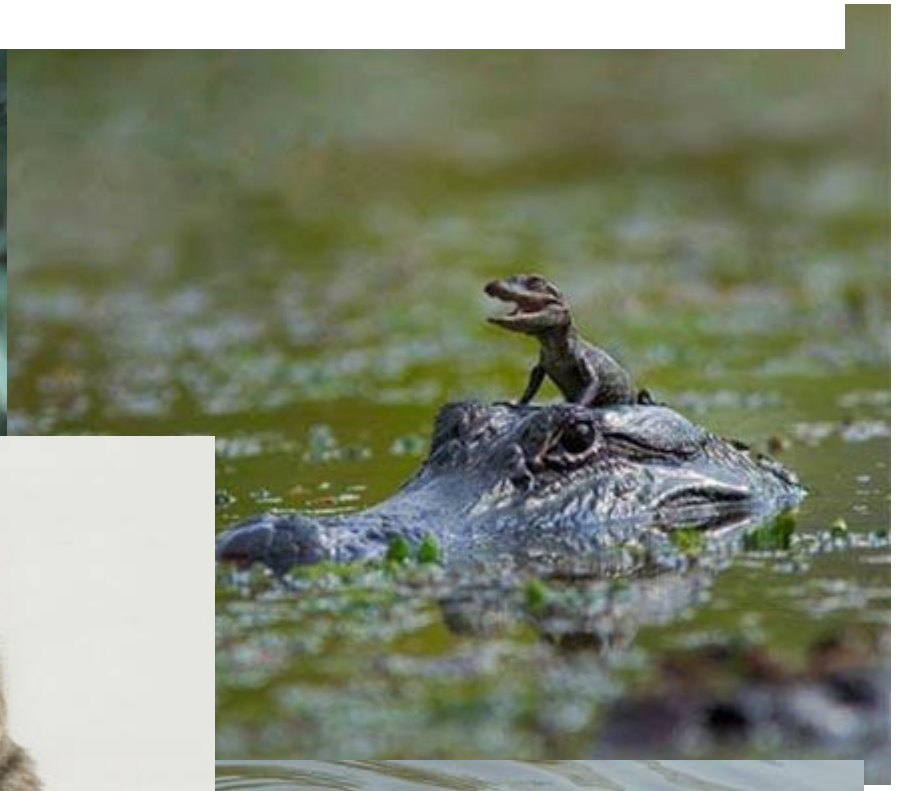
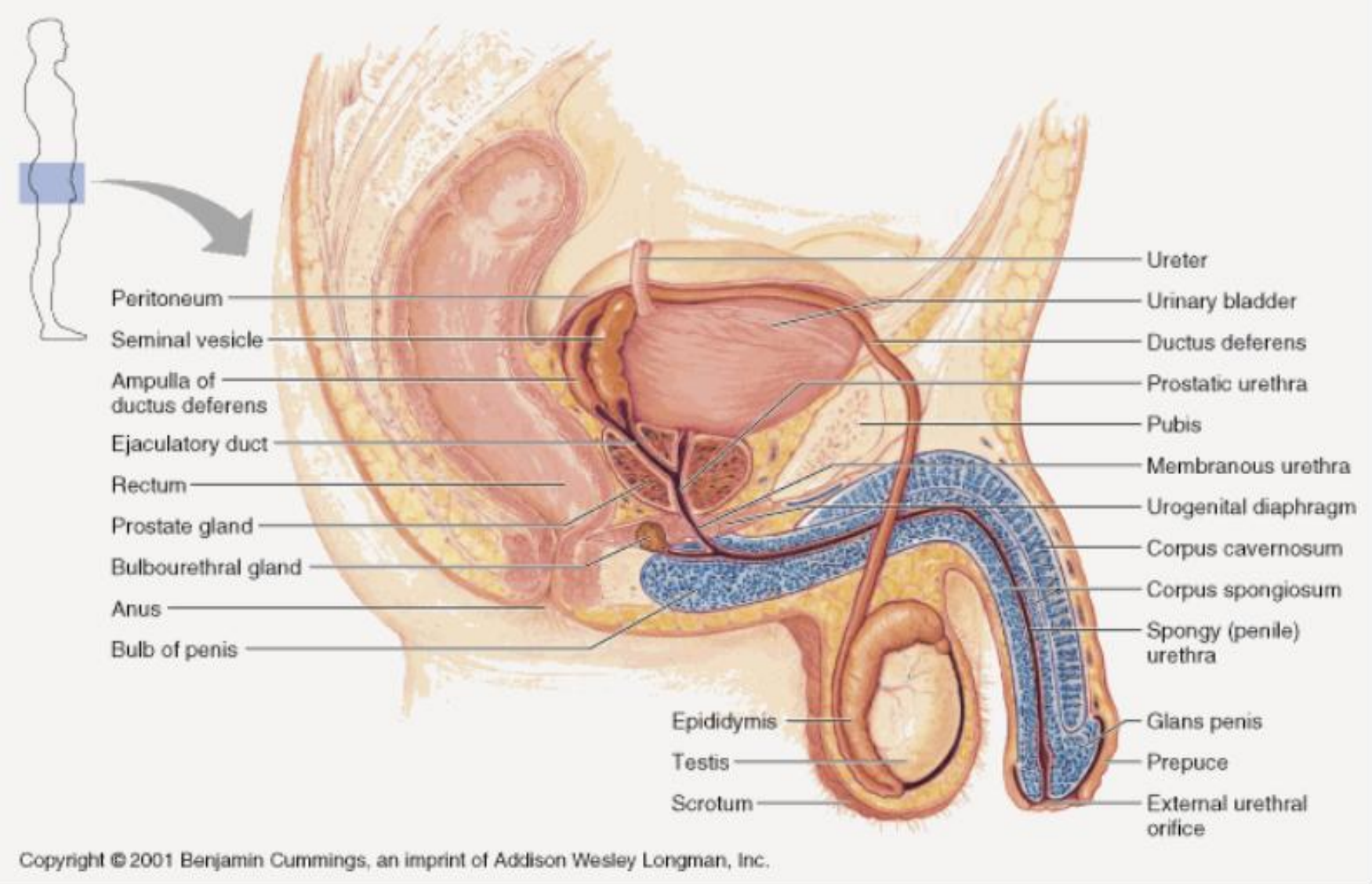
All Living Things Can Reproduce.....



Male Reproductive System



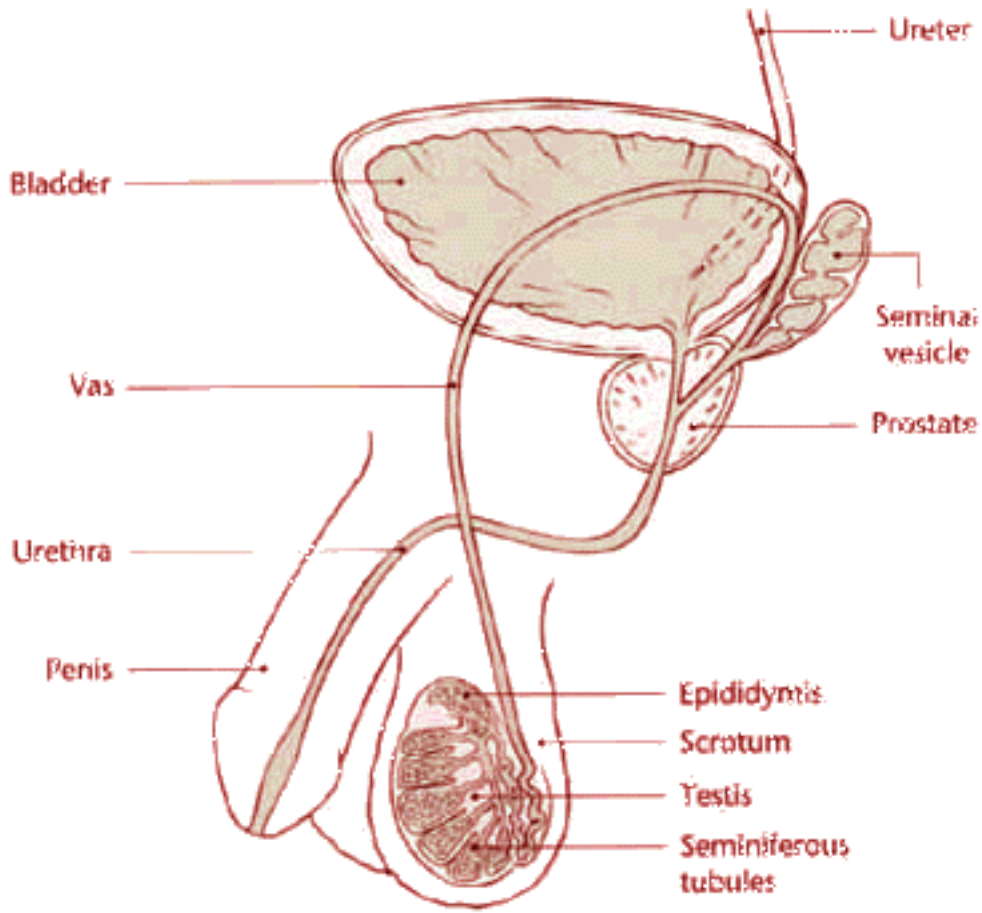
Major Structures: Testes, Vas Deferens, Prostate, Penis

What is the difference between the urethra and a garden hose?

There is a *vas deferens*....

Testes - make sperm via meiosis. The testes are also responsible for produces testosterone, the male hormone.

Testosterone is responsible for many of the "male" characteristics.



The **seminiferous tubules** make up 80% of the testes. They are the site of sperm production. Later, the sperm mature in the epididymus.

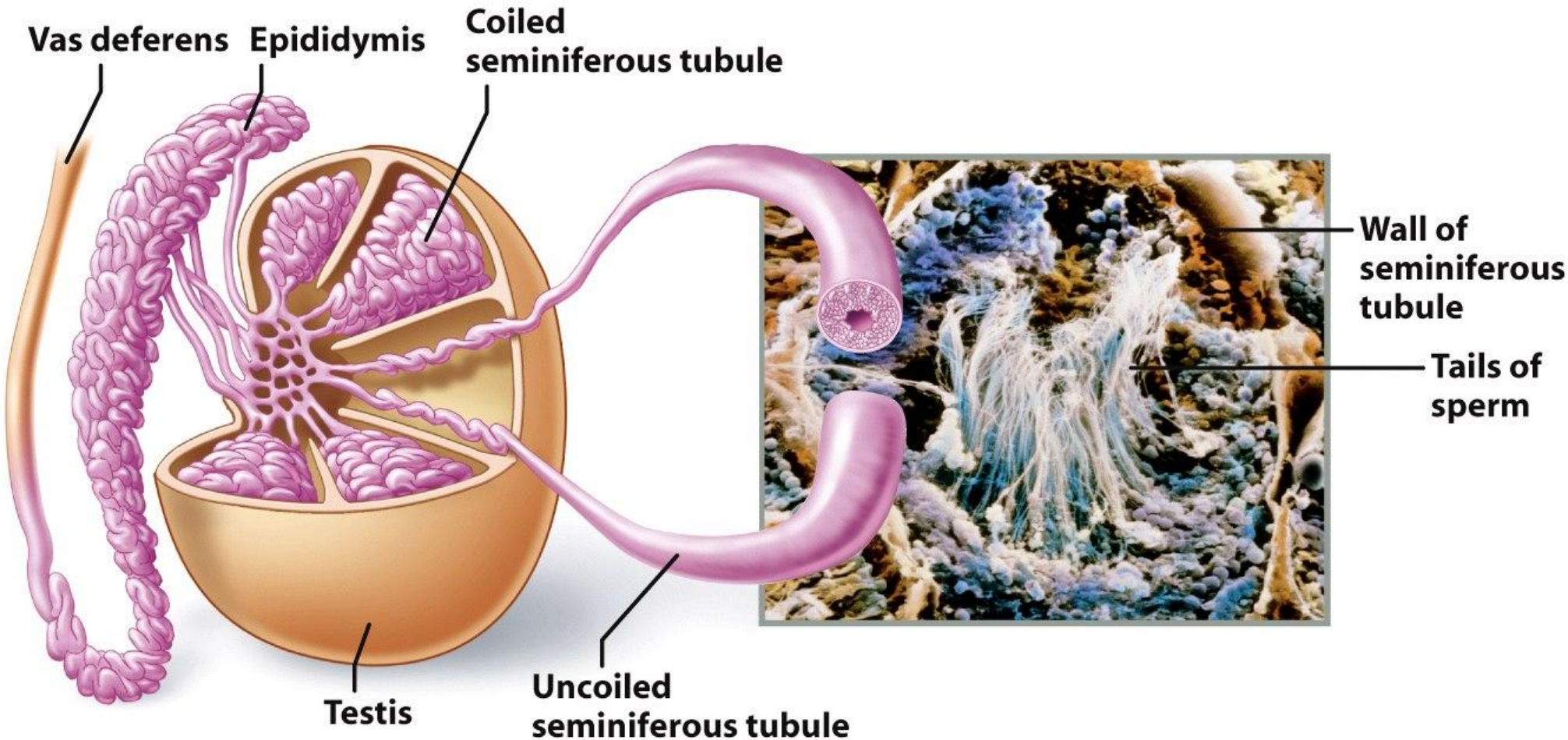
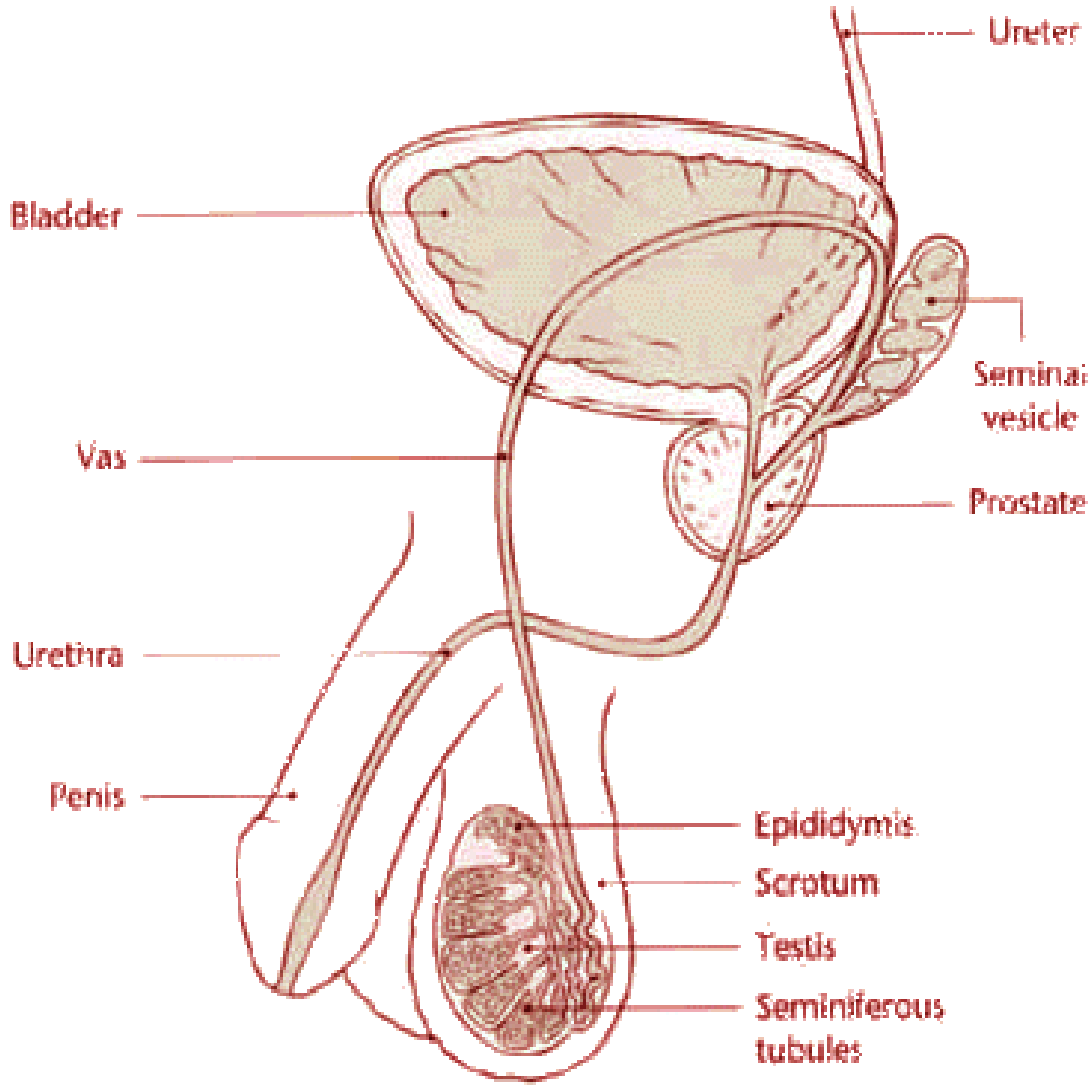


Figure 17-2 Biology of Humans, 2/e

Epididymus - collects mature sperm which is eventually propelled through the vas deferense

Vas deferens -sperm travel through this tube, joins with urethra



During ejaculation, the sperm leave the testes through the **vas deferens, passing out the *urethra as they leave the body.***

Semen neutralizes the passageways of the sperm, provides nutrition for them, and cause uterine contractions that take them closer to the egg.

*The fluid of the semen is produced by the **prostate gland, the paired seminal vesicles and the paired bulbourethral glands***

