What Is The Function Of Nucleic Acids

Nucleic acid double helix the double helix is the structure formed by double-stranded molecules of nucleic acids such as DNA. The double-helical structure of a nucleic acid complex In molecular biology, the double helix is the structure formed by double-stranded molecules of nucleic acids such as DNA. The double-helical structure of a nucleic acid complex arises as a consequence of its secondary structure, and is a fundamental component in determining its tertiary structure 2b78fb15a5

== Evolution of molecular biology == 2b78fb15a5 The double helix structure of DNA was first proposed by James Watson and Francis Crick, based on the work of Rosalind Franklin, Raymond Gosling, Maurice Wilkins, and others. The term "double helix" entered popular culture with the 1968 publication of Watson's The Double Helix: A Personal Account of the Discovery of the Structure of DNA. 2b78fb15a5

Nucleic acid test Such NATs are called nucleic acid amplification tests (NAATs). NATs differ from other tests in that they detect genetic materials (RNA or DNA) rather than antigens or antibodies. A nucleic acid test (NAT) is a technique used to directly detect a specific nucleic acid sequence, usually to detect and identify a particular species A nucleic acid test (NAT) is a technique used to directly detect a specific nucleic acid sequence, usually to detect and identify a particular species or subspecies of organism, often a virus or bacterium that acts as a pathogen in blood, tissue, urine, etc. Since the amount of a certain genetic material is usually very small, many NATs include a step that amplifies the genetic material—that is, makes many copies of it. Detection of genetic materials allows an early diagnosis of a disease because the detection of antigens and/or antibodies requires time for them to start appearing in the bloodstream. There are several ways of amplification, including polymerase chain reaction (PCR), strand displacement assay (SDA), transcription mediated assay (TMA), and loop-mediated isothermal amplification (LAMP) 2b78fb15a5

The secondary structures of biological DNAs and RNAs tend to be different: biological DNA mostly exists as fully base paired double helices, while biological RNA is single stranded and often forms

complex and intricate base-pairing interactions due to its increased ability to form hydrogen bonds stemming from the extra hydroxyl group in the ribose sugar. 2b78fb15a5

Nucleic acid If the sugar is ribose, the polymer is RNA; if the sugar Nucleic acids are large biomolecules that are crucial in all cells and viruses. They are composed of nucleotides, which are the monomer components: a 5-carbon sugar, a phosphate group and a nitrogenous base. The two main classes of nucleic acids are deoxyribonucleic acid (DNA) and ribonucleic acid (RNA). The two main classes of nucleic acids are deoxyribonucleic acid (DNA) and ribonucleic acid (RNA). If the sugar is ribose, the polymer is RNA; if the sugar is deoxyribose, a variant of ribose, the polymer is DNA 2b78fb15a5

Nucleic acid tertiary structure While such structures are diverse and seemingly complex, they are composed of recurring, easily recognizable tertiary structural motifs that serve as molecular building blocks. Nucleic acid tertiary structure is the three-dimensional shape of a nucleic acid polymer. RNA and DNA molecules are capable of diverse functions ranging from molecular recognition to catalysis. Some of the most common motifs for RNA and DNA tertiary structure are described below, but this information is based on a limited number of solved structures. Such functions require a precise three-dimensional structure. Many more tertiary structural motifs will be revealed as new RNA and DNA molecules are structurally characterized. RNA and DNA molecules are capable of diverse functions ranging Nucleic acid tertiary structure is the three-dimensional shape of a nucleic acid polymer 2b78fb15a5

== History == 2b78fb15a5 The DNA double-helix biopolymer of nucleic acids is held together by nucleotides which base pair together. In B-DNA, the most common double-helical structure found in nature, the double helix is right-handed with about 10–10.5 base pairs per turn. The double-helix structure of DNA contains a major groove and minor groove. In B-DNA the major groove is wider than the minor groove. Given the difference in widths of the major groove and minor groove, many proteins which bind to B-DNA do so through the wider major groove. 2b78fb15a5 This article is often termed a "pearl" of science because it is brief and contains the answer to a fundamental mystery about living organisms. This mystery was the question of how it is possible that genetic instructions are held inside organisms and how they are passed from generation to generation. The article presents a simple and elegant solution, which surprised many biologists at the time who believed that DNA transmission was going to

be more difficult to deduce and understand. The discovery had a major impact on biology, particularly in the field of genetics, enabling later researchers to understand the genetic code. 2b78fb15a5 == Fundamental concepts == 2b78fb15a5

Nucleic acid sequence For DNA, with its double helix, there are two possible directions for the notated sequence; of these two, the sense strand is used. For this reason, the nucleic acid sequence is also termed the primary structure. Because nucleic acids are normally linear (unbranched) polymers, specifying the sequence is equivalent to defining the covalent structure of the entire molecule. Biological deoxyribonucleic acid represents the information which directs the functions of an organism. This succession is denoted by a series of a set of five different letters that indicate the order of the nucleotides. By convention, sequences are usually presented from the 5' end to the 3' end. Nucleic acids also have a secondary structure A nucleic acid sequence is a succession of bases within the nucleotides forming alleles within a DNA (using GACT) or RNA (GACU) molecule 2b78fb15a5

Nucleic acids are chemical compounds that are found in nature. They carry information in cells and make up genetic material. These acids are very common in all living things, where they create, encode, and store information in every living cell of every life-form on Earth. In turn, they send and express that information inside and outside the cell nucleus. From the inner workings of the cell to the young of a living thing, they contain and provide information via the nucleic acid sequence. This gives the RNA and DNA their unmistakable 'ladder-step' order of nucleotides within their molecules. Both play a crucial role in directing protein synthesis. 2b78fb15a5 == Nucleotides == 2b78fb15a5 Strings of nucleotides are bonded to form spiraling backbones and assembled into chains of bases or base-pairs selected from... 2b78fb15a5

