Glencoe Science

Biology

Interactive Classroom

Click the advance arrow or press the space bar to continue

Mc Graw Hill Glencoe

Chapter 36 Human Reproduction and Development

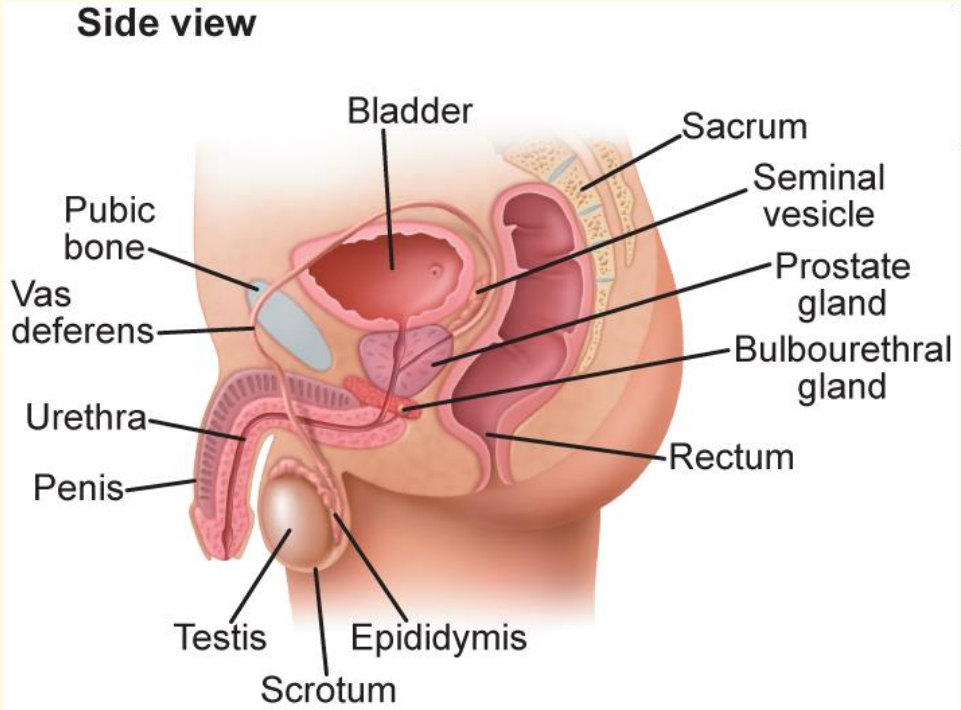
EXIT

Click on a lesson name to select.

36.1 Reproductive Systems

Human Male Reproductive System

- Reproductive glands are called the testes and are located outside the body cavity in a pouch called the scrotum.

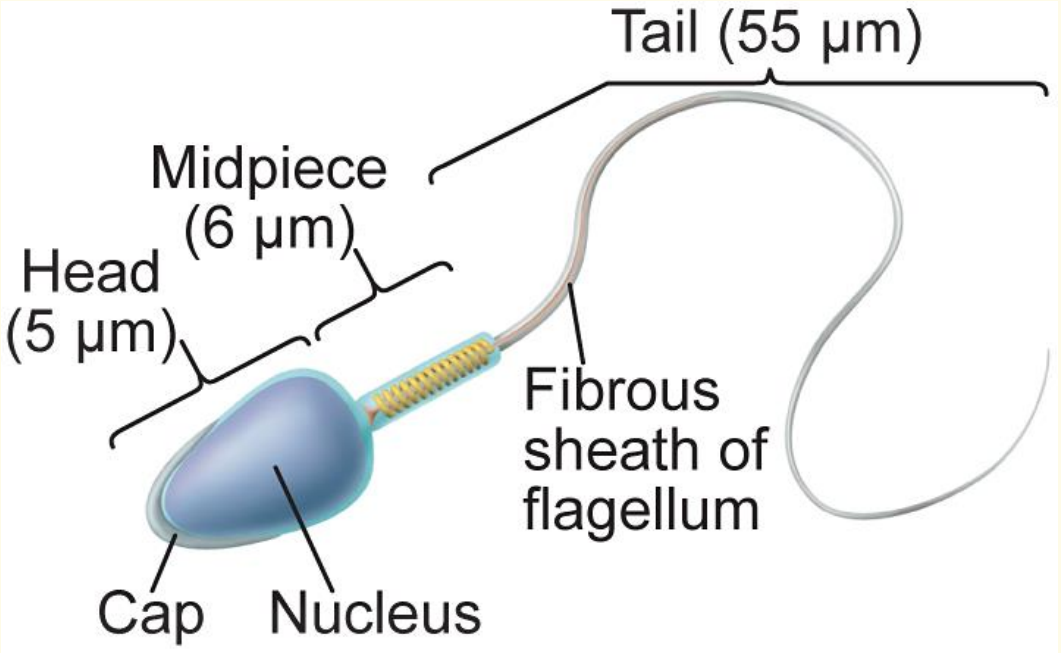


- A temperature lower than 37°C is required for the development of sperm.

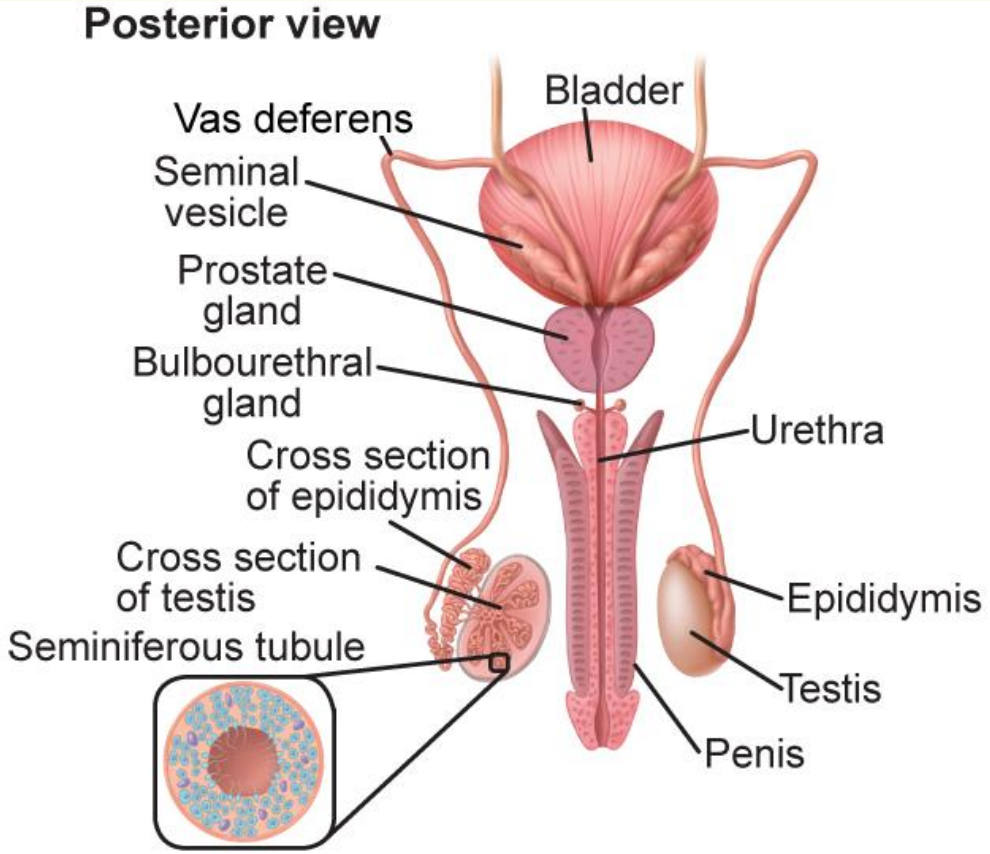
36.1 Reproductive Systems

Sperm Cells

- Develop in the testes in the seminiferous tubules.



36.1 Reproductive Systems



- Travel to the epididymis and are stored
- Travel through the vas deferens.
- The two vas deferens join together and enter the urethra.

