

14.19 PEOPLE OF SCIENCE

William Bateson (1861-1926) was a British geneticist. Dr. Bateson researched plant genetics and also was one of the scientists (along with Dr. de Vries) who “re-discovered” work done years earlier by Gregor Mendel. Dr. Bateson made many contributions to genetics, including founding the *Journal of Genetics*. He was also the first person to use the word “genetics” as it related to the study of chromosomes and heredity.

14.20 KEY CHAPTER POINTS

- Sometimes mutations arise in the DNA and genes during meiosis or mitosis. Mutations are changes in the normal sequence of DNA.
- Normal genotype variances arise through the process of independent assortment and crossing over during meiosis.
- Abnormal genetic variances occur due to mutation.
- Mutations are almost always fatal or, at best, **neutral** to the organism that inherits the mutated gene(s).
- It is estimated that 1% of an organism’s DNA sequences are actual genes. The remainder of the DNA codes for RNA, ribosomes, tandem repeats, and pseudogenes.
- Point mutations result in a change of only one nucleotide in DNA. There are three types of point mutations: addition, deletion, and substitution.
- Addition and deletion mutations cause frame-shift mutations.
- Missense mutations are point mutations which result in the insertion of the wrong amino acid into the protein for which the gene codes.
- Nonsense mutations are point mutations which result in the insertion of a stop codon into the gene. This leads to premature termination of protein translation.
- Chromosomal mutations occur when there are large segments of chromosomal material gained or lost by a chromosome. The types of chromosomal mutations are: crossing over, deletion, inversion, duplication, translocation, and nondisjunction.
- Mutagens are things which are known to cause genetic mutations.

14.21 DEFINITIONS

addition

A single nucleotide is added into the DNA sequence during replication.

albinism

A type of mutation that makes an animal unable to produce pigments of the skin, hair, and eyes.

albinos

Individuals who have albinism.

chromosomal mutations

Mutations which can occur involving larger segments of the DNA and, often, cause changes in thousands or millions of nucleotide sequences of DNA.

deletion mutation

When an entire segment of the chromosome is duplicated, added, or deleted from the chromosome during DNA replication.

deletion

A nucleotide is left out of its proper sequence in the DNA during replication.

down’s syndrome

DNA mutation caused by nondisjunction of chromosome 21 during meiosis I.