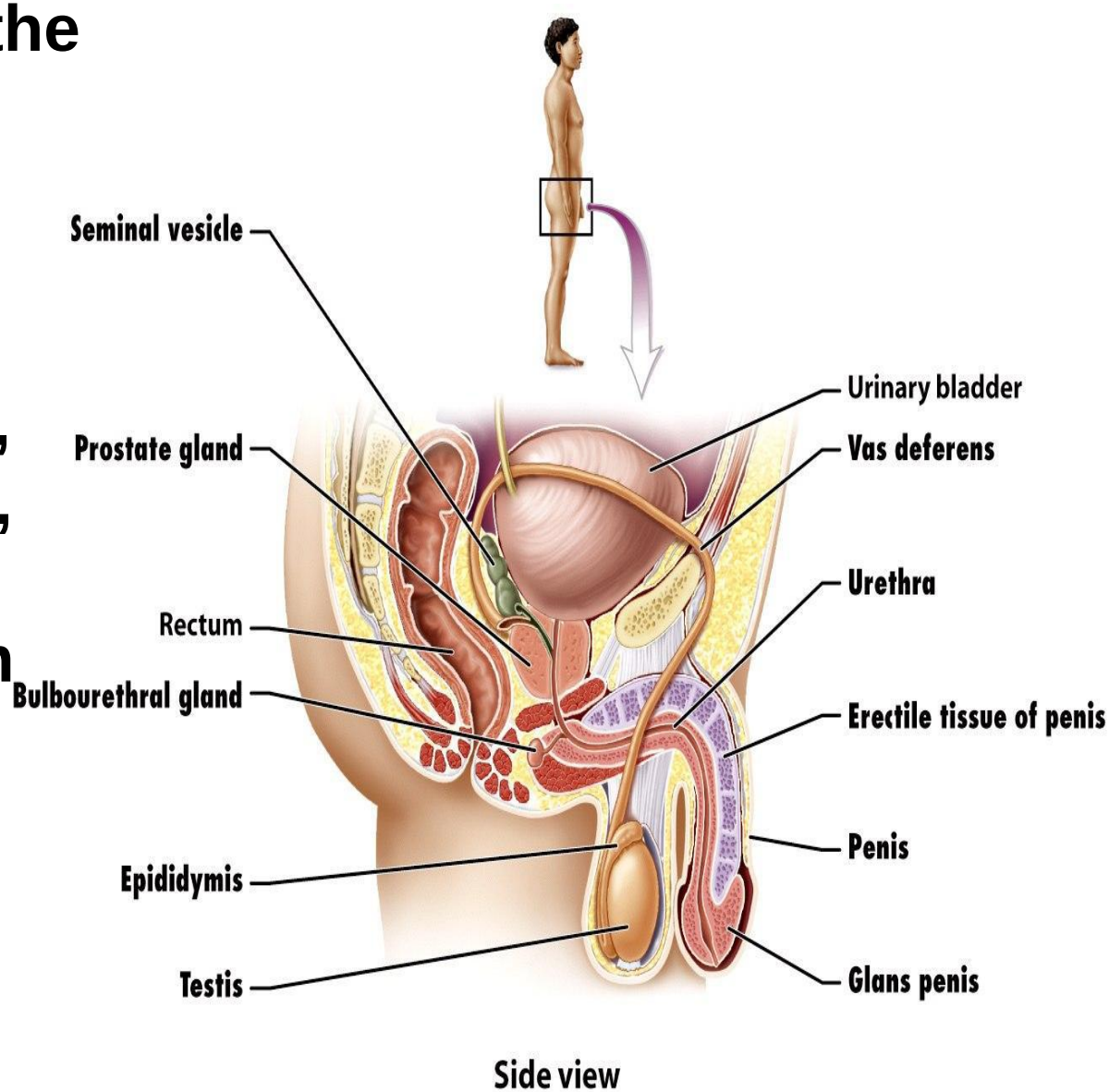


Figure 17-1 part 1 Biology of Humans, 2/e

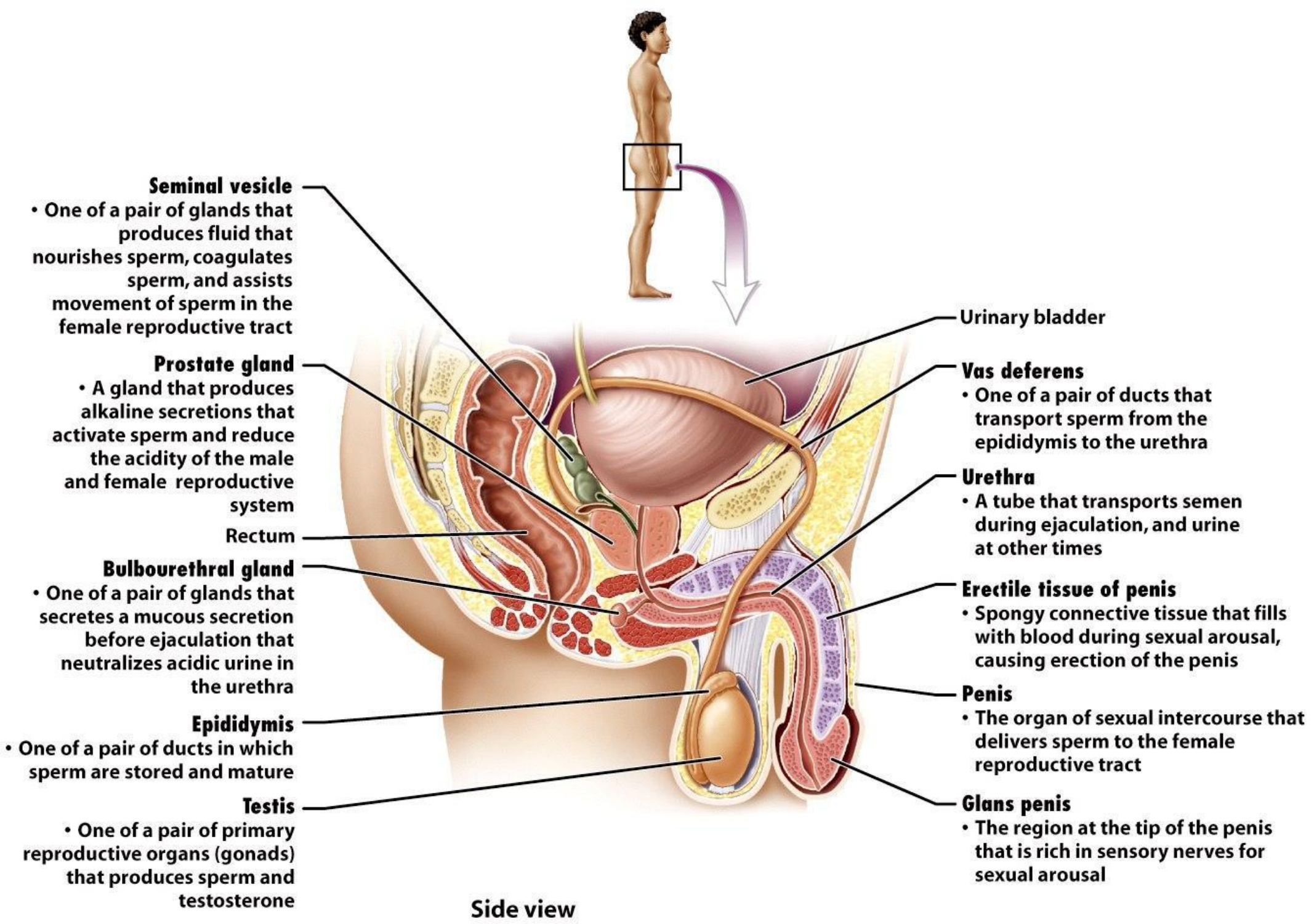
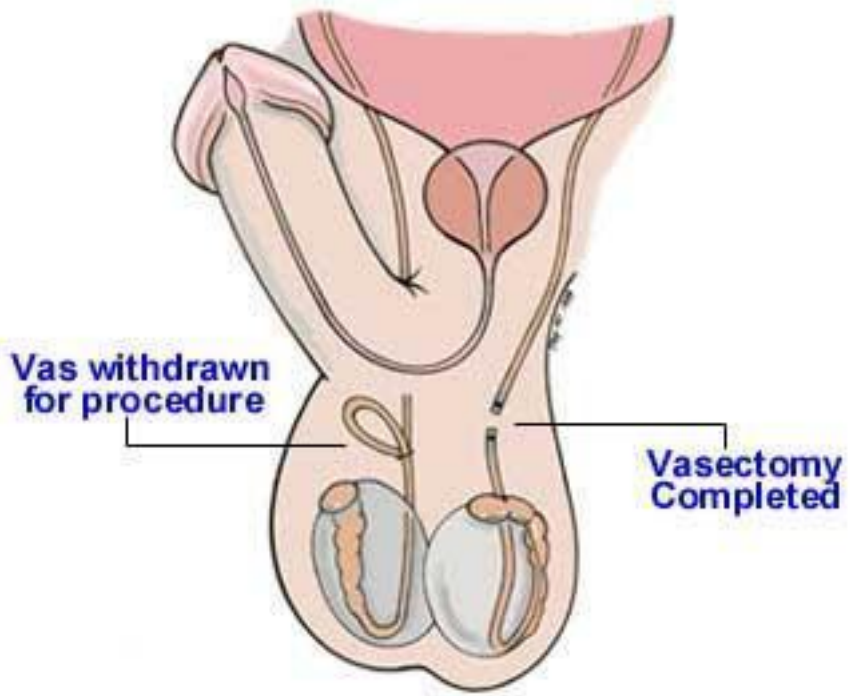


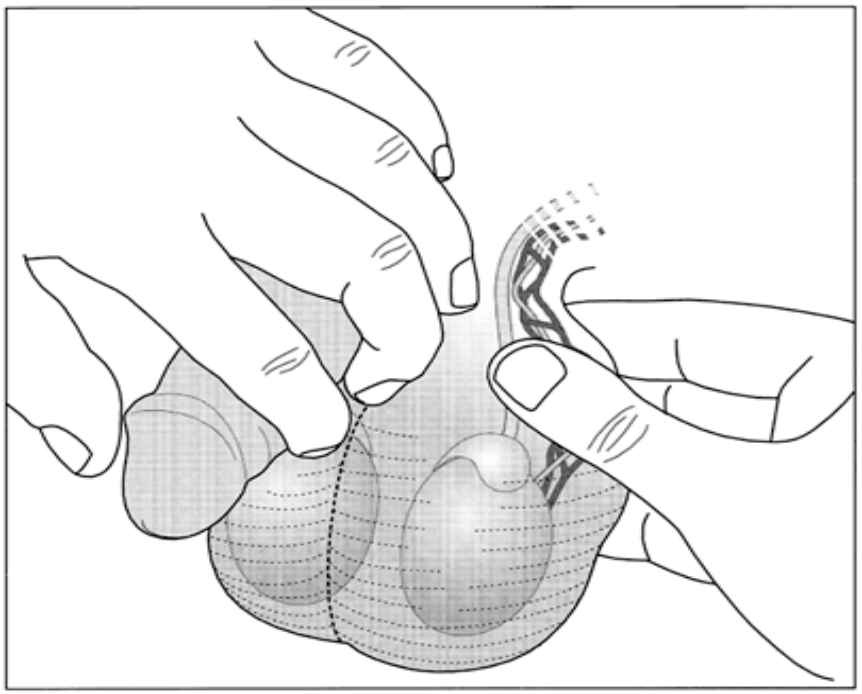
Figure 17-1 part 1 Biology of Humans, 2/e

Really, not that bad guys….

Vasectomy - the tube is cut to prevent sperm leaving (and fertilizing an egg)

This procedure can be done right in the doctor's office





Development of Sperm Cells

Spermatogenesis, the development of sperm, occurs in the wall of the seminiferous tubule.

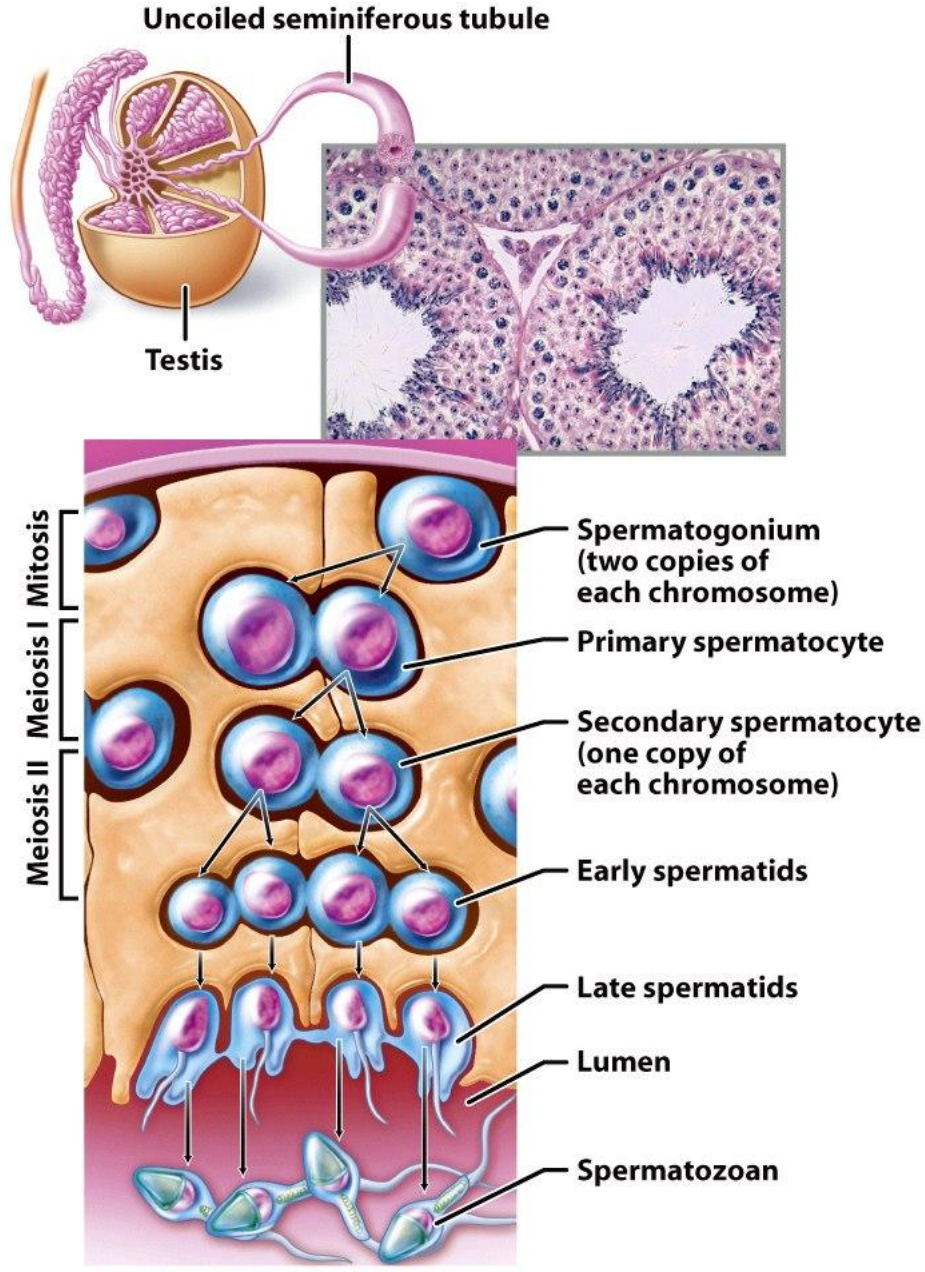


Figure 17-3 Biology of Humans, 2/e

The mature sperm cell has three regions: the head, the midpiece, and the tail.

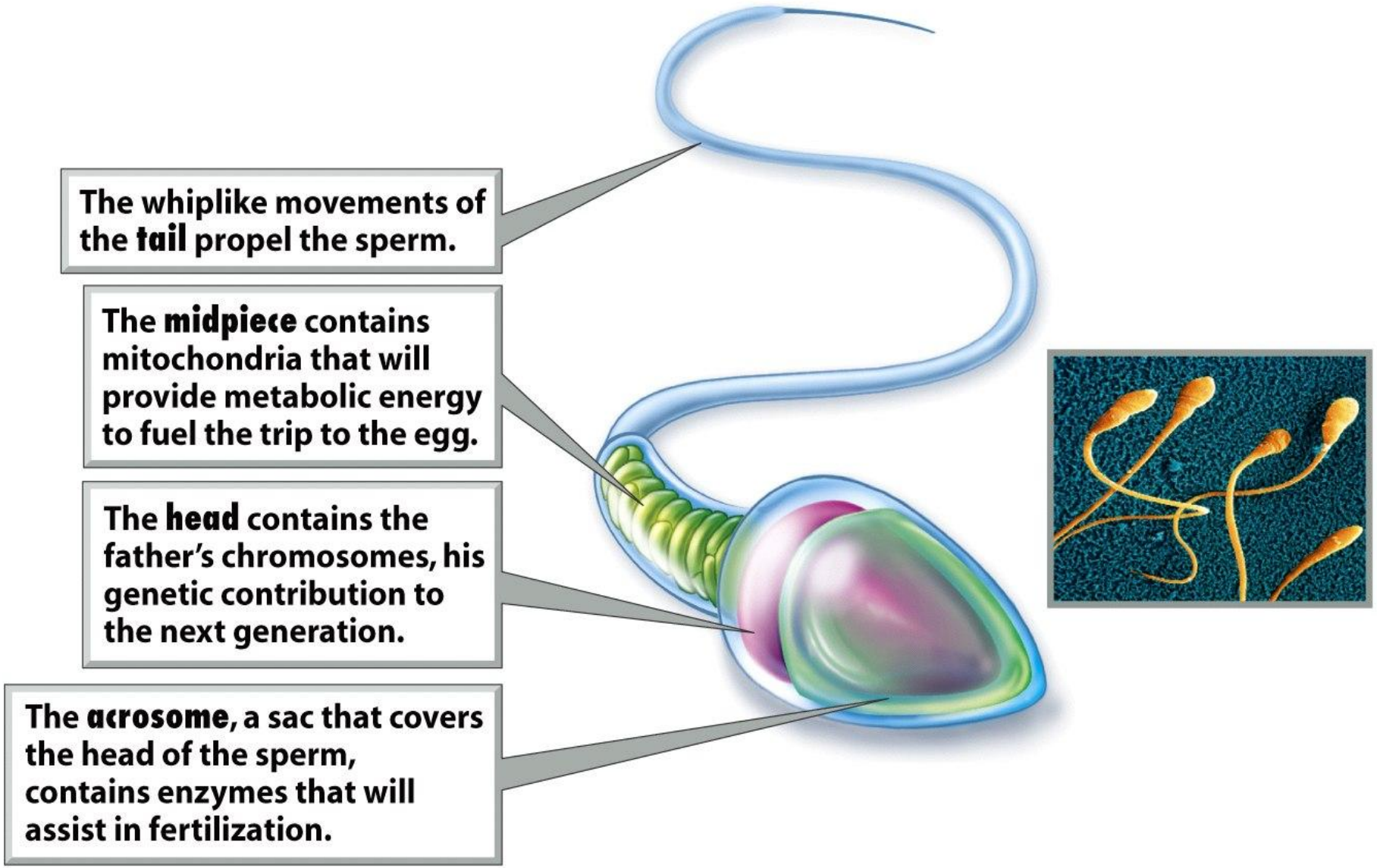
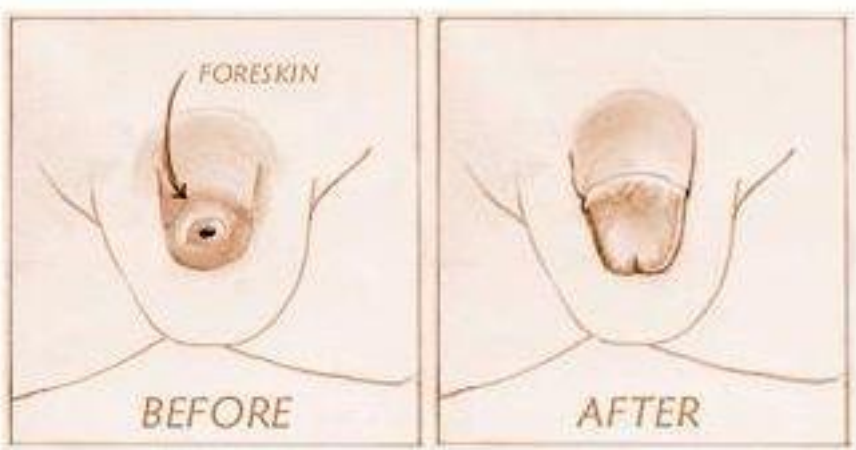
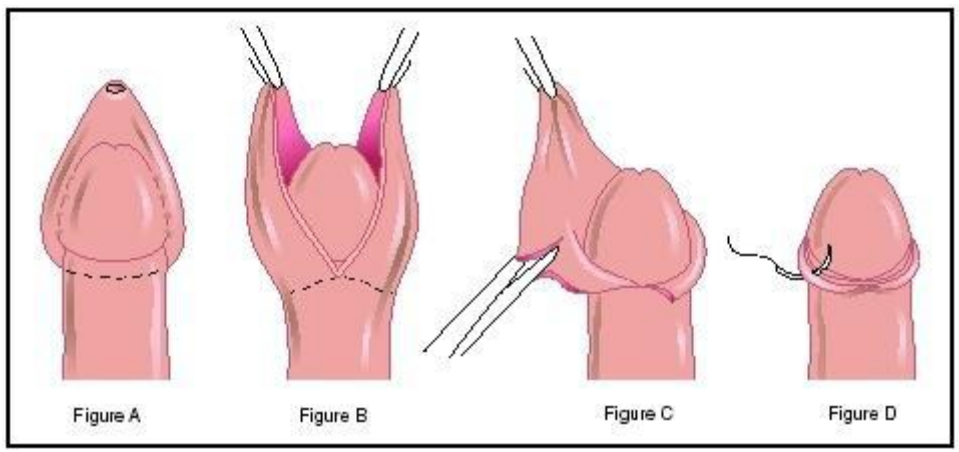


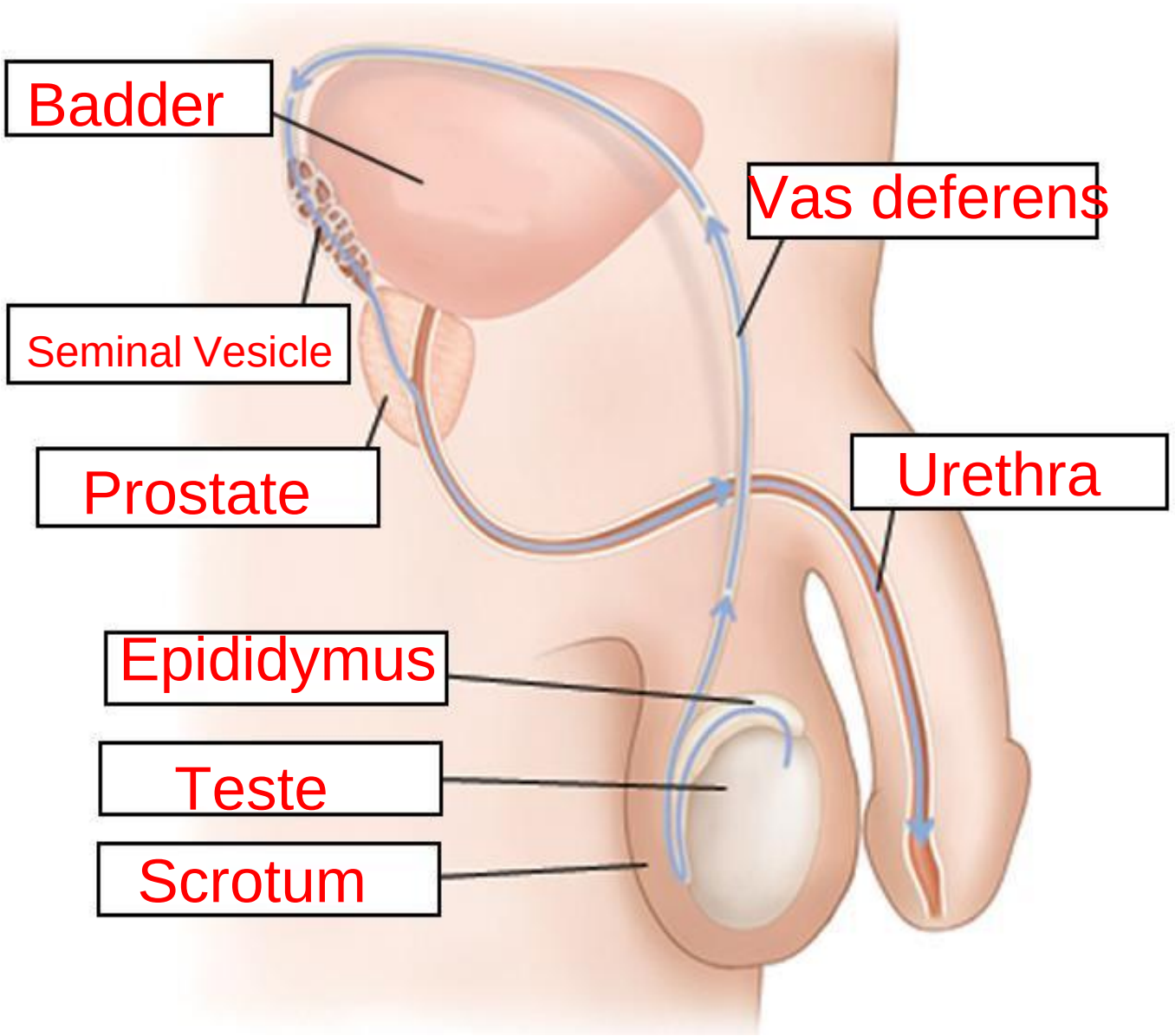
Figure 17-4 Biology of Humans, 2/e

Circumcision

Boys are born with a hood of skin, called the foreskin, covering the head (also called the glans) of the penis. In circumcision, the foreskin is surgically removed, exposing the end of the penis.







