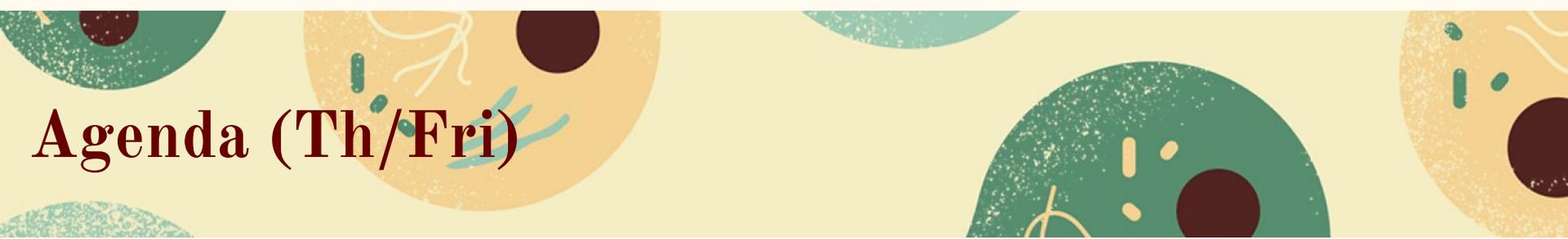


3.3 Cell Division

Unit 2: Cells, Energy and Life



Agenda (Th/Fri)

- Warm-up: Waterfall Question of the Day (1 participation point)
- Learning Goals (Copy them down in your journals)
- Review DNA
- Watch Henrietta Lacks video and introduce cell division
- DNA vs Chromosomes vs Chromatid vs Chromatin & Karyotype vocab chart
- Eukaryotic vs Prokaryotic cell review

How are cells made? Where do they come from?



Chapter Question and Learning Goals

Question: What is involved in the division of prokaryotic and eukaryotic cells?

Learning Goals:

1. I can explain the relevance of cell division in my daily life
2. I can relate the impact of scientific research on HeLa cells to current medical practices and explain why the use of HeLa cells is controversial
3. I can define, identify and differentiate between chromosomes, chromatids, chromatin and centromeres
4. I can differentiate between eukaryotic and prokaryotic cell division
5. I can distinguish between the stages of the cell cycle
6. I can distinguish between the events that take place in each step of mitosis
7. I can describe the characteristics of cancer cells
8. I can apply my knowledge of cell to understand how cells differentiate
9. I can analyze existing arguments and form opinions about stem cell research

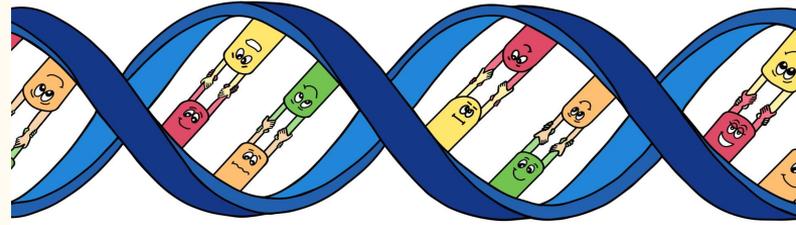
THE FIRST LINE OF IMMORTAL HUMAN CELLS

TEDEd

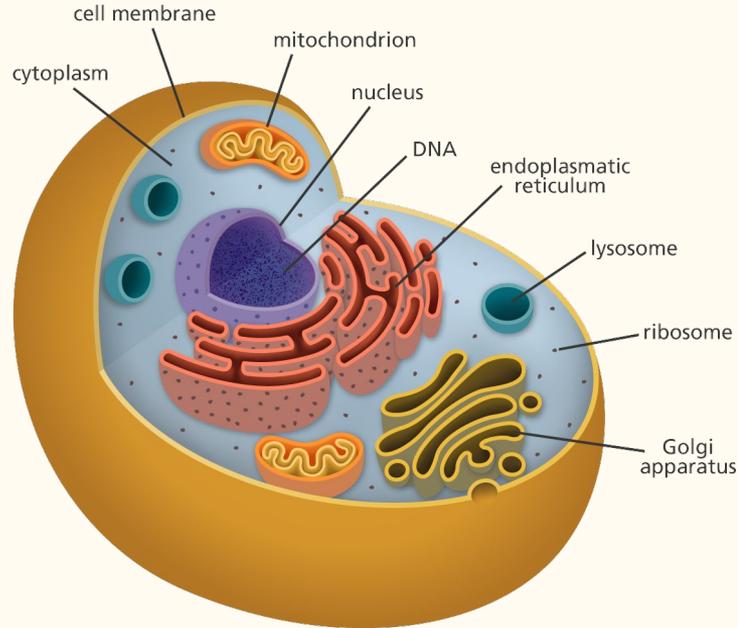


<https://www.nytimes.com/2013/08/08/science/after-decades-a-research-henrietta-lacks-family-is-asked-for-consent.html>