36.1 Reproductive Systems

Male Hormones

- Testosterone is a steroid hormone that is necessary for the production of sperm.
- Three hormones influence testosterone production.
  - Gonadotropin-releasing hormone (GnRH)
  - Follicle-stimulating hormone (FSH)
  - Luteinizing hormone (LH)

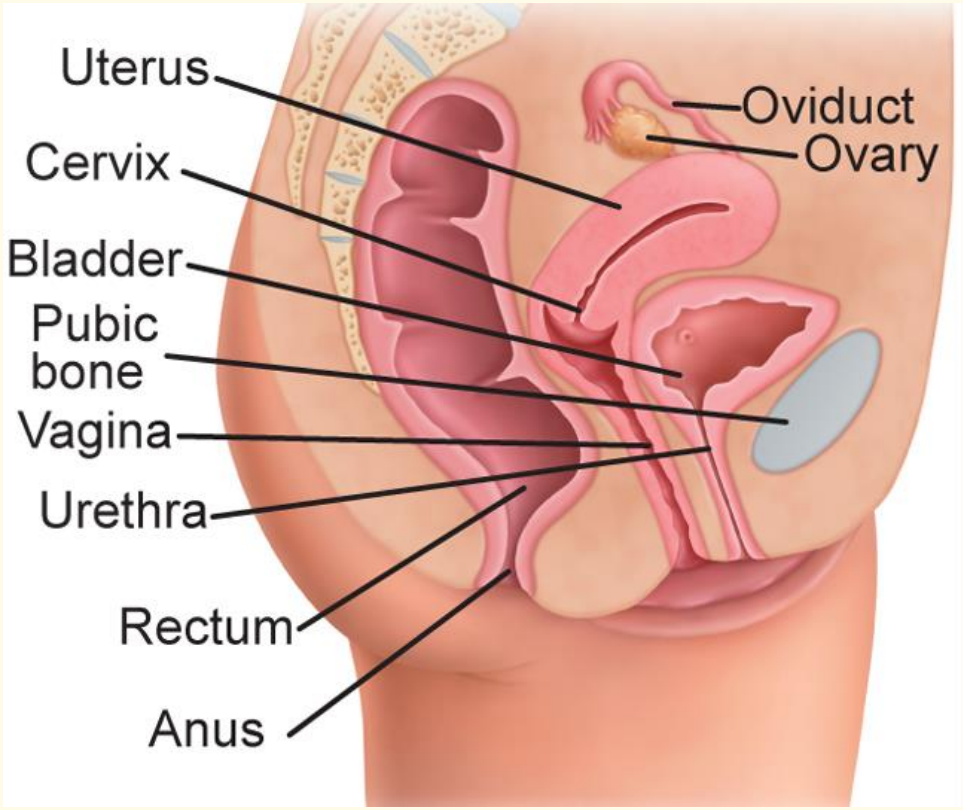
36.1 Reproductive Systems

Human Female Reproductive System

- Egg cells are produced in the ovaries.
- Inside each ovary are oocytes, which are immature eggs.
- The egg travels through an oviduct, a tube that connects to the uterus.
- The cervix at the lower end of the uterus has a narrow opening into the vagina, which leads to the outside of the female's body.

36.1 Reproductive Systems

- Estrogen and progesterone are steroid hormones made by cells in the ovaries.
- The anterior pituitary gland also produces LH and FSH.



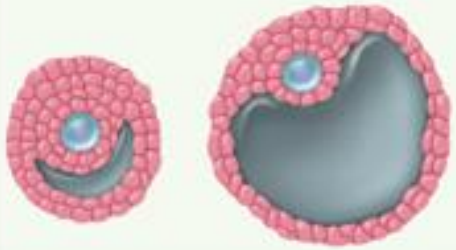
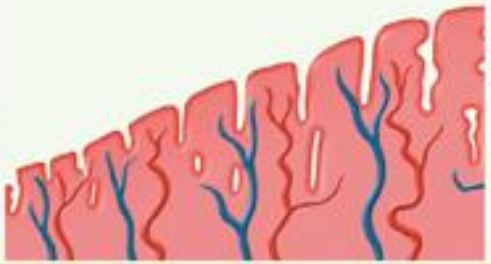
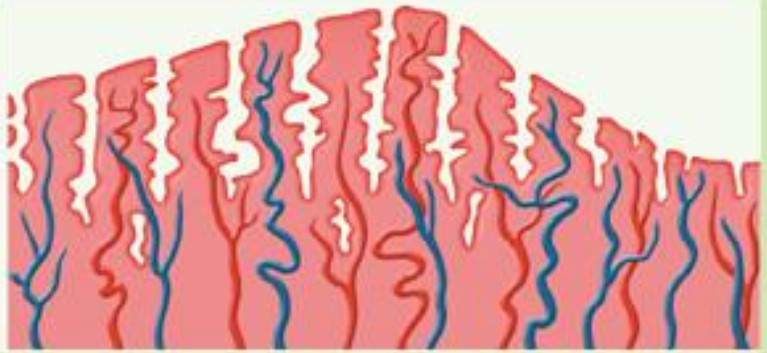
36.1 Reproductive Systems

The Menstrual Cycle

- The length of the menstrual cycle can vary from 23 to 35 days.
- The cycle can be divided into three phases: the flow phase, the follicular phase, and the luteal phase.

36.1 Reproductive Systems

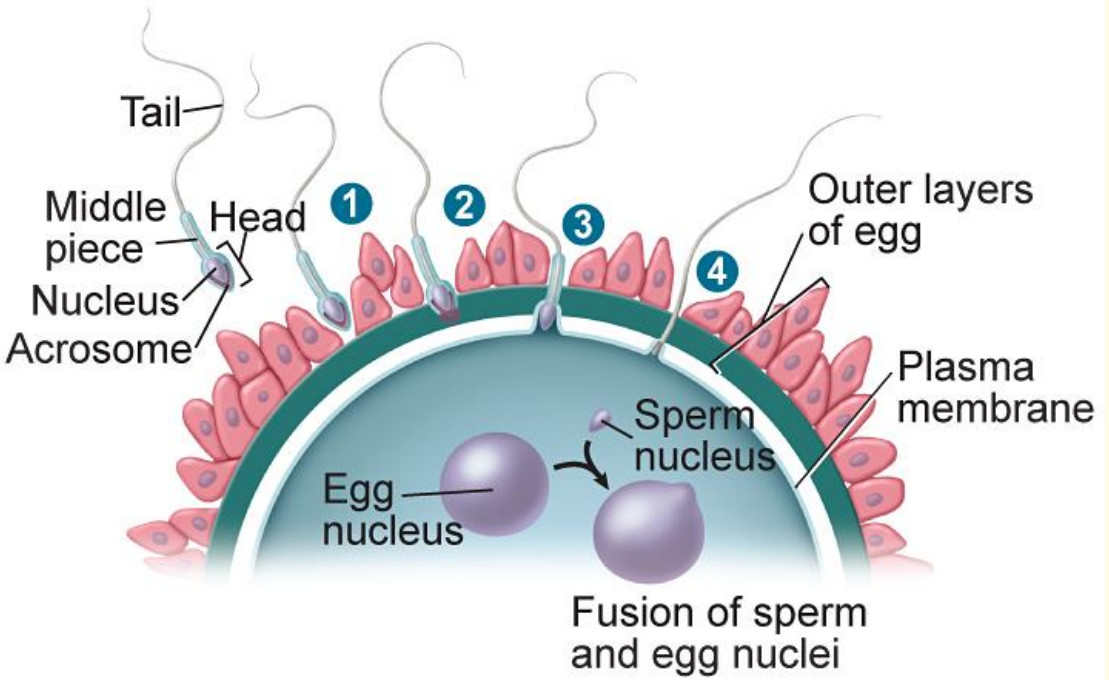
Menstrual Cycle Events

	Flow phase	Follicular phase	Luteal phase
Days	1-5	6-14	15-28
Ovarian activity			
Hormone levels			
Endometrium			

36.2 Human Development Before Birth

Fertilization

- Process of a sperm joining with an egg
- Sperm and eggs each are haploid, and each normally has 23 chromosomes.



- Fertilization restores the diploid number of 46 chromosomes.

