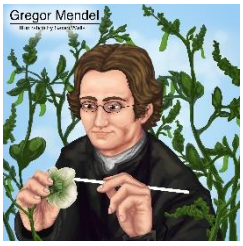


Heredity :The process of transmission of characters from parents to offspring is known as Heredity.
Variation: Small changes / modifications in a particular character that are visible between parents and Offsprings
Genetics is the science that deals with heredity and variation. (Father of Genetics **Gregor Johann Mendel**)

IMPORTANCE OF VARIATIONS

- ☞ Variation enables organisms to adjust and adapt better according to the changing conditions of the environment (**Survival advantage**),
- ☞ Different kinds of variations in organisms lead to the development of new species.

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 (-1ft
1	2	3	4	5	6	7

He selected Garden pea plant as experimental plant :

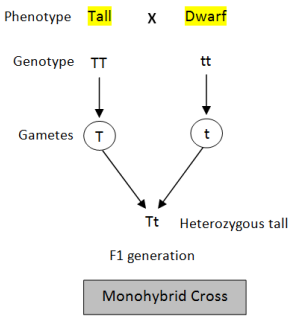
- ✓ 7 pairs of distinct easily contrasting characters
- ✓ Short life cycle
- ✓ Easily available Annual herb Bisexual Flower – Self & Cross Pollination.
- ✓ It produces large number of seeds.

He took pea plants with different characteristics – a tall plant and a short plant, produced progeny by crossing them, and calculated the percentages of tall or short progeny.

MONOHYBRID CROSS : SINGLE Trait like Height is studied at a time. Like we say that we consider character height and obtain different results.

TT x tt (Cross)
F1 Progeny -Tt (all are tall)

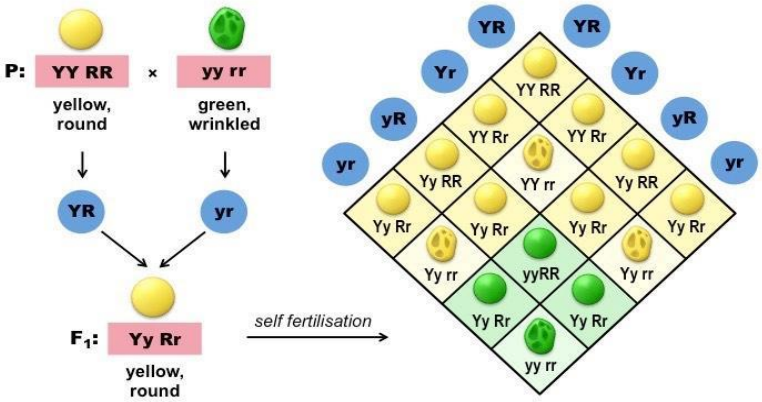
Tt X Tt (Selfing)
F2 progeny was : TT: Tt : tt
Phenotype : tall : dwarf
3 : 1
Genotype : TT : Tt : tt
1 : 2 :1
Phenotype: The physical expression of an organism **Genotype**: The genetic constitution of an organism



DIHYBRID CROSS: a cross in which two characters are studied at a time. For example, if we make cross considering two features : like **Seed Texture(Round/ wrinled) and Seed Colour(Yellow/green)** in a plant. Now let us understand the laws with dihybrid cross.

F2 Ratio : 9: 3:3:1

Round Yellow	**Round** green	wrinkled **Yellow**	wrinkled green
9	3	3	1



MENDEL'S LAW OF INHERITANCE

Law of Dominance: When parents having pure contrasting characters are crossed then only one character expresses itself in the F1 generation. This character is the dominant character and the character/factor which cannot express itself is called the recessive character.

Law of segregation: The phenomenon of separation of the two alternating factors of one character, during gamete formation so that one gamete receives only one factor of a character is called as Law of Segregation.

Law of Independent Assortment- 'When two pairs of traits are combined in a hybrid, segregation of one pair of characters is independent of the other pair of characters'.

HOW DO TRAITS GET EXPRESSED?

DNA is regulating the authority to making of proteins in the cell.

• Gene provides information for one particular protein. • E.g. the height of a plant depends upon the growth hormone which is in turn controlled by the gene.

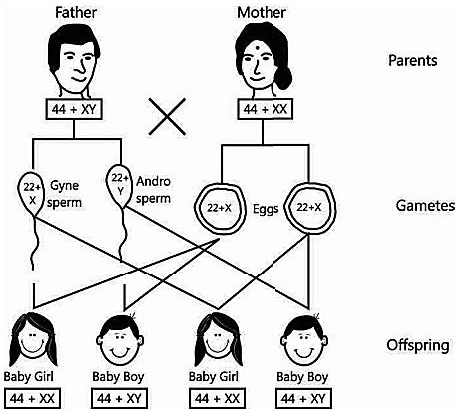
• Both parents contribute equally to the DNA of next-generation during sexual reproduction.

SEX DETERMINATION IN HUMAN

The process of determining the sex of an individual, based on the composition of the genetic makeup is called sex determination.

Human has 23 pair of chromosomes.

• Autosome: 22 pairs (44)
• Sex chromosomes: 01 pair (02).
They may be either-
i Homogametic – XX for female (44 +XX)
ii- Heterogametic XY for male (44 +XY)
In some organism-environment also plays a crucial role in the determination of sex-
In some Reptiles: The temperature at which a fertilized egg is incubated governs the gender.
Snails: A particular animal can change gender within one 's lifetime.



Determination of sex of offspring based on fusion of egg and sperm