

#### Reproduction

- The process by which a single cell duplicates its genetic material allowing it to divide (asexual reproduction)
- The process by which genetic material is passed from generation to generation
- the production of new offspring
  - Continuation of Species

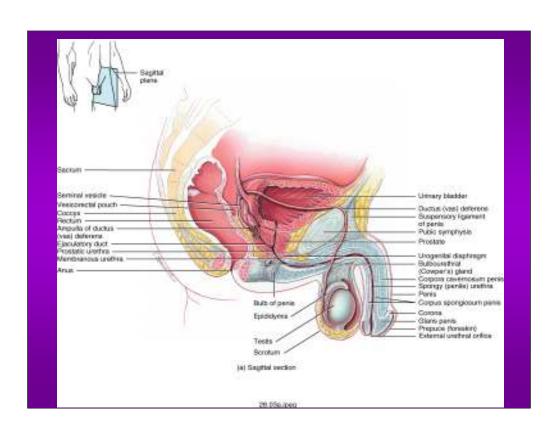


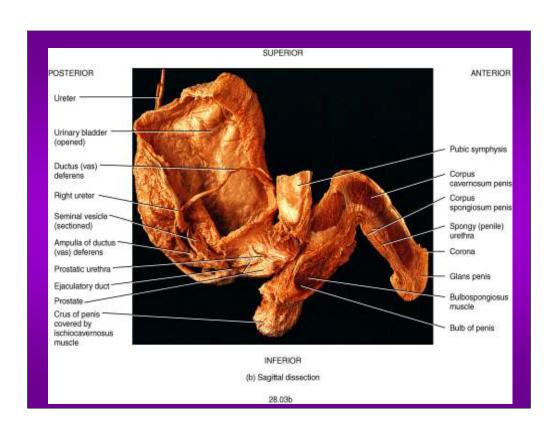
#### Gonads

- The organs in the body that produce the sex cells (gametes)
- Male testes produce sperm
- Female ovaries produce ova or egg cells

## **Male Reproductive System**

- Testes
- Ducts of the Testes
  - Epididymis
- Ductus (Vas)Deferens
- Ejaculatory Ducts
- Urethra
- Accessory Sex Glands
  - Seminal Vesicles
- -Prostate Gland
- Bulbourethral (Cowper's) Glands
- External Structures
  - Penis
- -Scrotum





#### **Testes**

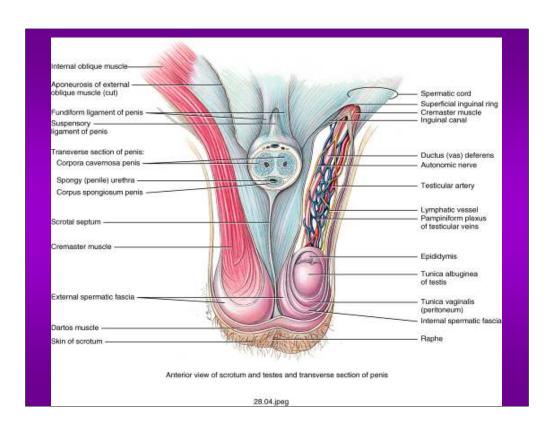
- Responsible for the production of sperm cells (spermatogenesis)
- Maturation of sperm takes approximately 74 days
- Also responsible for the production of the male hormone testosterone

#### **Epididymis**

- A comma shaped organ that lies on the posterior border of the testes
- Consists of tightly coiled tubules
- Measures about 20 feet in length
- The site of sperm final maturation (final 10 to 14 days)
- Sperm may remain in the epididymis for up to 4 weeks after which they are either expelled or reabsorbed by the body

#### **Ductus (Vas) Deferens**

- A long duct (18 inches) that is the passageway for sperm from the epididymis to the urethra
- Enters the body through an opening in the pelvic floor called the Inguinal Canal
- Part of a group of structures known as the spermatic cord
  - ductus deferens
  - testicular veins
  - lymphatic vessels
  - connective tissue
- testicular artery
- testicular nerves
- cremaster muscle



#### **Seminal Vesicles**

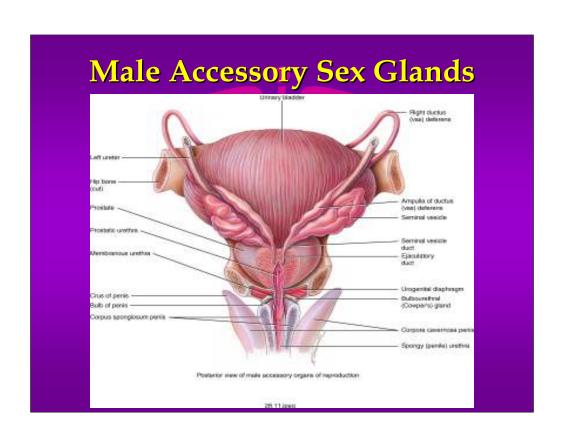
- Convoluted pouch-like structures lying posterior to and at the base of the urinary bladder in front of the rectum
- Secrete an alkaline fluid rich in fructose
- Used as an energy source for the sperm
- Makes up about 60% of the volume of the semen
- Alkaline nature of the fluid allows the sperm to survive in the acidic environment of the female reproductive tract

## **Ejaculatory Ducts**

- Ducts just posterior to the urinary bladder formed by the union of the ducts from the seminal vesicles and the ductus deferens
- Eject sperm into the prostatic urethra just prior to ejaculation

#### **Prostate Gland**

- A single donut-shaped gland about the size of a chestnut located inferior to the urinary bladder - surrounds the urethra
- Secretes a fluid rich in citric acid, prostatic acid, phosphatase, and prostaglandins
- Makes up about 13% 33% of the semen
- Often the site of cancerous growths in males



#### Semen (Seminal Fluid)

- Mixture of sperm and secretions of the seminal vesicles, prostate gland, and bulbourethral glands
- 2.5 5.0 ml of semen per ejaculation
- 50 150 million spermatozoa/ml semen
- If less than 20 million spermatozoa/ml of semen, the male is considered infertile

#### **Penis**

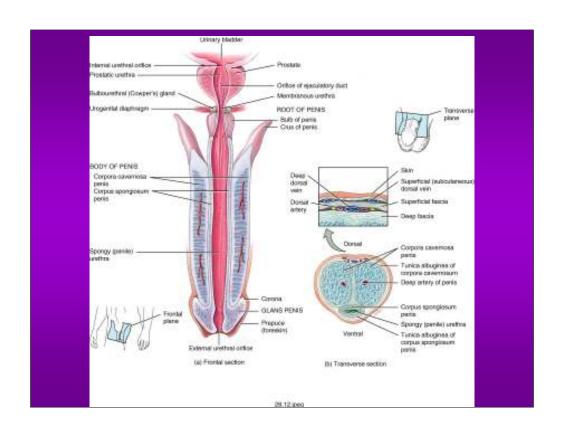
- The male anatomical structure used to introduce spermatozoa into the female vagina during intercourse
- Cylindrical in shape
- Consists of three portions:
  - Root the portion of the penis attached to the pubic area
  - Body main portion of the penis
  - Glans Penis the distal end of the penis

### **Body of the Penis**

- Composed of 3 cylindrical masses of tissue
- Corpora Cavernosa Penis the 2 most dorsal and lateral masses of the penis
- Corpus Spongiosum Penis the smaller midventral mass of the penis
  - The urethra passes through this tissue mass
- Each mass is surrounded by a sheath of fibrous connective tissue called the tunica albuginea

