Chapter 19: Hormones & Reproduction



Organs of the endocrine system (purple) and other organs containing tissues that secrete hormones (tan)

Hypothalamus

Secretes hormones involved with fluid balance, smooth muscle contraction, and the control of hormone secretion by the anterior pituitary gland

Pituitary Gland

Secretes multiple hormones that regulate the endocrine activities of the adrenal cortex, thyroid gland, and reproductive organs, and a hormone that stimulates melanin production

Thyroid Gland

Secretes hormones that affect metabolic rate and calcium levels in body fluids.

Adrenal Glands

Secrete hormones involved with mineral balance, metabolic control, and resistance to stress; the adrenal medullae release E and NE during sympathetic activation

Pancreas (Pancreatic Islets)

Secretes hormones regulating the rate of glucose uptake and utilization by body tissues

Pineal Gland

Secretes melatonin, which affects reproductive function and helps establish circadian (day/night) rhythms

Parathyroid Glands

Secrete a hormone important to the regulation of calcium ion concentrations in body fluids

Organs with Secondary Endocrine Functions

Heart: Secretes hormones involved in the regulation of blood volume

Thymus: Secretes hormones involved in the stimulation and coordination of the immune response

Digestive Tract: Secretes numerous hormones involved in the coordination of system functions, glucose metabolism, and appetite

Kidneys: Secrete hormones that regulate blood cell production and the rates of calcium and phosphate absorption by the intestinal tract

Gonads: Secrete hormones affecting growth, metabolism, and sexual characteristics, as well as hormones coordinating the activities of organs in the reproductive system

Testis

Ovary

The Endocrine



 Produces chemical messengers called
 <u>HORMONES</u> that control body activities

How It Works

Endocrine glands produce and/or release hormones directly into the bloodstream Hormones turn on, turn off, speed up, or slow down body organs/activities.

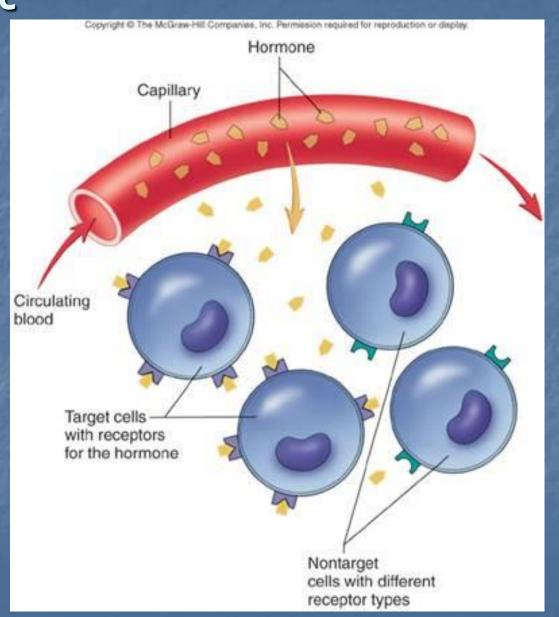


For Example

You see a burglar
Nerve impulse to brain
Brain sends impulse to adrenal glands to release adrenaline
Heart and breathing rates increase

