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title: Epigenetics: Hammering
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1 | Notes

1.0.1 | Genomes

- The Nucleus contains genes organized into two parts
  - Each part is called a genome
    - One is sourced from you mother and one from your father
  - Genomes are not the same
- Breaking up the genome into pieces those are called chromosomes
  - Humans have 23
  - Having two genomes makes us 2N
- Each chromosome has a bunch of genes that are divided up into three parts: the promoter (beginning), coding region (middle), and the terminator (end)
  - Each gene has enough information for a protein
  - Each genome has enough information to generate a human

1.0.2 | Epigenetics

- The epigenome is defined as the collection of DNA, RNA, proteins, and their chemical modifications (generally altering gene expression)
  - Epigenetic modifications are done by adding marks to the tails of histones
    - The addition of an acetyl group causes the tale to relax and release DNA
      - This increases transcription
    - Methyl groups can either increase or decrease that pattern of gene expression depending
      - putting this directly on DNA permanently shut it down
- When the envoirnment of a cell changes it creates epigenetic modifications
  - This is also very useful to cancers as more than half of known cancers contain mutations involved in regulation

DNA Packaging

- Packaging DNA starts with the assembly of a nucleosome via eight separate histone protein sub units attaching to the DNA
  - This creates a tight loop called the nucleosome
- Multiple nucleosomes are coiled together and stacked on top of eachother creating what is known as chromatin
  - These are then looped and further packaged
- These make tightly formed structures called chromosomes
- DNA is in usually a less organized form during division