### **Body of the Penis**

- All three masses are enclosed by fascia and skin and consist of erectile tissue permeated by blood sinuses
- Under the influence of sexual stimulation, the arteries supplying the penis dilate and large quantities of blood enter the sinuses and an erection occurs
- Sexual stimulation (visual, tactile, auditory, olfactory, imaginative)



#### **Glans Penis**

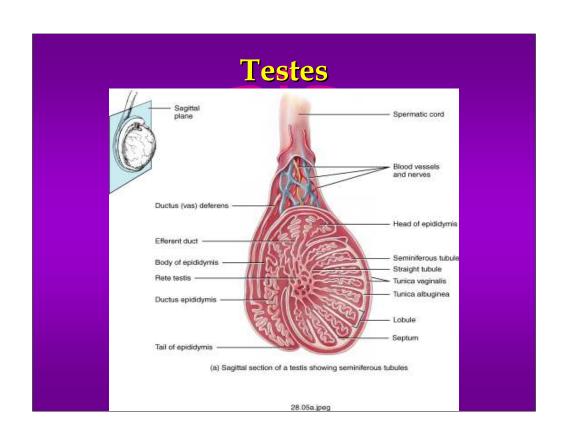
- Slightly enlarged distal end of the corpus spongiosum
- Literally means "shaped like an acorn"
- Separated from the body of the penis by a marginal area called the corona
- Covered by loose fitting skin called the foreskin or prepuce

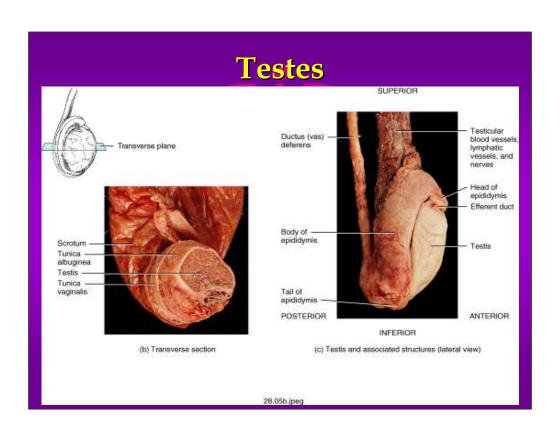
#### **Urethra**

- Terminal duct for both the reproductive and the urinary systems
- The passageway for sperm and urine to the external environment, not at the same time
- Measures about 8 inches in length
- 4 sections of the urethra
  - prostatic urethra membranous urethra
  - spongy urethra
  - external urethral orifice

# Bulbourethral Glands (Cowper's Glands)

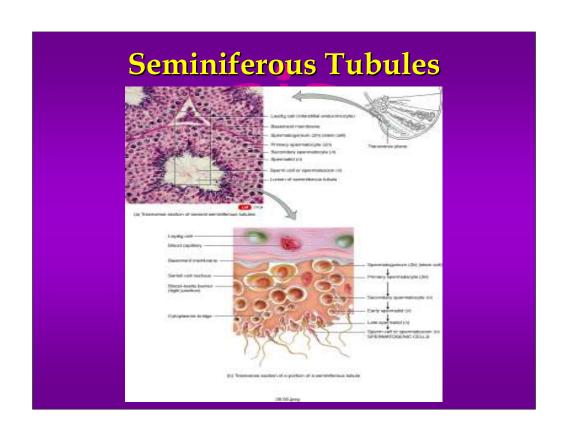
- Pea-sized glands located just inferior the prostate gland
- Also secretes an alkaline substance that helps neutralize the acid environment of the urethra
- Provides lubrication for sexual intercourse





#### **Seminiferous Tubules**

- Tightly coiled tubules in the testes where spermatogenesis occurs
- Spermatogonia immature sperm cell
- Spermatozoan mature sperm cell
- Interstitial Cells endocrine cells that produce and secrete the male hormone testosterone

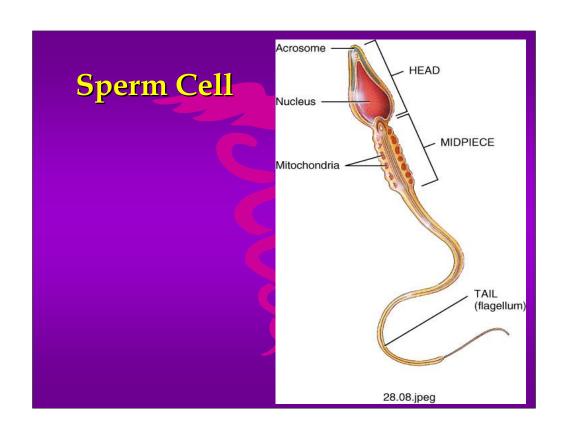


## **Spermatozoa**

- Mature sperm cells
- Mature at a rate of about 300 million per day
- Once ejaculated, have a life expectancy of about 48 hours

## **Components of Spermatozoa**

- Head contains the genetic material
  - Acrosome covering on the head that contains enzymes that help the sperm penetrate the egg's protective coating
- Midpiece mid portion of sperm cell contains numerous mitochondria for energy for locomotion
- Tail a typical flagellum used for propulsion of the sperm cell

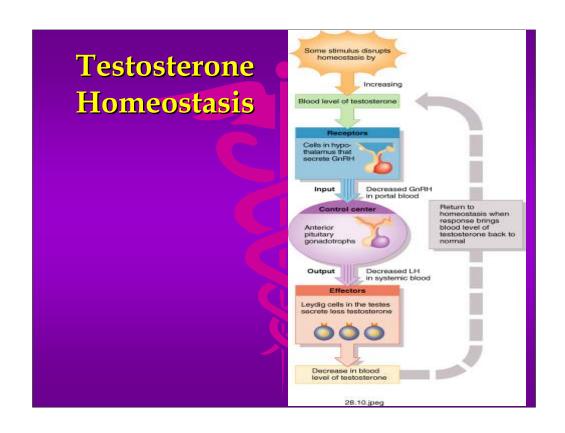


#### **Testosterone**

- The principle male hormone
- Produced by the interstitial cells
- Responsible for the male androgenic traits and characteristics

#### **Effects of Testosterone**

- growth and development
- maintenance of sex organs
- bone growth
- protein anabolism
- closure of the epiphyseal plate
- influences sexual behavior
- influences final maturation of sperm cells
- stimulates the development of secondary male sexual characteristics



## **Male Secondary Sex Characteristics**

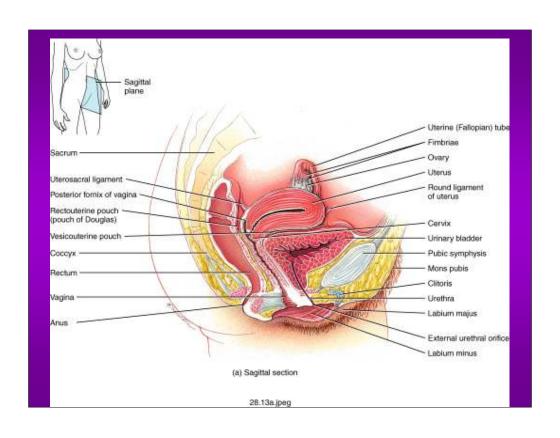
- muscular and skeletal development
- development of pubic, axillary, and chest hair
- facial hair growth
- temporal hairline recession
- deepening of the voice