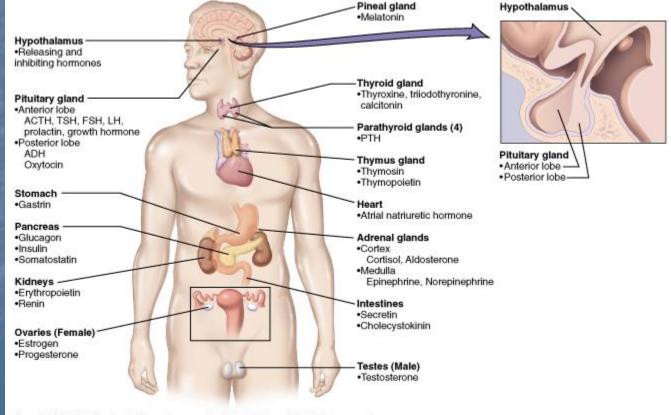


How Does It Know? Hormones only interact with TARGET CELLS



Hypothalamus

Links Nervous System to Endocrine System

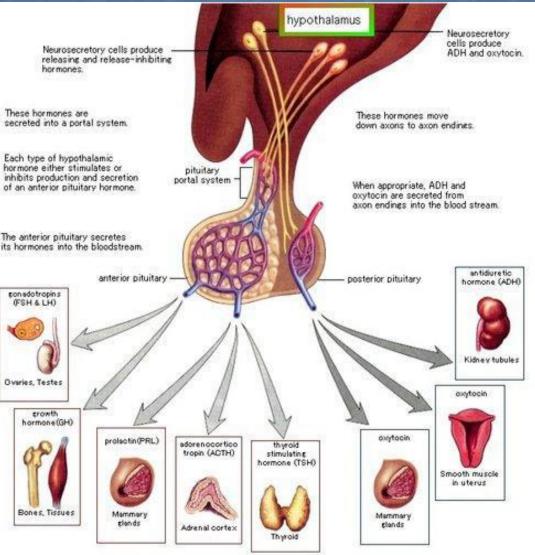


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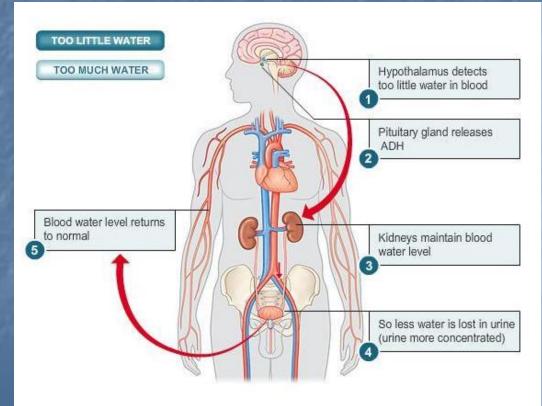
 "Master Gland" that regulates

> metabolism (thyroid)
> growth (bones)
> puberty (gonads)
> water regulation (kidneys)



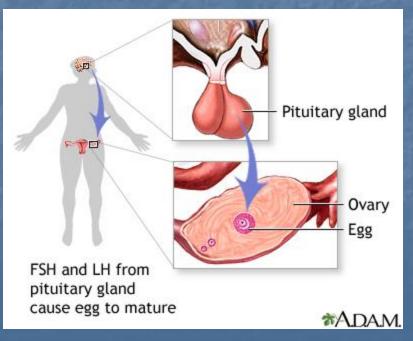
Negative Feedback

When levels high, endocrine system signals to stop release of hormone



Puberty "Wake Up" Hormones

- Follicle Stimulating Hormone (FSH) from pituitary "wakes up" gonads
- Luteinizing Hormone (LH), also from pituitary, signals maturation of sperm & egg
- Both rise and fall together during menstrual cycle



Sexual Reproduction

Egg – female sex cell
Sperm – male sex cell
Fertilization – joining of sperm & egg
Zygote – fertilized egg

Chromosomes

Found in nucleus
Contain DNA
Gametes (sperm & egg) carry 1/2 genetic code
When combined make a whole – YOU!



