GENETICS AND INHERITED TRAITS

What is Genetics?

- Genetics study of genes and heredity
- Genes determine your characteristics
- Makes you who you are
- Also controls body processes
- Passed down from parents

Where do your genes come from?

- 1/2 chromosomes come from your mother
- 1/2 chromosomes come from your father
- Create chromosome pairs

What are chromosomes?

- All your DNA wound up
- Contains all your genetic information
- Humans have 46 chromosomes
 - 23 from mom
 - 23 from dad
- Some diseases based on chromosomes

Homologous Chromosomes

- Term used to describe chromosome pairs
- Mothers chromosome + fathers chromosome
- Similar in length
- Genes in same location on chromosome

How Genes Transmit Information

- DNA contains all genes
- Genes contain information that determines traits
- Genes code for various proteins
- Proteins control development and functions

Inherited Traits

- Traits passed down from past generations
- Examples
 - Dimples
 - Tongue rolling
 - Hair, eye, skin color
 - Allergies
 - Medical conditions

Dominant vs. Recessive Alleles

- Alleles gene varieties
- Dominant Alleles
- Recessive Alleles
- Punnett squares display these alleles
- Determine which phenotypes occur
 - Phenotype = physical appearance
 - Genotype = genetic representation of alleles

Punnett Squares

- Shows probability of allele combinations
- Heterozygous Dominant and Recessive
- Homozygous Dominant and Dominant or Recessive and Recessive

Codominant Traits

- 2 Alleles are equally dominant
- Blending heterozygous, both traits expressed
 - Wavy hair, a mix of curly and straight hair traits
- Creates combinations of traits

Sex-Linked Traits

- Some genes carried by sex chromosome
- Can be shown by Punnett Square
- Examples
 - Colorblind disorders
 - Hemophilia

Polygenic Traits

- Phenotypes controlled by two or more genes
- Genes represented at different chromosome loci
- Example
 - Height several genes affect how tall you are
- Memory hint: poly = many, genic = genes

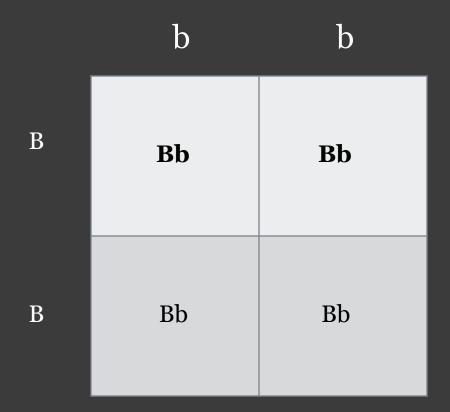
Mendel's Laws

- Gregor Mendel 1860s Pea pod experiment
- Law of Segregation and Independent Assortment
 - Alleles separate during reproduction
 - Offspring don't always exactly match parents

Punnett Square Problem

Brown eyes are dominant (B) and blue eyes are recessive (b) in humans. If a blue eyed man and a homozygous brown eyed woman have a child, what are the chances their child will have blue eyes?

Answer

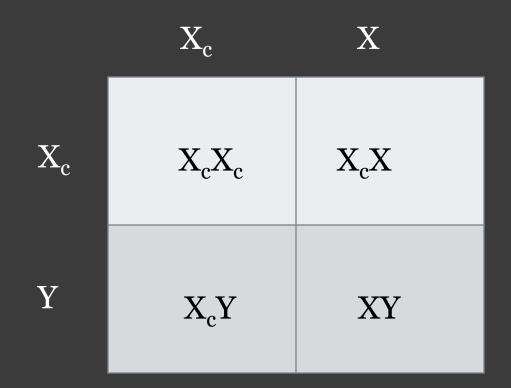


There is no chance their children will have blue eyes

Punnett Square Problem

Colorblindness is a sex-linked trait carried on the X chromosome. If a woman is a carrier of the gene, and her husband is colorblind, what are the chances her sons will be colorblind?

Answer



There is a 50% chance their sons will be colorblind.

Citations

- http://www.michigan.gov/documents/mde/Biology HCSE 9-15-09 292345 7.pdf
- http://anthro.palomar.edu/mendel/glossary.htm
- http://ghr.nlm.nih.gov/handbook/basics/chromosome
- http://biology.about.com/od/geneticsglossary/g/homologouschrom.ht
 m
- http://ghr.nlm.nih.gov/glossary=homologouschromosomes
- http://www.biology-online.org/dictionary/Inherited Traits
- http://ghr.nlm.nih.gov/handbook/howgeneswork
- http://science.halleyhosting.com/sci/soph/genetics/notes/codominanc e.htm
- http://www.biology-online.org/dictionary/Polygenic traits
- http://www.nature.com/scitable/definition/principle-of-segregationlaw-of-segregation-mendel-301
- http://anthro.palomar.edu/biobasis/bio 4.htm
- http://genetics.thetech.org/ask/ask8o
- http://biology.about.com/od/geneticsglossary/g/Mendels-Law-Of-Independent-Assortment.htm