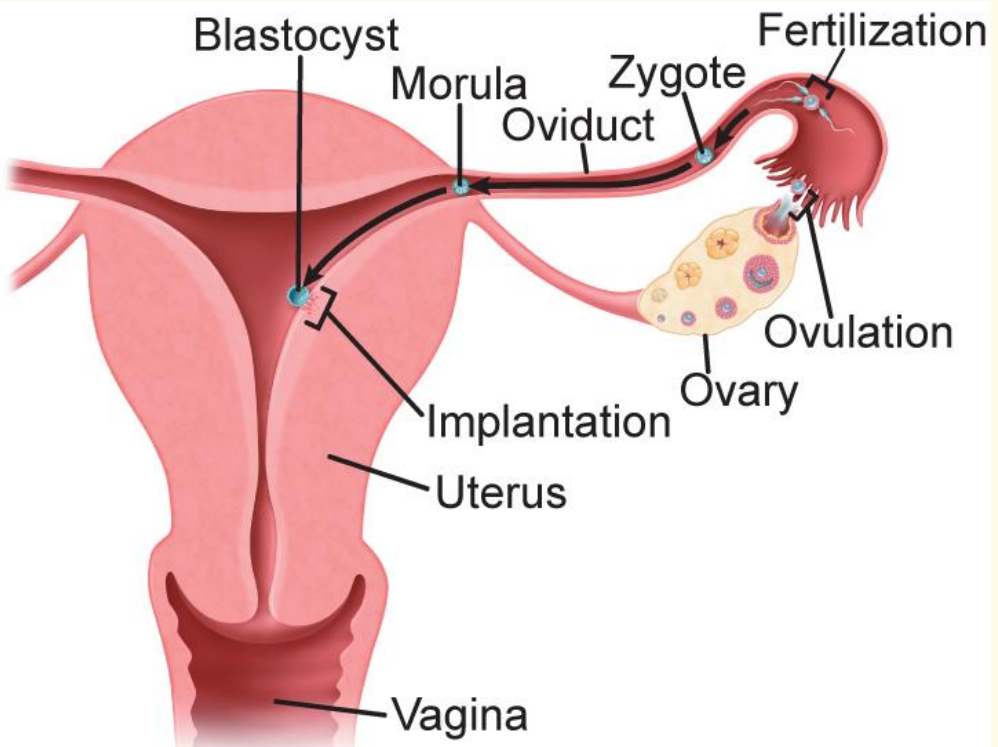
36.2 Human Development Before Birth

- The tip of each sperm cell is a specialized lysosome called an acrosome that weakens the plasma membrane surrounding the egg.
- Eventually the plasma membrane becomes weak enough that one sperm can penetrate the egg.
- Immediately following this penetration, the egg forms a barrier to prevent other sperm from entering the now-fertilized egg.

36.2 Human Development Before Birth

Early Development

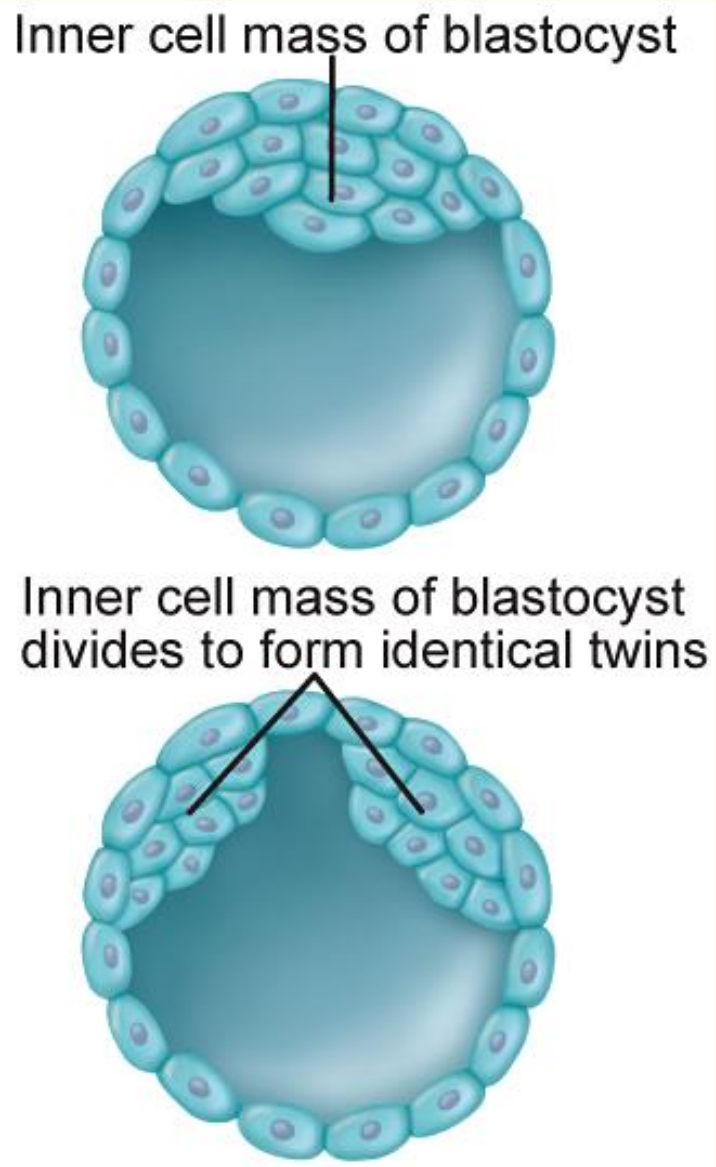
- The fertilized egg is called a zygote.
- Around 30 hours after fertilization, the zygote undergoes its first mitosis and cell division



- By the third day, the embryo, called a morula, leaves the oviduct and enters the uterus.

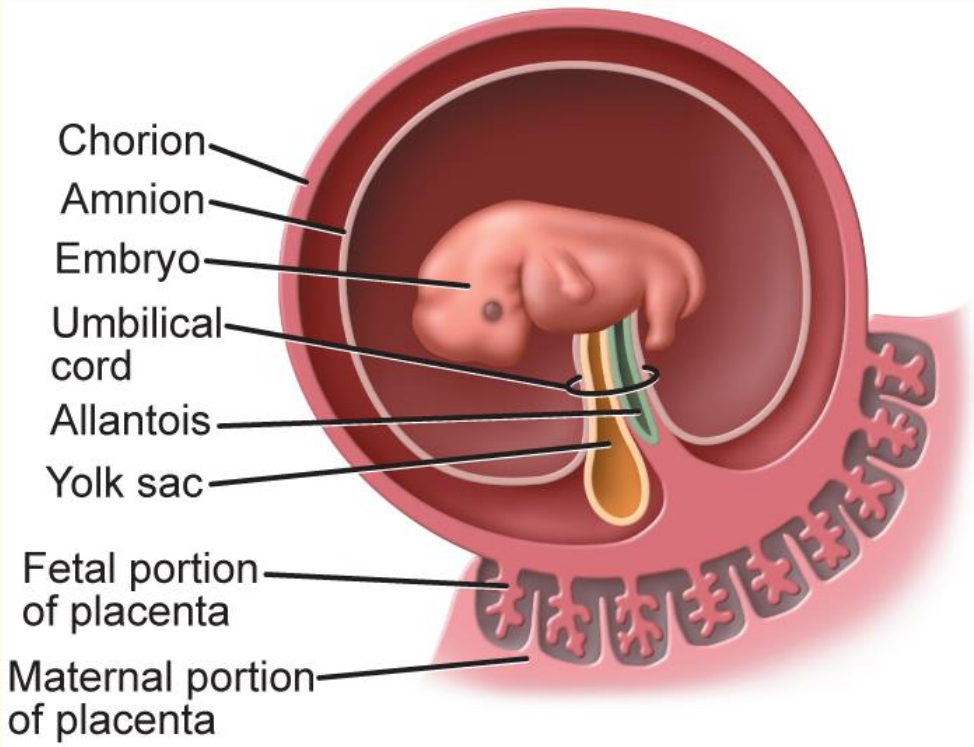
36.2 Human Development Before Birth

- By the fifth day, the morula has developed into a blastocyst.
- The blastocyst attaches to the endometrium around the sixth day and is fully implanted by Day 10.



36.2 Human Development Before Birth

Extraembryonic Membranes



- Four extraembryonic membranes form.
- These membranes are the amnion, the chorion, the yolk sac, and the allantois.

