

Chapter 2: RNA

Multiple Choice

Identify the choice that best completes the statement or answers the question.

- ___ 1. In an RNA molecule, adenine always base-pairs with:
- Thymine
 - Cytosine
 - Uracil
 - Guanine
- ___ 2. RNA and DNA are structurally similar because they both:
- Have ribose as their sugar moiety
 - Consist of a single strand that folds on itself
 - Consist of two complementary strands
 - Are polymers of four different nucleotide bases
- ___ 3. RNA is degraded by:
- Helicases
 - Polymerases
 - Ribonucleases
 - Methylases
- ___ 4. The large ribosome subunit in prokaryotes consists of ribosomal proteins and:
- 16S rRNA
 - 18S rRNA
 - 23S rRNA and 5S rRNA
 - 28S rRNA, 5S rRNA, and 5.8S rRNA
- ___ 5. Transfer RNA is different from other types of RNA because transfer RNA has:
- A 3'polyA tail
 - Introns and exons
 - A 3'methylated cap
 - Anticodons
- ___ 6. Synthesis of RNA guided by a DNA template is:
- Translation
 - DNA replication
 - Transcription
 - Reverse transcription
- ___ 7. Synthesis of DNA guided by a RNA template is:
- Translation
 - DNA replication
 - Transcription
 - Reverse transcription

- ___ 8. In transcription, what is the starting material, the ending material, and the major enzyme that catalyzes the process?
- DNA, RNA, DNA polymerase
 - RNA, protein, peptidyl transferase
 - RNA, DNA, reverse transcriptase
 - DNA, RNA, RNA polymerase
- ___ 9. If the following oligonucleotide of double-stranded DNA were transcribed, what would be the sequence of the RNA?
- 5'TGCTAGCTA3'
3'ACGATCGAT5'
- 5'UGCUAGCUA3'
 - 5'ACGAUCGAU3'
 - 3'ACGATCGAT5'
 - 3'ACGAUCGAU5'
- ___ 10. Which of the following enzymes performs transcription in bacteria?
- RNA-dependent DNA polymerase
 - DNA-dependent RNA polymerase
 - DNA-dependent DNA polymerase
 - RNA-dependent RNA polymerase
- ___ 11. The RNA polymerase holoenzyme consists of which of the following subunits?
- α_2, β, β'
 - $\alpha_2, \beta, \beta'\sigma$
 - $\alpha, \alpha', \beta, \beta'$
 - $\alpha_2, \beta, \beta', \rho$
- ___ 12. Which component of RNA polymerase is responsible for initiating transcription at the correct site?
- α
 - β
 - β'
 - ρ
 - σ
- ___ 13. Which of the following is required for termination of transcription in bacteria?
- DNA polymerase
 - Sigma
 - Rho
 - PolyA signal
- ___ 14. Which of the following is involved in termination of transcription in eukaryotes?
- RNA polymerase
 - Sigma
 - Rho
 - PolyA signal

- ___ 15. Which of the following types of RNA is directly involved in removing introns from RNA in eukaryotes?
- Micro
 - Transfer
 - Small nuclear
 - Small interfering
- ___ 16. What is the secondary structure of transfer RNA?
- Cruciform, or inverted L
 - Hairpin
 - Triple helix, or triplex
 - Ring, or inverted C
- ___ 17. The loop of transfer RNA that interacts with the codon on mRNA in translation is called the:
- D loop
 - T ψ C loop
 - Variable loop
 - Anticodon loop
- ___ 18. DNA sequences that are involved in the regulation of gene expression are called:
- Cis factors
 - Trans factors
 - Inducers
 - Repressors
- ___ 19. Which of the following is the binding site for the repressor protein of the lactose operon?
- P site
 - Operator
 - A site
 - Promoter
- ___ 20. Which of the following would prevent transcription of the lactose operon?
- Loss of promoter
 - Presence of inducer
 - Loss of the repressor protein
 - RNA polymerase binding to the promoter
- ___ 21. Which of the following is a cis factor of the lactose operon?
- Inducer
 - Operator
 - Repressor
 - Polymerase
- ___ 22. In the lactose operon, which of the following configurations would result in gene expression?
- Promoter +, Operator +, Repressor +, no inducer present
 - Promoter -, Operator +, Repressor +, no inducer present
 - Promoter -, Operator -, Repressor +, inducer present
 - Promoter +, Operator +, Repressor -, no inducer present

- ___ 23. Multiple products are generated from the same gene by what mechanism?
- Alternative splicing
 - Polyadenylation
 - Capping
- ___ 24. Thalassemias arise from changes in what part of the beta-globin gene?
- 3'untranslated region
 - PolyA tail
 - Splice recognition site
 - Ribosome binding site
- ___ 25. When gene expression is regulated by mechanisms other than the interaction of cis elements and trans factors, the regulation is called:
- Induction
 - Epigenetics
 - Attenuation
 - Combinatorial control
- ___ 26. Genomic imprinting is accomplished primarily through:
- Methylation
 - Acetylation
 - Transcription
 - Cis and trans factor interactions
- ___ 27. The most frequently methylated base in vertebrates is:
- Adenine
 - Cytosine
 - Guanine
 - Thymine
- ___ 28. MicroRNAs, short endogenous RNA, perform what function in the eukaryotic cell?
- Controlling DNA replication
 - Priming RNA synthesis
 - RNA splicing
 - Repressing gene expression
- ___ 29. What mechanism may explain the difference in symptoms in Prader-Willi and Angelman syndromes?
- Genomic imprinting
 - Alternative splicing
 - Genetic recombination
 - Capping
- ___ 30. Alteration of the nucleotide sequence of RNA after transcription is called:
- Methylation
 - RNA silencing
 - RNA editing
 - Capping

**Chapter 2: RNA
Answer Section**

MULTIPLE CHOICE

- | | |
|------------|--------|
| 1. ANS: C | PTS: 1 |
| 2. ANS: D | PTS: 1 |
| 3. ANS: C | PTS: 1 |
| 4. ANS: C | PTS: 1 |
| 5. ANS: D | PTS: 1 |
| 6. ANS: C | PTS: 1 |
| 7. ANS: D | PTS: 1 |
| 8. ANS: D | PTS: 1 |
| 9. ANS: A | PTS: 1 |
| 10. ANS: B | PTS: 1 |
| 11. ANS: B | PTS: 1 |
| 12. ANS: E | PTS: 1 |
| 13. ANS: C | PTS: 1 |
| 14. ANS: D | PTS: 1 |
| 15. ANS: C | PTS: 1 |
| 16. ANS: A | PTS: 1 |
| 17. ANS: D | PTS: 1 |
| 18. ANS: A | PTS: 1 |
| 19. ANS: B | PTS: 1 |
| 20. ANS: A | PTS: 1 |
| 21. ANS: B | PTS: 1 |
| 22. ANS: D | PTS: 1 |
| 23. ANS: A | PTS: 1 |
| 24. ANS: C | PTS: 1 |
| 25. ANS: B | PTS: 1 |
| 26. ANS: A | PTS: 1 |
| 27. ANS: B | PTS: 1 |
| 28. ANS: D | PTS: 1 |
| 29. ANS: A | PTS: 1 |
| 30. ANS: C | PTS: 1 |