Base Pairing Encyclopedia Article

Base Pairing

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Base Pairing

DNA is formed of a double helicaly wound strand. The information found in a molecule of DNA is coded for by four different molecules arranged in particular orders. These information-coding sections of DNA comprise four different organic **bases**: adenine (A), guanine (G), thymine (T), and cytosine (C). In **RNA**, thymine is replaced with uracil (U). C, U, and T are members of a group of compounds known as pyrimidines, and A and G are purines.

To hold together the **double helix** of DNA, a purine produces hydrogen bonds with a pyrimidine. A always bond with T (or U in RNA) and G always bonds with C. The practical application of this is that if one has a single strand of DNA then it is possible to make the complimentary strand using this constant relationship of the pairing of the **nucleotide** bases. This allows **replication** of the DNA molecule in **cell division**, the production of RNA from DNA, and the ability of the DNA molecule to carry conserved information that is encoded in this pattern of base pairing. The sizes of the molecules and the arrangements of the atoms within them ensures that a purine never joins with a purine (the molecule produced would be too large to fit into the DNA chain) and a pyrimidine never joins with a pyrimidine (the molecule would be too small). Also, when A links with T or U, then two hydrogen bonds are produced, whereas when G links with C, three hydrogen bonds are produced. An attempted mis-pairing, therefore, would produce a distorted molecule as well as being physically the wrong size for the DNA chain. This provides a self-check mechanism when new DNA is manufactured.