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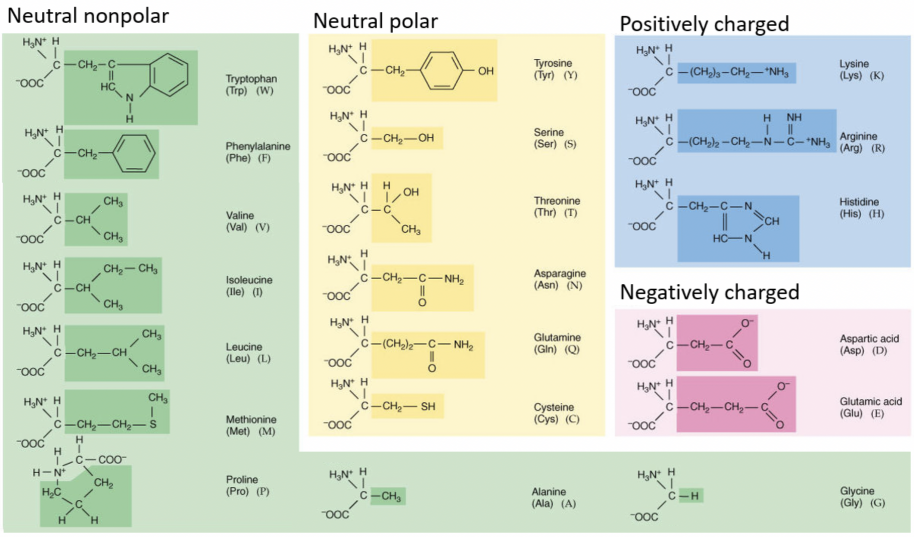
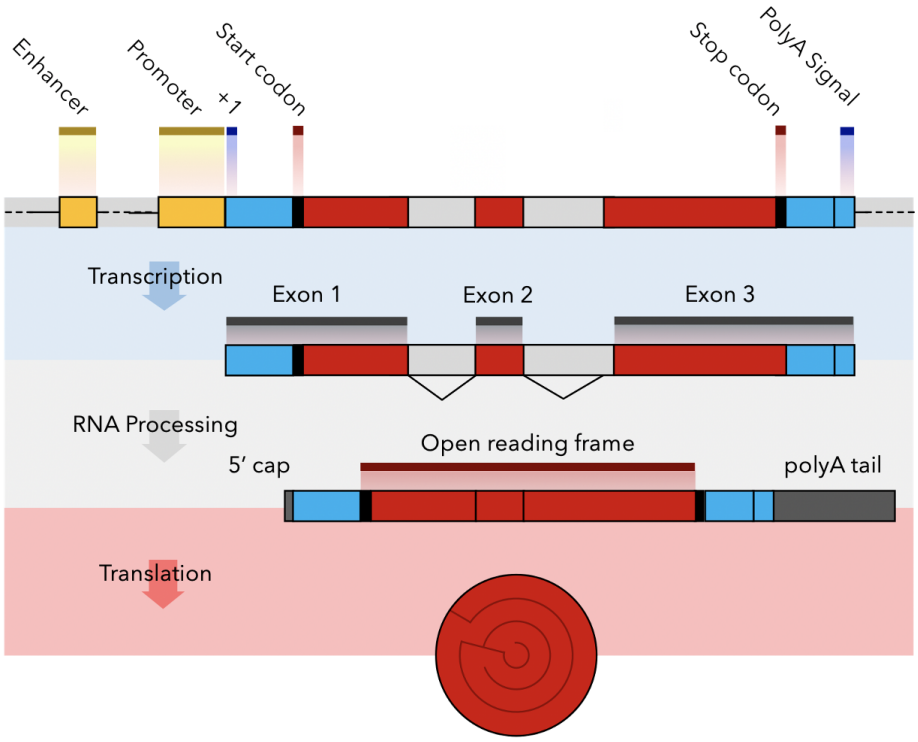
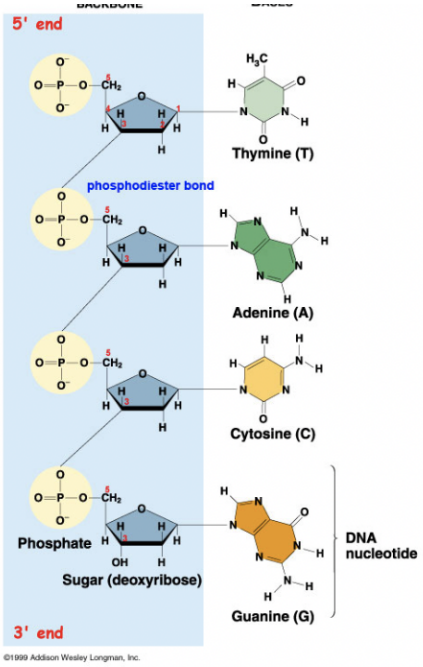
| **Started on** | Friday, 15 May 2020, 5:42 PM PDT |
| **State** | Finished |
| **Completed on** | Friday, 15 May 2020, 6:11 PM PDT |
| **Time taken** | 29 mins 38 secs |

