

Mendel's Laws of Inheritance

TT tt
Pure line

I Law of Dominance

Parents TT tt

Gametes (T) (T) (t) (t)

	σ^T	T	T
♀^t	t	Tt	Tt
t		Tt	Tt

F₁ generation - all tall Tt

II Law of Segregation

Parents Tt Tt

Gametes (T) (t) (T) (t)

	σ^T	T	t
♀^t	T	TT	Tt
t		Tt	tt

Phenotypic ratio

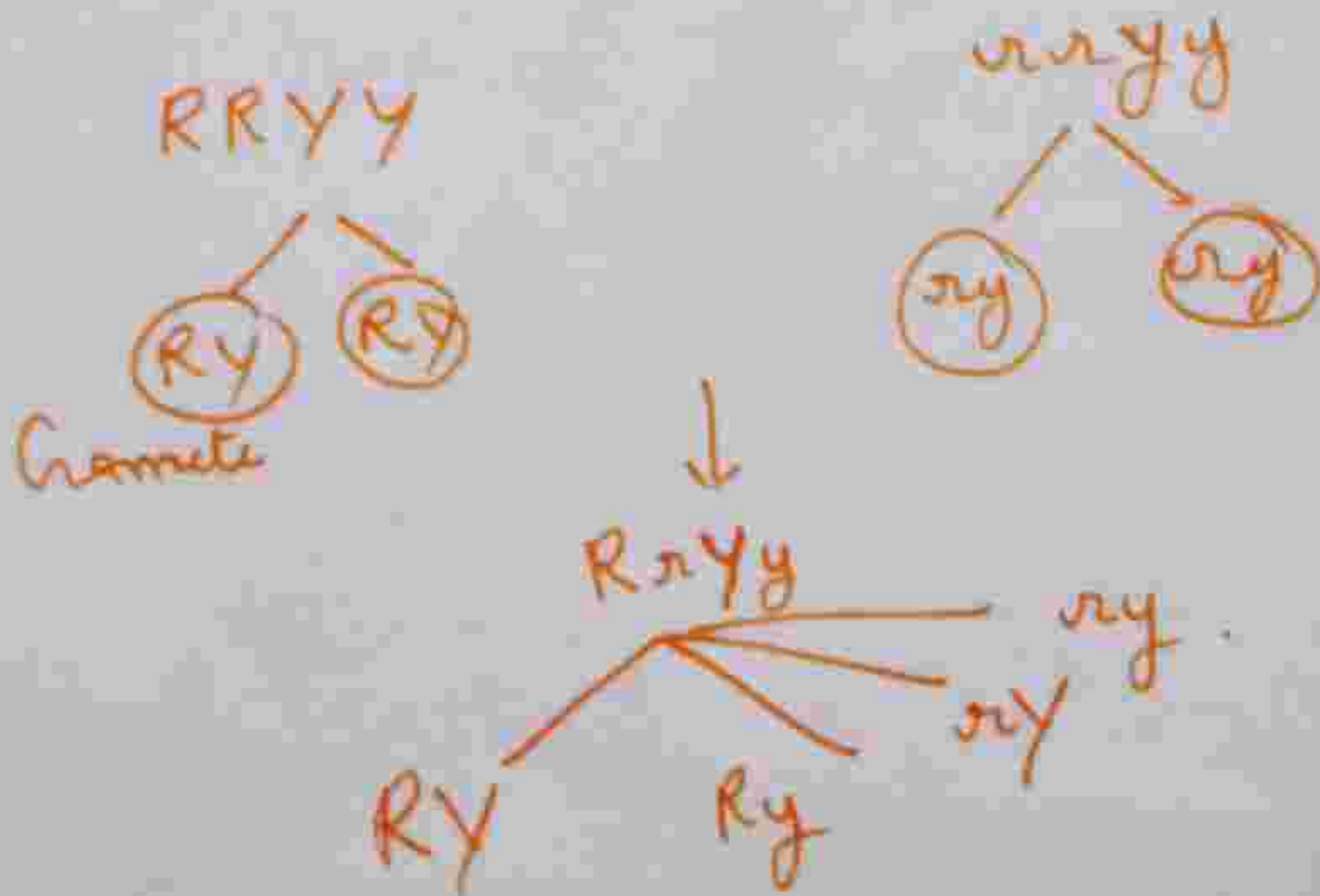
3 : 1

Tall Dwarf

Genotypic ratio = 1 : 2 : 1

Genetes carry only one Allele
Purity of Genetes.

