MENDEL'S DIHYBRID EXPERIMENT

Presented by
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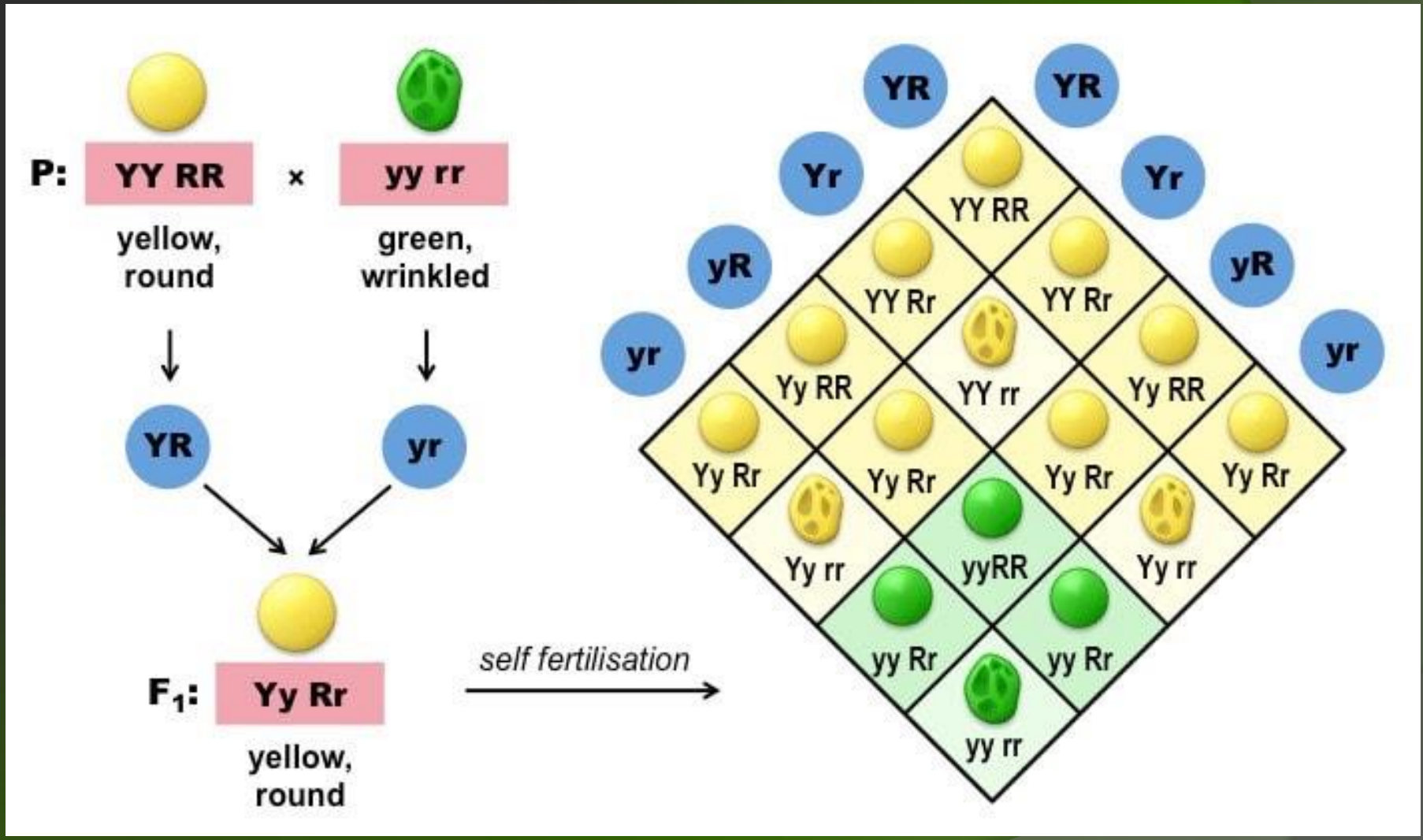
P:
YY RR
×
yy rr
yellow, round
green, wrinkled