36.2 Human Development Before Birth

The Placenta

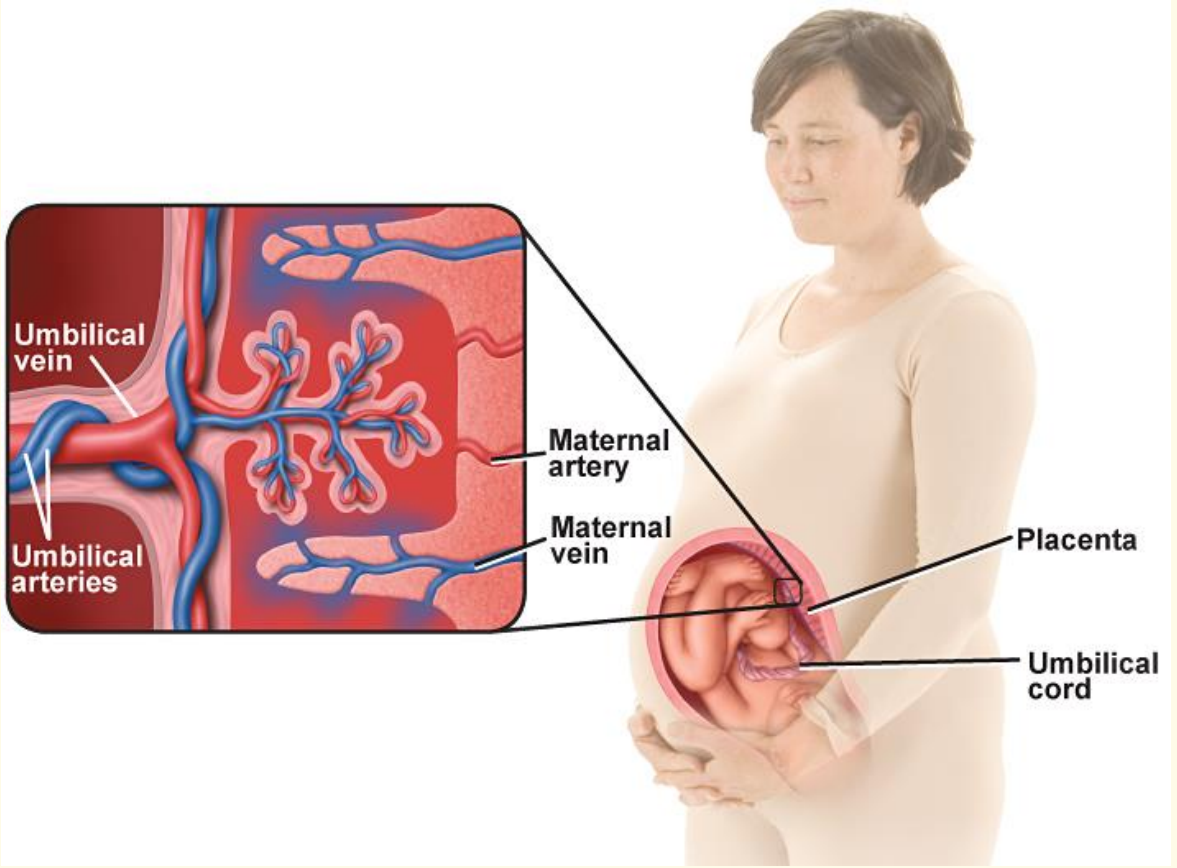
- Provides food and oxygen and removes wastes
- The placenta has two surfaces
  - A fetal side that forms from the chorion and faces the fetus
  - A maternal side that forms from uterine tissue

36.2 Human Development Before Birth

A. As an embryo develops, the chorionic villi begin to grow into the uterine wall.

B. Nutrients, oxygen, and wastes diffuse across maternal and fetal blood vessels, and are carried to and from the fetus through the umbilical cord.

C. The placenta contains tissue from both mother and fetus.



Concepts In Motion Animation

Visualizing the Placenta

Click here to proceed!

36.2 Human Development Before Birth

Three Trimesters of Development

- Human development takes around 266 days from fertilization to birth.
- The time span is divided into three trimesters.

36.2 Human Development Before Birth

The First Trimester

- All tissues, organs, and organ systems begin to develop.
- At the end of eight weeks, the embryo is called a fetus.

36.2 Human Development Before Birth

The Second Trimester

- Period of growth
- The fetal heartbeat might be heard.

The Third Trimester

- The fetus continues to grow at a rapid rate.
- Fat accumulates under the skin to provide insulation for the fetus once it is born.

36.2 Human Development Before Birth

Preventable Causes of Birth Defects	
Cause	**Defect**
Alcohol consumption	• Mental retardation
Cigarette smoking	• Health problems related to premature births and underweight babies
Lack of folic acid in diet	• Anecephaly (head and brain do not completely form) • Spina bifida (nerve cells from the spinal cord are exposed leading to paralysis)
Cocaine	• Low birth weight • Premature birth • Possible permanent brain damage and behavioral disorders
Methamphetamine	• Premature birth • Extreme irritability

Concepts In Motion

Table 36.2 Preventable Causes of Birth Defects

Cause	Defect
	• Mental retardation
	• Health problems related to premature births and underweight babies
	• Anecephaly (head and brain do not completely form) • Spina bifida (nerve cells from the spinal cord are exposed leading to paralysis)
	• Low birth weight • Premature birth • Possible permanent brain damage and behavioral disorders
	• Premature birth • Extreme irritability

Alcohol consumption

Cocaine

Methamphetamine

Cigarette smoking

Lack of folic acid in diet

Drag each option to its corresponding defect

Reset Submit Show me

36.2 Human Development Before Birth

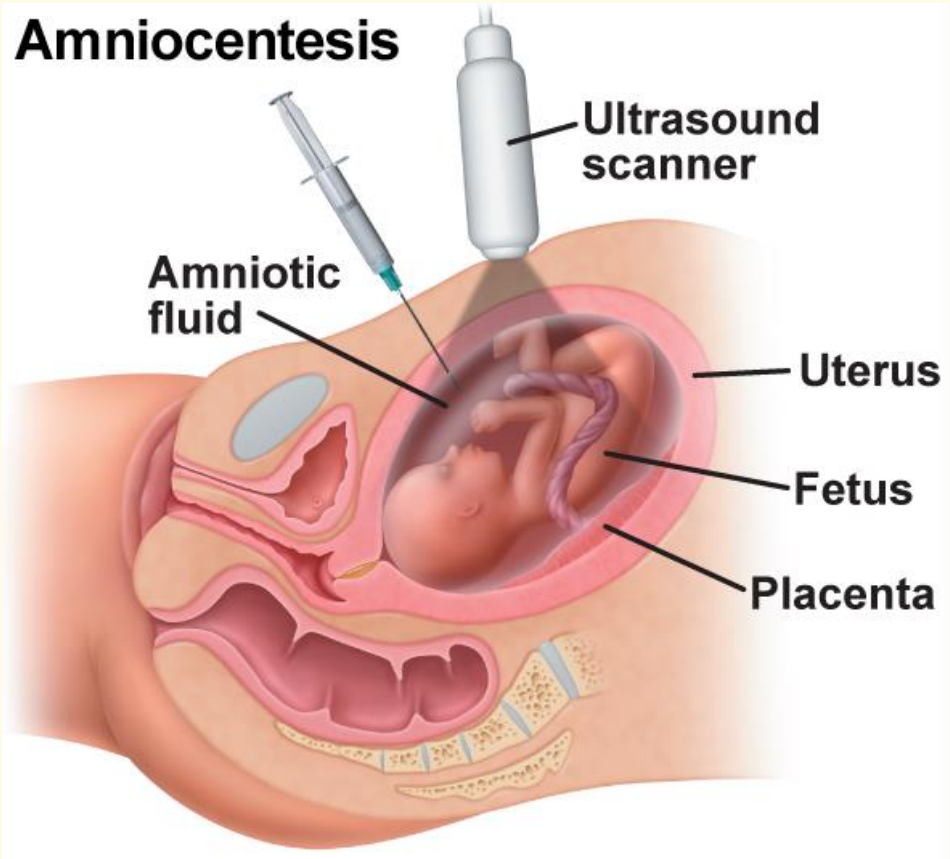
Diagnosis in the Fetus

- Ultrasound
  - Procedure in which sound waves are bounced off the fetus
  - Determines if the fetus is growing properly
  - Determines the position of the fetus in the uterus
  - Determines the gender of the fetus