III Law of Independent Assortment [Dihybrid cross]



Factors are Independent to assort with each other.

♀ ♂	RY	Ry	ry	ry
RY	RRYY (Round Yellow)	RRYy (Round)	RrYY (Round)	RrYy (Round)
Ry	RRYy (Round)	RRyy (Round Wrinkled)	RrYy (Round Yellow)	Rryy (Round Wrinkled)
ry	RrYY (Round)	RrYy (Round Yellow)	rrYY (Wrinkled Yellow)	rrYy (Wrinkled Yellow)
ry	RrYy (Round Yellow)	Rryy (Round Wrinkled)	rrYy (Wrinkled Yellow)	rryy (Wrinkled Green)

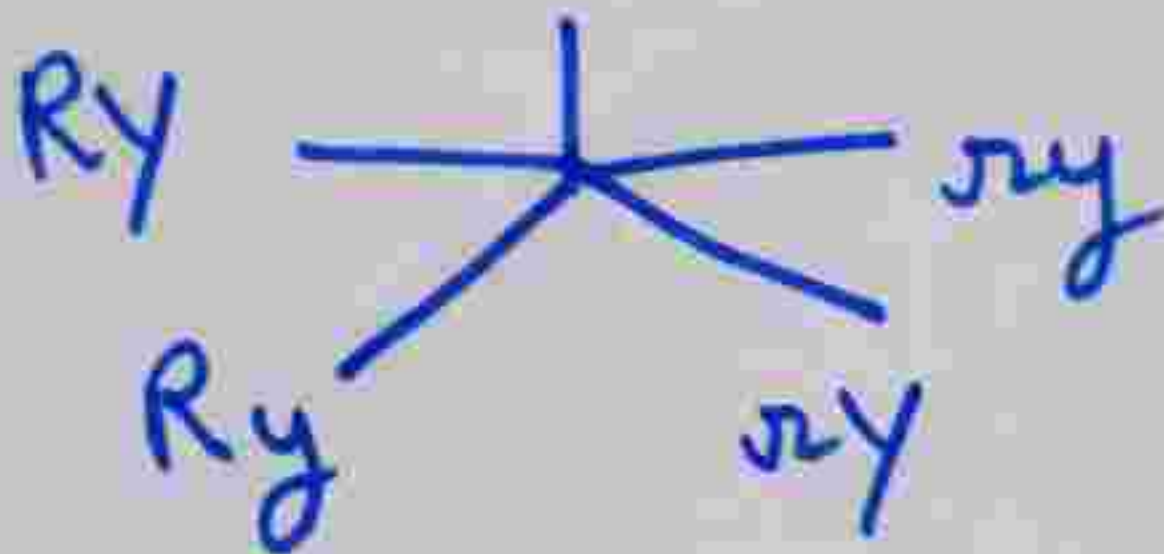
- 9 Round yellow
- 3 Round green
- 3 Round wrinkled yellow
- 1 wrinkled green

