Other Patterns of Inheritance

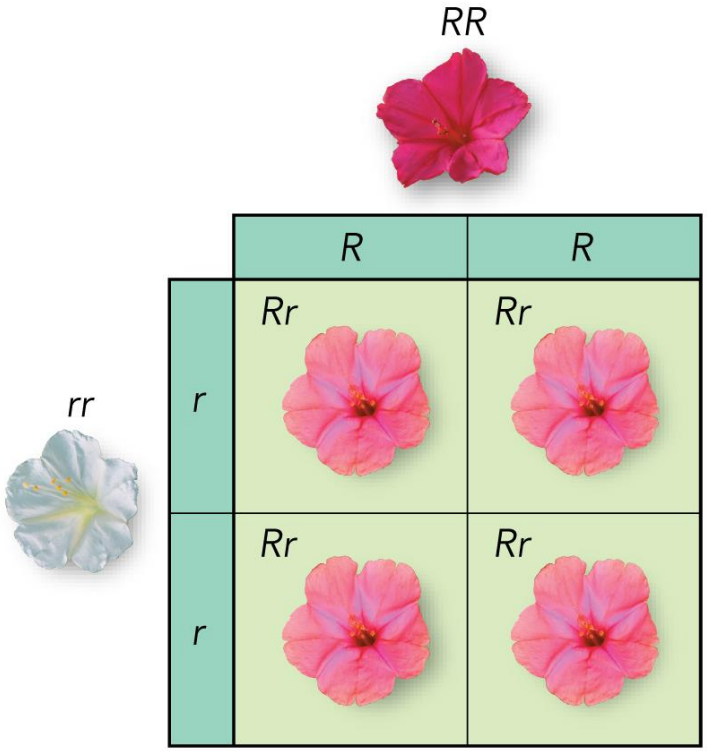
Incomplete Dominance

- As with all sciences, there are exceptions to every rule including Mendel's genetics.

- Some alleles are neither dominant nor recessive.

Incomplete dominance: One allele is not completely dominant over another.

- In the example to the right, the red and white flowers produce offspring with pink flowers.



Codominance

- Codominance: a situation in which the phenotypes produced by both alleles are clearly expressed

- Example: chicken feather color – codominance for black and white feathers

Multiple Alleles

Multiple alleles: a gene with more than 2 alleles

- Many genes exist in several different forms

Examples: human blood types, fur color in rabbits

Full color: CC, Cc^{ch}, Cc^{h}, or Cc

Chinchilla: $c^{ch}c^{h}$, $c^{ch}c^{ch}$, or $c^{ch}c$

Himalayan: $c^{h}c$ or $c^{h}c^{h}$

Albino: cc

C = full color; dominant to all other alleles
c^{ch} = chinchilla; partial defect in pigmentation; dominant to c^{h} and c alleles
c^{h} = Himalayan; color in certain parts of the body; dominant to c allele
c = albino; no color; recessive to all other alleles

Polygenic Traits

- **Polygenic traits:** traits controlled by 2 or more genes

- Many traits are produced by the interaction of several genes.

- Example: Shades of human eye color – at least 2 and as many as a dozen genes are responsible

- Traits typically show a wide variety of phenotypes.

Non-Mendelian Inheritance

- Some traits follow non-Mendelian patterns of inheritance.

- Ex. Leaf color in morning glory which is determined by the color of petal tissue in the maternal parent (mother)

- This is called *maternal inheritance*

- The leaf color is determined from the egg cell of the mother

- Human mitochondria are inherited from the mother's egg cell
  - Genetic disorders in human mitochondrial DNA follow this pattern of maternal inheritance

Genes and the Environment

Environmental conditions can affect gene expression and influence genetically determined traits.

The phenotype of an organism is only partly determined by its genotype.

Buckeye butterfly have different color patterns based on when the buckeyes hatched (summer or autumn)