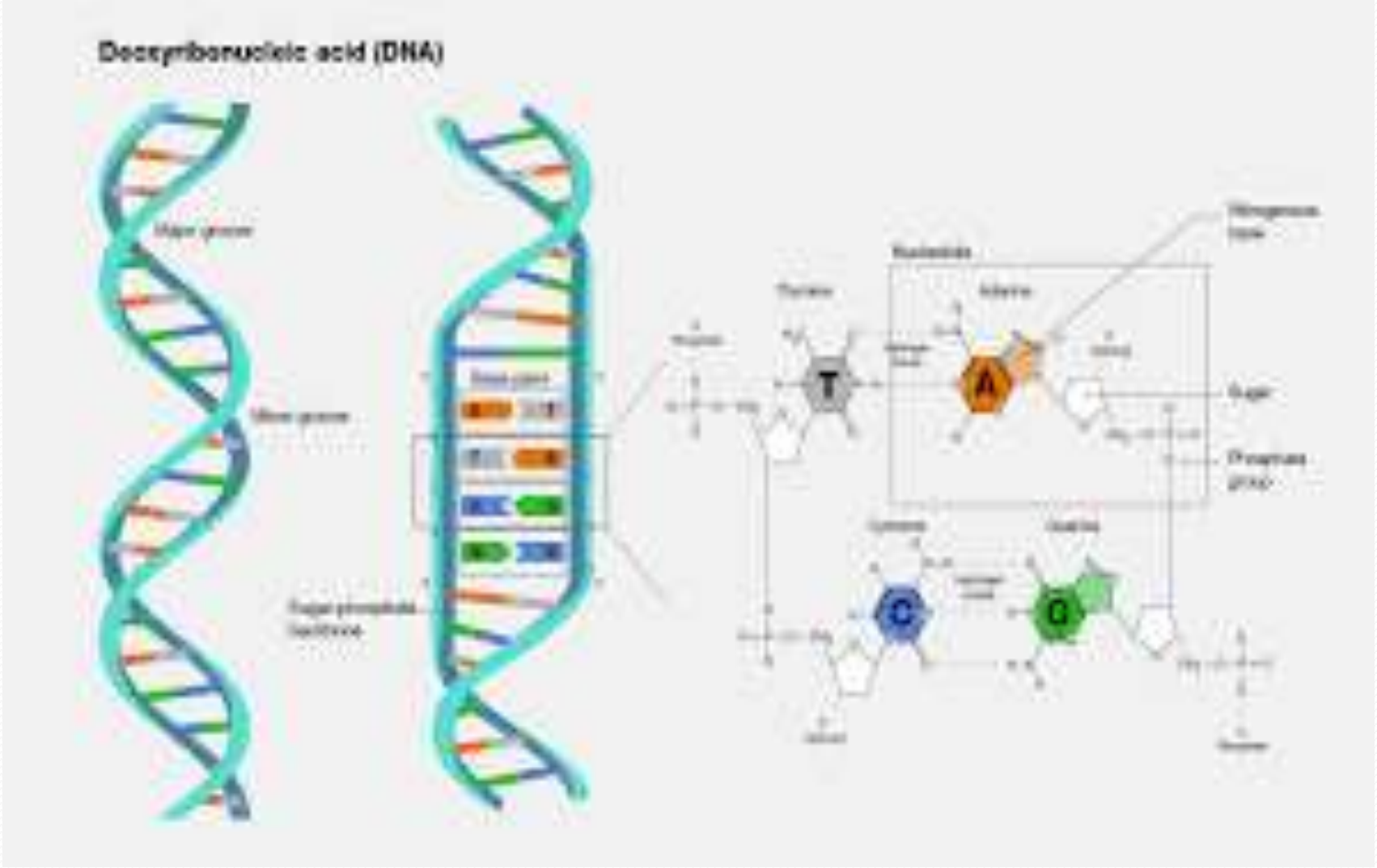
Lec (8)

DNA structure

- **First described by James Watson and Francis Crick in 1950**
- **Deoxyribonucleic acid (DNA)** composed of double strand that coil around each other to form a double helix.
- Double strand are antiparallel.
- The two DNA strands are known as polynucleotides as they are composed of simpler one units called nucleotides
- Nucleotides joined together in DNA chain by covalent bond between the sugar of one nucleotide and the phosphate of the next.

