Ch. 16 Key Terms

Double Helix | DNA Ligase | Mismatch Repair
Semi-conservative Model | Primer | Nuclease
Replication Fork | Primase | Excision Repair
DNA polymerase | Helicase | Telomeres
Leading Strand | Single-strand Binding | Telomerase
Lagging Strand | Protein |

Ch. 16 Questions

1. Explain why researchers originally thought protein was the genetic material.
2. Describe the structure of DNA. Explain the "base-pairing rule" and describe its significance.
3. Describe the semi-conservative model of replication.
4. Describe the process of DNA replication. Note the structure of the many origins of replication forks and explain the role of DNA polymerase.
5. Explain what energy source drives the polymerization of DNA.
6. Define "antiparallel" and explain why continuous synthesis of both DNA strands is not possible.
7. Distinguish between the leading strand and the lagging strand.
8. Explain how the lagging strand is synthesized even though DNA polymerase can add nucleotides to the end.
10. Explain the roles of DNA polymerase, mismatch repair enzymes, and nuclease in DNA proofreading.
11. Describe the structure and functions of telomeres. Explain the significance of telomerase to heal cancerous cells.

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### Ch.17 Key Terms

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<td>Introns</td>
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<tr>
<td>Messenger RNA</td>
<td>Exons</td>
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<td>(mRNA)</td>
<td>Splicesome</td>
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<td>Translation</td>
<td>Ribozymes</td>
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<td>Template Strand</td>
<td>Transfer RNA (tRNA)</td>
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<td>Codons</td>
<td>Anticodon</td>
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<td>RNA Polymerase</td>
<td>Wobble</td>
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<td>Transcription Unit</td>
<td>Aminoacyl-tRNA</td>
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<td>Promoter</td>
<td>Synthetase</td>
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<td>Transcription Initiation</td>
<td>Ribosomal RNA</td>
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<td>Complex</td>
<td>(rRNA)</td>
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<tr>
<td>TATA Box</td>
<td>P Site</td>
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<tr>
<td>Terminator</td>
<td>A Site</td>
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<tr>
<td>5' Cap</td>
<td>E Site</td>
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<tr>
<td>Poly (A) Tail</td>
<td>Initiation</td>
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<tr>
<td>RNA Splicing</td>
<td>Elongation</td>
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### Ch.17 Questions

1. Explain how RNA differs from DNA.
2. Distinguish between transcription and translation.
3. Compare where transcription and translation occur in prokaryotes and in eukaryotes.
4. Define "codon" and explain the relationship between the linear sequence of codons on mRNA and the sequence of amino acids in a polypeptide.
5. Explain why polypeptides begin with methionine when they are synthesized.
6. Explain the evolutionary significance of a nearly universal genetic code.
7. Explain in what way the genetic code is redundant and unambiguous.
8. Explain how RNA polymerase recognizes where transcription should begin.
9. Explain the general process of transcription, including the three major steps of initiation, elongation, and termination.
10. Explain how RNA is modified after transcription in eukaryotic cells.
11. Describe the functional and evolutionary significance of introns.
12. Describe the structure and function of RNA.
13. Describe the structure and functions of ribosomes.
14. Describe the process of translation (including initiation, elongation, and termination) and explain how enzymes, protein factors, and energy sources are needed for each stage.
15. Explain what determines the primary structure of a protein and describe how a polypeptide must be modified before it becomes fully functional.
17. Define "point mutations." Distinguish between base-pair substitutions and base-pair insertions.
18. Describe several examples of mutagens and explain how they cause mutations.
Ch. 18 Key Terms

- Capsid
- Viral Envelopes
- Bacteriophages
- Lytic Cycle
- Virulent Cycle
- Lysogenic Cycle
- Temperate Viruses
- Prophage
- Provirus
- Retroviruses
- Reverse Transcriptase
- HIV (Human Immunodeficiency Virus)
- Viroids
- Prions
- Nucleoid
- Transformation
- Transduction
- Conjugation
- F Factor
- Plasmid
- Episome
- F Plasmid
- AIDS (Acquired Immunodeficiency Syndrome)
- R Plasmids
- Transcription
- Insertion Sequences
- Operator
- Operon
- Prions
- Nucleoid
- Regulatory Gene
- Transformation
- Corepressor
- Inducer
- Conjugation
- Cyclic AMP (cAMP)
- CAMP Receptor Protein (CRP)

Ch. 18 Questions

1. List and describe the structural components of viruses.
2. Explain why viruses are obligate parasites.
3. Distinguish between the lytic and lysogenic reproductive cycles, using phage T4 and phage lambda as examples.
4. Describe the reproductive cycle of retroviruses.
5. Describe the structures and replication cycles of viroids and prions.
6. Describe the structure of a bacterial chromosome. How do bacteria replicate?
7. Compare the processes of transformation, transduction, and conjugation.
8. Distinguish between plasmids and viruses. Define an episome.
9. Explain how the F plasmid controls conjugation in bacteria.
10. Describe the significance of R plasmids.
11. Explain how the widespread use of antibodies contributes to R-plasmid-related disease.
12. Define transposon and describe two types of transposition.
13. Briefly describe two main strategies that cells use to control metabolism.
14. Explain the adaptive advantage of genes grouped into an operon.
15. Using the trp operon as an example, explain the concept of an operon and the function of the operator, repressor, and co-repressor.
16. Distinguish between structural and regulatory genes.
17. Describe how the lac operon functions.
18. Explain how repressible and inducible enzymes differ and how those differences reflect differences in the pathways they control.
Ch. 20 Key Terms

<table>
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<tr>
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<th>Definition</th>
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<td>Recombinant DNA</td>
<td>Denaturation</td>
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<td>Genetic Engineering</td>
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<td>Tumor-inducing</td>
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<td>Plasmid</td>
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Ch. 20 Questions

1. Describe the natural function of restriction enzymes.
2. Explain how the creation of sticky ends by restriction enzymes is useful in producing a recombinant DNA molecule.
3. Outline the procedures for cloning a eukaryotic gene in a bacterial plasmid.
4. Explain how eukaryotic genes are cloned to avoid the problems associated with introns.
5. Describe two advantages of using yeast cells instead of bacteria as hosts for cloning or expressing eukaryotic genes.
6. Describe three techniques to aggressively introduce recombinant DNA into eukaryotic cells.
7. Define and distinguish between genomic libraries using plasmids, phages, and cDNA.
8. Describe the polymerase chain reaction (PCR) and explain the advantages and limitations of this procedure.
9. Explain how gel electrophoresis is used to analyze nucleic acids and proteins and to distinguish between two alleles of a gene.
10. Describe the Southern blotting procedure and explain how it can be used to detect and analyze instances of restriction fragment length polymorphism (RFLP).
11. Explain how RFLP analysis facilitated the process of genomic mapping.
12. Explain how in vitro mutagenesis and RNA interference help to discover the functions of some genes.
13. Explain the significance of single nucleotide polymorphisms in the study of the human genome.
14. Explain how DNA technology can be used to improve the nutritional value of crops and to develop plants that can produce pharmaceutical products.
15. Describe the safety and ethical questions related to recombinant DNA studies and the biotechnology industry.

* All questions modified from http://occawlonline.pearsoned.com