

SOLUTIONS MANUAL

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WHAT'S INSIDE:

STUDENT EDITION

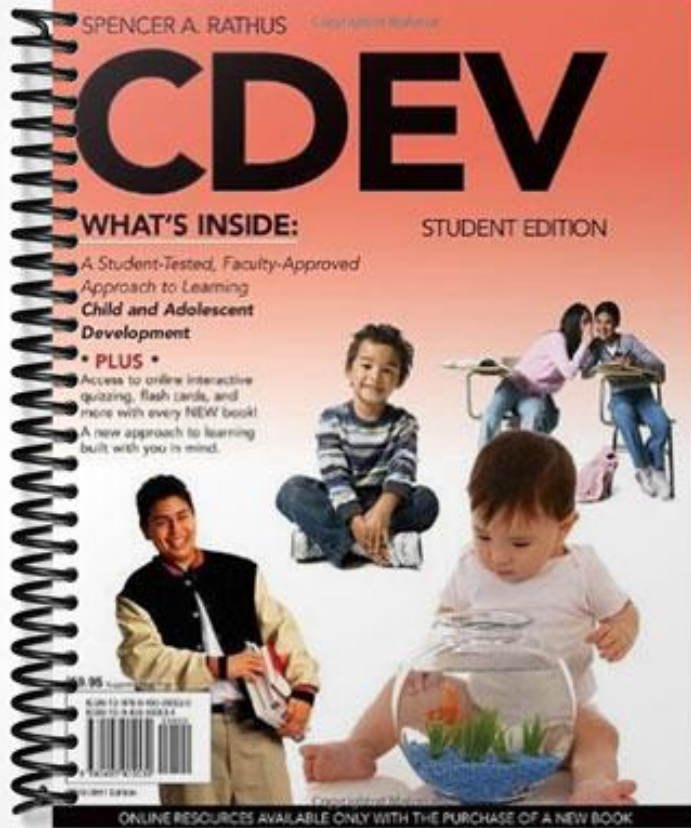
A Student-Tested, Faculty-Approved
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**Child and Adolescent
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Chapter 2 Heredity and Conception

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Learning Outcomes

- L01:** Describe the influences of heredity on development, referring to chromosomes and genes, mitosis, twins, and dominant and recessive traits
- L02:** Describe the features and causes of various chromosomal abnormalities
- L03:** Describe the features and causes of various genetic abnormalities
- L04:** Discuss methods of detecting genetic abnormalities
- L05:** Describe methods of determining genotypes and phenotypes
- L06:** Describe the process of conception
- L07:** Discuss the causes of infertility and alternate ways of becoming parents

Chapter Summary

Chapter 2 focuses on the influences of heredity and environmental factors on prenatal development. Information in the chapter also focuses on the process of conception.

Lecture Outline

- I. The Influence of Heredity on Development**
 - A. Genetics: the field of biology that studies heredity

- B. Chromosomes and genes
1. Traits are transmitted by chromosomes and genes
 2. Chromosomes are rod-shaped structures found in cells
 - a. Typical human cells contain 46 chromosomes organized in 23 pairs
 - b. Each chromosome contains thousands of segments called genes
 - c. Genes are biochemical materials that regulate the development of traits
 - d. Some traits are determined by a single pair of genes whereas other traits are polygenic, derived from multiple pairs of genes
 - e. Heredity is governed by 20,000 to 25,000 genes
 - f. Genes are segments of strands of deoxyribonucleic acid (DNA)
 - i. Take the form of a double spiral or helix
 - ii. One of two pairs of bases
 - Adenine (A) with Thymine (T)
 - Cytosine (C) with Guanine (G)
 - iii. The sequence of the rungs is the genetic code
 3. Mitosis and meiosis
 - a. Mitosis: strands of DNA break apart or unzip; the double helix then duplicates
 - b. Mutation: a sudden variation in a heritable characteristic due to an environmental influence
 - c. Meiosis: reduction division in which the DNA ladders unzip leaving unpaired halves of chromosomes; each new cell nucleus contains only 23 chromosomes
 - i. Ex: sperm and ova; we get 23 chromosomes from our father and 23 chromosomes from our mother
 - ii. Twenty-two of the pairs are autosomes, pairs that look alike and possess genetic information concerning the same set of traits
 - iii. The 23rd pair are sex chromosomes, which look different and determine our sex
 - If you receive an X chromosome from your father, you develop into a female; if you receive a Y chromosome from your father, you develop into a male
- C. Identical and fraternal twins
1. A zygote divides into two cells that separate so that each develops into an individual with the same genetic makeup
 - i. Monozygotic (MZ) twins are identical
 2. If a woman produces two ova in the same month and each is fertilized by different sperm, they develop into fraternal twins
 - i. Dizygotic twins (DZ)
 3. DZ twins run in families: if a woman is twin and her mother was a twin, too, the chances rise

