

PROKARYOTIC GENOME

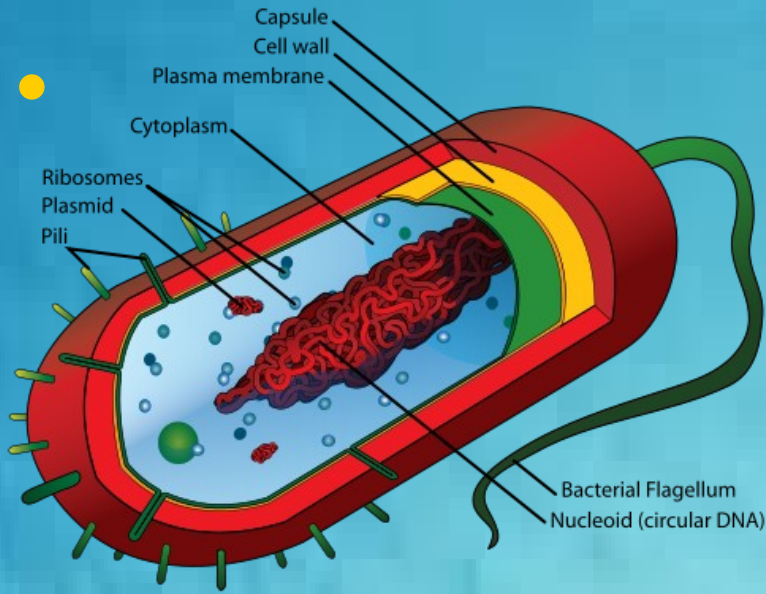
GENOME-entire **hereditary information** of an organism encoded either in DNA or RNA (in viruses). The name **GENOME** was given by **HANS WINKLER** in **1920**.

4 TYPES-viral, prokaryotic, mitochondrial, eukaryotic genome.

PROKARYOTIC GENOME

- It is **circular, double stranded** piece of DNA.
- Commonly referred to as **NUCLEOID**.
- Length varies widely but is generally few

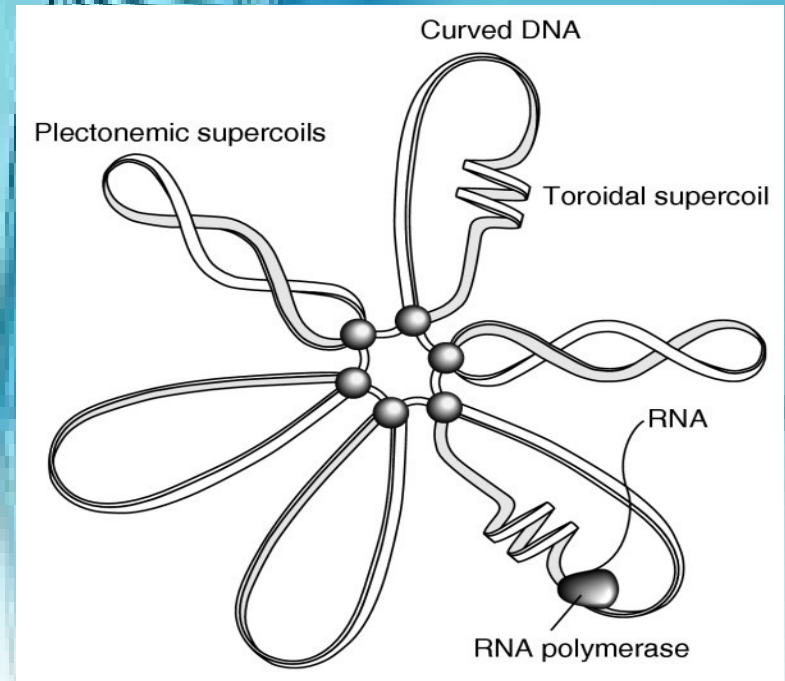
million base pairs.



Nucleoid is composed of **60% DNA** and small amounts of RNA and protein.

Nucleoid proteins help to maintain the supercoiled structure of DNA.

- **DNA supercoiling** refers to over or under winding of a DNA strand.
- It is important for **DNA packing** within all cells.
- 2 structures - **toroid** and **plectoneme**
- In prokaryotes, **plectonemic** supercoils are predominant because of circular DNA and small amount of genetic material.



