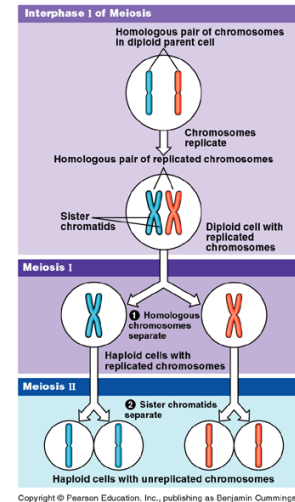
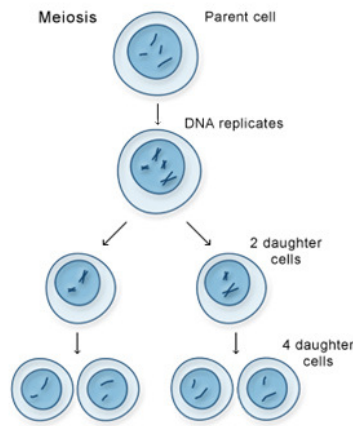
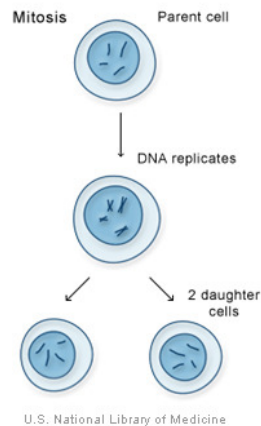


1. **Monohybrid inheritance**

- Inheritance involving only **1 pair** of contrasting traits

2. **Chromosome Structure**

- Rod like structures in the nucleus made up of **deoxyribonucleic acid (DNA)**
- Each chromosome carries many genes along its length.
- **Meiosis:** the division of 1 diploid cell to produce 4 haploid gametes



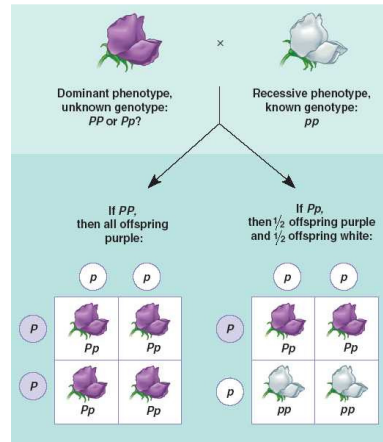
- Homologous chromosomes (called **chromatids**) exist in pair (1 from male and the other from female parent) which is similar in length in size (except for sex chromosome).
- **A gene** is a unit of inheritance which control specific function of body or for production of specific protein.
- **Alleles are different forms of a gene.** They occupy the same relative positions on a pair of homologous chromosomes (each of the 2 chromosomes carry similar genetics information but the alleles structure sequence might be different) and they affect the same heredity trait

3. **Genetics Modeling**

- Phenotype: is the trait which can be seen such as height, hair color etc.
- Genotype: is the genetic makeup or combination of genes.
  - **Homozygous** when the 2 alleles controlling the trait are the same (TT)
  - **Heterozygous** when the 2 alleles controlling the trait are different (Tt)
  - **Dominant allele** expresses itself and show the same phenotype in (TT) & (Tt) conditions.
  - **Recessive alleles** express itself ONLY in the (tt) condition.
  - **Co-dominance:** additive effect eg. Black + White=Grey

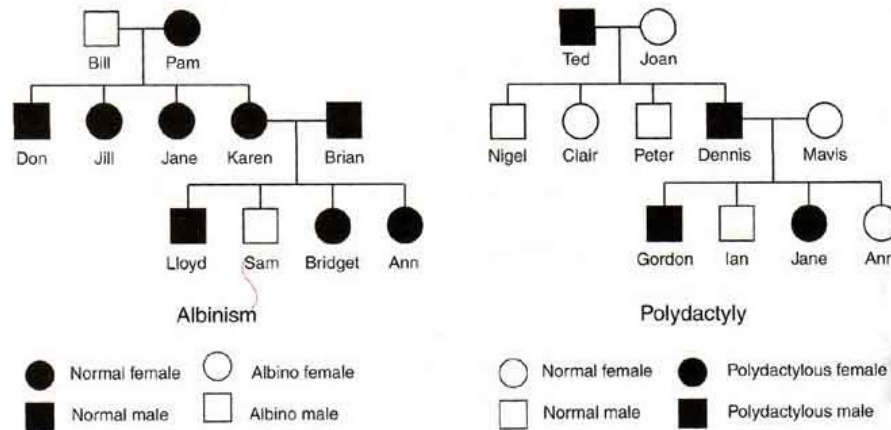
4. **Test Cross**

- To determine the genotype of an organism showing the dominant trait by crossing it with an organism that is homozygous recessive (tt)

