BHARATHIDASAN UNIVERSITY

Tiruchirappalli- 620 024
Tamil Nadu, India

Programme: M.Sc. Biochemistry

Course Title : Chromatin and Epigenetics
Course Code : BC205DCE

Unit-1
Chromatin Structure

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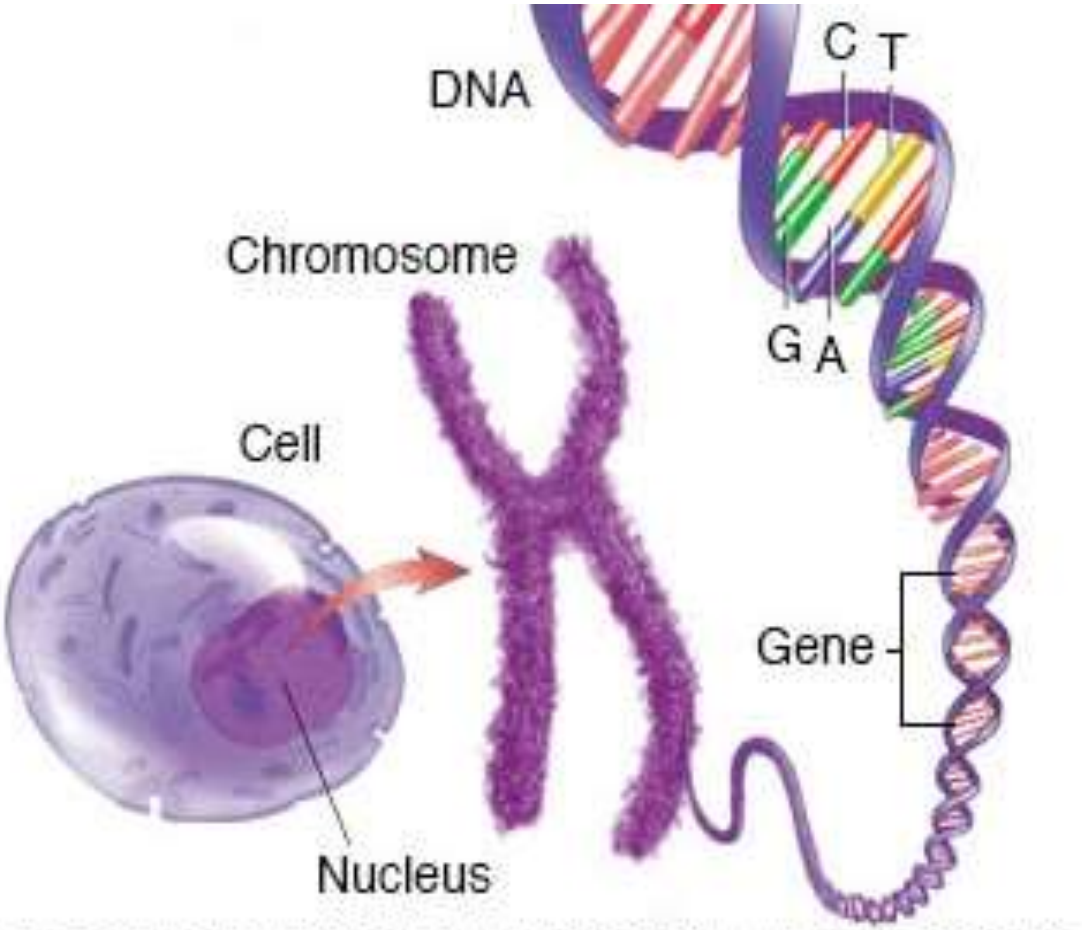
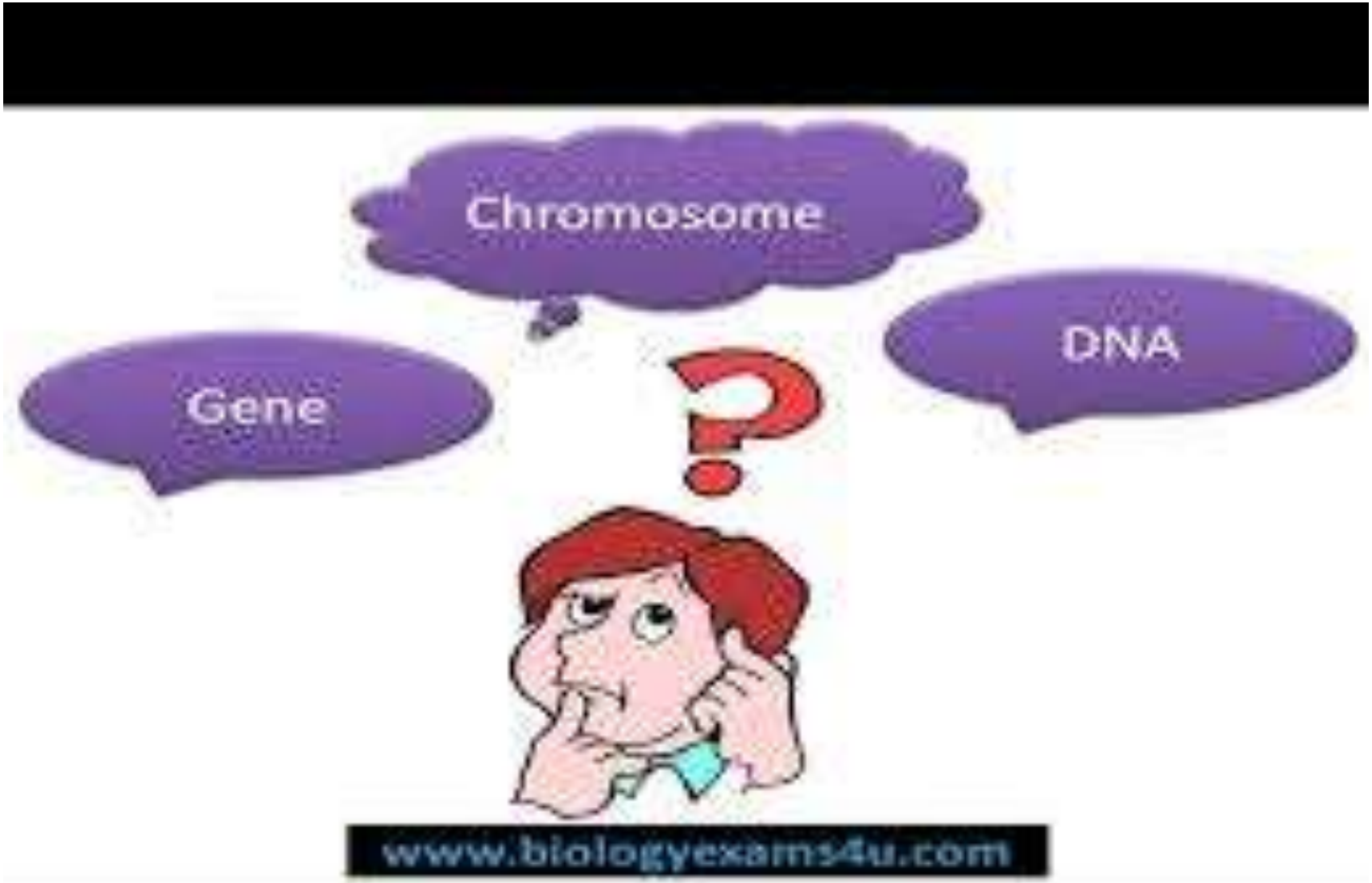
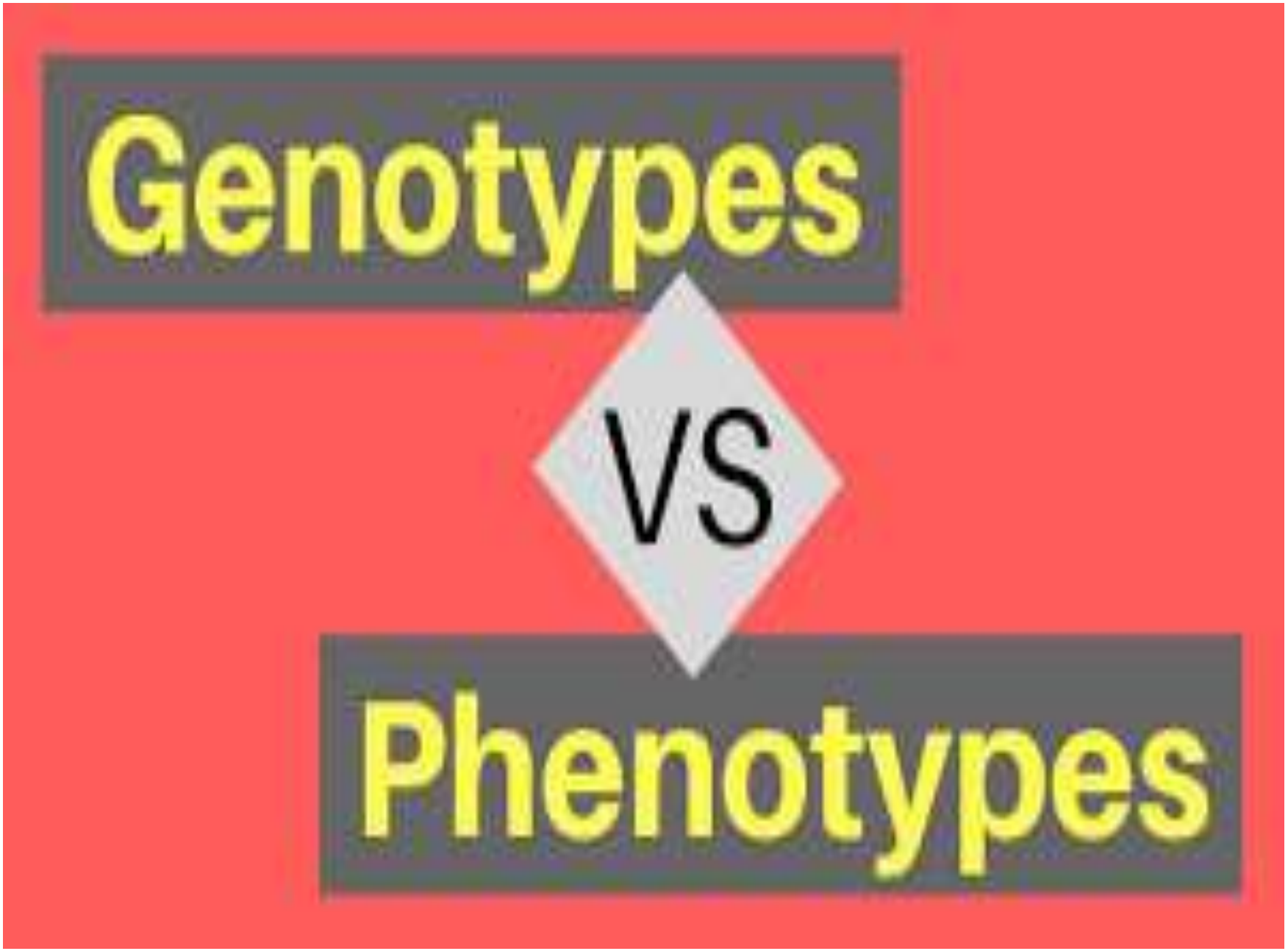
Unit-1 Overview

