

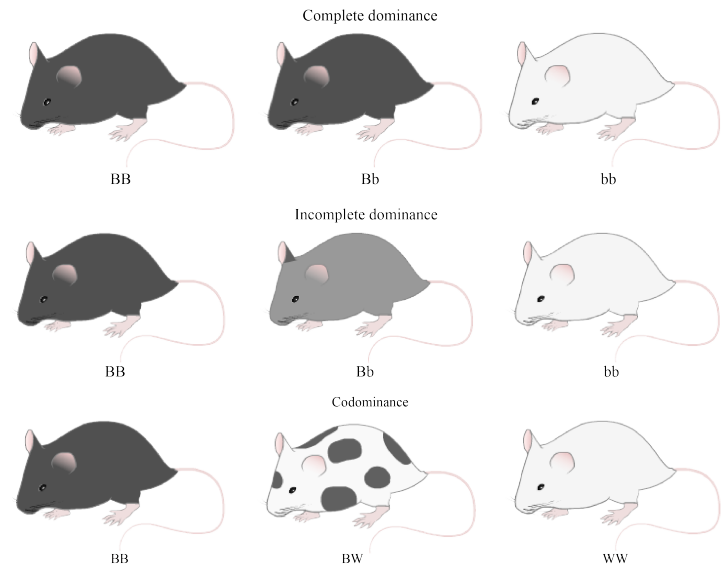
Non-Mendelian Genetics

Incomplete Dominance

- Complete dominance
 - Heterozygous individuals look like homozygous dominant
- Incomplete dominance – a type of inheritance in which neither of a pair of contrasting alleles is dominant over the other
 - Heterozygous individual is intermediate in phenotype

Codominance

- Codominance – a type of inheritance in which two dominant alleles are expressed at the same time without blending of traits
 - Heterozygous individuals display both phenotypes
 - Both alleles represented by capital letters



Multiple Alleles

- Multiple alleles – the three or more different forms of a gene, each producing a different phenotype
- Blood type
 - Alleles **A** and **B** are codominant
 - Allele **O** is recessive to both A and B

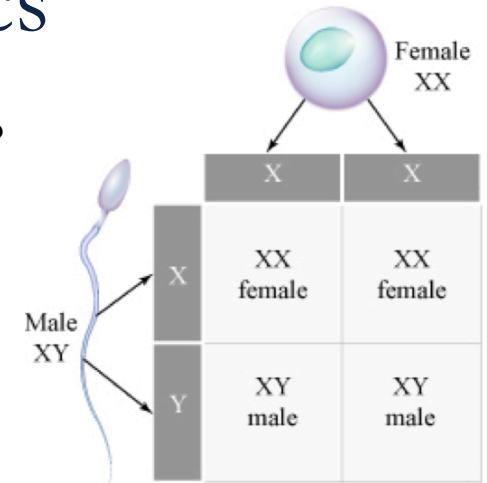
Allele	Carbohydrate
I^A or A	A ▲
I^B or B	B ●
i or O	none

Genotype	Red blood cell appearance	Blood type
$I^A I^A$ or $I^A i$ AA or AO		A
$I^B I^B$ or $I^B i$ BB or BO		B
$I^A I^B$ AB		AB
ii OO		O

Non-Mendelian Genetics

Sex Determination

- Sex chromosome – a chromosome that determines the sex of an individual; there are two
- Autosome – a chromosomes other than a sex chromosome
- Humans have 22 pairs of autosomes
- Humans have one pair of sex chromosomes
 - Females have two X chromosomes (XX)
 - Males have one X and one Y chromosome (XY)
- Sex is not determined by male parent's gametes in all species



Sex-linked Inheritance

- Thomas Morgan discovered a link between eye color and sex in fruit flies
 - Recessive white eye color gene is on X chromosome
 - Males with one recessive X have white eyes
 - Females must have two recessive X chromosomes to have white eyes
- Sex-linked trait – trait that is controlled by a gene found on one of the sex chromosomes
 - Ex) Color-blindness and hemophilia are sex-linked disorders
 - Most sex-linked traits are on X chromosome and only a few sex-linked traits are on Y chromosome



Polygenic Inheritance

- Polygenic inheritance – a process in which two or more genes affect the same characteristic
 - Melanin – a brown pigment that determines skin and eye color
 - Melanin production is controlled by several different genes
- Length of corn ears is controlled by two genes
 - Longest ears of corn have genotype **AABB**
 - Shortest ears of corn have genotype **aabb**
 - All other genotypes produce intermediate lengths

