



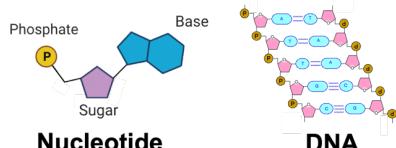
Newsletter

CANCER CONSULTANTS OF AMERICA

BRIDGING THE GAP BETWEEN CANCER AND UNDERSTANDING®

Cancer Answers

DNA: 6 Feet of Instructions Hidden in Plain Sight



The average human cell contains about 6 feet (2 meters) of deoxyribonucleic acid (DNA) that is neatly arranged in the subcellular structure named the nucleus. Despite this incredible packaging of the DNA, it remains accessible to the cellular machinery to carry out vital cellular functions. The packaging of 6 feet of DNA within the nucleus is truly mind-boggling and this organization of genetic information is accomplished because the thickness of the DNA molecule is approximately 1/100,000th the width of a human hair. The average human cell is so small that it cannot be seen with an unaided eye and within this "invisible" cell is the nucleus containing the DNA, which is even smaller than the cell that cannot be seen without a microscope. Inside this subcellular structure contains all the genetic information that is needed to initiate, perpetuate, and terminate the life of the cell.

DNA is a polymer molecule containing multiple smaller molecules named nucleotides that are connected to each other by strong covalent bonds that occur at the atomic level. A nucleotide consists of three molecules, a sugar molecule (deoxyribose), a phosphate, and a nitrogenous base that provides the identity of the individual nucleotides. The nucleotides are named adenine (A), guanine (G), cytosine (C), and thymine (T) and differ from each other only due to their nitrogenous base. These nucleotides of DNA are arranged in a similar manner as letters are arranged to create words. The words are arranged to create sentences and these sentences are arranged into paragraphs, similar to an instruction manual. These instructions provide the information for how to build cellular molecules. The DNA molecule serves as the instruction manual for the cell when it is synthesizing other essential molecules such as proteins, sugars, and enzymes which all contribute to the biological activity within the cell.

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These instructions coded in DNA are vital to the overall health of the cell. Furthermore, the DNA is delicate and can be damaged as a result of harmful reagents within the environment. The physical change in a DNA nucleotide from one letter to a different letter is referred to as a mutation which can result from environmental chemicals and ultraviolet radiation. This DNA letter change can change the meaning of the word within the instructions for creating a biological molecule. For example, when the cell is creating a switch to be used for turning on and off cellular proliferation, a single mutation can change the instructions for creating the switch and instead the cell creates a switch so that it is always set to the "on" position. This simple letter change can result in the cell to constantly proliferate thereby resulting in many more cells with the same "on" mutation. This abnormal and uncontrollable cellular growth is cancer. The goal when treating cancer with this type of mutation is to use medications to deactivate the switch that is configured in the "on" position and to eliminate all the cells with this "on" mutation coded in the DNA.

Submit your **Cancer Answers** topics to info@CancerConsultantsOfAmerica.com

We Are Available to You

Please contact us today if you would like more information about how our services can benefit you and your family.

Services:

- Individual and Family Cancer Education
- Medical Appointment Liaison Services
- Information Seminars and Public Speaking Events

Fun Facts – January

Cancer Awareness Month:

• Cervical Cancer (Teal & White)

January 2 – World Introvert Day

January 5 – National Whipped Cream Day

January 12 – National Pharmacist Day

January 20 – National Cheese Lovers Day

January 21 – National Hugging Day

January 25 – World Opposite Day

Cancer Consultants Of America

Phone: (561) 252-3090

E-mail: info@CancerConsultantsOfAmerica.com

www.CancerConsultantsOfAmerica.com

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@cancer_america

@cancer.america

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