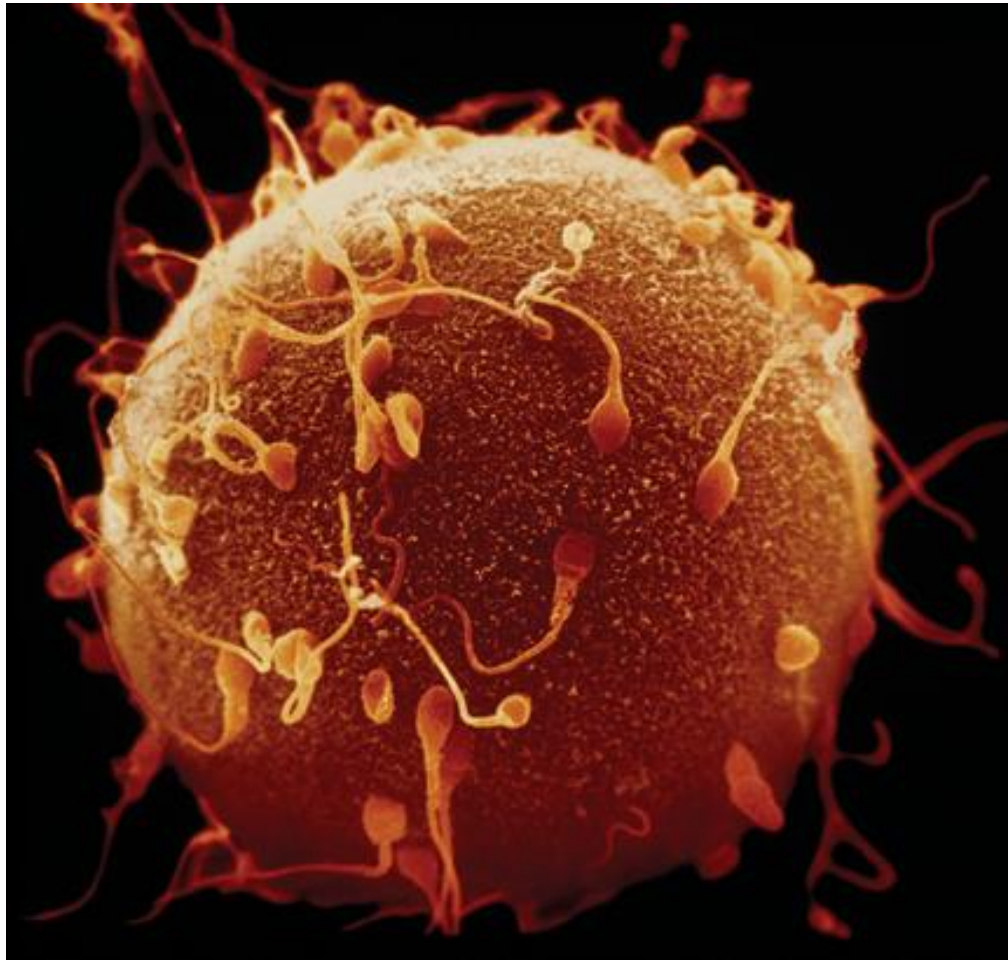


## 6.4 Traits, Genes, and Alleles

### KEY CONCEPT

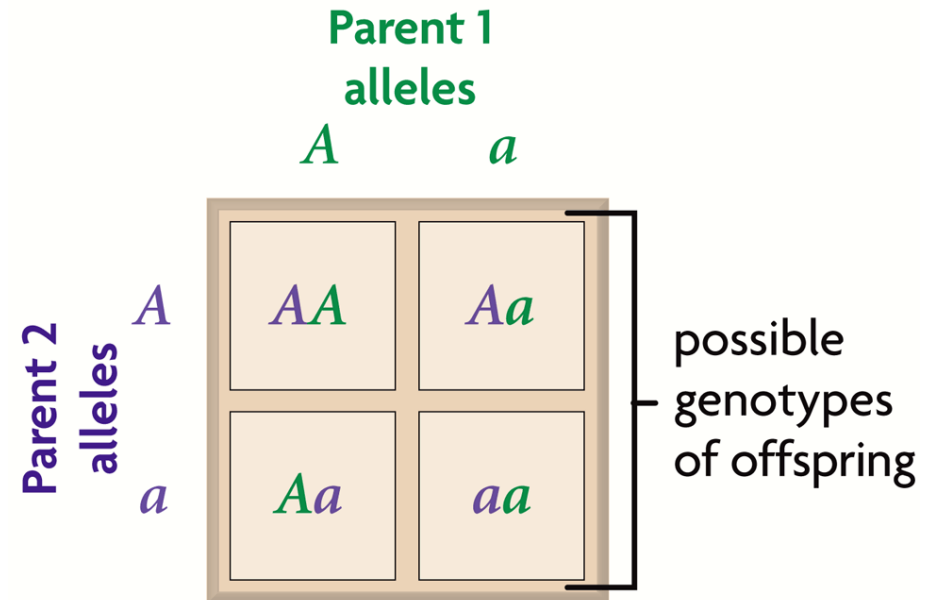
**Genes encode proteins that produce a diverse range of traits.**



## 6.4 Traits, Genes, and Alleles

### ▶ Punnett squares illustrate genetic crosses.

