Key

Worksheet 20 11 April 2014

1. What are the five bases that make up nucleotides? Group them is terms of DNA only, RNA only, or DNA and RNA.

DNA only	RNA only	DNA and RNA
thymine	uracil	cytosine adenine guanine

2. The sugar in DNA is deoxyribose while the sugar in RNA is ribose.
3. What are the components of a nucleotide? What are the components of a nucleoside?
   a. Nucleotide- phosphate, base, sugar
   b. Nucleoside- base, sugar
4. How are nucleosides named?
   "sine" or "dine" suffix and "oxy" or "deoxy" prefix
5. Describe the linkage between nucleotides.
   (linking a phosphate group to a carbon 5'-OH on a nucleoside forms nucleotide)
   - link them together; phosphate ester linkage between the phosphate group
6. In the primary structure of nucleic acids, the nucleic acid backbone is a b.
   a. Phosphate-base repeat
   b. Phosphate-sugar repeat
   c. Sugar-base repeat
   d. A protein
7. Nucleic acids are named as the bases, starting at the free 5' end and ending at the free 3' end.
   a. Bases , 3' , 5'
   (b.) Bases , 5' , 3'
   c. Nucleotides , 3', 5'
   d. Nucleotides , 5' , 3'
   e. Nucleosides , 5', 3'
8. If a phosphate is added to the nucleoside monophosphate, what forms?
   a nucleoside diphosphate (ADP)
9. If a phosphate is added to the nucleoside diphosphate, what forms?
   a nucleoside triphosphate (ATP)
   ↓
   energy source for DNA replication

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Write the type of bond that is between each of the following pairs in DNA.

1. Phosphate and sugar = phosphodiester
2. Base and base = hydrogen bond
3. Sugar and base = glycosidic bond

Write complementary DNA and RNA strands to:

Given: 5'-A-T-C-G-G-C-T-T-A-C-3'

4. DNA: 3'-T-A-G-C-C-G-A-A-T-G-5' .... 5'-G-T-A-A-G-C-C-G-A-T-3'
5. RNA: 3'-U-A-G-C-C-G-A-A-U-G-5' .... 5'-G-U-A-A-G-C-C-A-U-3'

Now, next to 4 and 5, write the sequence in the 5'-3' direction. This is how they are typically written.

DNA replication allows for the transfer of genetic information to new cells. The goal is to make exact copies of an existing parent DNA double strand. There are two ways to do this; define each:

6. Conservative Replication- the parent strands of the double helix form a duplicate new daughter strand
7. Semi-Conservative Replication- the parent strands of each form one strand of two new daughters (how it usually occurs)

Answer the following questions.

8. Where does DNA replication occur? nucleus
9. How does DNA replication occur? ① H^+ bonds between bases break, separating the strands and unwinding the DNA. ② complementary bases are added to each strand ③ new phosphodiester bonds between nucleotides (b/c complementary bases are added to the template strands, 2 exact copies form.
10. What is the process in which the DNA sequence is copied to an mRNA sequence? transcription
11. What is the process in which the mRNA code is converted into a protein/ amino acid sequence/ peptide chain? translation
12. **Transcription: Write the peptide coded for the following mRNA strand:**

    5'-AUG-UCU-AAU-CGU-GCU-GAU-UCG-GGU-GCA-UAG-3'

    $H_3\overset{+}{N}$-Met-Ser-Asn-Arg-Ala-Asp-Ser-Val-Ala-COO^-
13. Write the peptide coded if U6 is replaced by a C and if G23 is replaced by a U.

    $H_3\overset{+}{N}$-Met-Ser-Asn-Arg-Ala-Asp-Ser-Val-Ala-COO^-