DNA Review



https://d20kh7dtkh5ls.cloudfront.net/dna_double_helix.jpg



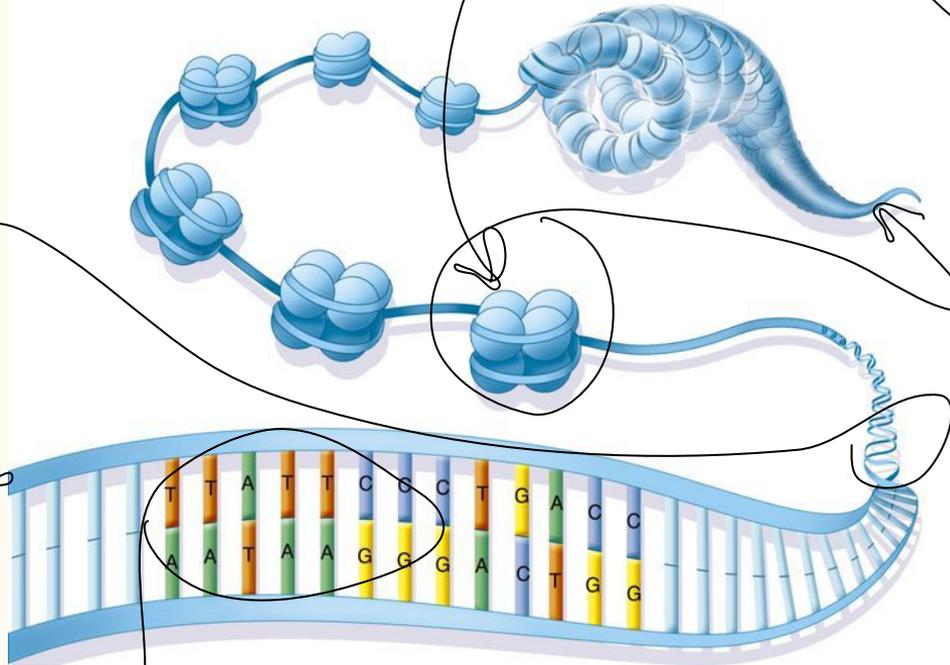
DNA is...

- genetic material
- found in every single cell
- located in the nucleus
- has the codes to create proteins
- Deoxyribonucleic acid

<https://i.pinimg.com/originals/77/7f/d8/777f80e3bc1484d96632926349254.png>

DNA → Chromatin

- DNA consists of two strands
- The **2** strands are wrapped in a **double helix**
- The strands are held together by **4 bases**



[https://www.thoughtco.com/thumb/vP7wafKktFchEie_2Wu393eUMAw=/768x0/filters:no_upscale\(\):max_bytes\(150000\):strip_icc\(\)/chromatin_unwinding-56c5e5a83d178e763fa64e53.jpg](https://www.thoughtco.com/thumb/vP7wafKktFchEie_2Wu393eUMAw=/768x0/filters:no_upscale():max_bytes(150000):strip_icc()/chromatin_unwinding-56c5e5a83d178e763fa64e53.jpg)

- DNA is tightly wound around **8 histone proteins**
- Each complex of 8 histone proteins and DNA is called a **nucleosome**
- Nucleosomes look like beads on a string
- These wind up even tighter to create **chromatin**

