INTRODUCTION TO CHROMATIN ORGANIZATION

Glossary reading:

<https://www.genome.gov/genetics-glossary/Chromatin>

Watch these videos:

# Chromatin:

<https://www.youtube.com/watch?v=bwVjYxcDQ5I>

# A 3D Map of the Human Genome:

<https://www.youtube.com/watch?v=dES-ozV65u4>

Read the specified sections of following article:

Beagrie RA, Scialdone A, Schueler M, Kraemer DC, Chotalia M, Xie SQ, Barbieri

M, de Santiago I, Lavitas LM, Branco MR, Fraser J, Dostie J, Game L, Dillon N, Edwards PA, Nicodemi M, Pombo A.

Complex multi-enhancer contacts captured by genome architecture mapping.

*Nature*. 2017 Mar 23;**543(7646)**:519-524.

### Estimation of chromosome radial position from GAM data

### Estimation of locus volume from GAM data

### Extended Data Figure 9

The article is available here:

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5366070/#!po=5.27638>

Concepts to learn from the videos and the glossary reading:

* What is chromatin and what is its function?
  1. Chromatin is a package of DNA into a tight volume
* What is the functional reason for a DNA loop?
  1. **DNA**-**looping** mechanisms **are** part of networks that regulate all aspects of **DNA** metabolism, including transcription, replication, and recombination
* What is the name of the protein that often helps to form DNA loops?
  1. CTCF
* What are the functions of DNA ‘marks’?
  1. he marks do not change the sequence of the DNA, but they do change the way cells use the DNA's instructions
* What is a nuclear sub compartment?
  1. These bodies are an indispensable fraction of the nuclear landscape as they subdivide the nucleoplasm and generate different environments inside the nucleus.
* What is the purpose of genome folding?
  1. It is linked to functional **DNA**-dependent processes, such as **DNA** replication and transcription.

Concepts to learn from the article:

* What is “the radial position of a nuclear profile (NP)”? How can it be estimated by using GAM data?
  1. Radial Position means through the radius, Areas with more chromosomes are close to the radial position compared to areas with fewer chromosomes.
* How can the degree of compaction of a genomic region (a locus) be estimated by using GAM data?
  1. Thanks to the random orientation of sectioning with respect to the nucleus, the DNA content of NPs originated from different latitudes of the nucleus can be used to estimate radial distributions of genomic regions

In the next class we will have a blackboard quiz about these concepts. The quiz may include multiple choice, true-false, fill-in-the-blank, and/or matching questions.