Experimetrix – Extra Credit

APA Writing Style
Genetic Foundations
Prenatal Development

January, 2007

APA Writing Style

• How do I do write a paper APA style?
  – See Handout/Link to APA-style
• Plagiarism, how to cite references…

Genetics and the Life Span

• Why is genetics important to life-span development?
• Balte’s view of evolution and culture
  (nature v. nurture over time)
Genetic Foundations

• What is the difference between **phenotype** and **genotype**?

• Whether or not a particular characteristic is expressed is often determined by our genotype (Dominant-Recessive Inheritance)

• Ex: Curly Hair, Facial Dimples

Genetic Material and Processes

• Material:
  – Chromosomes
    • 23 pairs (22 pair autosomes, 1 pair sex)
  – Gene
    • Alleles
    • Homozygous vs. Heterozygous
  – Deoxyribonucleic acid (DNA)

• Processes:
  – Mitosis
  – Meiosis
    • Gametes
    • Zygote

Dominant-Recessive Inheritance

• The dominant allele determines phenotype, whereas the recessive allele does not affect phenotype. However, if have 2 recessive alleles, that genotype will be expressed.

Ex: Phenylketonuria (PKU), Curly Hair, Facial Dimples, Type A vs. Type O

Keep in Mind: Parent can be carriers (heterozygous)

VERY FEW diseases that have a dominant inheritance. Why? Ex: Huntington Disease
Codominance

- Ex: Sickle cell anemia
  - Sickle cell anemia is an inherited disease in which the red blood cells, normally disc-shaped, become crescent shaped. As a result, they function abnormally and cause small blood clots. These clots give rise to recurrent painful episodes called "sickle cell pain crises." [medline](http://www.merck.com/mmhe/sec01/ch002/ch002b.html)

X-Linked Inheritance

- Phenotypes related to traits carried on the X chromosome.
- Males are more susceptible, why?
- Ex: Hemophilia

Genetic Imprinting

Imprinting
- Chemical marker that activates either father’s or mother’s gene.
- Often temporary.
- Fragile X Syndrome
- Autism
- Emotional Disorder
Polygenic Inheritance

- Defined
- Height, weight, intelligence, personality
- Blood pressure

Chromosomal Abnormalities

- **Down Syndrome (autosomes)**
  - Usually recognized at birth (if reach birth)
  - Usually problems during meiosis with 21st chromosome. End up with 3 chromosomes, rather than 2, thus aka Trisomy 21

- **Abnormalities of Sex Chromosomes**
  - Usually not recognized until adolescence
  - Very specific intellectual/physical challenges
    - XXY Syndrome
    - Triple X Syndrome (XXX)
    - Klinefelter Syndrome (XXY)
    - Turner Syndrome (XO)

Practice Quiz

- Inside each human cell are rodlike structures called that store and transmit genetic information.
  1. chromosomes
  2. nuclei
  3. DNA
  4. Genes

- A unique feature of DNA is that it can duplicate itself through a process called
  1. meiosis
  2. imprinting
  3. codominance
  4. mitosis

- A person whose 23rd pair of chromosomes is xy:
  1. is heterozygous.
  2. has Turner syndrome.
  3. is male.
  4. has Down syndrome.
• Dark hair is a dominant trait. Allison has blonde hair and Albert has dark hair. If they have four children, which scenario is most likely?
   1. All four children will have dark hair.
   2. All four children will have blonde hair.
   3. Two children will have blonde hair and two children will have dark hair.
   4. Three children will have dark hair, and one child will have blonde hair.

• Maya tested positive for PKU at birth. For Maya to have a normal lifespan, she will:
   1. require hormone replacement therapy.
   2. have to be placed on a diet low in phenylalanine.
   3. require frequent blood transfusions.
   4. need regular injections of insulin.

• ________ are more likely than ________ to be affected by X-linked diseases.
   1. Singletons; twins or triplets
   2. First-born children; later-born children
   3. Males; females
   4. African Americans; European Americans

• ________ helps explain why children are more likely to develop asthma if their mothers, rather than their fathers, suffer from it.
   1. X-linked inheritance
   2. Polygenetic inheritance
   3. Modifier genes
   4. Genetic imprinting

• A child born with an extra 21st chromosome has:
   1. hemophilia.
   2. sickle cell anemia
   3. fragile X syndrome
   4. down syndrome
Abnormalities of the sex chromosomes:
1. are a leading cause of mental retardation.
2. typically result in sexual dysfunctions during adulthood.
3. usually disrupt development so severely that miscarriage occurs.
4. often are not recognized until adolescence.

Prenatal Development
1. Prenatal Development and the Lifespan
2. Conception
3. Germinal, Embryonic, and Fetal Period
4. Teratogens
5. Cultural differences in childbirth beliefs and practices – Class Activity

Prenatal development and the Life Span
• How is prenatal development important for life-span human development?
• Class examples…
Conception and Implantation

Human Blastocyst

The Placenta and Umbilical Cord
Periods of Prenatal Development

<table>
<thead>
<tr>
<th>Period</th>
<th>Length</th>
<th>Key Events</th>
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| Zygote | 2 weeks | • Fertilization  
                          • Implantation  
                          • Start of Placenta |
| Embryo | 6 weeks | • Arms, legs, face, organs, muscles all develop  
                          • Heart begins beating |
| Fetus  | 30 weeks| • "Growth and finishing"                       |
Teratogens

- List and discuss some teratogens and potential harmful effects on prenatal development...
- Role of environment!

Cultural Perspective – Class Activity for Points!!!

- How might different cultures perceive and practice childbirth?
- Read about a different culture. Pick one culture and read a brief article discussing cultural values and practices surrounding childbirth for that culture.
- Discuss different beliefs/practices
- Discuss potential barriers to prenatal and childbirth care in the medical field