4. As a woman reaches the end of the child-bearing years, ovulation becomes less regular
 - a. The chances of DZ twins increases with parental age
 - b. Fertility drugs also increase the chance of DZ twins
- D. Dominant and recessive traits
 1. Pairs of genes determine traits
 - a. Each pair of genes is termed an allele
 2. When both of the alleles for a trait are the same, the person is homozygous for that trait
 3. When the alleles differ for a trait, the person is heterozygous for that trait
 - a. When a dominant allele is paired with a recessive allele, the trait determined by the dominant allele appears in the offspring
 - i. Brown eyes are dominant; blue eyes are recessive
 - b. Individuals who carry both the dominant and the recessive gene are said to be “carriers”
 4. Multifactorial problems stem from the interaction of heredity and environmental factors
 - a. Ex: diabetes

II. Chromosomal Abnormalities

- A. Down syndrome: usually caused by an extra chromosome on the 21st pair, resulting in 47 chromosomes
 1. Probability increases with increasing age of the parents
 2. Physical characteristics include rounded face, protruding tongue, broad, flat nose, and sloping fold of skin over the inner corners of the eyes
 3. Deficits in cognitive and motor development; typically, the individual will die in middle age from cardiovascular problems
- B. Sex-linked chromosomal abnormalities
 1. Abnormal number of sex chromosomes
 2. Extra Y (XYY) chromosome associated with maleness; heightens male secondary sex characteristics, including heavier beards, being taller than average
 - a. Sometimes referred to as “supermales”
 - b. Often delayed in language development
 3. Klinefelter’s syndrome: caused by an extra X sex chromosome (XXY)
 - a. Produce less testosterone
 - b. Male primary and secondary sex characteristics don’t develop properly
 - c. May develop enlarged breasts and be mildly mentally retarded, particularly in language skills
 - d. Can be treated with hormone replacement therapy, but infertility remains unchanged
 4. Turner’s syndrome: caused by a single X chromosome

- a. Ovaries are poorly developed, and less estrogen is produced
- b. Typically shorter than average and infertile
- c. May have specific cognitive deficits due to lack of estrogen, particularly in the area of visual-spatial skills and math
- 5. Triple X syndrome (XXX): caused by an extra X chromosome in females
 - a. Normal in appearance but tend to show lower-than-average language skills and poorer memory for recent events
 - b. Increased incidence of infertility

III. Genetic Abnormalities

- A. Phenylketonuria (PKU): transmitted by a recessive gene
 - 1. Can't metabolize an amino acid called phenylalanine, which can build up and impair functioning in the central nervous system
 - 2. Mental retardation, psychological disorders, and physical problems
 - 3. Intervention through special diet that enables the child to develop normally
- B. Huntington's disease: a fatal, progressive, degenerative disorder and a dominant trait
 - 1. Physical symptoms: uncontrollable muscle movements
 - 2. Psychological symptoms: loss of intellectual functioning, personality change
- C. Sickle-cell anemia: caused by a recessive gene; more common among African Americans
 - 1. Red blood cells take on the shape of a sickle and clump together, obstructing small blood vessels and decreasing oxygen supply
 - 2. Can impair cognitive skills and academic performance
 - 3. Physical symptoms include painful, swollen joints, jaundice, and potentially fatal conditions of pneumonia, stroke, heart, and kidney failure
- D. Tay-Sachs disease: caused by a recessive gene
 - 1. Causes the central nervous system to degenerate, resulting in death
 - 2. More commonly found among children in Jewish families of Eastern European background
 - 3. Children progressively lose control over their muscles, experience sensory losses, develop mental retardation, become paralyzed, and usually die by about the age of five
- E. Cystic fibrosis: caused by a recessive gene.
 - 1. Most common and fatal hereditary disease among European Americans
 - 2. Children suffer from excessive production of thick mucus that clogs the pancreas and lungs; most victims die of respiratory infections in their 20s
- F. Sex-linked genetic abnormalities: carried on the X sex chromosome and typically recessive

