

**Quiz**

**Section: Gene Regulation and Structure**

In the space provided, write the letter of the term or phrase that best completes each statement or best answers each question.

1. Gene regulation is necessary in living organisms.
  - a. so that the repressor will never bind to the operator.
  - b. to allow RNA polymerase continuous access to genes.
  - c. to avoid wasting their energy and resources on producing proteins that are not needed or are already available.
  - d. to ensure that the operon is always in the "on" state.
2. The *lac* operon enables a bacterium to build the proteins needed for lactose metabolism only when
  - a. glucose is present.
  - b. tryptophan is present.
  - c. galactose is present.
  - d. lactose is present.
3. Which of the following is NOT true about gene regulation in eukaryotic cells?
  - a. Gene regulation in eukaryotes is more complex than in prokaryotes.
  - b. Operons play a major role in eukaryote gene regulation.
  - c. Gene regulation can occur before, during, or after transcription.
  - d. Gene regulation can occur after translation.
4. Point mutations occur when
  - a. one nucleotide is replaced with a different nucleotide.
  - b. a gene's location changes.
  - c. long segments of a gene are lost.
  - d. gametes are forming during meiosis.
5. The *lac* operon turns "off" when
  - a. glucose is absent.
  - b. lactose is absent.
  - c. RNA polymerase is absent.
  - d. lactose is present.

In the space provided, write the letter of the description that best matches the term or phrase.

6. intron
  - a. long segments of eukaryotic DNA that have no coding information
  - b. includes the substitution, insertion, and deletion of one or more nucleotides
7. gene alteration
  - a. sequence of DNA that can be bound to a transcription factor
8. exon
  - a. can bind to an operator, which stops transcription
9. repressor
  - a. portions of a eukaryotic gene that are translated
10. enhancer
  - a. portions of a eukaryotic gene that are translated

**Test Prep Pretest**

Complete each statement by writing the correct term or phrase in the space provided.

1. Instead of the base thymine found in DNA, RNA has a base called \_\_\_\_\_.
2. Transcription begins when an enzyme called \_\_\_\_\_ binds to the beginning of a gene on a region of DNA called a promoter.
3. The instructions for building a protein are written as a series of three-nucleotide sequences called \_\_\_\_\_.
4. During translation, the area of the ribosome called the \_\_\_\_\_ site receives the next tRNA molecule.
5. Because of its position on the operon, the \_\_\_\_\_ is able to control RNA polymerase's access to the structural genes.
6. The *lac* operon is switched off when a protein called a(n) \_\_\_\_\_ is bound to the operator.
7. In eukaryotic gene regulation, proteins called \_\_\_\_\_ help arrange RNA polymerases in the correct position on the promoter.
8. In eukaryotes, long segments of nucleotides with no coding information are called \_\_\_\_\_.
9. In eukaryotes, the portions of a gene that are actually translated into proteins are called \_\_\_\_\_.
10. Insertions, deletions and point mutations are types of \_\_\_\_\_.