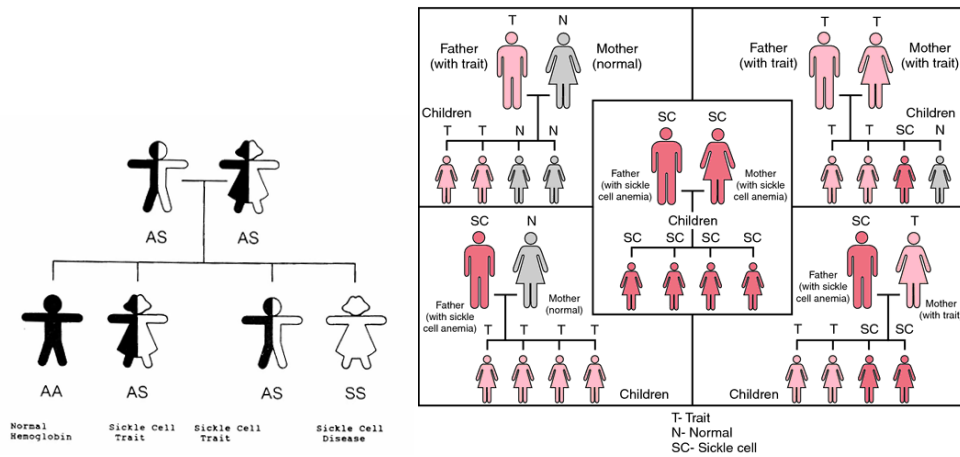


### 5. Gene mutation

- Mutations are the modification of genes occurs during cells division (both mitosis and meiosis process) which lead to diseases or cancerous cells.
- Mutagenic agents are agents which increases the rate of gene mutation. **Ultraviolet light, Alpha, Beta and Gamma radiation**, Chemicals such as **mustard gas, ferrous and manganese salts**.
- **Albinism**: caused by a recessive allele (tt) resulted in absence of pigments in skin, eyes, hairs. Albinos are very sensitive to sunlight.



- **Sickle-cells anemia**: caused by a recessive allele (tt) which affect production of normal haemoglobin, resulted in the red blood cells become sickle shape thus reducing the ability to carry oxygen. People with this disease die young.
- In area where **malaria is** prevalent such as in Africa, peoples with (Tt) have a small % of sickle-shaped red blood cells which make them more resistant to malaria than those with (TT) normal individuals. Thus (Tt) population increases since they do not fully contract sickle-cell anemia and malaria



**6. Chromosome mutation**

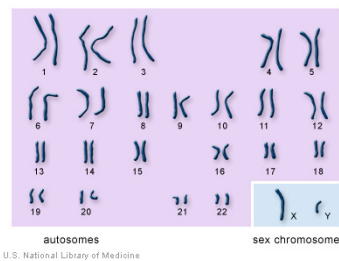
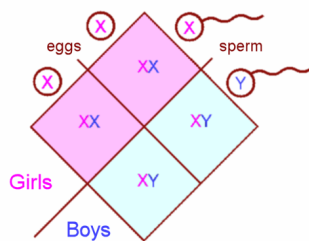
- Down’s syndrome: caused by **1 extra chromosome** (47 instead of 46 chromatids) in their body cells.
- High risk for old mother due to **chromosome #21** does not separate during gametes production.

**7. Continuous and discontinuous variation**

- Variations: are difference in traits between individuals of the same species
- **Discontinuous traits:** (a) easily distinguishable phenotype (b) affected by 1 or more genes but no additive effect and (c) not affected by environmental conditions (d) example: roll tongue, eye color, blood group, single & double eyelids
- **Continuous traits:** (a) a range of phenotypes (b) brought about by additive effect of many genes and (c) easily affected by environments conditions(d) example: skin color, body mass and height, intelligent (IQ) level

**8. Sex Chromosomes and Autosomes**

- **Y chromosome is dominant, X recessive**



**9. Important of Genetic Diversity**

- **Natural selection:** organisms with genetic variations that make them susceptible to diseases or environmental changes will die early while those with variations that help them adapt to environment or more resistant to diseases will survive.
- This elimination process ensures long term continuity of the species with stronger off springs.