Lecture 9

Human Reproductive System
Reproductive Choices

1. Why Sex?
2. Reproductive Anatomy
3. Sexually Transmitted Infections
4. Reproductive Choices
5. Pregnancy
Why Sex?

Why is there Sex??

Parthenogenic – virgin birth
Why is there Sex??

- Sex creates new combinations of genes
  - Main advantage of sexual reproduction – it gives rise to genetic variation within a species.

Why is there Sex??

- Helps species to adapt to an ever changing environment
- Adaptation (verb) – the process by which populations become better suited to their environment

What is Adaptation?
The process which enables organisms to adjust to their environment in order to ensure survival.
Why is there Sex??

Gene combinations that allow individuals to survive and reproduce will prevail, until the environment changes.

Adaptation - (noun) a trait that promotes the survival and reproductive success of an organism in a particular environment.

Adapted - From the Latin “adaptare” – to fit.

Polar Bears

Cheetah
Why is there Sex??

Clones
Sexual Anatomy and Functions

• Sex is determined by the sex chromosomes: XX  XY
Sexual Anatomy and Functions

- Male and female sex organs arise from the same undifferentiated tissue during the prenatal period.
Sexual Development and Health Across the Lifespan

- The biology of sexual and reproductive development is directed by hormones:
  - Androgens: male sex hormones secreted by the testes
  - Estrogen and Progestin: produced by ovaries

Male Reproductive Anatomy
Male and Female Gametes

Sperm                             Egg

Male gamete

Female gamete
At Conception...

Human Development
Female Ovulation
Fixed number of eggs at birth
Egg can survive for 1 – 4 days.

Male Spermatogenesis
Males produce sperm continually throughout life. Sperm can survive about a week.

Male Gamete Production
- **Spermatogenesis** (sperm production) begins in the testis and takes 64-72 days
- Each lobule of the testis contains 1-4 seminiferous tubules
- Interstitial cells in testis produce androgens such as **testosterone**
Sexual Response

- *Sex Drive*, also known as sexual desire or libido, is a biological urge for sexual activity.

- *Testosterone* is the principle hormone responsible for the sex drive in both men and women.

- Testosterone is produced by the testes in males and by the adrenal glands in both sexes.
Sexually Transmitted Infections

Protecting Your Sexual Health

• The biggest threat to one’s sexual health is sexually transmitted infections
• *Safer sex* practices prevent the exchange of STIs during sex
Sexually Transmitted Infections

- *Sexually Transmitted Infections (STI)*: infection spread predominantly through sexual contact
  - Preferred terminology over *Sexually Transmitted Disease (STD)* because often there are no symptoms
  - Primary pathogens: viruses and bacteria

Bacterial STIs

- Chlamydia
  - Most common bacterial STI
- Gonorrhea
- Pelvic Inflammatory Disease
  - Infection of uterus, fallopian tubes, and/or ovaries
- Syphilis
  - If untreated, can lead to serious complications
Viral STIs

- Human Papillomavirus (HPV)
  - Most common viral STI in the U.S; more than 40 types
- Genital Herpes
  - No cure; prevention particularly important
- Hepatitis
  - Inflammation of the liver
- HIV/AIDS

Bacterial STIs

Chlamydia

- Most common bacterial STI
- Usually has no symptoms…

7 out of 10 people who get chlamydia have no symptoms
Bacterial STIs

Chlamydia - symptoms

- pain or burning during urination
- pain during sex lower belly pain
- ♀: abnormal vaginal discharge bleeding between periods
- ♂: pus or a watery/milky discharge from the penis
- swollen or tender testicles

Why?

Infertility, or Eptopic pregnancy
Bacterial STI - Chlamydia

• Easily treated…if you know you are infected (antibiotics)

• Best line of defense is PREVENTION!

• Don’t have unprotected sex!

Viral STI - HIV/AIDS

• Cause: HIV virus attacks the helper T cells of the immune system

• Methods of transmission:
  – Sexual contact; direct contact involving the exchange of bodily fluids
  – Sharing of hypodermic needles
  – Through infected blood products*
  – Perinatal transmission (mother to fetus)*
Viral STI - HIV/AIDS

• Most infected people asymptomatic or can remain symptom-free for years, even though antibodies have been formed within weeks of infection

• Eventually the following symptoms may appear due to opportunistic infections:
  – Rapid weight loss
  – Cough
  – Night sweats
  – Diarrhea
  – Rashes or skin blemishes
  – Memory loss

People Living with HIV in 2012

[Map showing the distribution of people living with HIV in 2012 across different regions of the world, with North America having 1.3 million, East Asia 1.1 million, Western and Central Europe 880,000, and Sub-Saharan Africa 25.0 million. The total is 35.3 million people (range of 32.2 million – 38.8 million).]
Management of HIV/AIDS

• Antiretroviral Agents - do not cure the infection, but slow the rate of virus replication and destruction

• Drug Cocktails - complicated drug combinations that combat the development of resistant viral strains

• Vaccine development under way…

Protecting Your Sexual Health

• The behaviors listed below can help reduce your risk of contracting an infection:
  – Using condoms and dental dams, which provide a barrier against bacterial or viral transfer
  – Communicating about sex: take the time to tell your partner your sexual health history and find out about his or hers
  – Practicing abstinence: no sexual contact (not likely)
Reproductive Choices: Contraception
Reproductive Choices

- About half of all pregnancies in the United States are unintended
- Unintended pregnancies nearly always cause stress and life disruption and are associated with poorer health outcomes

Which Contraceptive Method Is Right for You?

