**Bioinformatics**

DNA is the information molecule for all living organisms.

All of the DNA of an organism is called its genome.

The genome is the entire set of DNA instructions found in a cell. In humans, the genome consists of 23 pairs of chromosomes located in the cell’s nucleus, as well as a small chromosome in the cell’s mitochondria. A genome contains all the information needed for an individual to develop and function.

Each male has around 36 trillion cells and each female has around 28 trillion cells in their body.

Each of the approximately 30^13 (30 trillion) cells in the adult human body has its own copy or copies of the genome

The human genome contains approximately 3 billion base pairs. Each base pair can be represented using two bits (A, T, C, G), so the total storage required for an uncompressed representation would be:Total storage = Number of base pairs × Bits per base pair / 8 (to convert bits to bytes)Total storage ≈ (3,000,000,000 base pairs) × (2 bits/base pair) / 8 bits/byteTotal storage ≈ 750,000,000 bytesTotal storage ≈ 750 megabytes (MB)

22.5 trillion GB

**Being complex doesn’t mean having more DNA in your genome**

Some genomes are incredibly small, such as those found in viruses and bacteria, whereas other genomes can be almost unexplainably large, such as found in some plants. It is still quite puzzling why there does not appear to be a consistent correlation between biological complexity and genome size. For example, the human genome contains about 3 billion nucleotides. While 3 billion is a big number, the rare Japanese flower called Paris japonica has a genome size of roughly 150 billion nucleotides, making it 50 times the size of the human genome. To date, humans are the only life form that has successfully sequenced its own genome, yet there are many life forms on earth that have genomes substantially larger from the human genome. Go figure!

**What is the probability that two siblings will have the same DNA?**

The probability that two non-twin siblings have the same combination of chromosomes is one is 7 trillion In fact, the probability is even lower because chromosomes sometimes swap genetic material with one another during cell divisions.

**DNA (deoxyribonucleic acid) and genome are related concepts but refer to different things.**

DNA (Deoxyribonucleic Acid):

DNA is a molecule found in cells, which carries the genetic instructions used in the growth, development, functioning, and reproduction of all known living organisms and many viruses.

It's often described as the blueprint or the instruction manual for building and maintaining an organism.

DNA consists of two long strands that coil around each other to form a double helix. These strands are made up of sequences of four chemical bases: adenine (A), thymine (T), cytosine (C), and guanine (G).

The sequence of these bases within DNA determines the genetic code, which ultimately determines the characteristics of an organism.

Genome:

The genome refers to the complete set of genetic material within an organism. It includes all of an organism's DNA, including its genes as well as non-coding sequences.

Genomes vary widely in size and complexity. For example, the human genome consists of about 3 billion base pairs of DNA, organized into 23 pairs of chromosomes.

In addition to the DNA that codes for proteins (genes), the genome also contains regulatory sequences, repetitive DNA sequences, and other elements that play roles in gene expression, chromosome structure, and genome stability.

The genome can be thought of as the entire instruction manual for an organism, including both the coding and non-coding parts of the DNA.