

Biological Disorders

by Sophia Tutorial



WHAT'S COVERED

In this lesson, we'll discuss how our understanding of biological and genetic developments can influence the study of biological disorders.

The specific areas of focus include:

1. Genetic Disorders
 - a. Gene Level
 - b. Chromosomal Level
2. Congenital Problems
 - a. Teratogen

1. Genetic Disorders

Genetic or biological disorders can start even before a person is born. **Agenetic disorder** is a biological issue that is passed on from parent to offspring. In other words, this type of disorder is inherited because it can be caused by a person's genes.

A person's genetic history thus can be used to determine whether or not that individual is more likely to have a certain genetic disorder. Genetic disorders can occur on two different levels:

- Gene level
- Chromosomal level



TERM TO KNOW

Genetic Disorders

Conditions caused by defects in the genes or chromosomes; may be inherited from parents and passed down through genetic transmission

1a. Gene Level

A genetic disorder at the gene level is called a "mutation," which is a single or maybe several changes within a person's DNA that in turn lead to changes in aspects like appearance or behavior.

1b. Chromosomal Level

Disorders at the chromosomal level are considered larger chromosomal problems in which chromosomes are either missing or divided unevenly.

➦ **EXAMPLE** Down Syndrome, or “Trisomy 21,” is a disorder in which a person has three of the 21st chromosomes instead of the two that he or she should normally have. This results in certain recognizable physical characteristics, such as a rounder face or slanted eyes, as well as cognitive impairment, which may vary over time but can result in different types of learning deficiencies.

➦ **EXAMPLE** There can also be defects in the sex chromosomes as well. This mainly occurs in the X-chromosome, which results in Turner Syndrome or Klinefelter Syndrome.

2. Congenital Problems

There can also be problems that occur before birth, leading to either biological or genetic disorders. These issues are not inherited in the same way as genetic disorders.

Disorders that originate in the womb are called **congenital problems**, and are often due to environmental factors that are introduced at that time.

Though the factors are environmental, they can have long-lasting genetic or biological effects because the prenatal time--the time when the child is in the womb--is a sensitive period. Thus, there is an increased susceptibility to environmental influences that can affect a person's development.



TERM TO KNOW

Congenital Problems

Conditions existing at birth, often originating during prenatal development, may be due to the prenatal environment, genetic or chromosomal abnormality

2a. Teratogen

A **teratogen** is any environmental factor that affects a person during prenatal development in the womb, and can lead to birth defects. Radiation or chemicals in the environment, such as fertilizers or pesticides, are common teratogens. However, the number one type of teratogen to cause birth defects is drugs like alcohol, tobacco, and marijuana.

➦ **EXAMPLE** One disorder caused by a teratogen is fetal alcohol syndrome, which occurs as a result of heavy and repeated drinking of alcohol while a child is still in the womb. The effects of this are low birth weight, a smaller head (also meaning a smaller brain being developed), body defects, and mental or behavioral retardation.



TERM TO KNOW

Teratogen

Substances that may cause birth defects; drugs and alcohol are the most common, but other teratogens include some maternal hormones, mercury, lead, and German Measles



SUMMARY

In this lesson, you learned that **genetic disorders** are biological disorders passed on from parent to offspring. Genetic disorders can occur at either the **gene level**, also called a "mutation," or the **chromosomal level**.

Congenital problems, on the other hand, are not genetic but are caused by environmental factors instead. **Teratogens**, such as alcohol and drugs, are one of the causes of disorders that occur from external influences.

Good luck!

Source: Adapted from Sophia tutorial by Erick Taggart.



TERMS TO KNOW

Congenital Problems

Condition existing at birth, often originating during prenatal development; may be due to prenatal environment, genetic or chromosomal abnormality.

Genetic Disorders

Conditions caused by defects in the genes or chromosomes; may be inherited from parents and passed down through genetic transmission.

Teratogen

Substances that may cause birth defects; drugs and alcohol are the most common but other teratogens include some maternal hormones, mercury, lead and German Measles.