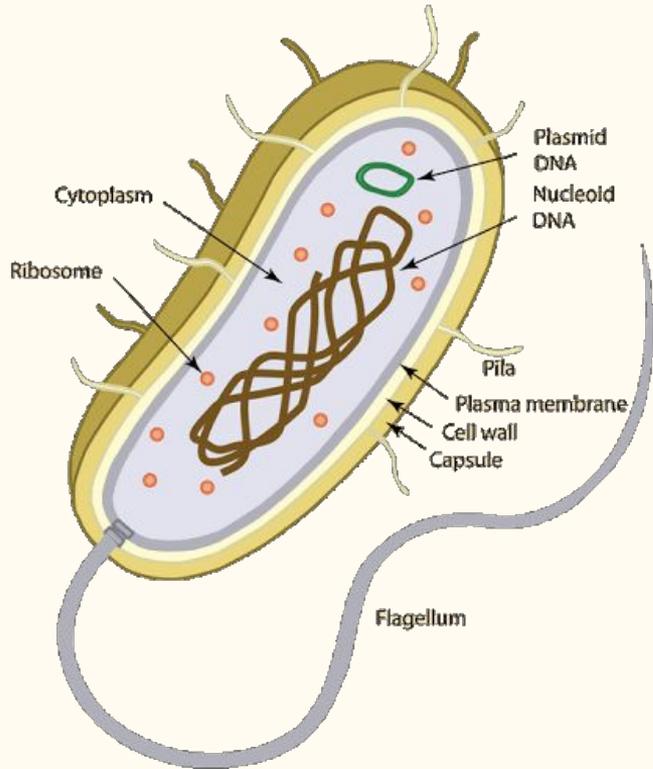
Dr. Marie Maynard Daly

- First Black American woman in the US to earn a Ph.D. in chemistry
- Determined the chemistry of histone proteins
- She had to uncoil the DNA and all of its components without destroying it
- Developed methods of fractionation to do so

