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## Abstract

RNA is part of a group of molecules known as the nucleic acids, which are one of the four major macromolecules (along with lipids, carbohydrates and proteins) essential for all known forms of life. Like DNA, RNA is made up of a long chain of components called nucleotides. Each nucleotide consists of a nucleobase, a ribose sugar, and a phosphate group. The sequence of nucleotides allows RNA to encode genetic information. All cellular organisms use messenger RNA (mRNA) to carry the genetic information that directs the synthesis of proteins. In addition, many viruses use RNA instead of DNA as their genetic material.Some RNA molecules play an active role in cells by catalyzing biological reactions, controlling gene expression, or sensing and communicating responses to cellular signals. One of these active processes is protein synthesis, a universal function whereby mRNA molecules direct the assembly of proteins on ribosomes. This process uses transfer RNA (tRNA) molecules to deliver amino acids to the ribosome, where ribosomal RNA (rRNA) links amino acids together to form proteins.

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## Introduction

**The essays will be graded, and count as a third of the final grade for the course.**

Figure 1: Example of one column figure, use textbox like this for legend. It is a good idea to insert figures as the last thing. Choose square for wrap text and unclick move with text (under “more layout options” for both figure and legends may also help.

**The essay should have a maximum of 2500 words (not counting words in legends and reference list), 30 references and 4 figures.**

Each nucleotide in RNA contains a ribose sugar, with carbons numbered 1' through 5'. A base is attached to the 1' position, 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. The phosphate groups have a negative charge each at physiological pH, making RNA a charged molecule (polyanion). The bases may form hydrogen bonds between cytosine and guanine, between adenine and uracil and between guanine and uracil.[5] However, other interactions are possible, such as a group of adenine bases binding to each other in a bulge,[6] or the GNRA tetraloop that has a guanine–adenine base-pair.[5] An important structural feature of RNA that distinguishes it from DNA is the presence of a hydroxyl group at the 2' position of the ribose sugar. The presence of this functional group causes the helix to adopt the A-form geometry rather than the B-form most commonly observed in DNA.[7] This results in a very deep and narrow major groove and a shallow and wide minor groove.[8] A second consequence of the presence of the 2'-hydroxyl group is that in conformationally flexible regions of an RNA molecule (that is, not involved in formation of a double helix), it can chemically attack the adjacent phosphodiester bond to cleave the backbone.[9]

## Section 1

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## Section 3

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## References

Text in this document is from http://en.wikipedia.org/wiki/RNA

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