Y х

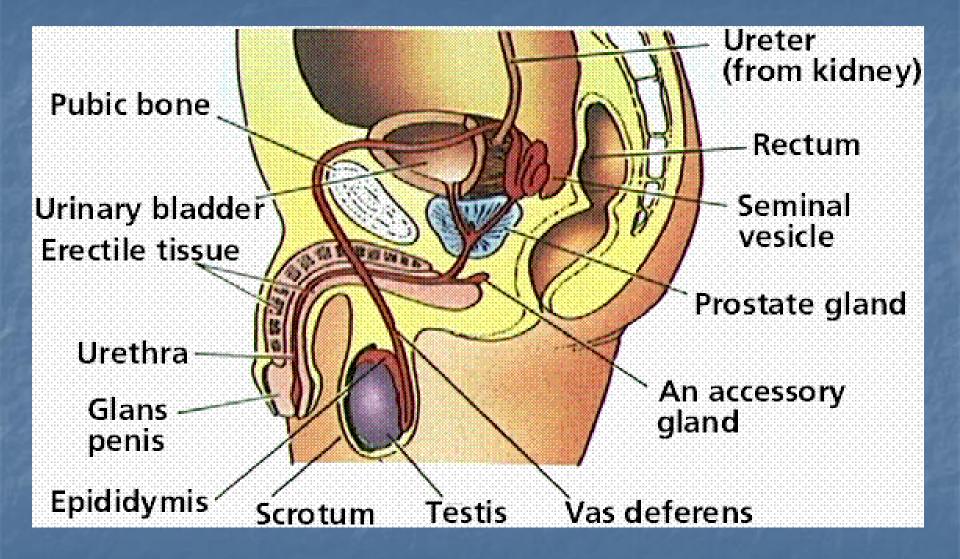
autosomes

sex chromosomes

U.S. National Library of Medicine

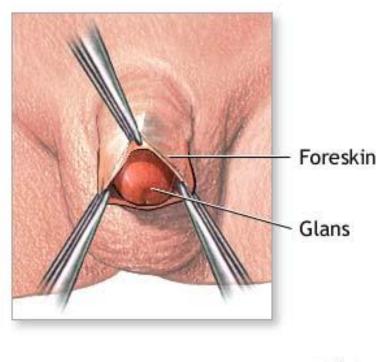
20.2 Reproductive Systems-

Male Reproductive System Produces sperm and testosterone 2 testes produce sperm Testes protected in scrotum (external sac) Sperm mix with fluids to form semen Semen leaves the body thru urethra of penis (ejaculation)



