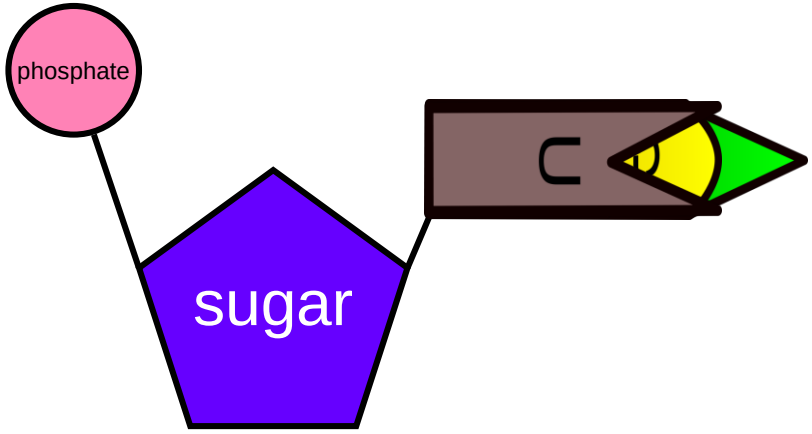

DNA
& RNA
cytosine
deoxyribose
guanine
adenine
Structure and Function

What is DNA and RNA?

- DNA and RNA are nucleic acids (1 of the 4 macromolecules we talked about before).

- They both are made of nucleotides. (3 parts)
  - **sugar** (deoxyribose or ribose)
  - **phosphate**
  - **nitrogenous base**
    - adenine (A)
    - thymine (T) (DNA only)
    - guanine (G)
    - cytosine (C)
    - uracil (U) (RNA only)



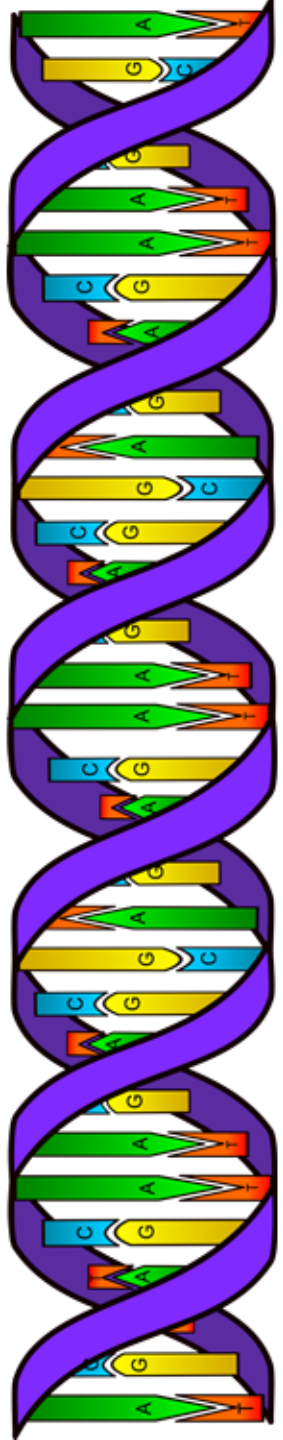
nucleotide

What does DNA do?

- DNA stores genetic information using its sequence of A's, T's, C's, and G's.
- This genetic information is the instructions to make an organism's proteins.
- You can think of DNA like a recipe book for proteins.