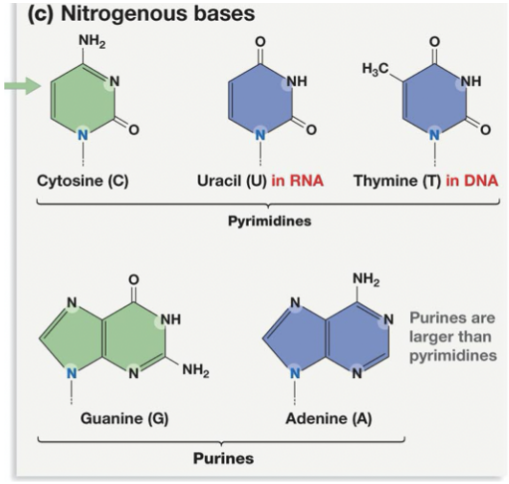
Hi friend, this isn't the best pdf because I used Ctrl+P on CCLE, which means that some questions are cut off and there is cursed text in places. Just ignore the cursed text, and try your best to understand. All answers present are correct.

figures if you find them useful:



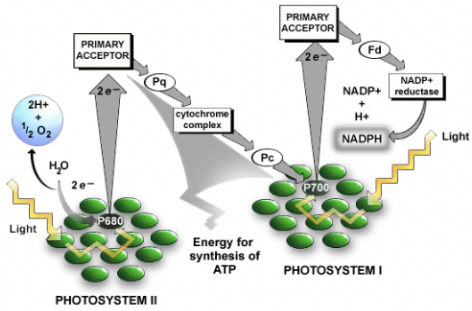



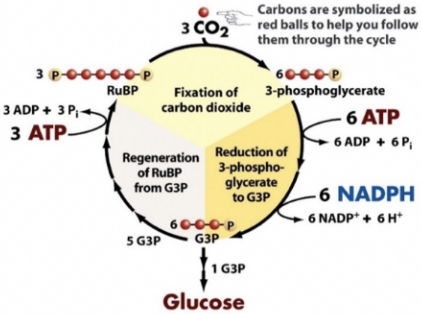


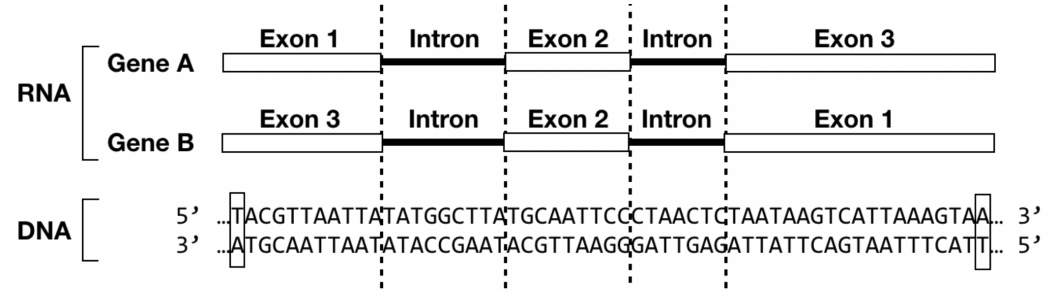

**Second letter**

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



depicted as white boxes, and introns are indicated by lines. The corresponding DNA sequence is shown below the gene diagrams. 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 for Gene A and Gene B are located somewhere off of your computer screen. Use this figure and the codon chart below to answer the following questions.




**Second letter**

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

Question 1

Correct

Points out of 2.00

For Gene B, RNA polymerase will read the DNA sequence from right to left.