1. Ex: hemophilia, a genetic disorder in which blood doesn't clot properly
2. One form of muscular dystrophy, Duchenne muscular dystrophy, is sex linked
 - a. Weakening of the muscles, which can lead to wasting away
 - b. Inability to walk and sometimes death
3. Other sex-linked abnormalities include diabetes, color blindness, and some types of night blindness

IV. Genetic Counseling and Prenatal Testing

- A. Amniocentesis and chorionic villus sampling (CVS)
 1. Amniocentesis is usually performed on the mother 14 to 16 weeks after conception
 - a. A syringe withdraws amniotic fluid that contains cells sloughed off by the fetus; cells are grown in a culture and examined for genetic and chromosomal abnormalities
 - b. A routine procedure for women who become pregnant past the age of 35
 2. CVS: similar to amniocentesis but carried out between 9th and 12th week of pregnancy
 - a. A small syringe extracts threadlike projections (villi) for examination
 - b. Not used as much due to the risk of spontaneous abortion; increases the risk of miscarriage
- B. Ultrasound: picture of the fetus; also called a sonogram
 1. Used to locate fetal structures and track fetal growth to determine age, sex, and any possible abnormalities
- C. Blood tests: parental blood tests can help determine the presence of genetic disorders such as sickle-cell anemia
 1. The alpha-fetoprotein (AFP) assay is used to detect tube defects such as spina bifida

V. Heredity and the Environment

- A. Inherited
 1. Genotype: the set of traits we inherit from our parents
 2. Phenotype: the set of traits we exhibit
- B. Canalization
 1. Genotype leads to canalization of the development of various traits, both physical and to some degree psychological
 2. Environment can be an influence, and if it changes, there's a tendency to "snap" back into the genetically determined "canal"
- C. Genetic-environmental correlation
 1. Passive correlation: children's parents not only contribute genes to their offspring but also intentionally and unintentionally place them in certain kinds of environments
 2. This is termed passive correlation because children have no choice in the matter
 3. Evocative correlation

- a. An evocative genetic correlation exists because a child's genotype is connected with behaviors that elicit certain kinds of responses from others
 - i. These responses become part of a child's social environment
 - Ex: teachers are more likely to befriend and smile at children who are interested in their subjects
 - 4. Active correlation
 - a. As we mature, we're more likely to take an active role in choosing or creating our environments
 - i. Ex: an intelligent, highly motivated child may ask to be placed in honors classes
 - 5. Epigenetic frameworks
 - a. The relationship between genetics and environmental influences is not a one-way street
 - i. Our development reflects continuing bidirectional exchanges between our genetic heritages and the environments in which we find ourselves
- D. Kinship studies
 - 1. Researchers study the distribution of traits or behavior among relatives who differ in degree of genetic closeness
 - a. Ex: parents and children have a 50% overlap in genetic endowment
- E. Twin studies: looking in the genetic mirror
 - 1. Monozygotic (MZ) twins share 100% of their genes whereas dizygotic twins (DZ) have a 50% overlap, just as other siblings
 - 2. MZ twins resemble each other more closely than DZ twins on a number of physical and psychological traits, even when they're reared apart and DZ twins are reared together
 - a. MZ twins are more likely to look alike and be similar in height
 - b. Taste preferences
 - c. Intelligence and personality traits
 - i. Psychological disorders such as autism, depression, schizophrenia, and vulnerability to alcoholism
 - d. Minnesota study of twins reared apart
 - i. MZ twins reared apart are about as similar as MZ twins reared together on measures of
 - Intelligence
 - Personality
 - Temperament
 - Occupational and leisure time interests
 - Social attitudes
- F. Adoption studies
 - 1. Researchers focus on children who were separated from their natural parents at an early age and reared by adoptive parents