- Considerations to evaluate when choosing contraception:
  - Consistency with personal values
  - Effectiveness
  - Cost
  - Convenience
  - Permanence
  - Safety
  - Protection against STDs
Abstinence

- Abstinence is the only guaranteed method of preventing pregnancy and STI transmission
  - In heterosexual couples who have vaginal intercourse and use no contraceptive method, 85% of the women will become pregnant in one year
  - Abstinence requires control and commitment

Hormonal Contraceptive Methods

- Work by preventing ovulation, or making it harder for sperm to reach ova, uterine lining affected so fertilized egg less likely to be implanted
Hormonal Contraceptive Methods

• Prescribed by a health care provider

<table>
<thead>
<tr>
<th>Potential side effects</th>
<th>Nausea, headaches, weight gain, sex drive fluctuation, frequent vaginal infections, mild depression, headaches</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advantages</td>
<td>Effective, easy to use, limited side effects, reduces menstrual cramping, ovarian cysts, endometriosis, and risk of certain cancers</td>
</tr>
<tr>
<td>Disadvantages</td>
<td>No protection against STIs</td>
</tr>
</tbody>
</table>

Hormonal Contraceptive Methods

• Types of hormonal contraceptive methods:
  – Birth Control Pills- most popular reversible form of contraception
  – Transdermal Patch- release estrogen and progesterone into blood stream via the skin

Birth Control Pills

Transdermal Patch
Hormonal Contraceptive Methods

• Types of hormonal contraceptive methods:
  – Vaginal Contraceptive Ring - flexible plastic ring placed in vagina for 21 days
  – Injectable Contraceptive (Depo-Provera) - progesterone shot by healthcare provider every three months
  – Contraceptive Implant - flexible plastic rod that contains progesterone inserted under skin of the upper arm that slowly release hormones

Serious Side Effects of Hormonal Contraceptives

- Blurry vision or loss of vision: Migraine, blood clot behind eye, change in shape of eye/cornea, contact lenses don’t fit
- Headaches: Migraine, hypertension, stroke
- Chest pain: Blood clot in lungs, heart attack
- Abdominal pain: Gallstones, blood clot in pelvic veins or liver, benign tumor in liver
- Severe leg pain: Blood clot

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The IUD

• Intrauterine device (IUD):
  – Long-acting reversible contraceptive
  – Altering the uterine and cervical fluids to reduce the chance that sperm will move up into the fallopian tubes

The IUD

• Intrauterine device (IUD):
  – Copper IUD can be left in place for 10 years
  – The progesterone IUD (hormone releasing) can remain for 5 years
Barrier Methods

- Physically separate the sperm from the female reproductive tract
- To increase effectiveness, sometimes need a spermicide, a chemical agent that kills sperm
Withdrawal

- **Withdrawal**: a contraceptive method in which the man removes his penis from the vagina before ejaculating
  - Success is dependent on a man’s ability to tell when he is about to ejaculate and to have the self-control to withdraw with impending orgasm

- The American College of Obstetrics and Gynecology do not recommend this method

- Approximately 18 to 27 percent of women will become pregnant in a year

Fertility Awareness–Based Methods

- Contraceptive method based on abstinence (or using a barrier contraceptive) during the window of time around ovulation when a woman is most likely to conceive
Fertility Awareness-Based Methods

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Sterilization

• A surgical procedure that permanently prevents future pregnancies
  
  – *Vasectomy*: male sterilization procedure, involving tying off and severing the vas deferens to prevent sperm from reaching the semen
  
  – *Tubal ligation*: female sterilization procedure involving severing and tying off or sealing the fallopian tubes to prevent ova from reaching the uterus
Vasectomy

- Bladder
- Seminal vesicle
- Previously stored sperm
- Vas deferens
- Incision made in scrotum
- Vas deferens tied and cut or cut and cauterized
- Testis

Tubal Ligation

- Fallopian tube
- Cauterized
- Cut and tied
- Uterus
Emergency Contraception (ECP)

• The *morning-after pill* or *backup birth control*

• Reduces chance of pregnancy by preventing ovulation and fertilization

• Most effective if taken within 48–72 hours and must be taken within 5 days of unprotected intercourse

• Useful when another method fails (condom breaks, or diaphragm or cervical cap slips)

• Will not cause the termination of an existing pregnancy and is not an *abortogenic* (not abortion-causing)

• Useful in cases of forced sex—rape and incest