Circumcision

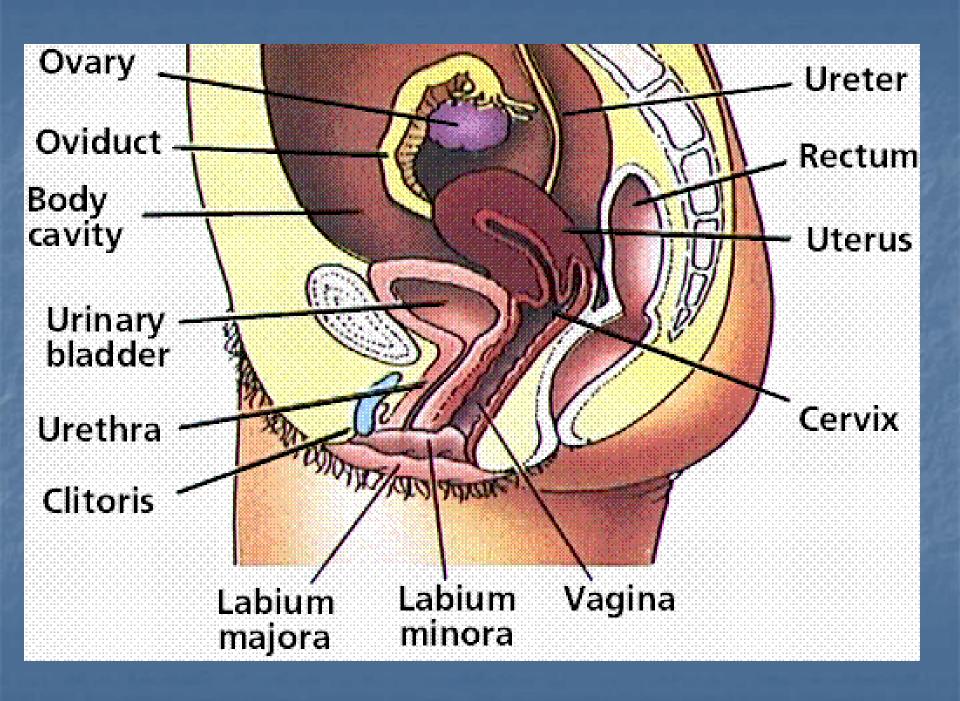
Removal of foreskin on penis





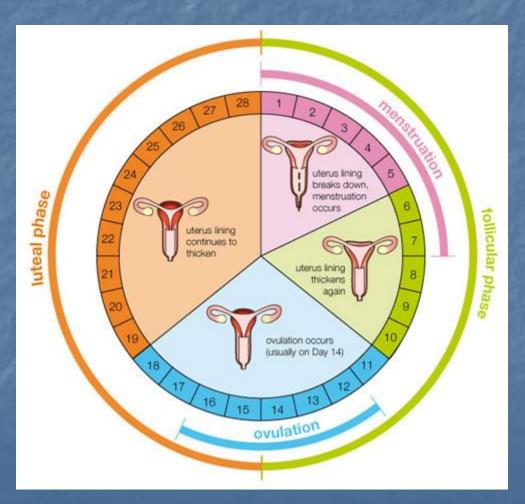
Female Reproductive System

To produce eggs, estrogen, and nourish a developing baby until birth 2 ovaries house eggs Egg released during ovulation Fallopian tubes lead to uterus Base of the uterus is the CErVIX (a common site of cancer in women: story of Henrietta Lacks) Vagina to outside of body



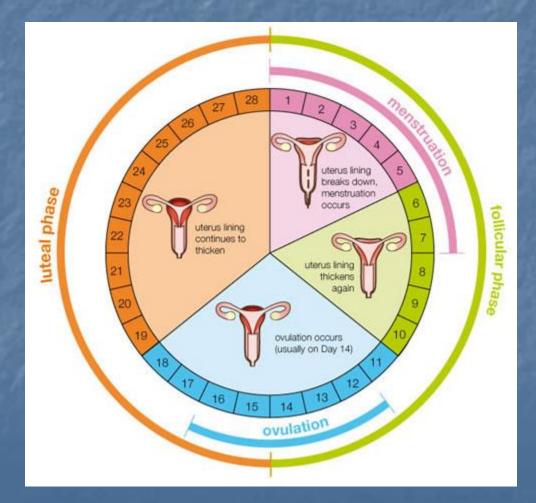
The Menstrual Cycle (about 28 days)

An egg matures in an ovary Lining of uterus begins to thicken At maturity, egg is released (ovulation) while cervical mucus thins



The Menstrual Cycle (about 28 days)

 If egg not fertilized in a few days, will break down (along with uterine wall)
 Thickened lining passes out of body (menstruation) for 4 – 6 days
 Another egg begins to mature





What About the Egg?

 Fertilization? = Pregnant
 No Fertilization? = Menstruation

20.3 Pregnancy

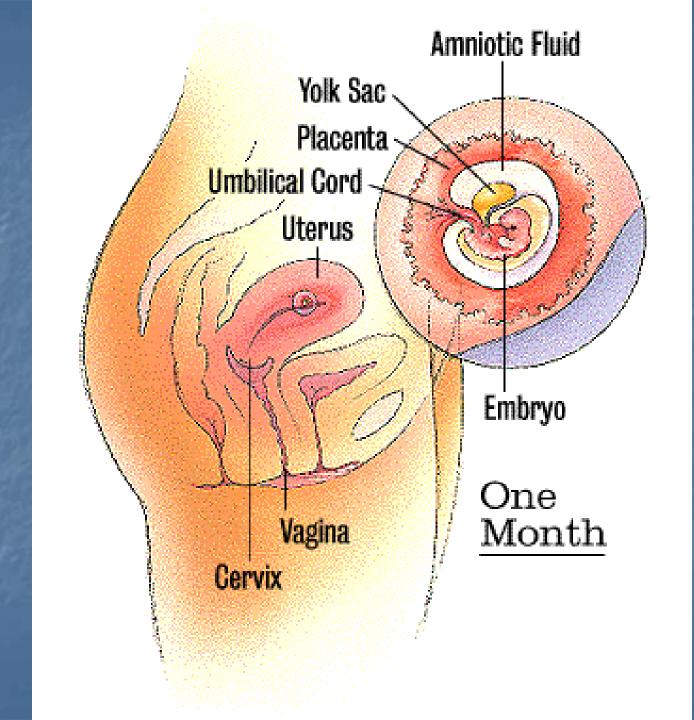
 Embryo attaches to uterine wall <u>(implantation</u>) Amniotic sac forms (filled with fluid to protect & cushion) Placenta develops from uterine lining Umbilical cord attaches where nutrients, gases & wastes are exchanged

