

Nucleic Acids

(What is DNA made of?)

Information:

Nucleic acids were so named because they were acidic molecules found in the nucleus of atoms. Like other biomolecules such as polysaccharides and proteins, nucleic acids are polymers made from a small number of building blocks. The two main types of nucleic acids are **ribonucleic acid** (RNA) and **2'-deoxyribonucleic acid** (DNA). DNA contains the genetic material of a cell, and is found in the nucleus. (The chromosomes which form during cell replication contain all the cellular DNA, along with proteins.) During the life of a cell, the information in DNA is copied to RNA, which contains the information needed to synthesize each protein that the cell requires.

Information:

When nucleosides are connected together, there is only one free 5' phosphate and one free 3' hydroxyl group. By convention, the sequences (primary structures) of DNA and RNA are always given from the 5' end to the 3' end. Therefore, AAAAGT is not the same as TGAAAA.

The most important **secondary structure** of DNA is the famous double helix. In this structure, two sugar-phosphate backbones spiral around each other, and are held together by **hydrogen bonds** between pairs of nitrogen bases, called **base pairs**. Figure 5 illustrates how the hydrogen bonding partnership works. Note that bases almost never pair with the wrong partner, because the hydrogen bonds would not line up correctly.

Figure 5: Hydrogen bonds between AT and CG (complementary) base pairs hold the DNA double helix together.

