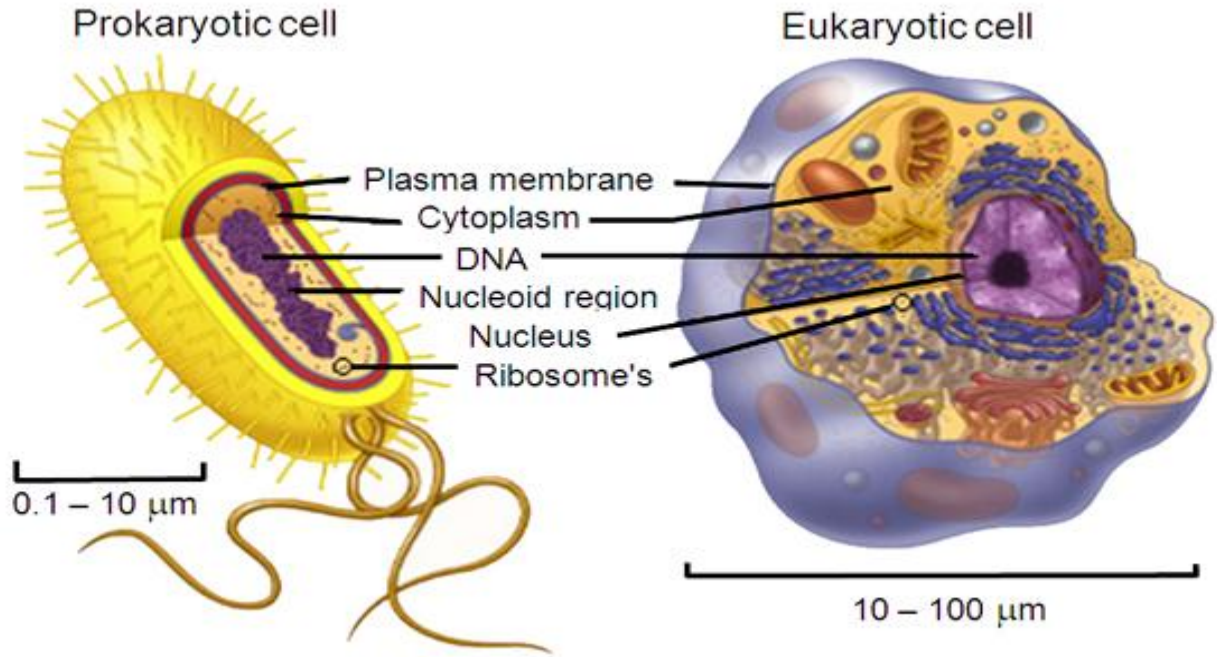
Genome organization of prokaryotic

Genome : complete set of gene or genetic material present in a cell organisms,fit the DNA into nucleus(few micrometer in diameter)

In eukaryotic, 22 autosome and sex chromosome.



Points:

1. Compaction(DNA) : change in the degree of condensation must occur quickly.
   a. DNA helix – DNA strand
   b. Chromatin strand(DNA with histone)
   c. Condensed chromatin during interphase with centromere

In prokaryotes

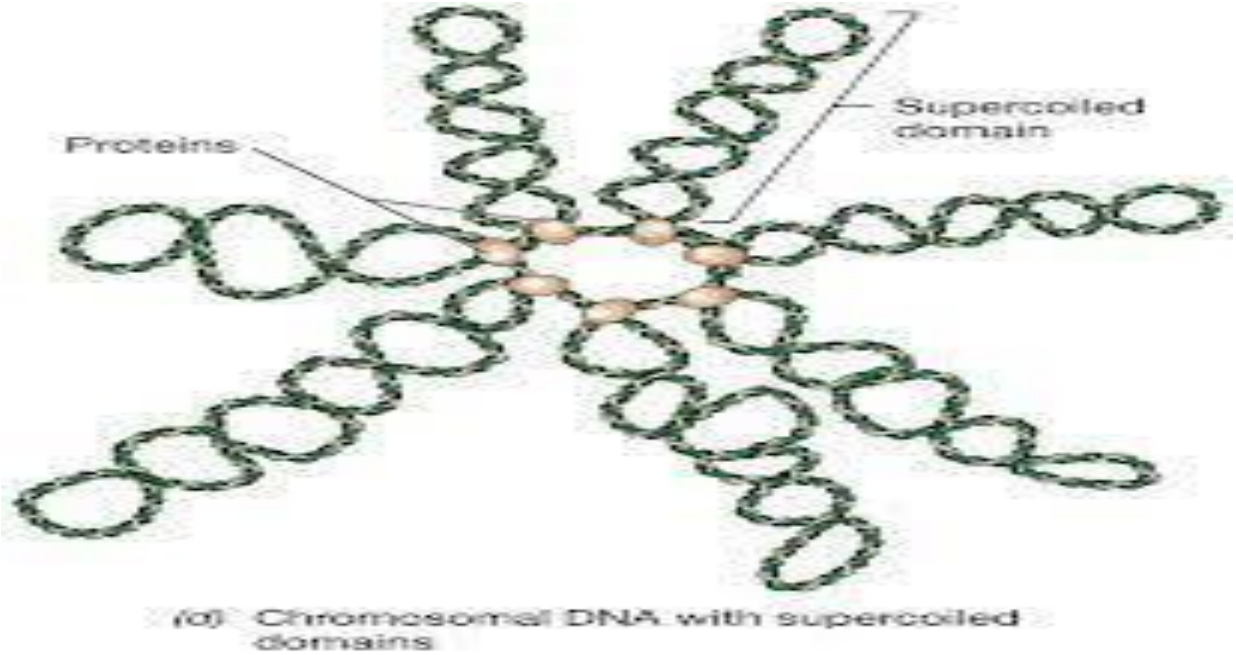
Do not contains nucleus and membrane bound organelles

Simple(G0)

Gene – do not have introns(non-coding sequence)

Or histone protein(DNA binding protein).

E.g, E.coil



(a) Chromosomal DNA with supercoiled domains

A. supercoiling in prokaryotes.

- Plectonemic supercoils (circular chromosome) small amount of genetic material (called folded genome).

- Organized into domains and loops – independently (-) supercoiled.

- Dimeric protein – HU condenses DNA and wrap it in bead-like structure.

Protein works

1. HU protein(heat – unstable protein) : protein in Nucleoid, work with an enzyme called topoisomerase I to bind DNA. → sharp bend in the chromosome → generating the tension necessary for (-) supercoiling.

2. IHF(Integrated host-factor) : bind with specific sequence(introduce additional bends) → folded DNA(variety of conformation) are supercoiled and wound around tetramers of the HU protein.
   DNA topoisomerase, DNA gyrase – help to maintain supercoiling

3. H-NS(Histone –like structure protein) : active role in transcription → gene expression involved in responses to environmental stimuli.