Aug 4, 2000
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Isom

EXAM 4

Physiological Chemistry II / CHEM 2450

Name:_____

Multiple Choice. Put the letter corresponding to the correct answer in the space provided. (1 point)

____1) Which is/are true of the extra, non-coding bases (Junk) present in some mRNA?

I. They are called introns
II. They are called intervening sequences
III. They are removed post-translationally
IV. They are never removed
V. mRNA can not contain non-coding sequences.

(a) V only (b) I and IV (c) II and III (d) II only (e) II and IV

____2) The ELISA test for the presence of HIV does NOT involve which of the following?

(a) enzyme-linked Ig (b) HIV antigen (c) Ig specific for HIV
(d) yellow color if positive (e) ELISA test includes all of the above

____3) The mutation responsible for sickle cell anemia results in which of the following changes ?

(a) val replaces gly on β-subunit (b) val replaces glu on β-subunit
(c) val replaces glu on α-subunit (d) ala replaces val on α-subunit
(e) more than one of these substitutions occurs.

____4) What is responsible for the color change observed in a positive ELISA HIV test?

(a) Product of an enzymatic reaction (b) Coagulation of Igs
(c) binding of one Ig to another (d) contamination (e) none of the above

____5) Which is/are true of prions?

I. They are infectous viruses
II. They contain genetic information
III. The normal protein is mostly α-helix and the infectous protein is mostly β-sheet
IV. The normal protein is mostly β-sheet and the infectous protein is mostly α-helix

(a) I, II and III (b) I, II and IV (c) III only (d) IV only (e) None are true

____5) The following side-chains are **most** likely to be found on the interior of a protein?
(a) non-polar (b) non-polar and charged (c) polar and uncharged (d) acidic
(e) all are equally likely

____ 6) The complex of an enzyme bound to a coenzyme is termed

(a) apoenzyme (b) effector (c) enzyme/substrate complex (d) holoenzyme
(e) none of the above

____7) The sulfa antibiotics are what type of inhibitor?

(a) reversible, competitive (b) irreversible, non-competitive
(c) reversible, non-competitive (d) irreversible, competitive (e) none of the above

____ 8) Which of the following type(s) of interactions are responsible for the secondary structure of proteins?

(a) non-polar stacking (b) ionic (c) covalent (d) hydrogen bonds
(e) all of these interactions

____9) A denatured protein

I. has lost its function
II. will refold if placed in correct conditions
III. has same primary structure as folded protein but different tertiary structure
IV. has same tertiary structure as folded protein but different secondary structure
V. can still be active

(a) I, II and III (b) II, V and III (c) II and V (d) I and IV (e) I and III

____10) The product of transcription is

(a) mRNA (b) DNA (c) tRNA (d) protein (e) none of the above

11) **Super short answers.** Answer **11 of the 14** below by filling in the blanks with the correct answer

a) a nucleic acid containing a sugar and a base is called a _____

b) To connect two nucleic acid units, the _____OH group reacts with the _____ phosphate group.

c) DNA contains _____as its sugar while RNA contains _____as its sugar

d)The enzymes present in high levels in blood after a heart attack are _____

e) A CG base pair has____hydrogen bonds and AT base pairs have_____

f) A and G are_____bases and C and T are_____

g) T is present only in_____while U is found in_____

h) In the _____model of substrate binding the active site is flexible.

i) In the_____model of substrate binding the active site is rigid.

j) An enzyme changes the _____of a reaction.

k)_____is a type of enzymatic regulation involving an effector.

l) Sarin is a_____inhibitor. It inhibits the enzyme_____

m) tRNA with an amino acid on its_____end is said to be_____

n) Post-translational modification (discussed in class) involves the removal of_____

14) **Short answers.** Provide concise answers (1 to 3 sentences and/or pictures) to **7 of the 9** questions.

a) Bobase is an nifty enzyme. Describe two ways that Bobase might promote the formation of a transition state that favors conversion of substrate to product.

b) List the types of interactions that stabilize the tertiary structure of a protein. Tell which would be the strongest and why.

c) When blood tests are performed on a patient with a suspected myocardial infarction why must the test be more specific than just a screen for the general types of enzymes present?

d) Explain two types of enzymatic regulation.

e) Why is the genetic code considered a triplet code? Why is this necessary?

f) Lisase is an cool apoenzyme. What does lisase need to become active? Why?