Select one:

- a. True ✔
- b. False

Question 2

Correct

Points out of 2.00

The template strand for Gene A is the top strand.

Select one:

- a. True
- b. False ✔

Correct

Points out of 2.00

Select one:

- a. True
- b. False ✔

Question 4

Correct

Points out of 2.00

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

Select one:

- a. True
- b. False ✔

Question 5

Correct

Points out of 2.00

The third amino acid in the protein made from gene A is Leu.

Select one:

- a. True
- b. False ✔

Question 6

Correct

Points out of 2.00

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

Select one:

- a. True
- b. False ✔

Question 7

Correct

Points out of 2.00

The resulting tertiary structure of the proteins expressed from each of these genes will most likely be the same.

Select one:

- a. True
- b. False ✔

Question 8

Correct

Points out of 2.00

How many amino acids would you find in the protein made from Gene B?

Select one:

- a. 3 ✔
- b. 5
- c. 8
- d. 9
- e. None of the above

Question 9

Correct

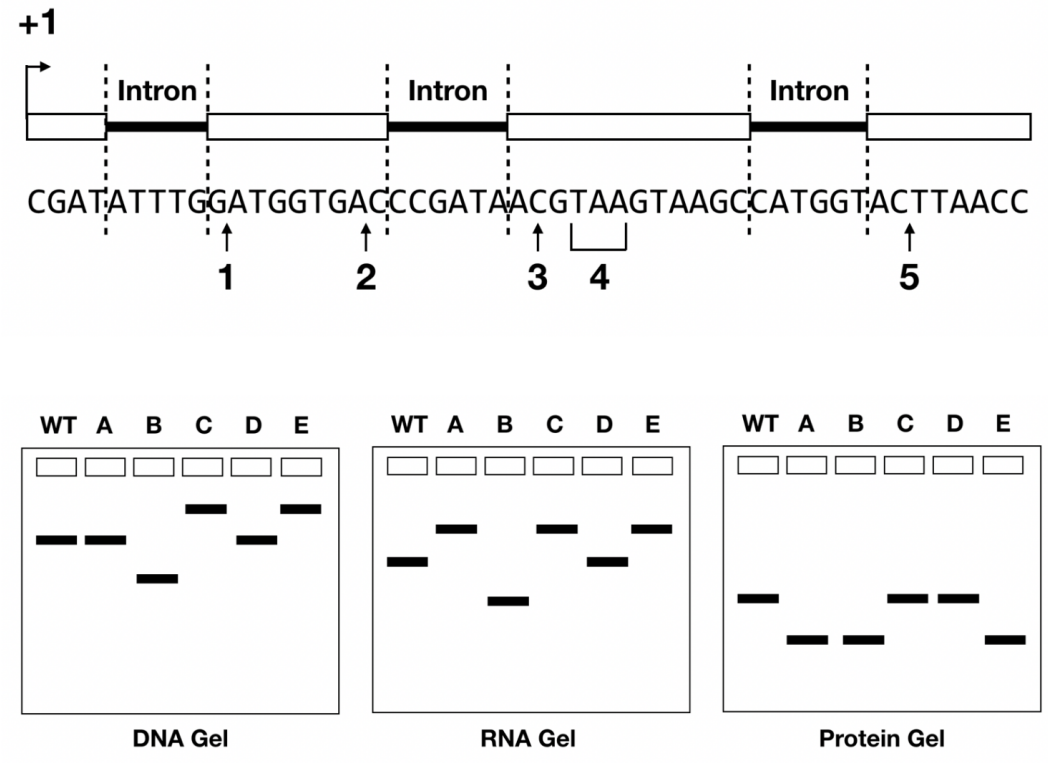
Points out of 2.00

Which of the following changes to a codon would you expect to be LEAST damaging to the resulting protein?

Select one:

- a. UCC -> CCC
- b. UCC -> UUC
- c. UCC -> UGC
- d. UCC -> AGU ✔

+1 transcription start site is shown by an arrow, exons are depicted by 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 this gene. The gels represent a DNA gel for Gene X, an RNA gel showing the mature mRNA product of Gene X, and a Protein gel showing the protein product of Gene X. On each gel, "WT" is the normal wild type version of Gene X and A, B, C, D, and E represent different mutations. Assume any difference in size of a molecule from WT is detectable on a gel. Use the gel lanes 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 10
Correct
Points out of 2.00

Gels that could result from the addition of CCGTAATCC at point 1.

