

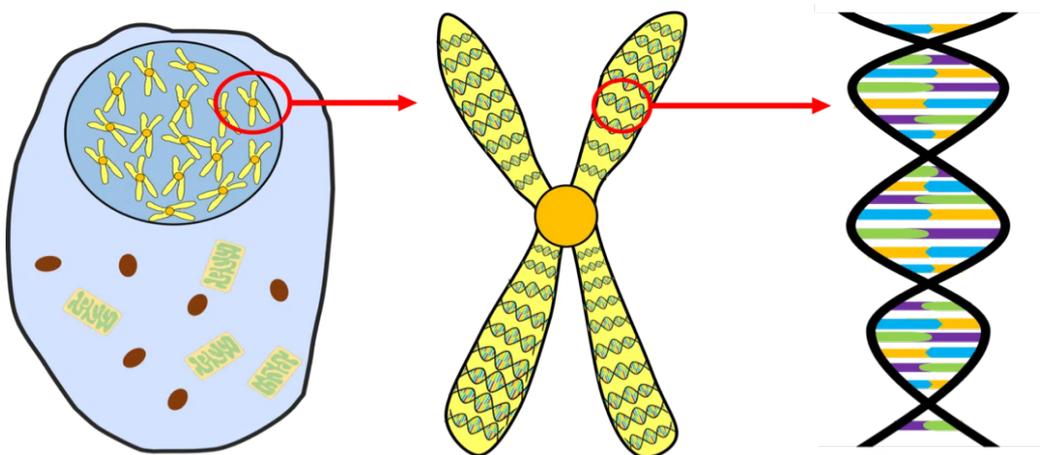
DNA (Deoxyribonucleic Acid)

DNA:

- It is a chemical found in the nucleus of the cell that holds all the genetic material or information for an organism
- **Composition of DNA:**
It is made up of chain of nucleotide that form chromosomes. Each chromosomes contains several genes having a specific information to create a specific protein through protein synthesis.

Structure of DNA

- **DNA (deoxyribonucleic acid)** is a chemical that holds all the **genetic information** of an organism and therefore controls growth and development.
- **DNA** is a polymer made from two strands of **nucleotides** that are coiled together in a **double helix** shape.
- In the **nucleus** of plant and animal cells, **DNA** forms structures called **chromosomes**.
- **DNA in chromosomes** is divided into smaller sections called **genes** that code for specific sequences of **amino acids** and create specific **proteins**.



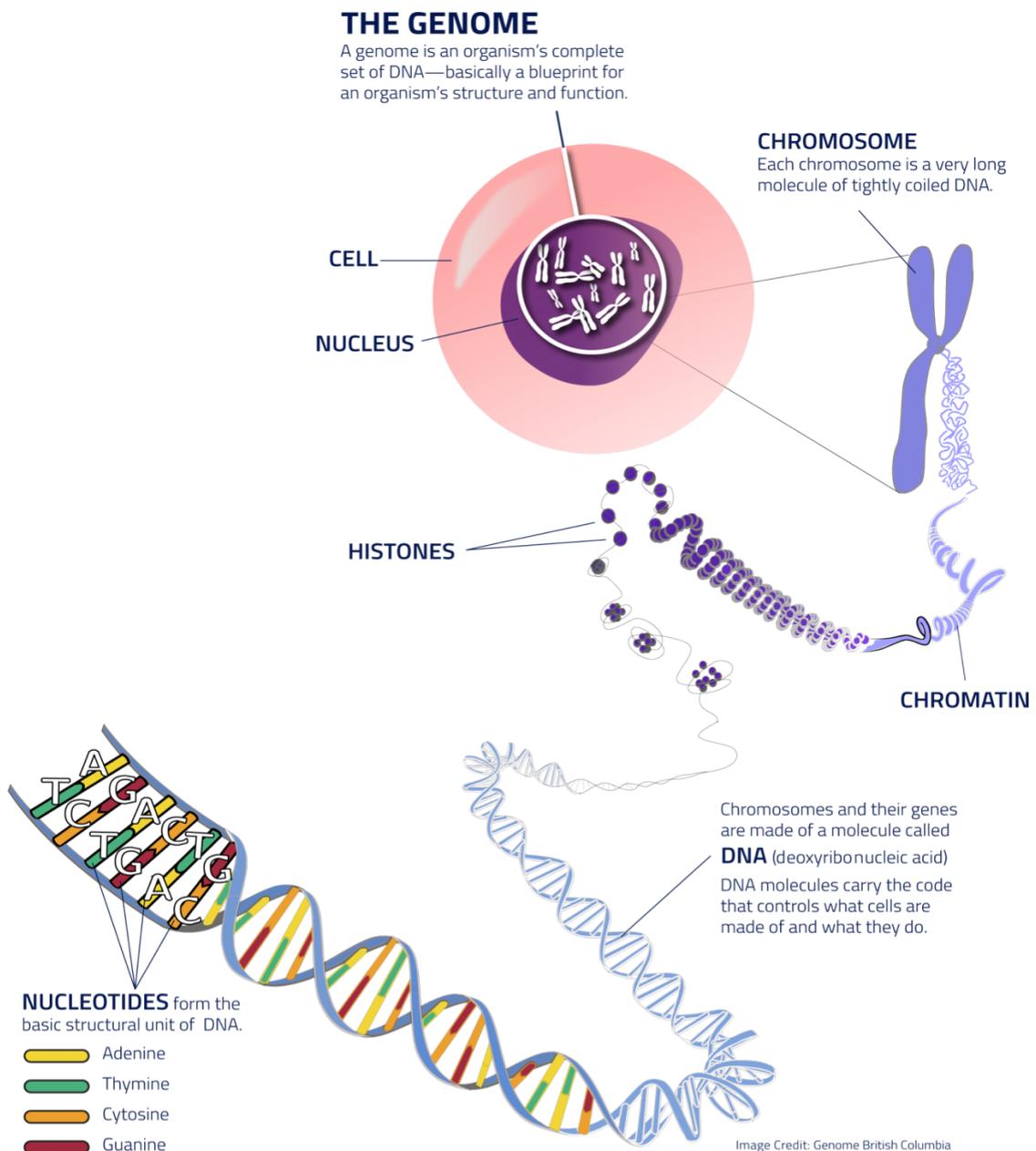
Cells have chromosomes in their nucleus.