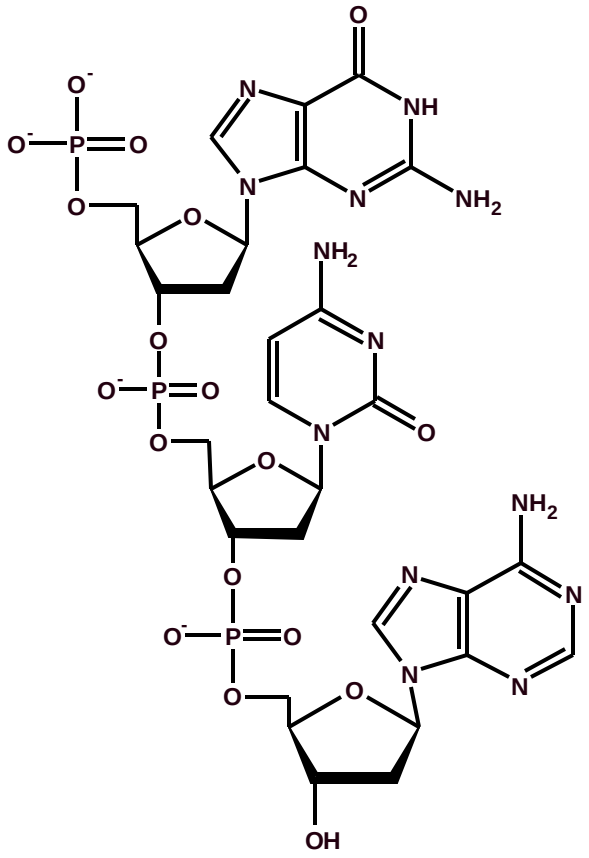
g) List the post-transcriptional modifications described in class. Why are they necessary?

h) During replication, there is a leading strand and a lagging strand. Explain what is meant by this and the reason it is necessary.

i) Why is PFK regulation analgous to a thermostat? What is PFK sensing?

15) Below is a strand of nucleic acid. **Do** the following: (8 points)

a) label 5' and 3' ends of the molecule
b) circle all phosphodiester links
c) put the appropriate letter corresponding to each base in the ring of each base
d) put a square around each glycosyl bond
e) number the atoms involved in each glycosyl bond
f) draw a line representing the orientation and base sequence of a strand complementary to this one.
g) is this RNA or DNA. Circle one.



16) Below is a peptide. Draw the peptide fragments produced by digestion with the enzymes given. (5 points)

N-Gly-Glu-Lys-His-Trp-Arg-Gln-Ala-Asp-Val-Lys-Gly-Asn-Glu-C

a) Write the peptide fragments produced from digestion with chymotrypsin.

b) Now, digest each of the fragments above with elastase. Write the resulting fragments below.

17) Below is the sequence of a strand of DNA. Provide the following information (8 points).

a) complete the DNA, providing the complementary strand
b) label the sense and non-sense strands
c) write the mRNA sequence (label it as mRNA)
d) put a bracket under each codon
e) above each codon, write the sequence of the anticodon
f) Below the mRNA, write the sequence of the protein produced from the DNA sequence.

5'-ATGCATTGGAGUGGAATTTGA-3'

22) Select **one** of the topics below and explain in **detail**, using words and pictures (10 points)

a) The binding of oxygen to hemoglobin is considered cooperative. Explain this and include details concerning the effect of oxygen binding on the conformation of the protein.

b) Explain enzyme catalysis using Eac and Keq . Include an explanation of the effect of substrate concentration on reaction rate for catalyzed and uncatalyzed reactions. Also, include the answer to this question (you have to think about this!!): At saturating concentrations of substrate, what could be added to further increase the reaction rate?

Bonus: (2 points) List two reasons that you need to know this stuff!!!

(a)

(b)