Select one:

- a. A
- b. B
- c. C
- d. D
- e. E ✔

Question 11
Correct
Points out of 2.00

Gels that could result from the addition of A at point 2.

Select one:

- a. A
- b. B
- c. C
- d. D
- e. E ✔

Correct

Points out of 2.00

Select one:

- a. A
- b. B
- c. C
- d. D ✔
- e. E

Question 13

Correct

Points out of 2.00

Gels that could result from deleting the three nucleotides in region 4.

Select one:

- a. A
- b. B ✔
- c. C
- d. D
- e. E

Question 14

Correct

Points out of 2.00

Gels that could result from the addition of AAG at point 5.

Select one:

- a. A
- b. B
- c. C ✔
- d. D
- e. E

Question 15

Correct

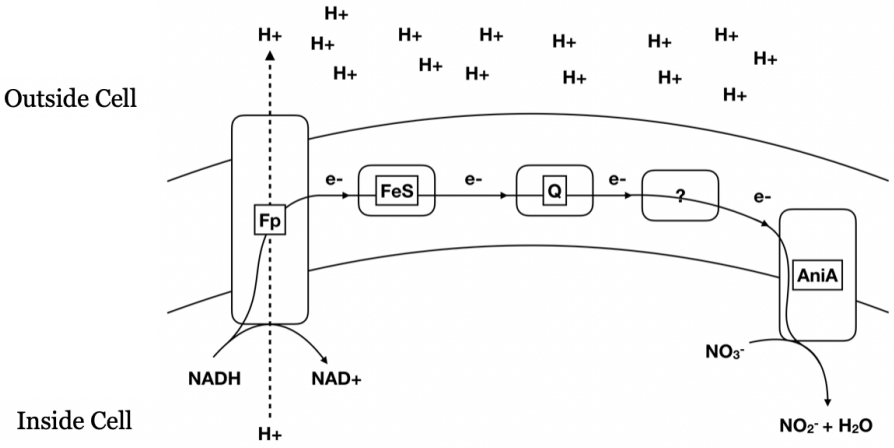
Points out of 2.00

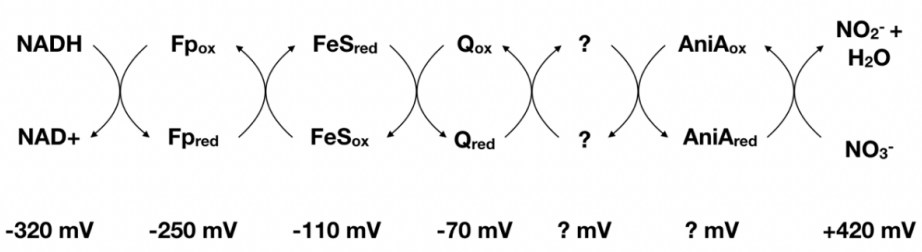
Gels that could result from a mutation making the spliceosome nonfunctional.

Select one:

- a. A ✔
- b. B
- c. C
- d. D
- e. E

about in humans to generate ATP. However, since fi GçŸŸGvç tend to live in environments without oxygen, they have evolved an electron transport chain that uses nitrate (NO3-) 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 fi GçŸŸGvç . fi GçŸŸGvç 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:




Question 16
Correct
Points out of 2.00

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 ✔

Question 17
Correct
Points out of 2.00

FeSred is an example of a reducing agent.

Select one:

- a. True ✔
- b. False

Question 18
Correct
Points out of 2.00

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 ✔

Correct

Points out of 2.00

Select one:

- a. True
- b. False ✔

**Question 20**

Correct

Points out of 2.00

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

Select one:

- a. True
- b. False ✔

Information

[Questions 21-22] A new drug to treat fi GeŸŸGwd 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 21**

Correct

Points out of 2.00

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

Select one:

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

**Question 22**

Correct

Points out of 2.00

If this drug is added to a Neisseria cell, the amount of Fpred will _____ compared to before treatment.

Select one:

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

Information

[Questions 23-25] A new organism has been discovered. This organism 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 DNA of this organism?

**Question 23**

Correct

Points out of 2.00

This organism must contain equal amounts of adenine and cytosine.

