

Class 2- Sept 13th Developmental Psychology: Genetic Basis of Child Development

- **Mechanisms of Heredity**

1. **Biology of Heredity**

- I. Each parent contributes 23 chromosomes.
- II. The first 22 are autosomes, and the 23rd are the sex chromosomes
- III. DNA is the main component of the chromosomes.
- IV. Rosalind Franklin: Took X-rays of atoms in order to understand their structure. She already hinted in 1950 that DNA was a double helix.
- V. DNA is made up of a phosphate, sugar, and nitrogenous base. These bases are adenine, guanine, thymine, and cytosine. A combines with T, and C with G.
- VI. Human genome project
- VII. Genotype and phenotype: how one becomes the other (behavioral and physical manifestation).

2. **Single Gene Inheritance**

- I. Allele: The same gene on a pair of chromosomes.
- II. Remember Mendel's pea experiment.
- III. HOMOZYGOUS alleles are the same, while HETEROZYGOUS alleles are different.
- IV. Heterozygous alleles will have a dominant and a recessive gene.

3. **Genetic Disorders**

- I. Sickle cell and cystic fibrosis are both recessive genetic disorders.
- II. Remember the working of the punnet square and the probability of a gene being expressed in different situations.
- III. The gene for Cystic Fibrosis is on chromosome 7.

- IV. Twin studies are ideal for studying this.
 - V. Too many/few chromosomes can also cause problems. Ex. Down syndrome, missing 21st chromosome.
 - VI. Trisomy: A third chromosome.
 - VII. Turner syndrome is a trisomy of the sex chromosomes (extra X). This causes mental retardation and physical deformity in males, and no physical expression in females although they may have learning disorders.
 - VIII. A number of disorders are caused by extra or missing sex chromosomes.
- **Heredity, Environment, and Development**
 1. **Behavioral Genetics**
 - I. Twin and adoption studies.
 - i. Monozygotic Twins (identical): there still may be some difference due to difference of blood flow in the uterus, even though genetically they are the same.
 - ii. Dizygotic Twins (fraternal): these twins have different genetic material.
 - II.
 2. **Paths from genes to behavior**
 - I. Reaction Range: The same genes can be expressed differently (different phenotype) based on environmental factors.
 - II. Heredity and environment interact dynamically throughout development
 - III. We sometimes look at catastrophic events to observe the behavior of offspring after the event.
 - IV. Epigenetics: a change in the genome that does not alter the DNA sequence
 - V. In the Netherlands there was a famine. It was later found the offspring of the malnourished mothers were more likely to have schizophrenia, obesity, heart disease etc.