

## *Mutations*

1. Alleles may be described as:
  - a. Similar forms of two different loci
  - b. Similar forms of two different genes
  - c. Alternative forms of a single gene
  - d. Alternative forms of two different loci
  
2. A mutation which produces a change from wild type to an abnormal phenotype is known as:
  - a. A back mutation
  - b. A forward mutation
  - c. A prototrophic mutation
  - d. A deletion
  
3. Normal allele “A” is mutated to recessive allele “a”. The “a” allele phenotype would be expressed in one of the following individuals:
  - a. Aa
  - b. aa
  - c. AA
  - d. aA
  
4. A transition base substitution mutation occurs for cytosine at a C ≡ G site in a DNA strand. After DNA replication the base pair at this site will be:
  - a. G ≡ C
  - b. T = A
  - c. A = T
  - d. G ≡ T
  
5. A 2-amino-purine can be incorporated into DNA in place of adenine. It can pair equally well with thymine or cytosine. What type of mutation do you expect it to cause?
  - a. Transversion
  - b. Deletion
  - c. Addition
  - d. Transition
  - e. Transversions and transitions
  
6. The first line below is the base sequence of a single strand of parental DNA. The corresponding (non-complementary) strand of a progeny DNA helix is given below it.

5' C G T T C A G A T G 3' parental  
5' C G C T C G G A A G 3' progeny

Which of the following types of mutations occurred during the replication of the parental sequence?

- a. Two transversions, one transition
- b. Three transitions
- c. Three transversions
- d. One transversion, two transitions

7. Mutations, even though most are deleterious when induced, are important in evolution of man because:
  - a. They can be compensated by numerous reverse back mutations which restore the original phenotype
  - b. They may be beneficial under different environments.
  - c. The rates at which they occur are the same for all the genes of man.
  - d. They are deleterious under all possible environments.
  
8. Most mutations are recessive because they:
  - a. Usually result in a non-functional protein
  - b. Occur only in somatic cells
  - c. Are rare
  - d. Occur very frequently in nature
  
9. If peroxides are involved in the pathway of mutation induction, the most likely mutagen is:
  - a. Nitrous acid
  - b. X-rays
  - c. Ultraviolet light
  - d. 5-bromo uracil
  
10. Tautomeric shifts in DNA bases lead to:
  - a. Thymine dimers
  - b. Base deletion
  - c. Base substitution
  - d. Deamination
  
11. The most likely mutational event induced by ultraviolet light in DNA is \_\_\_\_\_  
\_\_\_\_\_.
  
12. A transversion base substitution mutation occurs for cytosine at a C  $\equiv$  G site in a DNA strand. What is the substituted base pair at this site after replication?
  - a. A = T
  - b. T = A
  - c. C = G
  - d. A = U
  
13. Define deletion.
  
  
  
  
  
  
  
  
  
  
14. What is the process by which 5-bromo-uracil induces mutation?
  - a. Deamination of bases
  - b. Substitution for thymine in DNA, followed occasional pairing of 5-BU with G
  - c. Peroxides
  - d. Excitation of molecules

15. In a particular protein in the rat, the amino acid sequence tyr+pro+arg-val is replaced by the sequence tyr+ala-arg-val.

What is the most likely type of mutation causing this change?

- a. Transition base substitution
- b. Transversion base substitution
- c. Addition of one base
- d. Deletion of one base

16. Why can bacteria be useful for identifying cancer-causing chemicals?

17. What would be the advantages and disadvantages if the spontaneous mutation rate in human dropped to zero?

18. Choose the type of organism in which induced mutations have been most useful.

- a. Farm animals
- b. Humans
- c. Cereals
- d. Commercial fish