2. When these children show more similarities to their natural parents, an argument can be made for a genetic role

VI. Conception: Against All Odds

- A. Conception is the union of an ovum and a sperm cell
- B. Ova: at birth women, have all the ova they will ever have (roughly 400,000)
 1. Immature in form; at puberty, they mature
 2. Each month, an egg is released from its ovarian follicle and propelled along the fallopian tube; this journey can take three to four days
 3. If the egg isn't fertilized, it's discharged through the uterus and the vagina along with the endometrium that formed to support an embryo in the menstrual flow
 4. During a women's reproductive years, about 400 ova will ripen and be released
- C. Sperm cells: develop through several stages, beginning with 46 chromosomes, but after meiosis, each ends up with 23 chromosomes, half with X sex chromosomes and half with Y
 1. Sperm with Y sex chromosomes swim faster than X, which contributes to the conception of 120 to 150 boys for every 100 girls
 - a. Male fetuses suffer a higher rate of spontaneous abortion than females, often within the first month of pregnancy
 2. 150 million or so sperm in the ejaculate, although only one sperm can fertilize an ovum
 - a. Only one in 1,000 will ever approach the ovum; millions flow out of the woman's body due to gravity
 - b. Sperm cells are motivated to make the journey to the ovum due to calcium ions that occur when an ovum is released
 - c. The sperm that make it to the ovum release an enzyme that briefly thins the layer and allows a single sperm to penetrate; once it does, the layer thickens again, locking other sperm out
 - d. The chromosomes from the sperm line up with the chromosomes from the ovum, forming 23 new pairs with a unique set of genetic instructions

VII. Infertility

- A. One in six or seven American couples has fertility problems
 1. The term isn't applied until the couple has tried for one year to conceive
 2. About 40% of the cases are due to problems with the man
- B. Causes of infertility
 1. Low sperm count
 - a. Genetic factors, environmental poisons, diabetes, sexually transmitted diseases, overheating of the testes, aging, certain prescription and illicit drugs
 2. Sperm count adequate

- a. Prostrate or hormonal problems deform sperm
 - b. Deprived of motility
- 3. Irregular ovulation or lack of ovulation
 - a. Irregularities among the hormones that govern ovulation
 - b. Stress
 - c. Malnutrition
- 4. Infections may scar the fallopian tubes, such as pelvic inflammatory disease (PID)
 - a. Typically from the STDs gonorrhea and Chlamydia
- 5. Endometriosis: can obstruct the fallopian tubes
 - a. Common among women who delay childbearing
- C. Methods used to help infertile couples bear children
 - 1. Artificial insemination: multiple ejaculations of men with low sperm counts can be collected, frozen, and then injected into a woman's uterus at the time of ovulation
 - a. If the man has no sperm, then sperm from a donor can be used
 - 2. In vitro fertilization (IVF): "test tube babies"
 - a. Ripened ova surgically removed from a woman and placed in a laboratory dish; sperm from a man placed in the dish, and fertilized ova then injected into a woman's uterus for implantation
 - b. May be used when the fallopian tubes are blocked
 - c. A donor ova can be used if a woman doesn't produce ova
 - d. Can take several attempts for success
 - 3. Surrogate mothers: bring babies to term for infertile women
 - i. Can artificially inseminate with a man's sperm
 - ii. Can use IVF with a woman's ova and a man's sperm
 - 4. Adoption
 - a. Biological parents giving up their children to adoptive parents
 - b. Works well except in cases where the biological parents change their minds
 - c. Many American families find it easier to adopt infants from other countries or with special needs
- D. Selecting the sex of your child
 - 1. Preimplantation genetic diagnosis (PGD): invented to detect genetic disorders but also reveals the embryo's sex
 - 2. Embryos of the desired sex can be implanted in the woman's uterus

