

C. Genetic Terms:

1. gene: a segment of DNA that codes for the production of a protein
2. allele: alternate form of a gene
ex. pea shape is round or wrinkled
3. genotype: shows alleles present in a gene
 - a. heterozygous: two different alleles in a gene ex. Aa
 - b. homozygous: two of the same alleles in a gene. ex. AA or aa
4. phenotype: the physical appearance of the organism

Dominant = 1 allele
recessive = 2 alleles

Mendel: Experiment 1

III. Gene Expression

A. Traits

1. are the physical characteristics of an organism
2. controlled by one or more genes with two or more alleles
3. phenotype describes the trait

B. Dominant and Recessive Alleles

1. A dominant allele will hide the appearance of the recessive allele in the phenotype when the individual is heterozygous for the trait (Aa)
 - a. only certain traits follow this expression (Mendelian traits)
 - b. Dominant allele uses CAPS, recessive allele in lower case
- ex A = free earlobes, a = attached earlobes

<u>genotype</u>	<u>phenotype</u>
AA (homozygousD)	free earlobes
Aa (heterozygous)	free earlobes
aa (homozygousR)	attached earlobes

C. Incomplete Dominance

1. heterozygous individuals show a blend of the two alleles in the phenotype
 ex. in carnations, flower color is controlled by a single gene with two alleles.

The red allele (R) is incompletely dominant to the white allele (r).

The possible genotypes and phenotypes are:

- RR = red flowers
- Rr = pink flowers
- rr = white flowers



D. Co-Dominance

1. both alleles are expressed equally in a heterozygous individual
 ex. cattle hair color is controlled by one gene with two codominant alleles

R = red hair; R' = white hair

- RR = red hair
- RR' = roan (both red and white)
- R'R' = white hair



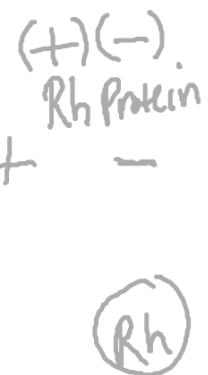
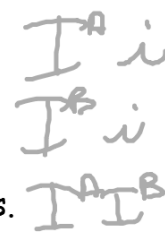
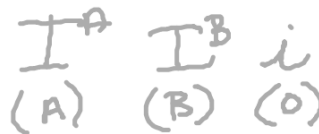
E. Multiple Allele Genes

1. a gene with three or more alleles
 2. only two alleles are present in one individual
 ex. human blood type is controlled by a single gene with three alleles.

The A allele (I^A) is codominant to the B allele (I^B). Both the A and B alleles are dominant to the O allele (i).

The possible genotypes and phenotypes are:

Genotype	Antigen on RBC (Antigen)	Antibodies in person	Rh Protein
$I^A I^A$ $I^A i$ > Type A	A	B	(+)
$I^B I^B$ $I^B i$ > Type B	B	A	(-)
$I^A I^B$ - Type AB	A, B	NONE	(Rh)
$i i$ - Type O		A, B	



IV. X-linked Recessive Disorders

sex-linked

R
r

A. X-linked Traits

1. are inherited on the X chromosome
2. Fathers pass their X c'some to all daughters
3. Mothers can pass X-linked genes to both sons and daughters

B. X-linked Recessive Disorders

1. Females will only show the trait if both X c'somes have the bad gene
2. Females will not show the disorder if only one X has the bad gene
- a. females with one bad X and one good X are called "carriers"
since they are able to pass the bad gene to their sons/daughters
3. Males will show the trait when their X has the bad gene (only one X)
4. Examples of X-linked recessive disorders:
 - a. color blindness: involves blue and green light
 - b. Duchenne's Muscular Dystrophy: progressive weakening of muscles
 - c. Hemophilia: bleeding disease; lacks protein to clot blood

(rr)

X^cX

X^cX^c

XX

X^cY

XY

BAlDness "male-pattern"