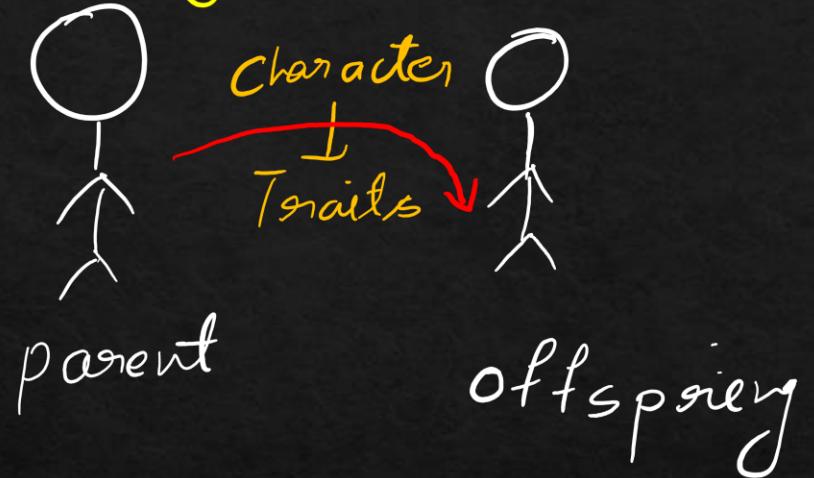


HEREDETY AND EVOLUTION

MOHIT GUPTA

* Heredity -



Genetics

It is study of
Heredity & Variations

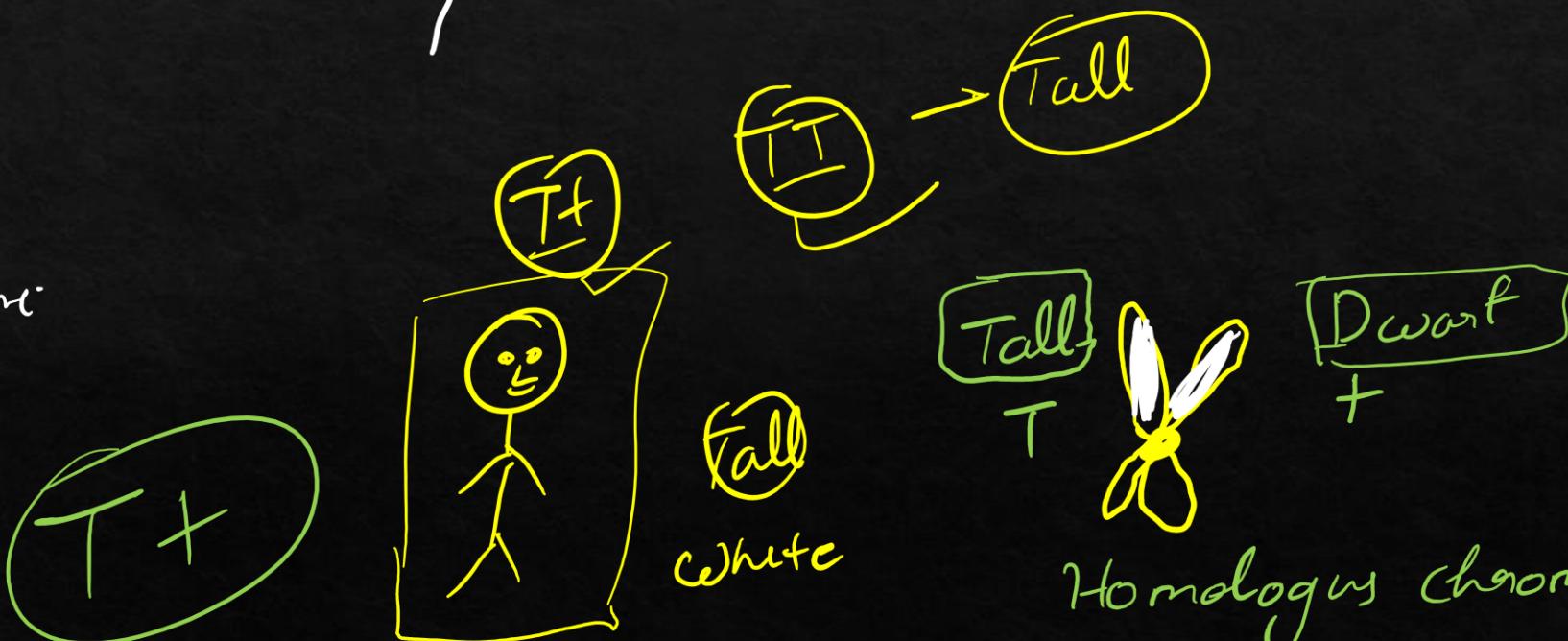
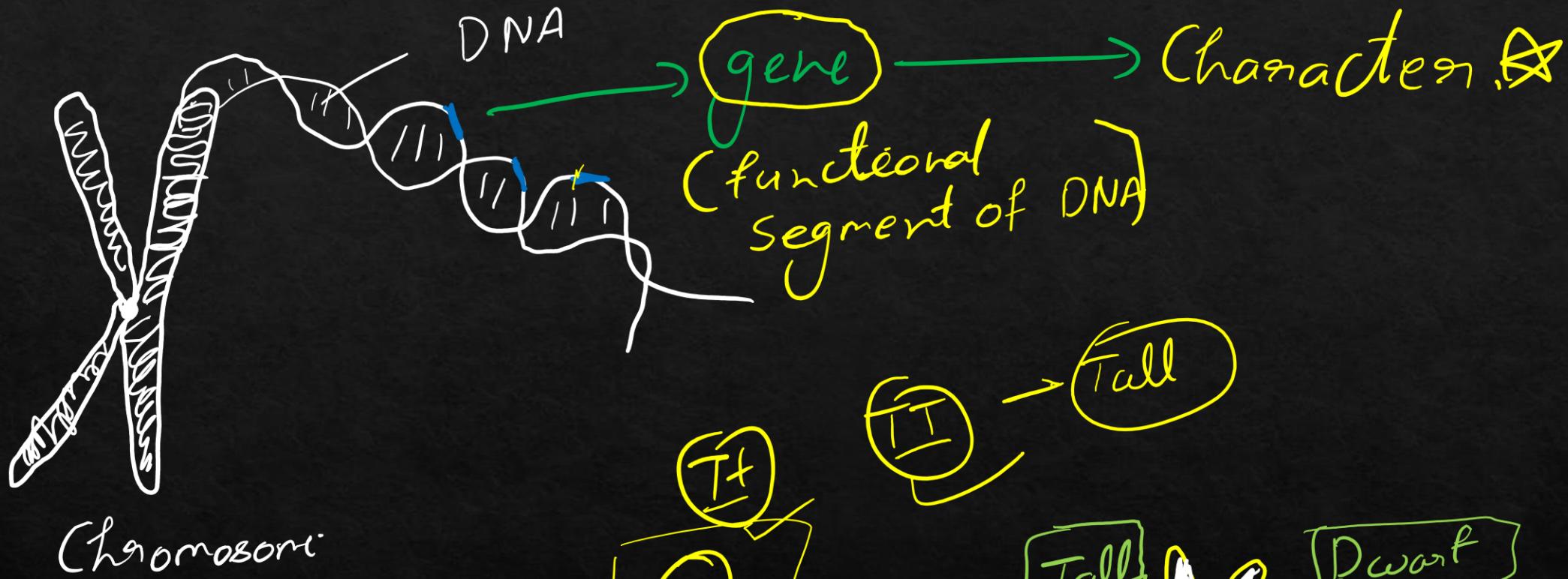
→ Refers to the transmission of characters from parents to offspring.

* Variation -

Refers to the differences shown by individual of same species.

- Gregor Johann Mendel was the first to explain the principal of Inheritance by conducting experiment on garden pea plant (Pisum Sativum)

- He postulates that there are a pair of unit ''factors'' controlling each character, one inherited from each parent.



Allele - Alternative form of gene , located
On same position on the Homologous
Chromosome.

- **Phenotype** - External appearance of Organism .
- **Genotype** - Genetic Constitution of Organism .

Mendel's work (1856 - 1863)

Reason for
Mendal-Success → 1/2 character at one time.

