

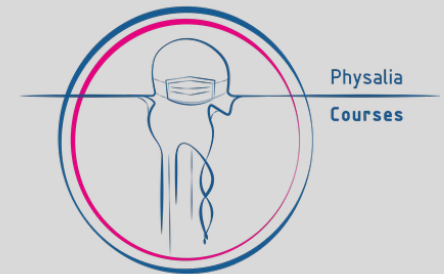
Introduction to epigenomics

Or how genes are regulated...

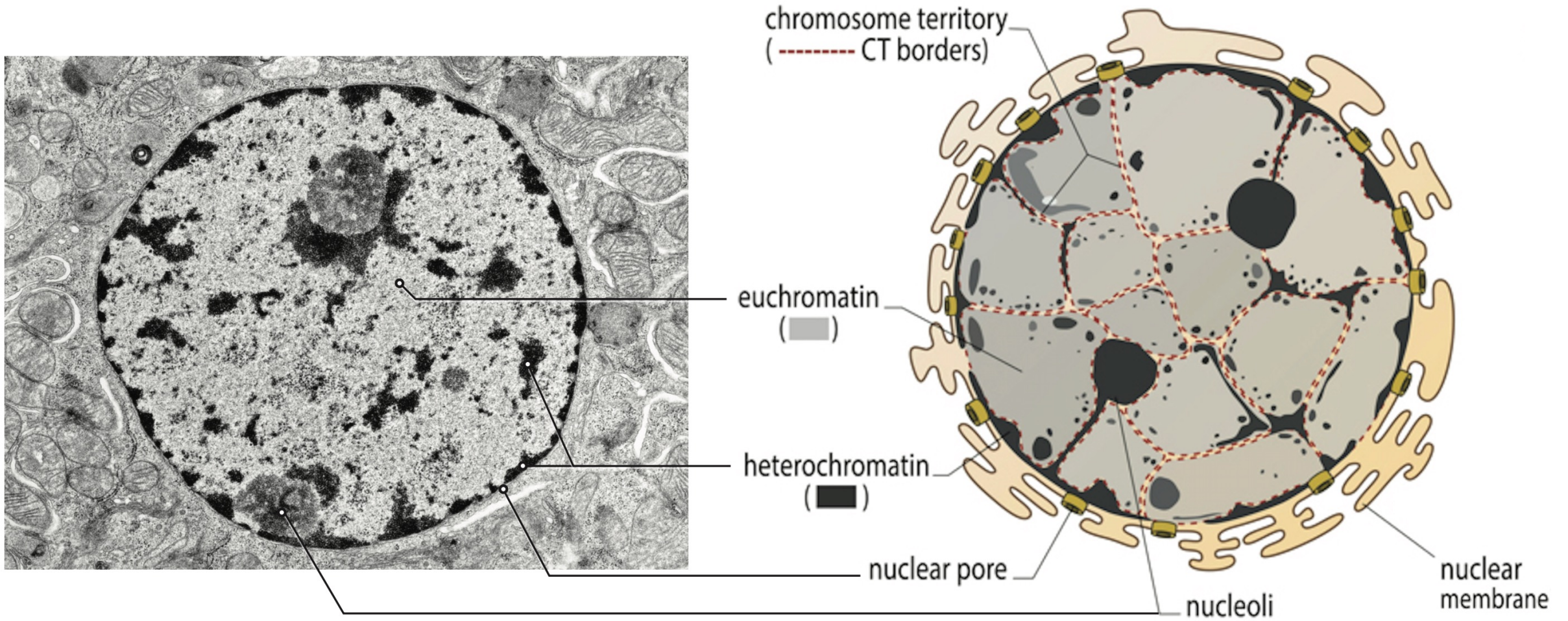
Epigenomics Data Analysis

Jacques Serizay

Physalia 2023



Chromatin is complex



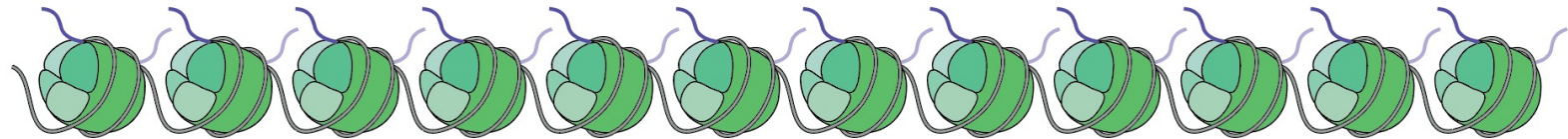
Chromatin composition varies along the genome

DNA



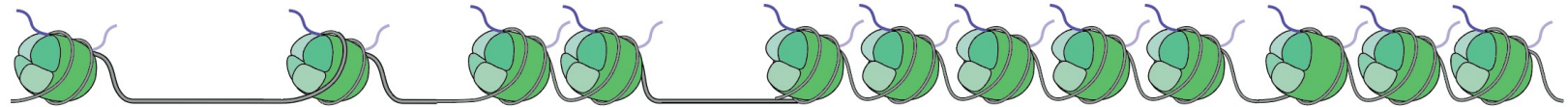
Chromatin composition varies along the genome