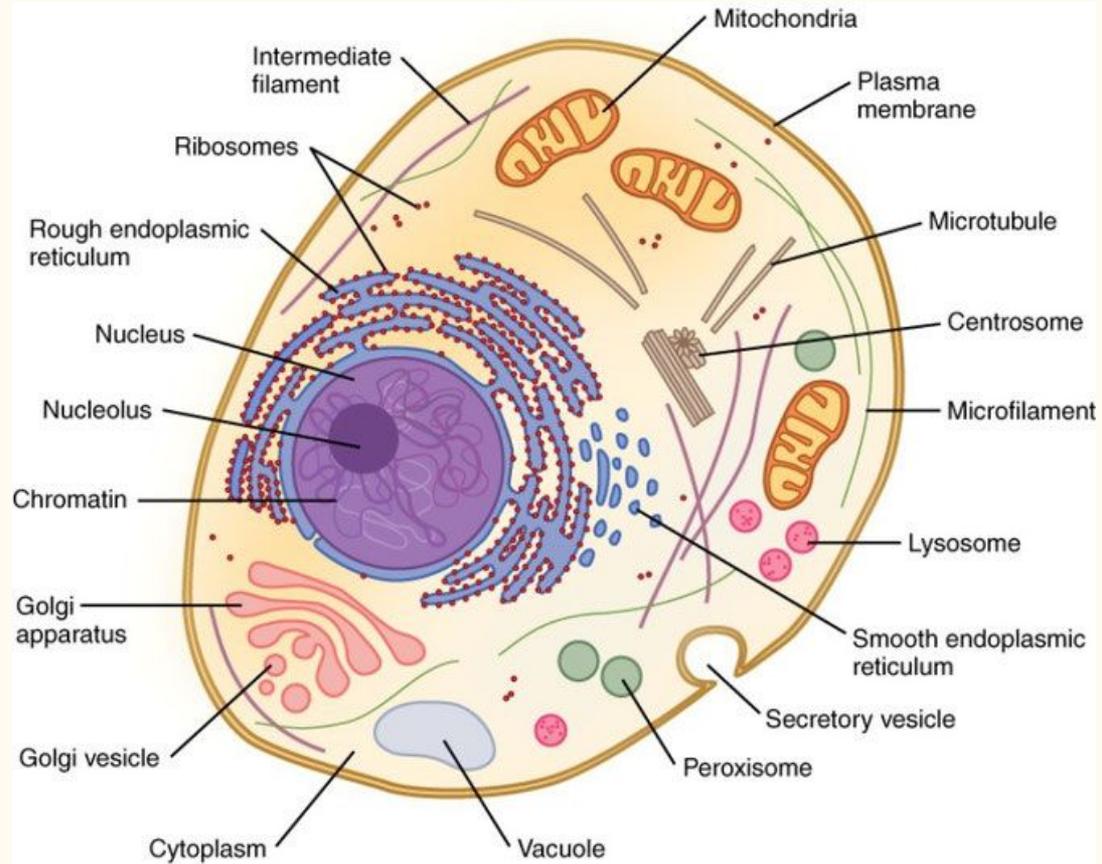


https://en.wikipedia.org/wiki/Marie_Maynard_Daly

Chromatin



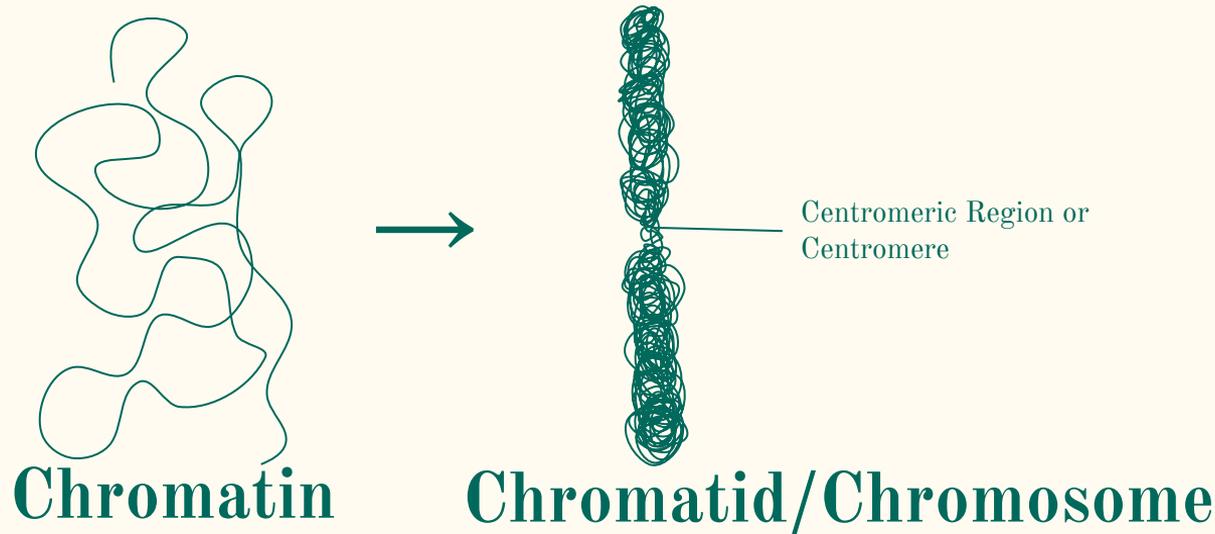
<http://hyperphysics.phy-astr.gsu.edu/hbase/Biology/prokar.html>



<https://image.jimcdn.com/app/cms/image/trans/dimension=670x10000:format=jpg:path/s79e2f60bf980ec19/image/iba744aa96c939c2c/version/1417044791/diagram-of-an-animal-cell.jpg>

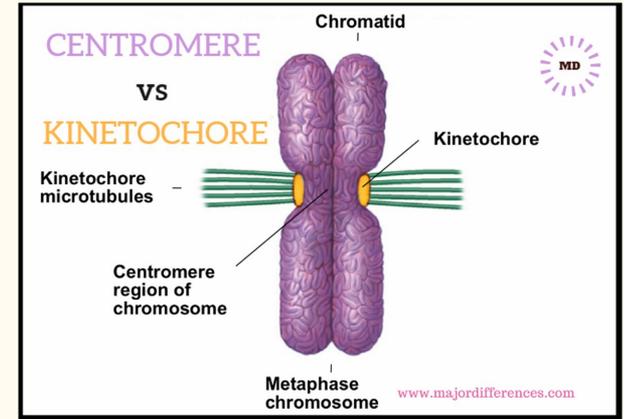
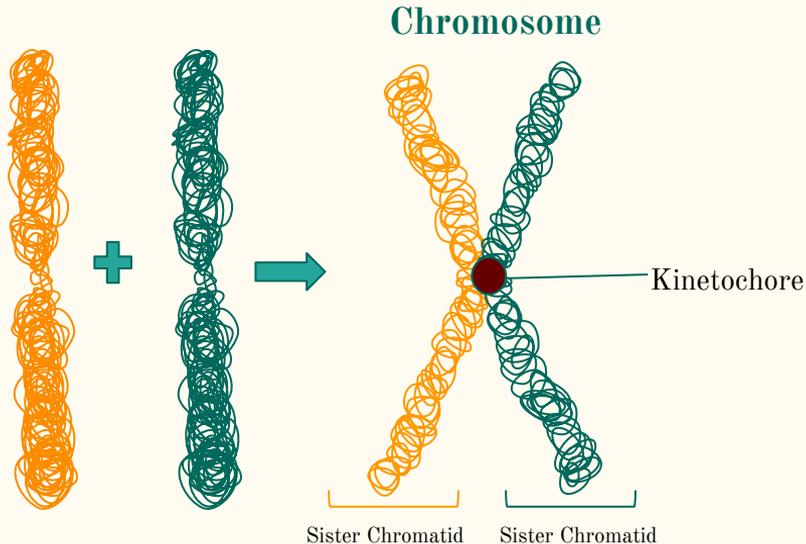
Chromatin → Chromatid