→ Statistical record

→ Pea plant selection
(Pisum sativum)

→ Self pollination
→ Multiple traits
→ Short life cycle.

- ① Stem height → Tall / dwarf
- ② flower colour → violet / white
- ③ flower position - Axial / Terminal
- ④ Pod shape - inflated / constricted
- ⑤ Pod colour - Green / yellow
- ⑥ Seed shape - Round / wrinkled
- ⑦ Seed colour - yellow / green

- 7 pair
of contrasting
characters.



Monohybrid Cross -

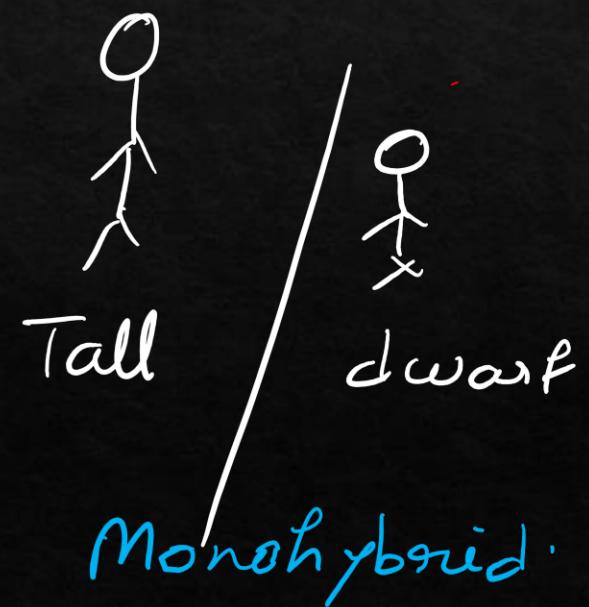
Monohybrid cross is cross b/w two pea plant with one pair of contrasting characters.

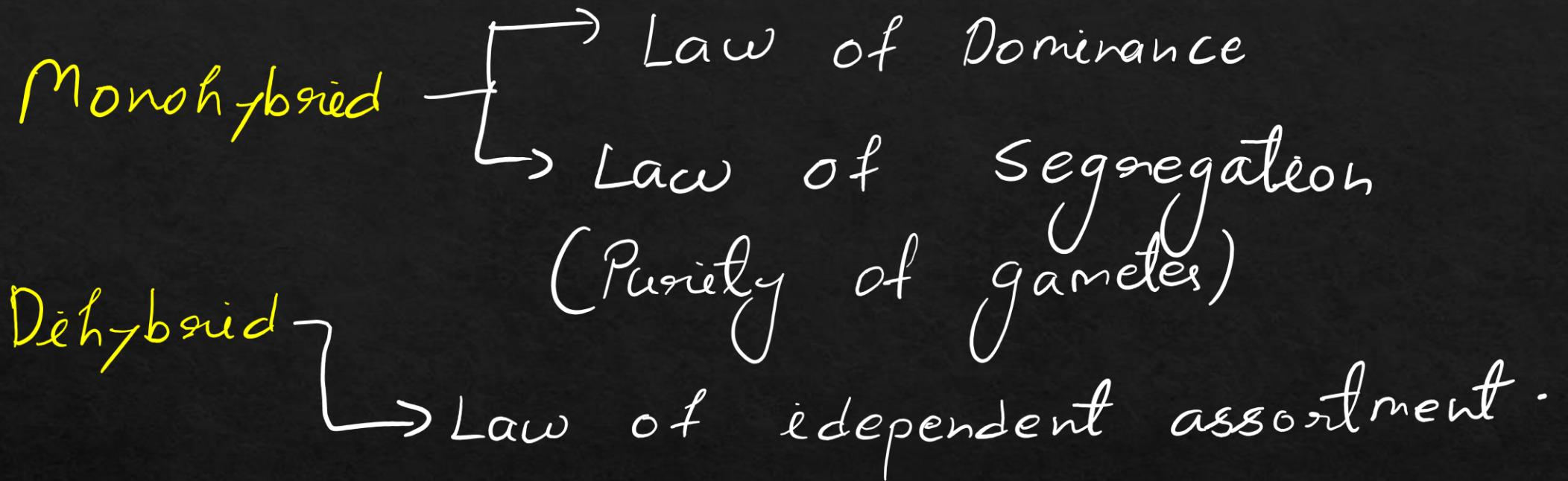
Dihybrid Cross -

Cross b/w two pea plant with two pairs contrasting characters.



