inhibits AniA, so that it can no longer pass electrons to its final electron acceptor. Use this information to answer the questions below.

Question **34**

Complete

Not graded

If this drug is added to a *Neisseria* cell, the total amount of ATP in the cell will _____ compared to before treatment.

Select one:

- a. Increase
 b. Decrease
 c. Stay the same

if you inhibit/break AniA, everything before will be stuck in the reduced state everything after will accumulate in oxidative state bc no electrons ATP will decrease because NADH won't be able to produce NAD⁺ and NADH production will stop?

Question **35**

Complete

Not graded

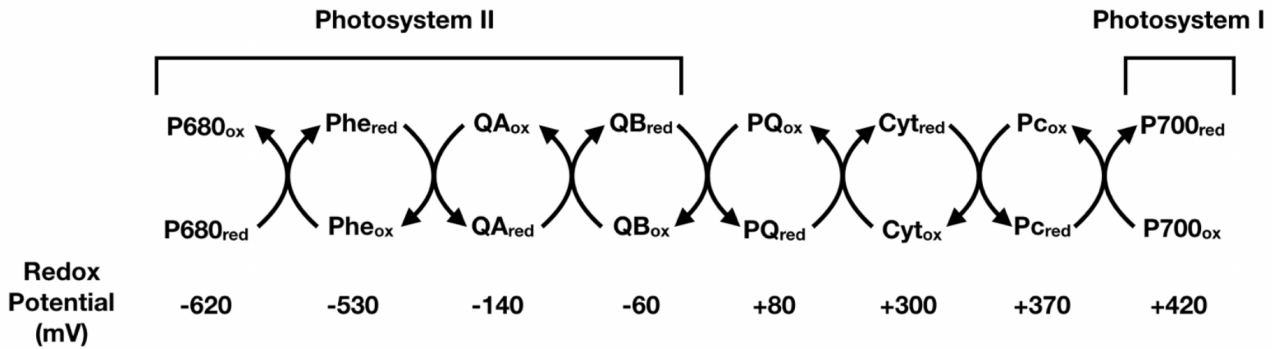
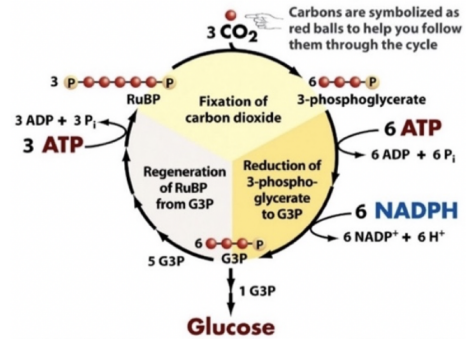
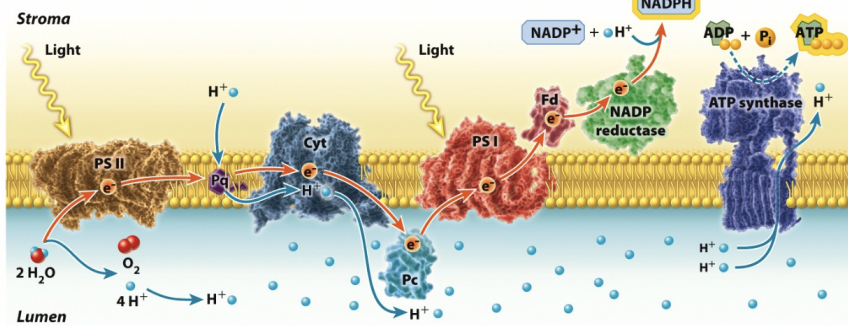
If this drug is added to a *Neisseria* cell, the amount of F_{pred} will _____ compared to before treatment.

Select one:

- a. Increase
 b. Decrease
 c. Stay the same

The figures below show the light harvesting reactions of photosynthesis and the Calvin Cycle. Beneath the figures is a partial diagram of the redox reactions involved in the light harvesting reactions of photosynthesis, going from photosystem II to photosystem I. Note that photosystem II is made up of multiple smaller components indicated on the redox reaction diagram.

The production of NADPH and ATP by photosynthesis



A chemical DCMU is used to block the binding of QB to QA in photosystem II. What would happen after a plant is treated with DCMU?

