

Laws of Inheritance

Gregor Mendel (1822-1884) was not only an Augustinian monk, but also a **founder of genetics** and a teacher of high school students. Although his main field was natural science, he became famous because of his sweet peas research.

The results of Mendel's research were summarized in the monograph - *Experiments with Plant Hybrids*. At the beginning was the foundation of an atypical variant of flower, which Mendel planted with the typical one. Their offspring get traits from both of the parents and this was the first step on the genetic way. It took him more than seven years of his life and thousands of experiments in mice, plants and sweet peas, before he finally discovered the law of inheritance.



Gregor Mendel

Laws of Inheritance

1) The Law of Segregation

Each of the parents transmits only half of its hereditary factors to offspring. The possible combinations of gametes depends on the number of paternal alleles. E.g. if a parent has two pairs of alleles (dominant - A, B and recessive - a, b), there are four combinations transfer to children (AB, Ab, aB, ab). An offspring receives always just one member of allelic pairs (A or a , B or b).

2) The Law of Independent Assortment

Alleles make up a gene and most of the genes can be assorted independently. Nowadays we know, that the last sentence was true at the time of Mendel, but later was discovered the exception - genetic linkage.

3) The Law of Dominance

Genes work in different variants - called alleles - which can be *dominant* or *recessive* and just the dominant ones are expressed in a phenotype. Recessive traits occur only, when no dominant allele is present.

Mendel's Research

Gregor Mendel followed 7 signs in sweet-peas (*Pisum sativum*):

Sign		
Flower color	white	purple
Pea shape	round	wrinkled
Flower position	axial	terminal
Plant height	short	tall
Seed	wrinkle	smooth
Pod shape	inflated	constricted
Pod color	yellow	green

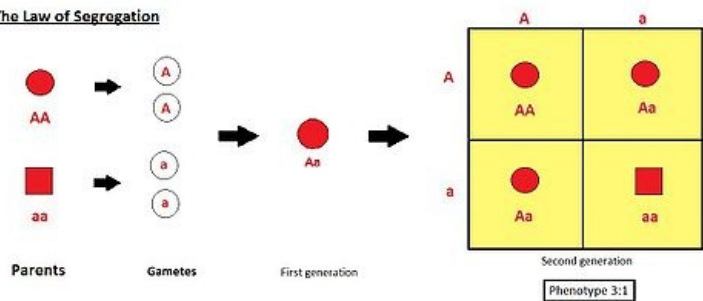
Exceptions to Mendel's Rules

1. Genetic linkage
2. Penetrance
3. Codominant alleles, specific alelic interactions
4. Epigenetics
5. Gonosomal inheritance
6. Extrachromosomal (e.g. mitochondrial) inheritance
7. Epistasis

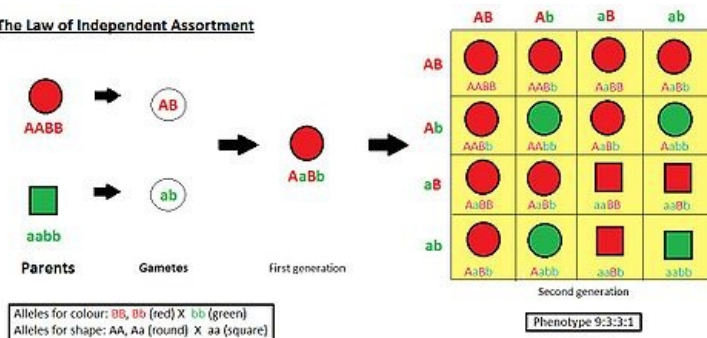
Seed		Flower	Pod		Stem	
Form	Cotyledons	Color	Form	Color	Place	Size
Grey & Round	Yellow	White	Full	Yellow	Axial pods, Flowers along	Long (6-7ft)
White & Wrinkled	Green	Violet	Constricted	Green	Terminal pods, Flowers top	Short (1-1.5ft)
1	2	3	4	5	6	7

Diagram showing the seven "characters" observed by J. G. Mendel

The Law of Segregation



The Law of Independent Assortment



Links

Related articles

- Allele
- Gene
- Phenotype
- Genetic Linkage
- Genetic Linkage Analysis
- Extrachromosomal and Non-Mendelian Inheritance

External links

- Gregor Mendel (http://www.accessexcellence.org/RC/AB/BC/Gregor_Mendel.php)
- Law of Inheritance (<http://www.bookrags.com/research/mendelian-laws-of-inheritance-wob/>)

Bibliography