DNA
+ Histone cores } Nucleosomes: core chromatin structural unit



Chromatin composition varies along the genome

DNA
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+ nucleosome positioning

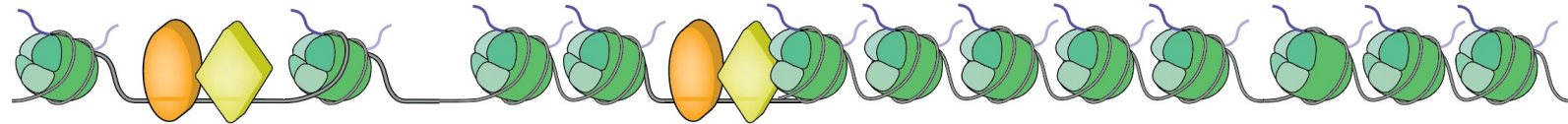


Chromatin composition varies along the genome

DNA
+ Histone cores } Nucleosomes: core chromatin structural unit

+ nucleosome positioning

+ transcription factors



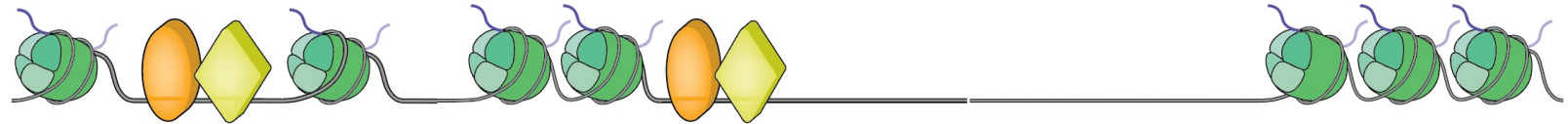
Chromatin composition varies along the genome

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Chromatin composition varies along the genome