36.2 Human Development Before Birth

Amniocentesis

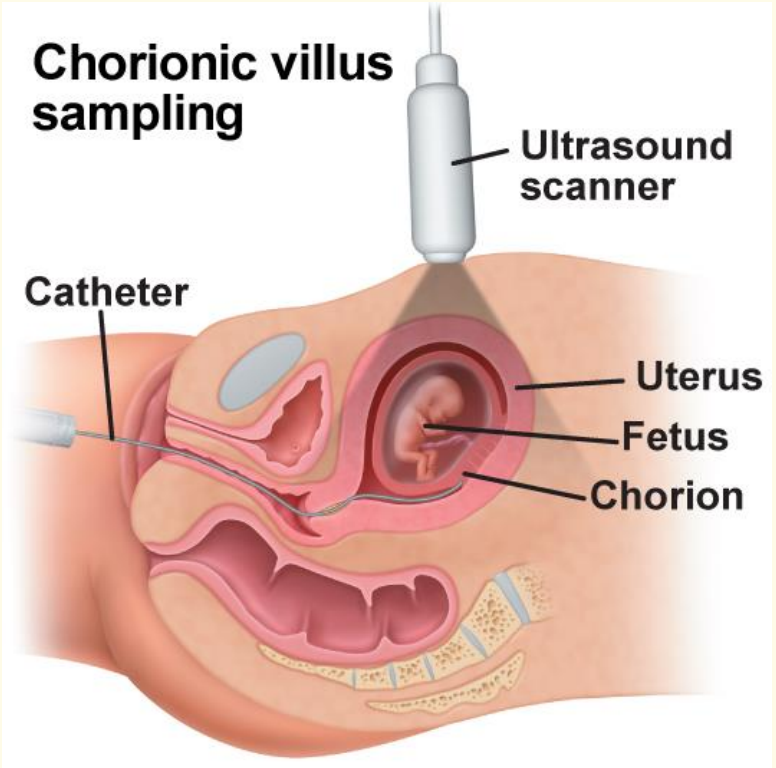
- Amniocentesis is performed in the second trimester.
- Fluid from the amniotic sac is removed and analyzed.



36.2 Human Development Before Birth

Chorionic Villus Sampling

- Chorionic villus sampling is performed during the first trimester.
- Cells from the chorion are removed and analyzed by karyotyping.



36.3 Birth, Growth, and Aging

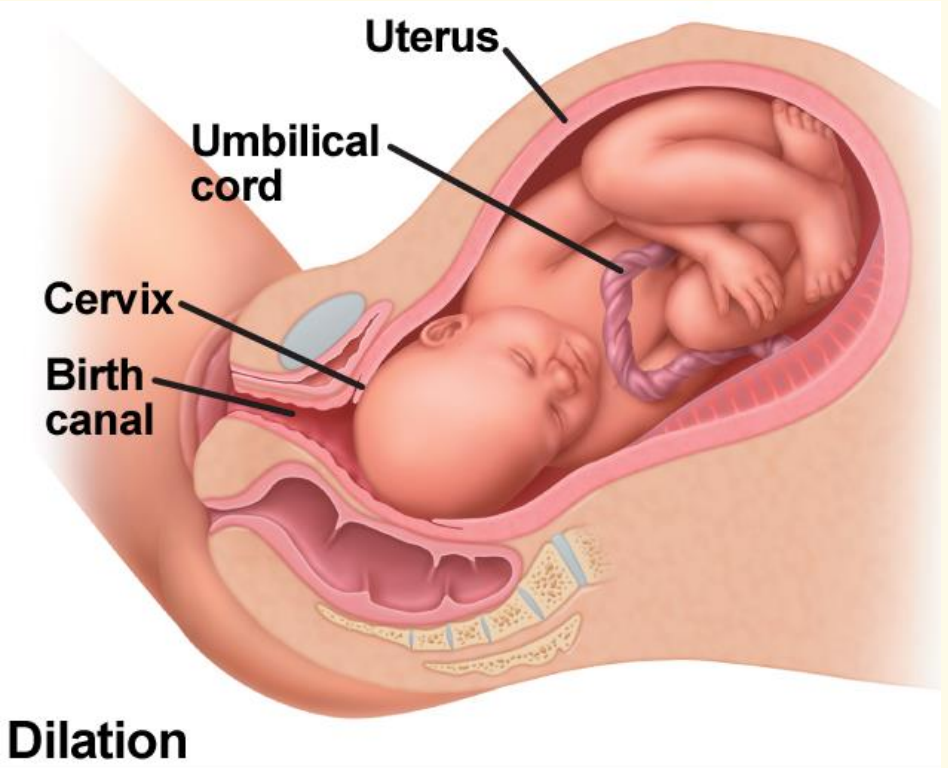
Birth

- Birth occurs in three stages: dilation, expulsion, and the placental stage.
- The beginning of the birthing process is called labor.

36.3 Birth, Growth, and Aging

Dilation

- Another sign the baby is going to be born is the dilation of the cervix.

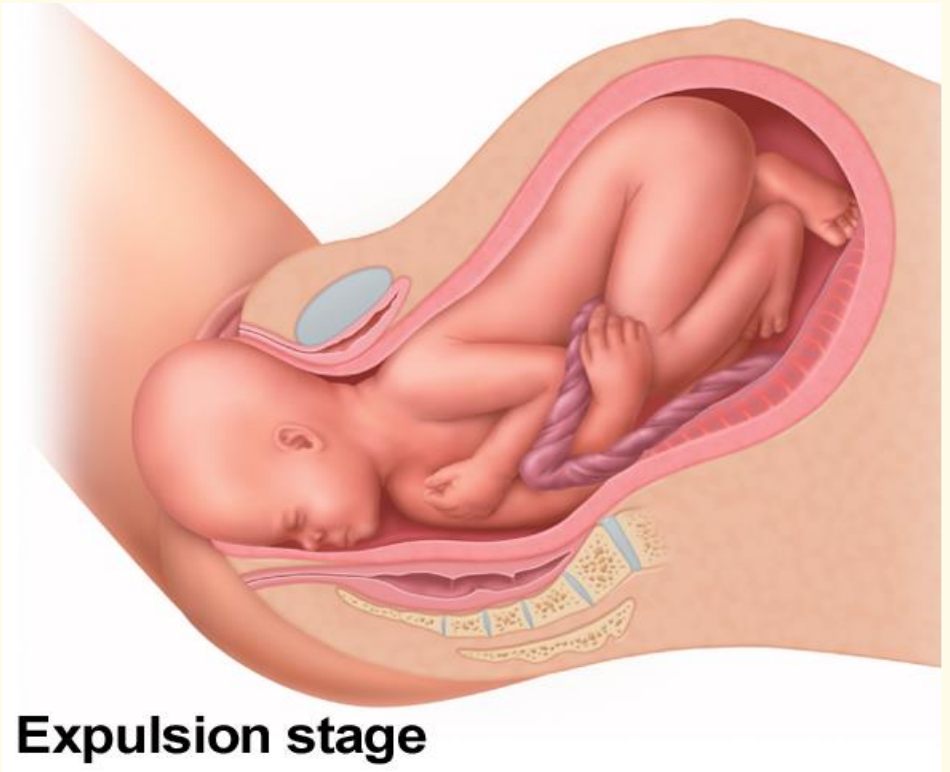


Dilation

36.3 Birth, Growth, and Aging

Expulsion Stage

- The mother consciously will contract her abdominal muscles to help push the baby, usually head first, through the vagina in the expulsion stage.