★ Dihybrid





Law of Dominance -

When two contrasting genes for a character come together in an organism, only one is expressed externally and shows visible effect. It is called Dominant gene and gene of the pair which does not express and remains hidden is known as Recessive gene.

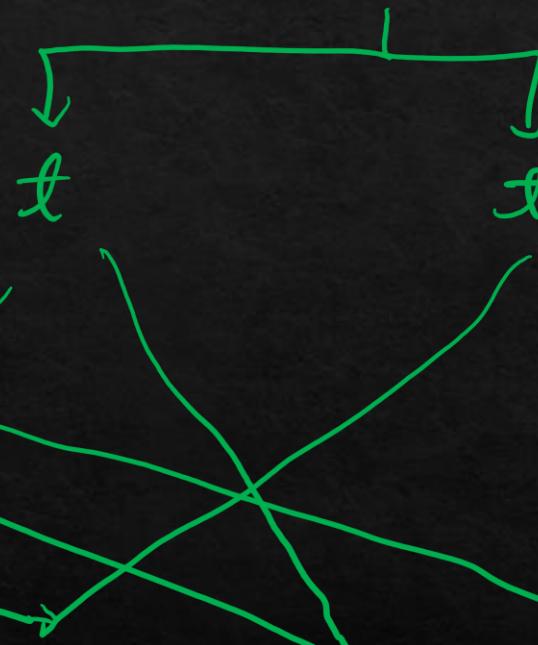
Tall plant ($\sigma^{\vec{r}}$)

TT



Dwarf plant (φ)

tt



$\rightarrow P.$ gen.

\rightarrow gametes

Tt

(Tall)
Hybrid

Tt

(Tall)

Tt

(Tall)