- DNA and histones
- Structure of histones
- Histone-DNA interactions
- Nucleosomes
- Organisation of nucleosomes
- Chromatin
- Chromosomal architecture
- Histone variants
- Non-histone proteins

Packing of DNA




Chromosome
DNA
Gene
?
www.biologyexams4u.com


Genotypes
VS
Phenotypes

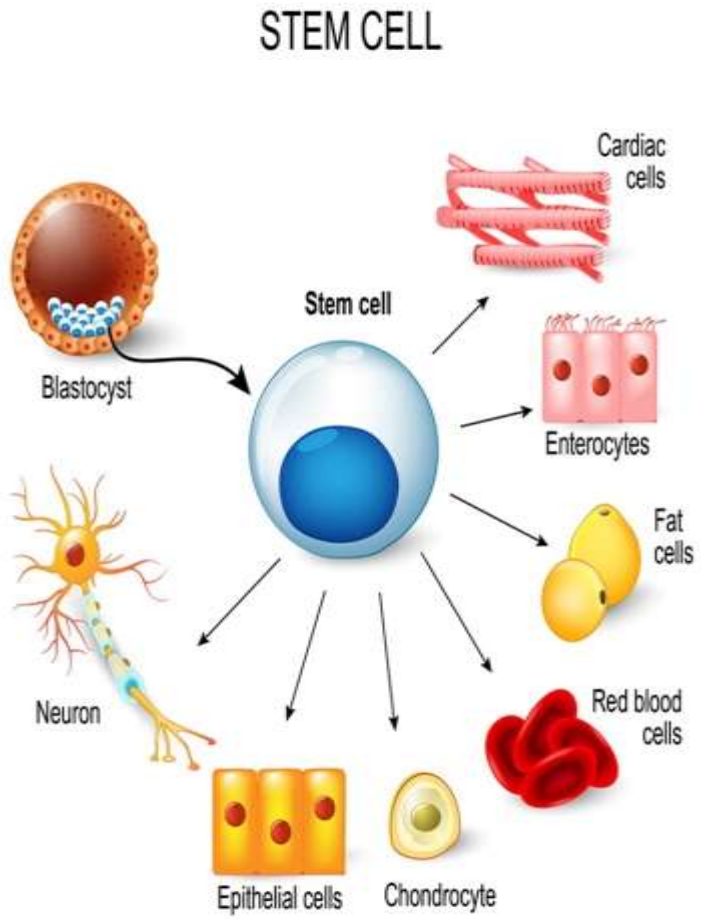
Every cell in our body has same gene

True

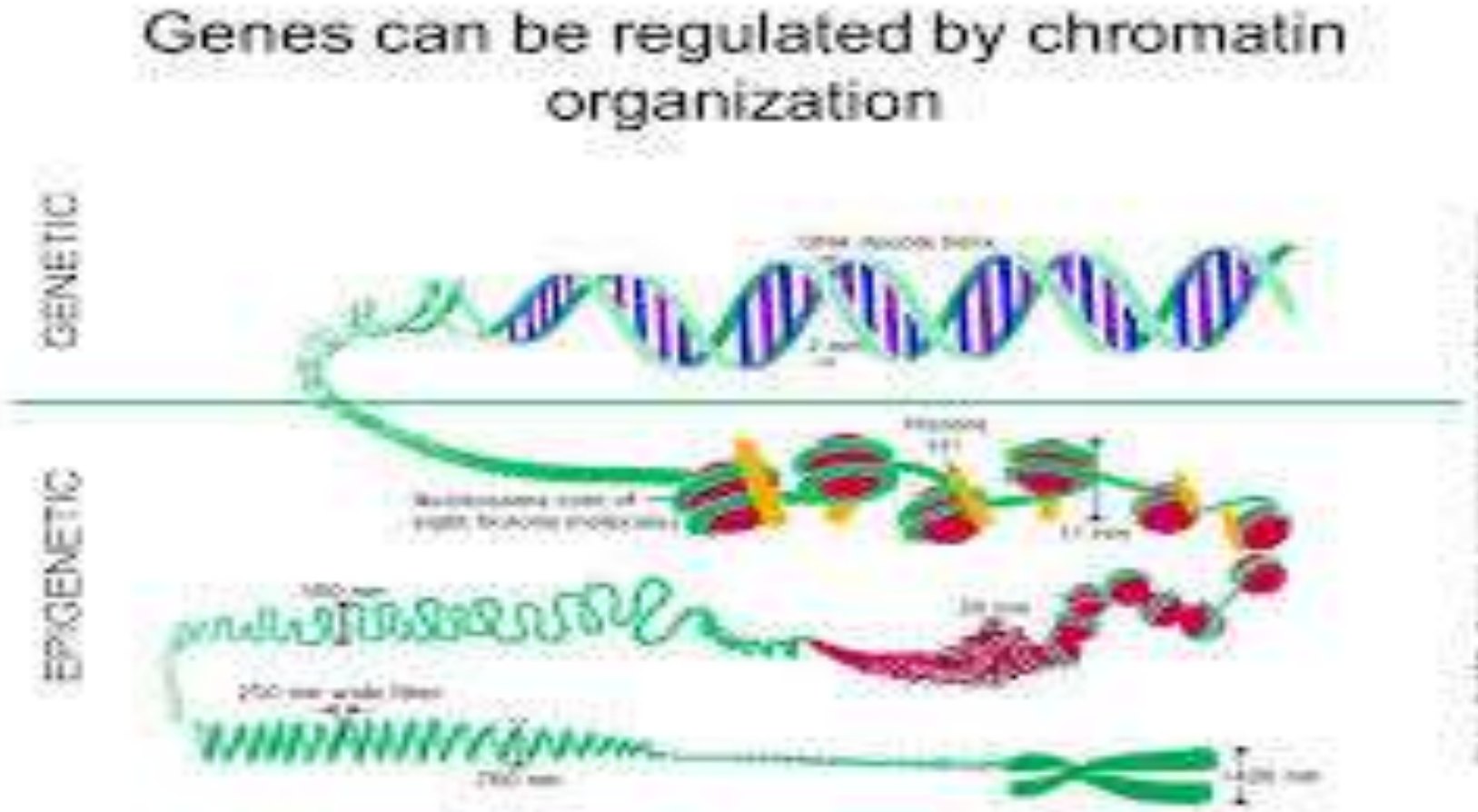
or

False

If all the cells have the same pattern of gene then why all the cells are different in phenotype?



Gene regulation beyond Genetics



To understand the gene regulation and function of a gene in a cell we have to understand the organization of gene in a cell

DNA

What is the length of the DNA?

How many cells are in our body?