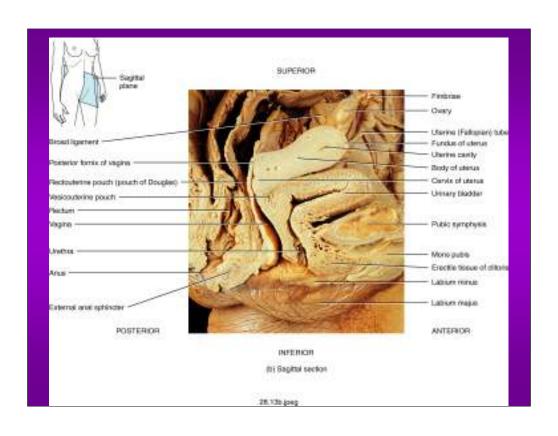
## Male Puberty

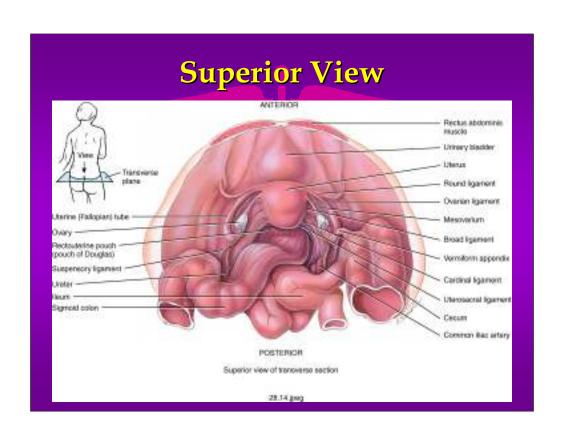
- male secondary sexual characteristics begin to appear
- potential for sexual reproduction
- begins at about age 10 11 and is usually completed at about age 15 - 17
- Puberty marriageable age

## The Female Reproductive System

- Ovaries
- Uterus
- Uterine (Fallopian) Tubes
- Vagina
- External Female Genitalia
  - Vulva
- Mons Pubis
- Labia Majora
- Labia Minora
- Clitoris
- -Vestibule
- Mammary Glands (Breasts)
- Perineum







### **Ovaries**

- The female gonads
- Oogenesis occurs in the ovaries
- Females are born with as many egg cells as they will ever have (500,000)
- Each month about 20 primary oocytes are stimulated to undergo meiosis
- Usually one of these 20 completes the process of oogenesis and develops into a secondary oocyte

# **Function of the Ovaries**

- produce secondary oocytes (Mature Ovum)
- Ovulation the discharging of secondary oocytes
- secretion of the sex hormones:

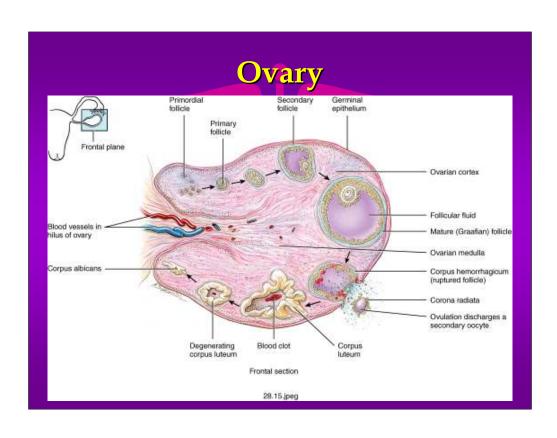
  - Estrogens Progesterone
  - Relaxin
- Inhibin

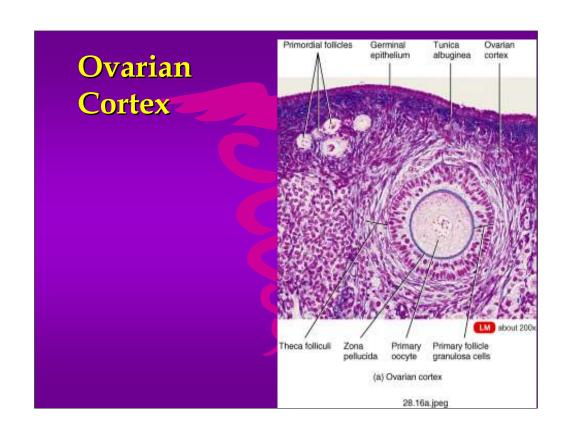
#### **Parts of the Ovaries**

- Germinal Epithelium a layer of simple epithelial tissue that covers the free surface of the ovaries
- Tunica Albuginea capsule of collagenous connective tissue just below the germinal epithelial tissue
- Stromma functional portion of the ovaries (contains the Ovarian Follicles)
  - Cortex outer denser layer
  - Medulla inner looser layer

#### **Parts of the Ovaries**

- Ovarian Follicles Oocytes and their surrounding tissue in various stages of development
  - primordial
  - primary
  - secondary
- Vesicular Ovarian (Graafian) Follicle a rather large, fluid filled follicle containing an immature ovum and its surrounding tissue
  - Secretes hormones (Estrogens)





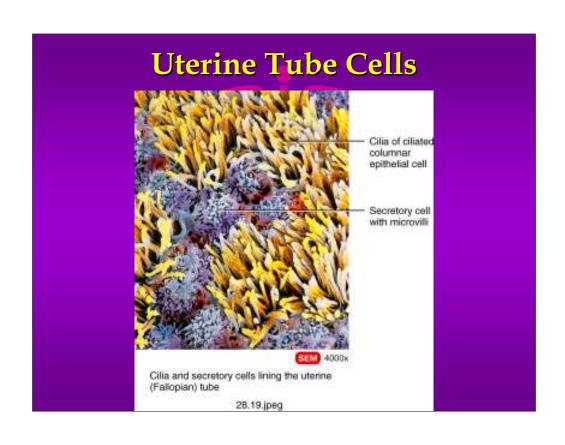
## **Parts of the Ovaries**

- Corpus Luteum the glandular body that develops from the vesicular ovarian follicle after ovulation
  - Secretes the hormones Estrogens,
     Progesterone, Relaxin, and Inhibin
- Corpus Albicans fibrous connective tissue remnants of a degenerated corpus luteum

- Zygote name given to a fertilized ovum
- Blastocyst the fertilized ovum as it is traveling through the uterine (Fallopian) tubes in various stages of cell division
- Embryo name given for a fertilized ovum once it has attached to the uterine wall through the first eight weeks of development
- Fetus name given to the developing human from week eight to the time of birth

# **Uterine (Fallopian) Tubes**

- Ducts that allow for the transport of the ova from the site of ovulation on the ovaries to the uterus
- Infundibulum funnel-shaped, open distal end of the uterine tubes
  - Fimbriae "little fingers" on distal end
- Ampulla widest, longest portion of the uterine tubes
  - fertilization usually occurs in this region
- Isthmus narrow, constricted, proximal end where the tubes attach to the uterus



## **Uterus**

- The female reproductive organ that serves as the site menstruation, implantation of a fertilized ovum, and the development and maintenance of the fetus during pregnancy
- Inverted pear-shaped muscular organ
- Has 3 sections or areas
  - Fundus Body Cervix