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Vas deferens

Scrotum

Urethra

Prostate

Epididymus

Bladder

Teste

Seminal Vesicle

See also: [Kidshealth Male Reproductive]

Male Reproductive Health

Recommended after age 50 - prostate exam

Doctors use the digital rectal exam (DRE) as a relatively simple test to check the prostate

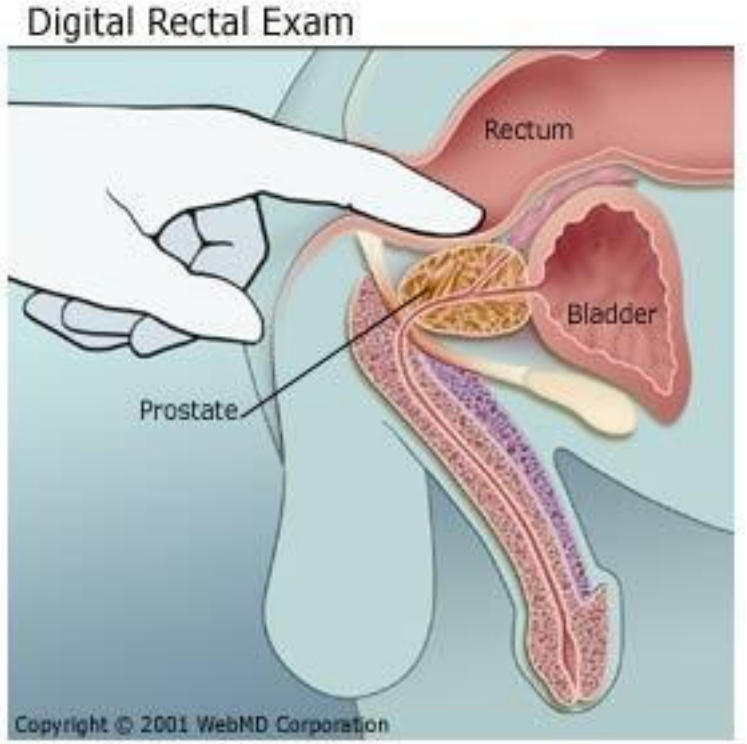


TABLE 17.2 REVIEW OF HORMONES IMPORTANT IN THE REGULATION OF MALE REPRODUCTIVE PROCESSES

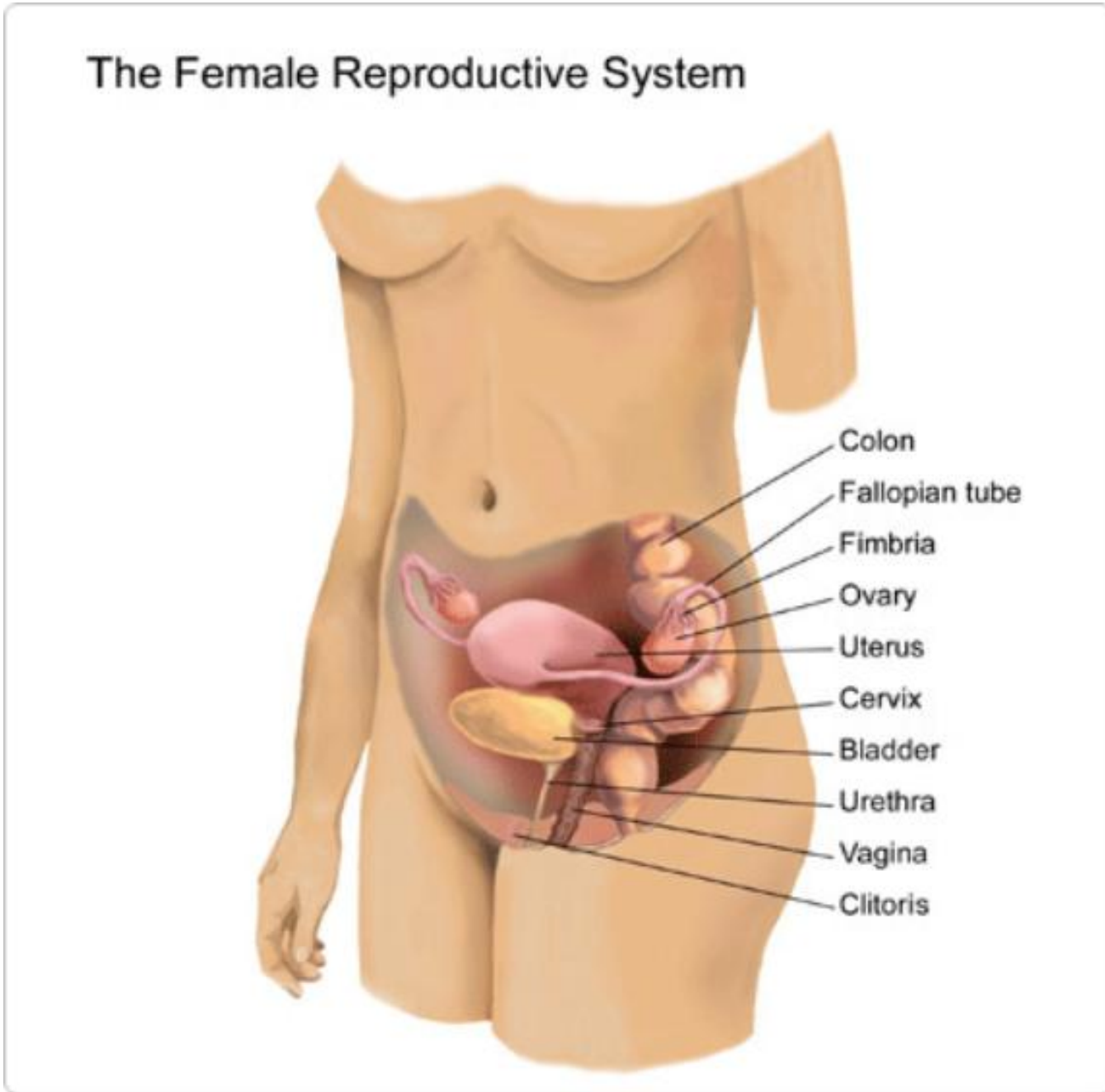
HORMONE	SOURCE	EFFECTS
Testosterone	Interstitial cells in testes	Sperm production; development and maintenance of male reproductive structures, male secondary sex characteristics; sex drive
Gonadotropin-releasing hormone (GnRH)	Hypothalamus (in brain)	Stimulates the anterior pituitary gland to release LH
Luteinizing hormone (LH)	Anterior pituitary gland (in brain)	Stimulates interstitial cells of testis to produce testosterone
Follicle-stimulating hormone (FSH)	Anterior pituitary gland (in brain)	Enhances sperm formation
Inhibin	Seminiferous tubules in testes	Inhibits FSH secretion by anterior pituitary gland, causing a decrease in sperm production and testosterone production

Table 17-2 Biology of Humans, 2/e

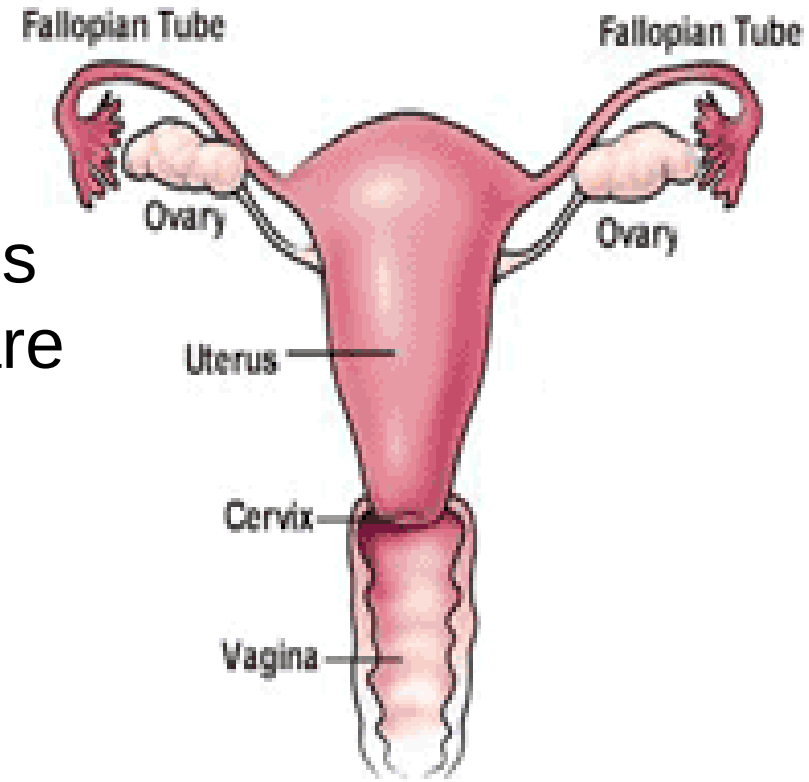
FEMALE REPRODUCTION

Main Structures

- Ovary
- Uterus
- Fallopian Tubes
- Vagina
- Cervix



OVARY - this is where the eggs are produced through cell division (MEIOSIS)



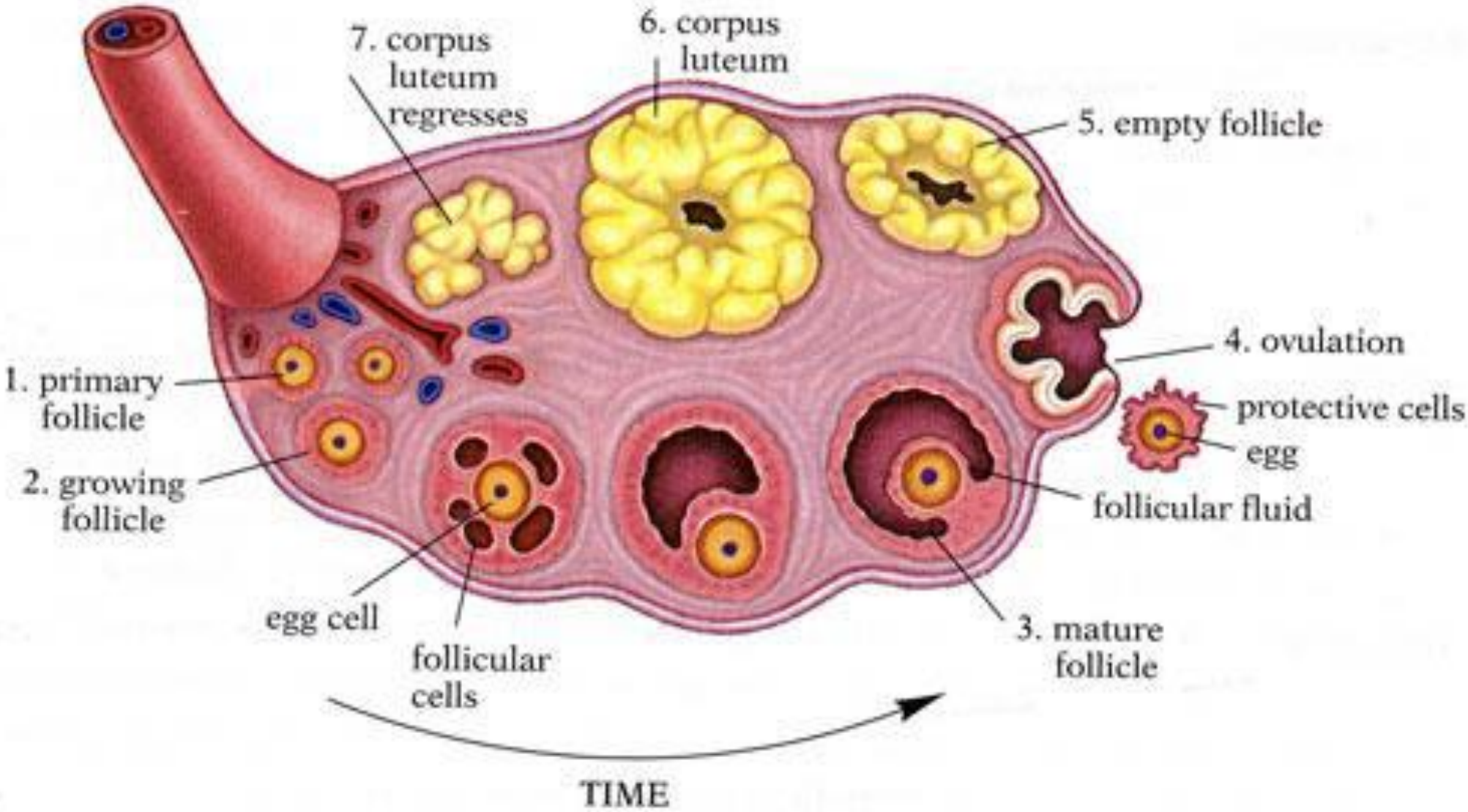
- each ovary takes turns releasing eggs every month, twins occur if two eggs are released

Ovaries secrete both estrogen and progesterone.

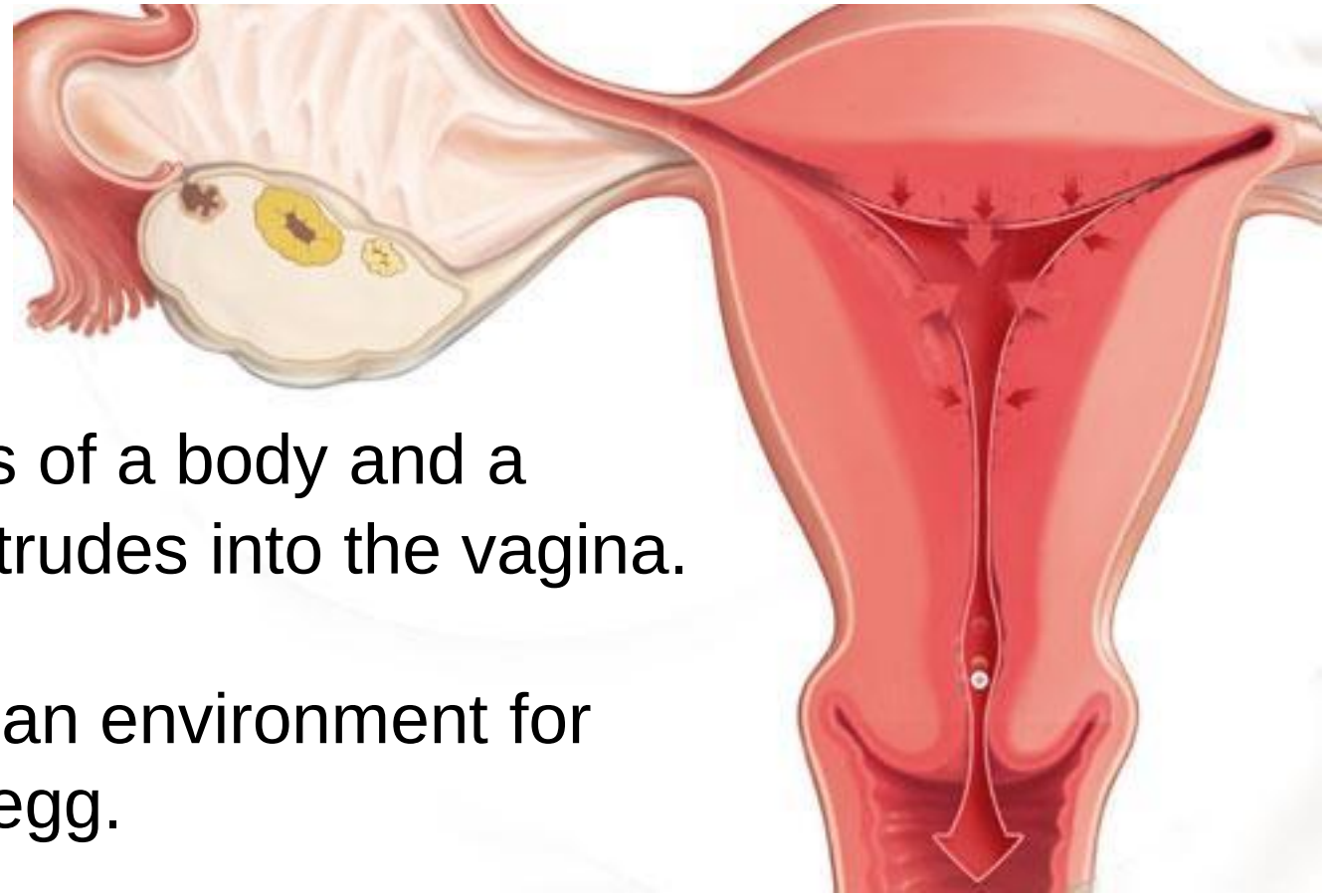
Estrogen is responsible for the appearance of secondary sex characteristics of females

Progesterone regulates menstruation

Structure of the Ovary



An egg is usually a few days old before it implants in the uterus. At this point, it has already divided several times and is called a blastula.



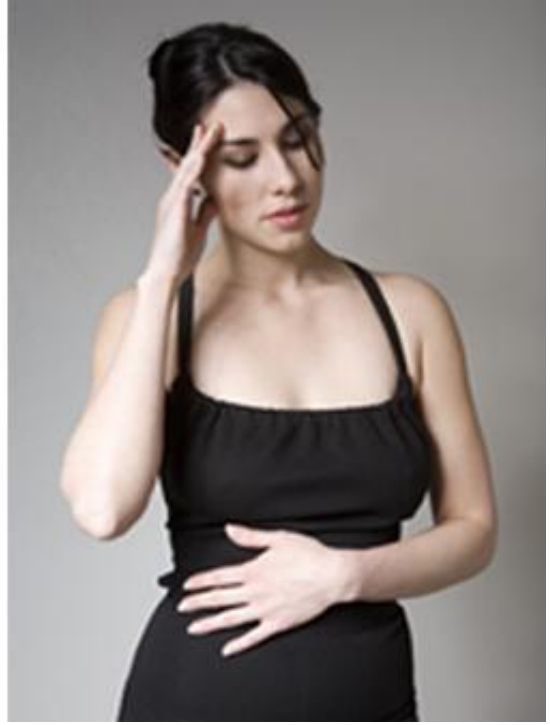
The **uterus** consists of a body and a cervix. The cervix protrudes into the vagina.

The uterus maintains an environment for accepting a fertilized egg.

The fertilized ovum becomes an embryo, attaches to a wall of the uterus, creates a placenta, and develops into a fetus (gestates) until childbirth.