YR
yr
F1:
Yy Rr
yellow, round
self fertilisation
YR
YR
Yr
Yr
yR
yR
yr
yr
YY RR
YY Rr
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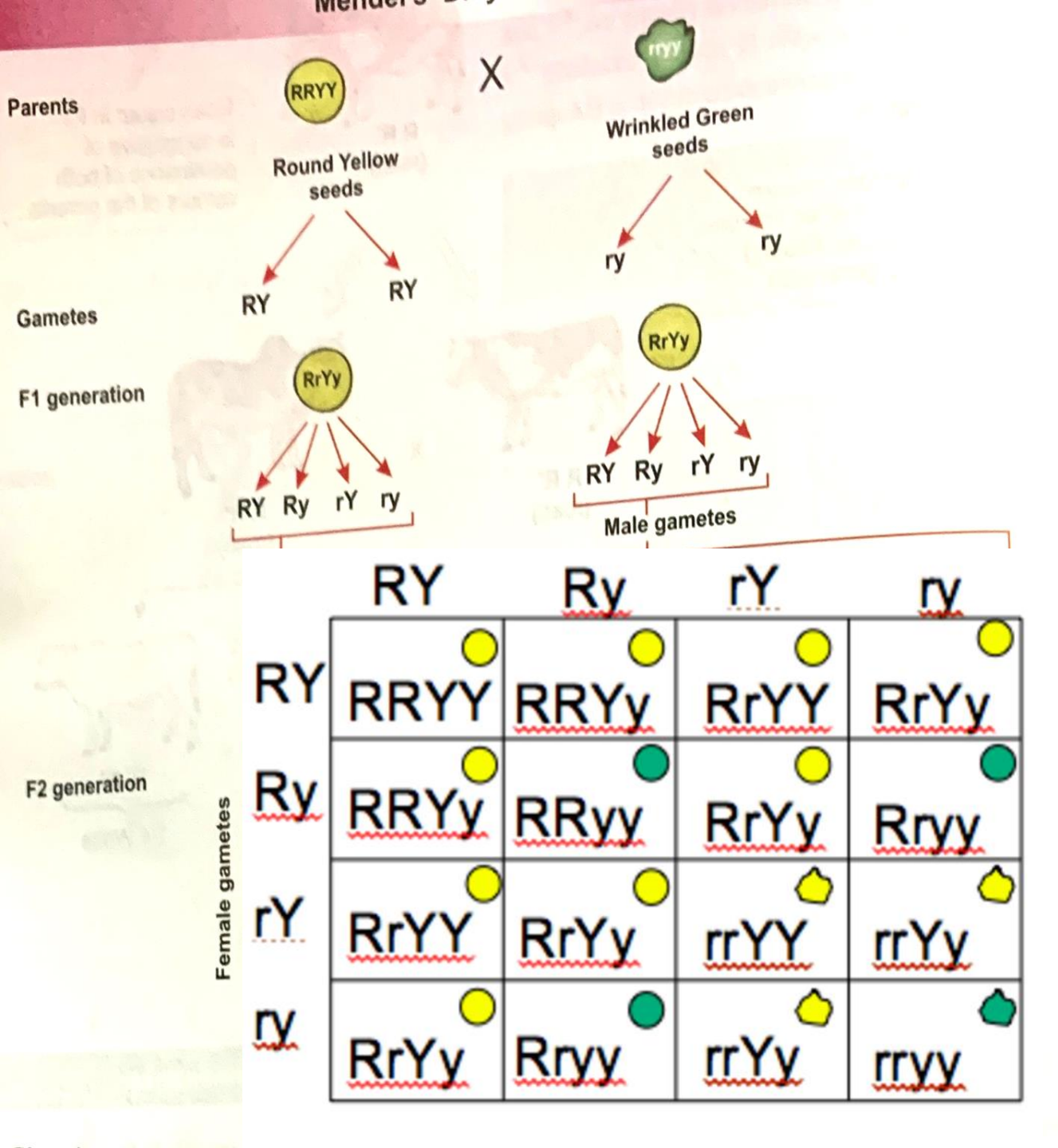