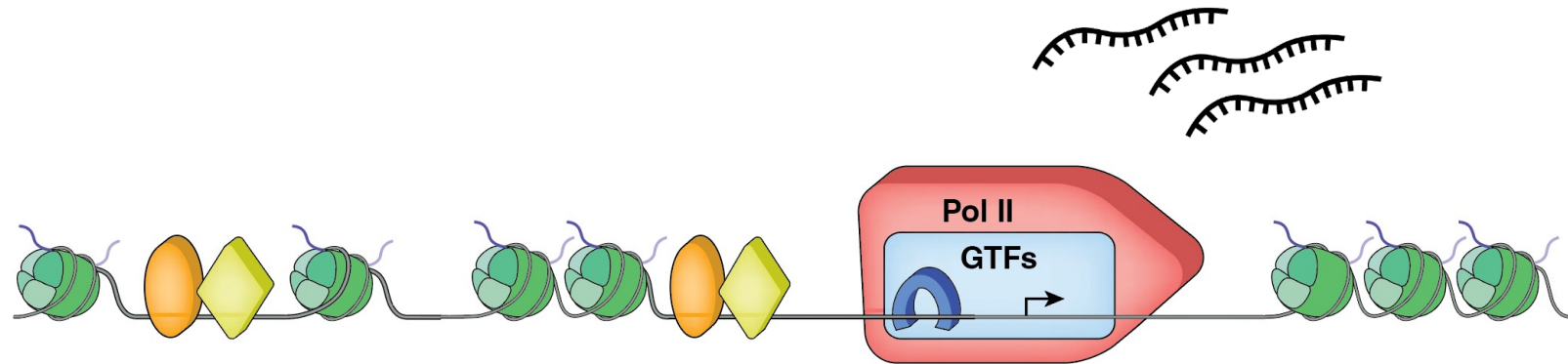
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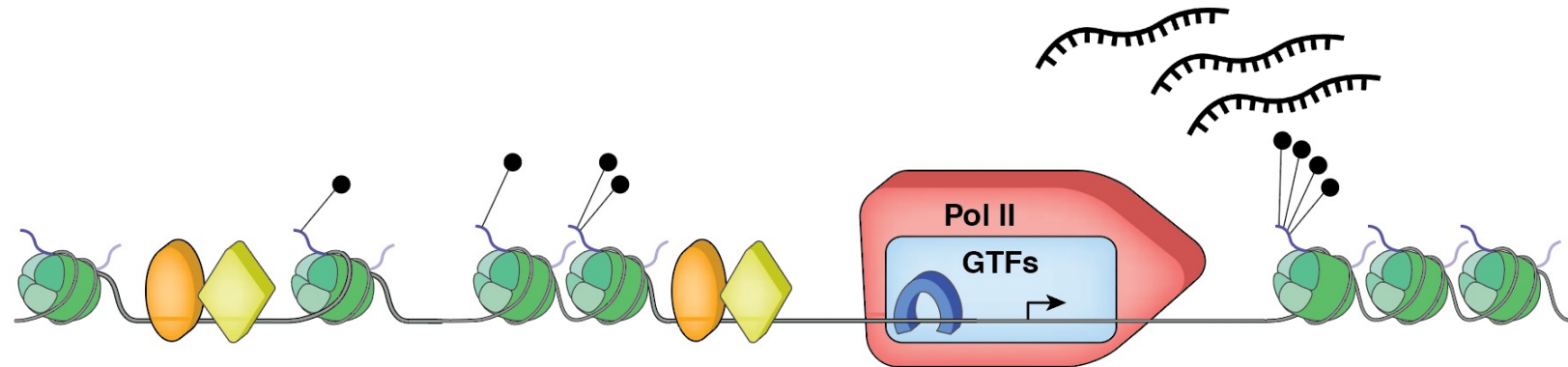
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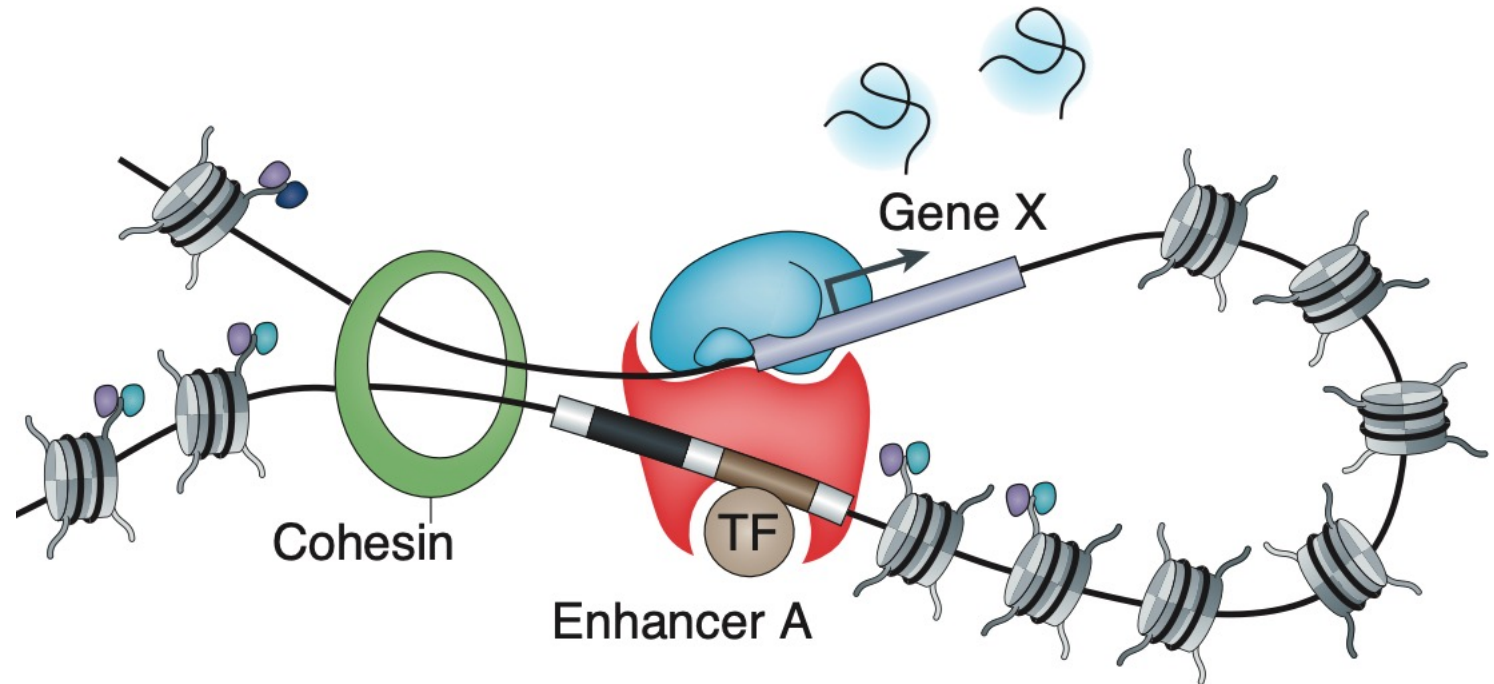
+ transcription factors