If no fertilized egg reaches the uterus, the lining is shed monthly in a process known as menstruation

Menstrual Cycle



Premenstrual syndrome (PMS) may be due to a decrease in the levels of progesterone and includes depression, irritability, fatigue and headaches

Menstruation follows and the drop in estrogen and progesterone levels cause FSH and LH levels to climb, beginning the cycle again

If fertilization occurs, the embryo produces ***human chorionic gonadotropin (HCG)*** that maintains the corpus luteum keeping estrogen and progesterone levels high preventing menstruation

Follicle maturation takes about 10-14 days and usually occurs once a month

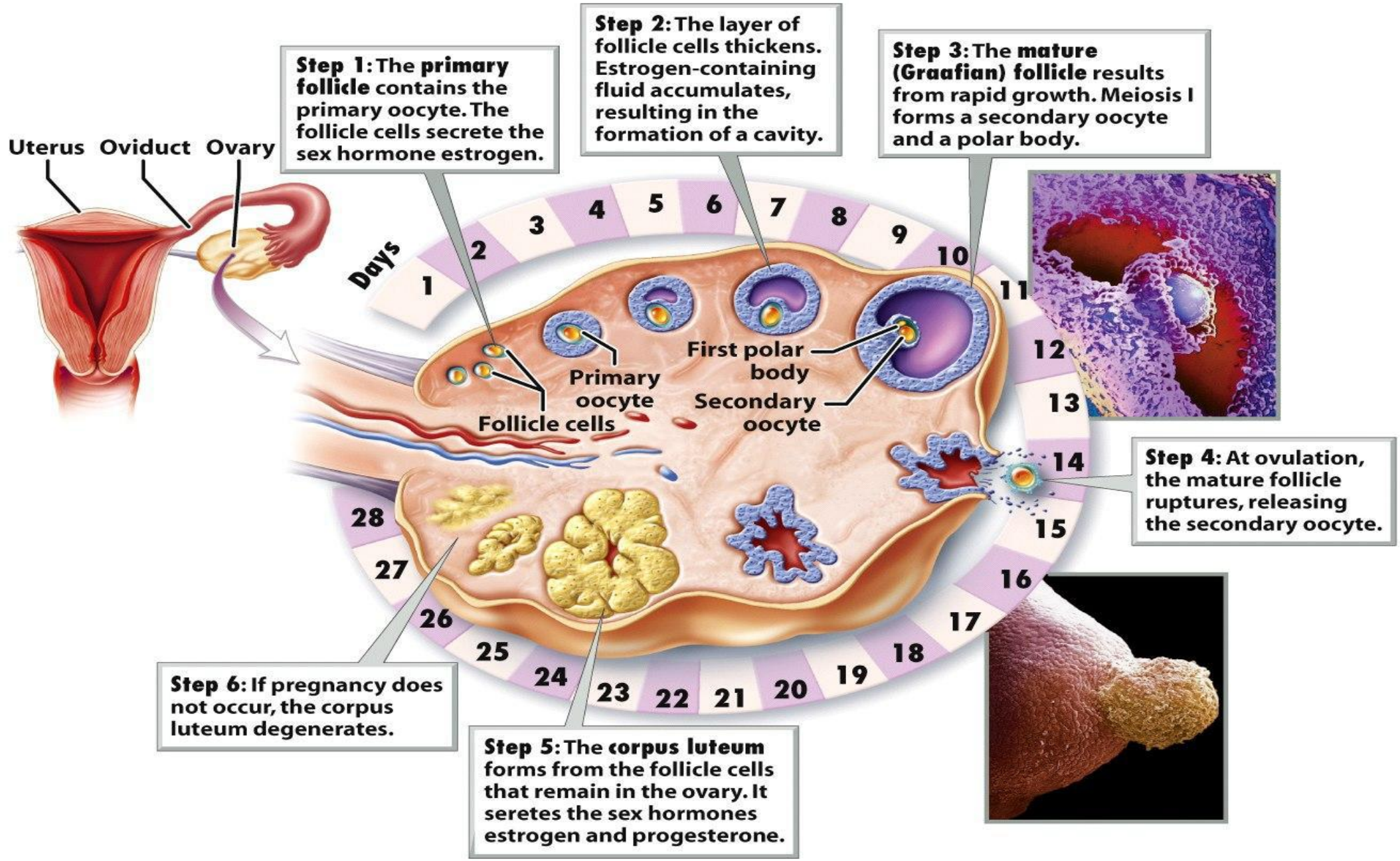
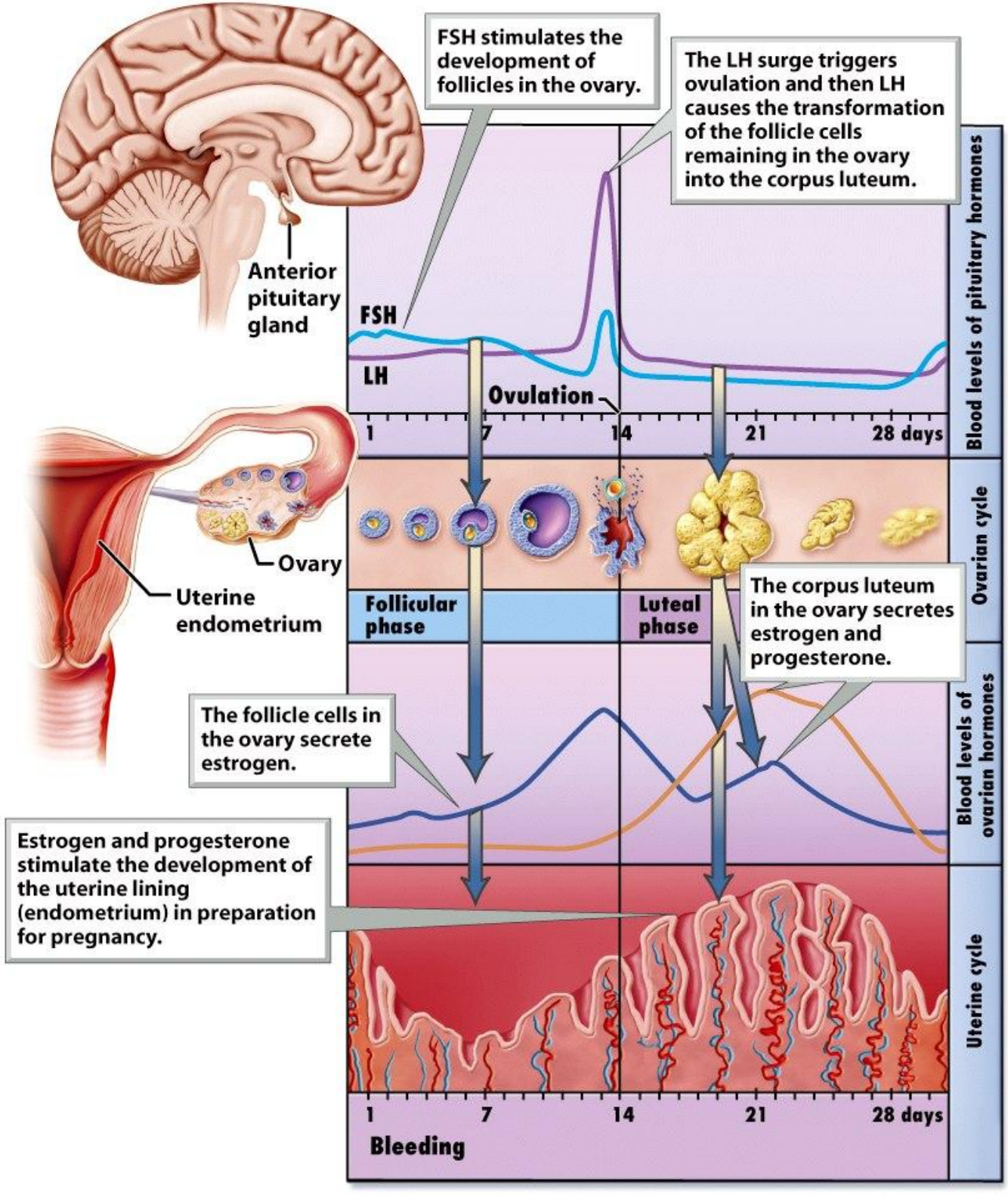
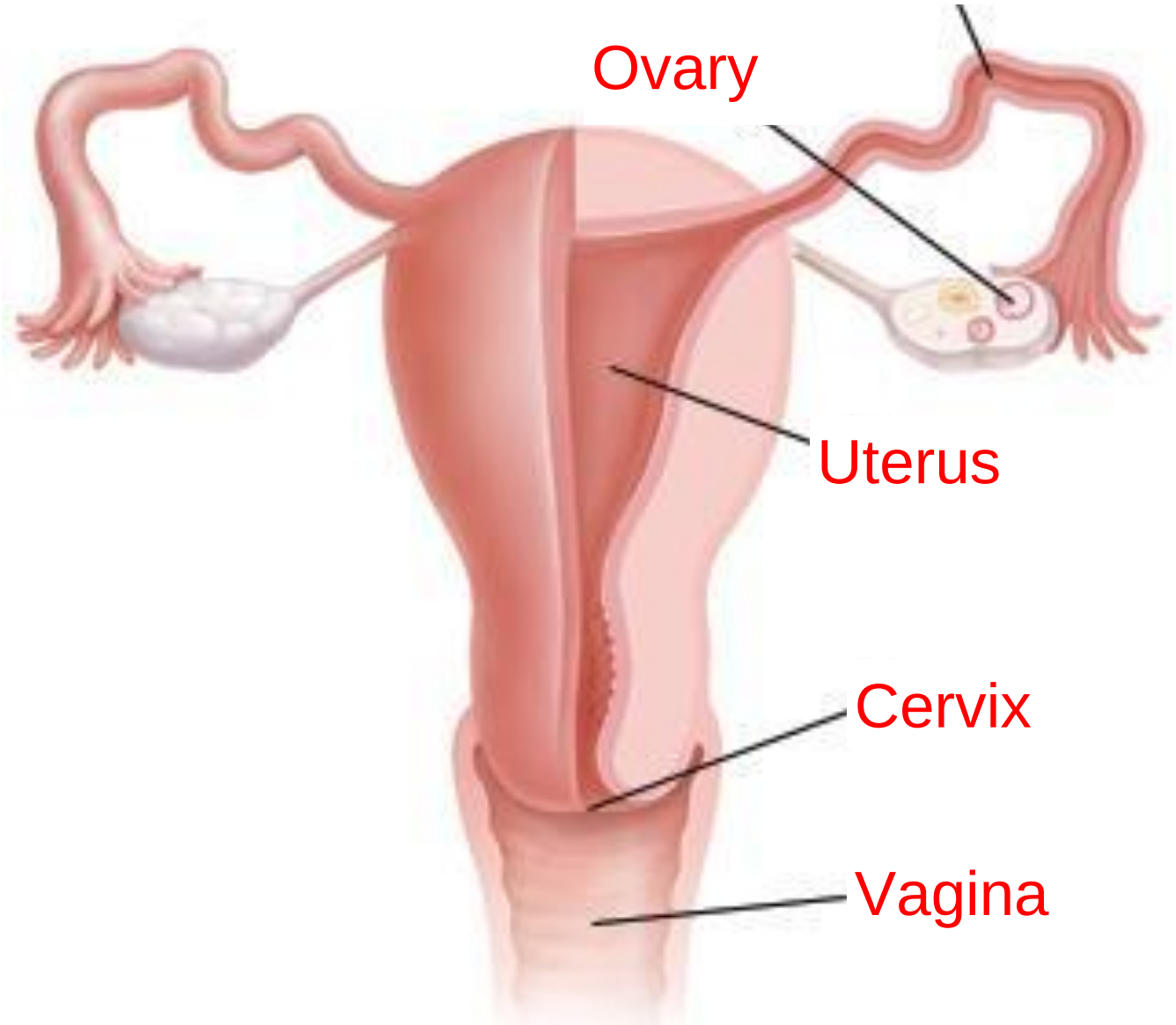


Figure 17-8 Biology of Humans, 2/e


FSH stimulates the development of follicles in the ovary.
The LH surge triggers ovulation and then LH causes the transformation of the follicle cells remaining in the ovary into the corpus luteum.
Anterior pituitary gland
FSH
LH
Ovulation
1
7
14
21
28 days
Blood levels of pituitary hormones
Ovary
Uterine endometrium
Follicular phase
Luteal phase
Ovarian cycle
The corpus luteum in the ovary secretes estrogen and progesterone.
The follicle cells in the ovary secrete estrogen.
Blood levels of ovarian hormones
Estrogen and progesterone stimulate the development of the uterine lining (endometrium) in preparation for pregnancy.
1
7
14
21
28 days
Bleeding
Uterine cycle



WORD BANK

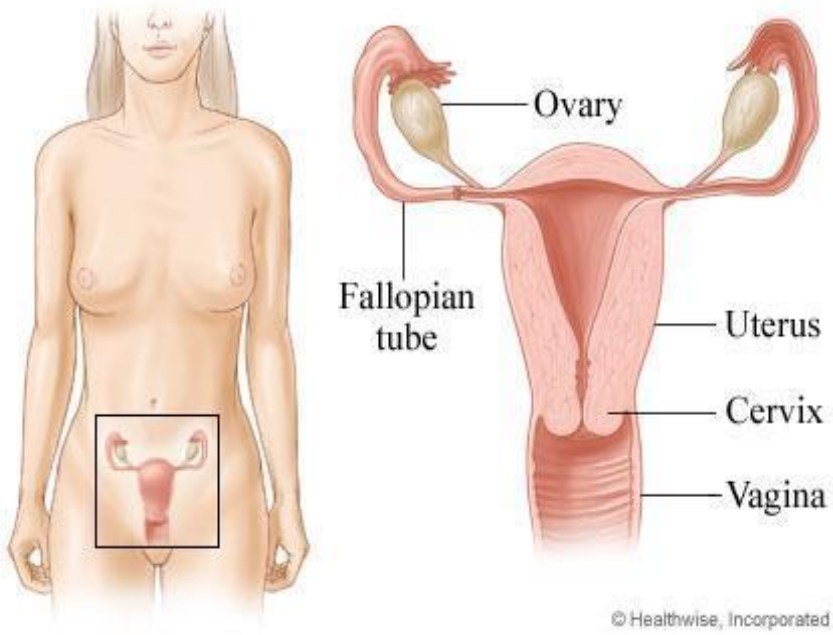
Cervix

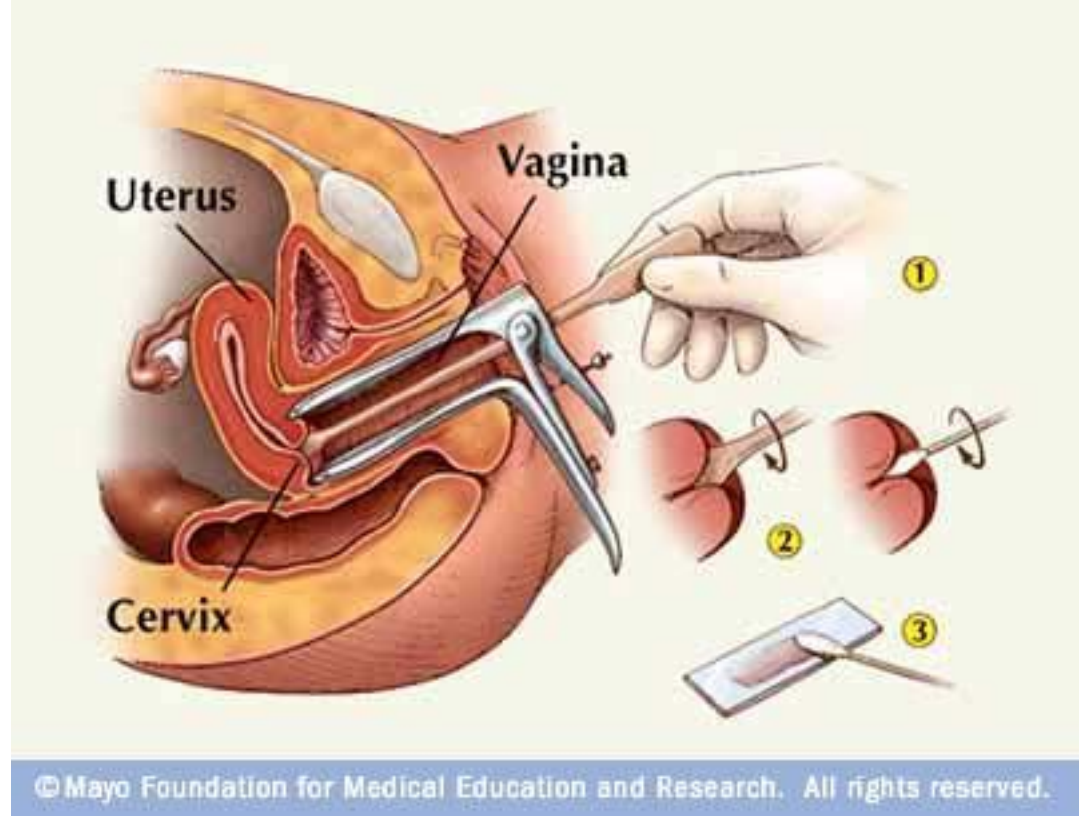
Fallopian Tubes

Vagina

Ovary

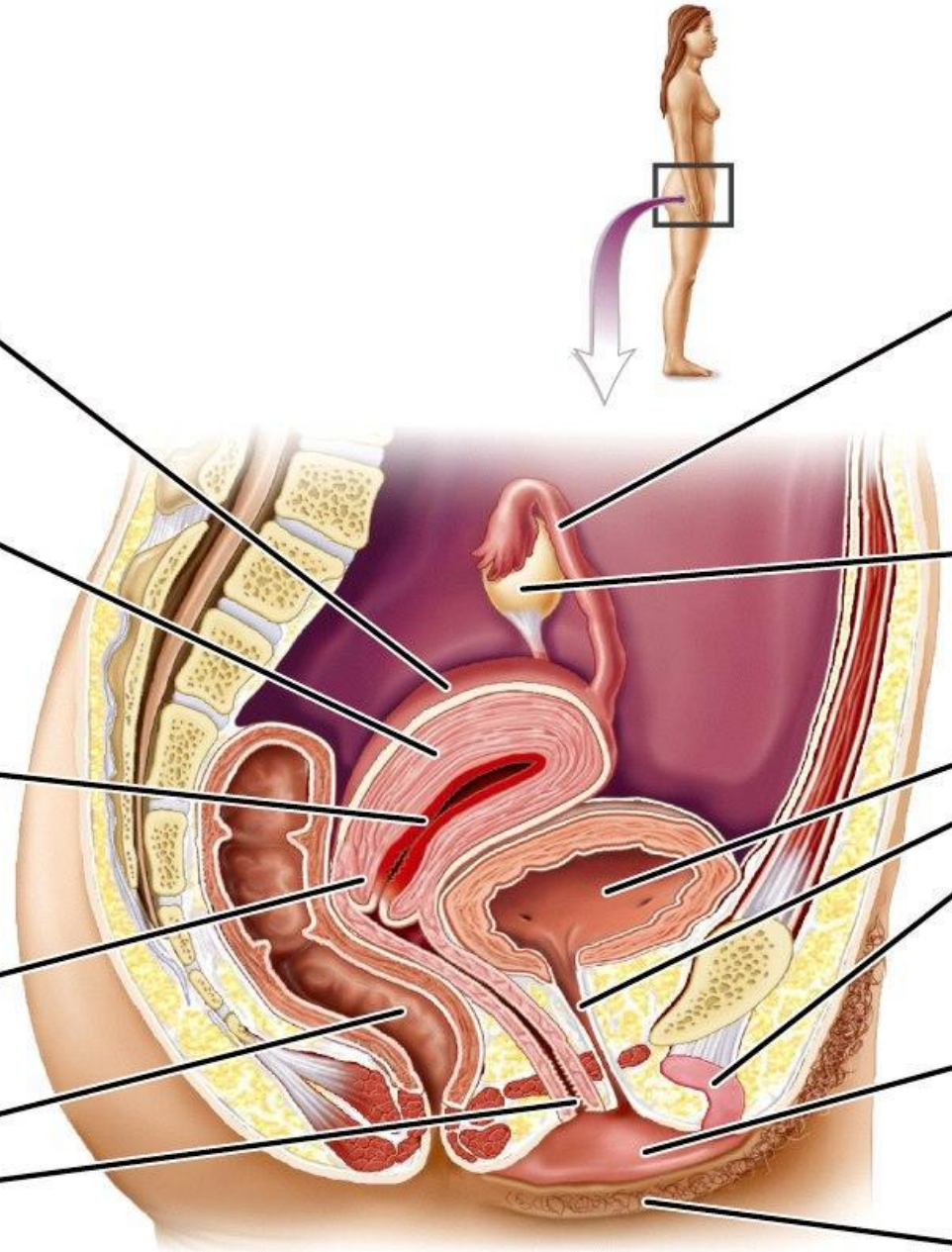
Uterus





Women should receive an annual PAP test. A doctor removes cells from around the cervix and a lab checks them for abnormalities.

