

Masterclass on Tumor Biomarkers

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Deoxyribonucleic acid (DNA) is a nucleic acid that contains the genetic instructions used in the development and functioning of all known living organisms, and some viruses. The main role of DNA molecules is the long-term storage of information. DNA is often compared to a set of blueprints or a recipe, or a code, for a cell. It is a chemical structure needed to construct other molecules in cells, such as proteins and RNA molecules. The DNA segments that carry this genetic information are called genes, but other DNA sequences have regulatory purposes, or are involved in regulating gene expression and genetic information.

Chemically, DNA consists of two long polymers of simple units called nucleotides, with one polymer being of sugars and phosphate groups joined by ester bonds. These two strands run in opposite directions to each other and are therefore antiparallel. Attached to each sugar is one of four types of molecules called bases. The sequence of these four bases along a strand is called the genetic code. This code specifies the amino acids within proteins. The process by which the copying stretches of DNA into the related RNA, in a process called transcription.

Within cells, DNA is organized into long structures called chromosomes. These chromosomes are duplicated before cells divide, in a process called DNA replication. Eukaryotic organisms (animals, plants, fungi, and protists) store most of their DNA inside the cell nucleus and some of their DNA in organelles such as mitochondria or chloroplasts. In contrast, prokaryotes (bacteria and archaea) store their DNA inside the cell's cytoplasm. Within the chromosomes, chromatin fibers are further compacted into nucleosomes by proteins, such as histones compact and organize DNA. These compact structures guide the interactions between DNA and other proteins, helping control which parts of the DNA are transcribed.

DNA exists in many possible conformations. The most common are A-DNA, B-DNA, and Z-DNA. A-DNA and Z-DNA have been found in functional organisms. The conformation of DNA depends on the sequence of the bases, the type of metal ions in the solution, and the presence of other molecules.

The first published reports of A-DNA were in 1944, and also B-DNA. Watson and Crick's model of DNA structure in 1953 was based on the work of others. The model was based on the work of others, including the work of Wilkins and Franklin, who had used X-ray diffraction scattering to study the structure of DNA. Watson and Crick's model was based on the work of others, including the work of Wilkins and Franklin, who had used X-ray diffraction scattering to study the structure of DNA.

The A-DNA form is a compact, wide, and short structure. It is found in some viruses and in some regions of DNA. The B-DNA form is the standard form of DNA. It is a right-handed helix with a major groove and a minor groove. The Z-DNA form is a left-handed helix. It is found in some viruses and in some regions of DNA.

Compared to B-DNA, the A-DNA form is a compact, wide, and short structure. It is found in some viruses and in some regions of DNA. The B-DNA form is the standard form of DNA. It is a right-handed helix with a major groove and a minor groove. The Z-DNA form is a left-handed helix. It is found in some viruses and in some regions of DNA.