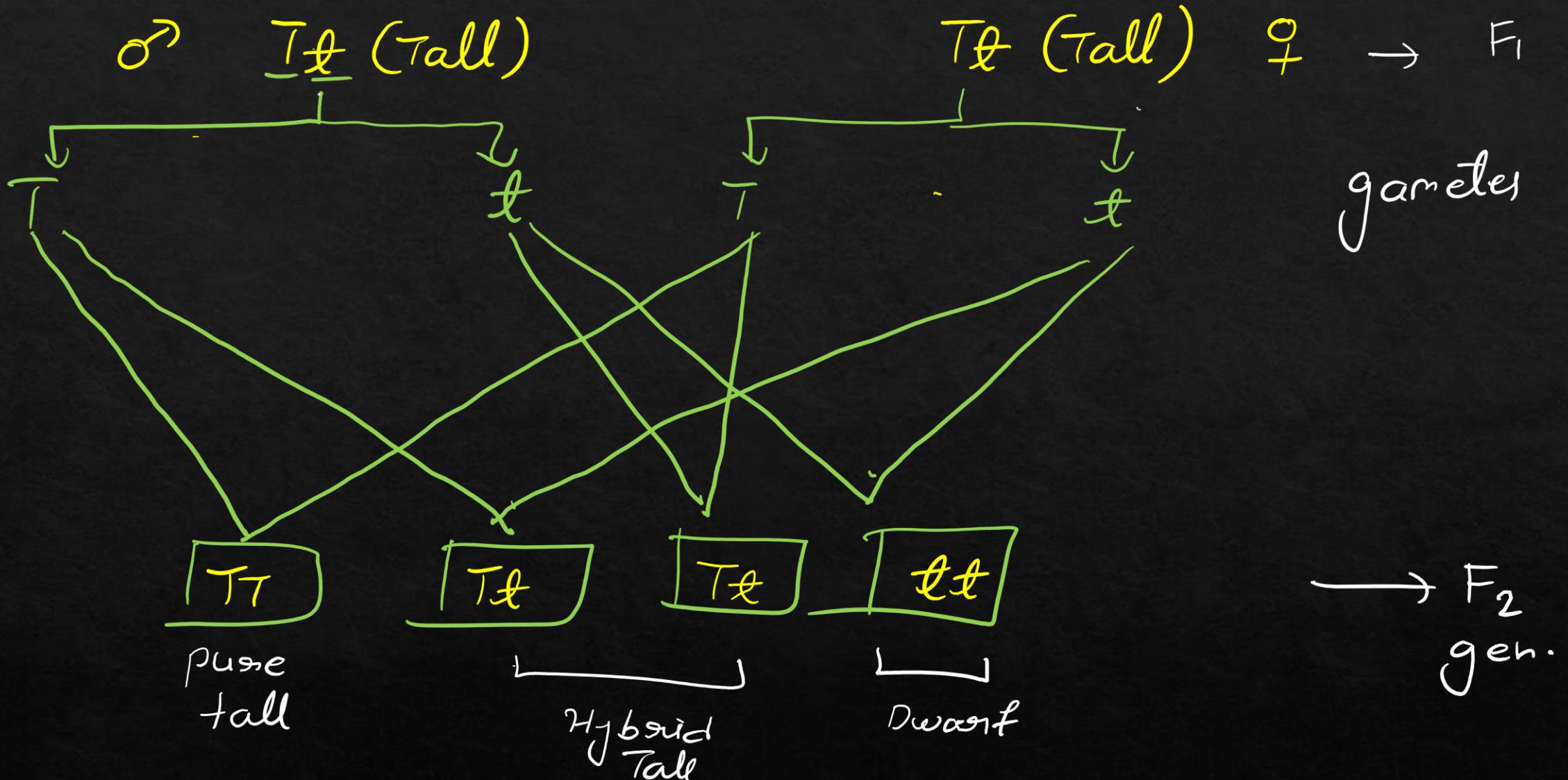
Tt

(Tall)

$\rightarrow F_1$ gen.

$+ \rightarrow$ Recessive
 $T \rightarrow$ Dominant gene

\rightarrow Tall plant



Phenotype - 3 : 1

Genotype - 1 : 2 : 1

② - Law of Segregation (Purity of gametes)

When a pair of alleles are brought together in F_1 hybrid they remains together (co-exist) without blending (mixing) with each other and separate completely and pure during formation of gamete.

* It is also known as 'Law of purity of gametes'.

Law of Independent assortment -

Round ♂ yellow

$RRYY$

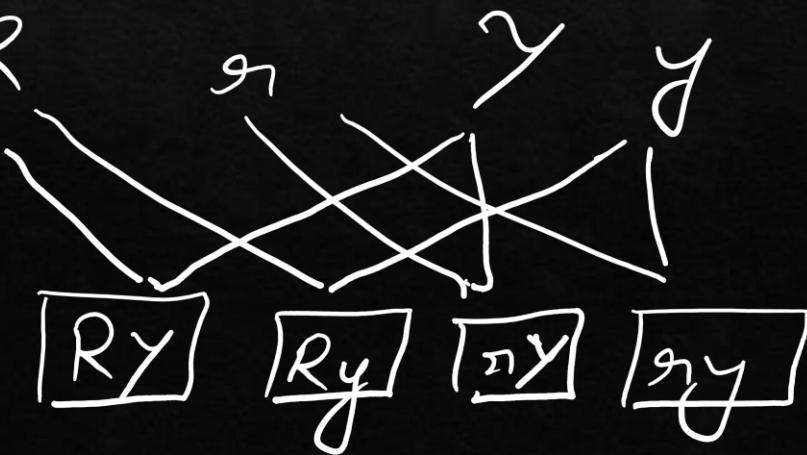
↓
 RY

$Rryy$

Wrinkled ♀ Green

$rryy$

ry



δ / φ	RY	Ry	ry	ry	
RY	RRYY	RRYy	Rryy	Rryy	
Ry	RRYy	RRyy	Rryy	Rryy	
ry	Rryy	Rryy	Rryy	Rryy	
ry	Rryy	Rryy	Rryy	Rryy	