Papanicolaou test



Uterus
• A pear-shaped organ that houses and nourishes the developing baby (the embryo and later the fetus) until birth

Uterine wall
• Muscle layers that stretch to accommodate the developing baby; contract during childbirth to deliver the baby

Endometrium
• The lining of the uterus that is built up and lost each month as menstrual fluid; the usual site of implantation

Cervix
• The opening of the uterus that extends into the vagina

Rectum

Vagina
• A muscular tube that receives the penis during sexual intercourse; the birth canal

Oviduct
• One of two ciliated tubes that conducts the egg (or embryo if fertilization occurred) toward the uterus; the usual site of fertilization

Ovary
• One of two glands that produce eggs and sex hormones (estrogen and progesterone)

Urinary bladder

Urethra in side view

Clitoris
• A small organ that is rich in sensory nerves for sexual arousal

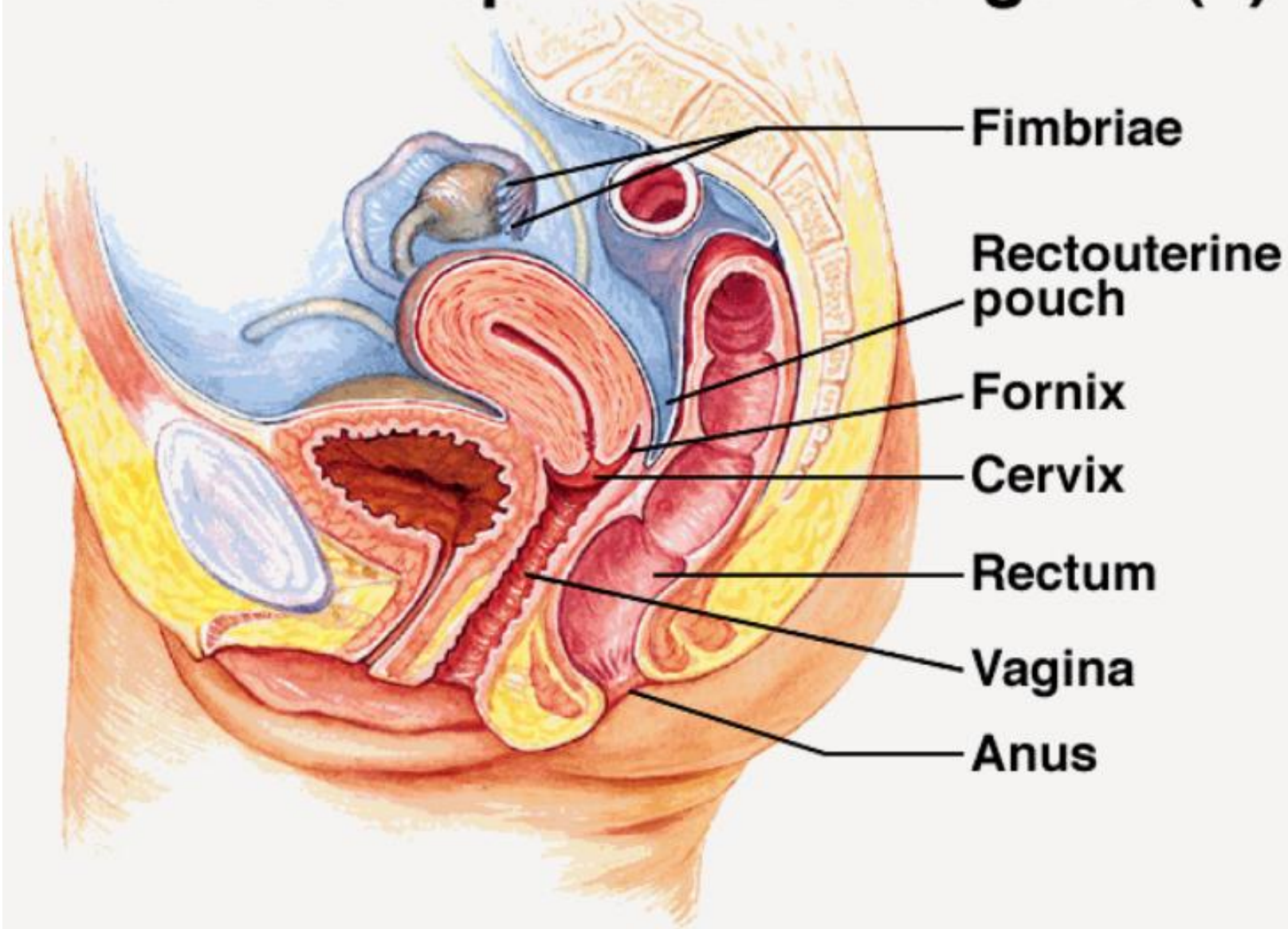
Labium minora
• One of the two inner skin folds that are part of the external genitalia

Labium majora
• One of the two outer skin folds that are part of the external genitalia

Side view

Figure 17-6a Biology of Humans, 2/e

Female Reproductive Organs (2)



Female External

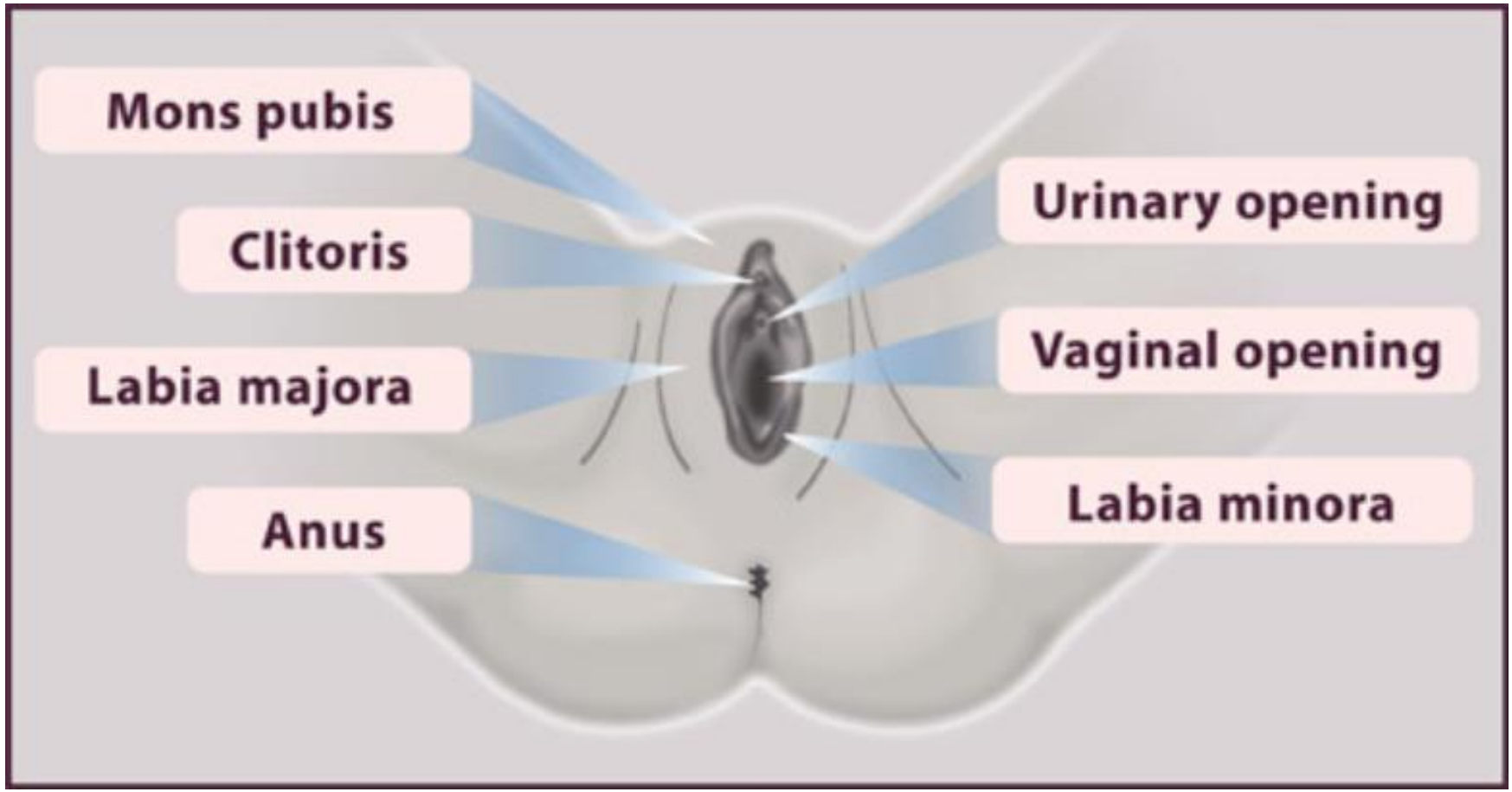


TABLE 17.4 REVIEW OF HORMONES INVOLVED IN THE REGULATION OF FEMALE REPRODUCTIVE PROCESSES

HORMONE	SOURCE	EFFECTS
Estrogen	Ovaries (follicle cells and corpus luteum)	Maturation of the egg; development and maintenance of female reproductive structures, secondary sex characteristics; thickens endometrium of uterus in preparation for implantation of embryo; cell division in breast tissue
Progesterone	Ovaries (corpus luteum)	Further prepares uterus for implantation of embryo; maintains endometrium
Follicle-stimulating hormone (FSH)	Anterior pituitary gland (in brain)	Stimulates development of a follicle in the ovary
Luteinizing hormone (LH)	Anterior pituitary gland (in brain)	Triggers ovulation; causes formation of the corpus luteum

TABLE 17.5 OVARIAN AND UTERINE CYCLES

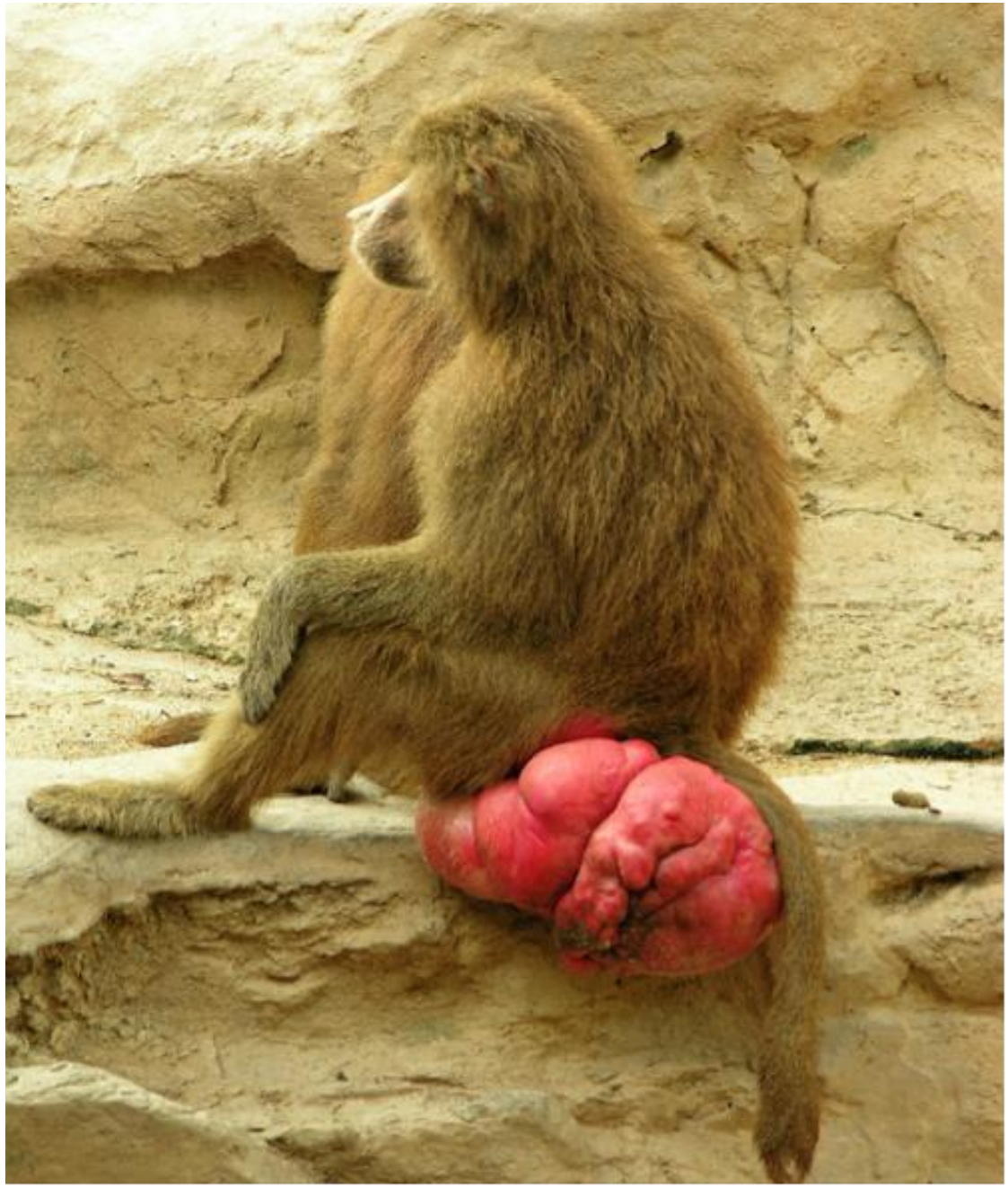
OVARIAN CYCLE		UTERINE CYCLE	
APPROXIMATE TIMING IN 28-DAY CYCLE	**EVENTS**	**APPROXIMATE TIMING IN 28-DAY CYCLE**	**EVENTS**
Days 1–13	Follicle develops, caused by FSH	Day 1	Onset of menstrual flow (breakdown of endometrium)
	Follicle cells produce estrogen	Day 6	Endometrium begins to get thicker
Day 14	Ovulation is triggered by LH surge		
Days 15–21	Corpus luteum forms and secretes estrogen and progesterone	Days 15–23	Endometrium is further prepared for implantation of the embryo by estrogen and progesterone
Days 22–28	Corpus luteum degenerates, causing estrogen and progesterone level to decline	Days 24–28	Endometrium begins to degenerate owing to declining maintenance by progesterone

Table 17-5 Biology of Humans, 2/e

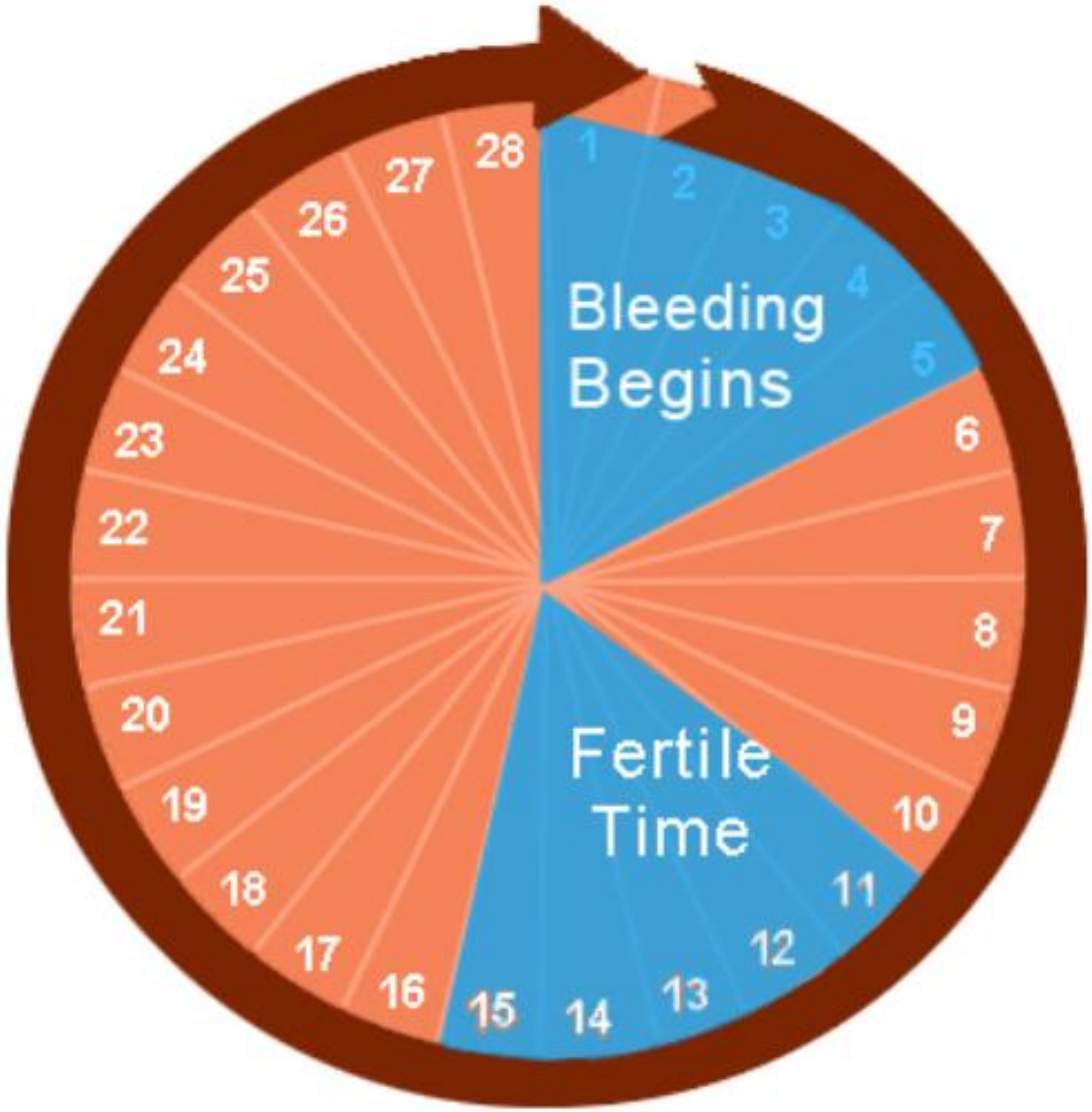
Female Cycles

*Interesting fact – humans are one of the few animals that do not have some kind of visible obvious display of fertility.

Evolutionary biologists suggest this trait evolved as a way to keep males interested for more than just the fertile period, increasing the likelihood of male parental care of offspring.



The Menstrual Cycle




No Strings.
Sans Liens.
Reusable 12-Hour Period Protection
Protection Menstruelle de 12 Heures réutilisable
Softcup
2
Softcup
2
Reusable for up to 1 cycle
Réutilisable pour jusqu'à 1 cycle
New Product!
Nouvel Produit!

When does it end?!?!

A woman’s fertility gradually declines until ovulation and menstruation completely stop, an event called **menopause.**

Difference between Sperm and Egg Production

Males

Spermatogenesis

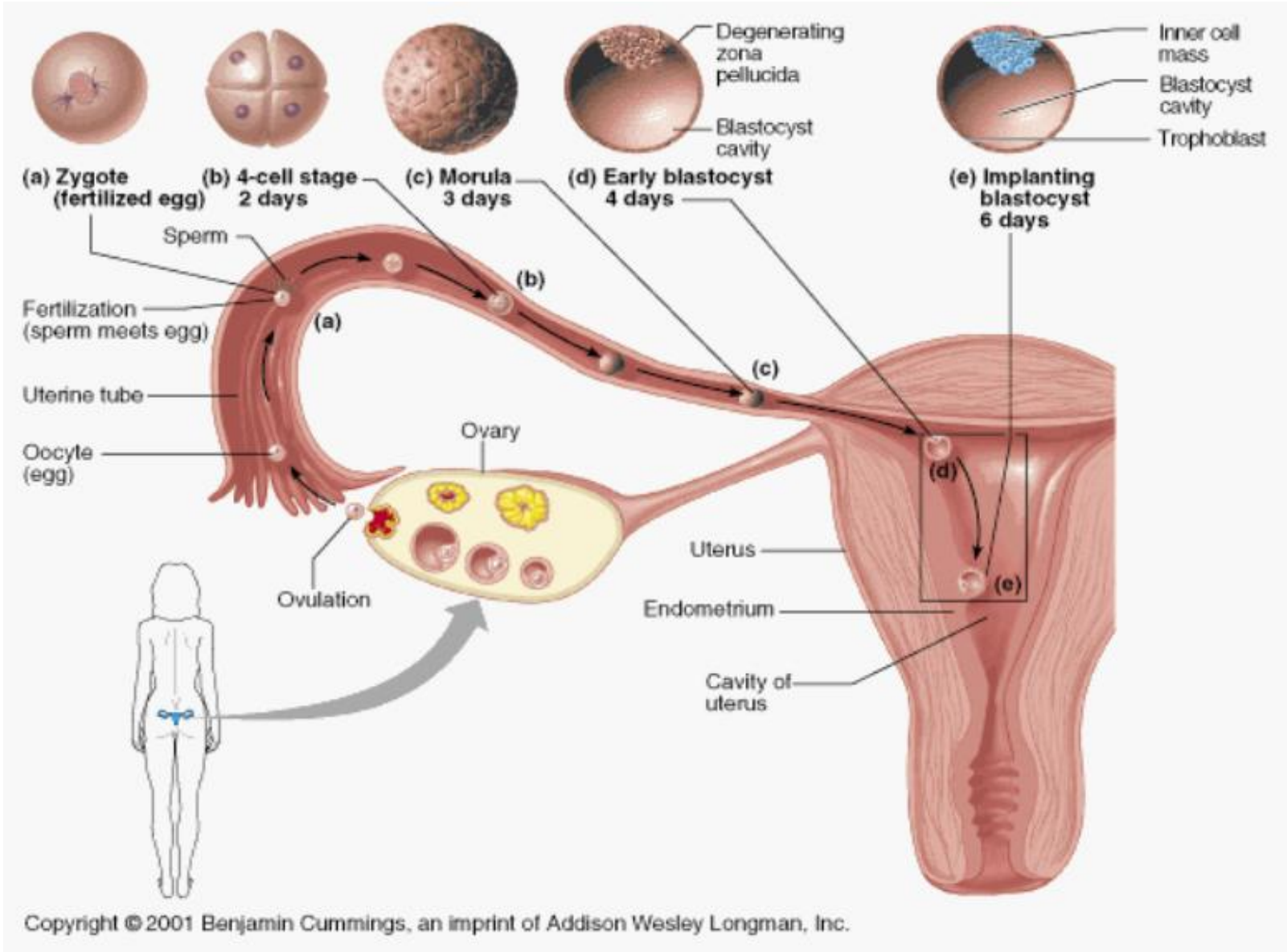
Occurs in the seminiferous tubules of the testes. The sperm mature in the epididymis. Of every two spermatogonia derived from the testes, one will go through meiosis twice to create four haploid unidentical sperm cells. *Why does the other stay a spermatogonia?*

Females

Oogenesis

Eggs are initially made during fetal development of the female. Eggs mature once ovulation and fertilization take place. During meiosis, only 1 egg is produced and the rest of the 4 at the end of meiosis II will make three polar bodies.