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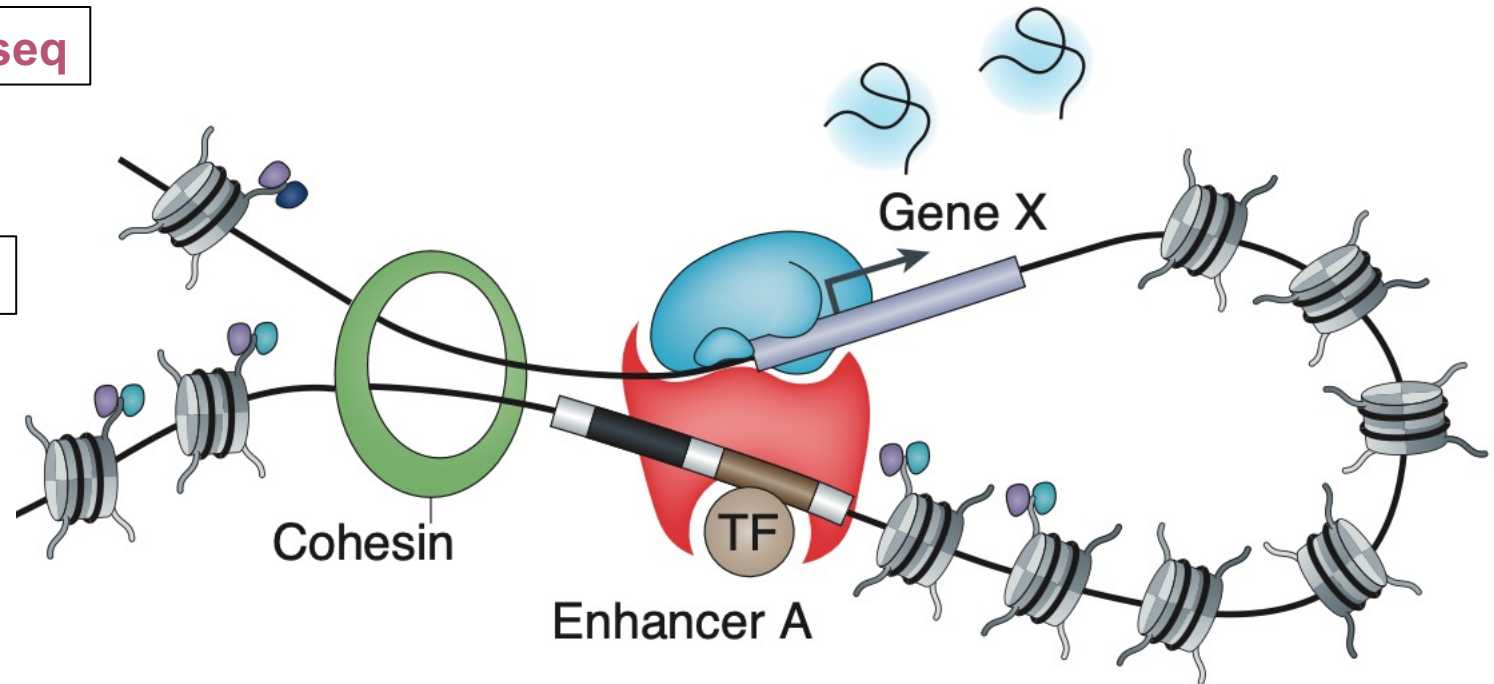
+ Histone PTMs

+ Chromatin folding

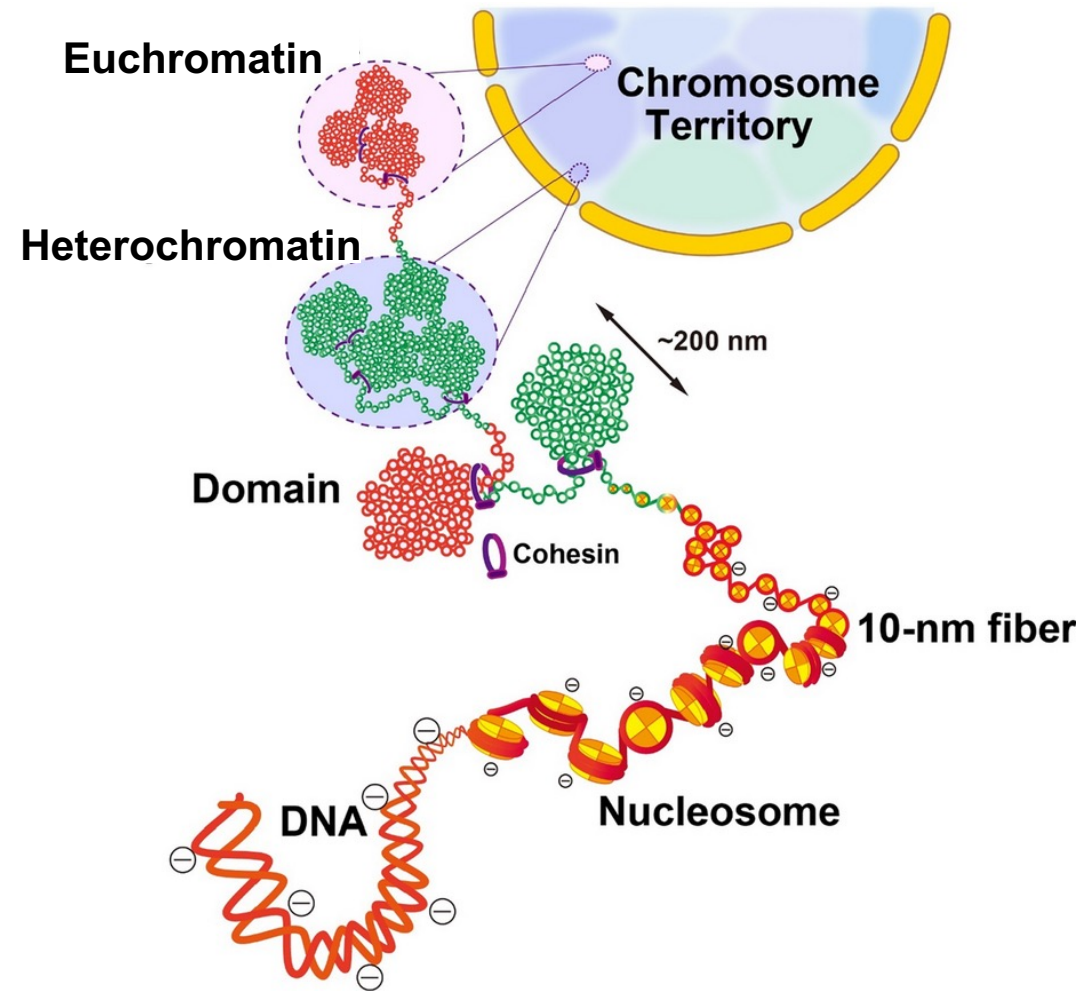


Chromatin composition varies along the genome

- DNA **WGS**
 - + Histone cores **ChIP-seq**
 - + nucleosome positioning **MNase-seq**
 - + transcription factors **ChIP-seq**
 - + Promoter accessibility **ATAC-seq**
 - + Polymerase **RNA-seq**
 - + Histone PTMs **ChIP-seq**
 - + Chromatin folding **Hi-C**
- Nucleosomes: core chromatin structural unit

