

120:301 Foundations in Biology
Spring, 2016

Sample questions for Exam 3

- 1) A DNA chain which provides the information for the base sequence of a new DNA or RNA chain is known as a _____ strand
 - a. replica
 - b. copy
 - c. template
 - d. promoter
 - e. supercoiled

- 2) What would likely be the result for a cell if the restriction point in the cell cycle were always open?
 - a. it would always be dividing
 - b. it would never divide
 - c. it could become a cancer cell
 - d. both a and c
 - e. both b and c

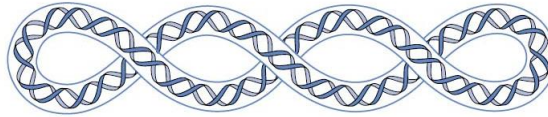
- 3) Gene A in a prokaryotic organism is found to contain the information for making polypeptide A. A base substitution mutation in the gene may result in a protein A with no change in its amino acid sequence. This can happen because the genetic code is
 - a. degenerate
 - b. universal
 - c. non-overlapping
 - d. triplet
 - e. none of the above

- 4) A new organism is discovered on Mars which has the usual 4 bases in its DNA but uses a doublet (rather than triplet) genetic code. What is the **maximum** number of different amino acids which can be present in the proteins of this organism?
 - a. 4
 - b. 8
 - c. 12
 - d. 16
 - e. 20

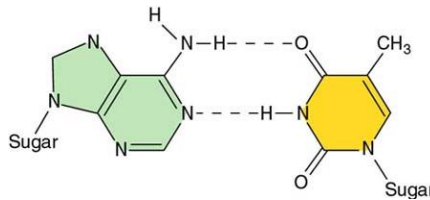
- 5) A sample of a DNA double helix is found to contain 20% A. The %C of this DNA is
 - a. 10
 - b. 20
 - c. 30
 - d. 60
 - e. not determinable from the information given.

- 6) The enzyme which makes RNA during DNA replication is responsible for
 - a. error correction
 - b. initiation of DNA chains
 - c. elongation of DNA chains
 - d. termination of DNA chains
 - e. actually there is no such enzyme.

7) The following picture illustrates



- a. Nucleosomes
 - b. Histones
 - c. Supercoiling
 - d. the tertiary structure of a protein
 - e. the quaternary structure of a protein
- 8) Anti-sense RNA for a gene
- a. has a base sequence which is identical to the mRNA
 - b. has a base sequence which is complementary to the mRNA
 - c. is not usually made in cells
 - d. both a and c
 - e. both b and c
- 9) The following picture shows a base pair found in a DNA double helix. What are the bases shown?

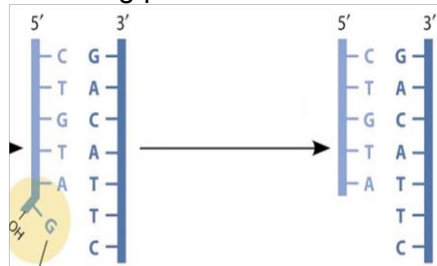


- a. Adenine and thymine
 - b. Adenine and cytosine
 - c. Guanine and thymine
 - d. Guanine and cytosine
 - e. You can't tell from the picture
- 10) One piece of evidence that all living things stem from a common ancestor is that they all have the same
- a. base sequence in their DNA
 - b. genes
 - c. proteins
 - d. chromosomes
 - e. correspondence between codons and amino acids
- 11) In procaryotes, the small ribosomal subunit binds to the _____ on the mRNA
- a. promoter
 - b. AUG codon
 - c. AUG anti-codon
 - d. Shine-Dalgarno site
 - e. Watson-Crick site

- 12) Which of the DNAs in the following table is likely to have the **highest** T_m (i.e. temp at which 50% is denatured)?

Source of DNA	Number of Each Type of Nucleotide*			
	A	T	G	C
Bovine thymus	28.4	28.4	21.1	22.1
Bovine liver	28.1	28.4	22.5	21.0
Bovine kidney	28.3	28.2	22.6	20.9
Bovine brain	28.0	28.1	22.3	21.6
Human liver	30.3	30.3	19.5	19.9
Locust	29.3	29.3	20.5	20.7
Sea urchin	32.8	32.1	17.7	17.3
Wheat germ	27.3	27.1	22.7	22.8
Marine crab	47.3	47.3	2.7	2.7
<i>Aspergillus</i> (mold)	25.0	24.9	25.1	25.0
<i>Saccharomyces cerevisiae</i> (yeast)	31.3	32.9	18.7	17.1
<i>Clostridium</i> (bacterium)	36.9	36.3	14.0	12.8

- Marine crab
 - Aspergillus*
 - Clostridium*
 - Human liver
 - There is insufficient information to answer the question
- 13) The reaction shown in the following picture is involved in maintaining the