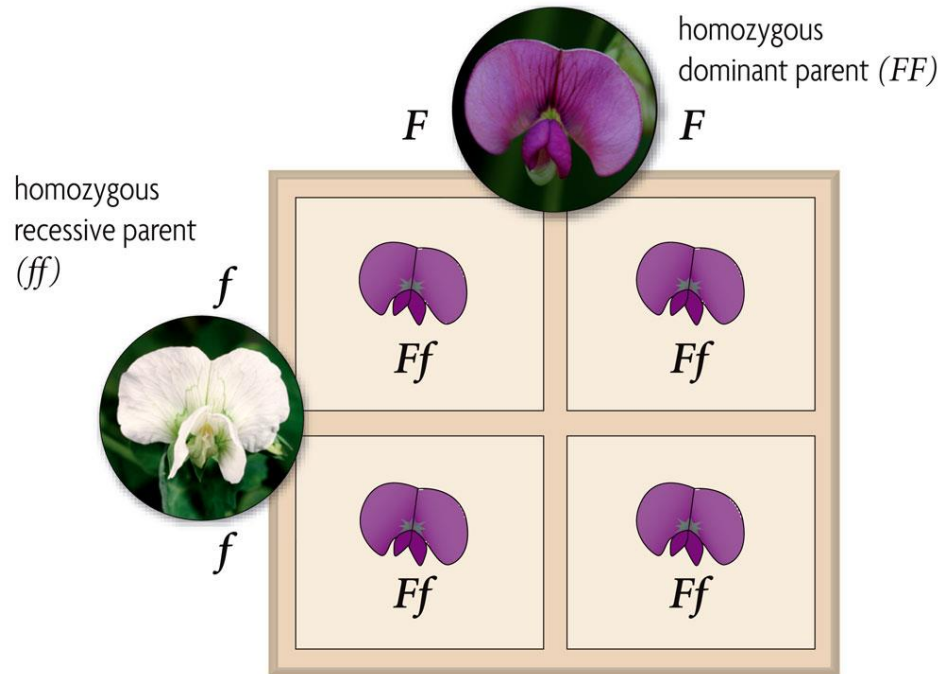
- The **Punnett square** is a grid system for predicting all possible genotypes resulting from a cross.
  - The axes represent the possible *gametes* of each parent.
  - The boxes show the possible genotypes of the offspring.



