Genes, Chromosomes, and DNA

In eukaryotic cells, DNA is stored in chromosomes. DNA molecules are linear and very long, so they must be wound up to fit in the nucleus. They are wound around proteins called histones, making the DNA very compact. The DNA and proteins are coiled up very tightly to make chromosomes.

In prokaryotic cells the DNA molecules are shorter. They form circular chromosomes, which are supercoiled to fit inside the cell.

Feature of DNA	Prokaryotic Cell	Eukaryotic Cell
Relative length of molecule	Short (a few genes)	Long (many genes)
Shape of chromosome	Circular	Linear
No. of different chromosomes	One	More than one (23 in humans)
per cell		
Association with proteins	No	Yes
Presence of plasmids	Yes	No

A **gene** is a sequence of bases of DNA that codes for a specific polypeptide. It occupies a fixed position (**locus**) on a chromosome. An **allele** is one specific form of a gene, differing from other alleles by one or a few bases. Each chromosome contains many genes, and a pair of chromosomes with the same type of gene at the same locus is called a **homologous pair**.

A **genome** is the whole set of the genetic information in an organism, i.e. the complete base sequence. The total amount of DNA in an organism is referred to as its **genome size**.

DNA barcoding is a taxonomic method that uses a short genetic marker in an Ortaniam's DNA to identify it as belonging to a particular species. **Cytochrome C** explores can be compared by identifying the similar and different amino acids in each inclusion the protein because it does not have a very high mutation rate.

John Cairns developed the technicul of minimising DNA breakate to produce and audiograph to allow DNA replication to be seding.



A **mutation** is a change in the base sequence of DNA or mRNA.