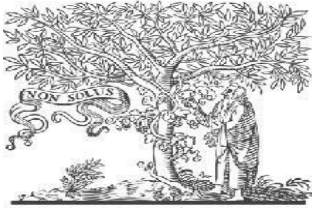


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TYPES AND FUNCTIONS OF GENETICS

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The science of genetics discovers the laws of heredity, heredity, and variability that are unique to all living organisms. The study of these laws is his subject. Heredity is the ability of a living organism to pass on its traits and characteristics to future generations, that is, from generation to generation. Heredity ensures the stability of generations of organisms. Heredity is a major causative factor of mutual and intergenerational similarity of organisms. At the same time, heredity ensures that differences in the traits and characteristics of organisms belonging to different species are preserved for generations. Thus, heredity underlies the distribution of organisms into systematic groups such as species, genus, and family, depending on the degree of mutual similarity and kinship. Because of the heredity, the stability and similarity of the organisms in these systematic groups are preserved. Ensuring that the traits of an organism are passed down through the generations is a one-way activity of heredity.

Its activity in the second direction is to determine the ontogenesis of organisms in a certain stable order, the sequence of phases and phases in them, the nature of their metabolism. In addition to the stability of heredity, another feature of it is the existence of variability. Variability is the property of a living organism to produce signs and characteristics that change under the influence of external and internal factors. Due to variability, organisms differ from their ancestors as well as from each other in character and characteristics. As a result, they show diversity (polymorphism). Heredity and variability are opposing but interrelated properties of a living organism. The science of genetics has proven that there is a genetic unit called a gene that allows the traits and characteristics of organisms to be passed down from generation to generation. The gene is derived from the Greek word "genos" which means generation, origin. Genes in the body are passed on to future generations through sperm and egg cells during sexual reproduction. In asexual and vegetative reproduction, genes are passed on to

subsequent generations through spores or body cells. The sum of all the genes in an organism is called the genotype. Genotype - gene and Greek typos - trace, mark. The set of traits, properties, and characteristics that are formed in the individual development of organisms is called a phenotype. The phenotype - Greek phaino - is made up of the words show and type. The terms "gene", "genotype", "phenotype" were introduced to science in 1909 by the Danish scientist W. Johansen. According to the evidence of molecular genetics, a gene is a specific part of a DNA molecule that enables the synthesis of a protein of a certain quality. A protein that is a product of gene activity, on the other hand, promotes the development of a particular trait or participates in its development along with other proteins. Most genes are located in the DNA molecule that makes up chromosomes. Inheritance through the activity of genes located on chromosomes is called chromosomal inheritance or nuclear inheritance. A relatively small number of genes are located in plastids, mitochondria, and other elements not related to

chromosomes located in the cytoplasm of the cell. This is called heredity - cytoplasmic inheritance, which is carried out by the activity of 5 genes in organoids. When studying heredity, which is one of the most important characteristics of organisms, it is necessary to distinguish between the following two concepts - heredity and heredity. Heredity is a property, and heredity is a process. At the same time, it is necessary to distinguish the laws of heredity from the laws of heredity. As a result of genetic research, the laws of heredity and the laws of heredity arising from them are discovered. As a result of Mendel's research, three laws of the transmission of traits, traits, and characteristics of an organism from generation to generation, that is, heredity, were discovered. Heredity is the transmission of genetic information from one generation of organisms to the next. This process is the transmission of genes through genetic cells to future generations - the genetic unit that ensures the development of parental traits and characteristics. The process of inheritance takes place through the following two stages:

1. The transfer of genes to subsequent generations;
2. The functioning of parental genes in the next generation of organisms to ensure the development of traits and characteristics.

Underlying the laws of heredity is a molecular genetical mechanism. The transfer of genes to future generations is accomplished through the following processes:

- a) The multiplication of DNA and genes due to the replication of the DNA molecule;
- b) The transfer of parental DNA and genes to the germ cells in a two-fold decrease;

c) In the zygote formed by the addition of gametes, the paternal and maternal DNA and the genes in them accumulate, and their number doubles to become specific to the type of organism.

Synthesized protein molecules, i.e., the product of gene activity, interact to ensure that parental traits develop in a new generation under certain external conditions. It should also be noted that the term "heredity" is used more broadly in the genetic literature. This term includes the terms heredity and heredity, used in the narrow sense mentioned above. With this in mind, the following more complete definition of heredity can be given. Heredity is the ability of an organism to pass on its genetic similarity from generation to generation in terms of body structure and function, as well as in terms of the order of ontogenetic development under certain conditions. Under the influence of strong physical and chemical factors, the genetic unit that provides the stability of heredity - genes - can change radically. The result is a new genetic variation - a mutation. In addition, changes in gene combinations in hybrids also result in genetic variability. Thus, heredity preserves not only the intergenerational similarity of organisms, but also the differences created by variability. Environmental factors also affect the level of phenotypic development of an organism's genotype. Cytogenetics is a science that uses the method of hybrid genetic analysis in a complex way with the cytological method. 10 Mutational genetics is the study of the laws of mutational (genetic) change in the genotype of organisms. Ecological genetics is the study of the influence of environmental factors on the development of an organism's genotype as a phenotype. It creates ways to solve the problem of protecting their gene pool from the negative effects of the extreme factor.

Population genetics is the study of the qualitative and quantitative composition of a population's gene pool, the distribution of genes and genotypes in a population, and the laws of distribution. Medical genetics is the development of the genetic basis of methods for diagnosing and treating the causes of hereditary diseases in humans. Molecular genetics is the study of the structure and function of genes, which are the material basis of heredity and variability. Genetic Engineering - Conducts practical research on genetic and chromosomal engineering based on the theoretical advances of molecular genetics. Transgenic plants are involved in the creation of animal forms, the creation of new forms by transplanting certain chromosomes or a portion of its beneficial gene. Biotechnology - develops and implements methods and technologies for obtaining physiologically active substances, recombinant proteins, substances used as drugs with the help of organisms with a new genotype obtained by the method of genetic engineering.

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