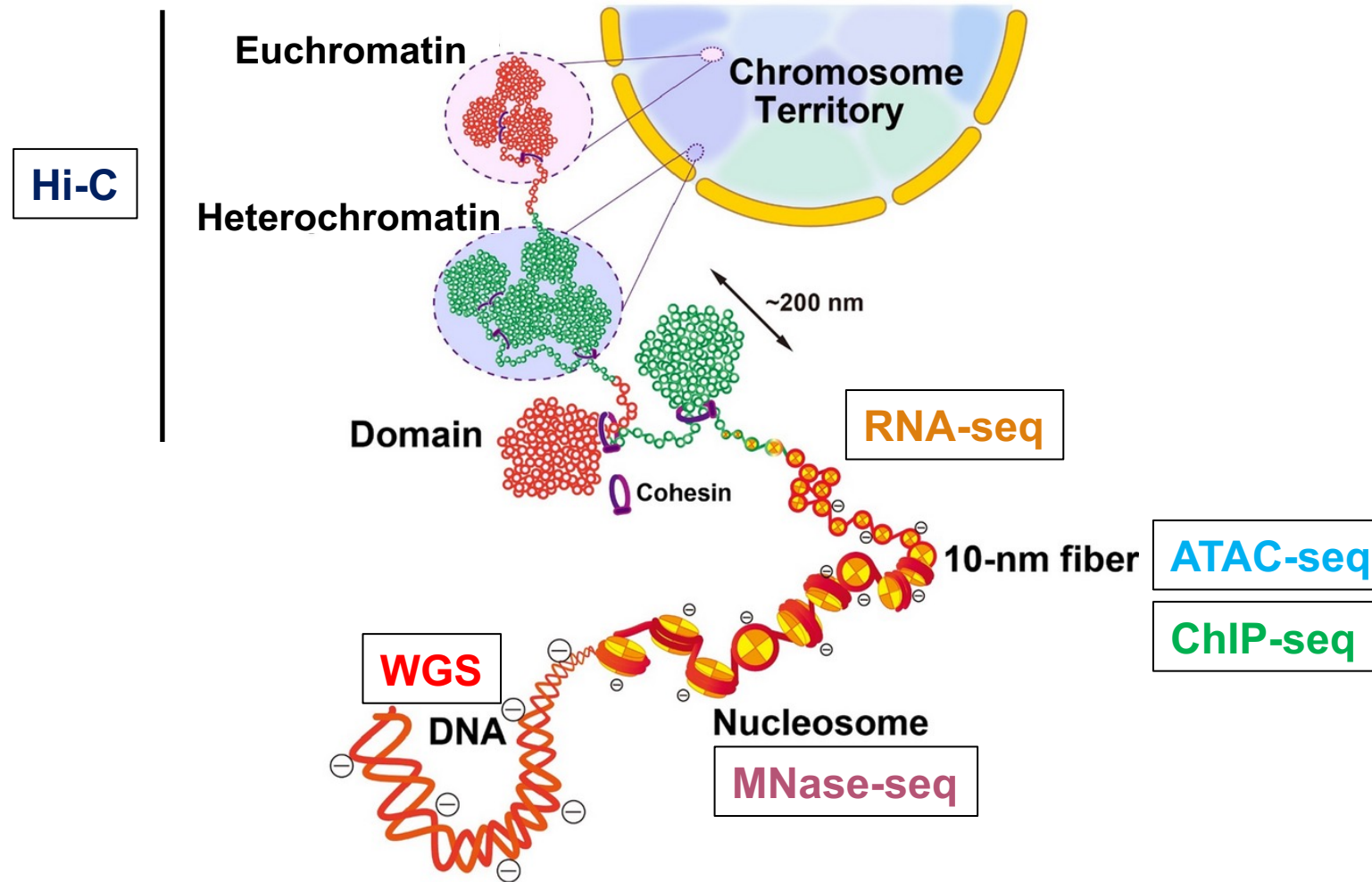


Chromatin is organized in hierarchical structure to enable transcriptional regulation