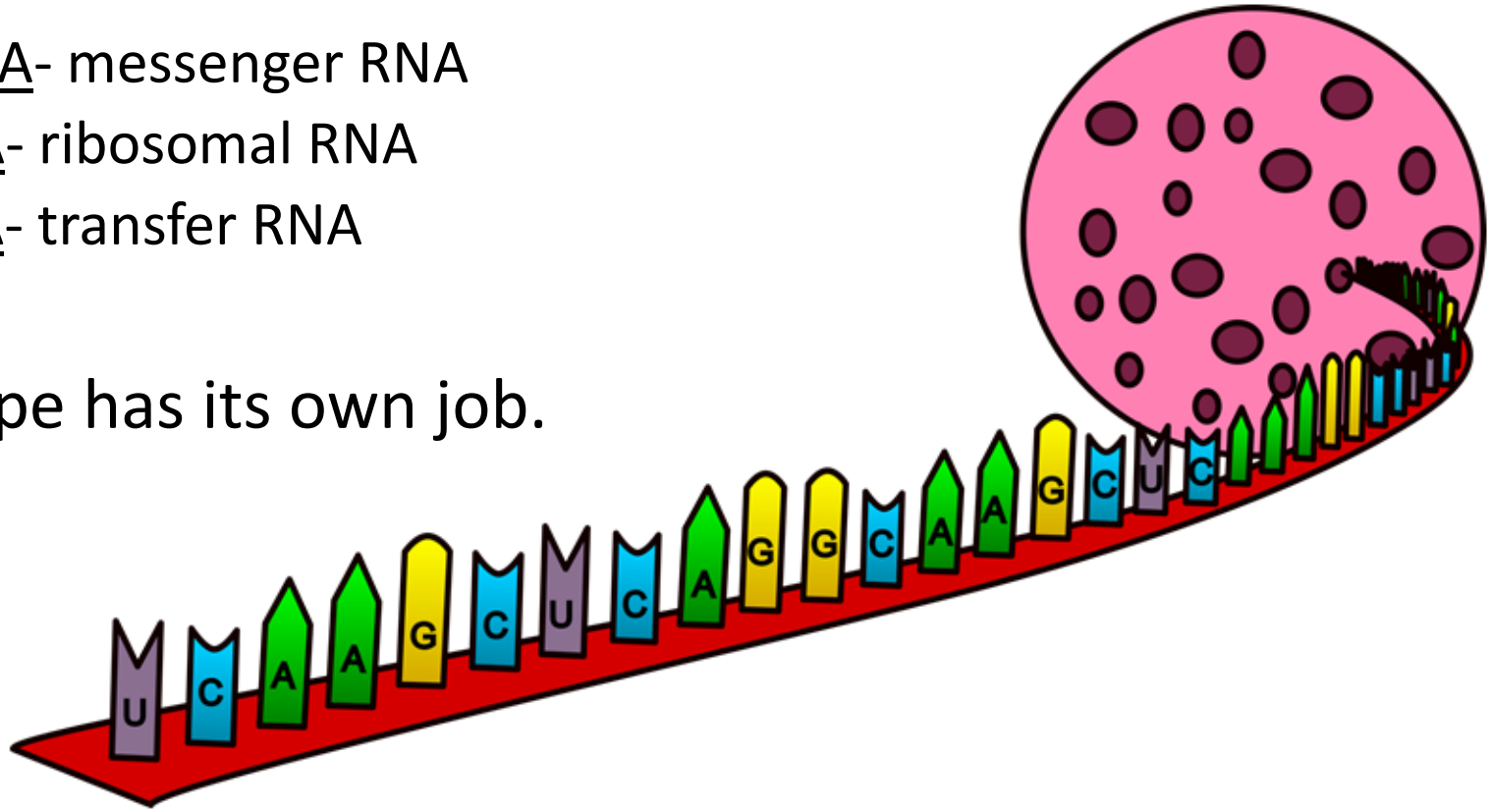
DNA Facts

- **What:** DNA= Deoxyribonucleic Acid
- **Structure:**
  - DNA has a **double helix** shape.
  - It is double stranded (like a twisted ladder).
  - made of deoxyribose sugar
  - nitrogenous bases:
    adenine, thymine, cytosine, guanine
- **Where:** in the nucleus of eukaryotes
- Human DNA is 3 BILLION nucleotides long!!