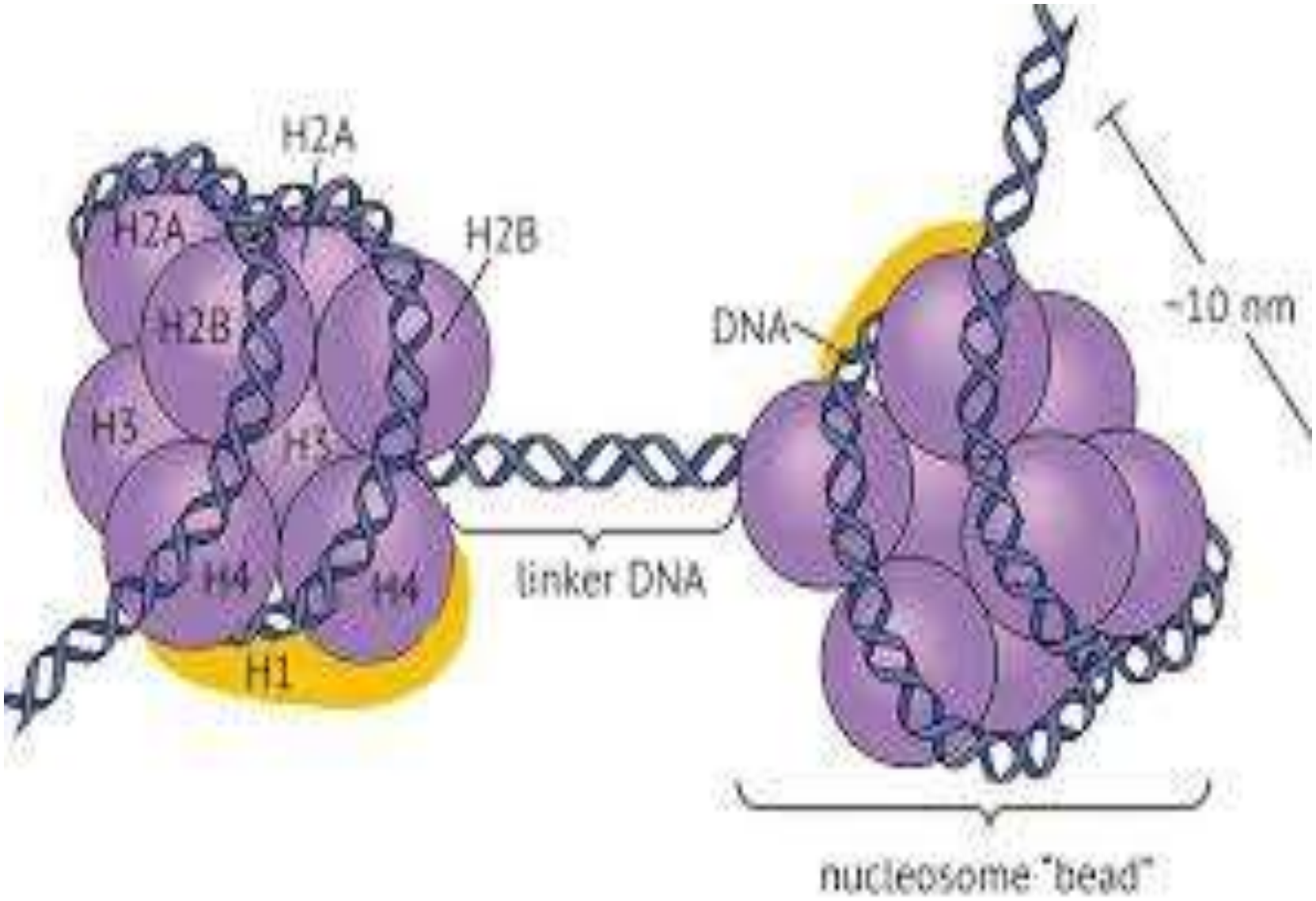
What is the size of a cell?

What is the size of the nucleus?

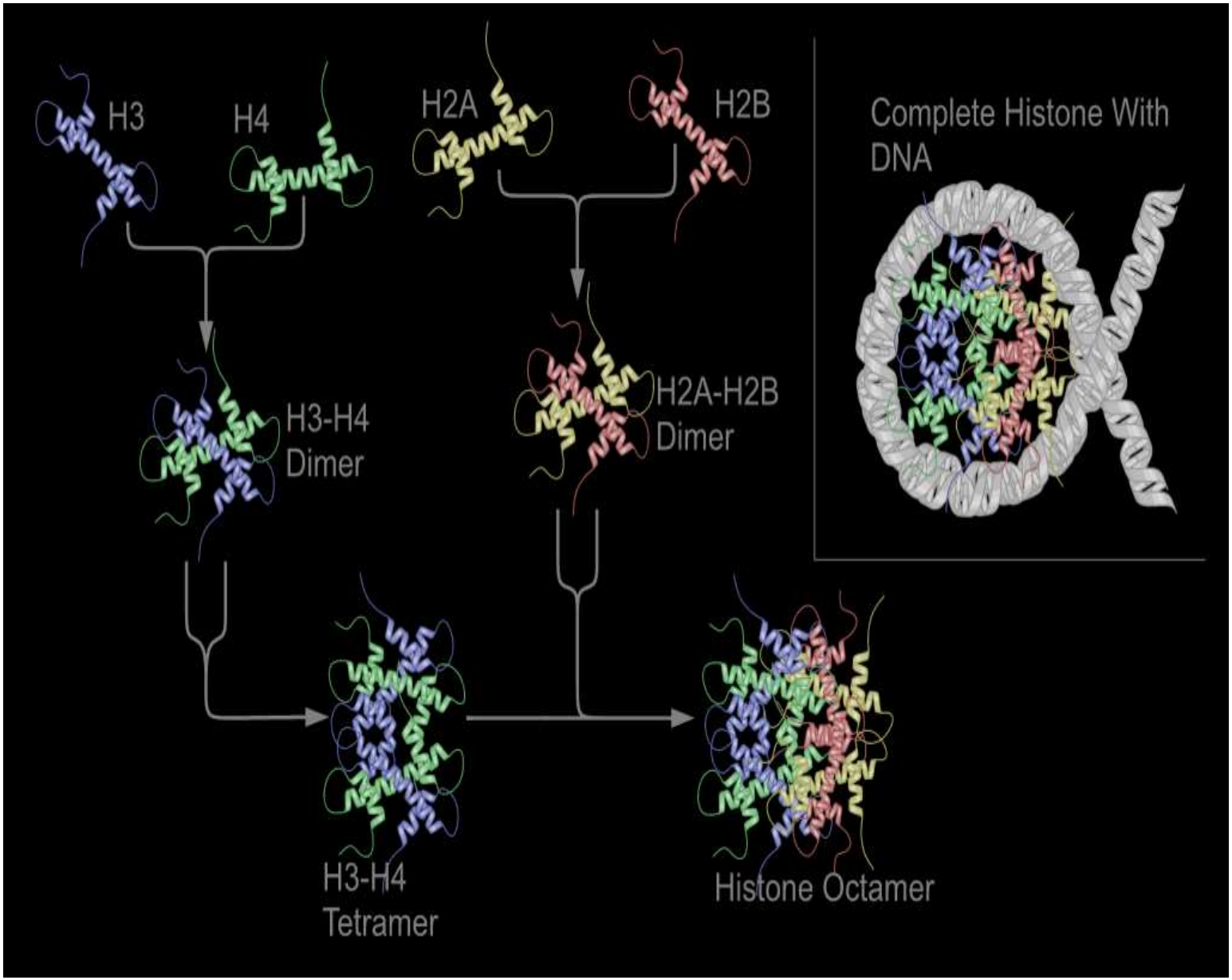
How a huge length of DNA accommodated in the tiny nucleus?

The Sun is 150 billion meters from Earth. Each of us has enough DNA to go from here to the Sun and back for more than 300 times, or around Earth's equator 2.5 million times! How is this possible?