# **Fundus of the Uterus**

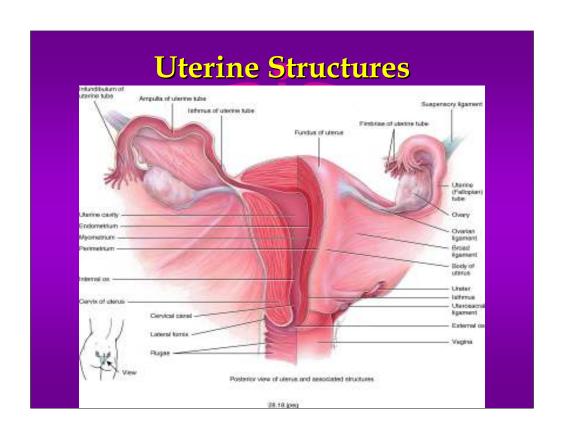
- The superior dome shaped portion of the uterus
- Area above the entrance of the uterine tubes

# **Body of the Uterus**

- The major, central, tapering portion of the uterus
- Uterine Cavity the interior cavity within the uterus
- Isthmus a narrow constricted area between the uterine body and the cervix

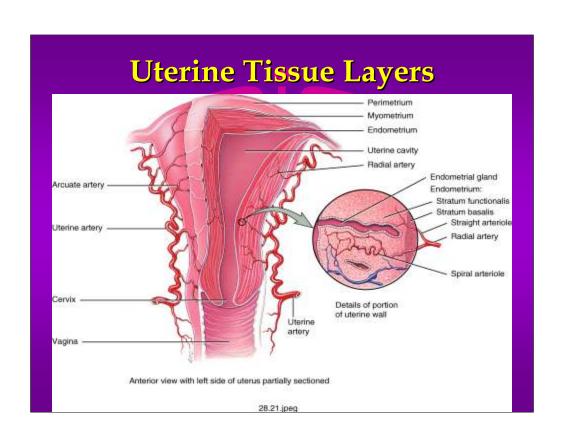
### Cervix

- Narrow, thick, muscular area that opens into the vagina
- Secretes a mucus that is less dense and more conducive to the passage of sperm into the uterus and uterine tubes during ovulation
- Passageway between the cervix and vagina
   Internal Os
   Cervical Canal
   External Os



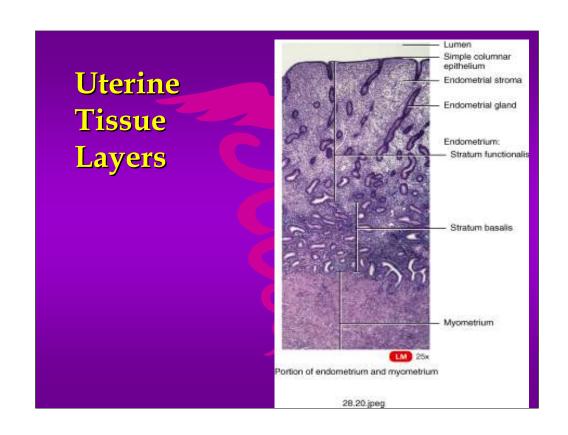
# **Tissue Layers of the Uterus**

- Histologically, the uterus is comprised of 3 tissue layers
- Perimetrium outermost layer
  - Actually part of the visceral peritoneum
- Myometrium middle, muscular layer
  - Makes up the majority of the uterus
  - Consists of three layers of smooth muscle
- Endometrium innermost layer of the uterus



#### **Endometrium**

- Comprised of two distinct tissue layers
- Stratum Functionalis layer of endometrial tissue closest to the uterine cavity
  - This layer is shed during menstruation
- Stratum Basalis the permanent,
   basement layer of the endometrium
  - Very vascular tissue layer
  - Function is to generate a new Stratum Functionalis layer following menstruation



# Vagina

- A tubular, fibromuscular organ lined with a mucous membrane
- Passageway for spermatozoa and menstrual flow
- Receptacle for the penis during sexual intercourse
- The lower portion of the birth canal

# **Vaginal Structures**

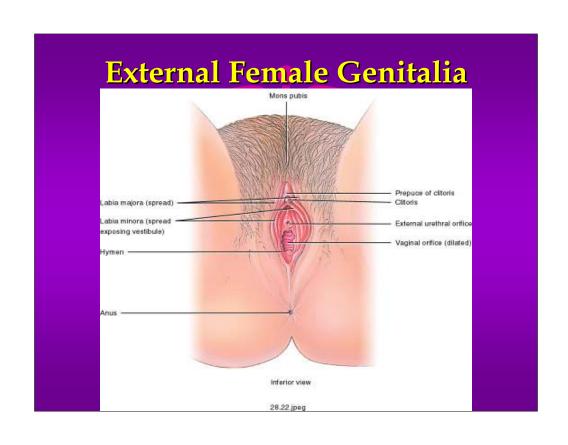
- Fornix the proximal area of the vagina where the vagina meets the cervix
- Rugae transverse, connective tissue folds in the vagina
- Hymen a thin fold of a vascular mucus membrane that forms a border around the vaginal orifice partially closing it
- Vaginal Orifice the distal end of the vagina that opens to the exterior

#### **Female External Genitalia**

- Vulva term used to describe all the female external genitalia collectively
- Mons Pubis an elevation of adipose tissue above the pubic symphysis, covered by skin and coarse pubic hair
- Labia Majora an area of longitudinal folds of tissue extending inferiorly and posteriorly
  - Adipose tissue, sebaceous glands, sudoriferous glands
  - Covered by pubic hair
  - Homologous to the male scrotum

# **Female External Genitalia**

- Labia Minora medial longitudinal folds of tissue
  - Very few sudoriferous glands
  - Numerous sebaceous glands
  - No adipose tissue or pubic hair



## **Clitoris**

- Clitoris a small cylindrical mass of nervous and erectile tissue
  - Prepuce layers of skin at the point where the anterior labia minora folds unite
    Covers the body of the clitoris
  - Glans the exposed distal portion of the
- Homologous to the male penis

clitoris

## Vestibule

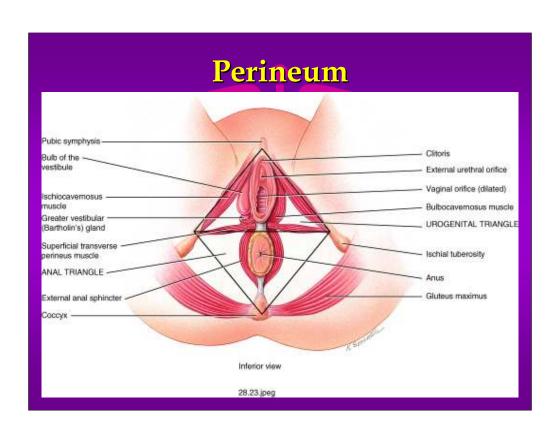
- The cleft between the labia minora
- Bulb of the Vestibule
  - Two elongated masses of erectile tissue located on the sides of the vaginal orifice
- Greater Vestibular Glands (Bartholin's)
  - Glands on the sides of the vaginal orifice that produce a mucoid secretion
    - lubrication during sexual intercourse
  - Homologous to the male bulbourethral glands

# Paraurethral Glands (Skene's Glands)

- Glands embedded in the wall of the urethra
- Secrete mucus
- Homologous to the male prostate gland

# **Perineum**

- Diamond shaped area between the thighs and buttocks of both males and females
- Bound anteriorly by the pubic symphysis, laterally by the ischial tuberosities, and posteriorly by the coccyx
  - urogenital triangle
  - anal triangle