Dihybrid

Test cross

$RrYy$

$rryy$



	RY	Ry	rY	ry
ry	$RrYy$	$Rryy$	$rrYy$	$rryy$

$1 : 1 : 1 : 1$

Round
yellow

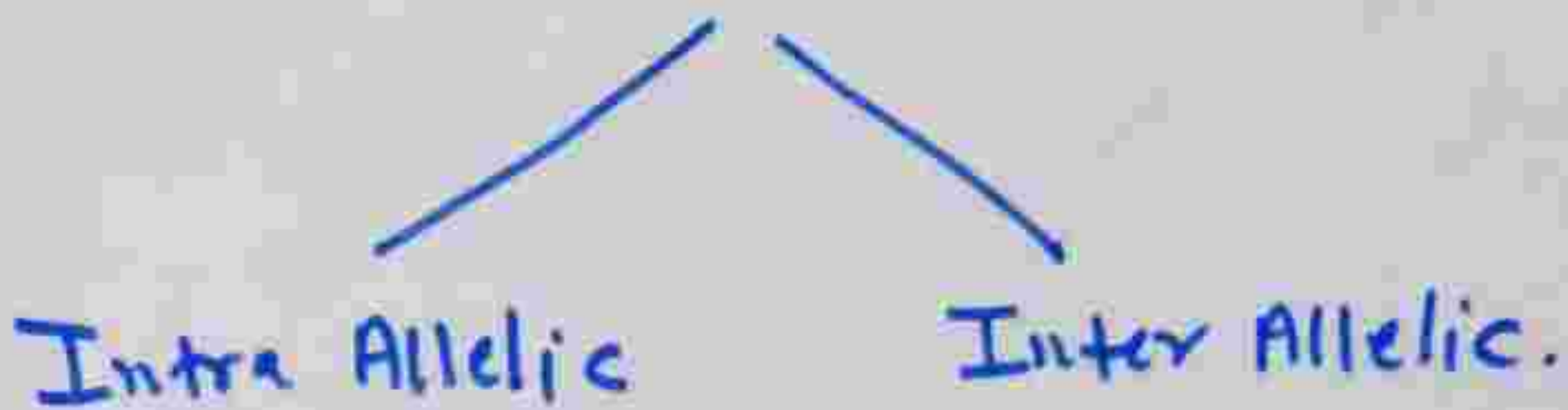
Round
green

wrinkled
yellow

wrinkled
green

Non Mendelian Inheritance

Gene Interaction



I Incomplete dominance or Blending Inheritance

→ Carl Correns

e.g I Mirabilis Jalapa
4, o clock Plant

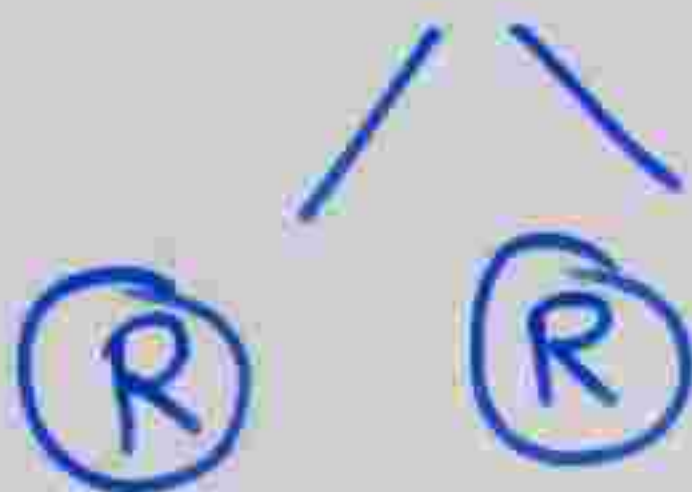
II Snapdragon or
dog flower

Antirrhinum majus

III Andalusian Fowl

RR
(Red flower)

rr
(White flower)



	R	R
r	Rr	Rr
r	Rr	Rr

F₁

Rr - All Pink



	R	r
R	RR	Rr
r	Rr	rr

1 : 2 : 1

Red : Pink : white

Codominance

→ Both Alleles are dominant

→ Genotypic and Phenotypic ratio same.

Eg:

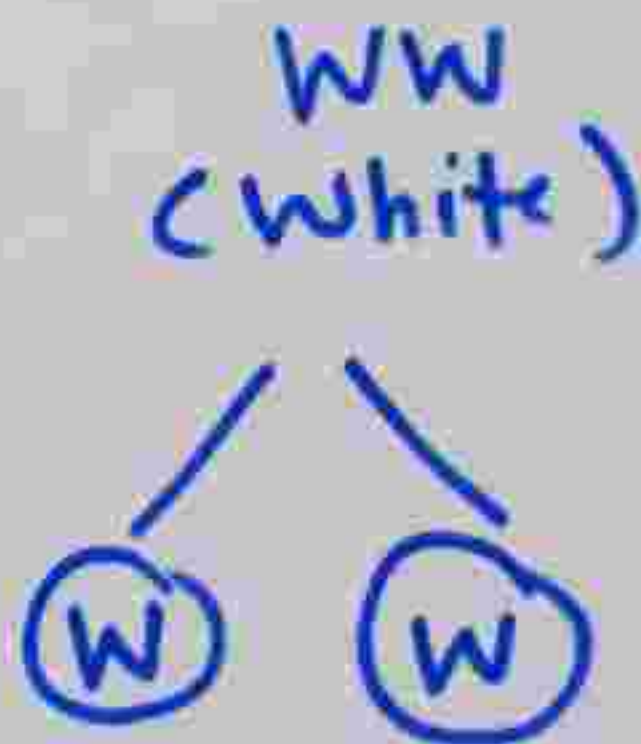
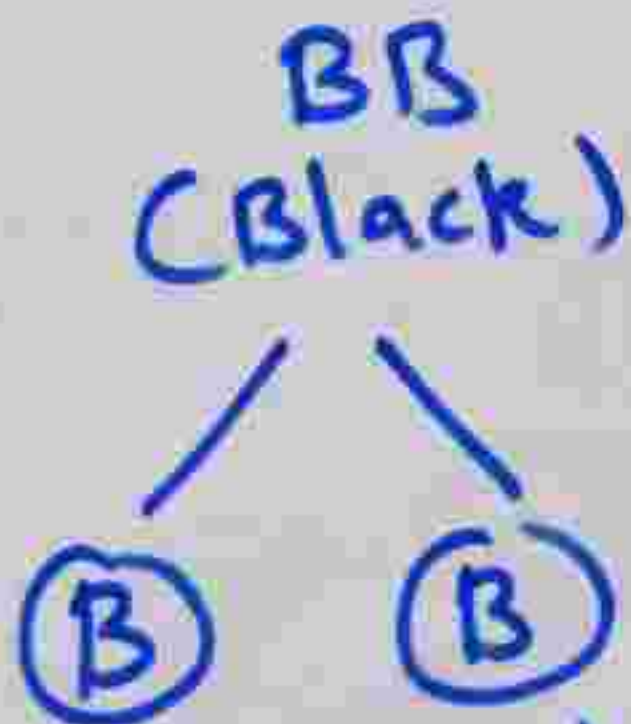
→ Coat colour in cattle.

AB Blood group.

Sickle cell Anaemia.

(Hybrid condition).

I coat colour in cattle.