Nucleotides

- A molecule of DNA is made up of millions of tiny subunits called Nucleotides.
- Each nucleotide consists of
- Phosphate group
- Sugar (Deoxyribose**)**
- Nitrogenous base (Adenine (A), guanine (G), cytosine (C) and thymine (T))


Deoxyribonucleic acid (DNA)
T
A
C
G

Nitrogenous base

- The bases on the two strands of DNA attach to each other by hydrogen bonds.
- The bases are divided into two group:

1- Pyrimidine (include thymine and cytosine)

2- Purine (include Adenine and Guanine)

- The hydrogen bonds hold the two strands together.
- Adenine with thymine by double bond
- Guanine with cytosine by triple bond

DNA replication

- DNA replication is the process by which the genome's DNA is copied in cells.
- The double helix and separation of the DNA strands
- DNA strand is used to create a new strand.
- . When DNA is copied the two strand of DNA (old strands) separate and new complementary nucleotides are added on the two separated strands.

Function of DNA

- DNA carrying and transmitting hereditary materials or genetic information.
- Transcription of RNA.

RNA Structure

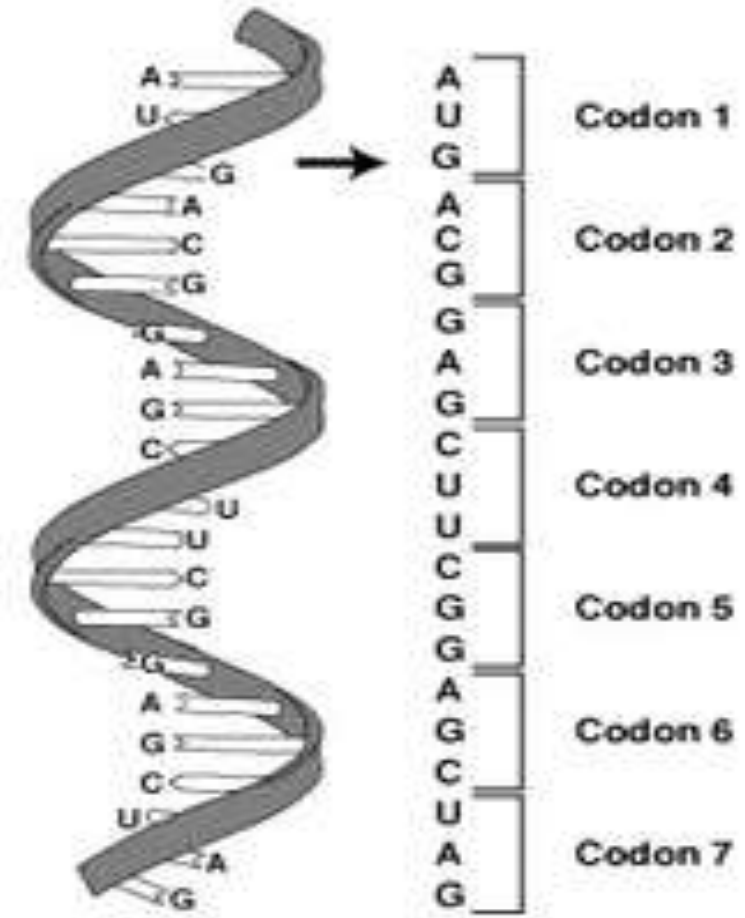
- RNA = RiboNucleic Acid.
- Single stranded
- Ribose Sugar
- Phosphate group
- Base: Adenine, Uracil, Cytosine, Guanine

Three Types of RNA

- **Messenger** RNA (mRNA) – transfers DNA code to ribosomes for translation.
- **Transfer** RNA (tRNA) – brings amino acids to ribosomes for protein synthesis.
- **Ribosomal** RNA (rRNA) – Ribosomes are made of rRNA and protein.

Transcription

- RNA molecules are produced by copying part of the nucleotide sequence of DNA into complementary sequence in RNA.
- During transcription, RNA polymerase binds to DNA and separates the DNA strands.
- RNA polymerase then uses one strand of DNA as a template from which nucleotides are assembled into a strand of mRNA.



RNA

Ribonucleic acid

Differences between DNA and RNA

1- RNA contains the sugar ribose, while DNA contains the slightly different sugar deoxyribose (a type of ribose that lacks one oxygen atom).

2-RNA has the nucleobase uracil while DNA contains thymine.