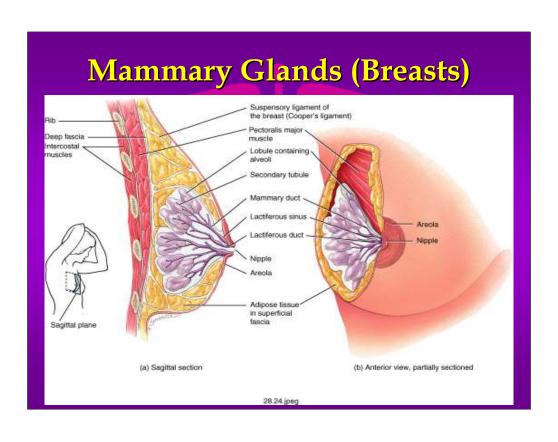


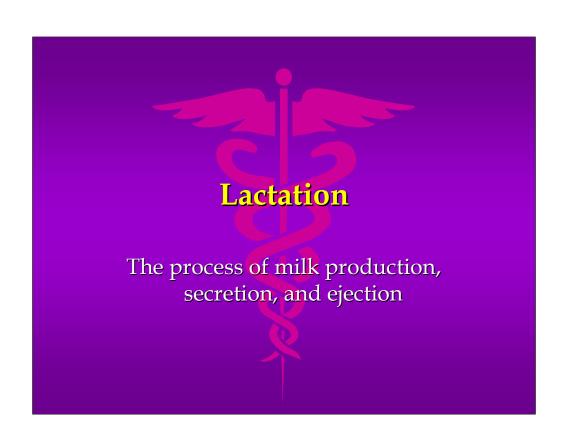
# **Mammary Glands (Breasts)**

- Actually modified sudoriferous glands (sweat glands)
- Each gland consists of 15 20 lobes or compartments separated by adipose tissue
- The amount of adipose tissue between the lobes determines the breast size
- Breast size is not related to milk production

# **Mammary Glands (Breasts)**

- Each lobe is broken down into smaller compartments called lobules
- Within the lobules are milk secreting glandular cells called alveolar glands
   the milk producing glands of the breast
- Nipple the raised area on the breast that an infant suckles to receive milk and stimulate lactation
- Areola the dark, circular, pigmented area that encircles the nipple





#### **Female Puberty**

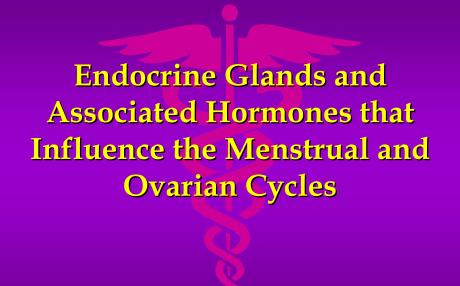
- Begins about the age of 7 8
- Females begin to increase production of adrenal androgenic hormones
  - Stimulate growth of axillary and pubic hair
- Increases production of LH and FSH
  - Causes an increase in estrogen production by the ovaries
- Increases in estrogen causes the development female secondary sexual characteristics

### **Female Secondary Sexual Characteristics**

- breast development
- widening of the pelvic girdle
- increased body fat storage
- voice pitch change
- associated with increased estrogen production is the initiation of menarche
- menarche first menstruation
  - occurs at about 12 years of age

# The Menstrual and Ovarian Cycles

- Ovarian Cycle the monthly series of events associated with the maturation and ovulation of an ovum
- Menstrual Cycle the monthly series of events associated with the changes of the endometrial lining of the uterus
  - Preparation for implantation of a fertilized ovum
- Correlated with each other and are under the influence of hormones



### **Hypothalamus**

- Produces and releases Gonadotropin Releasing Hormone (GnRH)
- Stimulates the Anterior Pituitary Gland to produce and release Follicle Stimulating Hormone (FSH) and Luteinizing Hormone (LH)

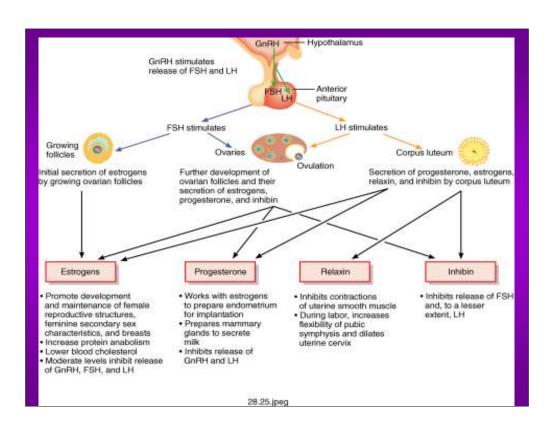
#### **Anterior Pituitary Gland**

- Produces and secretes FSH and LH
- FSH stimulates the initial development of the ovarian follicles and secretion of estrogen by the follicles
- LH stimulates further development of the ovarian follicles, brings about ovulation, and stimulates the production of estrogens, progesterone, inhibin, and relaxin by the ovarian cells of the corpus luteum

#### **Ovaries**

- Secrete the hormones Estrogen, Progesterone, Relaxin, and Inhibin
- Estrogens
  - At least 6 different types
  - Development and maintenance of the female reproductive system
  - Helps control fluid and electrolyte balance
  - Increases protein anabolism

- Progesterone hormone of maturation
  - Works in conjunction with estrogen to prepare the endometrial lining for implantation of a fertilized
  - Stimulates milk production and secretion
- Inhibin secreted by the corpus luteum
  - Inhibits secretion of FSH and LH
- Relaxin produced by the corpus luteum during pregnancy
  - Most prominent during the final trimester of pregnancy
  - Relaxes the pubic symphysis and helps dilate the cervix to facilitate delivery

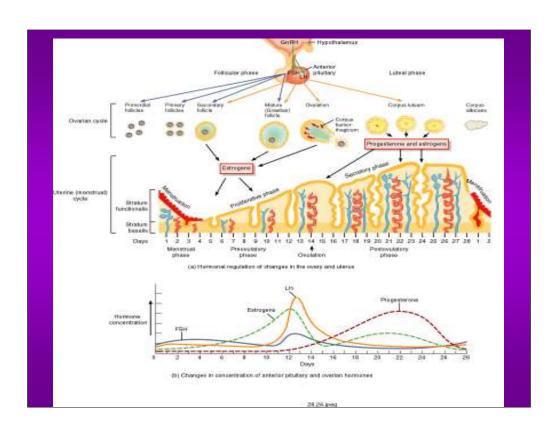


### Menstruation (The Menstrual Phase)

- The periodic discharge of 50 to 150 ml of blood, tissue fluid, mucus, and epithelial cells
- Caused by the sudden reduction of estrogens and progesterone
- Lasts approximately the first 5 days of the menstrual cycle
- Results in the shedding of the stratum functionalis layer of the endometrium
- The 1st day of the ovarian cycle is designated by the 1st day menstruation

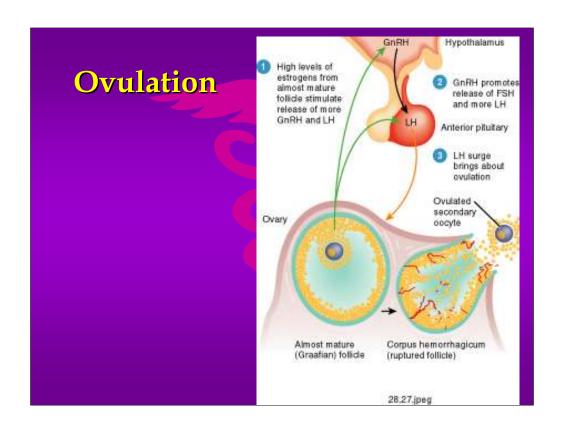
# Preovulatory Phase or Proliferative Phase

