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| **Lab3: RNA structure** |
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| **YEAR 3-SEMSTER 1** |

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Authored by: Fatima

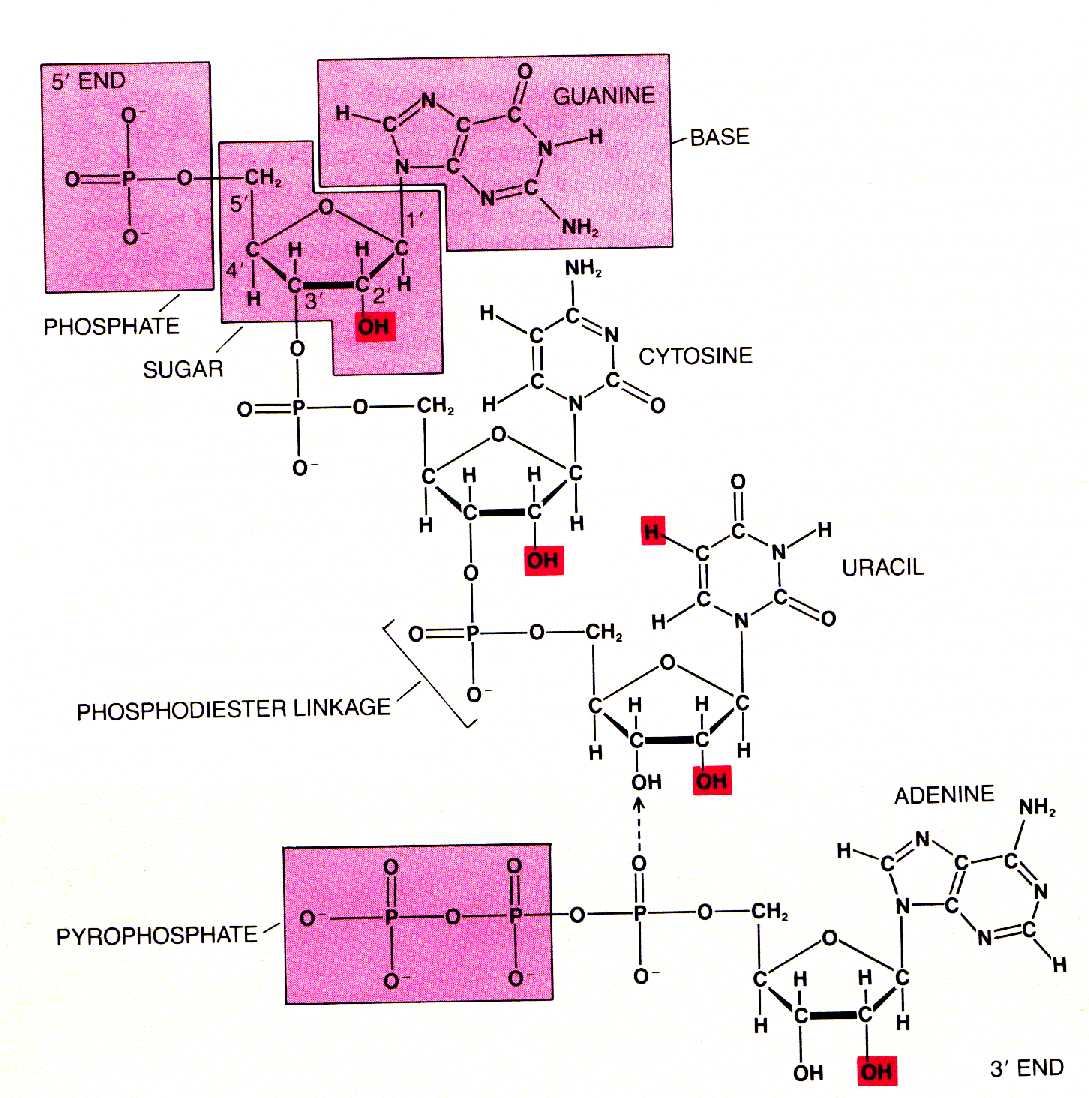
Lab3: RNA structure

YEAR 3-SEMSTER 1

RNA structures

RNA molecules are also polynucleotides with a sugar-phosphate backbone and four kinds of bases. The main differences between RNA and DNA are:

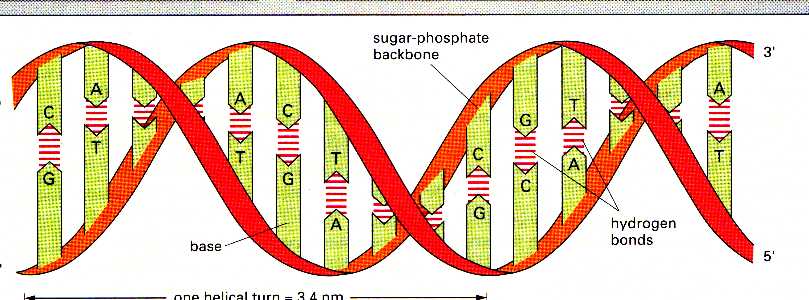
* RNA molecules are single-stranded
* The sugar in RNA is a ribose sugar (as opposed to deoxy-ribose) and has an OH at the 2' C position highlighted in red in the figure below (DNA sugars have oH at that position)
* Thymine in DNA is replaced by **U**racil in RNA. T has a methyl (-CH3) group instead of the H atom shown in red in U.

