DNA Replication & Protein Synthesis

(To find answers refer your notes & textbook)

Word Bank

<table>
<thead>
<tr>
<th>thymine</th>
<th>replication</th>
<th>cytosine</th>
</tr>
</thead>
<tbody>
<tr>
<td>phosphate group</td>
<td>proteins</td>
<td>identical</td>
</tr>
<tr>
<td>double helix</td>
<td>uracil</td>
<td>nitrogen base</td>
</tr>
<tr>
<td>two</td>
<td>deoxyribose sugar</td>
<td>hydrogen bonds</td>
</tr>
<tr>
<td>adenine</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. The double coiled shape of DNA is called a _____Double_____ Helix_____.

2. In order for DNA to begin replication ____Hydrogen____ Bonds_______ between nitrogen bases must break.

3. DNA has ____2____ strands.

4. DNA nucleotides consist of 3 parts:
   a. ____Nitrogen____ Bases_____
   b. ____Phosphate____ Groups____ &
   c. ____Deoxyribose____ Sugars____

5. Nitrogen bases in the DNA sequence code for____Proteins______.

6. The end result of DNA replication is two ____Identical____ double helixes.

7. In DNA, the nitrogen bases are: adenine; cytosine, guanine & ____Thymine____.

8. In RNA, the nitrogen bases are: adenine; cytosine, guanine & ____Uracil____.

9. ____Replication/DNA Synthesis____ is the DNA process that produces a new copy of an organism’s genetic information to pass on to a new cell.

10. Thymine forms a hydrogen bond with ______Adenine____ and guanine forms a hydrogen bond with ______Cytosine_____.

Label the diagram of DNA replication. Use the following word bank:

- base pair
- deoxyribose
- nucleotide
- phosphate
- hydrogen bonds
- nitrogen base

- Deoxyribose
- Nitrogen
- Nucleotide
- Base Pair
- Hydrogen Bonds
- Phosphate
17. The diagram below shows one side of an unzipped strand of DNA (replication). Write the letters – A, T, C, or G – of the bases that will pair with the bases on the strand. Some of the bases have been paired for you.

18. Write the complementary strand for the following DNA sequence (replication).

T A C G C A T T A C C G C T A T G C A T C
A T G C G T A A T G G C G A T A C G T A G

19. Adenine (A), cytosine (C), guanine (G), and __Uracil (U)__ are the nitrogen bases found in RNA.

20. RNA has ______ strands.
   a. 4  
   b. 3  
   c. 1  
   d. 2

21. RNA nucleotides consist of
   a. a nitrogen base only
   b. a phosphate group, ribose sugar, and a nitrogen base
   c. a ribose sugar and phosphate group
   d. ribose sugar and hydrogen base

22. In RNA, which of the nitrogen bases does not belong?
   a. guanine  
   b. uracil  
   c. thymine  
   d. adenine
Complete the following chart on the 3 chemical differences between DNA and RNA.

<table>
<thead>
<tr>
<th>Structure</th>
<th>DNA</th>
<th>RNA</th>
</tr>
</thead>
<tbody>
<tr>
<td>23. Number of strand(s)</td>
<td>two</td>
<td>one</td>
</tr>
<tr>
<td>24. Name of Sugar</td>
<td>deoxyribose</td>
<td>ribose</td>
</tr>
<tr>
<td>25. Names of the 4 nitrogen bases</td>
<td>adenine, thymine guanine, cytosine</td>
<td>adenine, uracil guanine, cytosine</td>
</tr>
</tbody>
</table>

26. Turning DNA into RNA is called:
   a. replication
   b. transcription
   c. translation
   d. mutation

27. Which of the following transcriptions is correct?
   A. TACGACTAGATC
      UUGCUGUUCUUG
   B. TACGACTAGATC
      ATGCTGATCTAG
   C. TACGACTAGATC
      CGTACGTACCGA
   D. TACGACTAGATC
      AUGCUGAUCUAG

28. A codon is
   a. a series of 3 nitrogen bases that code for an amino acid
   b. a series of 4 nitrogen bases that code for an amino acid
   c. a character on the TV series Star Trek
   d. when you put your coat on

29. Which type of RNA leaves the ribosome in search of nucleotides in the cytoplasm and brings them back to the ribosome for protein synthesis?
   a. tRNA
   b. rRNA
   c. mRNA
   d. zRNA
30. The 3 nucleotides that tRNA find and bring back to the ribosome are called the __anti__-codon.

31. The anti-codon and codon bond together by peptide bonds and form long chains of ___amino_____ acids_____.

Matching.
Use the key terms and match them with their definition.

a. transcription (p.
 b. translation
 c. tRNA
d. mRNA
e. codon

_E_ 32. This is a set of 3 nitrogen bases used to make amino acids.

_B_ 33. This happens when mRNA uses a copied DNA code to make protein.

_C_ 34. This brings amino acids to ribosomes.

_D_ 35. This carries the copied DNA code out to the cytoplasm.

_A_ 36. This happens when RNA unzips from the DNA code.

_B_ 37. A mutation is any mistake or change in the
   a. RNA sequence
   b. DNA sequence
   c. Ribosomes
   d. Nucleus

_B_ 38. After breaking away from the original strand of DNA during transcription, RNA becomes which type of RNA?
   a. tRNA
   b. mRNA
   c. rRNA
   d. zRNA

_A_ 39. The codons of 3 nitrogen bases in the mRNA strand codes for what?
   a. amino acids
   b. sugars
   c. fats
   d. dairy
40. List the 3 different types of codons that code for stops.

- UAA
- UAG
- UGA

41. When mRNA leaves the nucleus, where does it go? **INTO THE CYTOPLASM**

42. GCU codes for: **ALANINE**

43. AUG codes for: **METHIONINE** or it can act as a start codon.

44. UCU codes for: **SERINE**

45. How many stop codons are there on the codon chart? **THREE**

46. Translation is the process of using mRNA to make
   a. DNA
   b. Fats
   c. RNA
   d. Amino acid chains

**Compare & Contrast DNA & RNA**

<table>
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<tr>
<th>DNA Only</th>
<th>Both DNA &amp; RNA</th>
<th>RNA Only</th>
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<tbody>
<tr>
<td>Contains Thymine</td>
<td>Is called a nucleic acid</td>
<td>Has more than one type</td>
</tr>
<tr>
<td>Pairs A-T, T-A, G-C &amp; C-G</td>
<td>Found in the nucleus</td>
<td>Contains Uracil</td>
</tr>
<tr>
<td>Contains two strands of nucleotides</td>
<td>Contains a genetic code</td>
<td>Found outside of the nucleus</td>
</tr>
<tr>
<td>Contains Adenine, Guanine and Cytosine</td>
<td></td>
<td>Contains one strand of nucleotides</td>
</tr>
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