

# 11-1 The Work of Gregor Mendel



# Gregor Mendel's Peas

**Genetics** is the scientific study of heredity.

Gregor Mendel was an Austrian monk. His work was important to the understanding of heredity.

Mendel carried out his work with ordinary garden peas.

# Genes and Dominance












A **trait** is a specific characteristic that varies from one individual to another.













Each original pair of plants is the P (parental) generation.

The offspring are called the F<sub>1</sub>, or “first filial,” generation.

The offspring of crosses between parents with different traits are called **hybrids**.

The F<sub>1</sub> hybrid plants all had the character of only one of the parents.

Mendel's F <sub>1</sub> Crosses on Pea Plants				
	Seed Shape	Seed Color	Seed Coat Color	Pod Shape
P	Round 	Yellow 	Gray 	Smooth 
	X Wrinkled 	X Green 	X White 	
F <sub>1</sub>	 Round	 Yellow	 Gray	 Smooth

Mendel's F <sub>1</sub> Crosses on Pea Plants				
	Pod Shape	Pod Color	Flower Position	Plant Height
P	Smooth	Green	Axial	Tall
	 X  Constricted	 X  Yellow	 X  Terminal	 X  Short
F <sub>1</sub>	 Smooth	 Green	 Axial	 Tall

Mendel's first conclusion was that biological inheritance is determined by factors that are passed from one generation to the next.

Today, scientists call the factors that determine traits **genes**.

Each of the traits Mendel studied was controlled by one gene that occurred in two contrasting forms that produced different characters for each trait.

The different forms of a gene are called **alleles**.

Mendel's second conclusion is called the principle of dominance.





**The principle of dominance states that some alleles are dominant and others are recessive.**

An organism with a dominant allele for a trait will always exhibit that form of the trait.

An organism with the recessive allele for a trait will exhibit that form only when the dominant allele for that trait is not present.

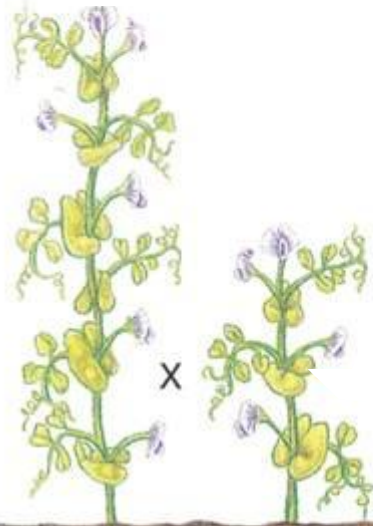
## Segregation

Mendel crossed the  $F_1$  generation with itself to produce the  $F_2$  (second filial) generation.

The traits controlled by recessive alleles reappeared in one fourth of the  $F_2$  plants.

# Mendel's F<sub>2</sub> Generation

P Generation



Tall

Short

Tall

Tall

Tall

Tall

Tall

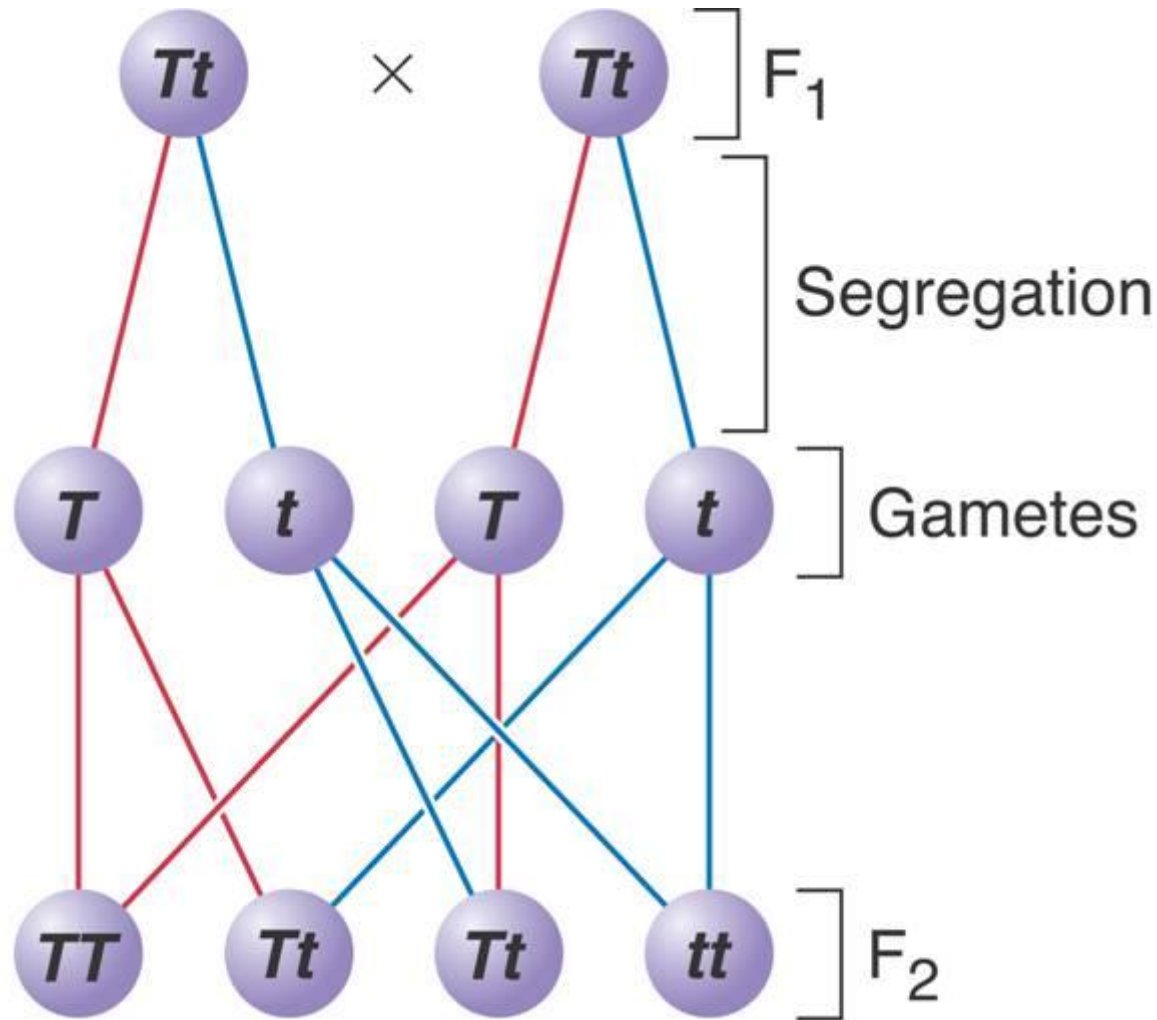
Short



**When each  $F_1$  plant flowers and produces gametes, the two alleles segregate from each other so that each gamete carries only a single copy of each gene.**

**Therefore, each  $F_1$  plant produces two types of gametes—those with the allele for tallness, and those with the allele for shortness.**

Alleles separate during gamete formation.



**END OF SECTION**