- Chromatin condenses itself further to create a **chromatid**
- Chromatid is a thick, condensed piece of DNA material
- The **Centromere** is the region where two chromatids will join



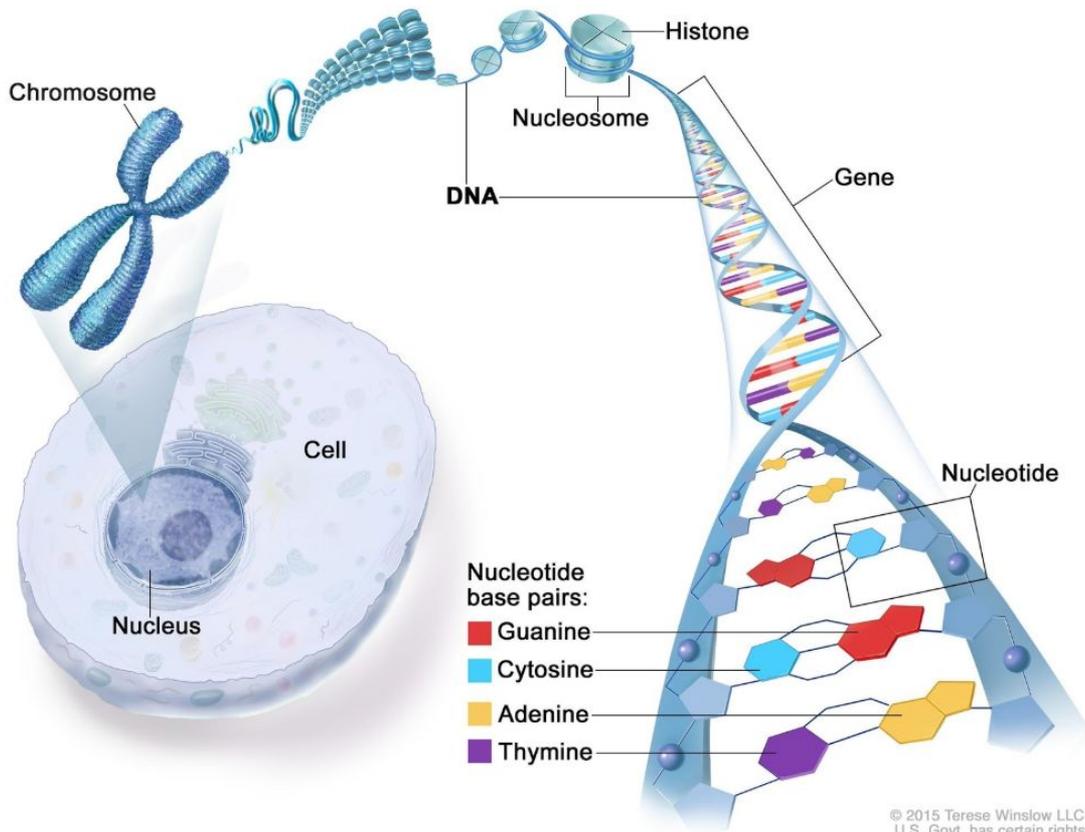
Chromatid/Sister Chromatids → Chromosome