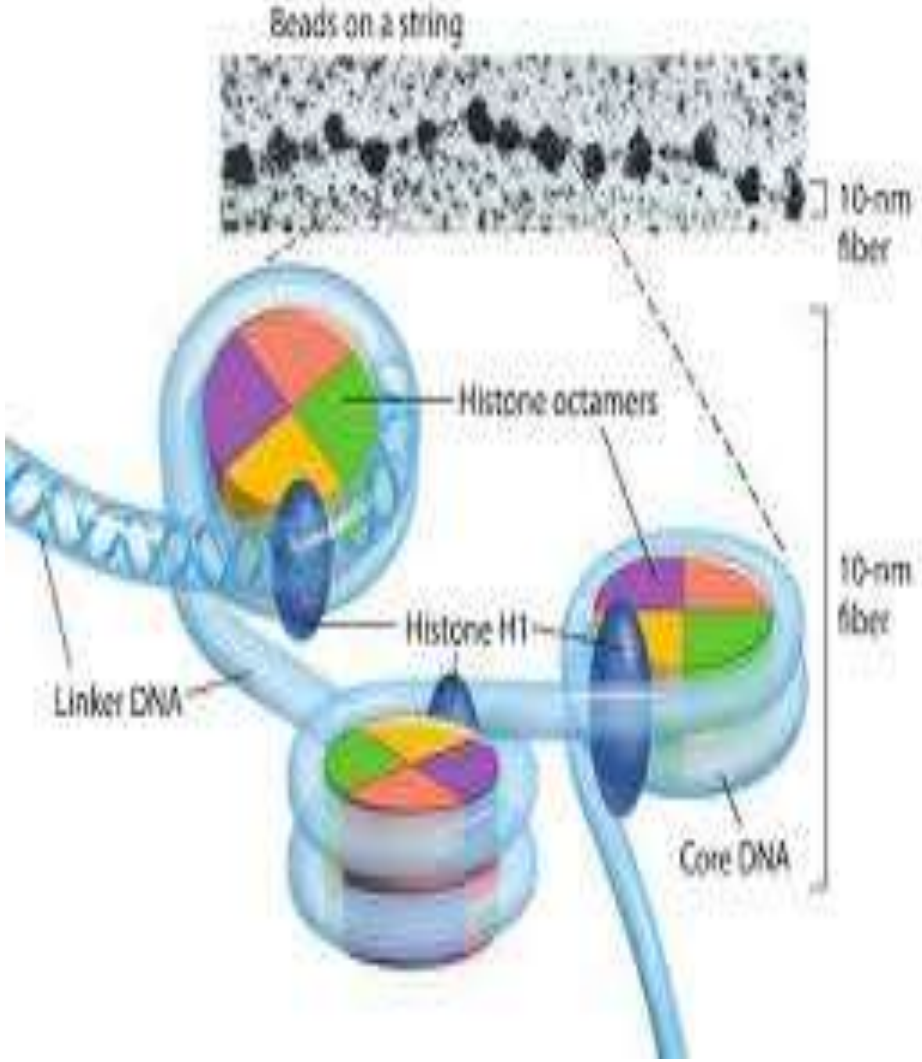
DNA and Histones

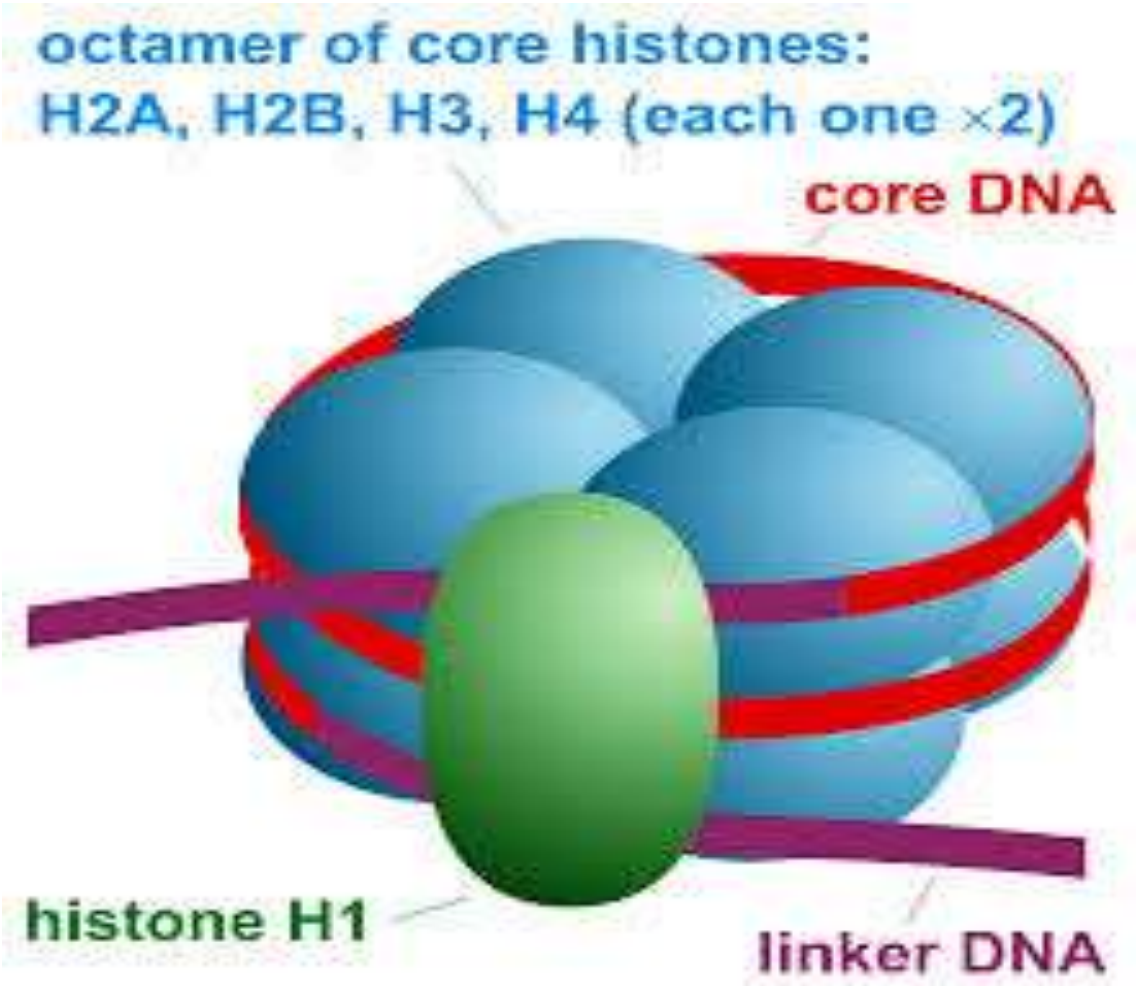


Structure of Histones



