

Topic Page: [Heredity](#)

Definition: **heredity** from *Philip's Encyclopedia*

Transmission of characteristics from one generation of plants or animals to another. Characteristics, such as red hair, may be specific to individuals within a group; others, such as the possession of external ears, may be typical of a group as a whole. The combination of characteristics that makes up an organism and makes it different from others is set out in the organism's genetic code, passed on from its parents. Austrian naturalist Gregor Mendel conducted the first studies of heredity.

Summary Article: **heredity**

From *The Columbia Encyclopedia*

transmission from generation to generation through the process of reproduction in plants and animals of factors which cause the offspring to resemble their parents. That like begets like has been a maxim since ancient times. Although the fact of heredity has been generally known for centuries, the actual mechanisms by which inherited characteristics are transmitted to successive generations could not be satisfactorily explained until powerful enough microscopes and sufficiently refined research techniques disclosed the true nature of the universal reproductive processes of cell division and those, in “higher” animals, in which the sperm and the ovum, containing the hereditary material (see chromosome) in their cell nuclei, unite to give rise to the new individual. Thus the science of heredity developed long after practical observations of breeding and of parent-child resemblance had been noted and also after the theory of evolution had been established. In the 18th cent. the popular concept of heredity was the theory of preformation: that the prototypical members of each organism (e.g., Adam and Eve among humans) contained within them all future generations, perfectly formed but in miniature, arranged one inside the next like a series of Chinese boxes. In the early 19th cent. Lamarck developed a theory of evolution in which the then current belief in the inheritance of acquired characteristics served as an explanation of its mechanism. The theory of pangenesis, as it was termed in a modified version in Darwinism, was strongly reminiscent of the ideas of Hippocrates and Aristotle. It hypothesized tiny particles called pangens, or gemmules—each bearing the hereditary potential for a specific body part—which circulated in the body and eventually collected in the reproductive cells. Finally, in 1875, Oscar Hertwig's principle of the universality of fertilization in sexual reproduction confirmed the transmission of hereditary material through the two sex cells. August Weismann's theory of germ plasm continuity (1892) established that the germ (sex) cells are set apart from other body cells early in embryonic development and thus that only changes in the germ plasm, and not influences on the adult body, can affect the characteristics of future generations. In 1900 the neglected work of Gregor Mendel was rediscovered and the first scientific laws for the mechanisms of heredity were presented. These, correlating with the microscopic and experimental observations of the behavior of chromosomes and reproductive cells and later with the biochemical analyses of genes and their products, provided the basis for modern studies. Genetics is the modern science that studies the mechanisms for the transmission of hereditary information in the resulting organism. Mutation is a mechanism for evolutionary change, initiating new variations.

See Jacob, F. , *The Logic of Life* (1974);

Bennett, J. H. , *Natural Selection, Heredity, and Eugenics* (1983);

Winterton, B. W. , *The Process of Heredity* (1983).

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