- The time between menstruation and ovulation
- Variable in length
- Usually from day 6 to day 13 in a 28 day cycle
- Characterized by repair and build up of the endometrium



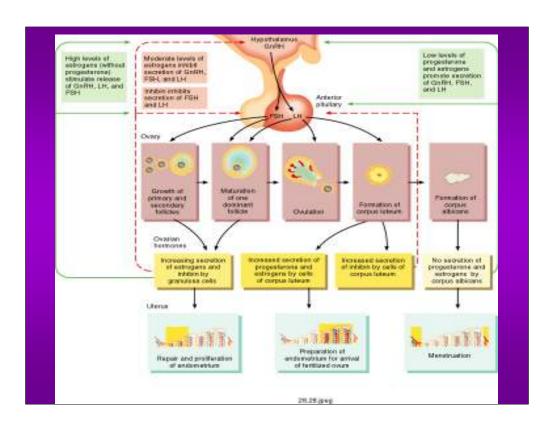
#### **Ovulation**

- the rupture of the vesicular ovarian (Graafian) follicle and the release of the secondary oocyte into the pelvic cavity
- usually occurs on day 14 of a 28 day cycle
- fimbriae of the uterine tubes become active
  - create currents to draw the secondary oocyte into the uterine tubes



# Post Ovulatory (Secretory Phase)

- The period of time after ovulation before the beginning of menstruation
- The most constant time in duration
- Usually lasts from day 15 to day 28 in a
   28 day cycle
- Uterine lining is optimally developed to allow a fertilized egg to be implanted
- If implantation occurs, the developing placenta releases Human Chorionic Gonadotropin (HCG)



#### Menopause

- Characterized by the climacteric
  - a situation where menstrual cycles become less frequent
- Typically begins between 40 50 years of age
- Caused by the ovaries failure to respond to FSH and LH

## Physiological Changes with Menopause

- Atrophy of the ovaries, uterine tubes, uterus, vagina, external genitalia and the breasts
- Increased risk for development of osteoporosis
- Increased risk for cardiovascular diseases

### **Symptoms of Menopause**

- hot flashes
- muscular pains
- insomnia
- weight gain
- headaches

- hair loss
- vaginal dryness
- depression
- emotional instability
- copious sweating

#### **Female Hormones**

- Estrogens produced by the ovaries and help to mature females as well as begin to prepare the lining of the uterus for a fertilized egg.
- Progesterone produced by the ovaries and help to thicken and increase the blood supply to the endometrium.

#### **Female Hormones**

• Relaxin – produced by the ovaries and helps to relax the symphysis pubis during the later half of pregnancy in preparation for delivery of the fetus at the end of 40 weeks.

#### **Effects of Meiosis**

- Meiosis is the specialized form of cell division that creates cells with half the normal number of chromosomes or the haploid number.
- Occurs only in the cells of the gonads responsible for producing eggs and sperm.
- Eggs and sperm cells each have 23 chromosomes.

### **Events Associated with Human Development**

- Prenatal Development
- The changes that occur prior to birth.
   These include the changes that occur in the formation of a fetus from a fertilized egg.



- Blastocyst
- As development continued from the zygote, it went through specialized mitosis call cleavage, to a fluid-filled sac which contains two sections. The outer portion will differentiate into membranes while the inner portion will eventually become the embryo.



- Growth of the embryo/fetus
- The embryo period lasts from implantation until 8 weeks.
- The fetal period last from 8 weeks until birth.
- 40 weeks is considered to be a full term fetus.

#### **Three Stages of Labor**

- First Stage Dilation and Effacement of the Cervix
- Contractions of the myometrium begin which push the fetus against the cervix.
   The cervix begins to thin and open.
   When the cervix is dilated to 10 cm and fully thinned, the woman enters stage 2.

- Second Stage of Labor Birth and Delivery
- The fetus is actively pushed out through the birth canal to the outside.
- (Sometimes C-sections are done instead).

- Third Stage of Labor Placental Expulsion
- Uterine contractions push the placenta out of the uterus.
- The uterus contracts to prevent bleeding after the birth of the fetus.

#### **Effects of Meiosis**

- Spermatogenesis is the formation of sperm. There are four sperm produced for each primary spermatocyte that undergoes meiosis.
- Oogenesis is the formation of eggs.
   There is ONE viable egg produced for each primary oocyte that undergoes meiosis.

#### **Breast Disorders**

- Breast Cancer
  - high fatality rates in females
  - usually seen in older women
  - increased risk with hormone therapy, high fat diets, not breastfeeding, etc.

### Risk Factors for Breast Cancer

- family history of breast cancer
- never having children or having your first child after the age of 34
- previous cancer(s)
- exposure to ionizing radiation
- excessive fat and alcohol intake in the diet

## **Breast Cancer Detection Methods and Strategies**

- self examination
- mammography
- ultrasound
- computed tomography with mammography (CT/M)

### **Treatment for Breast Cancer**

- Lumpectomy
- Mastectomy
- Radiation
- Chemotherapy

#### **Testicular Cancer**

- Cancer of the testes
- Occurs most often in young men ages
   15 34
- One of the most common cancers in young men
- Cause is unknown but is more prevalent in males with a history of undescended or late descending testes
- Treatment involves removal of the affected testes

#### **Cervical Cancer**

• Cervical cancer is cancer of the uterine cervix. There are several factors which increase a woman's chances including genetics, age, the presence of HIV, age, multiple sexual partners, use of birth control pills, infection with the human papilloma virus, and smoking. The symptoms of cervical cancer include no symptoms, a vague feeling of bloating, increased vaginal discharge, pelvic pain, and abnormal vaginal bleeding. Treatment includes surgery, chemotherapy and/or radiation.

#### **Ovarian Cancer**

• Ovarian cancer is cancer of the ovaries and is the seventh most common cancer and the fifth leading cause of cancer death after lung, breast, colorectal, and pancreatic. The risk factors include genetics, age, and other unknown causes. Symptoms of ovarian cancer are fairly vague including bloating and abdominal pain which makes diagnosis difficult since women do not generally see their health care providers for those symptoms. There is a blood test, CA 125, available which is used for women with a familial history of ovarian cancer. Treatment includes surgery and/or chemotherapy.