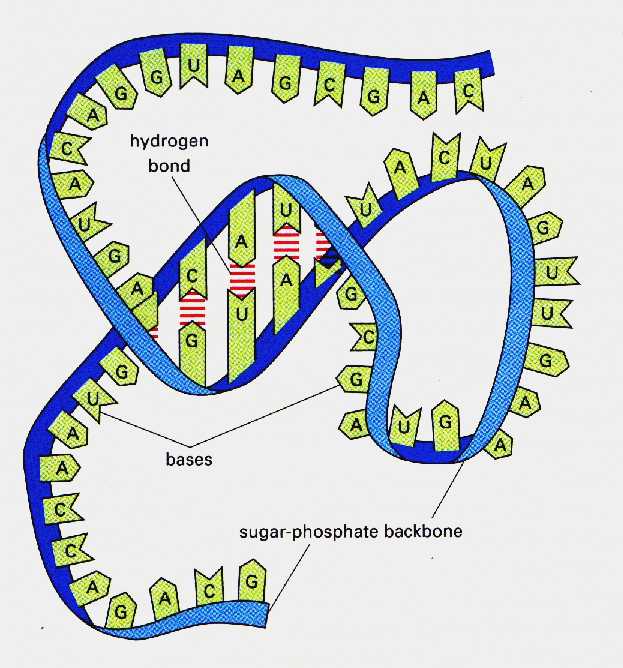


The picture shows an ATP molecule (adenosine tri-phosphate) about to be incorporated into an RNA chain with the release of a di-phosphate).

RNA molecules do not have a regular helical structure like DNA. Instead, they can form complicated 3-dimensional structures where the strands can loop back and form **intra-strand** base-pairs from self-complementary regions along the chain.

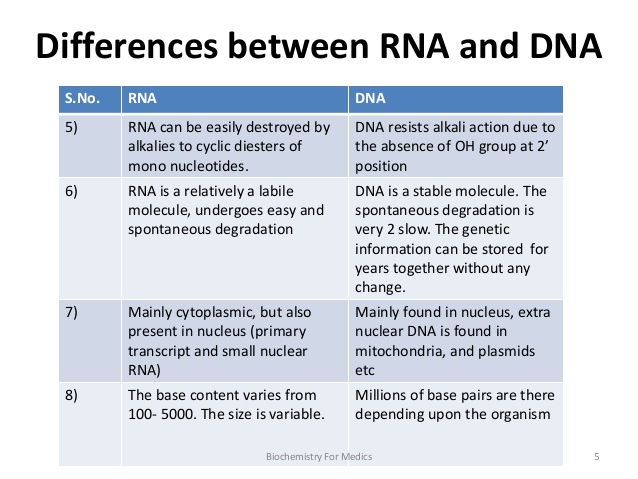
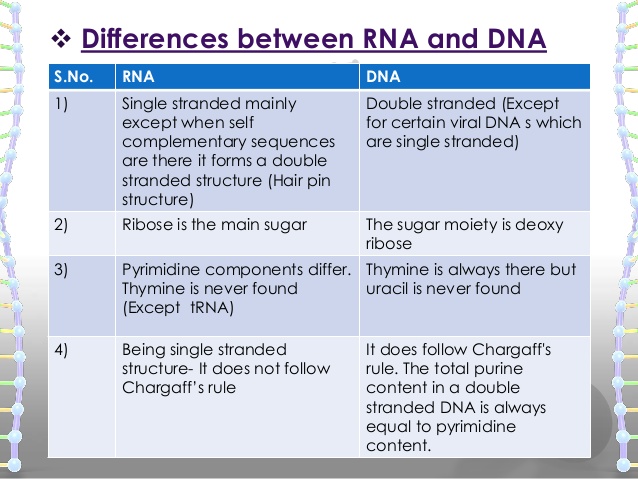
DNA structure



 RNA structure

There are three classes of RNA molecules:

* messenger RNA (mRNA) which acts as a template for protein synthesis and has the same sequence of bases (read from the 5' to the 3' end) as the DNA strand that has the gene sequence. mRNA can range from ~300 nucleotides to ~7000 nucleotides, depending on the size and the number of proteins that they are coding for.
* transfer RNA (tRNA), one for each triplet codon that codes for a specific amino-acid (the building blocks of proteins). tRNA molecules are covalently attached to the corresponding amino-acid at one end, and at the other end they have a triplet sequence (called the anti-codon) that is complementary to the triplet codon on the mRNA. All tRNA molecules are in the range ~70-90 nucleotides. They have a molecular weight of ~25,000 and have sedimentation constant ~ 4 Svedberg (S) units.
* ribosomal RNA (rRNA) which make up an integral part of the ribosome, the protein synthesis machinery in the cell.

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