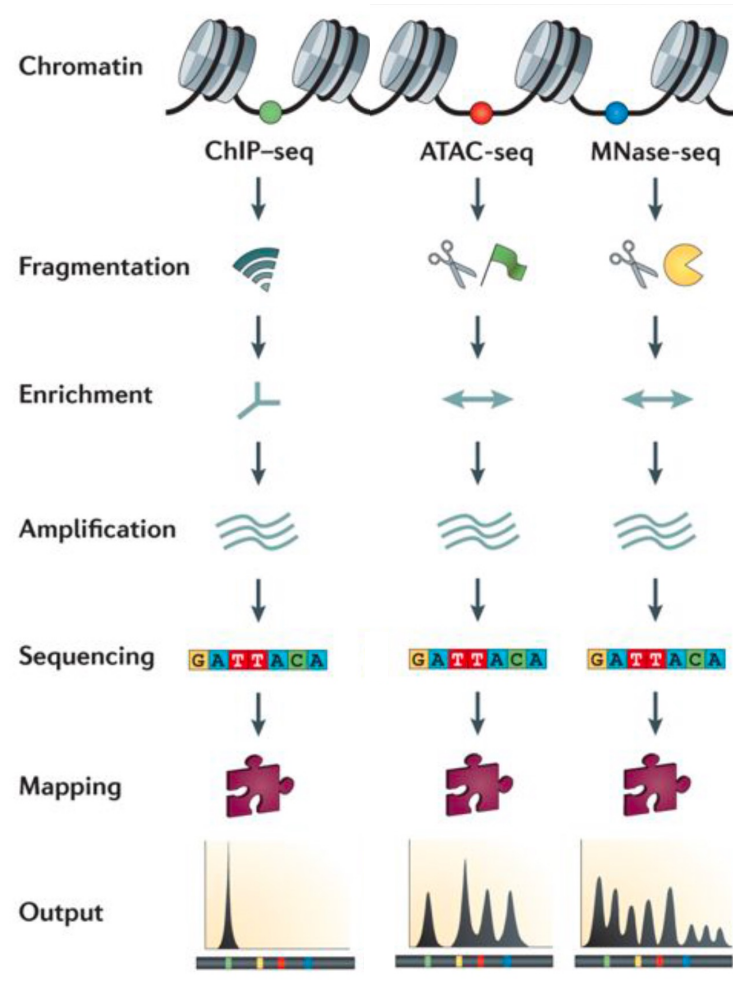
Lafontain et al., Current Protocols 2021

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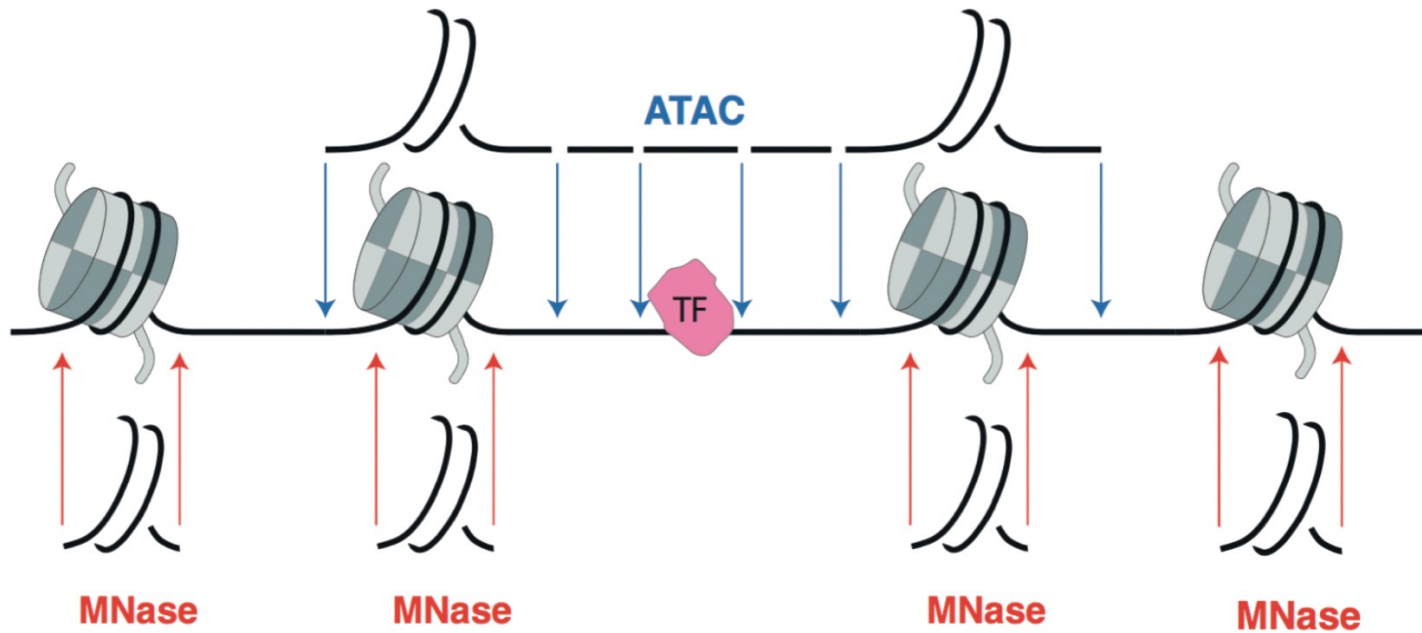


