

Modern Genetics: Patterns of Inheritance Beyond Mendel

1-Incomplete Dominance

heterozygote shows phenotype that is
intermediate btw homozygous dominant
and homozygous recessive

flower color in snapdragons

P: red X white

F1: pink

even though this seems like old blending
theory, it still follows basic rules of inherit

Modern Genetics

2-Co-Dominance

both alleles express themselves fully

3-Multiple Alleles

more than 2 forms of a gene in a population

Human Blood Groups show dominance,
co-dominance & mult alleles

Phenotype	Genotype	Antigen	Antibody
A	AA, AO	A	antiB
B	BB, BO	B	antiA
AB	AB	A&B	none
O	OO	none	antiA,antiB

Human Blood Groups

dominance: A is dominant to O, B is dominant to O

co-dominant: A & B are both expressed

multiple alleles: A, B, O

antigen: protein on surface of RBC

antibody: substance that recognizes & fights
foreign materials

type A given B blood: antiB antibody detects
foreign antigen B, clumps RBC's, can clog
arteries

universal donor: type O, has no antigens

universal recipient: type AB, has no antibodies

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4-Polygenic Traits

traits controlled by more than 1 pair of genes

hair color, skin color, height

eye color: 6 prs genes, tone, amt pigmt,
distribution of pigmt

5-Sex determination

humans: 23 prs chrom

22 prs autosomes, 1pr sex chromo

XX: female, 23 pr true homol chrom

XY: male, 22 pr homol chrom, 1 pr nonhomo

who determines sex of baby?

Modern Genetics

5-Linked genes

genes carried on same chromosome

linked genes are inherited together

Law of Indep Assortmt applies to genes on
different chromosomes

but still have crossing over

6-Sex-linked traits

traits carried on sex chromosomes

color-blindness & hemophilia

these 2 traits are carried on X chromo

so females get 2 genes for the trait, males
get only one

7-epistasis, p.273 in text

when one gene pair influences the
expression of another gene pair
coat color in labrador retrievers

B_: gives black coat color

bb: gives brown color

but there is 2nd gene pair E/e that allows
coat color to be deposited in hair (that
allows expression of coat color)

E_: allows color to be deposited

ee: does not allow color to be deposited

so: BBEE, BB Ee, BbEE, Bb Ee: black

bbEE, bb Ee: brown

BBee, Bbee, bbee: blonde

Chromosomal Abnormalities

Nondisjunction: failure of homologous chrom to separate during meiosis

Down Syndrome: nondisjunction of #21

3 # 21 chromosomes in every cell in body

Klinefelter's Syndrome: XXY

Turner's Syndrome: XO

Deletion: part of chromosome is missing

Crie du Chat: deletion of chrom #5