

Unit 5: Mendelian Genetics

Content Outline: Abnormal Chromosome Number (5.6) “When Meiosis Goes Wrong”

- I. Chromosomal Errors than can occur:
 - A. These could occur *during Mitosis or Meiosis*.
 1. They would occur during the *Anaphase* Stages where *chromosomes are moving*.
 2. They could also occur during *Crossover* where *gene DNA segments are moving*.
 3. **Please make sure that student understand the difference between a gene mutation and a Chromosomal abnormality. This is a very important concept that tests love to ask questions on this comparison. Gene is associated with the *nucleotide sequence* (point and reading frame) where chromosomal are about *structure of chromosomes or numbers of chromosomes*.**
 - B. Two *types* of errors can occur:
 1. **Chromosomal Number (Aneuploidy)** means “*Abnormal number* of chromosomes” See Part II below)
 - a. This is the result of **non-disjunction**. (*Failure to separate* during Anaphase.) Can you “see” a possible definition in the term?
 - b. **Trisomic** (*Three of 1 kind* of chromosome.)
 - c. **Monosomic** (*Missing one*, the other half of the pair.) (It is located in the **Trisomic** gamete.)
 - d. **Please help students see the connection between the two terms. Students should understand that the chromosome just did not disappear as that would be against the 1st Law of Matter... Matter is neither created nor destroyed; just transformed or transferred.**
 - e. **Polyplody** (*Many extra sets* of chromosomes.)
 - i. 3n (triploid) Three “halfs” are in this cell.
 - ii. 4n (tetraploid) Four “halfs” are in this cell.
 - iii. *Deadly in most animals; Plants not really affected.*
 2. **Individual Chromosome Structure** (Please help students “see” the terms as well as the relationship between them in one exists.)
 - a. These occur because of *faulty crossover*.
 - b. **Deletion** – Chromosome segment is “*missing*”. It got *stuck on the other* homologous chromosome during crossover.
 - c. **Duplication** – A chromosome segment was “*copied*” twice. (Two genes on one chromosome. It is “*missing*” from the other homologous chromosome.)
 - d. **Inversion** – A chromosomal segment is “*backwards*”. It was inverted backwards during crossover.
 - e. **Translocation** – A chromosomal segment is *attached to a different autosome*. It *accidentally* broke loose and ended up on another chromosome.

II. Syndrome

- A. This term refers to an organism “*possessing*” the *identifying traits* of a particular *genetic disorder*.
- B. Human Genetic Disorders due to two abnormal chromosomal number (#) or structure:
 1. **Down’s Syndrome (#)**
 - a. This affects about 1 in 700 births.
 - b. This individuals possess an *Extra 21 Autosome* (A.K.A. **Trisomy 21**)
 - c. General syndrome features (**Please show a facial picture and discuss the characteristics.**)
 - d. Mainly the result of women of advanced age having babies.
 2. Turners Syndrome (XO) (#)
 - a. General characteristics: These individuals appear fairly normal. They just are lacking the “sexual” characteristics we normally see in individuals. The “sexual” traits are missing because there is no second sex chromosome to help create those traits. These individuals are usually raised as females.

Remember, there are no cures for all of these disorders; only treatments because the problem is genetic!