Key Terms (running glossary from text)

Heredity: the transmission of traits and characteristics from parent to child by means of genes

Genetics: the branch of biology that studies heredity

Neuroticism: a personality trait characterized by anxiety and emotional instability

Chromosomes: rod-shaped structures composed of genes found within cell nuclei

Gene: the basic unit of heredity; genes are composed of deoxyribonucleic acid (DNA)

Polygenic: resulting from many genes

Deoxyribonucleic acid (DNA): genetic material that takes the form of a double helix composed of phosphates, sugars, and bases

Mitosis: the form of cell division in which each chromosome splits lengthwise to double in number; half of each chromosome combines with chemicals to retake its original form and then moves to the new cell

Mutation: a sudden variation in a heritable characteristic, as by an accident that affects the composition of genes

Meiosis: the form of cell division in which each pair of chromosomes splits so that one member of each pair moves to the new cell; consequently, each new cell has 23 chromosomes

Autosome: a member of a pair of chromosomes (with the exception of sex chromosomes)

Sex chromosome: a chromosome in the shape of a Y (male) or X (female) that determines a child's sex

Monozygotic (MZ) twins: twins that derive from a single zygote that has split into two; identical twins; each MZ twin carries the same genetic code

Dizygotic (DZ) twins: twins that derive from two zygotes; fraternal twins

Ovulation: the releasing of an ovum from an ovary

Allele: a member of a pair of genes

Homozygous: having two identical alleles

Heterozygous: having two different alleles

Dominant trait: a trait that is expressed

Recessive trait: a trait that isn't expressed when the gene or genes involved have been paired with dominant genes

Carrier: a person who carries and transmits characteristics but doesn't exhibit them

Multifactorial problems: problems that stem from the interaction of heredity and environmental factors

Sex-linked chromosomal abnormalities: abnormalities transmitted from generation to generation and carried by a sex chromosome

Klinefelter's syndrome: a chromosomal disorder found among males that's caused by an extra X sex chromosome and characterized by infertility and mild mental retardation

Testosterone: a male sex hormone produced mainly by the testes

Turner syndrome: a chromosomal disorder found among females; caused by having a single X sex chromosome and characterized by infertility

Estrogen: a female sex hormone produced mainly by the ovaries

Phenylketonuria (PKU): a genetic abnormality in which phenylalanine builds up and causes mental retardation

Huntington's disease: a fatal genetic neurologic disorder whose onset appears in middle age

Sickle-cell anemia: a genetic disorder that decreases the blood's capacity to carry oxygen

Tay-Sachs disease: a fatal genetic neurological disorder

Cystic fibrosis: a fatal genetic disorder in which mucus obstructs the lungs and pancreas

Hemophilia: a genetic disorder in which blood doesn't clot properly

Sex-linked genetic abnormalities: abnormalities resulting from genes found on the X sex chromosome; more likely to be shown by male offspring (who don't have an opposing gene from a second X chromosome) than by female offspring.

Muscular dystrophy: a chronic disease characterized by a progressive wasting away of the muscles

Genetic counseling: advice concerning the probabilities that a couple's children will show genetic abnormalities

Prenatal: before birth

Spina bifida: a neural tube defect that causes abnormalities of the brain and spine

Chorionic villus sampling: a method for the prenatal detection of genetic abnormalities that samples the membrane enveloping the amniotic sac and fetus

Uterus: the hollow organ within females in which the embryo and fetus develop

Ultrasound: sound waves too high in pitch to be sensed by the human ear

Sonogram: a procedure for using ultrasonic sound waves to create a picture of an embryo or fetus

Alpha-fetoprotein assay: a blood test that assesses the mother's blood level of alpha-fetoprotein, a substance linked with fetal neural tube defects

Reaction range: the variability in the expression of inherited traits as they're influenced by environmental factors

