

## BSCS Bio Chapter 9 Study Guide

1. List the two types of biomolecules that make up genetic material.
2. Genes direct the synthesis of \_\_\_\_\_.
3. True/False:
  - All genes are always expressed in all cell types.
  - Different cell types will have different sets of genes.
  - Gene expression is controlled differently in specific cell types.
  - The expression of genes is random only occurring by chance.
4. Would tRNA or mRNA be called the “working tapes” of instructions which are carried to the ribosomes?
5. Would DNA and RNA be considered genes or nucleic acids?
6. How does DNA control protein synthesis?
7. Why does DNA control the tertiary structure of proteins?
8. Proteins are made up of less complex organic molecules called \_\_\_\_\_.
9. Why does mRNA carry the genetic code of DNA?
10. What is the principle reason humans need amino acids in their diet?

11. How many types of RNA are there?
12. Name the group of organic compounds what includes enzymes.
13. How is the sequence of nucleotides in mRNA determined?
14. Ribosomes in the cell are the sites for the synthesis of \_\_\_\_\_  
\_\_\_\_\_.
15. Many (specialized) RNA molecules act as \_\_\_\_\_, just as enzymes made of proteins do.
16. Name the part of the cell where the transfer of genetic information from DNA to RNA takes place.
17. DNA serves as a blueprint for \_\_\_\_\_.
18. Name the basic building blocks of proteins.
19. Name compounds that are catalytic proteins and act to change the rate of chemical reactions.
20. Which compound is part of the structure of another compound that is listed?
- amino acids
  - nucleic acids
  - enzymes
21. Do amino acids or nucleic acids contain the instructions for protein synthesis?



32. Which molecule – DNA or RNA is assumed to be a double helix?
33. Does either DNA or RNA molecules make up specific amino-acid sequences?
34. The hereditary codes are made up of three nucleotides. Is this true of DNA, RNA or both?
35. The nucleotides for DNA serve as the four letters of the code alphabet. This genetic code requires at least 20 different code words – one for each \_\_\_\_\_.
36. The functioning of the code occurring in the ribosomes. Is this in reference to DNA or RNA?
37. One type is a pattern for building proteins - would this apply to DNA, or RNA, or both DNA and RNA?
38. This is the code that transmits genetic information in most cells. Is this in reference to DNA or RNA or both DNA and RNA?
39. The code is involved in protein synthesis. Is this in reference to DNA, RNA, or both DNA and RNA?
40. This molecule has the ability to duplicate itself. Is this in reference to DNA, or RNA, or both DNA and RNA.
41. The transfer type has a single code word. Is this in reference to DNA, or RNA, or both DNA and RNA.
42. The code may be affected by mutations. Is this in reference to DNA, or RNA, or both DNA and RNA?
43. The messenger type transmits instructions. Is this in reference to DNA, or RNA, or both DNA and RNA?
44. Each code word contains three letters. Is this in reference to DNA or RNA or both DNA and RNA?
45. Why are proteins an excellent mechanism by which genetic information is expressed?

46. From the following list choose which would bind to DNA sequences and control gene expression.

- sugars
- starches
- lipids
- proteins

47. Gene expression begins with \_\_\_\_\_.

48. Describe the sequence for a gene on DNA *transcribed* into an RNA molecule.

49. Name the enzyme which initiates the first stage of transcription.

50. African violet leaves can be used to clone any other African violet plant tissue. This is evidence that

- the African violet DNA quickly mutates.
- all African plant cells are the same.
- all African violet cells have the enzymes necessary for growth of the plant.
- all African violet cells have necessary DNA to make the many different needed RNA molecules for the production of enzymes.

51. Arrange the following structures in decreasing order of size.

- DNA, nucleus, chromosome, nucleotide

52. When a particular protein is made in the cell it is directly related to the

- number of mitochondria in the cell.
- number of ribosomes in the cell.
- sequence of nucleotides in a molecule of DNA.
- sequence of sugar and phosphate in a molecule of DNA.

53. How does a retrovirus differ from a DNA virus?

54. Name the organism(s) in which the process of reverse transcription is found.

55. From the list of organisms which one would you most likely find introns in?

- *Streptococcus*-type bacteria cells
- *E. coli* bacteria cells
- retrovirus DNA molecules
- cloned African violet leaf tissue

56. What type of product does an intron code for?

57. Why is RNA in cytosol smaller than RNA found in the nucleus?

58. What is the function of tRNA?

59. Why is the production of proteins directed by DNA?

60. Name the substance, which during protein synthesis, attaches to a particular amino-acid molecule and positions it on a ribosome.

61. True/False:

- Any protein that will function as an enzyme is active at the termination of synthesis on the ribosome.
- Many newly synthesized proteins must be chemically modified in order to become functional.
- All proteins are synthesized at the site in the cell at which they are to perform their function.
- All newly proteins are fully functional at termination of synthesis on the ribosomes.

62. What is the function of the chaperone proteins?

63. What is the purpose of the signal sequence found in many proteins?

64. Name some factors which could determine the length of time a protein exists in a cell following its synthesis.

65. Name the site for the production of most enzymes within a cell.

66. Name the organelle where translation takes place.

67. Is the ribosome reused in protein synthesis?

68. If a mutation takes place in a segment of DNA you could conclude which of the following?

- the complementary RNA would also be altered
- protein synthesis is unchanged
- enzyme synthesis is not affected
- the mutation is harmful to the organism

69. Here is a sequence of DNA – AACGTACGAACGCC – If the second A is lost during transcription to mRNA what could you assume?

- the sequence of amino acids produced will be exactly the same as before the loss of the “A” nucleotide
- since it is only one nucleotide the protein product will be unaffected
- if another nucleotide is lost then the correct reading frame will be established
- the reading frame has shifted from frame 1 to frame 2.

70. Describe a virus.

71. Generally speaking what does viral replication involve?

72. You will have 10 questions associated with the scenario listed below. Your choices will be as follows:

- an illogical assumption
- a necessary assumption
- a logical but unnecessary assumption
- not an assumption; a restatement of the data

A guinea pig was injected with radioactive amino acids. Thirty minutes later, tissue analysis showed that protein of the ribosomes had over twice as much radioactivity per gram as the protein of any other part of the cell.

Conclusion: Proteins are manufactured in the ribosomes.

In order to draw this conclusion, certain assumption must be made. Evaluate each of the following statements.

Here is a sample question.

Messenger RNA transmits the hereditary traits from DNA to the ribosomes.