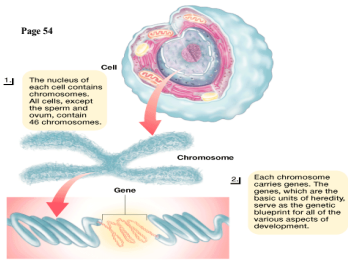
Goals & Objectives

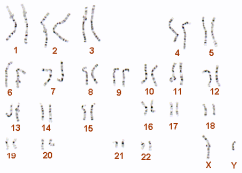
- **Learn** the facts of genetics.
  - Chromosomes, inheritance, genetic disorders.
  - Heredity is *not* destiny.
- **Apply** our new knowledge to
  - Guess about qualities of our kids.
  - **Evaluate** cloning and eugenics.



Chromosomes

- Piles of genetic material.
- Have GENES - smallest unit of heredity
- Made of DNA - deoxyribonucleic acid.

All about the Chromosomes!



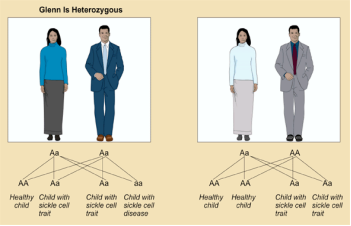
What are Genes?

- **Genes** are a "group of nucleotide bases that provide specific set of biochemical instructions." (Kail, 2001)
- GATTACA (guanine, adenine, thymine, cytosine)

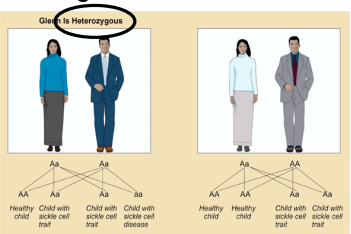
Nucleotide bases

- **Dominant** - when the presence of that gene means it happens.
  - Curly hair, dark hair, brown eyes, thick lips, normal hearing, Type A or B blood, being male, etc (p.56.)
- **Recessive** - need two the same to work.
  - By evolution, most diseases are recessive.
  - But have purpose (sickle cell resistant to malaria)
  - Huntington's is dominant.
- **Incomplete Dominance** - Halfway between.

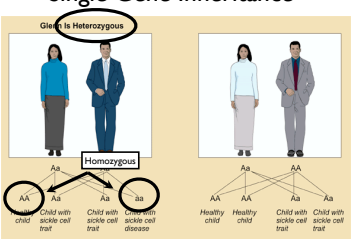
Single Gene Inheritance



Single Gene Inheritance



Single Gene Inheritance



Behavioral Genetics

- ***Behavioral genetics*** is the branch of genetics that deals with the inheritance of behavioral and psychological traits.
- It is complicated.
- Next time someone says "hey did you hear? They found the gene for…"
- Say, "Really! I'll bet its more complicated than that.

Two kinds of Twins

- ***Monozygotic*** - meaning one egg.
- ***Dizygotic*** - meaning two eggs (and two sperm).
- That's mono like monopoly, mono (as opposed to stereo) and mononucleosis),
- And Di as in diad, dichromatic, but not Lady Di.

Twins are interesting

- Because monozygotic twins are genetically identical, any differences must be due to nurture, and any similarities could be due to genetics.
- Because fraternal (dizygotic) twins are only about half genetically alike, have a control.
- This is important, because if no difference is found, still might be environment.

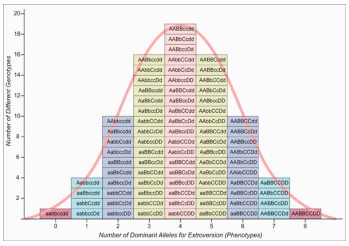
More Methods of Behavioral Genetics

- *Adoption studies:* heredity is implicated when children are more like their biological parents than their adoptive parents
- *DNA marker*: examine specific alleles

Polygenic Inheritance

- Most traits are determined by many genes.
- Think of it as a football team.
  - Many players.
  - One outcome.
- For the population, think of it as a stock portfolio.
  - Hundreds of stock
  - Wide range of outcomes - normally distributed.

Polygenic Inheritance



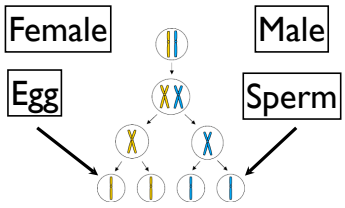
Characteristics Most Affected by Heredity

- Intelligence
- Psychological Disorders
- Personality

2.2 Genetic Disorders

- Inherited Disorders: sickle-cell disease, PKU, Huntington's, Albinism, Cystic fibrosis, Tay-Sachs
- Abnormal Chromosomes: Down syndrome, Turner's syndrome

Meiosis - Normal



When meiosis goes wrong

- Klinefelter's syndrome - XXY
- XYY - XYY
- Turner's Syndrome - X
- XXX Syndrome - XXX

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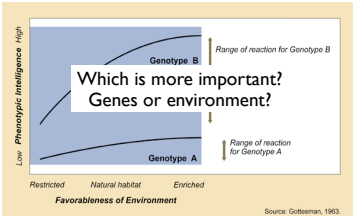
Paths from Genes to Behavior

- Genes affect behavior indirectly.
  - Maybe very indirectly.
  - The gene for popularity?
- The impact of genes on behavior depends on the environment.

Reaction Range



Changing Relations between Nature and Nurture

- *passive gene-environment relation:* parents provide genes and environments
- *evocative gene-environment relation:* phenotypes evoke different responses
- *active gene-environment relation:* children actively seek environments that match their genetic makeup - **niche-picking.**

The Nature of Nurture

- Siblings are not much alike. Why?
  - Genes are different.
  - Breeding takes time.
- Family environments affect each child differently.
  - **Evocative** and **active** reactions lead to non-shared environmental influences.