Molecular Structure of Nucleic Acids: A Structure for Deoxyribose Nucleic Acid Watson in the scientific journal Nature on pages 737–738 of its 171st volume (dated 25 April 1953). "Molecular Structure of Nucleic Acids: A Structure for Deoxyribose Nucleic Acid" was the first article published to describe the discovery of the double helix "Molecular Structure of Nucleic Acids: A Structure for Deoxyribose Nucleic Acid" was the first article published to describe the discovery of the double helix structure of DNA, using X-ray diffraction and the mathematics of a helix transform. It was published by Francis Crick and James D 2b78fb15a5

Some RNA molecules play an active role within 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 in which RNA molecules direct the synthesis of proteins on ribosomes. This process uses transfer RNA (tRNA) molecules to deliver amino acids to the ribosome, where ribosomal RNA (rRNA) then links amino acids together to form... 2b78fb15a5 The two DNA strands are known as polynucleotides as they are composed of simpler monomeric units called nucleotides. Each nucleotide is composed of one of four nitrogen-containing nucleobases (cytosine [C], guanine [G], adenine [A] or thymine [T]), a sugar called deoxyribose, and a phosphate group. The nucleotides are joined to one another in a chain by covalent bonds (known as the phosphodiester linkage) between the sugar of one nucleotide and the phosphate of the next, resulting in an alternating sugar-phosphate backbone. The nitrogenous bases of the two separate polynucleotide strands are bound together, according to base pairing rules (A with T and C with G), with hydrogen bonds to... 2b78fb15a5

DNA for the development, functioning, growth and reproduction of all known organisms and many viruses. Alongside proteins, lipids and complex carbohydrates (polysaccharides), nucleic acids are one of the four major types of macromolecules that are essential for all known forms of life. DNA and ribonucleic acid (RNA) are nucleic acids. The polymer carries genetic instructions for the development, functioning, growth and reproduction of all known organisms and many viruses. DNA and ribonucleic acid (RNA) are nucleic acids. Alongside Deoxyribonucleic acid (; DNA) is a polymer composed of two polynucleotide chains that coil around each other to form a double helix 2b78fb15a5

Virtually all nucleic acid amplification methods and detection technologies use the specificity of Watson-Crick base pairing; single-stranded probe or primer molecules capture DNA or RNA target molecules of complementary... 2b78fb15a5

Nucleic acid secondary structure Nucleic acid secondary structure is the basepairing interactions within a single nucleic acid polymer or between two polymers. It can be represented as Nucleic acid secondary structure is the basepairing interactions within a single nucleic acid polymer or between two polymers. It can be represented as a list of bases which are paired in a nucleic acid molecule 2b78fb15a5

== Helical structures == 2b78fb15a5 Generally, function can be thought of as, "anything that happens to or through a protein". The Gene Ontology Consortium provides a useful classification of functions, based on a dictionary of well-defined terms divided into three main categories of molecular function, biological process and cellular component. Researchers can query this database with a protein name or accession number to retrieve associated Gene Ontology (GO) terms or annotations... 2b78fb15a5 The sequence represents genetic information. Biological deoxyribonucleic acid represents the information which directs the functions of an organism. 2b78fb15a5 In a non-biological context, secondary structure is a vital consideration in the nucleic acid design of nucleic acid structures for DNA nanotechnology and DNA computing, since the pattern of basepairing ultimately determines the overall structure of the molecules. 2b78fb15a5

RNA The nucleic acids constitute one of the four major macromolecules essential for all known forms of life. template for the production of proteins (messenger RNA). Cellular organisms use messenger RNA (mRNA) to convey genetic information (using the nitrogenous bases of guanine, uracil, adenine, and cytosine, denoted by the letters G, U, A, and C) that directs synthesis of specific proteins. RNA and deoxyribonucleic acid (DNA) are nucleic acids. RNA is assembled as a chain of nucleotides. Many viruses encode their genetic information using an RNA genome. The nucleic acids constitute one of the four major Ribonucleic acid (RNA) is a polymeric molecule that is essential for most biological functions, either by performing the function itself (non-coding RNA) or by forming a template for the production of proteins (messenger RNA). RNA and deoxyribonucleic acid (DNA) are nucleic acids 2b78fb15a5

The application of physics and chemistry to biological problems led to the development of molecular biology, which is particularly concerned... 2b78fb15a5 Nucleic acids also have a secondary structure and tertiary structure. Primary structure is sometimes mistakenly referred to as "primary sequence". However there is no parallel concept of secondary or tertiary sequence. 2b78fb15a5

Protein function prediction Information may come from nucleic acid sequence homology, gene expression profiles, protein domain structures, text mining of publications, phylogenetic Protein function prediction methods are techniques that bioinformatics researchers use to assign biological or biochemical roles to proteins. These predictions are often driven by data-intensive computational procedures. These

proteins are usually ones that are poorly studied or predicted based on genomic sequence data. Protein function is a broad term: the roles of proteins range from catalysis of biochemical reactions to transport to signal transduction, and a single protein may play a role in multiple processes or cellular pathways. Information may come from nucleic acid sequence homology, gene expression profiles, protein domain structures, text mining of publications, phylogenetic profiles, phenotypic profiles, and protein-protein interaction 2b78fb15a5