FERTILIZATION normally occurs in the Fallopian Tubes

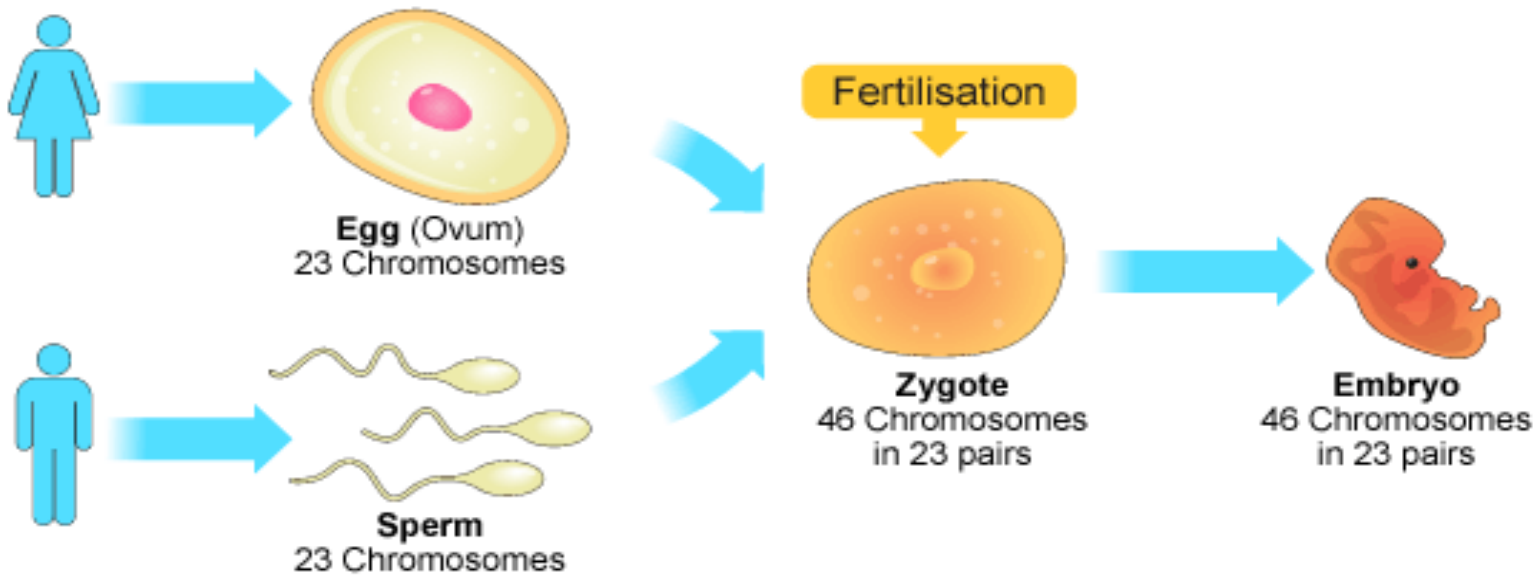


The fertilized egg (zygote) implants in the uterus

FERTILIZATION & PREGNANCY

Sperm must travel to the egg and penetrate to combine the DNA from both parents -- this creates the first cell after fertilization: the ZYGOTE

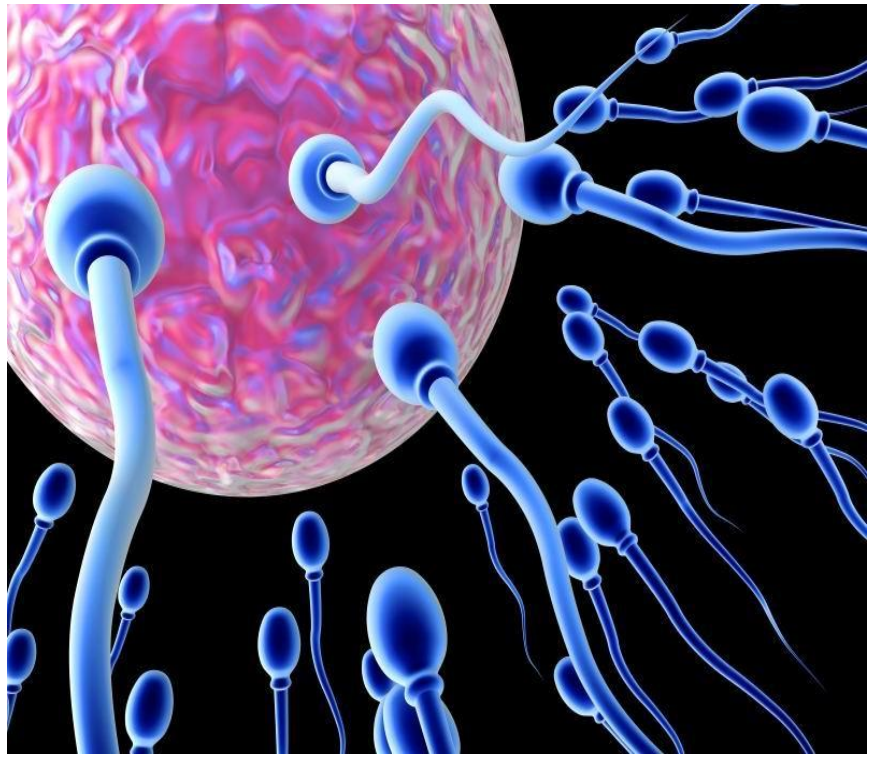
23 chromosomes from each parent; zygote has a total of 46 chromosomes



CONCEPTION

Refers to the point at which the egg is fertilized

Some believe life begins at conception



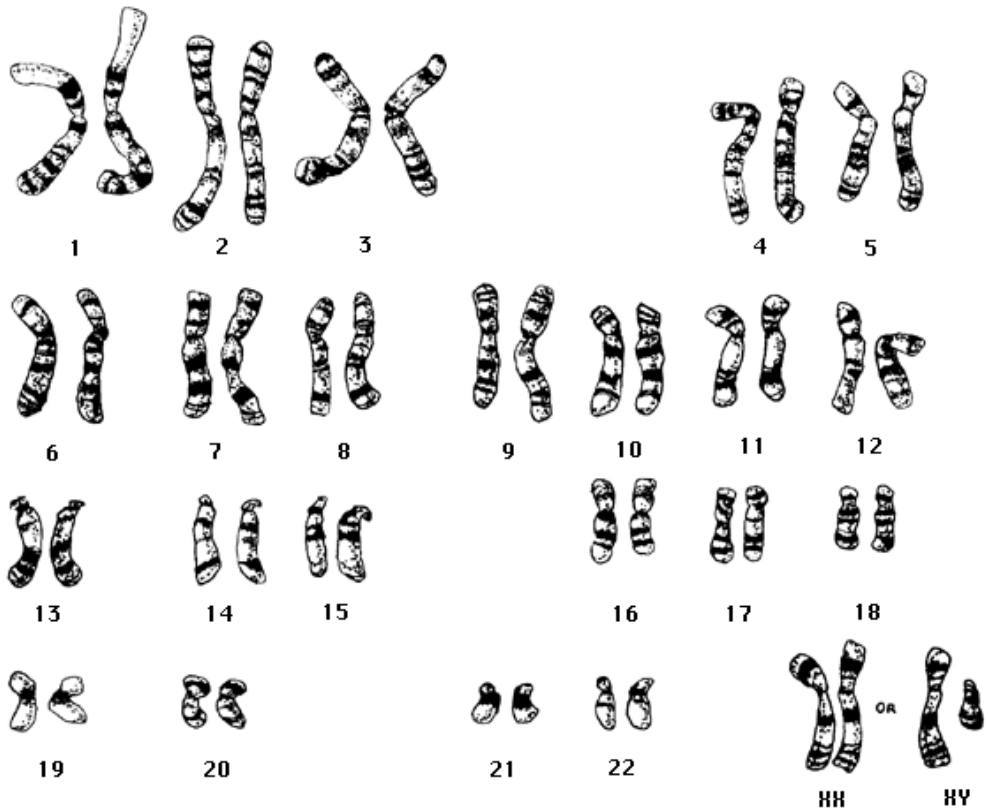
Conception can also be a verb

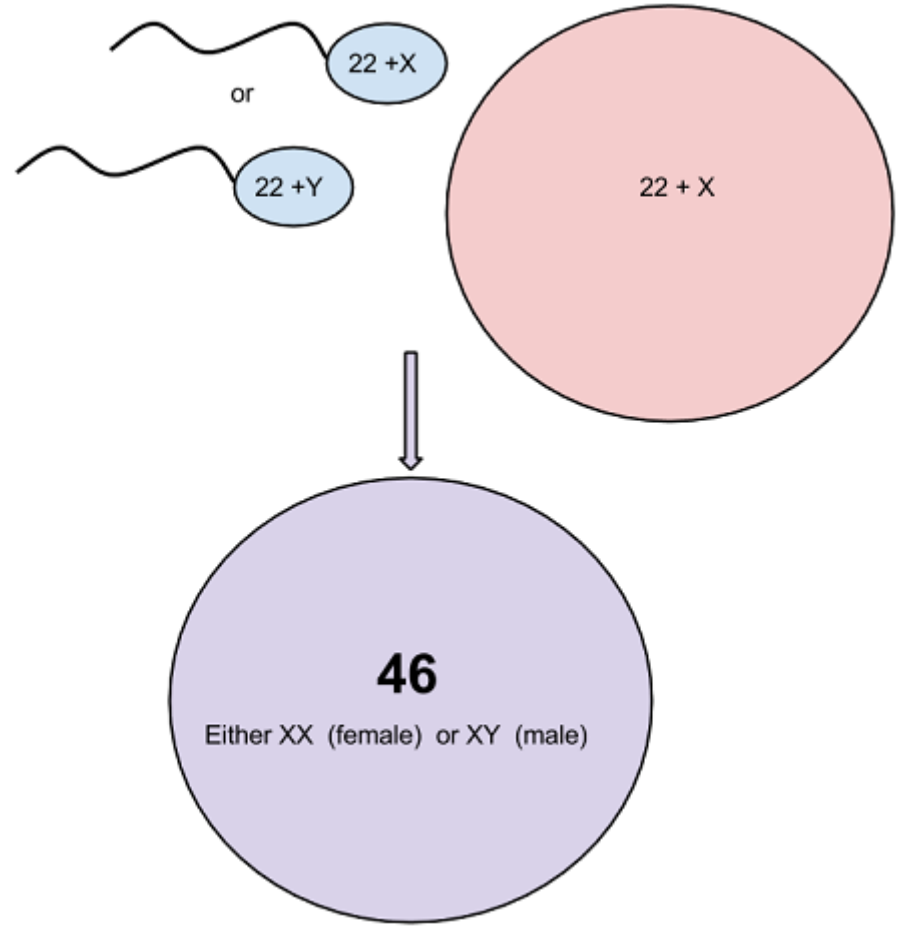
Jane did not have trouble conceiving her first child.

Bob could not conceive of a situation where he would need a parachute.

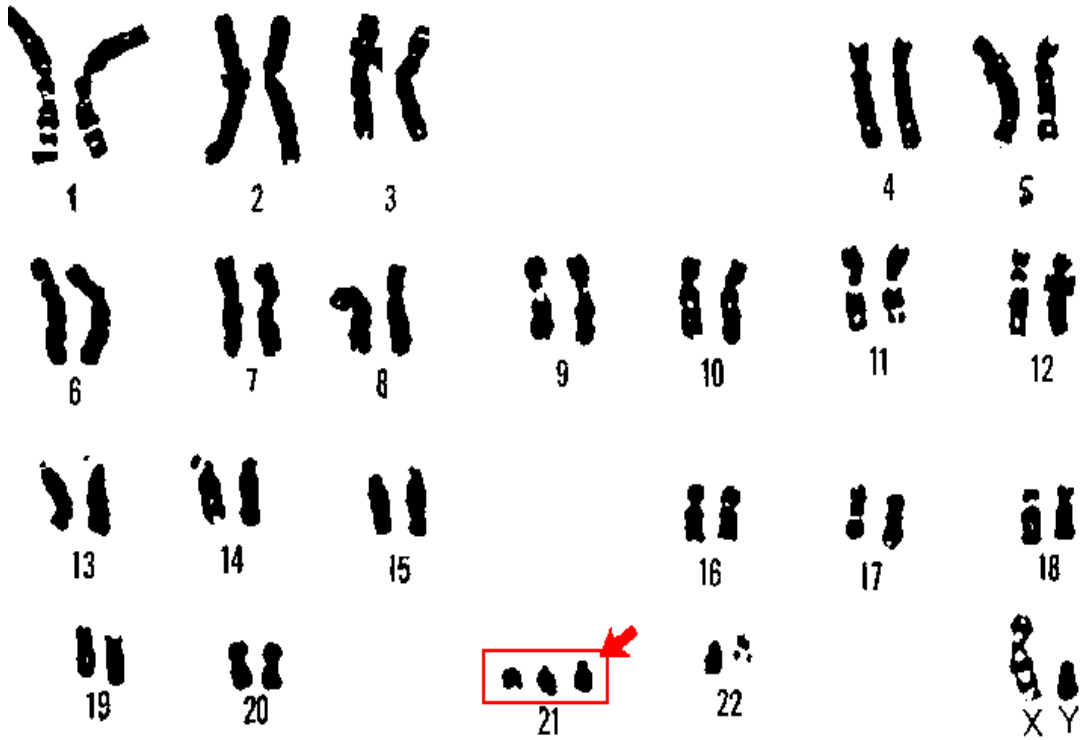
What does MISCONCEPTION mean?

SEX DETERMINATION





If the zygote has the incorrect number of chromosomes, it may never start growing. An extra chromosome #21 will result in the baby having Down Syndrome.

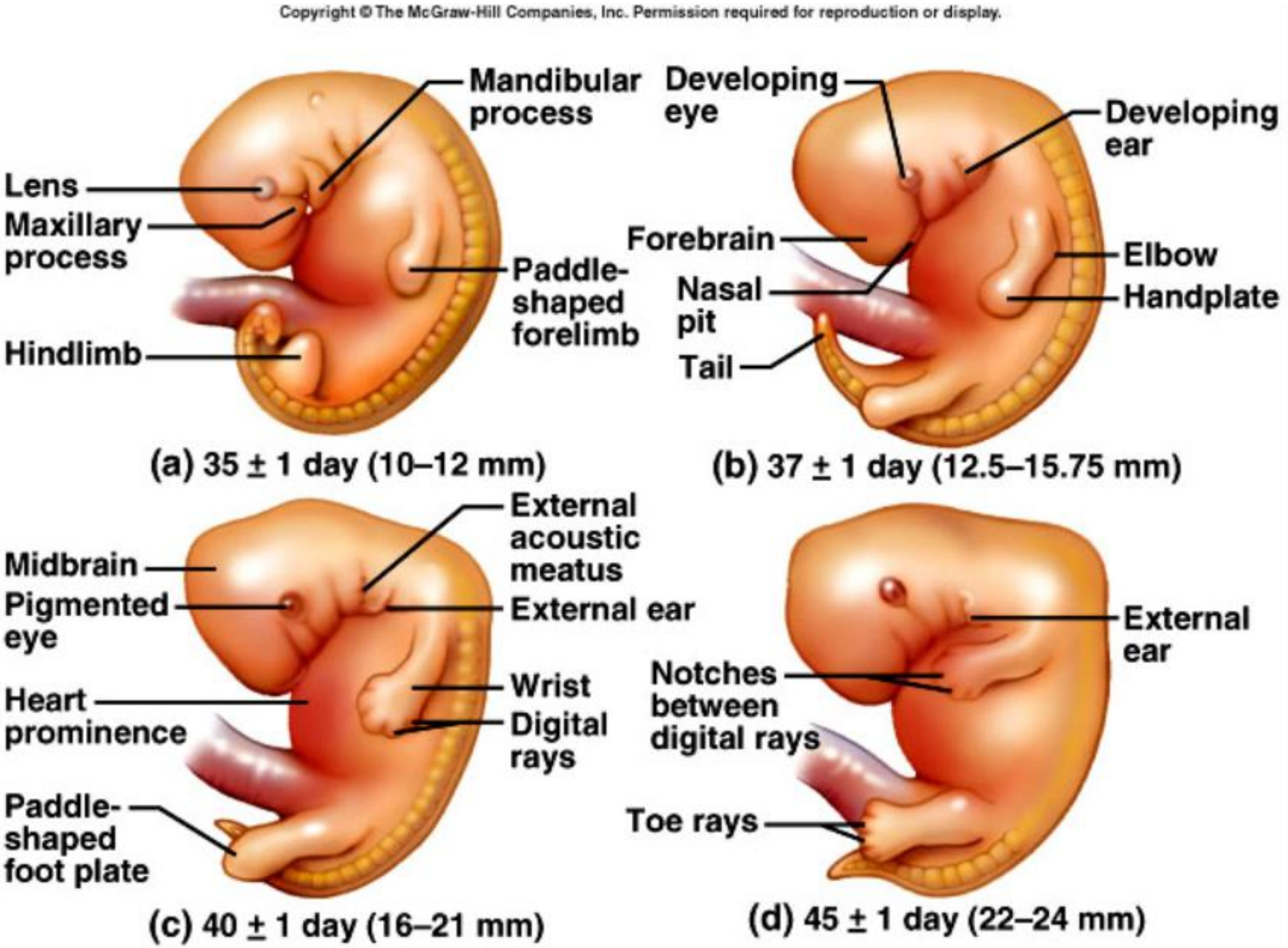


How does a woman know she is pregnant?

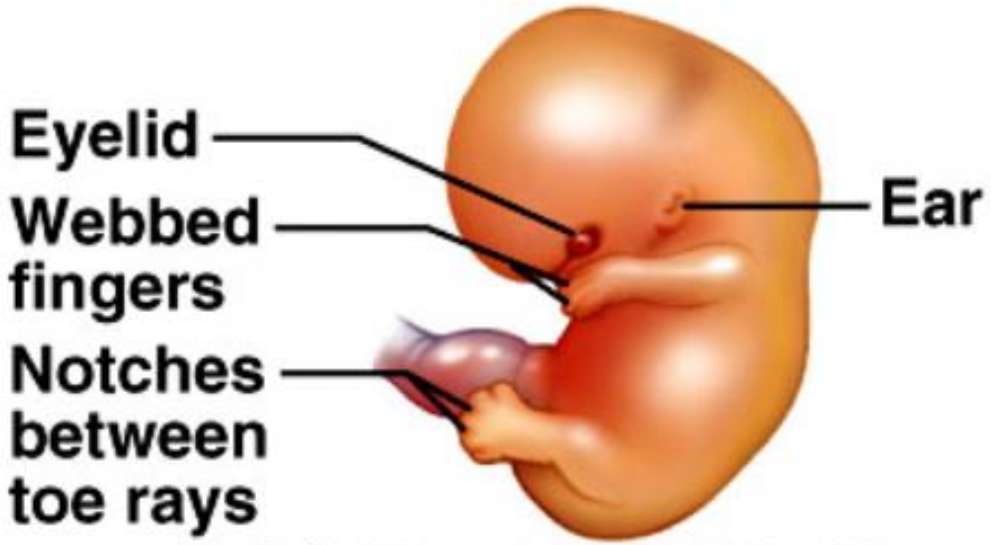
- Missed period
- Changes in body, tenderness in breasts, nausea…etc
- Pregnancy test – tests urine for hormone levels

Clearblue Pregnancy Test

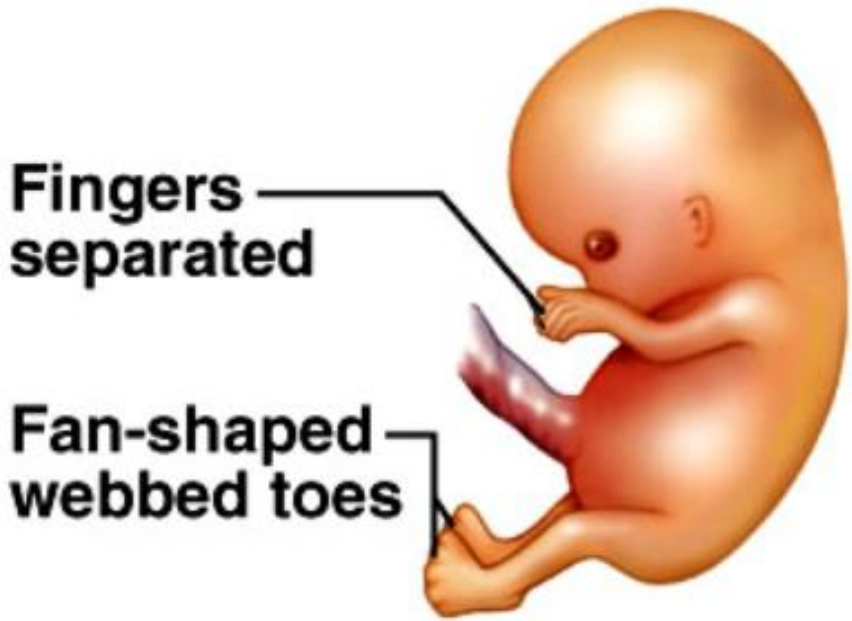
Fetal Development



Fetal Development



(e) 49 ± 1 day (28–30 mm)

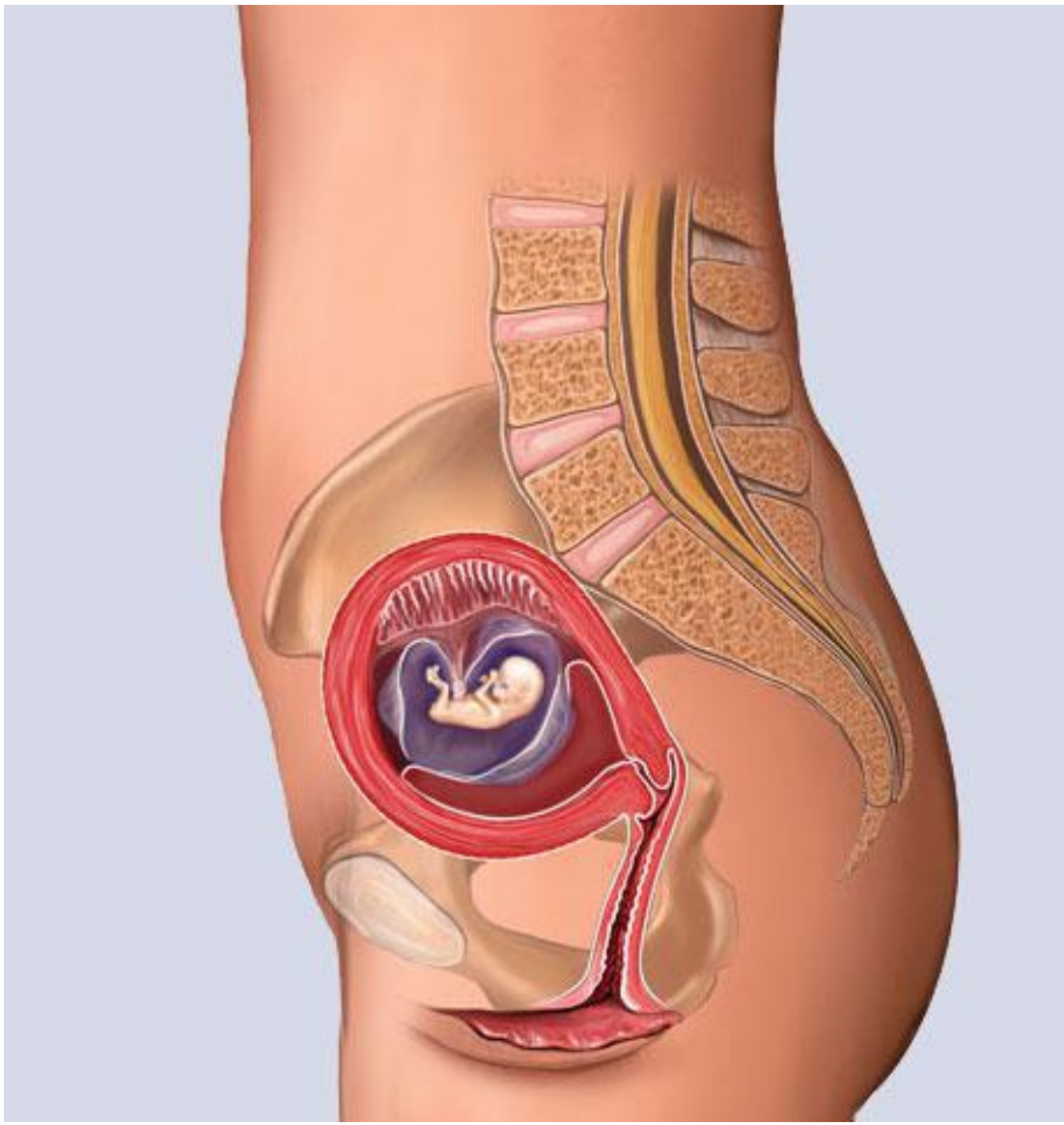


(f) 52 ± 1 day (32–34 mm)