Lafontain et al., Current Protocols 2021

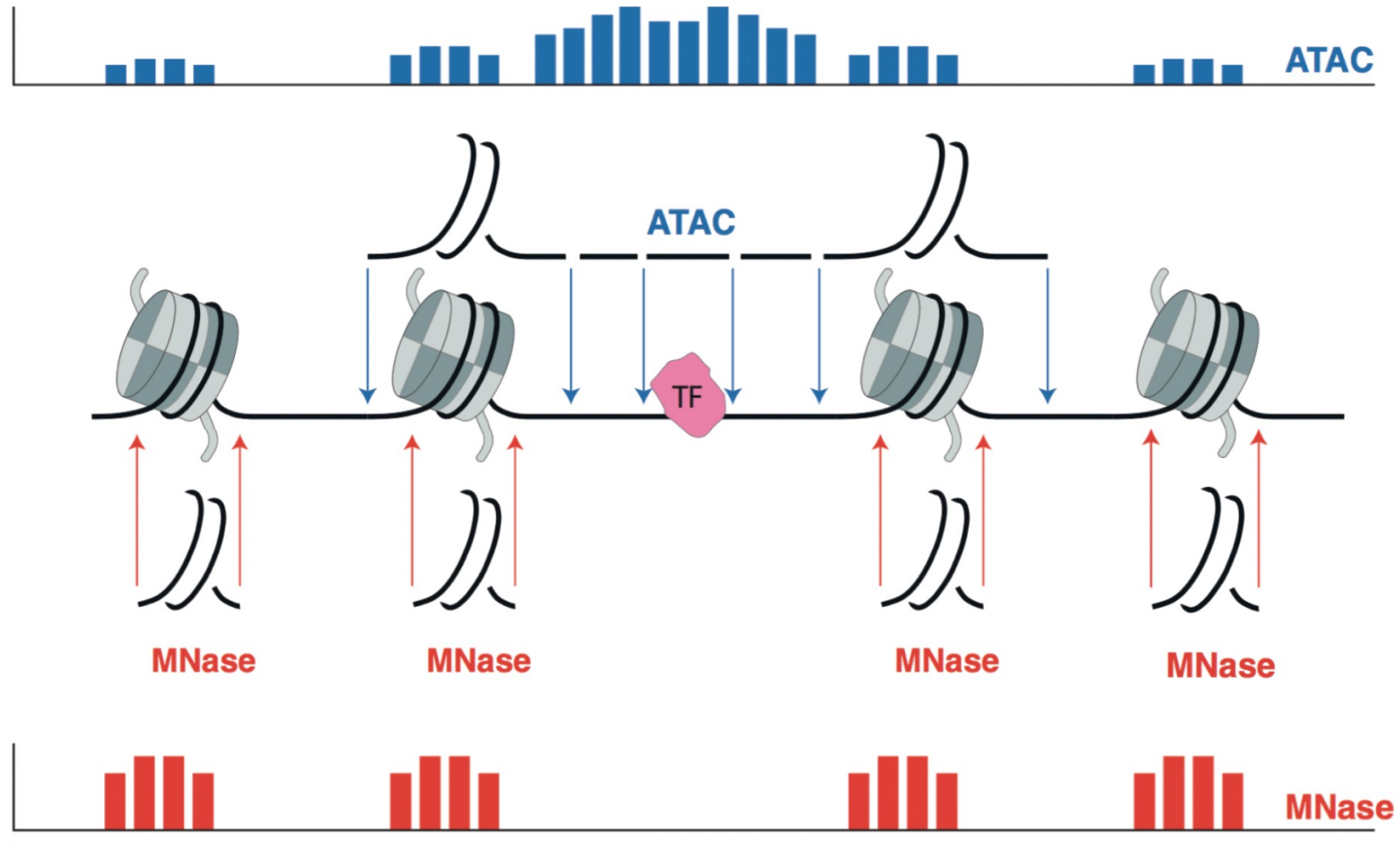
ChIP-seq vs. ATAC-seq vs MNase-seq



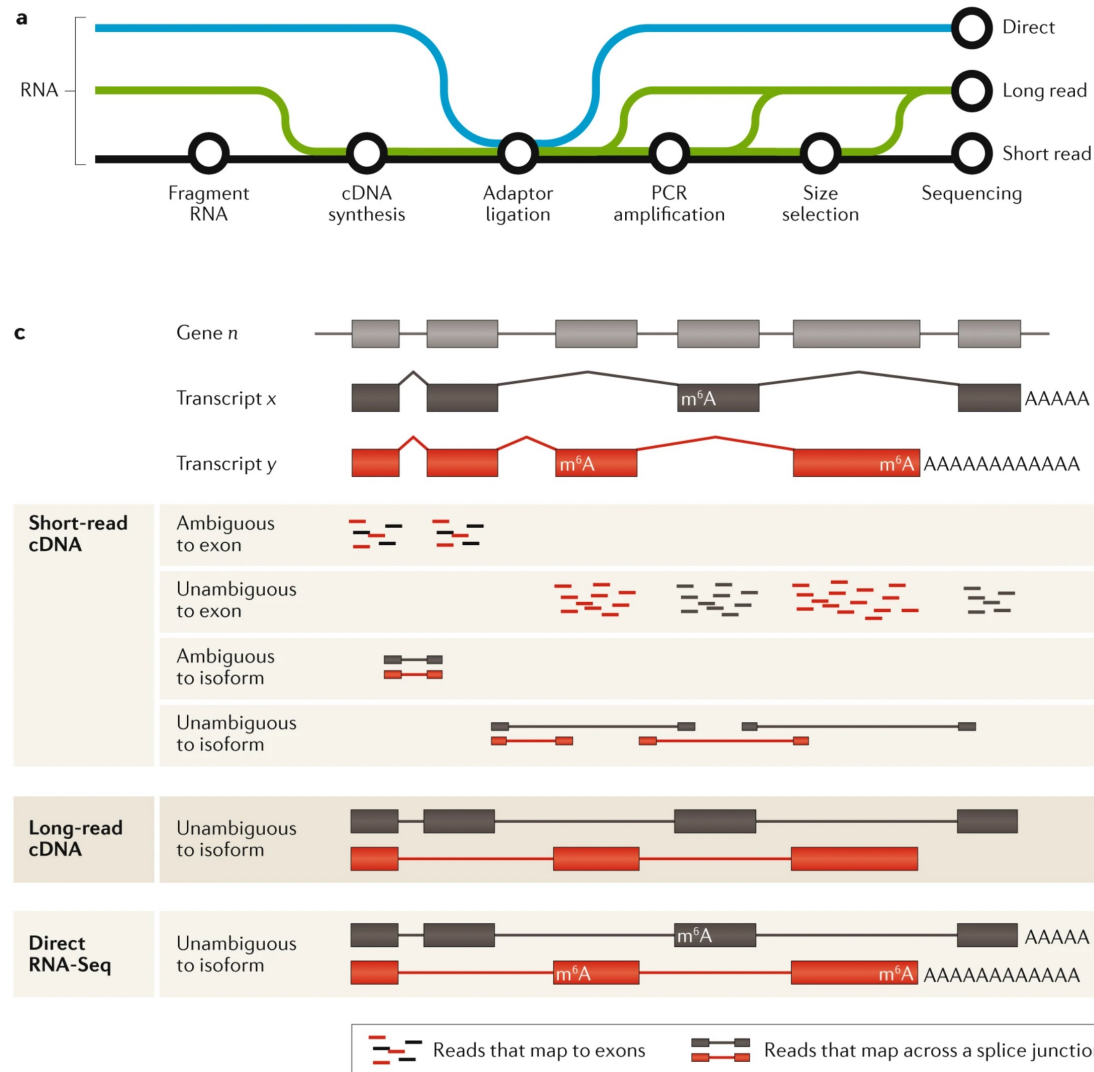
