

The Characters Mendel Examined Showed Complete Dominance

This means that the presence of the dominant allele, whether homozygous (PP), or heterozygous (Pp)...results in the dominant phenotype being expressed.

Flower color	 Purple	 White
Flower position	 Axial	 Terminal
Seed color	 Yellow	 Green
Seed shape	 Round	 Wrinkled
Pod shape	 Inflated	 Constricted
Pod color	 Green	 Yellow
Stem length	 Tall	 Dwarf

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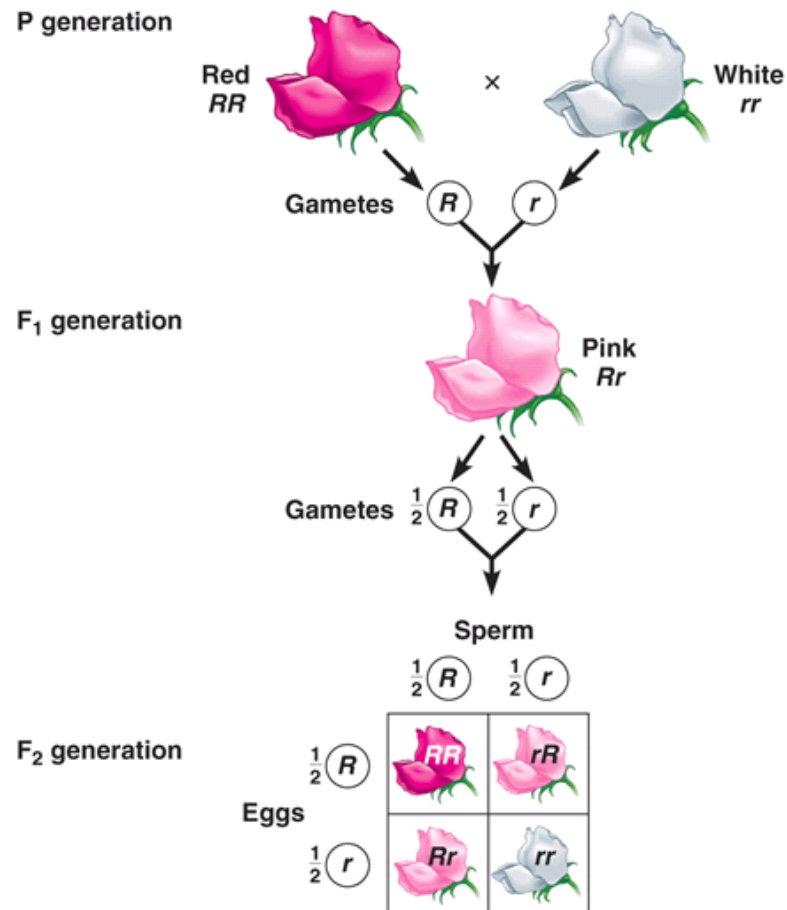
There was NO
blending of
traits...they were
either/or

Other Patterns Do Exist...

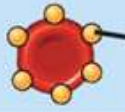
Incomplete Dominance: phenotype of heterozygous individual in intermediate of the two homozygous phenotypes

This is NOT a blending of genotype... notice the dominant and recessive alleles are still present in F₁ and can reappear in the F₂ generation

Prior to Mendel, it was thought that traits of offspring were "blended" from traits of parents, like mixing of two liquids...would result in less variation in each generation...and would not explain the reappearance of recessive traits in F₂



Multiple Alleles and Codominance

Blood Group (Phenotype)	Genotypes	Red Blood Cells	Antibodies Present in Blood	Reaction When Blood from Groups Below Is Mixed with Antibodies from Groups at Left			
				O	A	B	AB
O	ii		Anti-A Anti-B				
A	$I^A I^A$ or $I^A i$	 Carbohydrate A	Anti-B				
B	$I^B I^B$ or $I^B i$	 Carbohydrate B	Anti-A				
AB	$I^A I^B$		—				

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Blood type is determined by a pair of three possible alleles (A, B, and O)