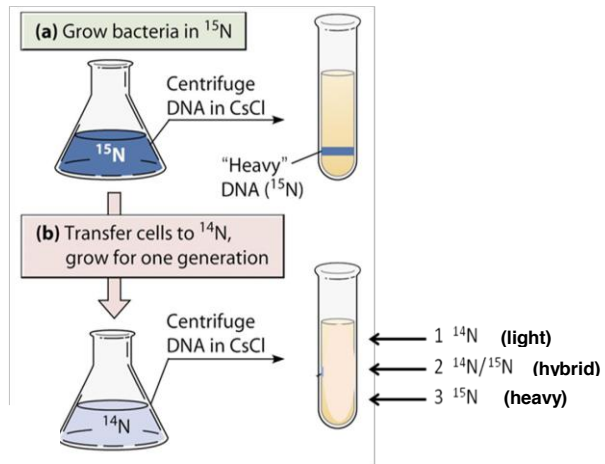


- accuracy of DNA replication
 - accuracy of transcription
 - accuracy of translation
 - accuracy of gene expression
 - none of the above
- 14) The antibiotic shown in the following picture stops bacterial reproduction by inhibiting



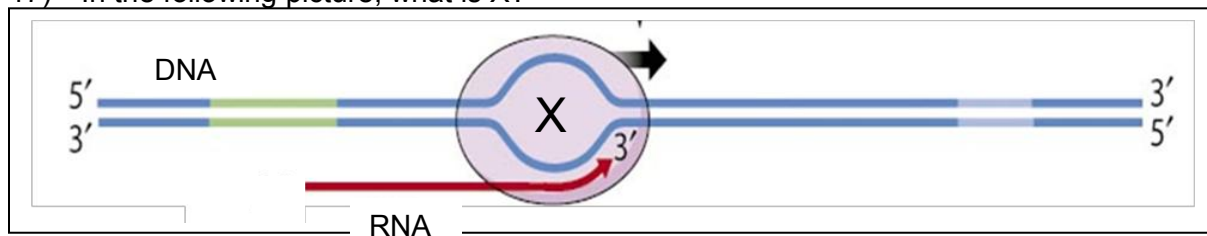
- DNA polymerase
 - RNA polymerase
 - DNA ligase
 - topoisomerase
 - ATP synthesis
- 15) A base pair which would usually NOT be present in a DNA double helix because it is too large would be one which contains
- 2 purines
 - 2 pyrimidines
 - 1 purine and 1 pyrimidine
 - There are no base pairs that would be too large
 - Actually all base pairs are the same size

- 16) The following picture shows the **first part** of the Meselson-Stahl Experiment. When the experiment was carried out, which bands of DNA were observed?



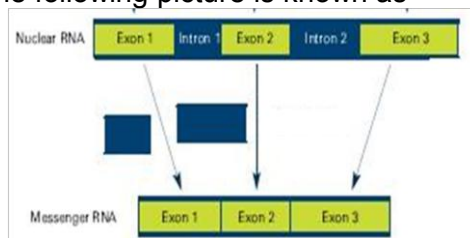
- 1
- 2
- 3
- both 1 and 2
- both 1 and 3

- 17) In the following picture, what is X?



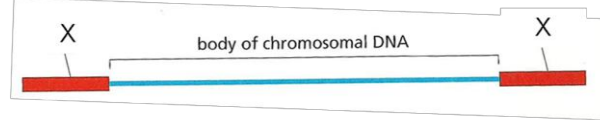
- DNA polymerase
- RNA polymerase
- ribosome
- tRNA
- promoter

- 18) The process shown in the following picture is known as



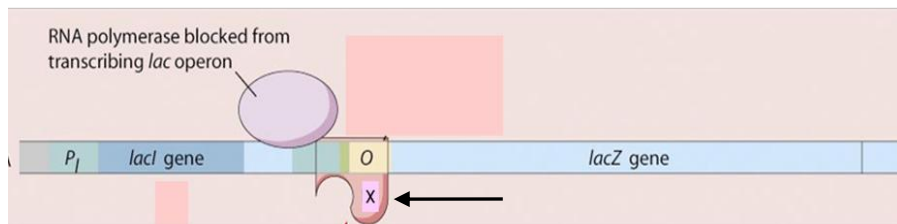
- transcription
- exonylation
- replication
- splicing
- repair

19) In the following diagram of a eucaryotic DNA molecule what are X?



- a. promoters
- b. DNA polymerase molecules
- c. telomeres
- d. centromeres
- e. capsomeres

20) In the following picture what is X (indicated by arrow)?



- a. repressor
- b. ribosome
- c. lactose
- d. tRNA
- e. rRNA

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Answers to sample questions for Exam 3

- 1) c
- 2) d
- 3) a
- 4) d
- 5) c
- 6) b
- 7) c
- 8) e
- 9) a
- 10) e
- 11) d
- 12) b
- 13) a
- 14) d
- 15) a
- 16) b
- 17) b
- 18) d
- 19) c
- 20) a