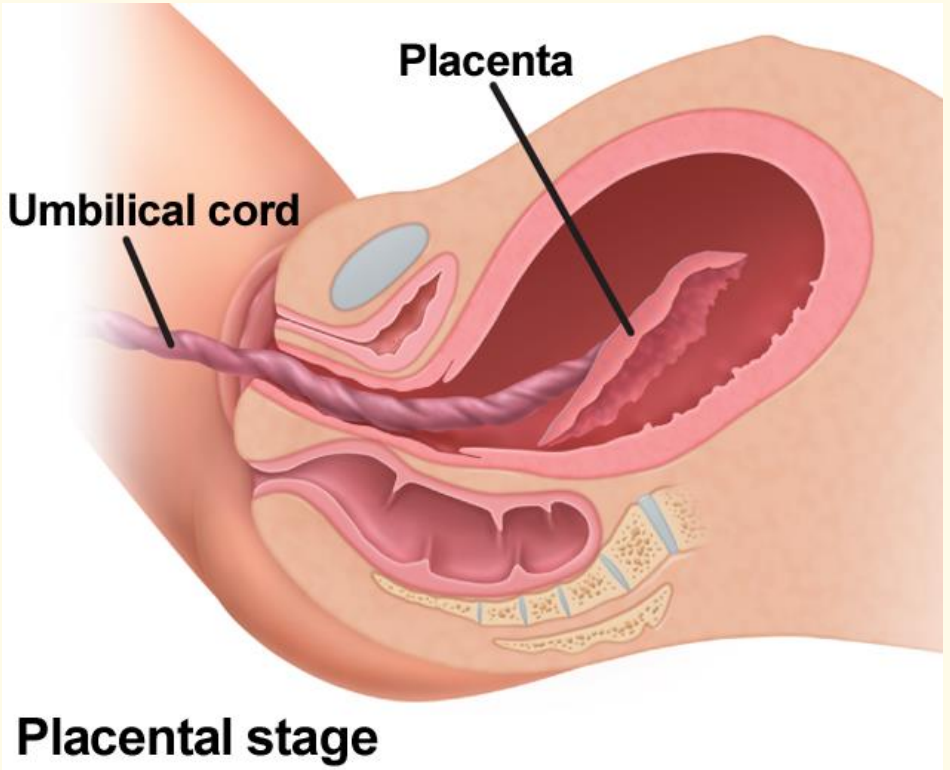


Expulsion stage

36.3 Birth, Growth, and Aging

Placental Stage

- The placenta detaches from the uterus and leaves the mother's body along with extraembryonic membranes in the placental stage.



Placental stage

36.3 Birth, Growth, and Aging

Infancy

- The first two years of life

Childhood and Adolescence

- Childhood is the period of growth and development that extends from infancy to adolescence.

36.3 Birth, Growth, and Aging

- Puberty marks the beginning of adolescence.
- Begins between ages 8 to 13 in girls and ages 10 to 15 in boys.

36.3 Birth, Growth, and Aging

Adulthood

- At the end of adolescence, physical growth is complete, marking the beginning of adulthood.
- Physical changes perhaps are the most noticeable signs of aging.
- Other changes include a decrease in muscle mass, a slowing of overall metabolism, and a decreased pumping ability of the heart.

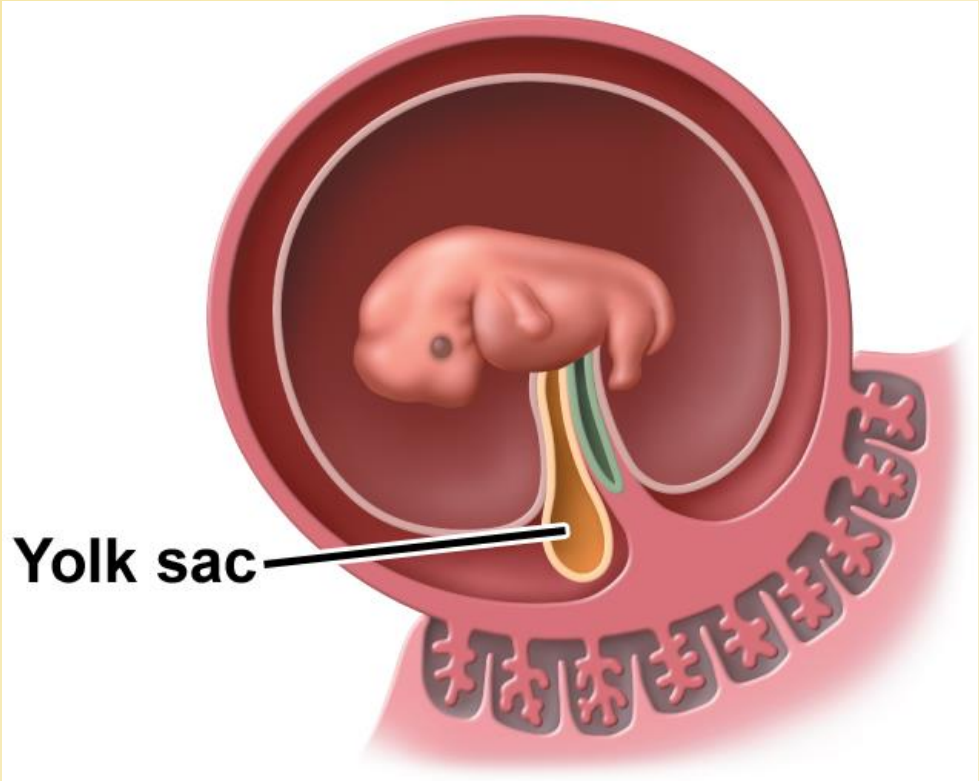
Chapter Resource Menu

Click on a hyperlink to view the corresponding lesson.

Chapter Diagnostic Questions

CheckPoint

Describe the function of the yolk sac.



Chapter Diagnostic Questions

CheckPoint

A. cushions the embryo

B. nourishes the embryo

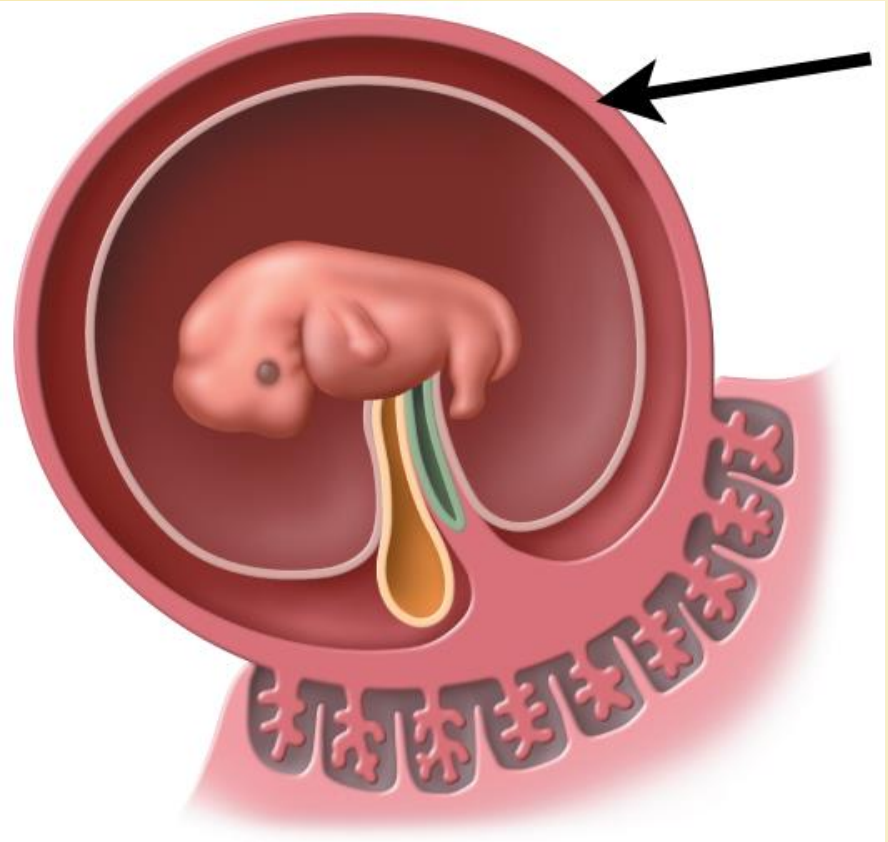
C. forms the placenta

D. forms red blood cells

Chapter Diagnostic Questions

CheckPoint

What structure is indicated in the image?



A. allantois

B. amnion

C. chorion

D. embryo

Chapter Diagnostic Questions

CheckPoint

The two meiotic divisions of egg production yield how many eggs?

A. one
B. two
C. four
D. six

36.1 Formative Questions

CheckPoint

What condition is necessary in order for the seminiferous tubules in the testes to produce sperm cells?