Genotype: the genetic form or constitution of a person as determined by heredity

Phenotype: the actual form or constitution of a person as determined by heredity and environmental factors

Autism: a developmental disorder characterized by failure to relate to others, communication problems, intolerance of change, and ritualistic behavior

Amniocentesis: a procedure for drawing and examining fetal cells sloughed off into amniotic fluid to determine the presence of various disorders

Down syndrome: a chromosomal abnormality characterized by mental retardation and caused by an extra chromosome in the 21st pair

Conception: the union of a sperm cell and an ovum that occurs when the chromosomes of each of these cells combine to form 23 new pairs

Fallopian tube: a tube through which ova travel from an ovary to the uterus

Endometrium: the inner lining of the uterus

Spontaneous abortion: unplanned, accidental abortion

Motility: self-propulsion

Pelvic inflammatory disease (PID): an infection of the abdominal region that may have various causes and impair fertility

Endometriosis: inflammation of endometrial tissue sloughed off into the abdominal cavity rather than out of the body during menstruation; the condition is characterized by abdominal pain and sometimes infertility

Artificial insemination: injection of sperm into the uterus to fertilize an ovum

In vitro fertilization: Fertilization of an ovum in a laboratory dish

Donor IVF: the transfer of a donor's ovum, fertilized in a laboratory dish, to the uterus of another woman

Embryonic transplant: the transfer of an embryo from the uterus of one woman to that of another

Surrogate mother: a woman who's artificially inseminated and carries to term a child who is then given to another woman, typically the sperm donor's spouse

Ideas for Instruction

Lecture Topic 1: SIDS

Many students have heard of Sudden Infant Death Syndrome (SIDS) and might be curious as to its cause(s). When a family experiences the loss of an infant due to SIDS, it can be devastated. Continued research in this area has shown several possible contributors, including some genetic explanations. The following article (found in most libraries) reports on a number of possible contributors to SIDS:

Hunt, C.E., & Hauck, F.R. (2006). Sudden infant death syndrome. *Canadian Medical Association Journal*, 174, 1861-1869.

Lecture Topic 2: Genetic Counseling

To help students better understand genetic counseling, read the following article (found in most libraries), which discusses an aspect of genetic counseling and how it can empower families by giving them choice:

Latimer, J. (2007). Diagnosis, dysmorphology, and the family: Knowledge, motility, choice. *Medical Anthropology*, 26, 97-138.

Lecture Topic 3: Sickle-Cell Disease

To help students better understand how genetic diseases can be transmitted to unborn children, read the following article (found in most libraries) on sickle-cell disease:

Creary, M., Williamson, D., & Kulkarni, R. (2007). Sickle cell disease: Current activities, public health implications, and future directions. *Journal of Women's Health*, 16, 575-582.

Classroom Demonstration 1: The Beginning of Life

Preparation: Assign students the task of preparing for a debate on the topic of when life begins. Have them come to class prepared with both sides of the issue.

With renewed interest in the *Roe vs. Wade* Supreme Court decision, you may get a lively debate over the timing of when human life begins. One way to organize such a debate is to assign students both positions to defend ahead of time, working in teams of two or three. When the debate day arrives, flip a coin to decide which team will defend which side of the issue. After three minutes, have the teams switch sides.

Classroom Demonstration 2: Babymakers

Preparation: You will need a TV, a DVD player, and the DVD titled “Babymakers.”

This classroom demonstration will explore the controversy surrounding artificial insemination. Show “Babymakers,” a video that discusses artificial insemination, test-tube babies, and the use of surrogate mothers. The video also has footage of the actual freezing of embryos.

Classroom Demonstration 3: Life’s Greatest Miracle

Preparation: You will need a computer, a projector, and Internet access.

PBS has a film series titled “Life’s Greatest Miracle,” which can be accessed online at

<http://www.pbs.org/wgbh/nova/miracle/program.html>

This program is an hour long and divided into eight chapters: 1. Passing on Your DNA; 2. The Egg’s Journey; 3. The Sperm’s Journey; 4. The First Two Weeks; 5. The Embryo Takes Shape; 6. Messages in the Genes; 7. Feeding the Growing Fetus; 8. The Third Trimester.