Select one:

- a. True
- b. False ✔

**Question 24**

Correct

Points out of 2.00

This organism must contain equal amounts of purines and pyrimidines.

Select one:

- a. True ✔
- b. False

Correct

Points out of 2.00

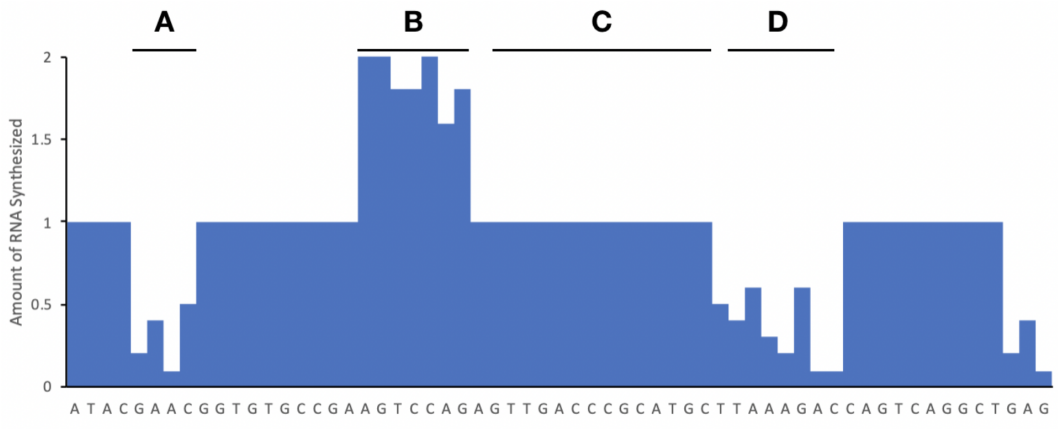
Select one:

a. True

b. False ✔

Information

[Questions 26-29] You are studying regulation of transcription in a newly discovered gene. 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.




Question 26

Correct

Points out of 2.00

Region D could be a promoter sequence.

Select one:

a. True ✔

b. False

Question 27

Correct

Points out of 2.00

Region B could be a promoter sequence.

Select one:

a. True

b. False ✔

Question 28

Correct

Points out of 2.00

Region A could be an enhancer sequence.

Select one:

a. True ✔

b. False

Question 29

Correct

Points out of 2.00

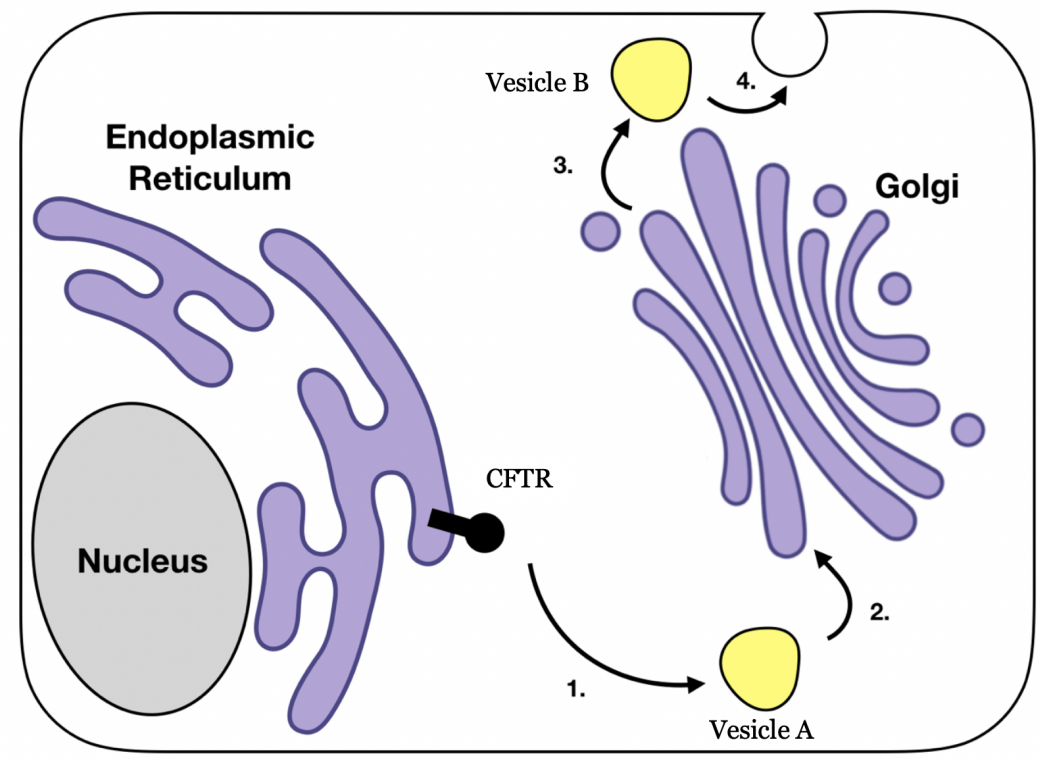
Region A could be an inhibitor sequence.