#### **Prostate Cancer**

- Cancer of the prostate gland
- Second leading cause of cancer death in males (34,000 annually)
- Influenced by:
  - age race occupation geography
  - ethnic origin
- PSA Prostate Specific Antigen a protein that can be detected in the bloodstream that can indicate a high risk for developing prostate cancer

#### **Endometriosis**

- Benign condition characterized by growth of endometrial tissue outside the uterus
- May be caused by regurgitation of menstrual flow back into the abdominopelvic cavity
- Common in women between 25 40 who have never had children
- Symptoms include premenstrual pain or unusual menstrual pain

## **Impotence**

- The inability of the adult male to attain or maintain an erection
- Many possible causes:
  - drugs psychological factors
  - diabetes mellitus neurological disorders
  - physical abnormalities of the penis
  - systemic disorders such as syphilis
  - vascular disorders



## Gonorrhea (Clap)

- An infectious STI that primarily affects the mucous membranes of the urogenital tract, the rectum, and occasionally the eyes
- Caused by the bacterium *Neisseria gonorrhoeae*
- Probably 3 4 million cases a year
- Primarily affects individuals 15 24 years age

#### Gonorrhea (cont.)

- Males inflammation of the urethra with a greenish-yellowish pus and painful urination
- Females infection of the vagina, urethra, cervix, with a discharge of a greenish-yellowish pus
  - Can lead to infection of the uterine tubes and peritoneum (PID or Pelvic Inflammatory Disease)
- May cause sterility or even death
- Can be transmitted to the eyes of a newborn during childbirth
  - May lead to blindness

## Syphilis

- STI caused by the spirochete *Treponema* pallidum
- About 85,000 new cases each year
- Mostly affects the 20 39 year old age group
- Develops in stages:
  - Primary Stage open sore or chancre
  - Secondary Stage skin rash, fever, joint and muscle aches
  - Latent Period symptomless period where the disease cannot be transmitted
  - Tertiary Stage organ degeneration

## Syphilis (cont.)

- May attack the nervous system (Neurosyphilis)
  - Meningitis, brain damage, loss of coordination, inability to control urine and bowel movement
- Can infect the fetus during childbirth
  - 25% die in utero
  - 30% die shortly after birth
  - 40% develop symptomatic syphilis during their lifetime

#### **Genital Herpes**

- STI transmitted by the Herpes Simplex Virus
- 400,000 to 600,000 new cases each year
- Type I Herpes Simplex infections above the waist such as cold sores etc.
- Type II Herpes Simplex below the waist infections such as painful genital blisters
- May also experience flu-like symptoms such as fever, chills, lymphadenopathy

## Chlamydia

- STI transmitted by the intracellular parasite *Chlamydia trachomatis*
- The most prevalent and one of the most damaging STI's
- Affects 3 million to 5 million annually
- Males frequent, painful burning during urination with low back pain
- Females urethritis that may extend into the uterine tubes which increases risk of sterility or development of ectopic pregnancies
- May affect a newborn during childbirth

#### **Trichomoniasis**

- Caused by the flagellate microorganism Trichomoniasis Vaginalis
- Inhabits the vagina in females and the urethra in males
- Females persistent redness, burning and itching of the vulvar tissue with a yellowish vaginal discharge, an offensive odor, and severe vaginal itch
- Men are usually asymptomatic

#### **Genital Warts**

- An infectious disease caused by a virus
- In humans, caused by the Human Papilloma Virus (HPV)
- Affects nearly 1 million people per year
- Increases the risk for developing certain types of cancers:
  - vulva vagina cervical
  - penile rectal

# Pelvic Inflammatory Diseases (PID's)

- An infection of the uterus, uterine tubes, and adjacent pelvic structures that are not associated with surgery or pregnancy
- Usually an ascending infection
  - vagina
  - cervix
  - upper reproductive structures
- Can be caused by almost any bacterium or STI



## **Human Development**

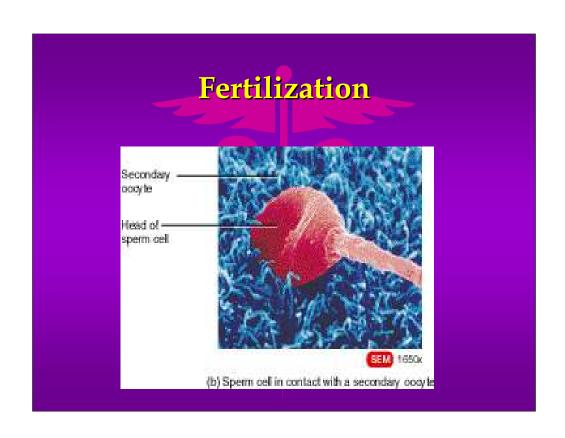
- The continuous process of body changes that begins at the moment of fertilization and continues until the death of the individual
- Divided into two Periods
  - Prenatal Development
    - Conception until Birth
  - Postnatal Development
    - Birth until Death

## **Prenatal Development**

- Changes that occur prior to birth
- Divided into two periods
  - The Embryonic Period
    - fertilization until eight weeks
  - The Fetal Period
    - eight weeks until birth

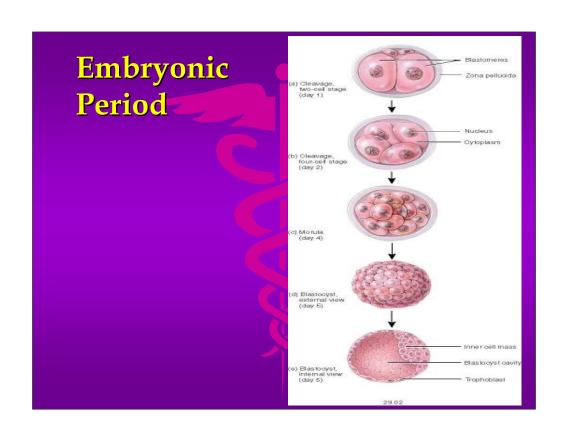
#### **Fertilization**

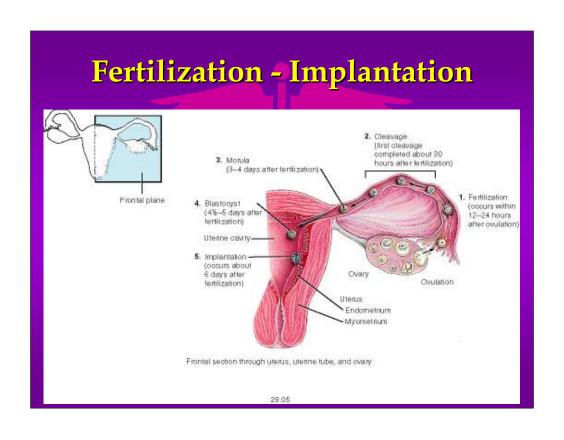
- The union of a sperm cell with an oocyte
- Also called "Conception"
- One sperm cell penetrates the three layers of the egg
  - Zona Radiata (outside layer)
  - Zona Pellucida (middle layer)
  - Oocyte Membrane (inner layer)
- Aided by an enzyme found on the head of the sperm (*Hyaluronidase*)
- Oocyte cell membrane changes biochemically

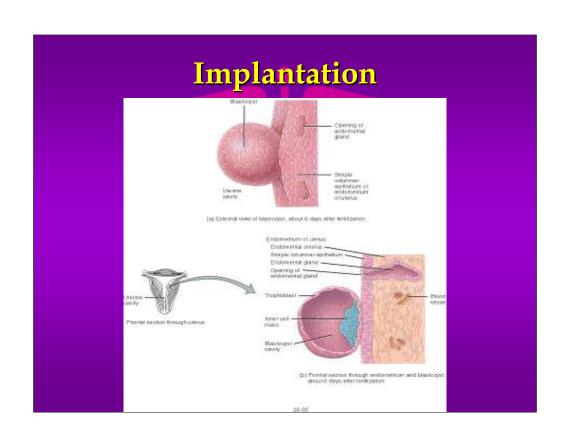


## The Embryonic Period

- The first eight weeks of life
- Upon conception the fertilized egg is sometimes called a *zygote*
- The first cell divisions of the zygote are called cleavage which results in a small ball of cells called a *morula*
- The morula eventually turns into a large mass of cells called a blastocyst