1:2:2:4:1:
= 2:1:2:1

Genotype = 1:2:2:4:1:2:1

Phenotype - 9:3:3:1

Phenotype - Round ♂ yellow - 9

Round ♀ Green - 3

Wrinkled ♀ yellow - 3

Wrinkled ♀ Green - 1

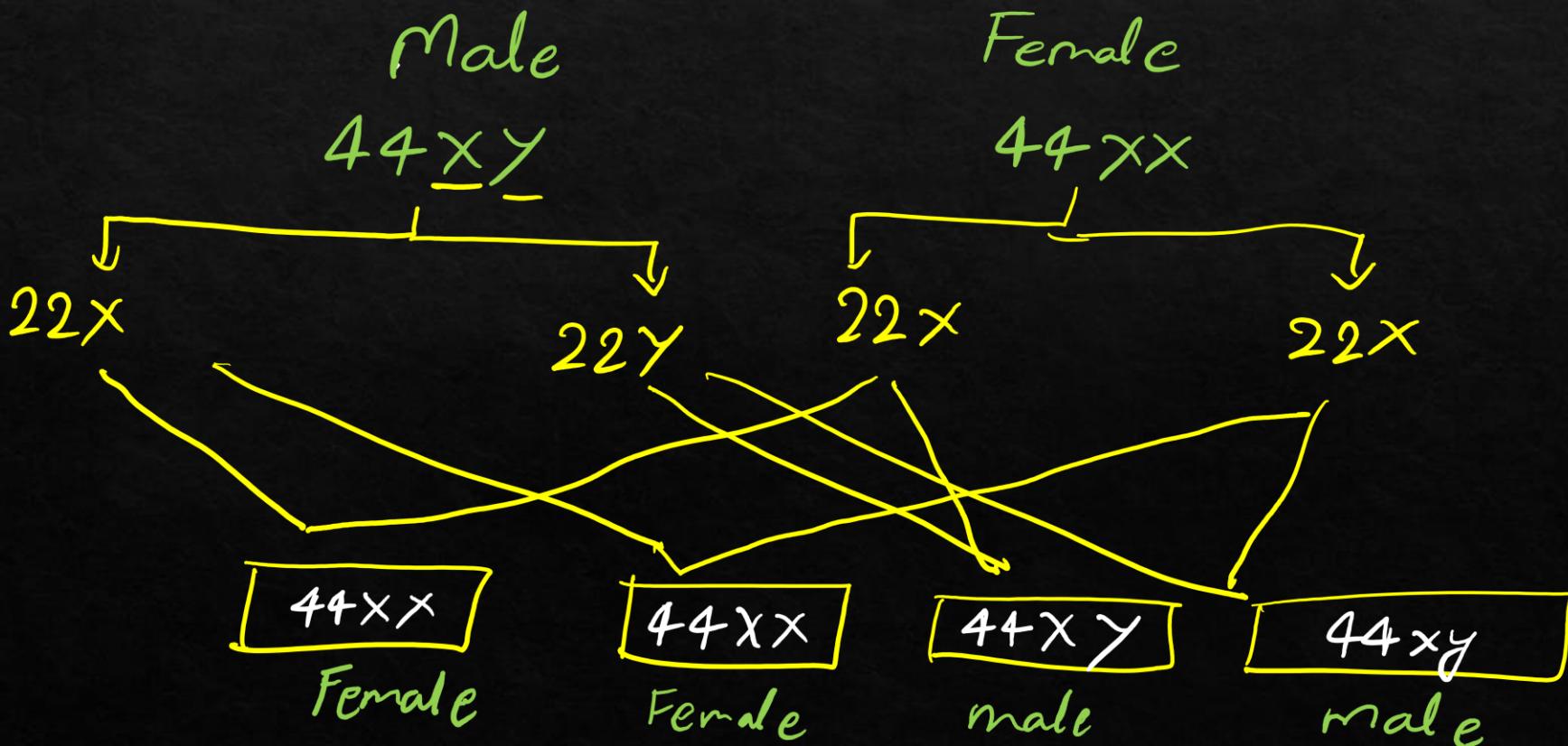
"According to this law, alleles of different pairs of contrasting characters are assorted independently of one another during gamete formation."

Sex determination

Autosome → Body cells → 44 (22 pairs)

Heterosome (Sex chromosome) → gonades → \underline{XX} (female)
 \underline{XY} (male)

]- 23 pairs
46 (chromosome)



50% - male
50% female

Phenotype - 1:1
Genotype - 1:1