(g) 56 ± 1 day (34–40 mm)

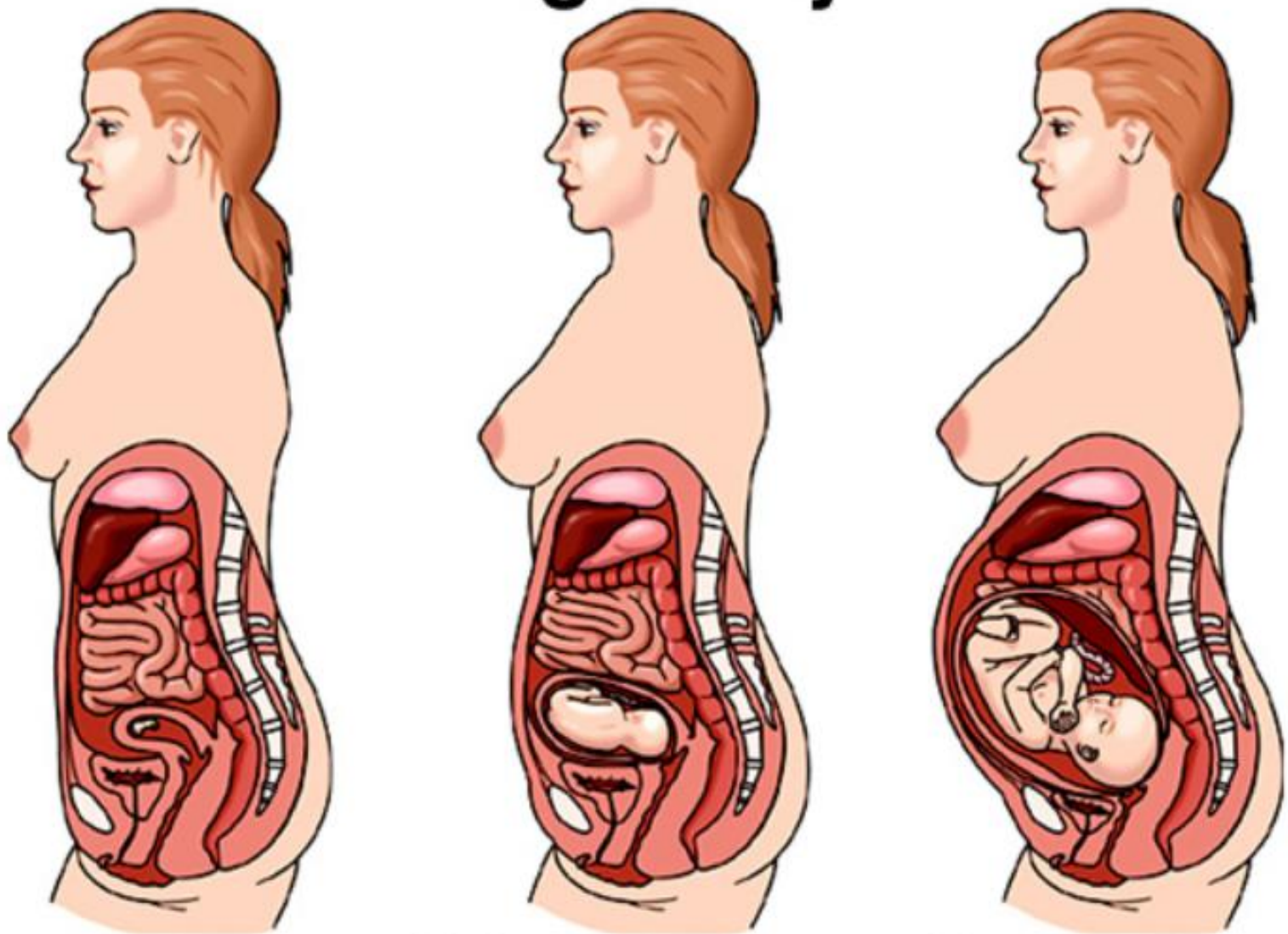
At the 8th week, the embryo is called a FETUS

At 8 weeks



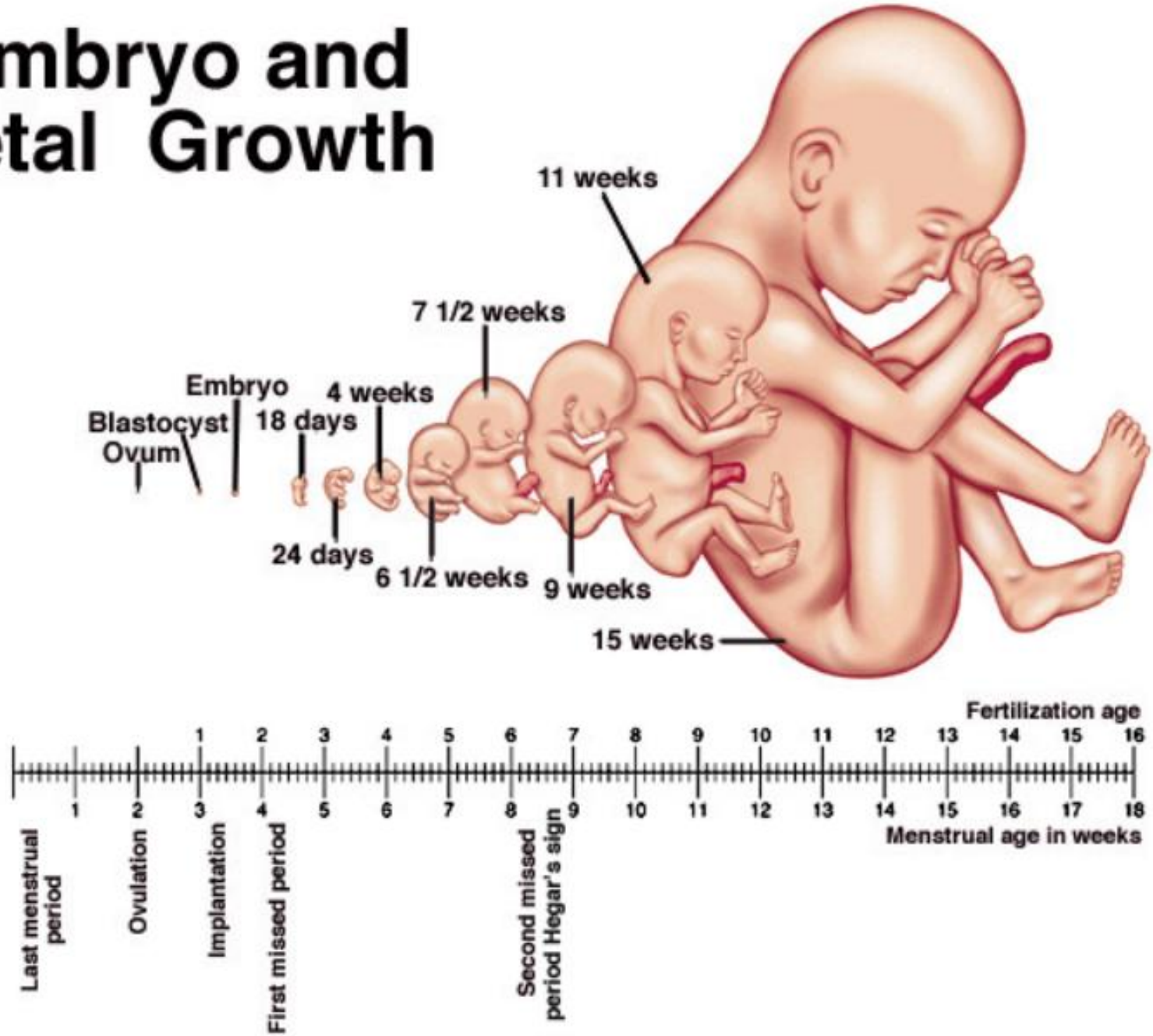
http://www.flickr.com/photos/lunarcaustic/3385925240/

Changes in Woman's Body During Pregnancy



(a) First trimester (b) Second trimester (c) Third trimester

Embryo and Fetal Growth



(b)

What Causes Morning Sickness?

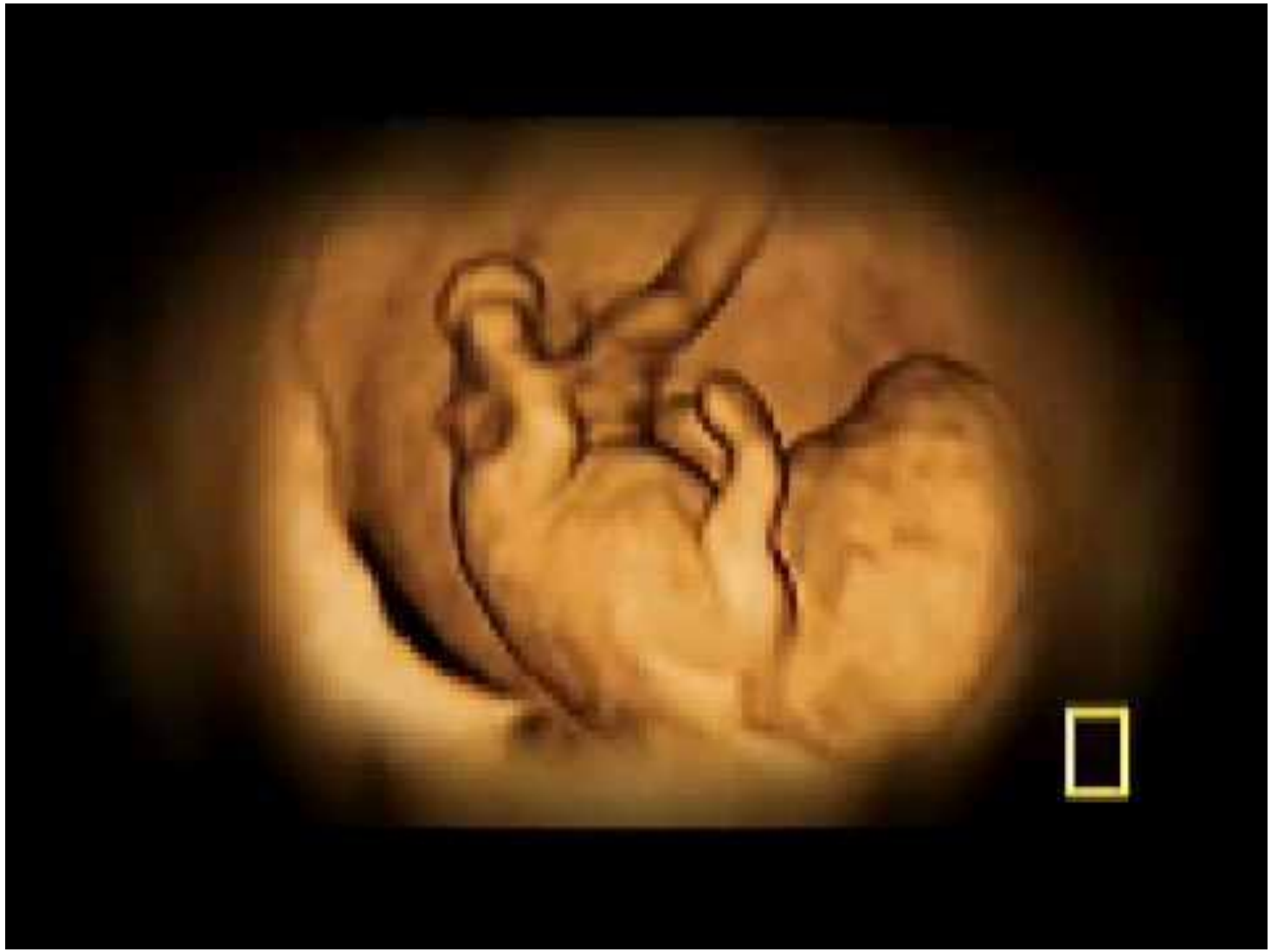
It is likely hormones that rise rapidly with most incidences occurring in the first trimester

Human chorionic gonadotropin (hCG): This hormone rises rapidly during early pregnancy. No one knows how hCG contributes to nausea, but it's a prime suspect because the timing is right: Nausea tends to peak around the same time as levels of hCG. What's more, conditions in which women have higher levels of hCG, such as carrying multiples, are associated with higher rates of nausea and vomiting.

Fetal Tests

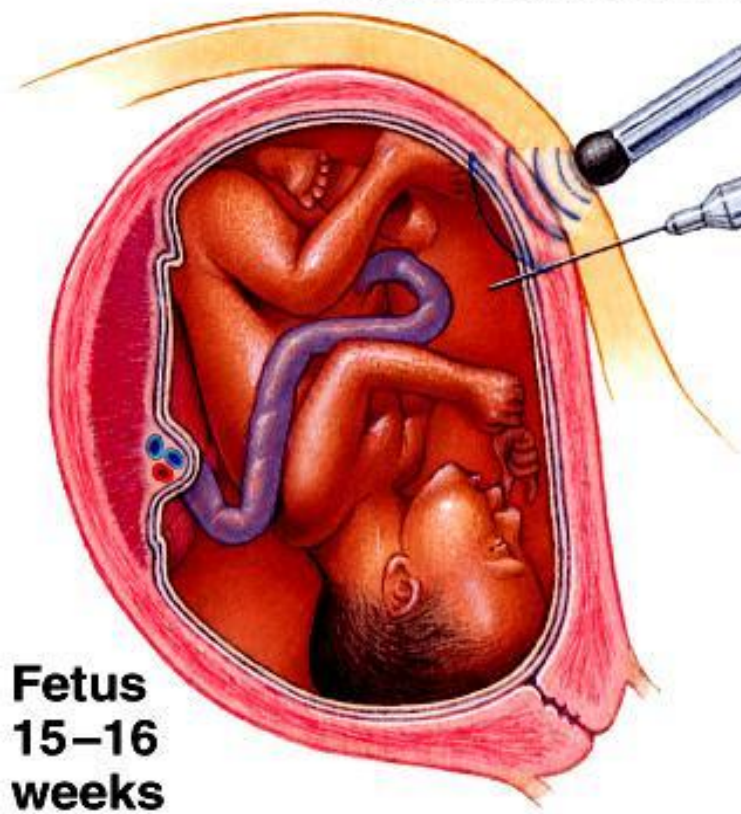
Ultrasound - sound waves are used to get an image of the baby

You can tell the sex of the baby and its position

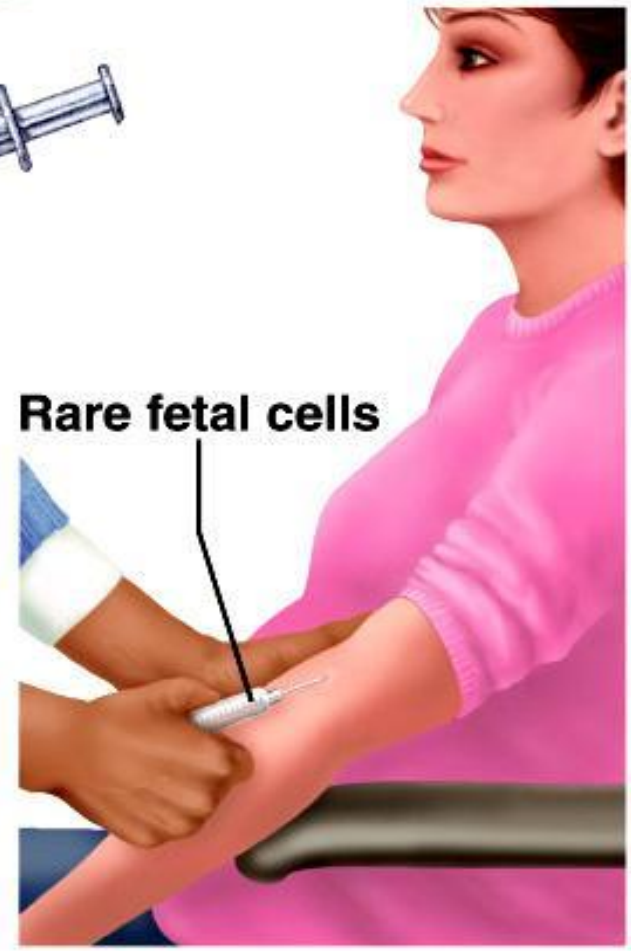


Amniocentesis & Chorionic Villi Sampling

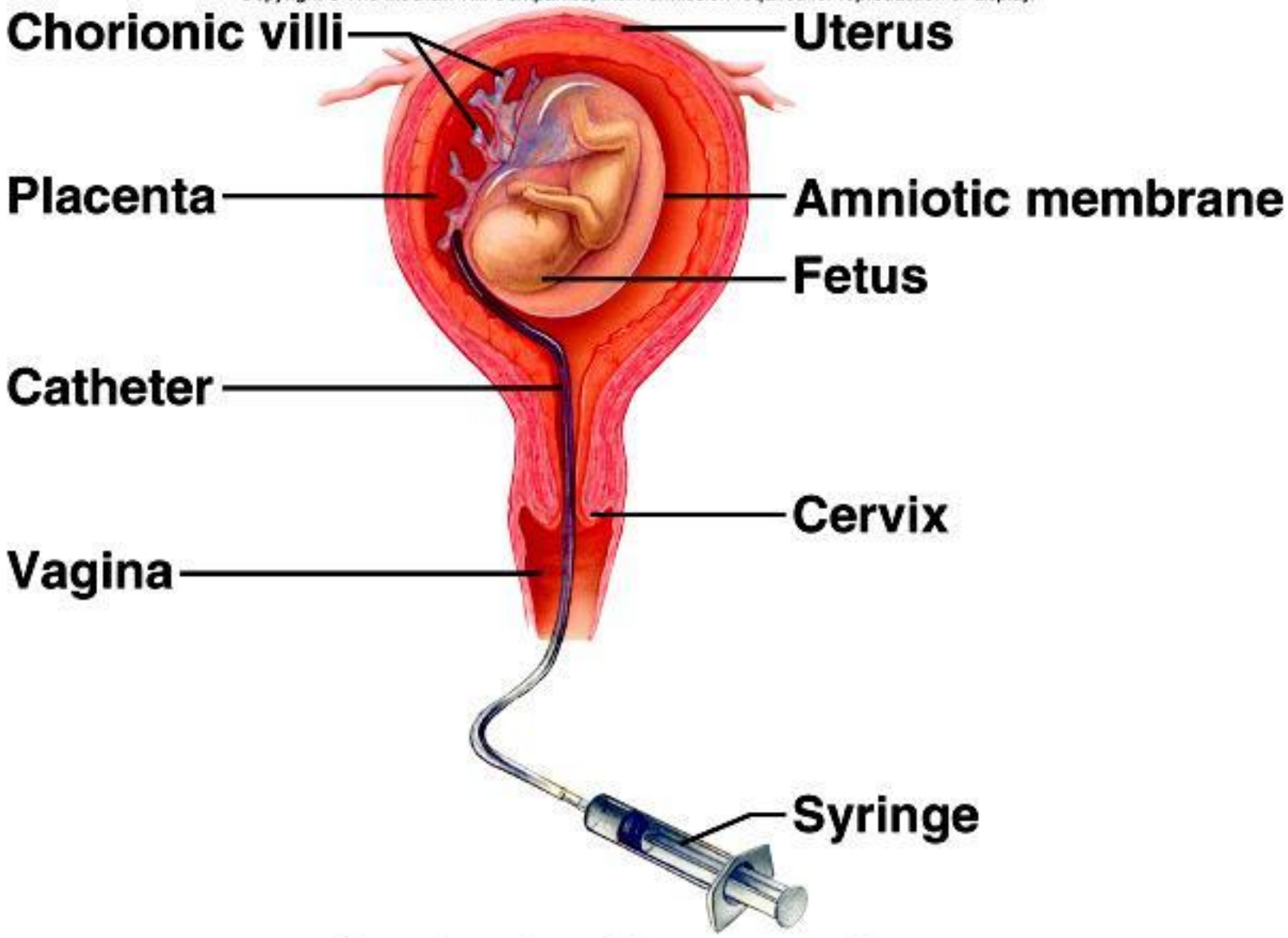
Tests fetal cells for abnormalities, such as chromosome numbers