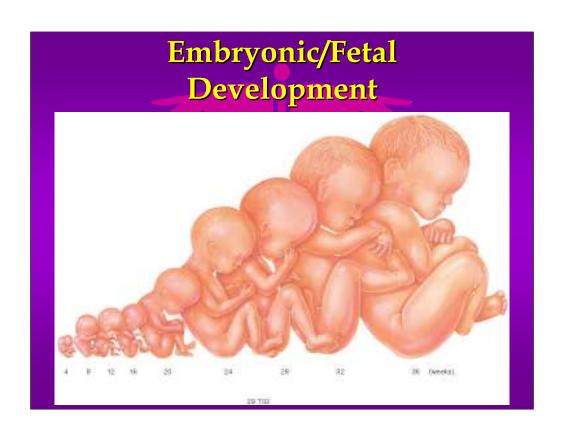


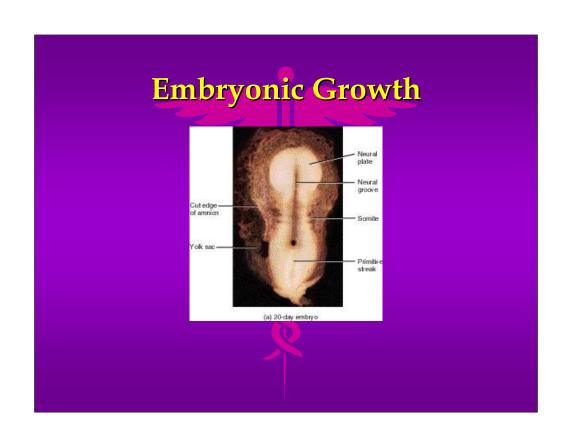
## **Embryonic Development**

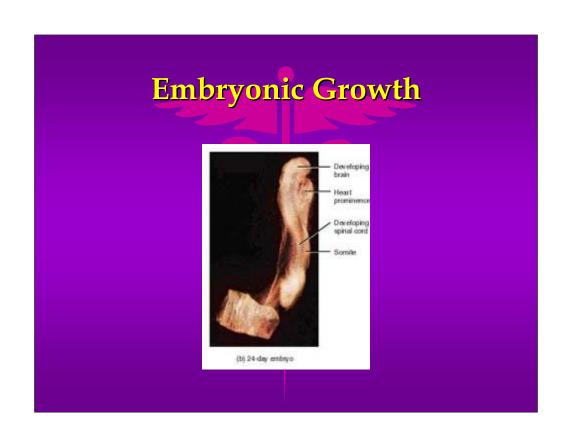
- Development of Body Form
  - weeks three to eight
  - the disc shaped embryo folds to form the Foregut,
     Midgut, and Hindgut
  - the embryo resembles a human like figure
- Development of Organs
  - cells undergo the process of Organogenesis
  - most major organs appear during the first eight weeks of development

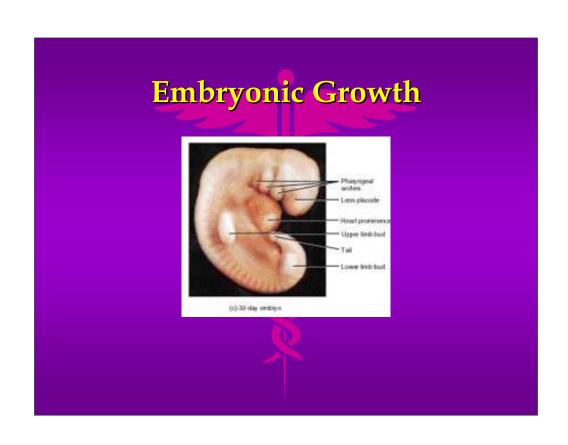
#### **Fetal Growth**

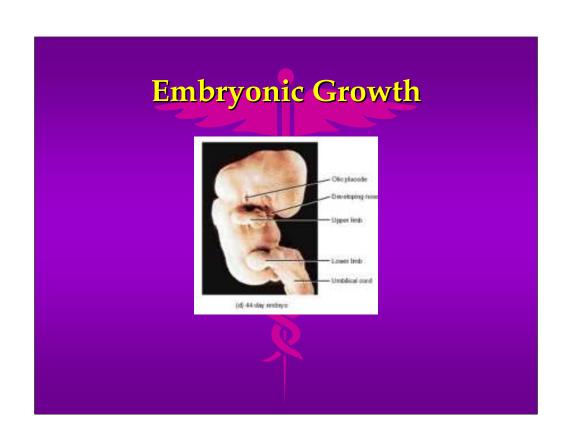
- Week eight until birth
- Bones ossify
- Rapid growth or organs and tissues by mitosis
- Covered by a layer of soft white hair and epithelial cells called *lanugo* 
  - protects the fetus from waste products in the amniotic fluid
- Fetus is considered full term and ready for birth 38 weeks after conception

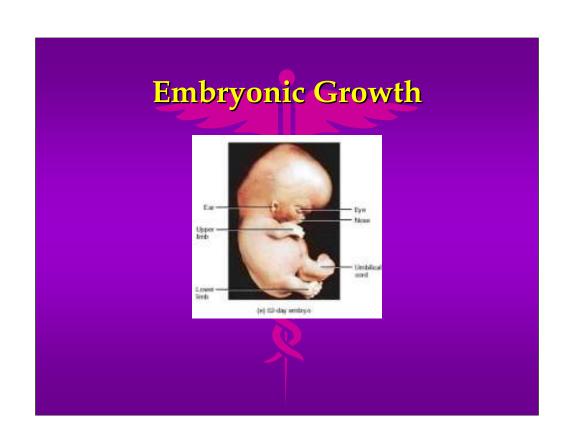








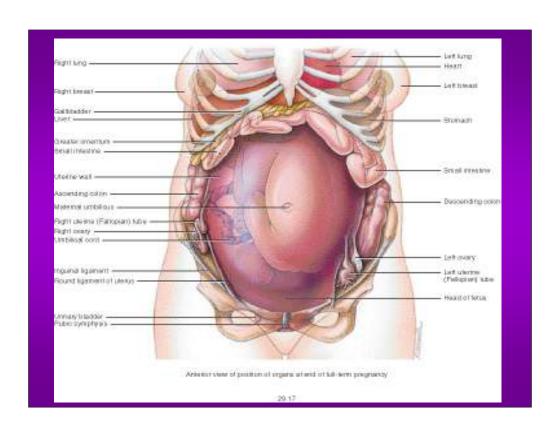












#### **Parturition**

- The process of giving birth
- Braxton-Hicks Contraction
  - minor contractions of the uterine wall in preparation for childbirth
  - stimulated by high levels of estrogen produced by the placenta
- Oxytocin Secretion
  - stimulated by stretching of the uterine wall
  - signals the hypothalamus to secrete oxytocin
  - strengthens contraction of the myometrium
  - signals the beginning of labor

#### Labor

- The movement of the fetus through the birth canal in response to uterine contractions
- Three Stages of Labor
  - Stage One dilation and effacement
    - contractions push the fetus against the cervix
    - the amniotic sac ruptures
    - the cervix dilates
    - once the cervix dilates to 10 cm Stage Two begins
  - Stage Two delivery and birth
  - Stage Three expulsion of the placenta

## **Stages of Labor**

- Stage 1 Dilation
- Stage 2
  Expulsion
  (Delivery)
- Stage 3
   Delivery of the Placenta