A. a slightly acidic environment

B. a temperature lower than 37° C

C. nutritive fluids from the seminal vesicles

D. the release of gonadotropin-releasing hormone (GnRH)

36.1 Formative Questions

CheckPoint

Which hormone influences the development of male secondary sex characteristics at puberty?

A. follicle-stimulating hormone (FSH)

B. gonadotropin-releasing hormone (GnRH)

C. luteinizing hormone (LH)

D. testosterone

36.1 Formative Questions

CheckPoint

Which two hormones secreted by the anterior pituitary gland regulate the levels of testosterone in males and estrogen in females? (Two answers.)

A. follicle-stimulating hormone (FSH)

B. gonadotropin-releasing hormone (GnRH)

C. luteinizing hormone (LH)

D. progesterone-activating hormone (PAH)

36.1 Formative Questions

CheckPoint

What prevents the menstrual cycle from continuing once an egg has been fertilized?

A. Progesterone levels remain high.

B. Estrogen levels decrease.

C. The corpus luteum degenerates.

D. Blood supply to the endometrium decreases.

36.2 Formative Questions

CheckPoint

True or False

In order for sperm cells to enter a females reproductive system during intercourse, there must be a strong ejaculation of semen.

36.2 Formative Questions

CheckPoint

Why are several hundred sperm cells needed for the fertilization of an egg?

A. They carry hormones to the egg.

B. They contribute DNA to the egg.

C. They help each other swim to the egg.

D. They weaken the egg's plasma membrane.

36.2 Formative Questions

CheckPoint

What is the hollow ball of cells that attaches to the wall of the uterus around the sixth day after fertilization?

A. the amniote

B. the blastocyst

C. the morula

D. the zygote

36.2 Formative Questions

CheckPoint

What is the thin tissue layer that forms a fluid-filled sac around the developing embryo?

A. amnion

B. allantois

C. chorion

D. yolk sac

36.2 Formative Questions

CheckPoint

During which trimester has all of the fetus' tissues, organs, and organ systems begun to form?

A. first trimester

B. second trimester

C. third trimester

36.3 Formative Questions

CheckPoint

What begins the process of labor?

A. dilation of the cervix

B. detachment of the placenta from the uterus

C. muscle contractions in the wall of the uterus

D. the release of amniotic fluid out of the vagina

36.3 Formative Questions

CheckPoint

Which hormone stimulates growth by increasing the rates of protein synthesis and breakdown of fats?

A. adrenocortisin hormone

B. human growth hormone

C. parathyroid hormone

D. thyrotropin-releasing hormone

36.3 Formative Questions

CheckPoint

Which hormone promotes growth by increasing metabolic rate?

A. calcitronin

B. prolactin

C. testosterone

D. thyroxine

Chapter Assessment Questions

CheckPoint

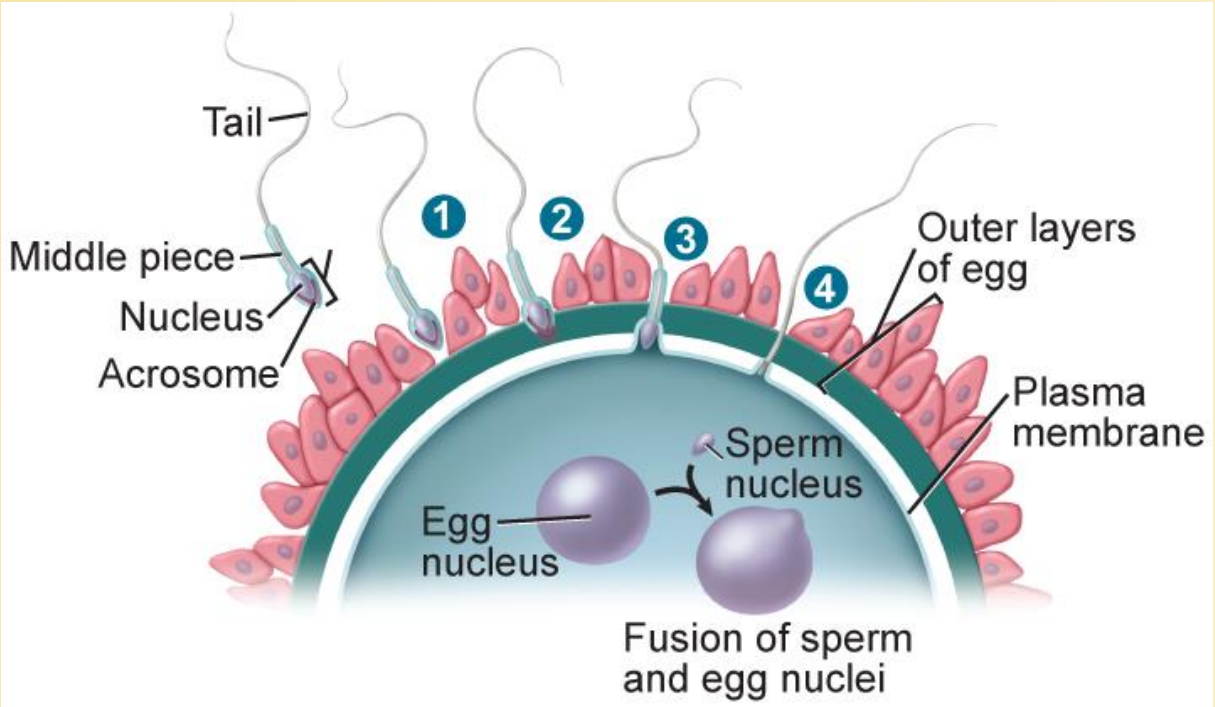
True or False

Testosterone and progesterone are the female hormones produced in the ovaries.

Chapter Assessment Questions

CheckPoint

What term is used to describe a fertilized egg?



Chapter Assessment Questions

CheckPoint

A. blastocyst

B. oocyte

C. polar body

D. zygote

Chapter Assessment Questions

CheckPoint

Which is the correct order of development of the fertilized egg?

A. blastocyst, morula, zygote

B. zygote, morula, blastocyst

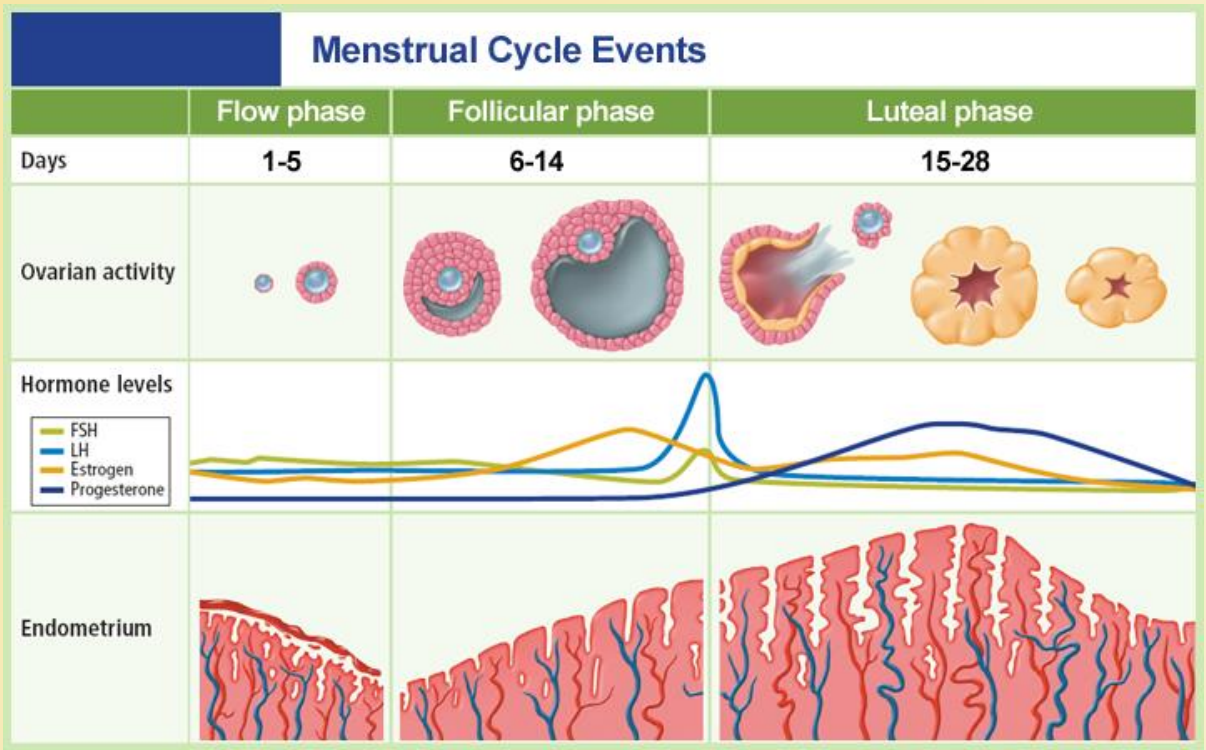
C. oocyte, zygote, blastocyst

D. morula, zygote, blastocyst

Standardized Test Practice

CheckPoint

Which hormone causes ovulation to occur at the end of the follicular phase?