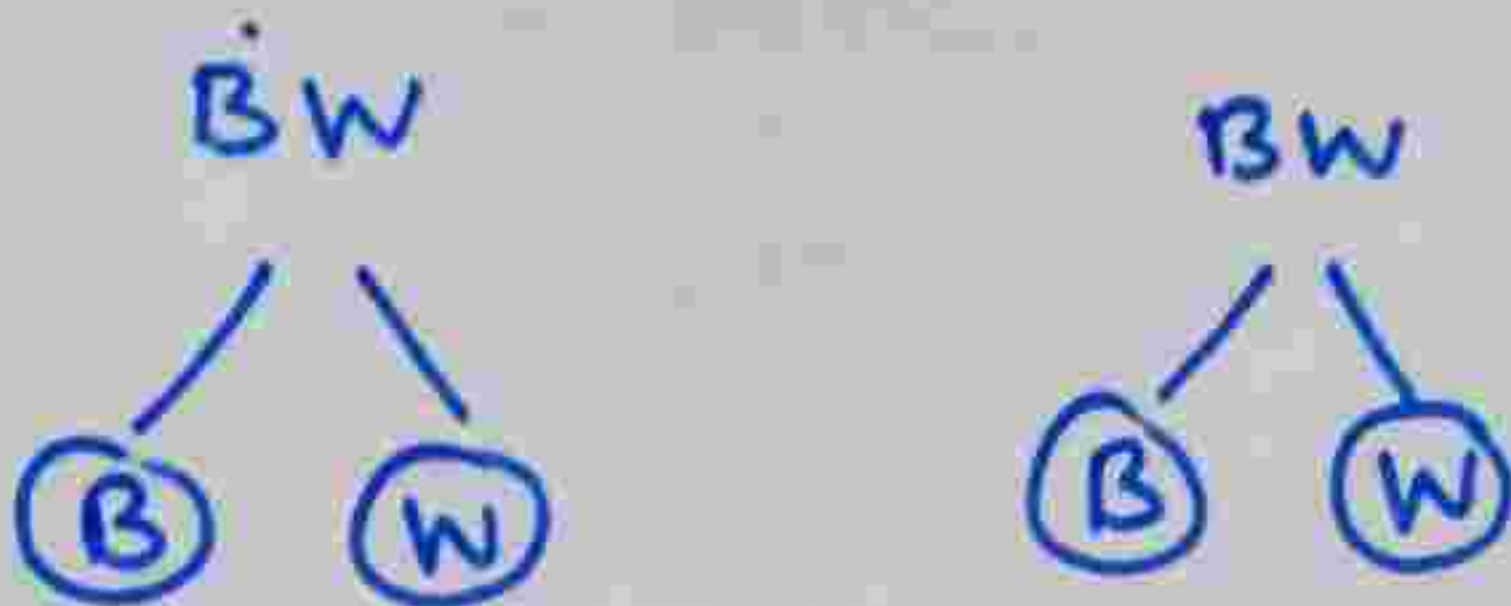


♀ ♂

	B	B
W	BW	BW
W	BW	BW

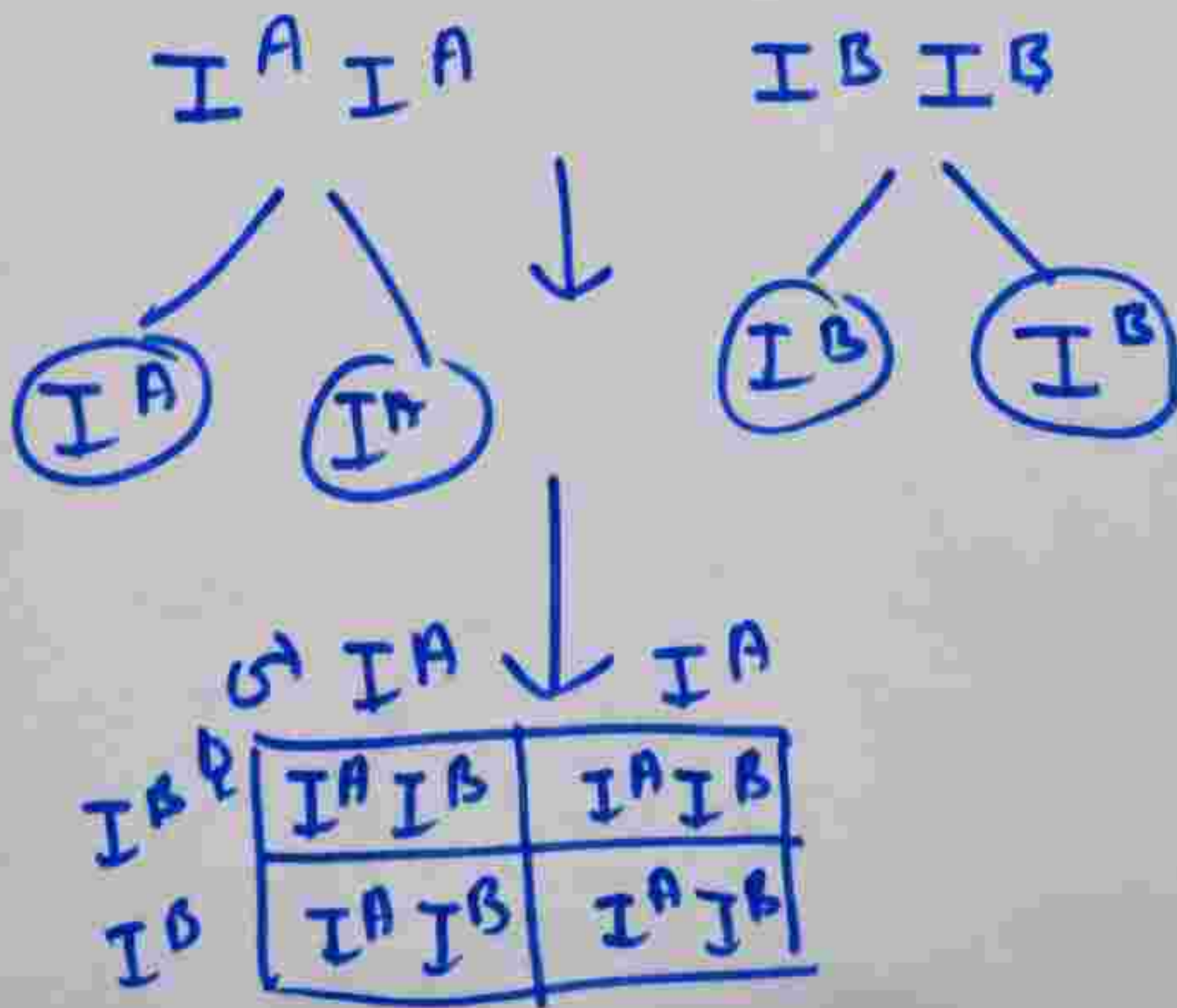
All
BW - Roan

F₂



1 Black : 2 Roan : 1 white.

II

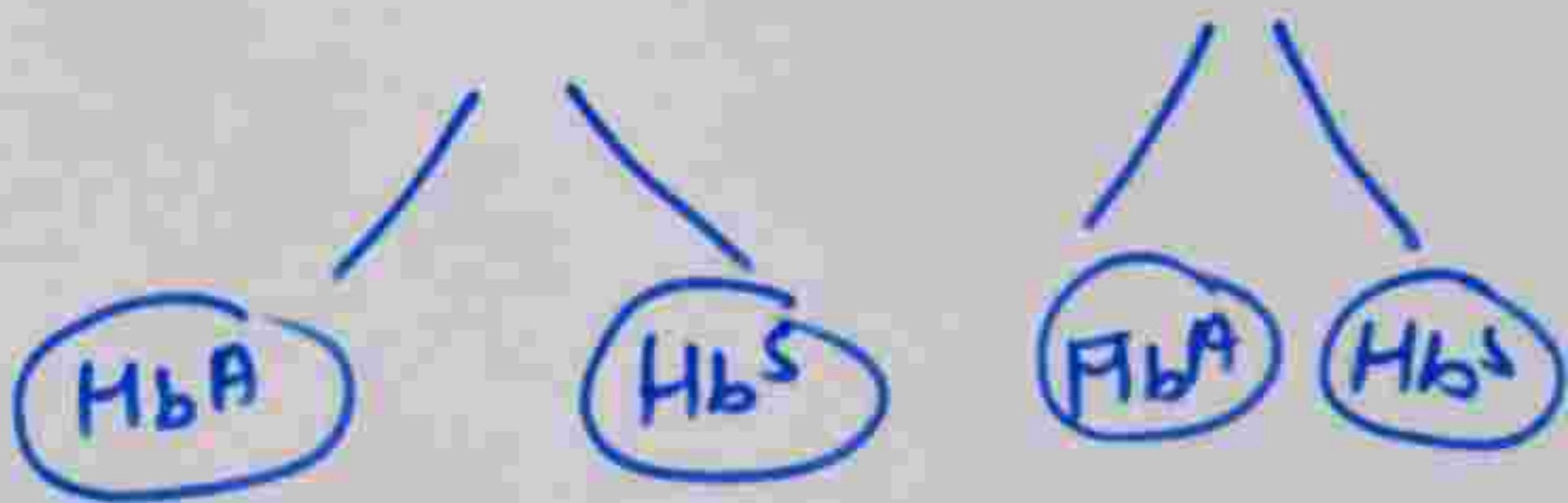


	I^A	I^B
I^A	$I^A I^A$	$I^A I^B$
I^B	$I^A I^B$	$I^B I^B$

1 A : 2 AB : 1 B.

III Sickle cell Anaemia.

$Hb^A Hb^S \quad \times \quad Hb^A Hb^S$



	Hb^A	Hb^S
Hb^A	$Hb^A Hb^A$	$Hb^A Hb^S$
Hb^S	$Hb^A Hb^S$	$Hb^S Hb^S$

1 : 2 : 1 X
Normal : Hybrid : Sickle cell Anaemia