



**General biology 2**  
**2nd stage**

**RNA& labarotary of machines**

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## RNA

**Ribonucleic acid (RNA)** is a polymeric molecule that is essential for most biological functions, either by performing the function itself (Non-coding RNA) or by forming a template for the production of proteins (messenger RNA). RNA and deoxyribonucleic acid (DNA) are nucleic acids. The nucleic acids constitute one of the four major macromolecules essential for all known forms of life



single strand of RNA

## Types of RNA

RNA stands for **ribonucleic acid**. Its function is to carry out the instructions encoded in DNA. There are three types of RNA, each with a different function.

These are:

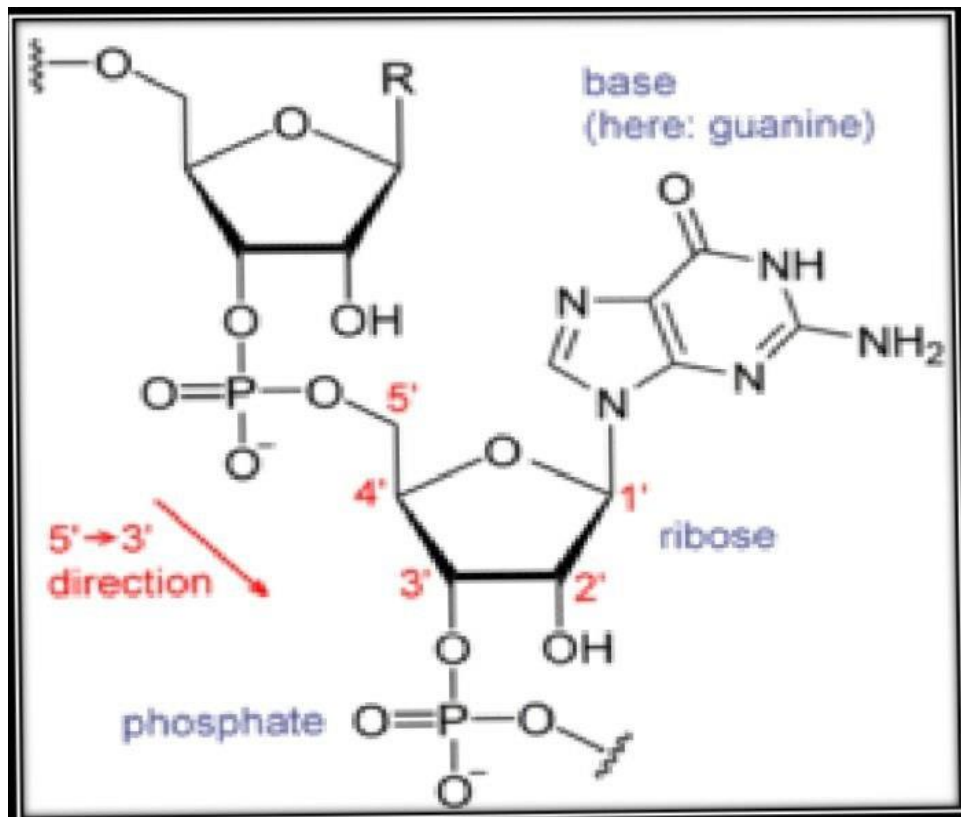
**1– Messenger RNA (mRNA)** – mRNA carries information for protein synthesis from the DNA molecules in the nucleus to the **ribosomes**

**2– ribosomal RNA (rRNA)** – rRNA is a structural component of **ribosomes** (the organelles that perform protein synthesis)

**3– Transfer RNA (tRNA)** – tRNA transfers amino acids to the ribosome. These amino acids are used to assemble a new **polypeptide chain**