Cross of Parent Generation

round, yellow

wrinkled, green

	RY	RY
ry	RrYy	RrYy
ry	RrYy	RrYy

Round/Yellow: 9

Round/green: 3

wrinkled/Yellow: 3

wrinkled/green: 1

9:3:3:1 phenotypic ratio

Genotypic ratio: 1:2:1:2:4:2:1:2:1

Round = R
Wrinkled = r

	R	r
R	RR	Rr
r	Rr	rr

¼ RR ½ Rr ¼ rr

Yellow = Y
Green = y

	Y	y
Y	YY	Yy
y	Yy	yy

¼ YY ½ Yy ¼ yy

¼ RR
- ¼ YY → 1/16 RRYY → 1/16 RRYY
- ½ Yy → 1/8 RRYy → 2/16 RRYy
- ¼ yy → 1/16 RRyy → 1/16 RRyy

½ Rr
- ¼ YY → 1/8 RrYY → 2/16 RrYY
- ½ Yy → 1/4 RrYy → 4/16 RrYy
- ¼ yy → 1/8 Rryy → 2/16 Rryy

¼ rr
- ¼ YY → 1/16 rrYY → 1/16 rrYY
- ½ Yy → 1/8 rrYy → 2/16 rrYy
- ¼ yy → 1/16 rryy → 1/16 rryy

RrYy x RrYy

	R	r
R	RR	Rr
r	Rr	rr

	Y	y
Y	YY	Yy
y	Yy	yy

3) Multiply the results:

1 RR * 1 YY = 1 RRYY
2 Yy = 2 RRYy
1 yy = 1 RRyy

2 Rr * 1 YY = 2 RrYY
2 Yy = 4 RrYy
1 yy = 2 Rryy

1 rr * 1 YY = 1 rrYY
2 Yy = 2 rrYy
1 yy = 1 rryy

Genotype Ratio: 1:2:1:2:4:2:1:2:1

Applications!!

Example 1: A woman homozygous for type B blood marries a man who is heterozygous type A. What will be the possible genotypes and phenotypes of their children?

Genotype	Blood Type
I^A i	A
I^A I^A	A
I^B I^B	B
I^B i	B
I^A I^B	AB
i i	O

Example 1: A woman homozygous for type B blood marries a man who is heterozygous type A. What will be the possible genotypes and phenotypes of their children?

I^BI^B X $I^A i^O$

	I^B	I^B
I^A	I^AI^B	I^AI^B
i^O	I^Bi^O	I^Bi^O

Genotypic = 2 I^AI^B : 2 I^Bi^O

Phenotypic = 2 AB : 2 B

Rh Factor

- There are 2 different alleles for the Rh factor known as Rh+ and Rh-.
- Someone who is "Rh positive" or "Rh+" has at least one Rh+ allele, but could have two. Their genotype could be either Rh+/Rh+ or Rh+/Rh-. Someone who Rh- has a genotype of Rh-/Rh-.