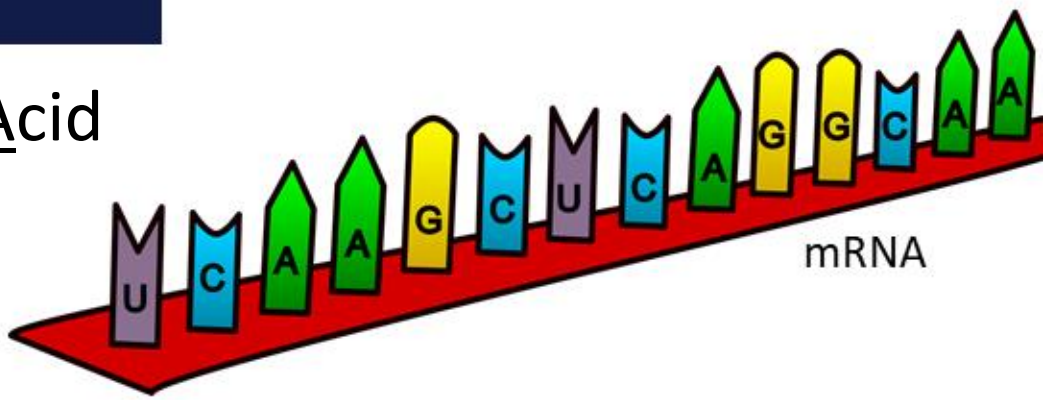


What does RNA do?

- RNA helps DNA to make proteins.
- 3 types of RNA
  - mRNA- messenger RNA
  - rRNA- ribosomal RNA
  - tRNA- transfer RNA
- Each type has its own job.



RNA Facts



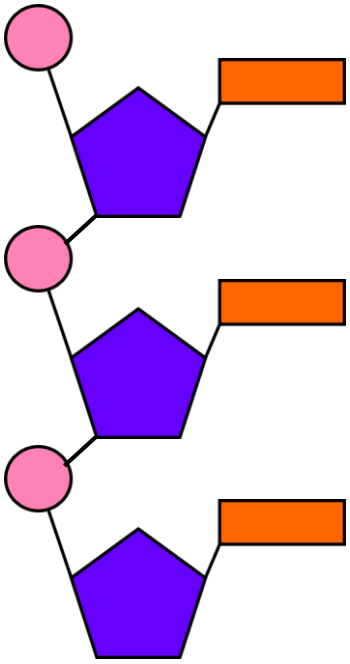
- **What:** RNA= Ribonucleic Acid
- **Structure:**
  - RNA is single stranded.
  - made of ribose sugar
  - nitrogenous bases:
    adenine, uracil, cytosine, guanine
- **Where:** found in nucleus and cytoplasm

- The COVID-19 vaccine is a mRNA vaccine.

Video Link: https://youtu.be/WOvvyqJ-vwo

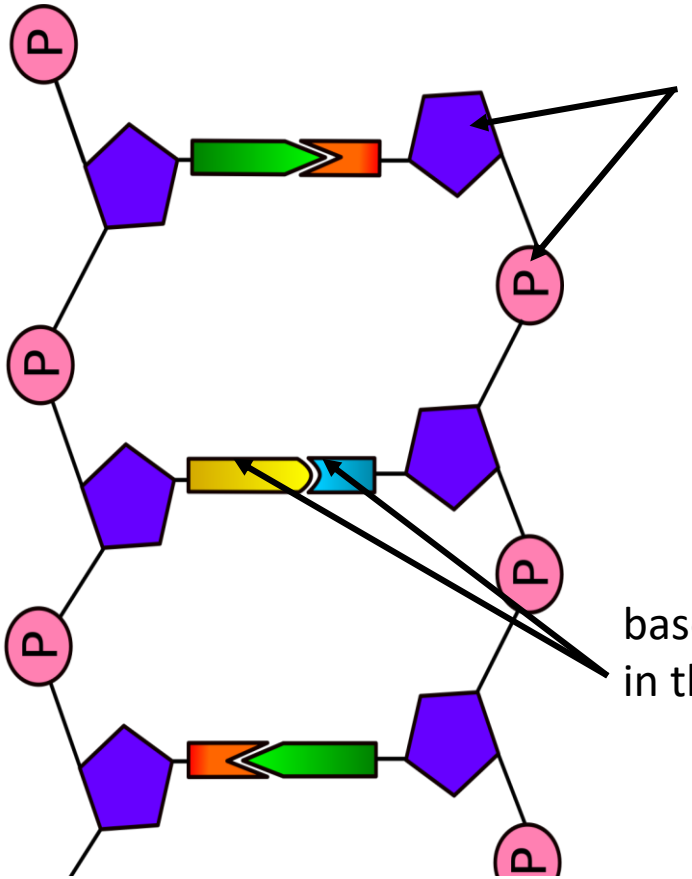
DNA Structure

Nucleotides link together to form long chains.