## Structures of RNA

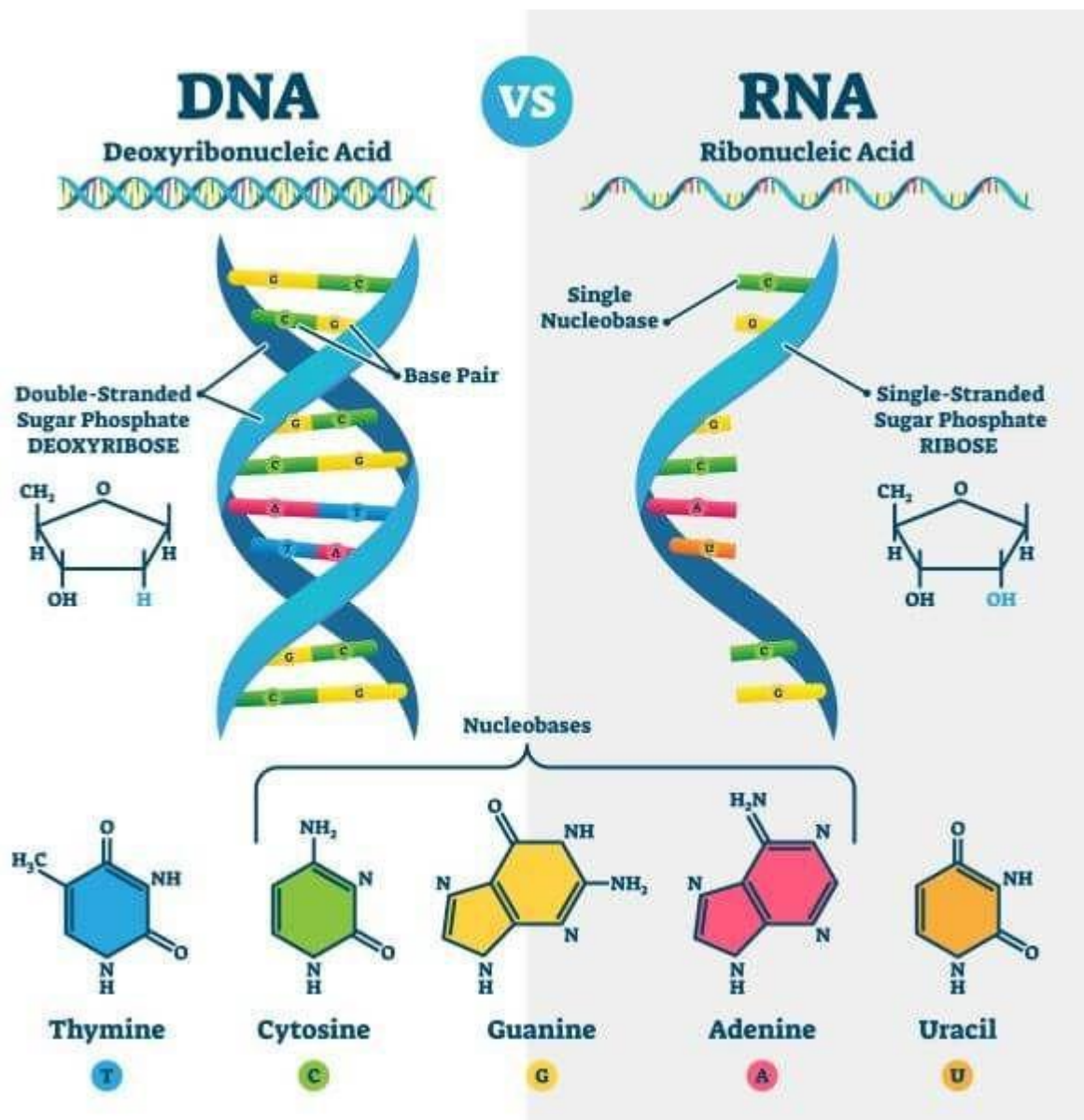
- 1\_** Each nucleotide in RNA contains a ribose sugar, with carbons numbered 1' through 5'.
- 2\_** in general, adenine (A), cytosine (C), guanine (G), or uracil (U). Adenine and guanine are purines, cytosine and uracil are pyrimidines. A phosphate group is attached to the 3' position of one ribose and the 5' position of the next.
- 3\_** The phosphate groups have a negative charge each, making RNA a charged molecule (polyanion).
- 4\_** The bases form hydrogen bonds between cytosine and guanine, between adenine and uracil and between guanine and uracil.
- 5\_** An important structural component of RNA that distinguishes it from DNA is the presence of a hydroxyl group at the 2' position of the ribose sugar.