Rh Factor	Possible Genotypes
Rh^+	Rh^+/Rh^+ Rh^+/Rh^-
Rh^-	Rh^-/Rh^-

Rh Inheritance

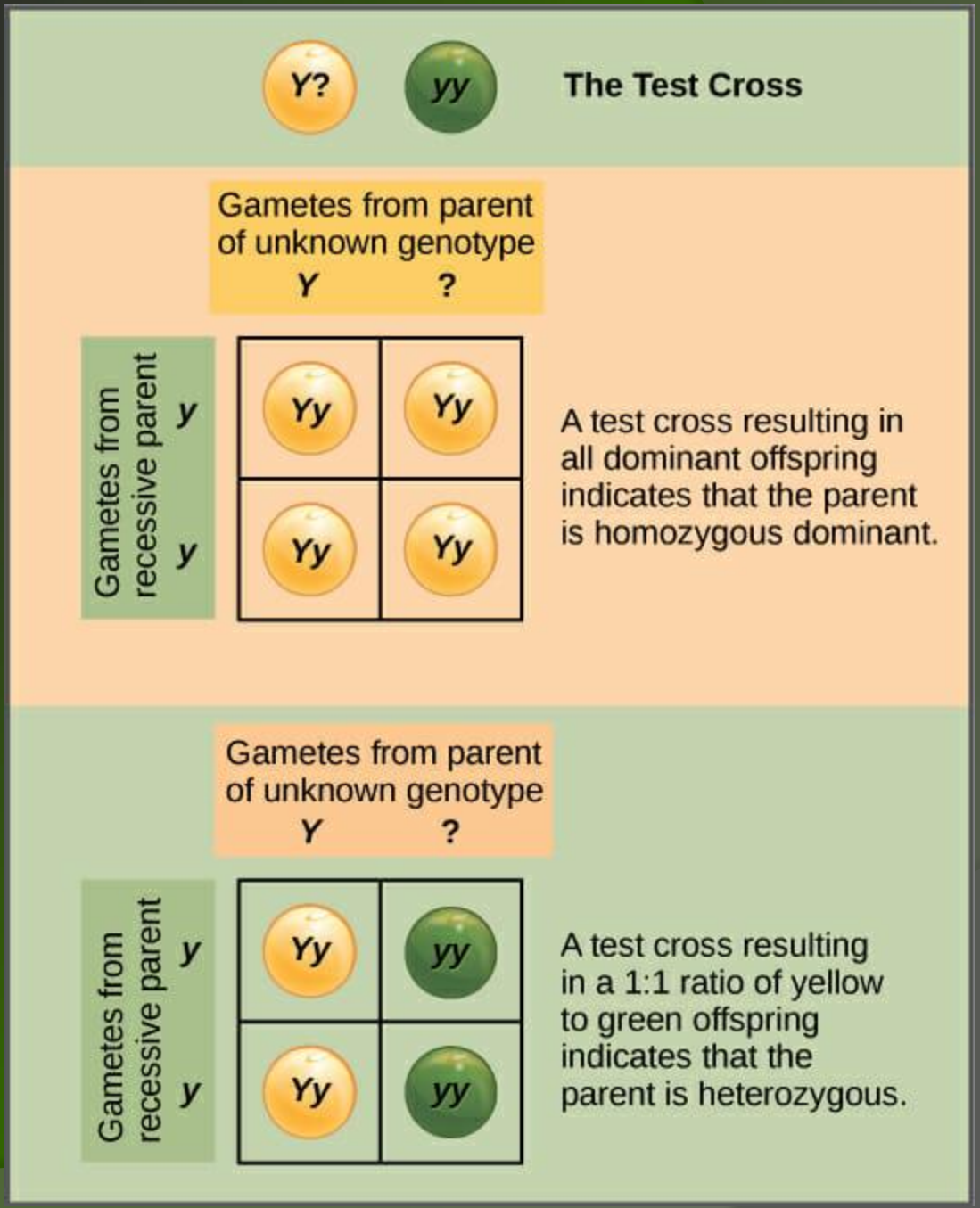
Rh inheritance is independent of A, B, O blood type.

Rh factor	Possible genotypes
Rh^+	Rh^+/Rh^+ OR Rh^+/Rh^-
Rh^-	Rh^-/Rh^-

Parent 1 Rh allele	Parent 2 Rh allele	Child's phenotype
Rh+	Rh+	Rh+
Rh-	Rh+	Rh+
Rh-	Rh-	Rh-

Test Cross

- In genetics, a test cross, first introduced by Gregor Mendel, involves the breeding of an individual with a phenotypically recessive individual, in order to determine the zygosity of the former by analyzing proportions of offspring phenotypes.



Back Cross

- Backcrossing is a crossing of a hybrid with one of its parents or an individual genetically similar to its parent, in order to achieve offspring with a genetic identity which is closer to that of the parent.