Chapter 28

Lactation / Contraceptive Devices / Sexual Transmitted Diseases
Lactation

• **lactation** – the synthesis and ejection of milk from the mammary glands
  
  – lasts as little as a week in women who do not breast-feed their infants
  
  – can continue for many years as long as the breast is stimulated by a nursing infant or a mechanical device (**breast pump**)
  
  – women traditionally nurse their infants until a median age of about **2.8 years**
Mammary Gland Development

• high estrogen level in pregnancy causes the ducts of the mammary glands to grow and branch extensively

• growth hormone, insulin, glucocorticoids, and prolactin contribute to this development

• progesterone stimulates the budding and development of acini at the end of the ducts

• acini organized into grape-like clusters (lobules) within each breast lobe
Colostrum and Milk Synthesis

- **colostrum** forms in late pregnancy
  - similar to breast milk in protein and lactose, but contains 1/3 less fat
  - first 1 to 3 days after birth
  - thin watery consistency and a cloudy yellow color
  - contains IgA to protection the baby from gastroenteritis

- **prolactin** (from anterior pituitary) promotes milk synthesis
  - inhibited by dopamine when not pregnant
  - synthesis of hormone begins 5 weeks into pregnancy, by full term it is 10 to 20 times normal level
    - little effect on mammary glands until after birth
  - steroid hormones from placenta oppose prolactin until birth
  - milk synthesis also requires growth hormone, cortisol, insulin, and parathyroid hormone to mobilize necessary amino acids, fatty acids, glucose, and calcium
Colostrum and Milk Synthesis

- at birth, prolactin secretion drops to nonpregnancy levels
- every time the infant nurses prolactin levels jump to 10 to 20 times this level for the next hour
  - stimulates the synthesis of milk for the next feeding
  - without nursing, milk production stops in 1 week
- only 5-10% of women become pregnant while breast-feeding
  - inhibition of GnRH and reduced ovarian cycling
  - natural means of spacing births
Prolactin and Lactation

Figure 28.22

Prolactin surges

Feedings

Pregnancy

Lactation

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Milk Ejection

- milk is continually secreted into the mammary acini, but does not easily flow into the ducts

- milk ejection (letdown) is controlled by a neuroendocrine reflex
  
  - infant’s suckling stimulates sensory receptors in nipple, signaling hypothalamus and posterior pituitary to release oxytocin

  - oxytocin stimulates myoepithelial cells around each acinus

  - contract to squeeze milk into duct
    - milk flow within 30-60 seconds after suckling begins
Breast Milk

• breast milk changes composition over the first two weeks
  – varies from one time of day to another
  – at the end of a feeding there is less lactose and protein, but six times the fat

• cow’s milk not a good substitute
  – 1/3 less lactose but 3 times as much protein
  – harder to digest and more nitrogenous waste (diaper rash)

• colostrum and milk have a laxative effect that clears intestine of meconium (green, bile-filled fecal material in newborn)

• supplies antibodies and colonizes intestine with beneficial bacteria

• nursing woman can produce 1.5L per day
Contraceptive Devices

Male condom

Female condom

Diaphragm with contraceptive jelly

Contraceptive foam with vaginal applicator

Birth-control pills

Intrauterine device (IUD)

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Methods of Contraception

• **contraception** - any procedure or device intended to prevent pregnancy

• behavioral methods
  – abstinence
  – rhythm method (periodic abstinence)
  – withdrawal (coitus interruptus)

• **barrier and spermicidal methods** // male and female condom, diaphragm, sponge

• **hormonal methods**
  – “the pill”, patch, injection or vaginal ring - ovarian follicles do not mature
  – “morning after pills” – induces menstruation providing implantation has not occurred
  – RU-486 – induces abortion up to 2 months into pregnancy

• preventing implantation // intrauterine device (IUD)

• surgical sterilization // clamping or cutting the genital ducts (uterine tubes or ductus deferens)
Sexually Transmitted Diseases

• STDs have an **incubation period** in which the pathogen multiplies with no symptoms and a **communicable period** in which the disease can be transmitted to others. // Symptomless carriers do exist.

• **bacterial STDs**
  - **chlamydia** – may cause urethral discharge and testicular pain
  - **gonorrhea** – pain and pus discharge – may result in sterility from pelvic inflammatory disease
  - **syphilis** – hard lesions (chancres) at site of infection
    • disappearance of chancres ends first stage
    • second stage is widespread pink rash
    • neurosyphilis is third stage with cardiovascular damage and brain lesions

• **viral STDs**
  - **genital herpes** – most common STD in US
    • blisters and pain
  - **genital warts** – warts on perineal region, cervix, anus
  - **hepatitis B and C** – inflammatory liver disease