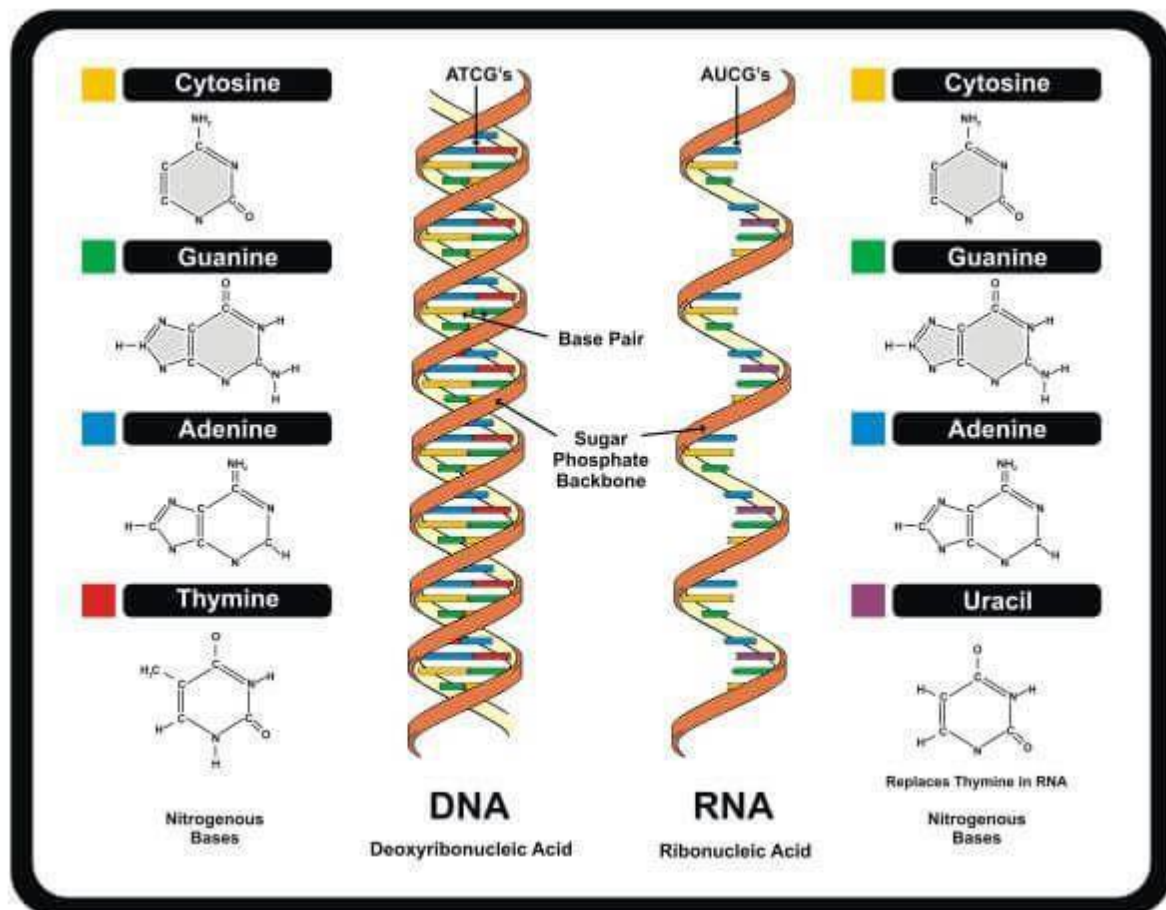
Structure of a fragment of an RNA

### Comparison between DNA and RNA:

DNA	RNA
Stores genetic information for the cell	Uses the information stored in DNA to make proteins
Contains the 5-carbon sugar deoxyribose	Contains the 5-carbon sugar ribose
Double-stranded	Single-stranded
Contains thymine	Contains uracil
Self-replicating	Self-replicating



DNA and RNA molecules have different functions. DNA stores genetic information for the cell, whereas RNA codes for amino acids and acts as a messenger between DNA molecules and the ribosomes. NA molecules are **self-replicating**, whereas RNA molecules are synthesized by a process called **transcription**.



## labarotary of machines

### 1– Microscopy

is the technical field of using microscopes to view objects and areas of objects that cannot be seen with the naked eye (objects that are not within the resolution range of the normal eye). There are three well-known branches of microscopy: optical, electron, and scanning probe microscopy, along with the emerging field of X-ray microscopy.

### 2– Incubator

A laboratory incubator is pretty much the same thing. It is essentially a box that provides a particular kind of environment within it, maintaining certain atmospheric conditions like temperature, humidity and gaseous mix. Some bacteria and other living stuff need

that kind of precise atmosphere to grow; and you can put them in an incubator and set the climate inside accordingly to help their growth. Like most lab machines.

### **3– Autoclave**

An autoclave is not a lab machine that helps in doing experiments, but it is highly essential in any microbiology or medical labs . Cleaning and sterilization are probably the most important part of safety in biological works.

### **4– Centrifuge**

A centrifuge machine is basically a slanted rotating platform that can hold some tube-like glassware (or plasticware) and spin them at a high velocity so that the liquid inside them presses down hard on the bottom of the tubes. Any particles suspended in the liquid – like red cells in the blood – fall down in the bottom while the clear solution gathers above.

That means whenever you want to separate particles from liquids (and don't want to wait a century to have them fall naturally), you'll want a centrifuge . They are available in various sizes – some can hold tiny milliliter-volume tubes only.

### **5– Water Bath**

A laboratory water bath can heat substances slowly and keep that temperature for a long time, as long as you keep the switch on. You can also use it to heat flammable substances that one just can't hold over a burner. They come in various capacities and capabilities such as circulating water baths or shaking water baths.

## **6– Hot Air Oven**

You cannot put everything in an autoclave. For example, what about things made of paper or similar stuff that you can't get wet? Or maybe you want to sterilize some powder, or something that melts in water like a tablet? Or, what if the material is flammable? To sterilize such material, you have to use the dry heat as only a hot air oven can provide. It works just like an autoclave, except here you use heated air instead of steam. This has the added benefit of generating even more heat – like three hundred degrees! There is literally no living thing that will survive that kind of heat for a sustained time. An autoclave heats up plain air in a heating chamber and circulates it in the chamber, assaulting any living organism and oxidizing them into inertness.