Select one:

a. True

b. False ✔

transmembrane protein called CFTR is shown after it has been translated on the endoplasmic reticulum (ER). CFTR is important for proper function of the cells lining your lung tissue. Use this information to answer the following questions. For questions 30 and 31, mark True or False.




Question 30
Correct
Points out of 2.00

A ribosome initially bound to the mRNA encoding CFTR while it was in the cytosol.

Select one:

- a. True ✔
- b. False

Question 31
Correct
Points out of 2.00

In the diagram above, vesicle A and vesicle B have the same v-SNARES, but different t-SNARES.

Select one:

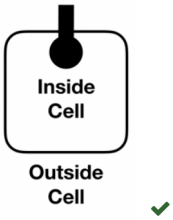
- a. True
- b. False ✔

Correct

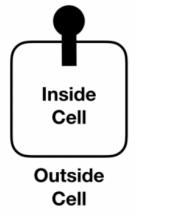
Points out of 2.00

Select one:

A.




B.




Question 33

Correct

Points out of 2.00

Different kinds of mutations in CFTR lead to a severe disease called cystic fibrosis. The most common CFTR mutation in individuals with cystic fibrosis is a mutation that prevents the formation of any vesicles with CFTR. In individuals with this type of mutation, where would you expect to find accumulation of the CFTR protein?

Select one:

a. In the cytosol

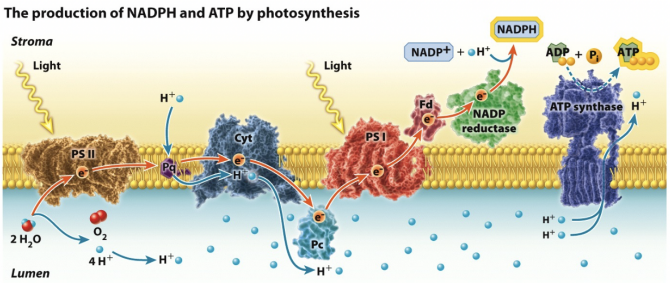
b. In the rough ER

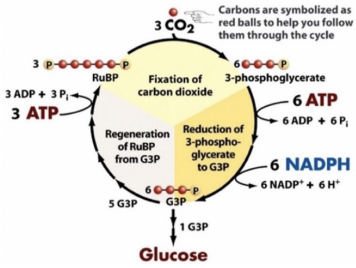
c. In vesicles

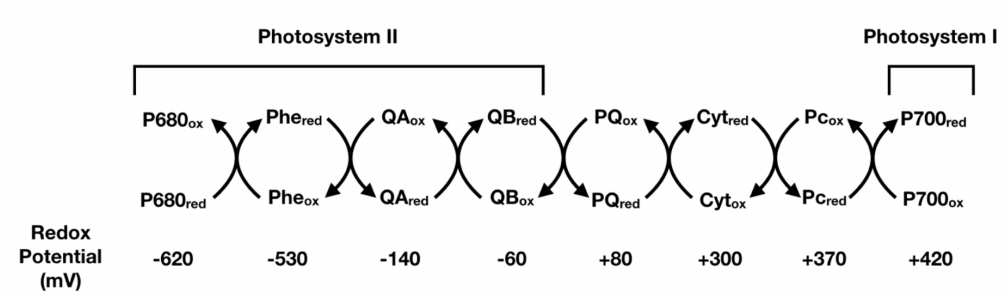
d. In the golgi

Information

[Questions 34-38] 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.




Atrazine is an herbicide that prevents the transfer of electrons from QA to QB. For the following questions, indicate what would happen after a plant is treated with atrazine. Mark True or False.

