

DNA SCAVENGER HUNT

What does “DNA” stand for?

Deoxyribonucleic Acid

Which of the 4 types of macromolecule is it?

Nucleic Acid

What do Cells use it for?

Storing and Passing along hereditary information.

Describe the shape of the molecule:

Double helix (twisted rope ladder)

What are the monomer subunits?

Nucleotides: there are 4 different kinds

What are the 3 parts of each subunit?

Deoxyribose sugar, Phosphate group and a Nitrogenous Base

What is along the sides of the molecule?

The sugar and phosphates alternate

What is in the center?

The nitrogenous bases in pairs.

Who got credit for discovering the shape?

Watson and Crick

What year was it?

1953 – Nobel Prize!

Earlier research was done by who? (List at least 5)

Rosalind Franklin, Maurice Wilkins, Avery, Griffith, Hershey, Chase

Names of the 4 Nitrogenous bases:

Adenine, Thymine, Guanine, Cytosine

Classified as? (2 categories)

Purines (Double carbon Ring) – A and G

Pyrimidines (Single Carbon Ring)

- T and C

How do they pair?

Adenine always with Thymine

Guanine always with Cytosine

Pairs held by: Hydrogen Bonds

How is DNA repaired? (Flying Geese book)

DNA polymerase enzyme “checks” the new strand. If errors are found, other enzymes “cut “ out the error, and the correct nucleotides are inserted.

How does the Nitrogen Base pairing make each species unique, if all species use the same 4 bases?

The sequence and amounts of the nucleotides varies from species to species and individual to individual! (My DNA base sequence is different than yours!)

What is DNA Replication?

DNA making copies of itself (in “S” phase of the Cell cycle!)

How is it done? (5 steps)

- 1. 2 Strands of DNA helix separate (“unzip” by breaking H bonds)**
- 2. Each single strand serves as a template for producing a new, complementary strand**
- 3. Nucleotides line up one at a time across from the existing strand, using base pairing rule (A-T, G-C)**
- 4. Enzymes link the nucleotides together, forming 2 new DNA strands, called daughter strands.**
- 5. Result: 2 identical DNA molecules consisting of 1 old and 1 new strand**

What is the final result of DNA Replication?

Two identical DNA molecules that each consist of 1 original DNA strand and 1 new strand.

What enzymes are involved?

Dozens of different enzymes

-DNA Helicase – “Cuts” the H bonds between the strands prior to replication

-DNA Polymerase – link up the new nucleotides in the new strand

RNA & Protein Synthesis Scavenger Hunt

DNA COMPARED TO RNA

NUCLEIC ACID	DNA	RNA
<i>Number of Strands</i>	2	1
<i>Name of Sugar</i>	Deoxyribose	Ribose
<i>Names of Nitrogenous Bases</i>	Adenine Thymine Guanine	Adenine Uracil Guanine

Cytosine

Cytosine

Pattern of Base Pairing A-T, G-C A-U, G-C

Two Main Steps of Protein Synthesis (List/Explain)

Step 1: Transcription = Making RNA from DNA (in Nucleus if Eukaryote)

1. DNA unzips down H bonds
2. Only 1 DNA strand serves as template to make RNA
3. RNA nucleotides pair with their complement on the DNA strand, but Uracil now pairs with Adenine
4. RNA polymerase links the nucleotides
5. RNA released, DNA zips back up

Two Main Steps of Protein Synthesis (List/Explain)

Step 2 : Translation = Making a Protein at the Ribosome from the RNA Code

1. mRNA “feeds” through the ribosome
2. Every 3 N bases on it = “Codon”
3. Transfer RNA (tRNA) brings in amino acids to pair with the codons by matching up its “anticodon”
4. Amino acids get attached to each other with peptide bonds.
5. Finished protein then released from the ribosome

Enzymes Involved RNA Polymerase

Three Kinds of RNA (List/Define/)

- a. mRNA = Messenger RNA = transcribes the DNA code
- b. rRNA = Ribosomal RNA = part of the ribosome, helps “read” the genetic code on the mRNA
- c. tRNA = Transfer RNA = brings specific amino acids to the ribosome to help make the protein

What is the Genetic Code?

The sequence of the nitrogen bases in the center of each DNA molecule. Each sequence of 3 codes for an amino acid to be put into a protein. There are 64 possible codon combinations, but only 20 different amino acids. (More than 1 way to code for each.)

*This code is “Universal” – all life forms use the same code sheet!

Codon = series of 3 nitrogen bases on mRNA

Anticodon = series of 3 nitrogen bases on tRNA that complement a specific codon

Mutations = Any change in the N base sequence

Effect on Protein Synthesis:

- **Can cause change in amino acid sequence**
- **Can cause protein to not function properly**
- **May be beneficial, harmful or neither**

Gene Mutation = change in a single gene (as compared to a chromosomal mutation that affects many genes)

Example(s) = "Point" mutations

Insertion or Deletion = "Frameshift" mutations

Base-Pair Substitution = 1 N base substituted for another