Standardized Test Practice

CheckPoint

A. FSH

B. LH

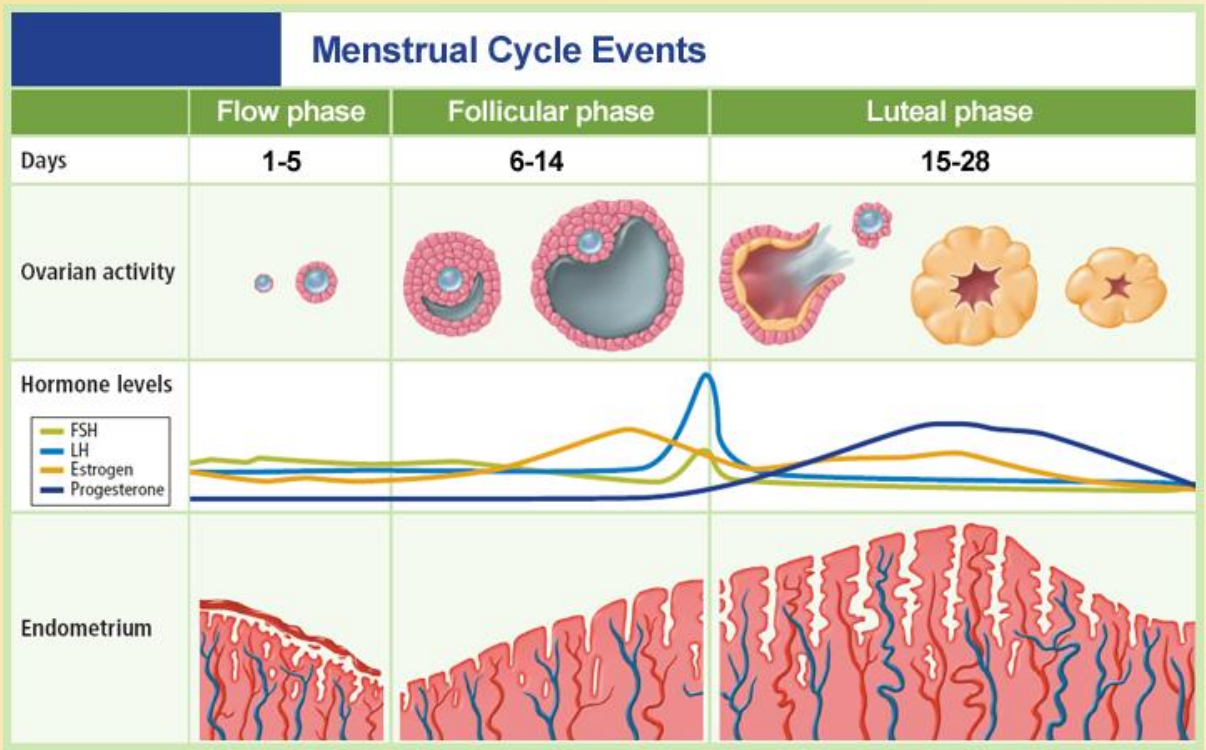
C. estrogen

D. progesterone

Standardized Test Practice

CheckPoint

What triggers a new menstrual cycle and the beginning of menstrual flow?



Standardized Test Practice

CheckPoint

A. a decline in progesterone

B. a decrease in LH production

C. formation of the corpus luteum

D. thickening of the endometrium

Standardized Test Practice

CheckPoint

Where does fertilization occur?

A. in the ovary

B. in the oviduct

C. in the uterus

D. in the cervix

Standardized Test Practice

CheckPoint

True or False

There is about a three-day span time within the female menstrual cycle in which fertilization can occur.

Standardized Test Practice

CheckPoint

What substances *cannot* pass through the placenta between the mother and fetus?

A. alcohol and drugs

B. blood cells and plasma

C. HIV and other viruses

D. metabolic waste products

Standardized Test Practice

CheckPoint

Why is a baby at great risk if it is born during the second trimester?

A. It cannot get nutrients from proteins.

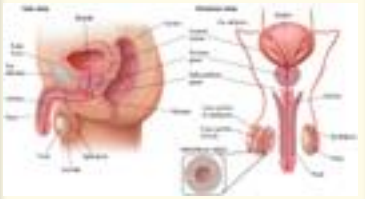
B. Its brain has not yet developed.

C. It has not accumulated enough fat.

D. Its immune system is not fully functional.

Glencoe Biology Transparencies



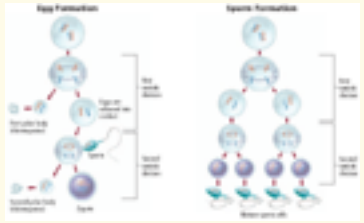
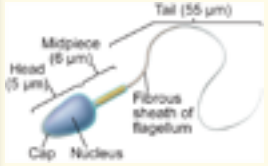
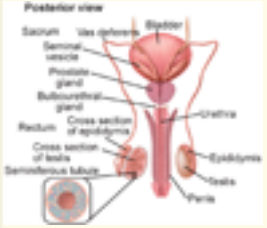


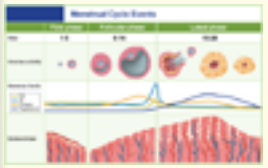

Image Bank


Side view
Rectum
Sacrum
Seminal vesicle
Prostate gland
Bulbourethral gland
Urethra
Penis
Rectum
Testis
Epididymis
Scrotum

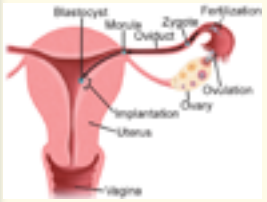

Tail (55 µm)
Midpiece (6 µm)
Head (5 µm)
Fibrous sheath of flagellum
Cap
Nucleus


Posterior view
Sacrum
Vas deferens
Bladder
Seminal vesicle
Prostate gland
Bulbourethral gland
Rectum
Cross section of epididymis
Cross section of testis
Seminiferous tubule
Urethra
Epididymis
Testis
Penis


Uterus
Oviduct
Ovary
Cervix
Bladder
Pubic bone
Vagina
Urethra
Rectum
Anus




Tail
Head
Nucleus
Acrosome
Outer layers of egg
Plasma membrane
Fusion of sperm and egg nuclei


Blastocyst
Morula
Zygote
Fertilization
Oviduct
Ovulation
Ovary
Implantation
Uterus
Vagina


Inner cell mass of blastocyst
Inner cell mass of blastocyst divides to form identical twins


Chorion
Amnion
Embryo
Umbilical cord
Allantois
Yolk sac
Fetal portion of placenta
Maternal portion of placenta


Preventable Causes of Birth Defects
Cause
Defect


Amniocentesis
Ultrasound scanner
Amniotic fluid
Uterus
Fetus
Placenta


Chorionic villi sampling
Ultrasound scanner
Catheter
Uterus
Fetus
Chorion


Uterus
Umbilical cord
Cervix
Birth canal
Dilation


Expulsion stage

Image Bank

Vocabulary

Section 1

- seminiferous tubule
- epididymis
- vas deferens
- urethra
- semen
- puberty
- oocyte
- oviduct
- menstrual cycle
- polar body

Vocabulary

Section 2

- morula
- blastocyst
- amniotic fluid

Vocabulary

Section 3

- labor
- dilation
- expulsion stage
- placental stage
- adolescence
- infancy
- adulthood

Animation

Concepts In Motion

- Ovulation
- Visualizing the Placenta