Correct

Points out of 2.00

Select one:

- a. True ✔
- b. False

Question 35

Correct

Points out of 2.00

Pc accumulates in its reduced form.

Select one:

- a. True
- b. False ✔

Question 36

Correct

Points out of 2.00

Light absorption by chlorophyll molecules in photosystem I will no longer cause their electrons to become excited.

Select one:

- a. True
- b. False ✔

Question 37

Correct

Points out of 2.00

More oxygen will be produced by the plant and less carbon dioxide will be used by the plant.

Select one:

- a. True
- b. False ✔

Question 38

Correct

Points out of 2.00

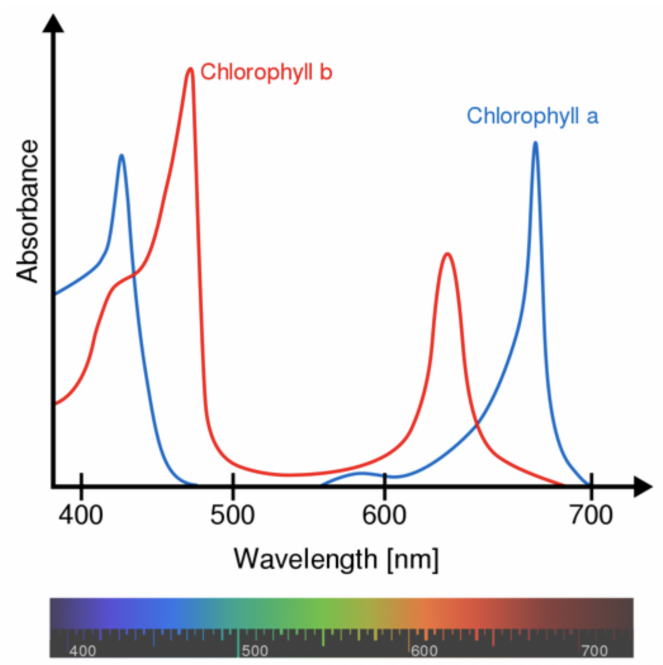
When a plant is treated with atrazine, 3-phosphoglycerate will accumulate in the chloroplast.

Select one:

- a. True ✔
- b. False

pigments used by plants in photosynthesis are chlorophyll a and chlorophyll b. 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 B for photosynthesis. Use this information and the diagrams of photosynthesis above to answer the following questions.




Question **39**
Correct
Points out of 2.00

If both plants are grown under a lamp that emits light at 610 nm, which plant would produce more oxygen?

Select one:
- a. Plant A
- b. Plant B ✔

Question **40**
Correct
Points out of 2.00

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

Select one:
- a. Plant A ✔
- b. Plant B

Question **41**
Correct
Points out of 2.00

If both plants are grown under a lamp that emits light at 480 nm, which plant would produce ATP at a higher rate?

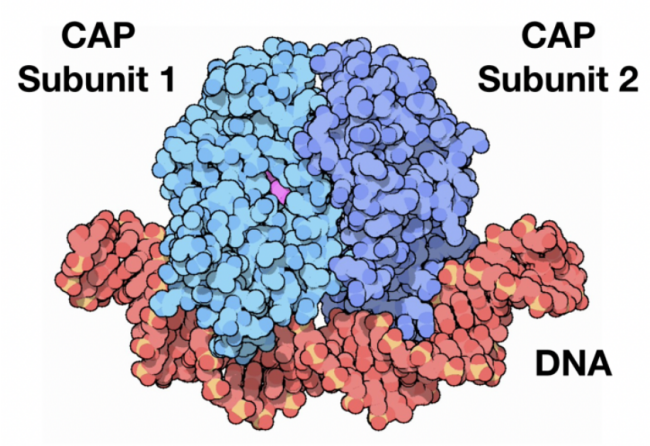
Select one:
- a. Plant A
- b. Plant B ✔

Question **42**
Correct
Points out of 2.00

If they are grown outside without artificial light, more $CO_2$ will be fixed by Plant A and Plant B during the daytime than at night.

Select one:
- a. True ✔
- b. False

made up of two identical peptide chains, or subunits, that associate with each other and then bind DNA under certain cellular conditions to activate transcription. Use this information to answer the following questions.




Question **43**
Correct
Points out of 2.00

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

Select one:
- a. Primary
- b. Secondary
- c. Tertiary
- d. Quaternary ✔

Question **44**
Correct
Points out of 2.00

Adding heat to CAP would disrupt its primary structure.

