

## DNA

(Deoxyribonucleic Acid)

DNA is often called the blueprint of life.

In simple terms, DNA contains the instructions for making proteins within the cell

Our genes are on our chromosomes.

Chromosomes are made up of a chemical called DNA.

A nucleotide consists of a nitrogenous base (base), a five-carbon sugar (pentose), and a phosphate group. The phosphate group and nitrogenous base are attached to the 5'-carbon and 1'-carbon atoms of the sugar moiety, respectively. The pentose sugar of DNA is a deoxyribose, because, deoxyribose has only a hydrogen group on the 2'-carbon.

The nucleotides of DNA are joined by phosphodiester bonds, with the phosphate group of the 5'-carbon of one nucleotide linked to the 3'-OH group of the deoxyribose of the adjacent nucleotide.

A polynucleotide strand has a 3'-OH group at one end (3'-end) and a 5'-phosphate group at the other (5'-end).

The coiled polynucleotide chains of DNA are held together by hydrogen bonds between the bases of the opposite strands.

The bases occur as specific sets of complementary pairs. Adenine (A) pairs only with thymine (T), and guanine (G) pairs only with cytosine (C). An AT base pair is held together by two hydrogen bonds, and a GC base pair by three. The number of complementary base pairs (bp) is often used to describe the length of a double stranded DNA molecule.

For DNA molecules with thousands or millions of base pairs, the designations kilobase pairs (kb) or megabase pairs (Mb) are used, respectively

The two strands of a duplex DNA molecule run in opposite directions (antiparallel chains). One chain is oriented in a 3' to 5' direction and the other in a 5' to 3' direction.

When one strand of DNA has the sequence of bases that is 5'-TAGGCAT-3', for example, the complementary strand must be 3'-ATCCGTA-5'.