Chromosomes are made up of DNA.

DNA is made up of 2 strands of nucleotides in a double helix structure.

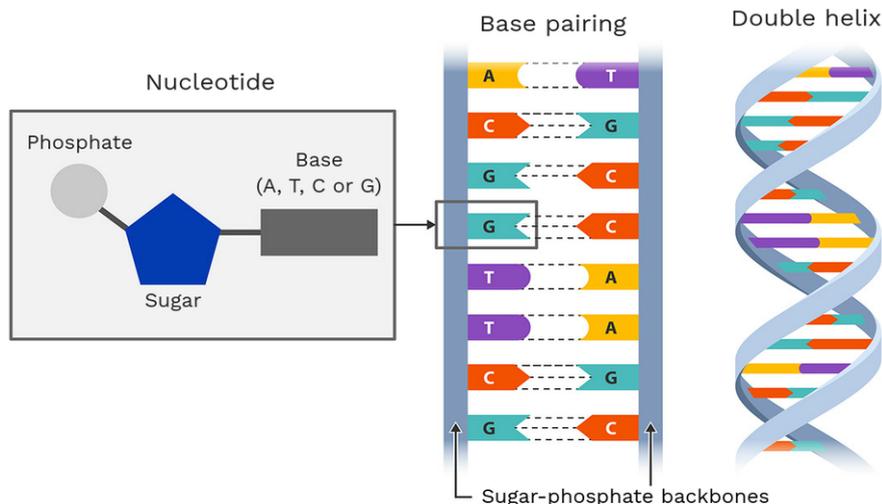
Human Genome

- The **genome** of an organism is all of its **genetic information**.
- The **human genome** can be very useful:
 1. Scientists study the human genome to identify **genes** that are linked to **diseases** and better understand **inherited genetic disorders**. This can help them identify people who are at risk of developing a disease and can help create effective **treatments**.
 2. Scientists also use the human genome to study **migration patterns** of our **ancestors**. They do this by studying the **genomic differences** between **populations** of people from around the world.



Nucleotides

- DNA is a polymer made from repeating nucleotides.
- All the nucleotides contain a **sugar** and a **phosphate** group but will have one of 4 different **bases**, **Adenine (A)**, **Thymine (T)**, **Guanine (G)** and **Cytosine (C)**.
- Each base has a **complementary base** on the other stand of the DNA. The **DNA** strands are held together by the **complementary base pairs**:
 1. **A** is always linked to a **T** and vice versa. Double bond are present between A and T
 2. **G** is always linked to a **C** and vice versa. Triple bond are present between G and C
- Every group of **3 bases** in the sequence codes for a different **amino acid**. The order of the **bases** determines the order of **amino acids** produced and therefore which specific **protein** is created.



Protein Synthesis

- **Proteins** are built using **DNA** in a process called **protein synthesis**.
 1. A **single-stranded** copy of the **DNA** called **mRNA** is made in the **nucleus**.
 2. The **mRNA** travels out of the nucleus and to a **ribosome** which is situated in the **cytoplasm**.
 3. At the ribosome, **carrier molecules** bring specific **amino acids** in the right order based on the **mRNA** template and they form an amino acid chain. Every **3 bases** codes for one **amino acid**.

B6: Inheritance, variation

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4. When the chain is complete, the **amino acid** chain folds into a unique shape, forming a **specific protein**. There are lots of different types of protein that are produced this way, including **enzymes**, **hormones** and **structural proteins** (like collagen).
- The specific sequence of bases in the **DNA** creates a specific order of **amino acids** assembled at the **ribosome**. This will determine how the chain gets folded and which **specific protein** is made.
 - Not all parts of **DNA** code for **proteins**. **Non-coding** parts of DNA can control whether or not other **genes** are used to make a **proteins**.