3 billion in humans

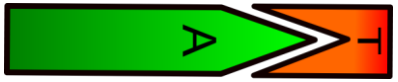
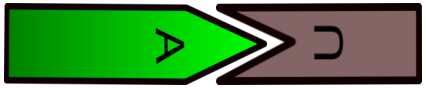
The nitrogenous bases match up in the middle to form a two stranded molecule



Sugar and phosphate are on the outside= **backbone**

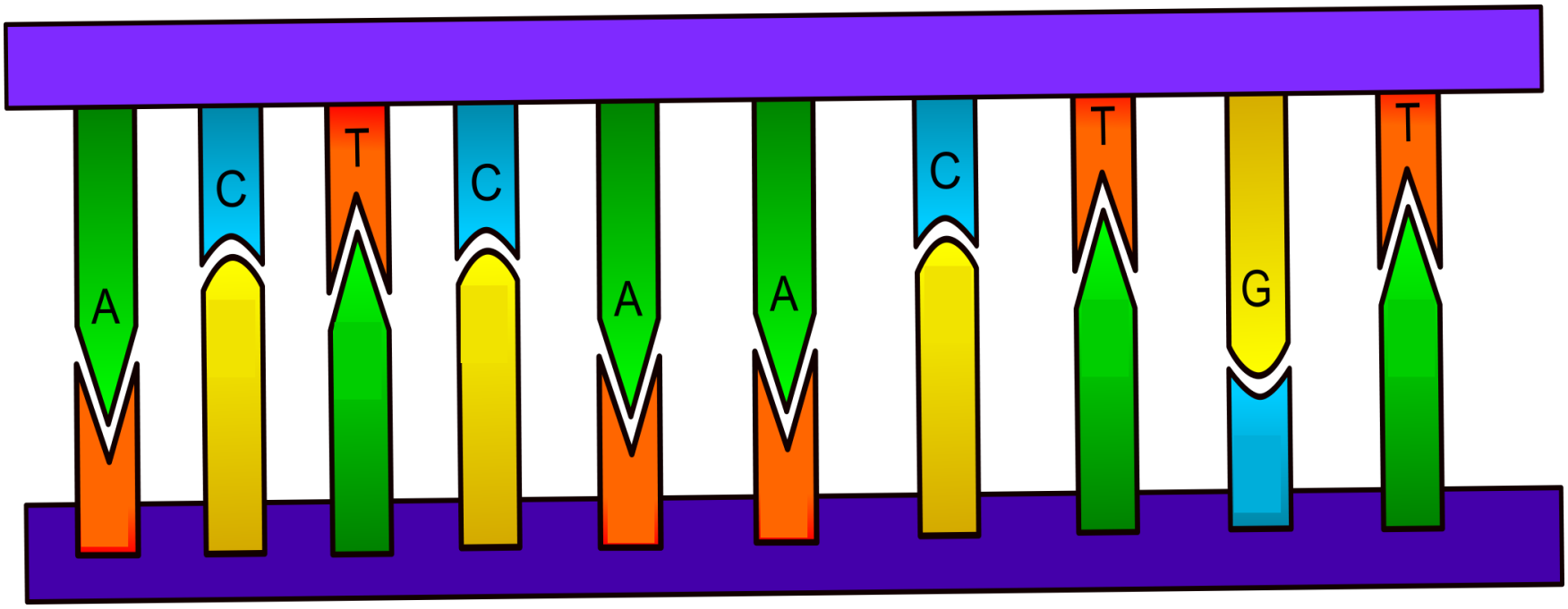
bases pairing in the middle

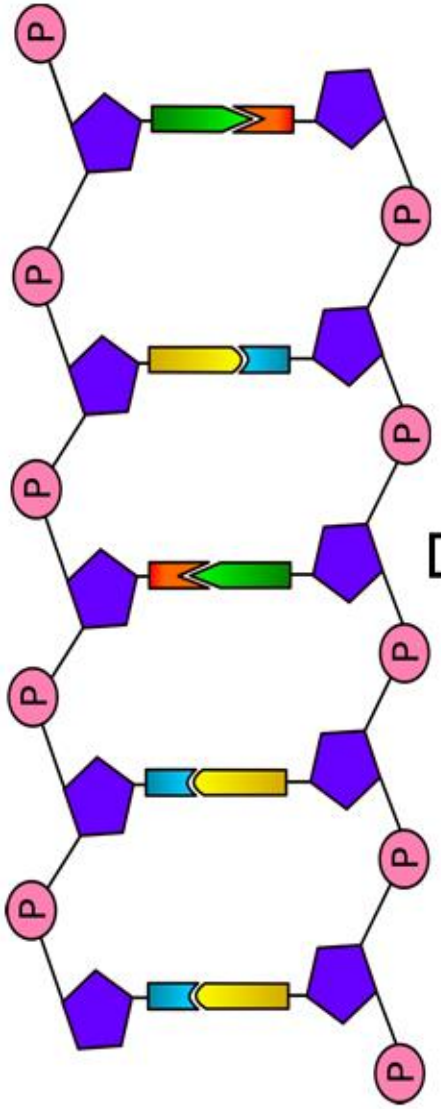
Base Pairing Rules

- The nitrogenous bases pair up in a specific way.
  - **A** pairs with **T** 
  - **C** pairs with **G** 
  - In RNA: **A** pairs with **U** 
- The pairs (and the two sides of DNA) are held together by hydrogen bonds.

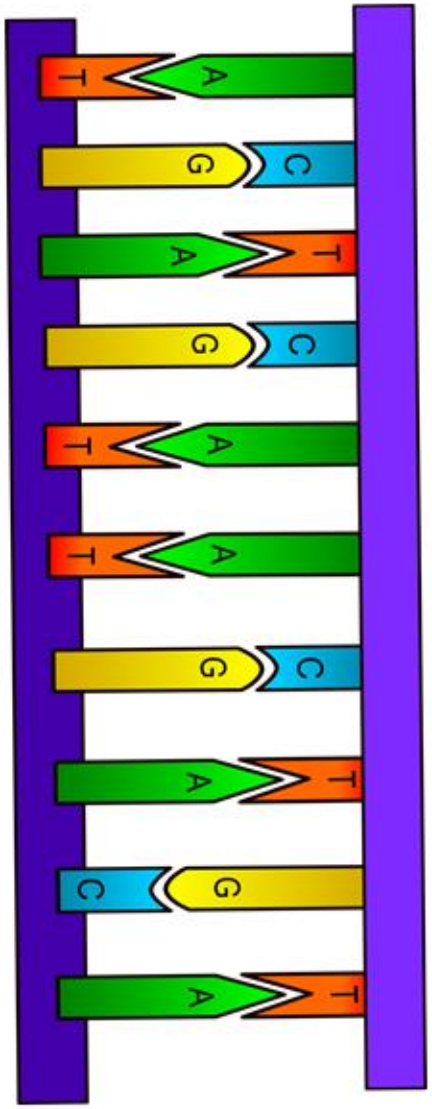
Complementary Base Pairing

- In DNA, one side serves as a template for the other.
- Fill in the other strand of DNA using base pairing rules:





Nucleotides link together to form DNA.



This forms the DNA ladder.

This ladder twists into a double helix.

Let's Compare: DNA vs. RNA

	DNA	RNA
Number of strands:		
Type of sugar:		
Nitrogenous bases:		
Base pairing rules:		

Let's Compare: DNA vs. RNA

	DNA	RNA
Number of strands:	2	1
Type of sugar:	deoxyribose	ribose
Nitrogenous bases:	adenine, thymine, guanine, cytosine	adenine, uracil, guanine, cytosine
Base pairing rules:	A=T C=G	A=U C=G

Discovery of DNA's Structure

- James Watson and Francis Crick
- Maurice Wilkins and Rosalind Franklin


James Watson


Francis Crick


Maurice Wilkins


Rosalind Franklin

Video Link: https://youtu.be/1vm3od_UmFg