Question **36**
 Complete
 Not graded

NADP accumulates in its reduced form.

- Select one:
- a. True
 - b. False

**if you inhibit/break photosystem II, everything before will be stuck in the reduced state
 everything after will accumulate in oxidative state bc no electrons
 NADP will accumulate in its oxidative form**



Complete

Not graded

Pc accumulates in its oxidized form.

Select one:

- a. True
 b. False

Question 38

Complete

Not graded

Light energy will no longer be absorbed by chlorophyll molecules in photosystem I.

Select one:

- a. True
 b. False

Question 39

Complete

Not graded

More oxygen will be produced by the plant when treated with DCMU.

Select one:

- a. True
 b. False

Question 40

Complete

Not graded

When a plant is treated with DCMU, 3-phosphoglycerate will accumulate in the chloroplast.

Select one:

- a. True
 b. False

Adding a particular drug changes the redox potential of P700 from +420 to +310. Which of the following would you expect to observe in plant cells treated with this drug?

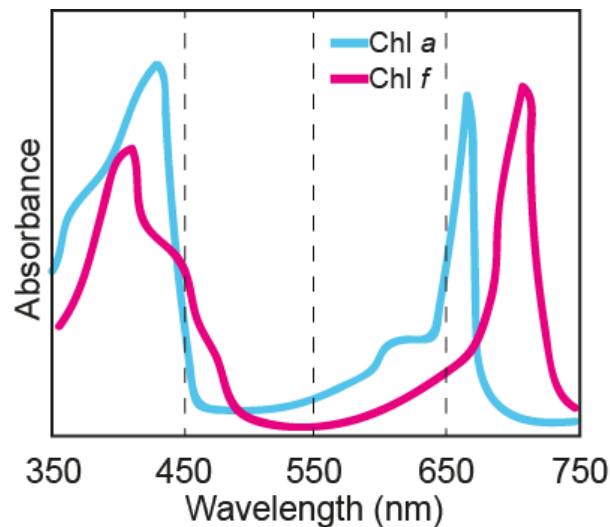
- a. Phe would accumulate in its reduced form.
- b. ATP would continue to be produced.
- c. Pc would accumulate in its oxidized form.
- d. Levels of 3-phosphoglycerate would decrease.
- e. More than one of the above

**pc will accumulate in oxidized form
levels of 3-phos will INCREASE because
NADPH and ADP levels decrease so 3-phos
won't convert to glucose**

Information

[Questions 42-45] Plants use a variety of pigments to absorb energy from the sun. The most commonly used pigment in plants is chlorophyll a; however, some plants and photosynthetic bacteria produce another pigment, chlorophyll f. Both of these pigments are able to absorb solar energy at different wavelengths, as indicated by the graph below.

You have recently discovered two species of plants, which you have cleverly called "Plant A" and "Plant B". Plant A uses only chlorophyll A for photosynthesis, and Plant B uses only chlorophyll f for photosynthesis. Use this information and the diagrams of photosynthesis above to answer the following questions.



Question 42

Complete

Not graded

If both plants are grown under a light source that emits light at 725 nm, which would produce more oxygen?

Select one:

- a. Plant A
- b. Plant B



Complete

Not graded

If both plants are grown under a light source that emits light at 680 nm, in which would you expect to find more PQred?

Select one:

- a. Plant A
 b. Plant B

Question 44

Complete

Not graded

If both plants are grown under a light source that emits light at 430 nm, which would produce ATP at a higher rate?

Select one:

- a. Plant A
 b. Plant B

Question 45

Complete

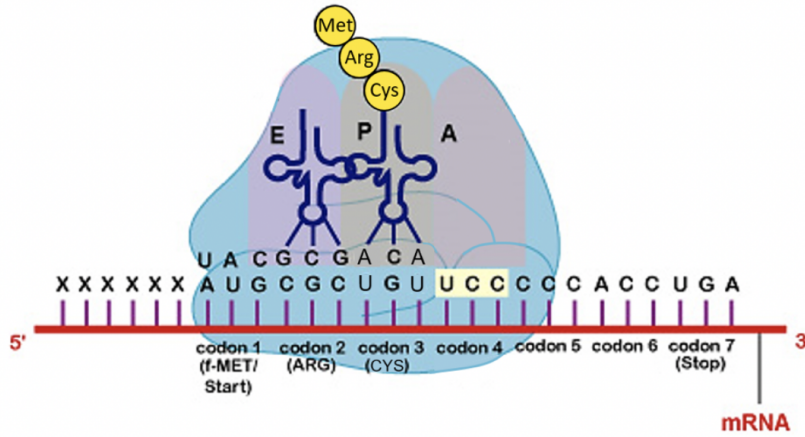
Not graded

If they are grown outside with natural sunlight as their light source, more carbon dioxide will be fixed by both plants during the daytime than at night.

Select one:

- a. True
 b. False

[Questions 46-53] The figure below represents a ribosome in the process of translating an mRNA molecule. What will happen as the ribosome continues to translate the mRNA molecule shown in the diagram? For questions 46-50, mark true or false. You may find the codon chart below useful in answering questions 51-53.



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

Question 46
Complete
Not graded

The growing polypeptide chain will be transferred to the tRNA in the E site of the ribosome.

Select one:

- a. True **it will stay in the P site to grow, the E site ejects it**
- b. False



Complete

Not graded

The tRNA that is shown in the diagram with the anticodon 3'-ACA-5' will eventually be ejected from the ribosome.

Select one:

- a. True
 b. False

Question 48

Complete

Not graded

The same aminoacyl tRNA synthetase can charge the tRNA molecule with the anticodon 3'-GCG-5' and the tRNA molecule with the anticodon 3'-ACA-5'

Select one:

- a. True
 b. False

Question 49

Complete

Not graded

The amino acid encoded by codon 4 will be covalently bonded to the tRNA currently shown in the P site.

Select one:

- a. True
 b. False
- amino acid from codon 4 will never physically touch the ACA tRNA that is currently in the P site, and the polypeptide chain will actually bind on the A site**

Question 50

Complete

Not graded

The next amino acid added to the polypeptide will form a peptide bond with the Cys amino acid.

Select one:

- a. True
 b. False



Complete

Not graded

Refer to the diagram of translation above. What is the anticodon of the tRNA that recognizes codon 4?

Select one:

- a. 5'-GGA-3'
- b. 5'-CCU-3'
- c. 5'-AGG-3'
- d. 5'-UCC-3'
- e. None of the above

**tRNA is antiparallel to mRNA
the codon chart refers to mRNA
so the anticodon is 5'-GGA-3'**

**codons in mRNA are read from 5'-3'
so the anticodons read from 3'-5'**

**codon 5'-UCC-3'
anticodon 3'-AGG-5'
tRNA reads 5'-GGA-3'**

Question 52

Complete

Not graded

What amino acid will be attached to a tRNA with the anticodon sequence 5'-CGU-3'?

Select one:

- a. Arginine (Arg)
- b. Threonine (Thr)
- c. Alanine (Ala)
- d. Serine (Ser)
- e. None of the above

tRNA reads 5'-CGU-3'

preceding anticodon that tRNA read: 3'-UGC-5'

mRNA that anticodon read: 5'-ACG-3' (codon chart is mRNA 5'-3')

Question 53

Complete

Not graded

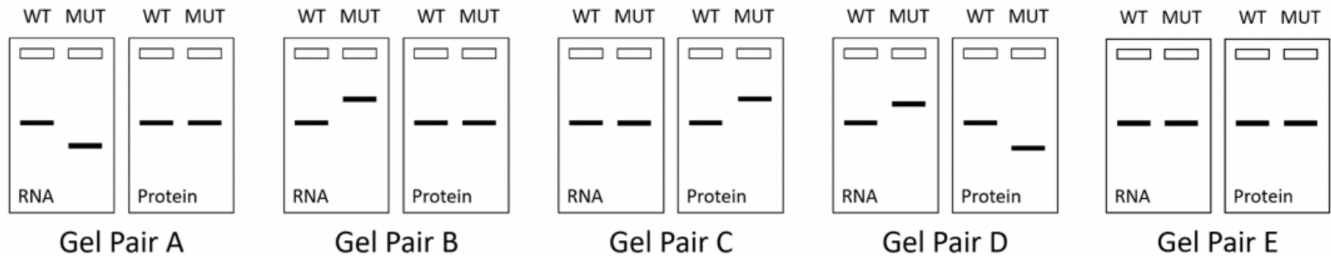
In a certain mutant strain of bacteria, 10% of the tRNAs with the anticodon 5'-UAG-3' are modified so that they have an anticodon of 5'-CCU-3'. These bacteria will synthesize:

Select one:

- a. Proteins in which Leu is inserted at some positions normally occupied by Arg.
- b. Shorter proteins on average than the wild-type bacterium
- c. Proteins in which Arg is inserted at some positions normally occupied by Leu.
- d. Longer proteins on average than the wild-type bacterium

**tRNA anticodon 5'-UAG-3' corresponds to mRNA codon CUA (leu)
tRNA anticodon 5'-CCU-3' corresponds to mRNA codon AGG (Arg)
bacteria will synthesize proteins in which Arg is inserted at positions
normally occupied by Leu**

[Questions 54-57] Each of the questions below describes a different mutation that could occur in a eukaryotic gene. Each gel pair contains an RNA gel showing the mature mRNA product of a eukaryotic gene and a Protein gel showing the protein product of the same gene. On each gel, "WT" is the normal wild type version and "MUT" is the mutated version. Use the answer choices [A, B, C, D, or E] to determine which pair of gels you would be most likely to observe as a consequence of each mutation. Answer choices may be used more than once or not at all.



Question 54

Complete

Not graded

A mutation that causes the polyA tail to be half the length of the WT polyA tail.

Select one:

- a. Gel pair A **mature mRNA with polyA tail will get shorter as it's halved → move further down the gel**
- b. Gel pair B
- c. Gel pair C **protein will remain the same bc only concerned with open reading frame not the polyA tail**
- d. Gel pair D
- e. Gel pair E

Question 55

Complete

Not graded

A missense mutation in an exon of this gene that changes the codon for serine to the codon for threonine.

Select one:

- a. Gel pair A
- b. Gel pair B
- c. Gel pair C **same bc not a stop codon**
- d. Gel pair D
- e. Gel pair E



Complete

Not graded

A mutation that adds 50 nucleotides to the 5' untranslated region (UTR) of this gene.

Select one:

- a. Gel pair A
- b. Gel pair B
- c. Gel pair C
- d. Gel pair D
- e. Gel pair E

RNA gets longer, protein is same

Question **57**

Complete

Not graded

A mutation changing the stop codon into the codon for methionine.

Select one:

- a. Gel pair A
- b. Gel pair B
- c. Gel pair C
- d. Gel pair D
- e. Gel pair E

RNA same, protein longer so moves up gel

Information

[Questions 58-60] Even though they are organelles within eukaryotic cells, mitochondria have their own genomes! These mitochondrial genomes contain several genes that are transcribed and translated inside the mitochondria. Mitochondria have their own ribosomes and tRNAs that use the same genetic code as the rest of the eukaryotic cell with two important differences: one stop codon codes for the amino acid Tyrosine (Tyr) and another stop codon codes for the amino acid Tryptophan (Trp). This information is summarized in the table below.

Codon	Cytosol	Mitochondria
5' – UAA – 3'	STOP	Tyr
5' – UAG – 3'	STOP	STOP
5' – UGA – 3'	STOP	Trp

Use this information to answer the following questions.



Complete

Not graded

A tRNA with the anticodon 5'-UCA-3' is present in mitochondria.

Select one:

- a. True
 b. False

Question 59

Complete

Not graded

A tRNA with the anticodon 5'-UCA-3' is present in the cytosol.

Select one:

- a. True
 b. False

Question 60

Complete

Not graded

Suppose that all of the tRNAs inside the mitochondria escape and are present in the cytosol of the cell. Assuming that these tRNAs can be used by the ribosomes in the cytosol, the average length of polypeptides synthesized by the cell will most likely _____.

Select one:

- a. Increase
 b. Decrease
 c. Stay the same

tRNA can pair with a stop codon to make the protein longer instead of stopping translation all together, so the average length of the polypeptides synthesized by the cell will increase

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[Answer change reasoning ... ▶](#)