ATAC-seq vs MNase-seq



ATAC-seq vs MNase-seq

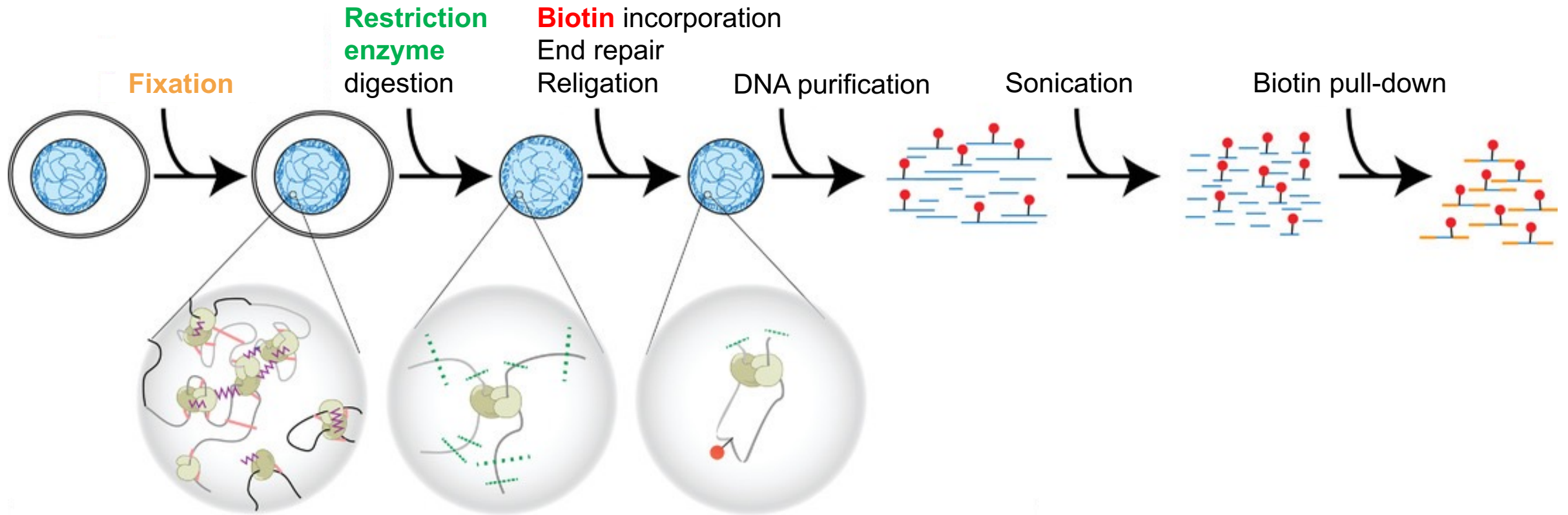


RNA-seq



Stark, Grzelak & Hadfield 2019

Hi-C



Lafontain et al., Current Protocols 2021