



MODULE 7

Cellular Reproduction and DNA

ON YOUR OWN QUESTIONS

7.1 Two identical twins have exactly the same set of genes. They are separated at birth and grow up in different households. If a scientist were to study the twins as adults, would he find them to be identical in every way, since they have the same genes? Why or why not?

7.2 An RNA strand has the following sequence of nucleotides:

uracil, adenine, adenine, guanine, cytosine, cytosine

What was the nucleotide sequence in the DNA that it transcribed?

7.3 A DNA strand has the following sequence of nucleotides:

thymine, thymine, thymine, adenine, guanine, cytosine

What will the RNA sequence be when this DNA section is transcribed?

7.4

A scientist is studying a nucleic acid, but her notes are sketchy. You do not know whether she is studying DNA or RNA. You can make out the following nucleotide sequence, however:

guanine, cytosine, cytosine, uracil, guanine, adenine

Is the scientist studying DNA or RNA?

7.5

A protein has alanine as its first amino acid. One codon that calls for alanine has the following sequence of nucleotide bases:

guanine, cytosine, adenine

- a. If a portion of DNA instructs a cell to make this protein, what will be the first three nucleotide bases of that DNA portion?

- b. What will be the sequence of nucleotide bases on the tRNA that responds to the mRNA codon given above?

7.6

The phases of a cell's life are listed below. Which one is not a part of mitosis? Take the remaining phases and order them according to when they occur in the mitosis process.

anaphase, prophase, interphase, telophase, metaphase

7.7 A cell uses vesicles to build the plasma membrane during the telophase of mitosis. Is it a plant cell or an animal cell?

7.8 In which phase of mitosis are the chromosomes separated from their duplicates?

7.9 A pea plant has seven pairs of homologous chromosomes. What is its haploid number? What is its diploid number?

7.10 In a scientist's notebook, you find notes regarding a new species that is being studied. The notes say that the species is diploid, with a chromosome number of 17. Is this the haploid or diploid number? If this is the haploid number, give the diploid number. If this is the diploid number, give the corresponding haploid number.

7.11 Which phases of meiosis are essentially the same as the corresponding phases of mitosis? Which are different?

7.12 A cellular reproduction process results in four diploid cells. Is this mitosis or meiosis? How many cells underwent this process?

7.13 A cellular reproduction process results in four haploid cells. Is this mitosis or meiosis? How many cells underwent this process?

7.14 A sperm cell finds a polar body and attempts to fuse with it. Will a viable zygote develop?

7.15 What is the principal difference between viruses and pathogenic bacteria?

7.16 The human body can produce the antibodies that destroy smallpox. If this is the case, why did so many people die from it? Why didn't their bodies just kill the virus?

STUDY GUIDE QUESTIONS

1 Write the definitions for the following terms. You will be expected to have them memorized for the test!

TERM	DEFINITION
Genetics	

TERM	DEFINITION
Genetic factors	
Environmental factors	
Spiritual factors	
Gene	
Messenger RNA	
Anticodon	
Codon	
Chromosome	
Mitosis	
Interphase	
Centromere	
Mother cell	

TERM	DEFINITION
Karyotype	
Diploid cell	
Haploid cell	
Diploid number	
Haploid number	
Meiosis	
Gametes	
Virus	
Antibodies	
Vaccine	

2 A DNA strand has the following sequence of nucleotides:

guanine, cytosine, adenine, adenine, thymine, guanine

- What will the mRNA sequence be?
- How many amino acids will the mRNA code for?
- How many codons will the mRNA have?
- What are the anticodons on the tRNAs that will bond to the mRNA?

3 Fill in the blanks:



4 An RNA strand has an anticodon. Is it tRNA or mRNA?

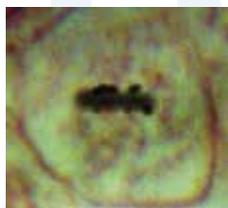
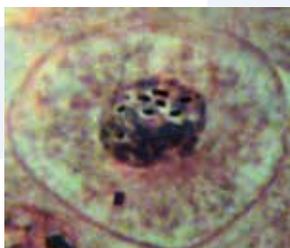
5 Protein synthesis is occurring in a ribosome. Is this a part of transcription or translation?

6 Suppose scientists determine that a set of genes is significantly more prevalent in murderers than in the population at large. Would that mean that murderers are not at fault for what they do? Why or why not?

7 If you look under a microscope and see distinct chromosomes in a cell, is the cell in interphase? Why or why not?

8 List (in order) the four stages of mitosis.

9 Identify the stage of mitosis for each of the following pictures:



Photos by Kathleen J. Wile

a. _____

b. _____

c. _____

d. _____

10 The diploid number of a cell is 16. What is its haploid number?

11 The haploid number of a cell is 9. What is its diploid number?

12 What is the difference between a gamete and a regular animal cell?

13 List (in order) all of the stages of meiosis.

14 Which is closer to mitosis: meiosis I or meiosis II?

15 A single cell with seven pairs of homologous chromosomes goes through meiosis I. How many cells result at the end of meiosis I? How many chromosomes exist in each cell? Are the chromosomes in each cell duplicated or not?