Alleles

The genes of the nuclear chromosomes of diploid cells **occur in pairs** in the organism. Thus, each trait is controlled by a pair of genes. **The exception** is the gonosome of a man, i.e. a pair of X and Y chromosomes, where only short pseudoautosomal regions of the X and Y chromosomes contain functionally identical genes. Most of the genes located on this pair of chromosomes are unpaired. The term gene means a general designation, e.g. a gene for the production of antigens that they determineblood type AB0.

Specific forms of genes are called **alleles.**

Alleles are variants of a gene at the molecular level, where each allele has a slight difference in the DNA nucleotide sequence.

The sequence of nucleotides determines the nature of the gene in the molecular genetic sense. Genes either occur in the population in two forms, i.e. that there are two different alleles of a given gene, or in multiple forms – multiple alleles. An allele ensures a specific phenotypic manifestation of a gene.

Only two alleles can be present on homologous nuclear chromosomes in an individual. When both alleles are identical in paired loci, it is either a dominant homozygote (*AA*) or by a recessive homozygote (*aa*). When different alleles are present on paired chromosomes at a given locus, it is a heterozygote (*Aa*). Marking of alleles is done by agreement.

An allele is one of two or more versions of a gene. An individual inherits two alleles for each gene, one from each parent. If the two alleles are the same, the individual is homozygous for that gene. If the alleles are different, the individual is heterozygous.

Here are some examples:

In the general interpretation, e.g. monohybridism, **the dominant allele** is usually marked with **a capital letter** *A* and the **recessive** with **a small letter** *a* ; in dihybridism, the alleles of the second gene are labeled *B* and *b*, etc. For specific genes, an abbreviation of the gene name is often used to denote alleles. For example, the gene responsible for the formation of pigment, **c**hromogen, has a dominant allele marked *C* and a recessive *c*.

In another case, the symbol derived from the name of the gene **marks only one of the pair of alleles**, as is the case, for example, with the gene responsible for distinguishing between red and green colors. Two alleles exist in a population; the original allele ensuring correct color discrimination is dominant and is marked +. A mutation that leads to an incorrect distinction between red and green has changed the original allele to a recessive one. The recessive allele is marked *rg* (derived from the English words **r**ed and **g**reen).

In the case of polygenic inheritance, the alleles of individual genes participating in the realization of the same trait are referred to as active alleles (e.g. *A* 1, *A* 2, *A* 3... *A* n) and inactive alleles (*a* 1, *a* 2, *a* 3... *a* n).

Also note that phenotype (trait) is written in normal font, gene /allele **in italics**.

Links

related articles

- Allelic interactions
- Phenotype
- Gene
- Genotype
- Heterozygous
- Homozygous
- Monohybridism