

- 1) When comparing DNA and RNA, we find
 - A) no sugar is present in either molecule.
 - B) hydrogen bonding is important only in DNA.
 - C) only DNA has a backbone of sugars and phosphates.
 - D) adenine pairs with different bases in DNA and RNA.
 - E) thymine pairs with different bases in DNA and RNA.
- 2) Both DNA and RNA
 - A) are single-stranded molecules.
 - B) contain the same four types of nitrogen-containing bases.
 - C) have the same five-carbon sugars.
 - D) contain phosphate groups.
 - E) cannot both be present in a cell simultaneously.
- 3) The number of different possible codons is
 - A) 3.
 - B) 4.
 - C) 20.
 - D) 64.
 - E) unknown.
- 4) If a bacterial protein has 30 amino acids, how many nucleotides are needed to encode it?
 - A) 30
 - B) 33
 - C) 90
 - D) 93
 - E) 600
- 5) Which of the following molecules functions to transfer information from one generation to the next?
 - A) DNA
 - B) mRNA
 - C) tRNA
 - D) proteins
 - E) lipids
- 6) If the sequence of bases in a section of template DNA is TAGGCTAA, what is the corresponding sequence of bases in mRNA?
 - A) ATCCGATT
 - B) TAGGCTAA
 - C) CGAAUCGG
 - D) AATCGGAT
 - E) AUCCGAUU
- 7) The process of copying genetic information from DNA to RNA is called
 - A) translation.
 - B) transformation.
 - C) replication.
 - D) transcription.
 - E) polymerization.
- 8) In eukaryotic cells, which of the following molecules functions to transfer information from the nucleus to the cytoplasm?
 - A) DNA
 - B) mRNA
 - C) tRNA
 - D) proteins
 - E) lipids
- 9) If a tRNA molecule specialized for transfer of the amino acid valine has the anticodon CAG, with what codon will it couple?
 - A) GAC
 - B) GTC
 - C) TUG
 - D) GUC
 - E) CAG
- 10) Which occurs in the nucleus?
 - A) transcription only
 - B) assembly of amino acids into protein
 - C) replication of genetic material
 - D) transcription and replication of genetic material
 - E) translation only
- 11) Transfer RNA
 - A) is a nucleic acid that alone encodes the amino acid sequence of a protein.
 - B) is made directly from DNA during transcription.
 - C) is incorporated into the structure of ribosomes.
 - D) is larger in size if the protein to be made is longer in amino acid sequence.
 - E) transfers amino acids from proteins to mRNA.
- 12) The process of converting the "message" of mRNA into a sequence of amino acids is called
 - A) translation.
 - B) transcription.
 - C) activation.
 - D) replication.
 - E) repression.
- 13) All of the following are directly involved in translation EXCEPT
 - A) ribosomes.
 - B) tRNA.
 - C) amino acids.
 - D) DNA.
 - E) mRNA.
- 14) A random change in a DNA nucleotide base sequence
 - A) has no influence on genetic variation.
 - B) is never expressed phenotypically.

- C) constitutes a mutation.
 D) is never beneficial to the organism.
 E) will kill the cell when it occurs.
- 15) Which of the following is TRUE about gene expression?
 A) Gene expression remains constant throughout an organism's life span.
 B) Different individuals of the same species express all the same genes.
 C) Gene expression is not influenced by the environment.
 D) Different tissues within an organism express different genes.
 E) All of the above statements are false.
- 16) Ultimately, cellular differentiation depends upon
 A) specialization of cells.
 B) gene expression.
 C) mutations.
 D) environmental cues.
- 17) Your tongue does not grow hair because
 A) different genes are expressed in different tissues.
 B) skin cells have extra DNA that encodes hair proteins.
 C) the genes for hair proteins have been deleted from the cells of your tongue.
 D) saliva prevents hair from growing.
 E) None of the above are correct.
- 18) Rank the following nucleic acid structures from largest to smallest.
 A) Chromosome, Gene, Open Reading Frame, Codon
- B) Genes, Chromosome, Open Reading Frame, Codon
 C) Codon, Genes, Chromosome, Open Reading Frame
 D) Chromosome, Codon, Gene, Open Reading Frame
 E) Codon, Chromosome, Open Reading Frame, Genes
- 19) Which of the following best describes the role of the sex reversal Y (sry) gene in humans.
 A) It reverses the sex of any individual that carries it.
 B) It causes hermaphroditism in humans
 C) There are two copies of it in females and one copy in males
 D) It is found in all sperm
 E) Individuals with sry develop a male phenotype.
- 20) A tRNA has the sequence GGG as its anticodon. What amino acid would you expect to be attached to this tRNA?
 A) Lys
 B) Pro
 C) Tyr
 D) Phe
 E) Gly

21. Explain why a non-sense mutation will usually have a bigger impact on phenotype than a mis-sense mutation.

22. 31. The sequence of a very short mRNA is written below. How many amino acids will the polypeptide encoded by this mRNA have and what is the sequence of amino acids in the polypeptide?

GAGGACCUAGAUGCCUGUACCUGGCUAAUCUGUAGUAGUGG

23. The one gene – one polypeptide hypothesis explains how genes control traits. Use the example of testicular feminization to explain how a gene encodes a polypeptide and how this polypeptide in turn controls the trait.