Histones 1 is a linker

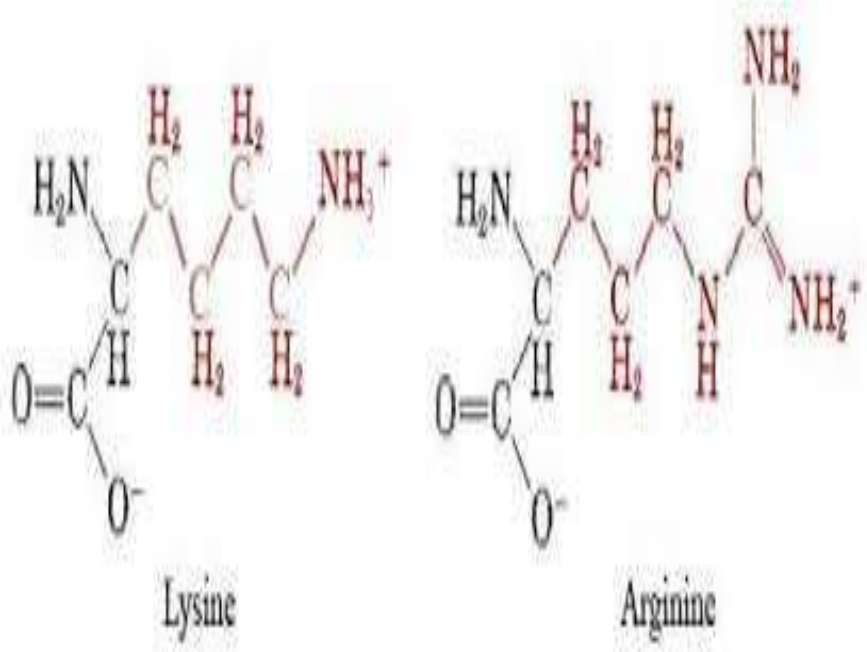


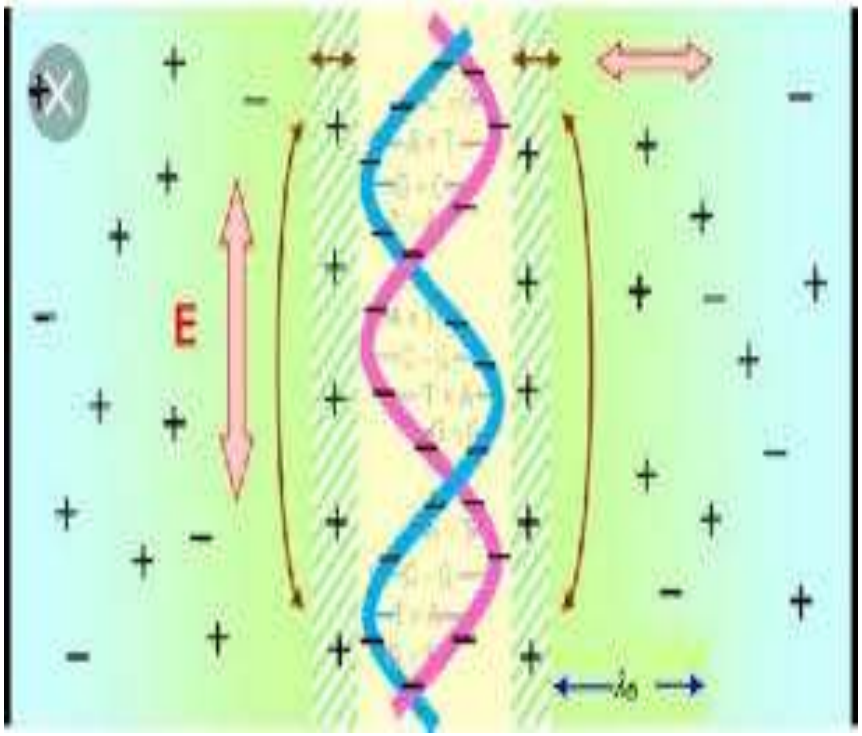


Animation video link:

https://www.youtube.com/watch?v=RkbV3oaOns4

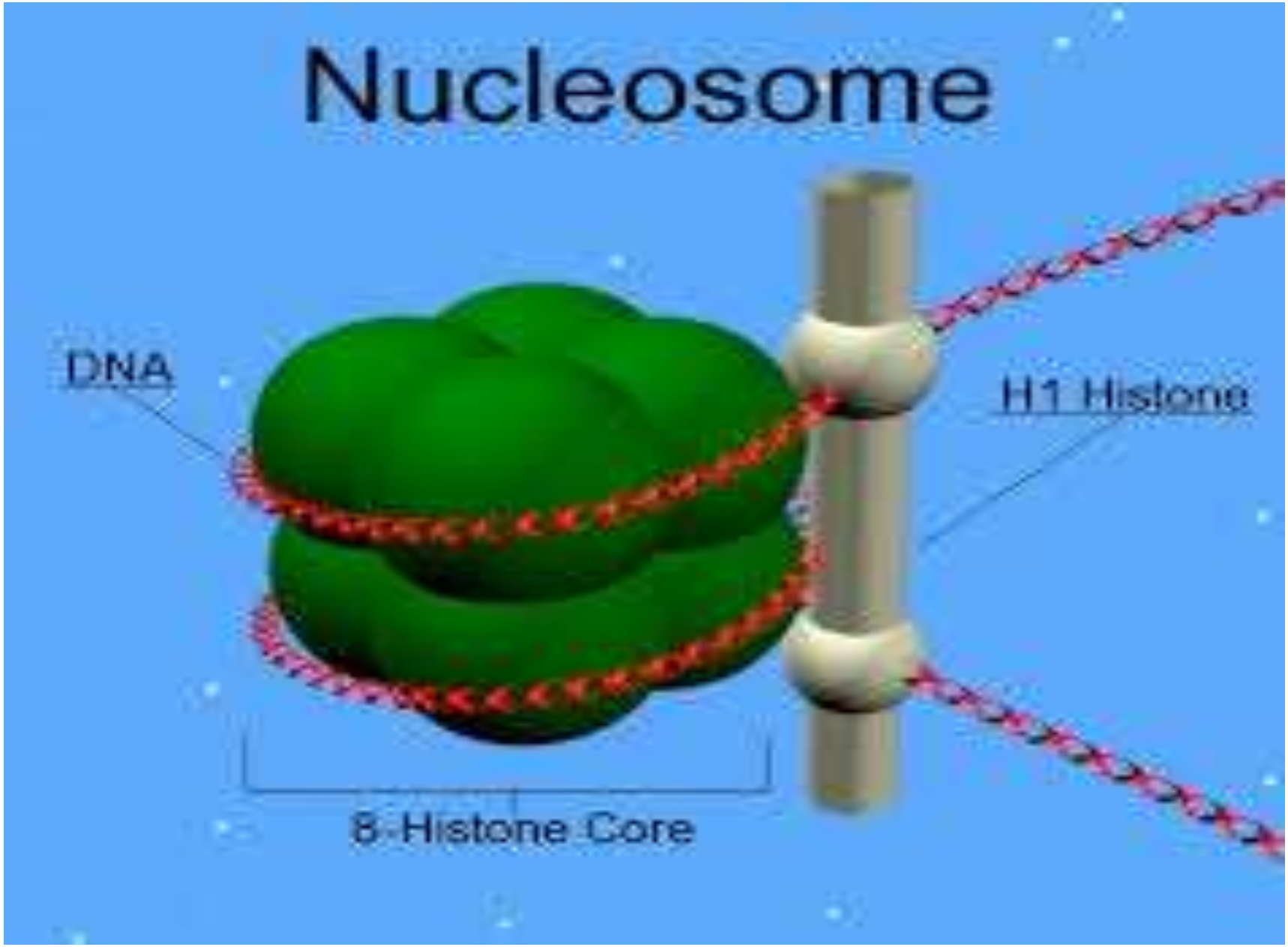
How DNA attaches with Histones





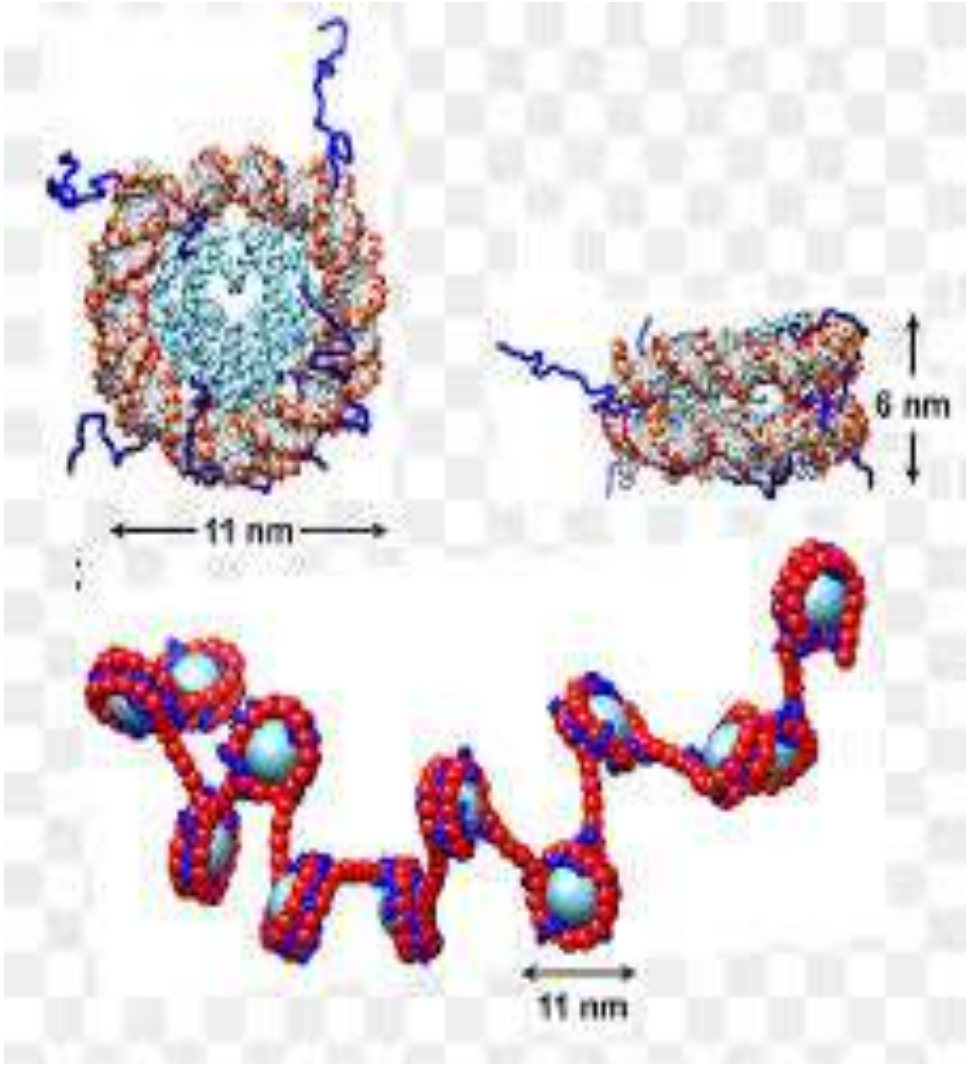
Basic amino acids with strong positive charge