Student Project 1: Genetics and Pregnancy

Genetic testing has become a more common experience with pregnancy. Once used to explore possible complications of high-risk pregnancies, it can now be used to determine a child’s sex. An interesting Website focuses on various aspects of pregnancy (including genetic testing):

<http://www.babyzone.com>

Access this site, search for topics that you find interesting related to prenatal testing, and then write a one-page response summarizing what you learned.

Student Project 2: Becoming an Egg Donor

Choosing to become an egg donor is an important decision, one that can truly benefit the lives of women who want to have children but can't. One issue surrounding this is whether the egg donor remains anonymous. Read the article titled, "Becoming a Mother by Non-Anonymous Egg Donation: Secrecy and the Relationship between Egg Recipient, Egg Donor and Egg Donation Child," written by Van Berkel, Candido, and Pijffers (2007) and then write a one-page response summarizing what you learned from the article.

Student Project 3: Preconception Counseling

Choosing to become pregnant and starting a family is a big decision. Some have argued that we require people to take classes before getting a driver's license, so shouldn't we require some kind of mandatory class before people get married or have children? With this idea in mind, read the article titled "Preconception Counseling: Make it Part of the Annual Exam," written by Carl and Hill (2009), then write a response paper arguing for or against the necessity of having preconception counseling. Include the pros and cons of this type of intervention and be prepared to discuss what you learned in class.

Truth or Fiction?

Q1: T or F: Your father determines whether you're born female or male. (True: Males supply either an X or Y chromosome, which determines a baby's sex.)

Q2: T or F: You can carry the genes for a deadly illness and not become sick yourself. (True: this occurs when genes are recessive, and dominant genes cancel their effects.)

Q3: T or F: Approximately 120 to 150 boys are conceived for every 100 girls. (True: Sperm with Y chromosomes swim faster, resulting in the conception of more boys than girls.)

Q4: T or F: Sperm travel about at random inside the woman's reproductive tract. (False: The direction that sperm travel is guided by a change in calcium ions that occurs when an ovum is released.)

Q5: T or F: "Test tube" babies are grown in a laboratory dish throughout their nine-month gestation period. (False: Clearly a baby can't grow in a test tube. "Test tube" babies are conceived in a laboratory dish, with embryos implanted into a woman's uterus for gestation.)

Q6: T or F: You can select your child's sex. (True: The method for doing so is called preimplantation genetic diagnosis.)

Annotated Bibliography

- Carl, J., & Hill, D.A. (2009). Preconception counseling: Make it part of the annual exam. *The Journal of Family Practice*, 58, 307-314. This article discusses the role of preconception counseling with women.
- Creary, M., Williamson, D., & Kulkarni, R. (2007). Sickle cell disease: Current activities, public health implications, and future directions. *Journal of Women's Health*, 16, 575-582. This article from the CDC reports on current directions and future implications of sickle-cell disease.
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- Latimer, J. (2007). Diagnosis, dysmorphology, and the family: Knowledge, motility, choice. *Medical Anthropology*, 26, 97-138. This article uses an ethnographic approach to discuss genetic counseling.
- Van Berkel, D., Candido, D., & Pijffers, W.H. (2007). Becoming a mother by non-anonymous egg donation: Secrecy and the relationship between egg recipient, egg donor and egg donation child. *Journal of Psychosomatic Obstetrics & Gynecology*, 28(2), 97-104. This article explores some issues surrounding egg donation to assist those seeking to become pregnant.

Films/Videos

- Babymakers.** This video explores the controversy surrounding artificial insemination, surrogate mothers, and test-tube babies. Available from CRM/McGraw-Hill.
- Cells: Baby and Child.** This video makes extensive use of microscopic imaging to create an overview of cells in their role as the building blocks of life. Available from Films for the Humanities and Sciences.

Websites

<http://www.babyzone.com>

This Website provides information on various aspects of pregnancy, including genetic testing.