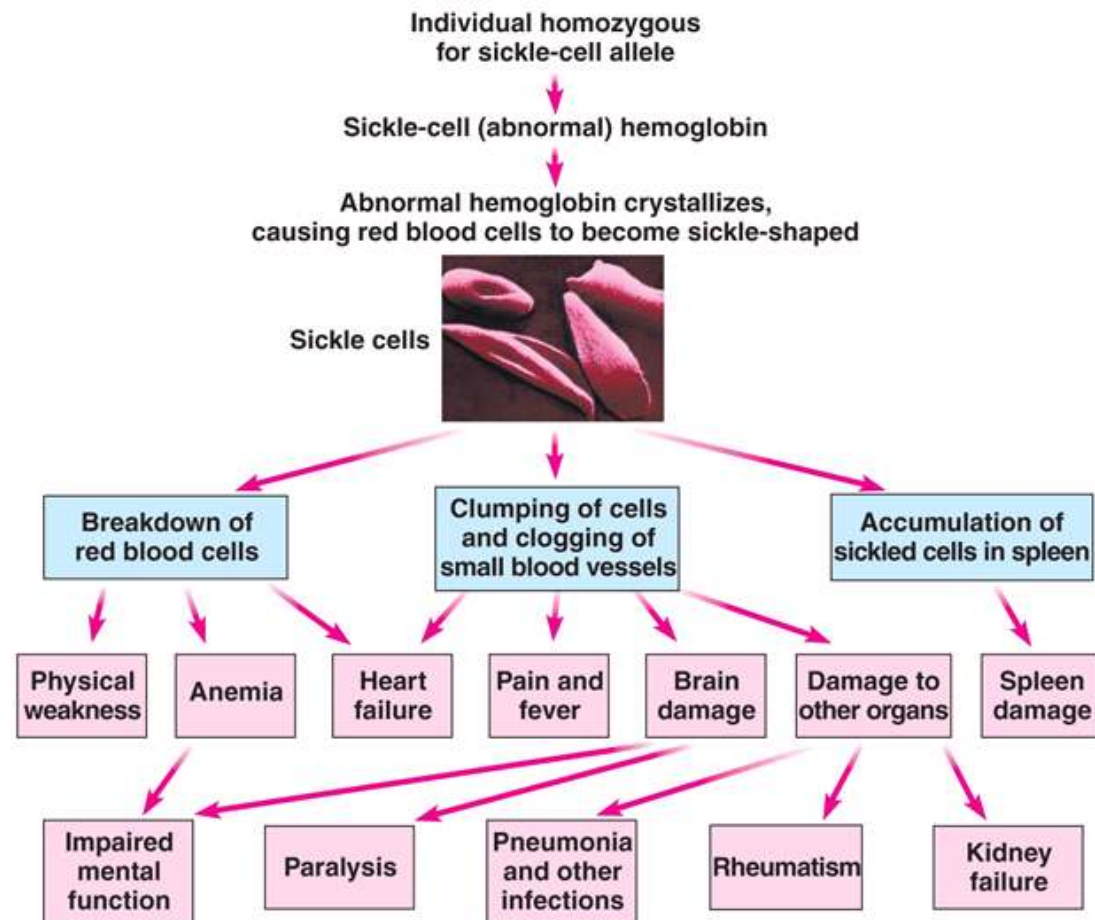
A and B are codominant, meaning they will both be expressed in the genotype $I^A I^B$ and are dominant over O

Pleiotropy (PLY -o-TRO-pee)

Many phenotypic characters are determined by a single gene

Only those homozygous for the sickle cell allele have the disease...those who are heterozygous have sickle cell "trait"

The sickle cell allele has remained in the population as it is an "advantage" in areas where malaria is prevalent

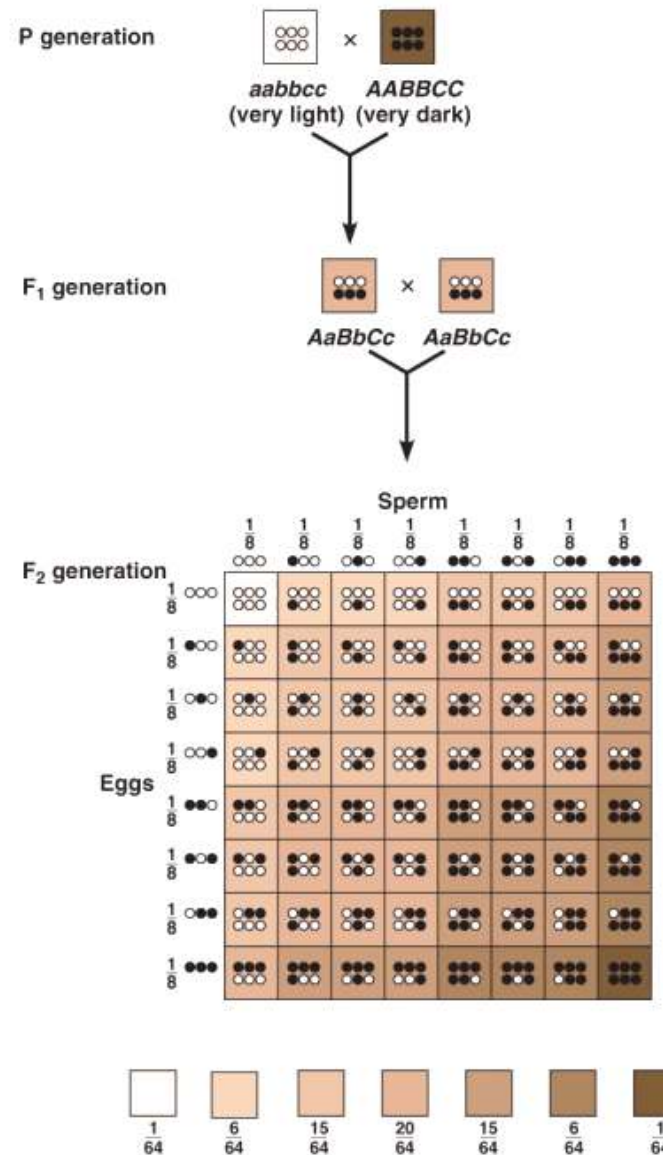


Polygenic Inheritance

One phenotypic character is the result of the interactions of two or more genes

The continuous variation in skin color is an example of polygenic inheritance...

Notice in this example that the combination of alleles from three genes determine the shade of color of the phenotype



Effects of Environment on Phenotype

UV radiation...causes a darkening of skin shade

Exposure to wind/sun may cause tree leaves to be different shapes and sizes on the same tree

Risks for cancer, heart disease, and other ailments can be the result of both genetic factors and the environment (smoker/nonsmoker, diet/exercise)

KEY POINT...you may be able to change a phenotype...but you CANNOT change your genotype!