Phosphate group in DNA negative charge

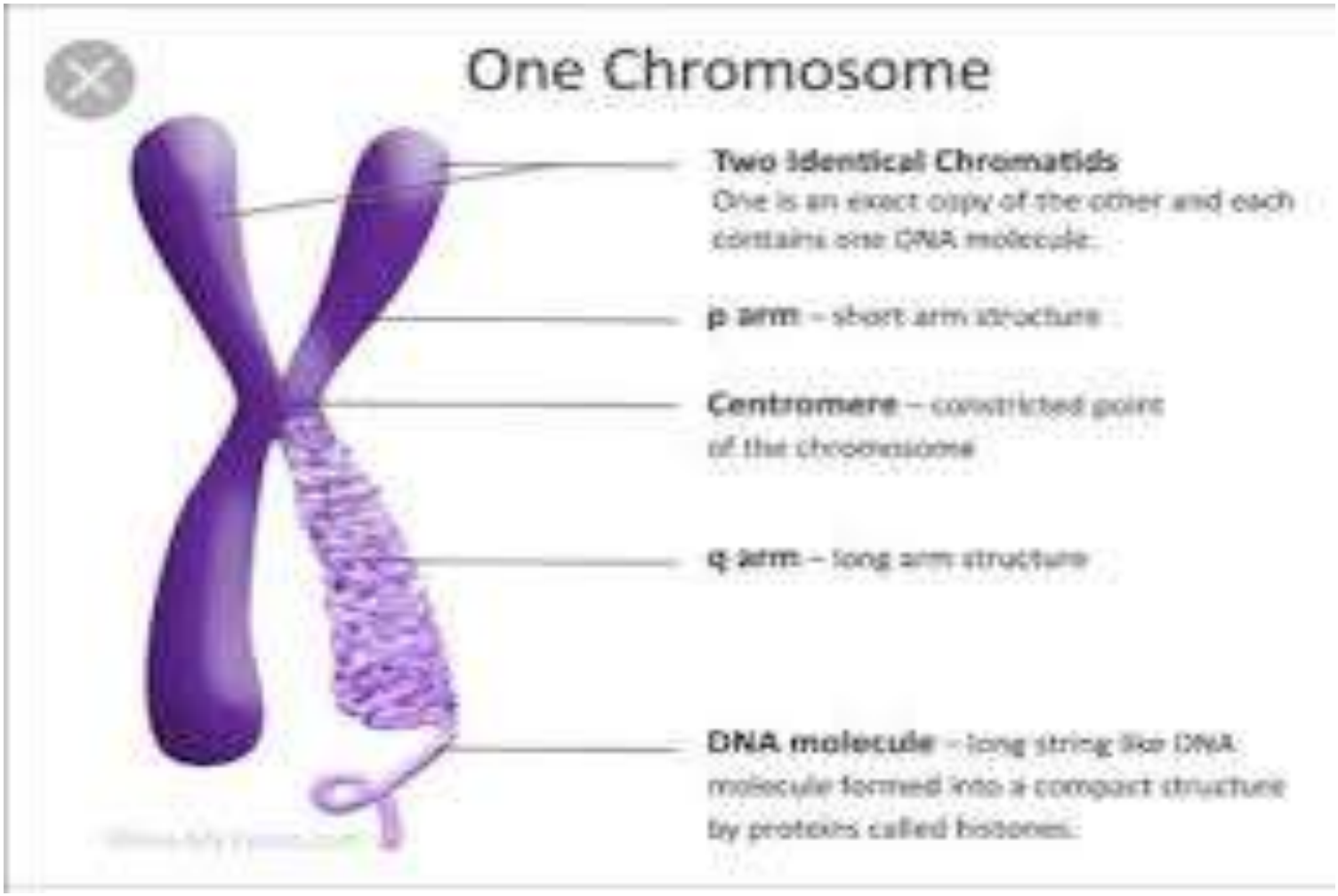

Nucleosome
DNA
H1 Histone
8 Histone Core

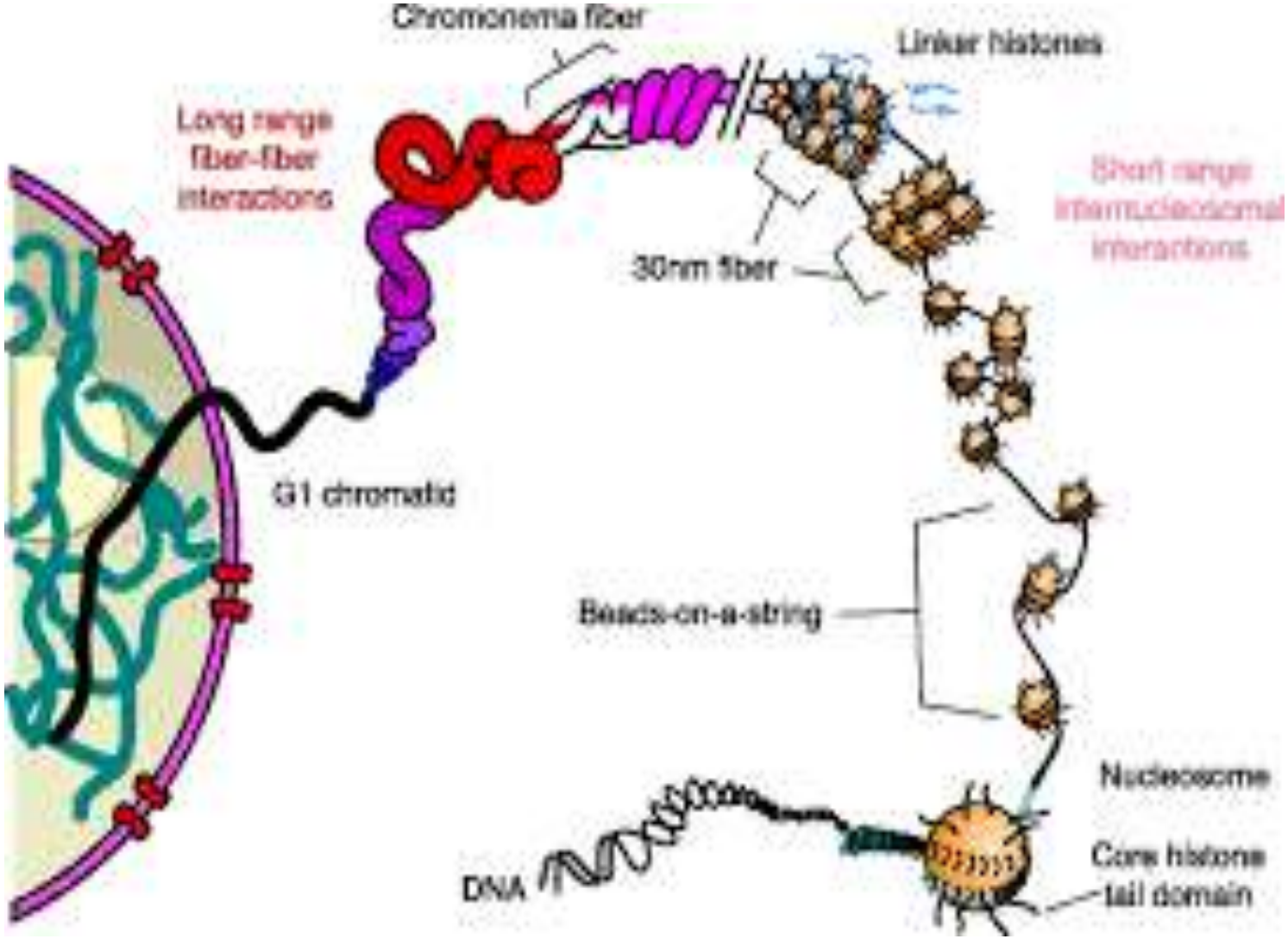
https://www.youtube.com/watch?v=gbSIBhFwQ4s

Chromatin



Chromatids and Chromosome





Animation video link:

https://www.youtube.com/watch?v=shANhO_Icc0