

Multiple allele

General

If there are more than 2 alternative alleles for 1 locus in a population - this is referred to as a **multiple allele**.

- occurs in the inheritance of normal and pathological traits in humans
- e.g. gene for erythrocyte antigen A blood AB0 system can occur in up to 15 alleles
- similarly haemoglobinopathies- genetically determined by multiple alleles: the synthesis of Hb in humans is determined by 3 pairs of genes (polygenically determined), each of which has several alleles (polyalleles); thus, dozens of aberrant Hb types can arise

Allelic interactions

 For more information see *Allelic interactions*.

In a diploid cell, there are 2 alleles for a single gene. There can be 3 different relationships between these alleles, on which the final gene expression depends.

Incomplete dominance and recessiveness

- the dominant allele does not completely suppress the recessive allele, the recessive allele is also partially expressed.
- e.g. flower colour in a flower (A - red colour; a - white colour):
 - homozygote AA - red colour
 - homozygote aa - white colour
 - heterozygote Aa - pink color

Complete dominance and recessiveness

- the dominant allele completely suppresses the expression of the recessive allele
- e.g. blood group in humans (A - agglutinin A is formed; 0 - no agglutinin is formed):
 - homozygote AA - blood group A
 - homozygote 00 - blood group zero
 - heterozygote A0 - blood group A (agglutinin A is formed)

Codominance

- both dominant alleles are fully expressed in the heterozygote and do not affect each other
- e.g. with human blood groups (alleles A and B are codominant to each other and dominant to allele 0):
 - heterozygote A0 - group A
 - heterozygote B0 - group B
 - heterozygote AB - group AB (both agglutinogens are formed)
 - homozygote AA - group A
 - homozygote BB - group B
 - homozygote 00 - group zero (no agglutinin is formed)

References

Related articles

- Alleles
- Allelic interactions
- Hemoglobin
- Blood groups

References

- ŠTEFÁNEK, Jiří. *Medicína, nemoci, studium na 1. LF UK* [online]. [cit. 11 February 2010]. <<https://www.stefajir.cz/>>.
- ŠÍPEK, Antonín. *Genetika* [online]. [cit. 11. 2. 2010]. <<http://www.genetika-biologie.cz/>>.