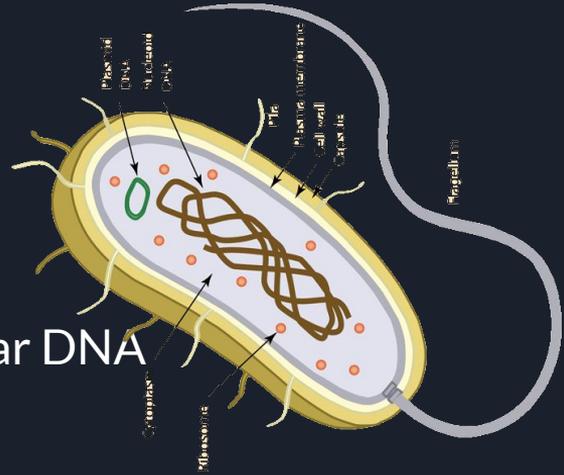




# 3.2 Chromosomes

Sakha, Kubari, Holmes

# Prokaryotes



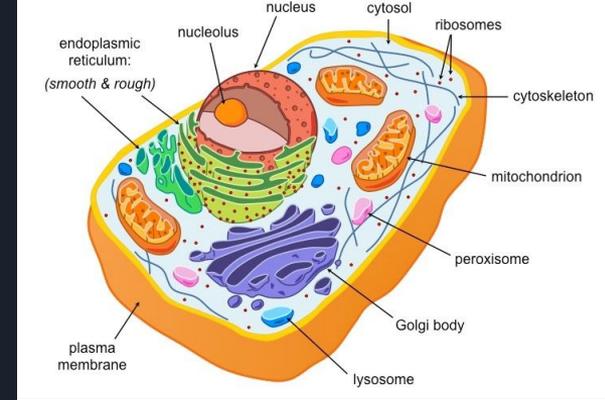
- Have one chromosome, consisting of a circular DNA

## Molecule

- Usually only a single copy of each gene, which is then replicated
- Plasmids- small DNA molecules w/ a few genes
- Aren't always replicated at same time
- Copies of plasmids can be transferred to another cell

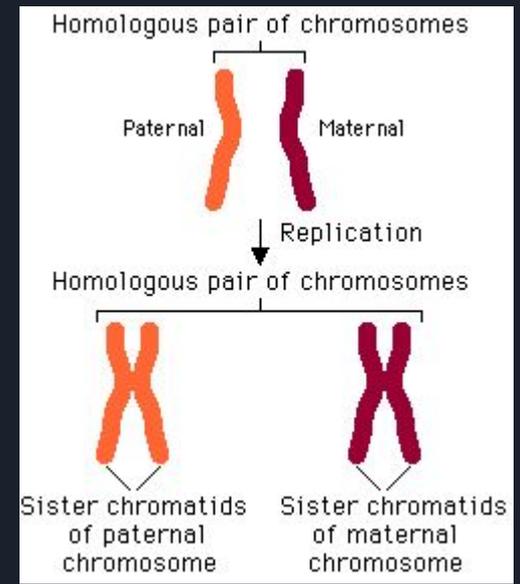
# Eukaryotes

- Chromosomes contain DNA & Protein
- Mitosis: chromosomes double. Different types can be seen
- At least 2 different types in every eukaryote (humans = 23)
- Locus of gene- each chromosome carries a specific sequence of genes (over 1,000's)
- Standard sequence- allows part of chromosomes to be swapped during meiosis



# Homologous Chromosomes

- When two chromosomes have the same sequence of genes
- Not usually identical, the alleles are different
- Two eukaryotes of same species -> chromosome will have at least one chromosome of the other.
- Allows interbreeding for members of a species.





# Chromosomes and Numbers

- Chromosomes carry genes in a linear sequence that is shared by members of a species
- The number of chromosomes is a characteristic feature of members of a particular species
- Organisms with different diploid numbers are unlikely to be able to interbreed (cannot form homologous pairs in zygotes)
- In cases where different species do interbreed, offspring are usually infertile (cannot form functional gametes)



# Sex Determination

- Human sex determination occurs according to the X - Y system
- Females have two copies of the larger X chromosome
- Males have one X and one Y chromosome (and hence determine gender in offspring)

## **Other Systems**

### **X - 0 System**

- Common in certain insects, including grasshoppers and cricket

### **Z-W system**

- Common in birds, some reptiles and certain insects

### **Haplo-diploid System**

- Common in certain insect species, such as ants and bees



# Related Chapter

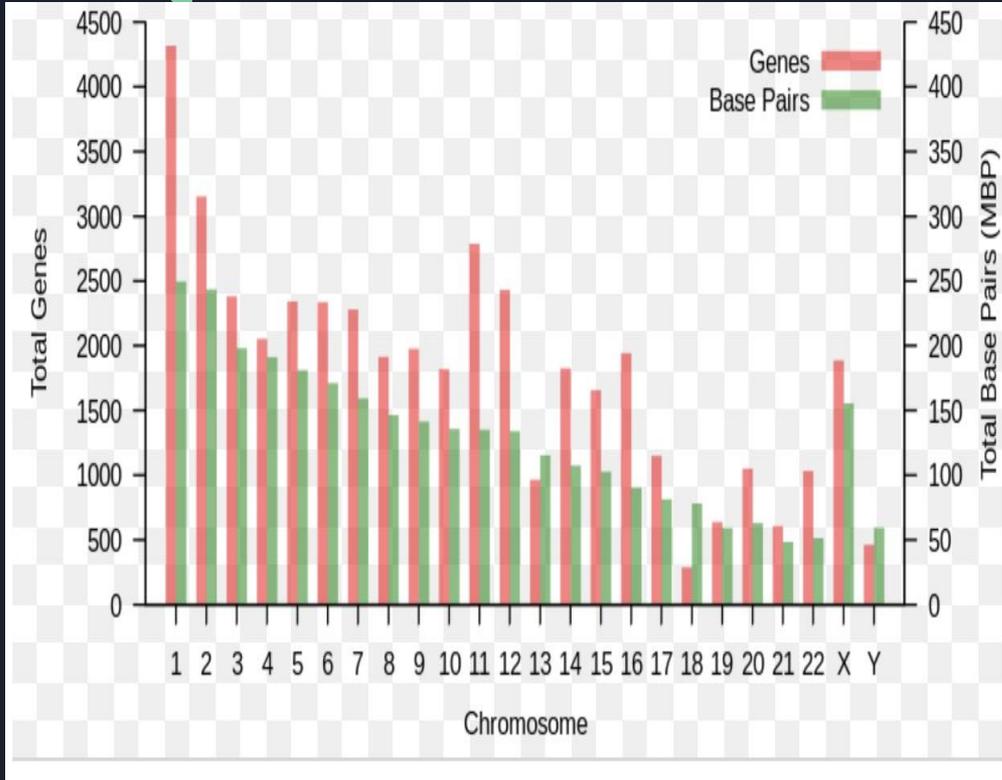
## Chapter 1.2-Ultrastructure of Cells

- Prokaryotes are not compartmentalized
- Eukaryotes are compartmentalized with organelles that perform specific jobs

## Chapter 5.1-Evolution

- Eukaryotes evolved from prokaryotes

# DBQ



The following is a chart of the estimated amount of human genes and base pair on each chromosome.

1. Explain, using evidence from the data, how some people fall susceptible to syndromes and disease.
2. Discuss why there is more genes and base pairs on the X sex chromosome and not the Y sex chromosome.
3. State the relationship between chromosomes genes and base pairs according to the graph.
  - a. Suggest a reason for this relationship.