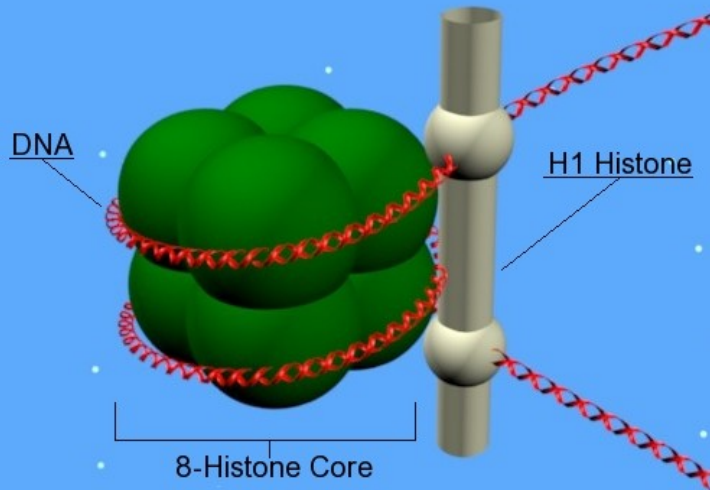
EUKARYOTIC GENOME



➤ *Saccharomyces cerevisiae* was the 1st eukaryote to have its complete genome sequence determined.

- Genome is in the form of nucleoprotein complex called **chromatin**.
- Chromatin is made up of **35% DNA, 60% proteins, 5% RNA** and is dispersed in nuclear matrix in form of network of chromatin threads.
- Information in DNA is read using **histones** and **non-histones** (associated with gene regulation).

Nucleosome



➤ **HISTONES**: are main **structural proteins** in eukaryotes.

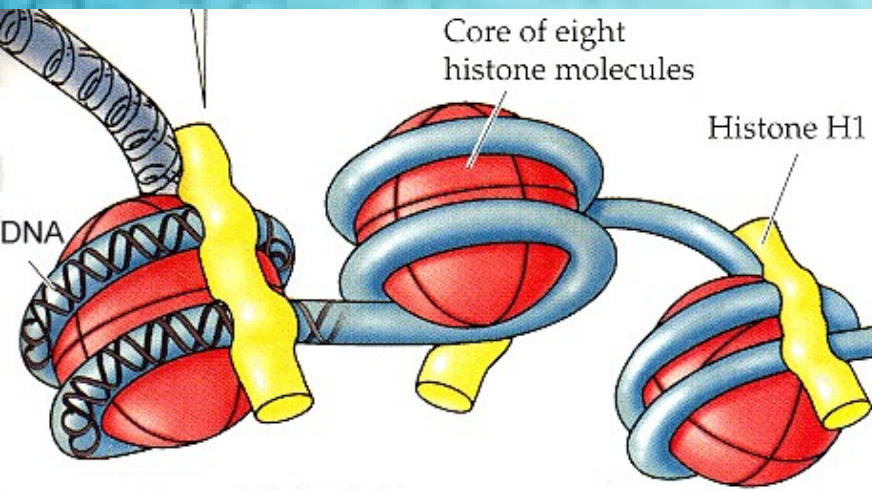
➤ It has positively charged amino acids which helps histones to bind to DNA and help in packing of DNA molecule.

➤ Nucleosome has octamer of histones **H2A, H2B, H3, H4** & a strand of DNA having 146 base pair wrapped tightly around this.

➤ DNA strand linking 1 nucleosome to another is called **linker DNA**.

➤ Histone 1 protein is associated with linker DNA.

➤ The nucleosome model was proposed by **R.D.KORNBERG & J.O.THOMAS** in 1974 to explain chromatin structure.



Prokaryotic versus Eukaryotic Genome

PROKARYOTIC GENOME

- They are **small** in size.
- Contains single **circular** chromosome.
- They are **haploid**.
- DNA is **not associated** with histones.
- They are condensed in nucleoid via **DNA super coiling**.

EUKARYOTIC GENOME

- They are larger than prokaryotic genome.
- Contains multiple **linear** chromosome.
- They are **diploid**.
- DNA is **associated** with histones.
- They are condensed in membrane bound nucleus via **histones**.

*THANK
YOU*

BY

*SHREYA
GOPINATH*

*THANK
YOU*

BY

SUMAN KUMAR MEKAP