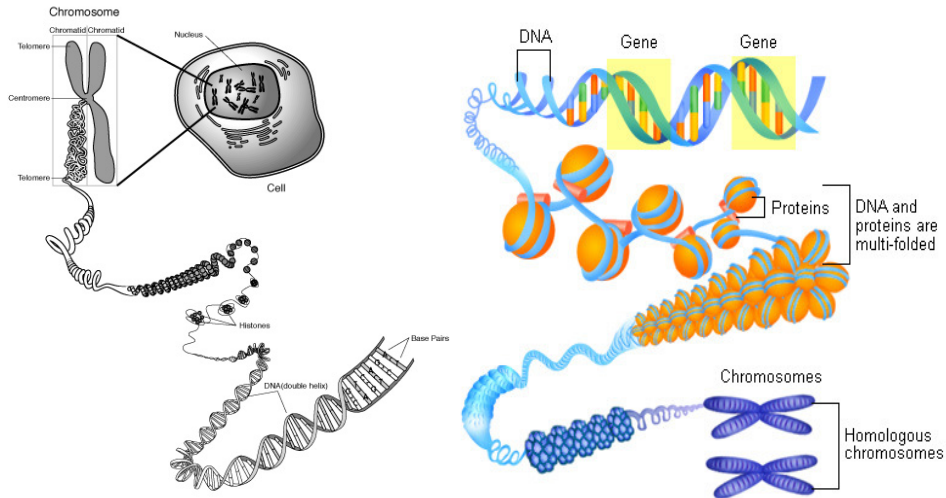


**1. Deoxyribonucleic Acid (DNA)**

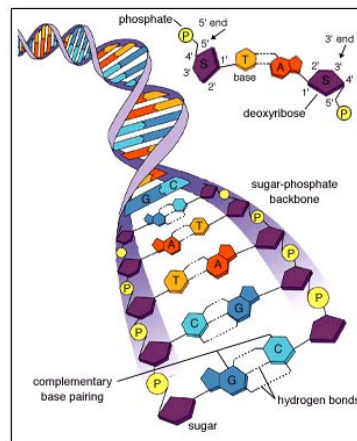
- DNA is a molecule that carries genetic information which is vital to cells function such as **cell division and cell differentiation** (in different body tissues and organs).
- About 2 meters of DNA can be found in each cell nucleus.



- Each DNA consists of 2 parallel strands twisted around each other to form a double helix.
- A molecule of DNA is wrapped around proteins to form a single chromatin thread
- During cell division, the loose **chromatin threads** coil tightly into structures called **chromosomes** inside the cell nucleus for the purpose of duplication and division.

**2. Unit of DNA**

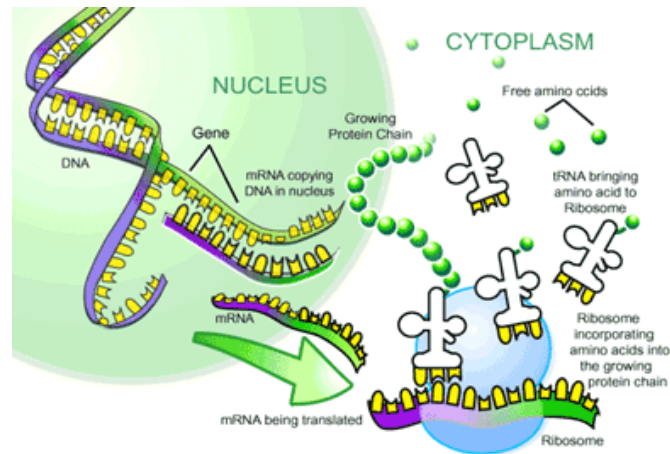
- DNA make up of nucleotides bases : (a) **Adenine**, (b) **Thymine**, (c) **Guanine**, (d) **Cytosine**
- Each nucleotide consists of (a) **1 phosphate group**, (b) **1 deoxyribose sugar** and (c) **1 Nitrogen-containing base**.



- The % of G/C and A/T also the same in a single double stranded DNA due to pairing rule.
- For virus cell, only single strand of DNA thus % of A,T,G,C are independent.

### 3. Genetic coding

- A gene is a segment of DNA that contains information used to make a single protein which is responsible for determining a particular characteristic of an organism.
- Each gene consists of 2 anti-parallel polynucleotides chains which can be unzipped, one of which called the **Template** which determine the type of protein made.
- **A Codon or triplet code** consists of 3 bases to represent 1 amino acid
- Each gene was used to make 1 polypeptide
- If a protein (polypeptide) consists of more than 1 polypeptide, more than 1 gene will contribute to the building. (Haemoglobin is made of 4 polypeptides )



### 4. Protein synthesis

- **Transcription:** In the nucleus, mRNA copy the template codons using A, **Uracil** instead of T, G, C
- **Translation:** In the cytoplasm, a **ribosome** helps to translate message in the mRNA into a protein molecule. **tRNA** with **anticodon** brings in the specific amino acid for building.
- Stop codon: **UGA,UAA,UAG** (i.e. Anticodon ACU, AUU, AUC of tRNA do not exist )

5.	DNA	Verses	RNA
	Deoxyribose sugar		Ribose sugar (1 more OH)
	Bases are A/T/G/C		Bases are A/U/G/C
	A:T and G:C is 1: 1		No fixed ratio between A:T and G:C
	Large permanent molecule in nucleus		Small temporary molecules movable out of nucleus

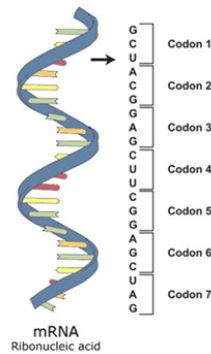
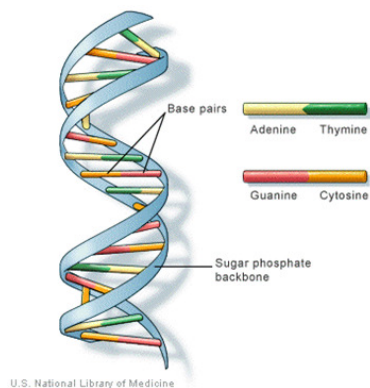


Image adapted from: National Human Genome Research Institute. Talking Glossary of Genetic Terms. Available at: www.genome.gov/Pages/Hyperon/DNA/ATP/Glossary/illustration/codon.shtml.