

Al- Mustaqbal University College

First stage.  
Department of Optometry(Optics)



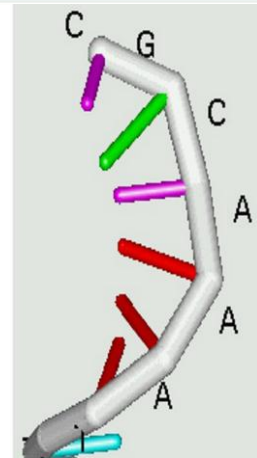
جامعة المستقبل الاهلي  
مرحلة الاولى  
قسم التقنيات البصرية

# RNA

Lecture :4

Dr: Zainab waddah naser

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## What is RNA?

**RNA is a nucleic acid called Ribonucleic Acid**

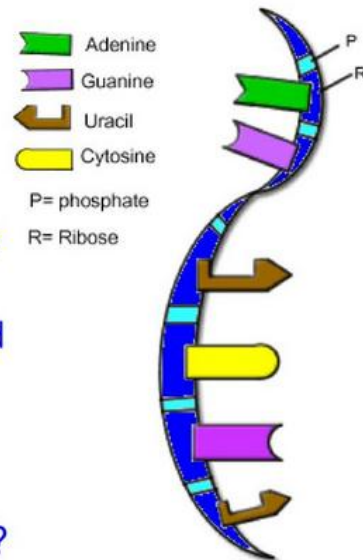
### Functions of RNA:

- **RNA transfers genetic information from the nucleus (DNA) to the cell (proteins) for use.**
- **Makes up ribosomes**
- **Helps assemble proteins**

## The Structure of RNA

(Similar to DNA with several key differences)

- Made up of a repeating strand of nucleotides, contains all 3 parts similar to DNA (sugar, phosphate, nitrogen base)
- The sugar in RNA is called Ribose
- Contains the nitrogen base Uracil instead of Thymine. Uracil will bind to Adenine just like thymine did.
- RNA is a single strand



How does DNA compare to RNA?

## Types of RNA

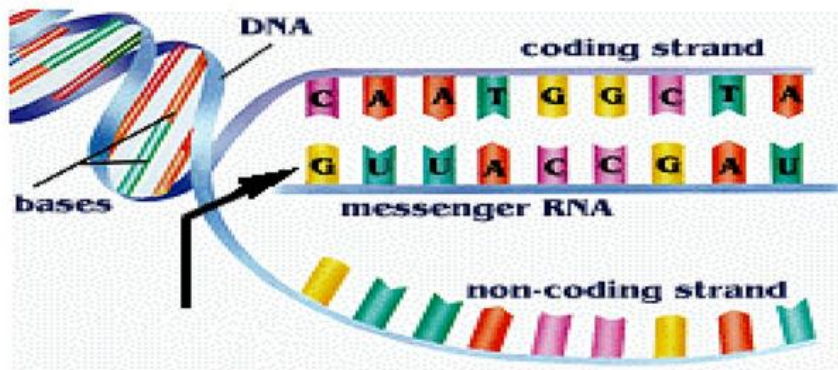
There are 3 types of RNA, each with a different job

1. Messenger RNA (mRNA)
2. Transfer RNA (tRNA)
3. Ribosomal RNA (rRNA)

Each type of RNA has a different structure that is related to its function.

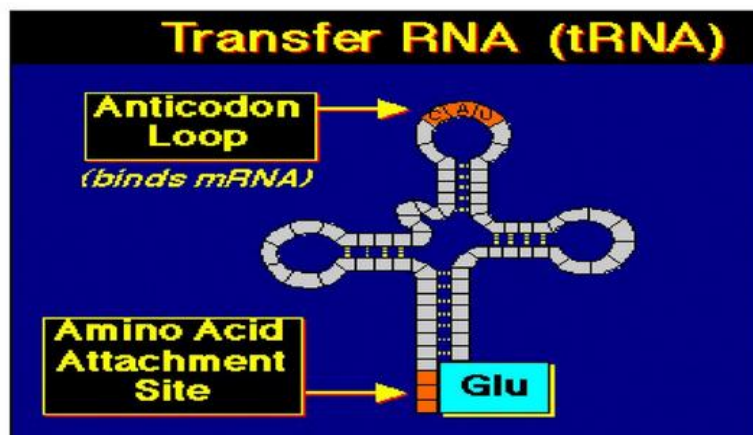
## Messenger RNA (mRNA)

- mRNA- single strand that carries messages from the DNA in the nucleus to the ribosomes in the cytosol, so that it can be used make proteins.



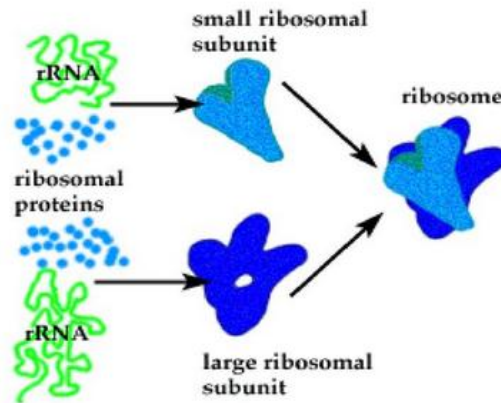
## Transfer RNA (tRNA)

- tRNA- is a cloverleaf shaped single strand that carries amino acids to the ribosome and helps to assemble them in the correct order



## Ribosomal RNA (rRNA)

- rRNA- is a single strand in globular form, rRNA binds with proteins to make up ribosomes which are then used to make the proteins



## Why do we need RNA

- Our body needs to make proteins in order to carry out cell functions. The instructions on how to make proteins are found in our DNA.
- Ribosomes cannot read our DNA, so it must be converted into RNA which our ribosomes can read. This process is called...

## Transcription!



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How do we get RNA from the  
DNA message?

# Transcription

The word “transcribe” means to copy  
Transcription copies the DNA message  
onto a piece of RNA

This allows DNA to stay in the nucleus,  
where it is protected.

## Transcription is...

The process of making RNA from the DNA  
strands in the nucleus

All 3 types of RNA are made through  
transcription.

Location: Takes place in the nucleus of a cell

## Transcription Steps

Step 1: RNA polymerase binds to the promoter region.

- Promoter is a DNA sequence that signals the start of transcription.

Step 2: RNA polymerase breaks the hydrogen bonds, unwinding the DNA double helix.

Step 3: RNA polymerase reads the DNA, building a new RNA strand by adding one nucleotide at a time.

- RNA polymerase uses the same base-pairing rules, but bonds with U instead of T!

## Transcription Steps

Step 4: RNA polymerase continues adding nucleotides until it reaches the termination sequence.

- The termination sequence is a sequence of bases that signals the end of transcription.
- The RNA polymerase and the new RNA strand are released from the DNA and the DNA recoils.

Step 5: The RNA strand moves out of the nucleus through a nuclear pore into the cytosol.

# Transcription

