12/11

Inheritance in Life

HERIDITY

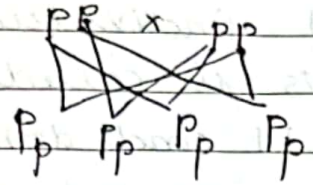
Heredity is the transmission of particular characteristics from parent to offspring.

Gregor Johann Mendel - Father of Genetics.
He studied pea plants with at least 7 easily distinguishable traits.
Peas are easy to grow, short generation time.
They can self fertilize; bisexual.
It's an ideal plant for doing genetics.

Monohybrid cross -
- He selected one character for his experiment.
- Crosses between white flowered and purple flowered plants were made.
- Allowed it to cross fertilize.
- All the seeds that resulted from this were hybrids.

Purp X White
↓
F_1 Purple X Purple (F_1)
↓
F_2 3 Purple, White (3 : 1)
(dominant) (recessive)

Capital letter for dominant character.
Small letter for recessive character.



$F_1 \rightarrow$

	P	P
P	Pp	Pp
p	Pp	Pp

$F_2 \rightarrow Pp \times Pp$

	P	p
P	PP	Pp
p	Pp	pp

Colour (phenotypic ratio)
3:1
Genotypic Ratio
1:2:1

Phenotype → physical characteristics.
Genotype → genetic / allelic characteristics.

~~Hybrid~~

Hybrid offspring always resembled one of the parents, did not have an intermediate flower colour.

For each pair of traits that Mendel examined, one alternative was not expressed in F1 hybrids even though it reappeared in F2 generation.

LAW OF SEGGREGATION

When a pair of 'factors' for characters brought together in a hybrid, they segregate during the formation of gametes. Hence each gamete is pure with reference to this character.

BACK-CROSS - TEST CROSS

- A cross involving the F1 individuals with either of the two parents is called back cross.
- A back cross between F1 and dominant parent only produces dominant individuals.
- The cross between the F1 and recessive parent type, both the phenotypes appear in the progeny 50:50%.
- The cross between F1 and recessive parent is called test cross (Pp X pp)

Pp X PP

	P	P
P	PP	Pp
P	PP	Pp

Pp X pp (Test-cross)

	P	P
p	Pp	Pp
p	Pp	pp

A SIMPLE MODEL OF HEREDITY

- Parents transmit "factors to offspring.
- Each individual receives 2 factors which code for the same trait
- Not all factors are identical - alternative gene forms are called alleles.
- Alleles do not influence each other as they ~~are~~ seperate individually into gametes.
- The presence of an allele does not insure that its trait will be expressed.