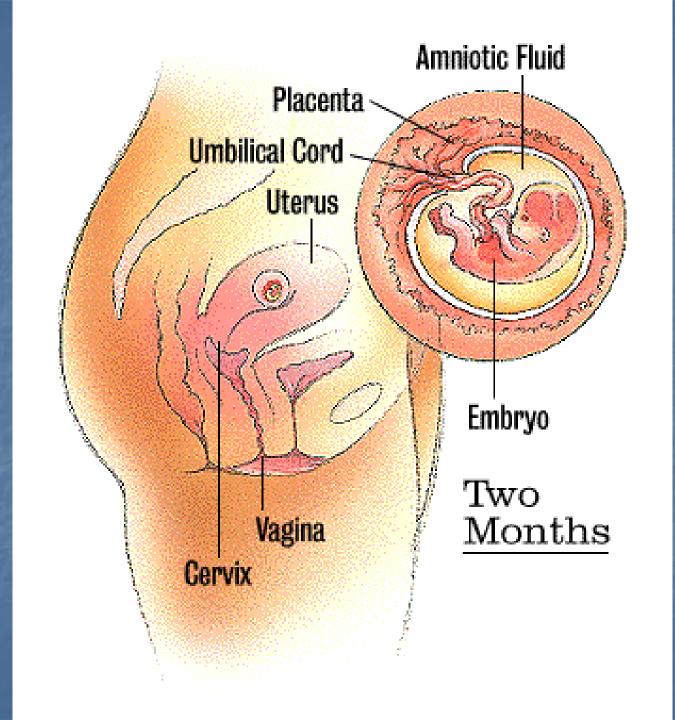
Human Development

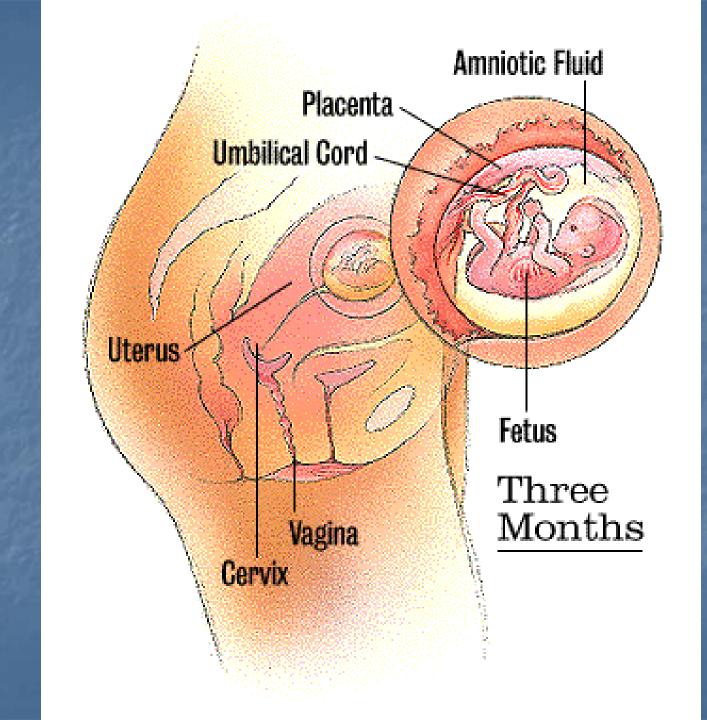
Zygote – fertilized egg
Embryo – til 8 weeks
Fetus – 9 wks to birth



