ACQUIRED & INHERITED MUTATIONS

A mutation is a permanent alteration in the sequence of DNA (symbolized as a small letter [c] in the above diagram) which may have no effect on the organism, have a chemical effect, or can lead to a beneficial effect that increases the organism’s rate of survival and thus the likelihood that the mutation will be passed along to its offspring. A mutation can be induced by exposure to radiation, x-rays, ultraviolet rays from the sun, or chemicals in food, water, or at that damage DNA. It may also occur randomly due to a mistake during cell division, when a cell makes a copy of its own DNA. Although cellular repair mechanisms and the body’s immune system can often fix or eliminate mutated cells, mutations can sometimes accumulate, and, over time, a cancer may develop. This type of mutation is referred to as acquired, or somatic; the effects of acquired mutations cannot be passed on to the next generation. If a mutation occurs in one of the body’s reproductive cells (sperm or eggs) and their immediate precursor—a cell just before it divides to form two identical daughter cells—the mutation will be passed along to its offspring. A mutation can have a positive effect that increases the organism’s chance of survival and reproduction. If a mutated organism survives, that organism’s offspring will carry the mutation and may also benefit.

CERTAIN TYPES OF MUTATIONS CAUSE GENETIC DISORDERS

Genetic disorders can be caused by an inherited or acquired mutation in a gene. A genetic disease is a disease that is caused by a mutation in a gene; specifically, it is a condition in which the disease exists in all the cells of the parent’s body—it may be inherited by the child.

GENES, MUTATIONS, AND DISEASES

How do mutations cause a disease?

1. Acquired mutations are caused by changes in DNA. These changes can be caused by inherited or acquired mutations in a gene. A genetic disease is caused by a mutation in a gene that is passed on from one generation to the next. A mutation is a permanent alteration in the sequence of DNA that may have no effect on the organism, cause a chemical effect, or cause a beneficial effect that increases the organism’s rate of survival and reproduction. If a mutated organism survives, that organism’s offspring will carry the mutation and may also benefit.

2. Inherited mutations are caused by changes in DNA. These changes can be caused by inherited or acquired mutations in a gene. A genetic disease is caused by a mutation in a gene that is passed on from one generation to the next. A mutation is a permanent alteration in the sequence of DNA that may have no effect on the organism, cause a chemical effect, or cause a beneficial effect that increases the organism’s rate of survival and reproduction. If a mutated organism survives, that organism’s offspring will carry the mutation and may also benefit.

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