# 6.4 Traits, Genes, and Alleles

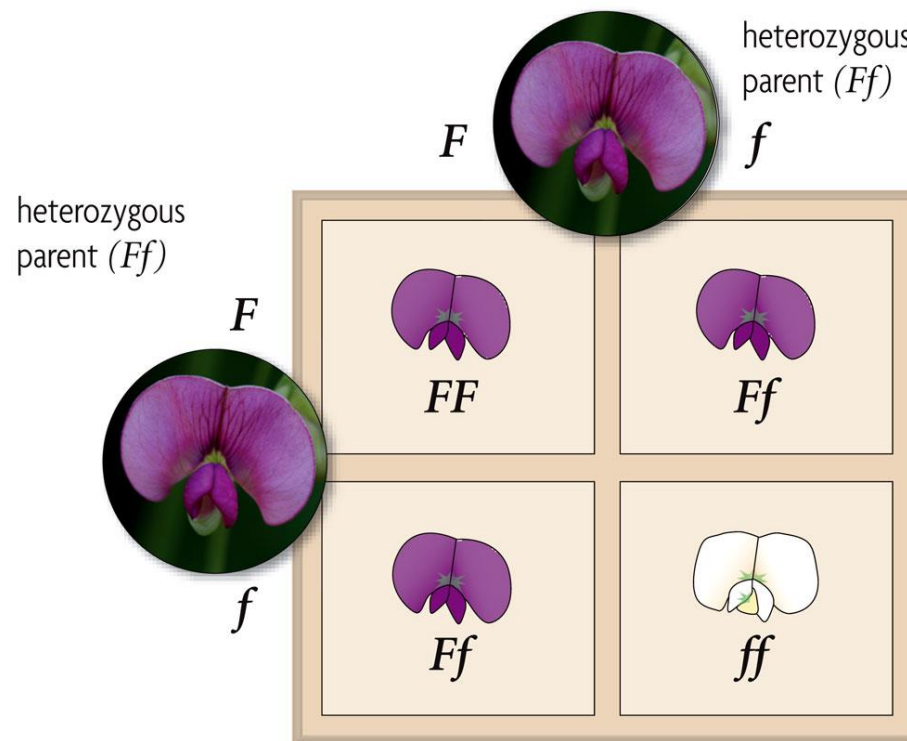
## ▶ A monohybrid cross involves one trait:

- Homozygous dominant ( $FF$ ) crossed with a homozygous recessive ( $ff$ ):
  - Possible Genotypes:  $Ff$
  - Possible Phenotypes: Purple, or 100% purple



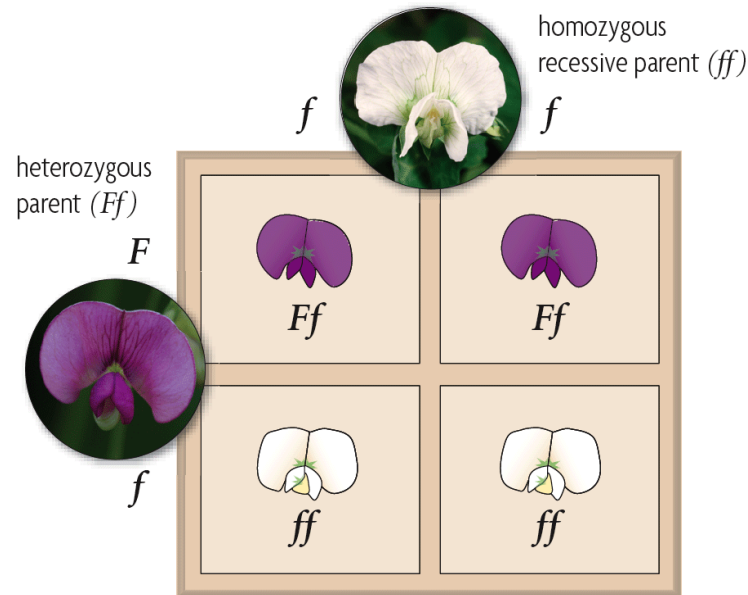
# 6.4 Traits, Genes, and Alleles

- Heterozygous ( $Ff$ ) crossed with a heterozygous ( $Ff$ )
  - Possible Genotypes:  $FF$ ,  $Ff$ ,  $ff$ , or a 1:2:1 ratio
  - Possible Phenotypes: 75% purple, 25% white



# 6.4 Traits, Genes, and Alleles

- Heterozygous ( $Ff$ ) crossed with homozygous recessive ( $ff$ )
  - Possible Genotypes:  $Ff$ ,  $ff$ , or 1:1
  - Possible Phenotypes: 50% purple, 50% white



- A **testcross** is a cross between an organism with an unknown genotype and an organism with the recessive phenotype.