- 2 chromatids make 1 **chromosome**
- 1 chromatid can also be called a chromosome
- Chromosomes are counted by the number of centromeres
- When two chromatids are part of a chromosome, they are each known as **sister chromatids**



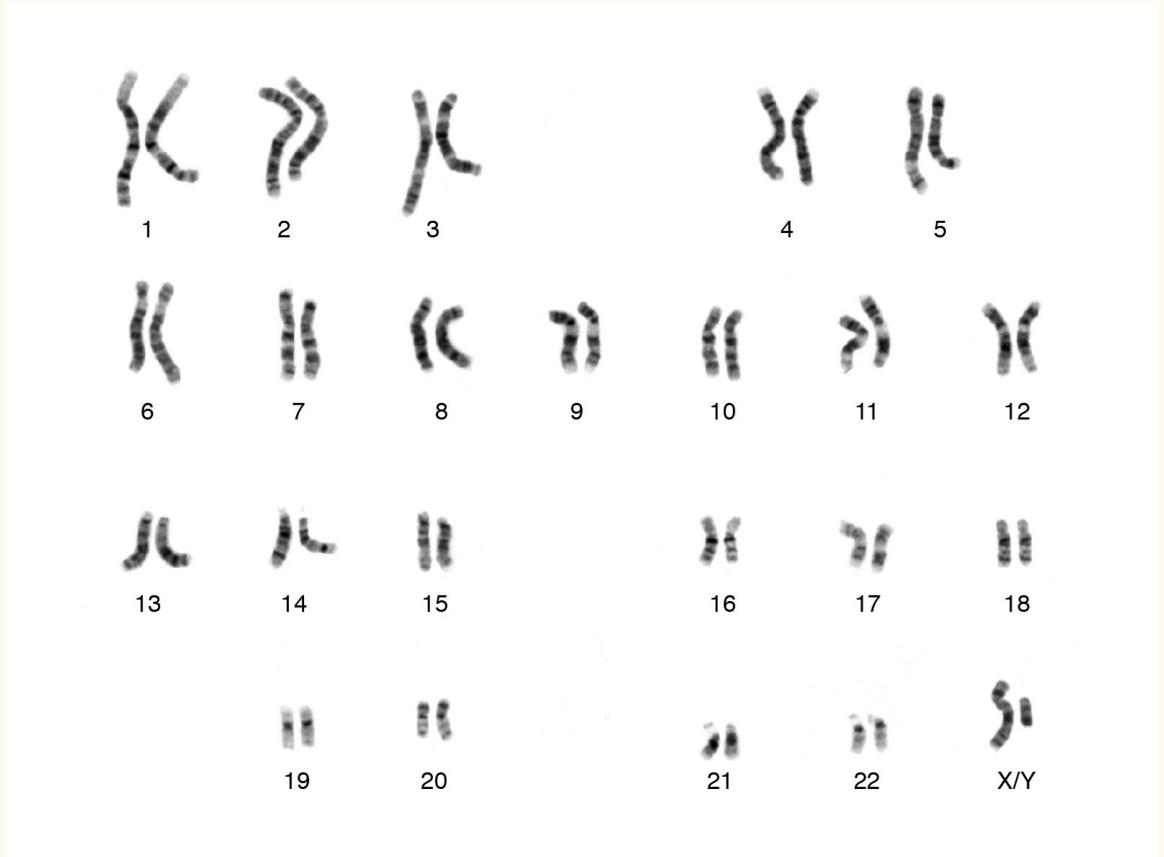
The **kinetochores** is a protein complex that joins at the centromeric region and holds the sister chromatids together

DNA Structure



Karyotype

- A karyotype is a visual representation of all the chromosomes within the nucleus of an organism's cell
- In humans, every cells contains 23 pairs of chromosomes



Eukaryotic Cells vs. Prokaryotic Cells REVIEW 3rd hour

Eukaryotic Cells



Prokaryotic Cells



Homework

- 5B. Turn in Learning Goals and Chapter Question on GC (in class)
- 5C. Turn in Vocab Chart on GC (in class)
 - DNA
 - Nucleosomes
 - Chromatin
 - Chromatid
 - Chromosome
 - Karyotype
- 5D. Read/take notes on DiscoveryED Engage pg.1 and watch Burn Victim video and Explore pg. 1 and 3. Submit to GC (>20 mins)