

In short, geneticists have learned how to manipulate genes more or less at will. This artful manipulation has allowed researchers to study genetic phenomena in great detail. It deals with transfer genes from one organism to another.

In addition, advances within molecular genetics have shed considerable light on the areas of transmission and population genetics. It has spawned a variety of modern molecular technologies and computer-based approaches. Furthermore, discoveries within molecular genetics have had widespread applications in agriculture, medicine, and biotechnology.

The following are some general concepts focused within the field of molecular genetics:

- Molecular structures of DNA and RNA
- Composition and conformation of chromosomes
- Process of genetic material duplication
- Mechanism genes expression and regulation under the appropriate conditions
- Cloning and Sequencing
- Gene manipulation

POPULATION GENETICS

Population genetics is the branch of genetics that studies the genetic makeup of groups of individuals and how a group's genetic composition changes with time. Geneticists seek to document the variability and to understand its significance. The most basic approach is to determine the frequencies of specific alleles in a population and then to ascertain if these frequencies change over time. If they do, the population is evolving. The assessment of genetic variability in a population is therefore a foundation for the study of biological evolution. It is also useful in the effort to understand the inheritance of complex traits, such as body size or disease susceptibility. Often complex traits are of considerable interest because they have an agricultural or a medical significance.

The foundations of population genetics arose during the first few decades of the twentieth century. Although many scientists of this era did not accept the findings of Mendel or Darwin, the theories of population genetics provided a compelling way to connect the two viewpoints.