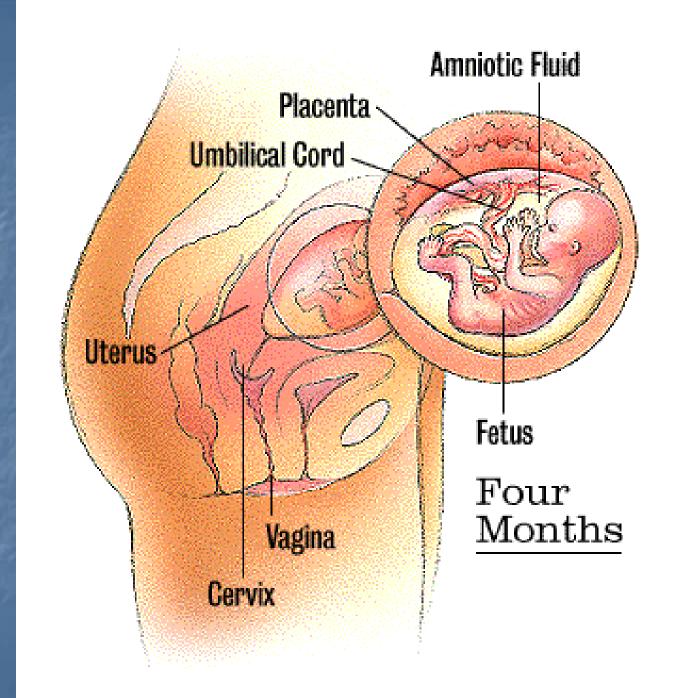
3 Stages of Pregnancy 40 week Gestation ■ 1st Trimester ■ 1st 12 - 14 weeks Organs forming Most critical time

