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1. Ribonucleic acid is *not* normally associated with the  
(1) cytoplasm                      (2) nucleolus                      (3) ribosomes                      (4) **vacuoles**
2. Two types of RNA molecules are  
(1) uracil and adenine                      (3) cytosine and thymine  
(2) **messenger RNA and transfer RNA**                      (4) transfer RNA and translocation RNA
3. Which nitrogenous base is normally present in RNA molecules but *not* in DNA molecules?  
(1) adenine                      (2) cytosine                      (3) thymine                      (4) **uracil**
4. What will happen if a base sequence of a strand of DNA is changed from A–T–G to A–T–C?  
(1) **The m-RNA will be changed from U–A–C to U–A–G.**  
(2) The t-RNA will be changed from U–A–C to T–A–C.  
(3) The m-RNA will be changed from T–U–C to T–U–G.  
(4) The t-RNA will be changed from C–A–U to C–A–C.
5. Which statement best describes messenger RNA?  
(1) It transfers polypeptides to the nucleus.                      (3) It has one oxygen atom less than DNA.  
(2) It is chemically more complex than DNA.                      (4) **It is composed of a single strand of nucleotides.**
6. Which chemical components may be parts of a molecule of transfer RNA?  
(1) **ribose, phosphate group, uracil base**                      (3) glucose, amino group, thymine base  
(2) deoxyribose, phosphate group, guanine base                      (4) maltose, carboxyl group, uracil base
7. The structure of messenger RNA is determined by the structure of  
(1) PGAL                      (2) ATP                      (3) **DNA**                      (4) ADP
8. DNA serves as a template for the synthesis of  
(1) **messenger RNA**                      (2) cellulose                      (3) starches                      (4) lipids
9. In a cell, the transfer of genetic information from DNA to RNA occurs in the  
(1) cell membrane                      (3) **nucleus**  
(2) endoplasmic reticulum                      (4) nucleolus
10. Which nucleic acid carries instructions from the nucleus to the cytoplasm?  
(1) DNA, only                      (3) Transfer RNA, only  
(2) **Messenger RNA, only**                      (4) DNA, messenger RNA, and transfer RNA
11. Which of the following nucleic acids are composed of nucleotides?  
(1) DNA, only                      (3) Transfer RNA, only  
(2) Messenger RNA, only                      (4) **DNA, messenger RNA, and transfer RNA**
12. The code of a gene is delivered to the enzyme-producing region of a cell by a  
(1) hormone                      (3) **messenger RNA molecule**  
(2) nerve impulse                      (4) DNA molecule
13. The core of a virus may contain either DNA or RNA. To identify which nucleic acid is present, a biochemist could chemically analyze the virus for the presence of  
(1) guanine                      (2) **ribose**                      (3) cytosine                      (4) phosphate