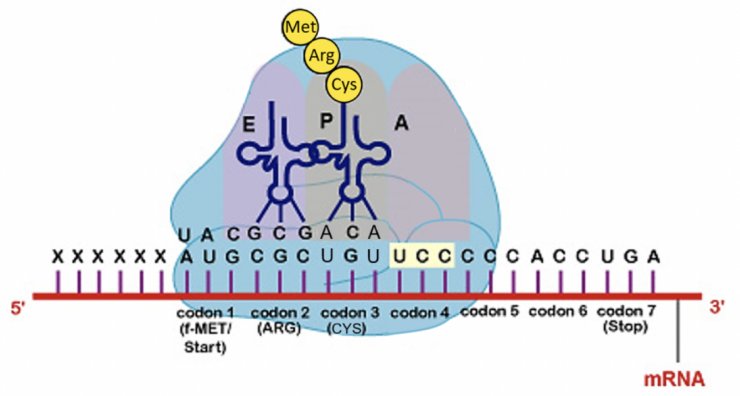
Select one:
- a. True
- b. False ✔

Question **45**
Correct
Points out of 2.00

Deletion of one nucleotide in the open reading frame of the CAP gene would likely result in a nonfunctional CAP protein.

Select one:
- a. True ✔
- b. False

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 51-52.




**Second letter**

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

Question **46**
Correct
Points out of 2.00

The tRNA that is shown carrying the polypeptide in the diagram will move to the E site of the ribosome.

Select one:
- a. True ✔
- b. False

Question **47**
Correct
Points out of 2.00

The tRNA that is shown carrying the polypeptide in the diagram will eventually be ejected from the ribosome

Select one:
- a. True ✔
- b. False

Question **48**
Correct
Points out of 2.00

One aminoacyl tRNA synthetase enzyme can charge all of the tRNA molecules shown in the diagram.

Select one:
- a. True
- b. False ✔

Correct

Points out of 2.00

Select one:

- a. True
- b. False ✔

Question 50

Correct

Points out of 2.00

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

Select one:

- a. True ✔
- b. False

Question 51

Correct

Points out of 2.00

Refer to the diagram of translation above. What is the anticodon of the tRNA that recognizes codon 6?

Select one:

- a. 5'-GGU-3' ✔
- b. 5'-CCA-3'
- c. 5'-UGG-3'
- d. 5'-ACC-3'
- e. None of the above

Question 52

Correct

Points out of 2.00

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

Question 53

Correct

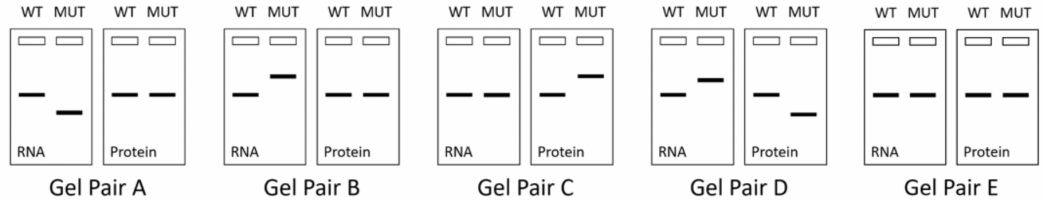
Points out of 2.00

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

Select one:

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

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**
Correct
Points out of 2.00

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

Select one:
- a. Gel pair A ✔
- b. Gel pair B
- c. Gel pair C
- d. Gel pair D
- e. Gel pair E

Question **55**
Correct
Points out of 2.00

A missense mutation in an exon 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 ✔

Question **56**
Correct
Points out of 2.00

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

Question **57**
Correct
Points out of 2.00

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

genome contains several protein-coding genes that are transcribed and translated inside the mitochondria! Mitochondrial ribosomes and tRNAs use the same genetic code as the rest of the eukaryotic cell with an important difference: 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.

Question 58
Correct
Points out of 2.00

A tRNA with the anticodon 5′-UCA-3′ will be present in mitochondria.

Select one:
- a. True ✔
- b. False

Question 59
Correct
Points out of 2.00

A tRNA with the anticodon 5′-UCA-3′ will be present in the cytosol.

Select one:
- a. True
- b. False ✔

Question 60
Correct
Points out of 2.00

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