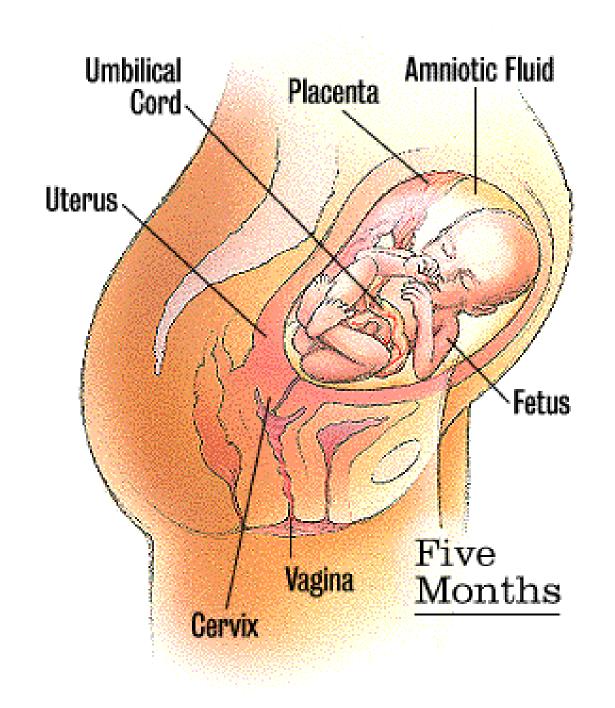


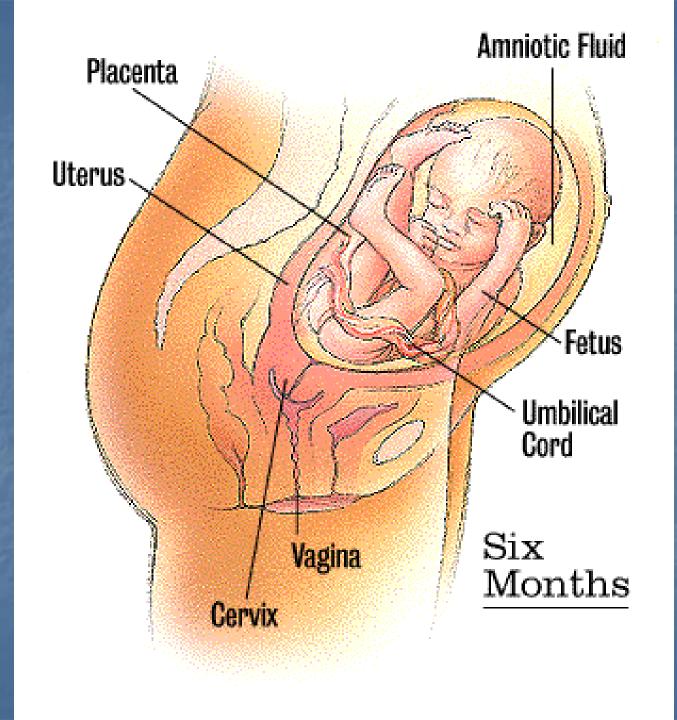


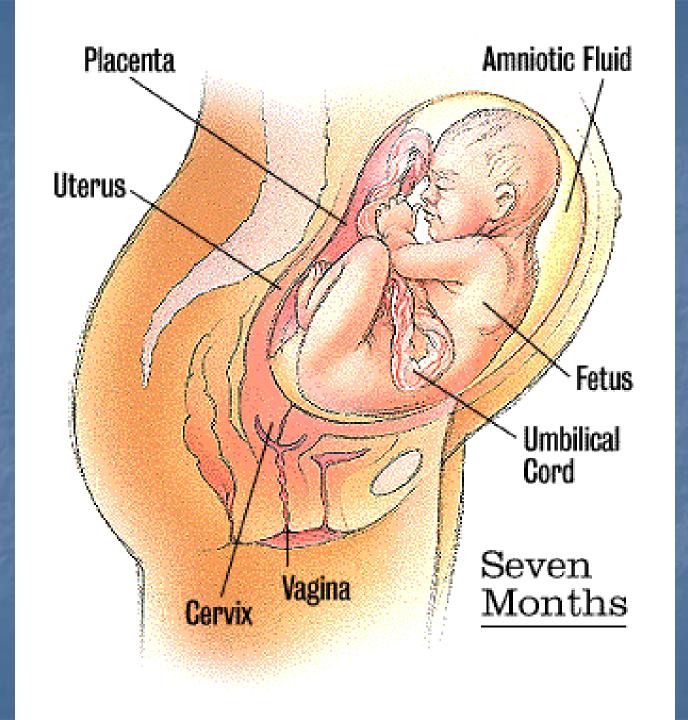


3 Stages of Pregnancy (cont.) 2nd Trimester ■ Til end of 7th month Organ systems formed & maturing





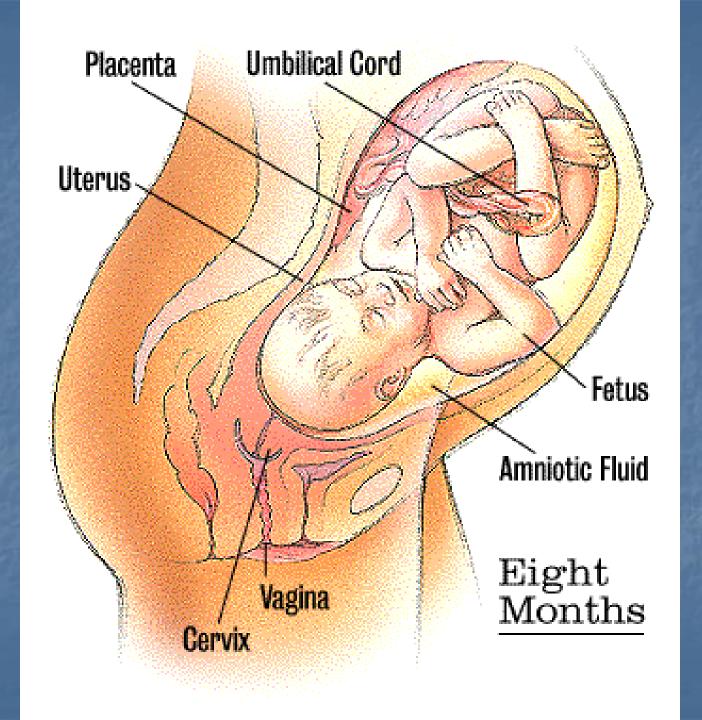


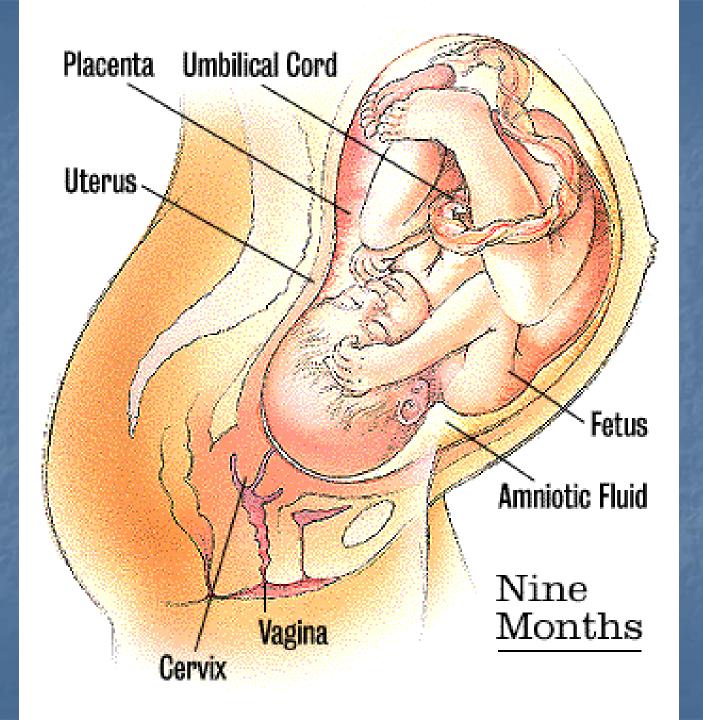


3 Stages of Pregnancy (cont.)

 3rd Trimester
 Final weeks
 Rapid growth and weight gain of fetus







Ready?

 Between 38 & 42 weeks, all systems mature
 Baby's size puts pressure on cervix & amniotic sac



Cervical Effacement & Dilation (Borramiento y Dilatación Cervical)

Effacement -the gradual thinning, shortening and drawing up of the cervix measured in percentages from 0 to 100%. *Borramiento* - el adelgazamiento, acortamiento y encogimiento gradual del

Borramiento - el adelgazamiento, acortamiento y encogimiento gradual de cervix medido en porcentajes del 0 al 100 %.



Dilation - the gradual opening of the cervix measured in centimeters from 0 to 10 cms.

Dilatación - La apertura gradual del cérvix medida en centímetros de 0 a 10 cms.



1cm



7cm

8cm

9cm

10cm

Stages of Childbirth

Labor – cervix dilates, uterus contracts
Delivery – baby pushed out through vagina (aka birth canal)
Afterbirth – Placenta is delivered
Caesarean Section (C-Section) – baby is removed surgically from abdomen

Other Pregnancy Terms



Siblings – brothers and sisters
Fraternal Twins – 2 eggs and 2 sperm
Identical Twins – zygote splits

Infancy

 1st two years
 Rapid learning, growth, and development



Toddlers

Continued growth and independence





Childhood

Growth slows but continues, more coordinated in activities

Adolescence

 "Awkward" stage between childhood and adulthood
 Puberty – sexual development



Adulthood

Body peaks at 22 and by 27 body and brain starts its slow decline, which varies depending on individual.



Aging

 skin wrinkles, muscles decrease, sense organs decline
 Slow aging process by diet & exercise