Amniocentesis



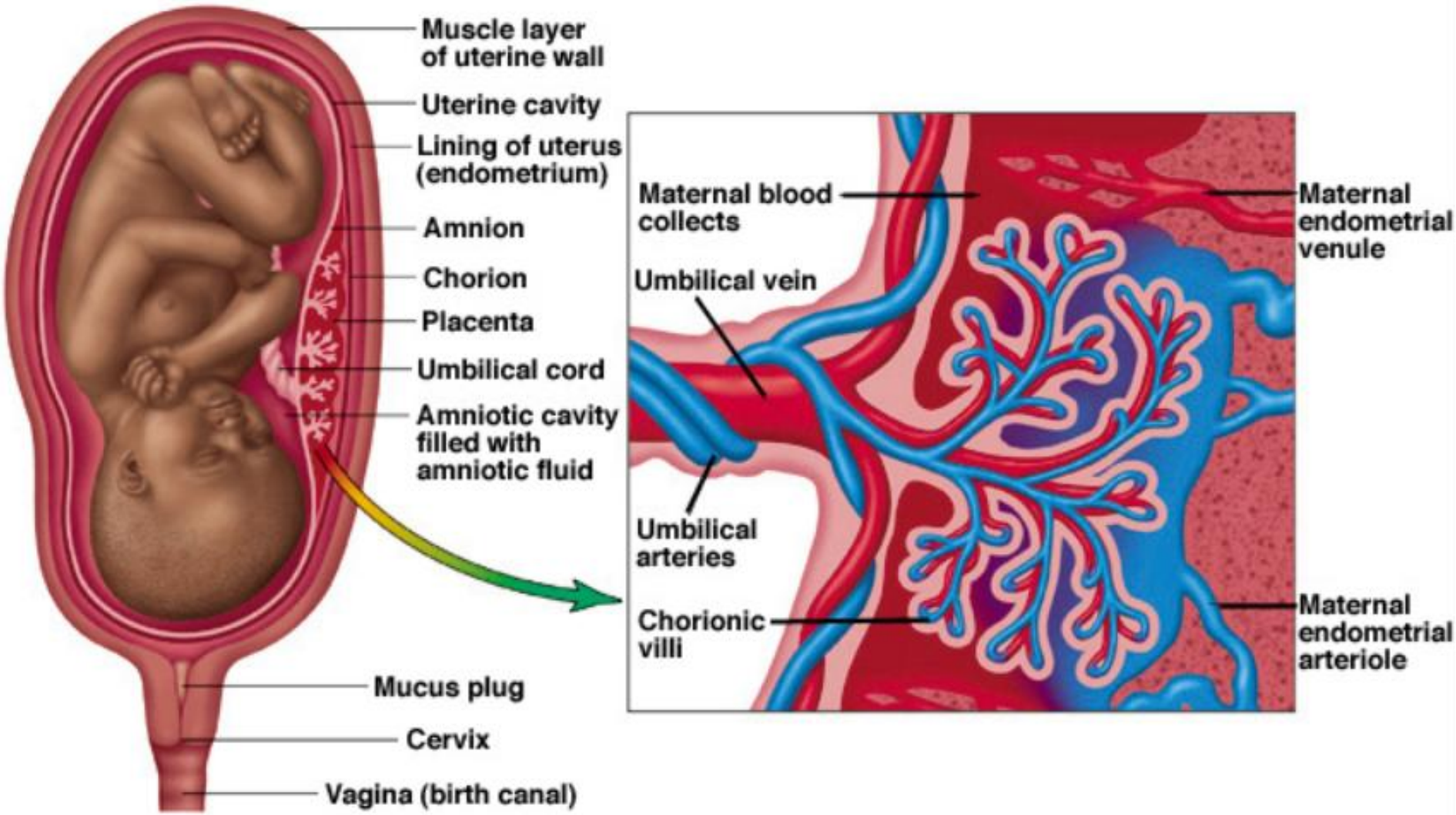
Fetal cell sorting

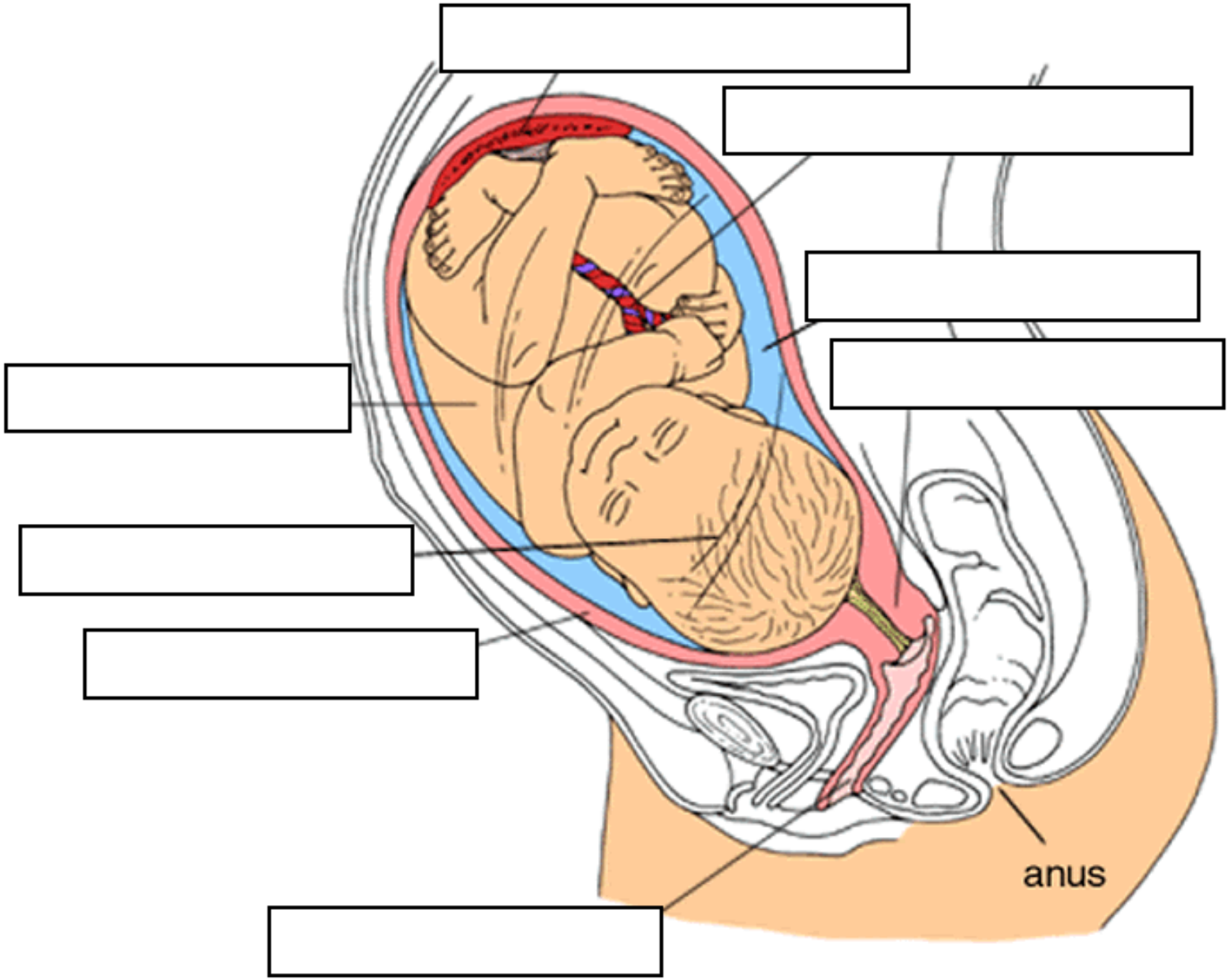


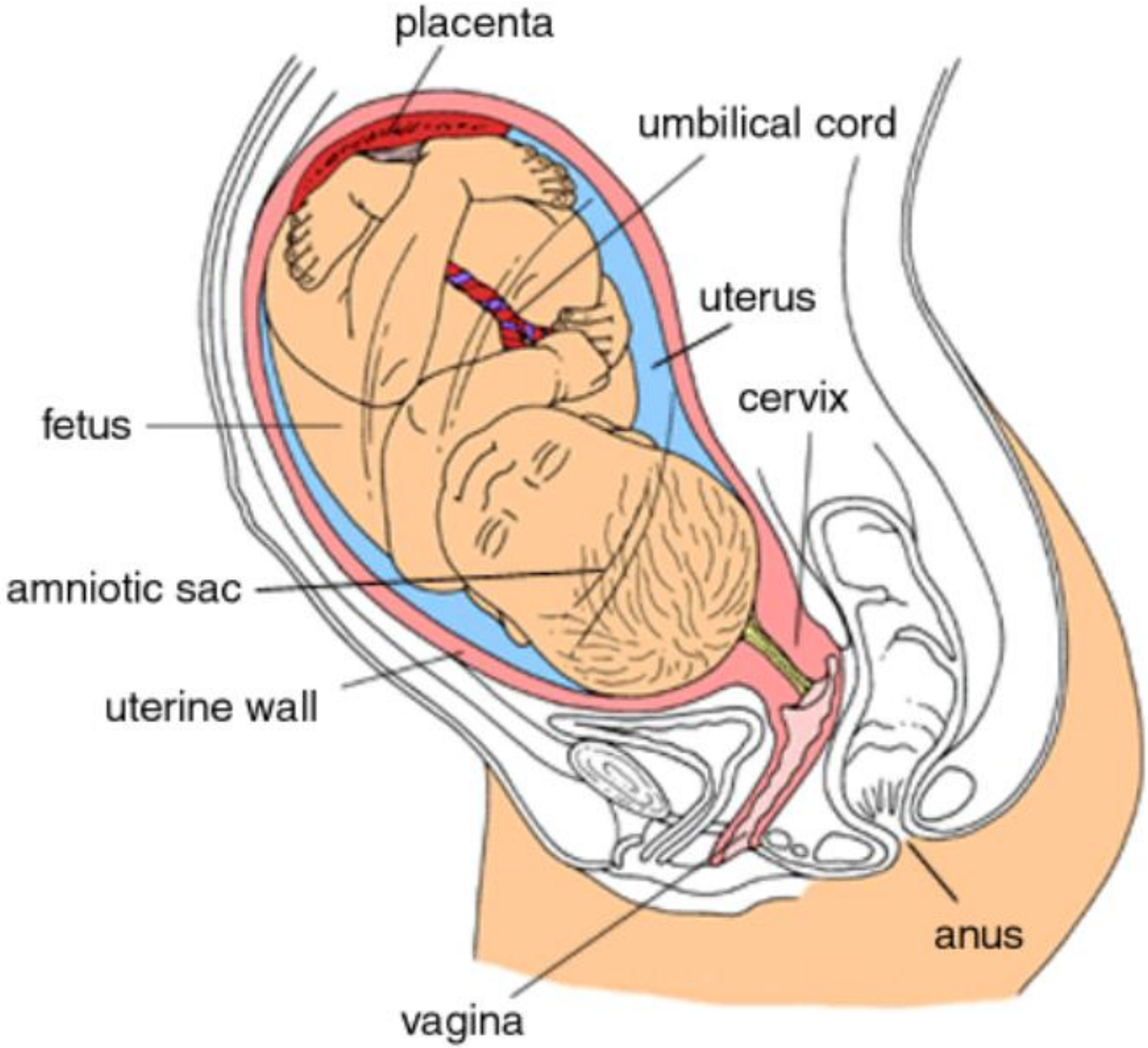
Chorionic villus sampling

CHILDBIRTH

The Fetus, Uterus & Placenta



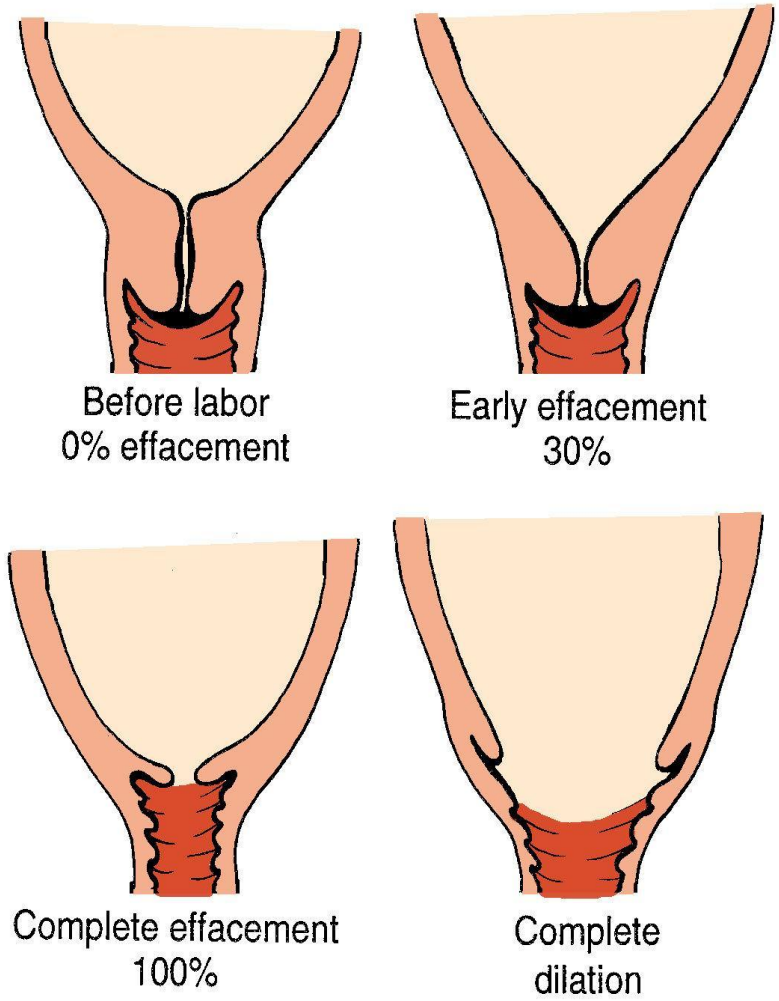

anus


placenta
umbilical cord
uterus
cervix
fetus
amniotic sac
uterine wall
anus
vagina

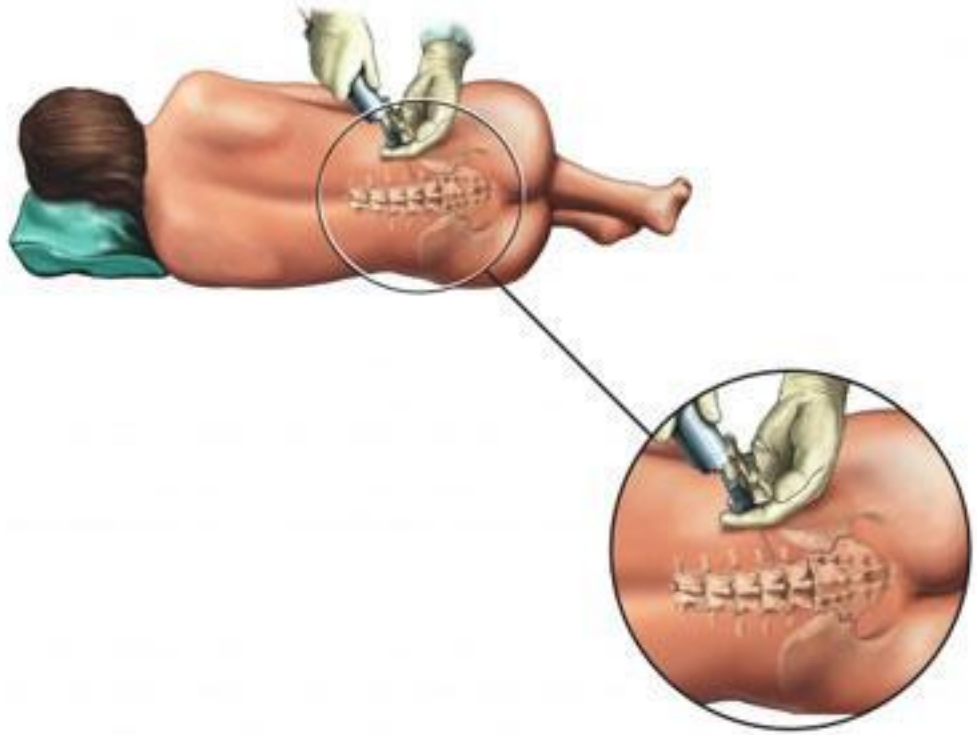
Labor

Contractions of muscles occur and become faster and faster, this timing can be used to predict the progression of the labor.

Braxton Hicks contractions can occur throughout pregnancy, but probably more frequent at the end



Dilation of the cervix allows for baby to pass through, the amount of dilation also is a good clue for how close baby is.

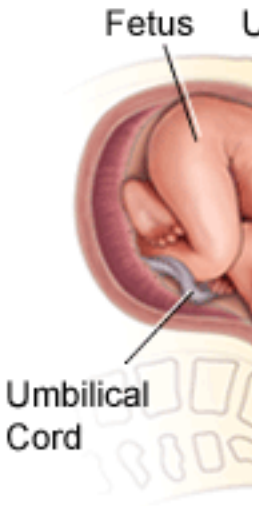


An epidural can be used to manage pain of labor. A shot in the spine will temporarily eliminate any feeling below that point. Mom is awake for the birth, but doesn't have the pain of it.

Unfortunately, an epidural must be timed exactly right. Too soon and it will wear off. Too late, and they cannot do the procedure.

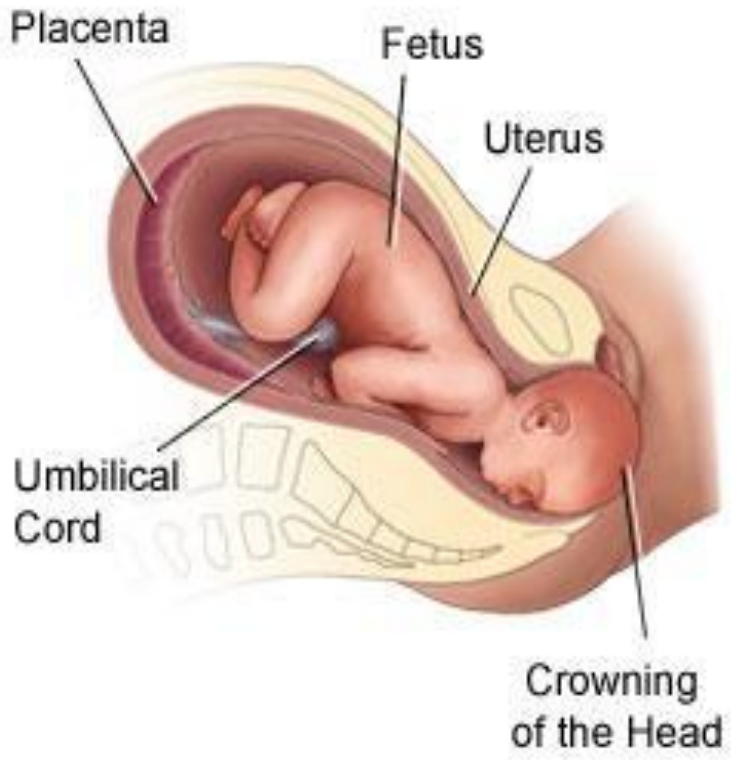
Stage 1

Initial (Latent) Phase

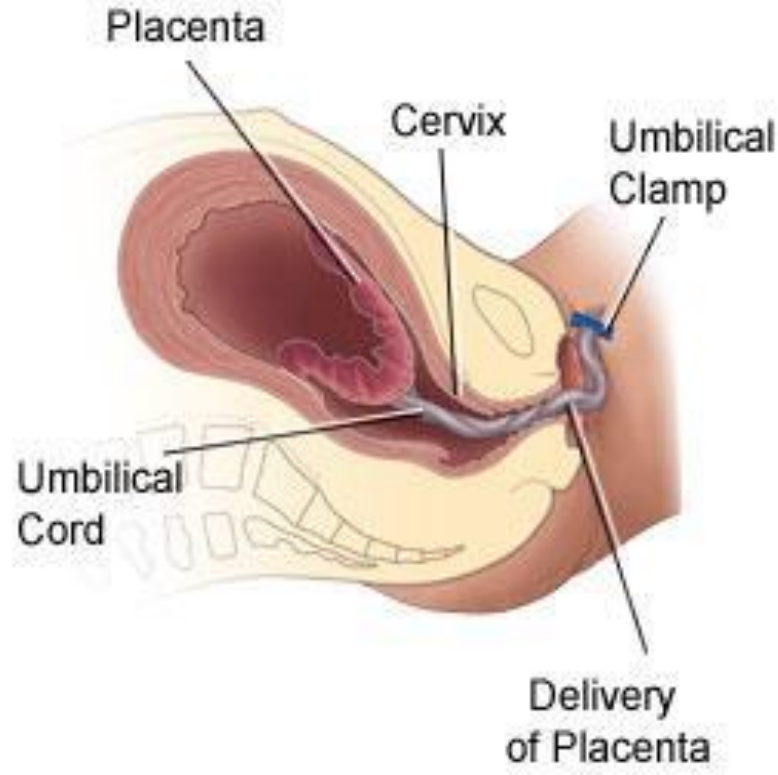


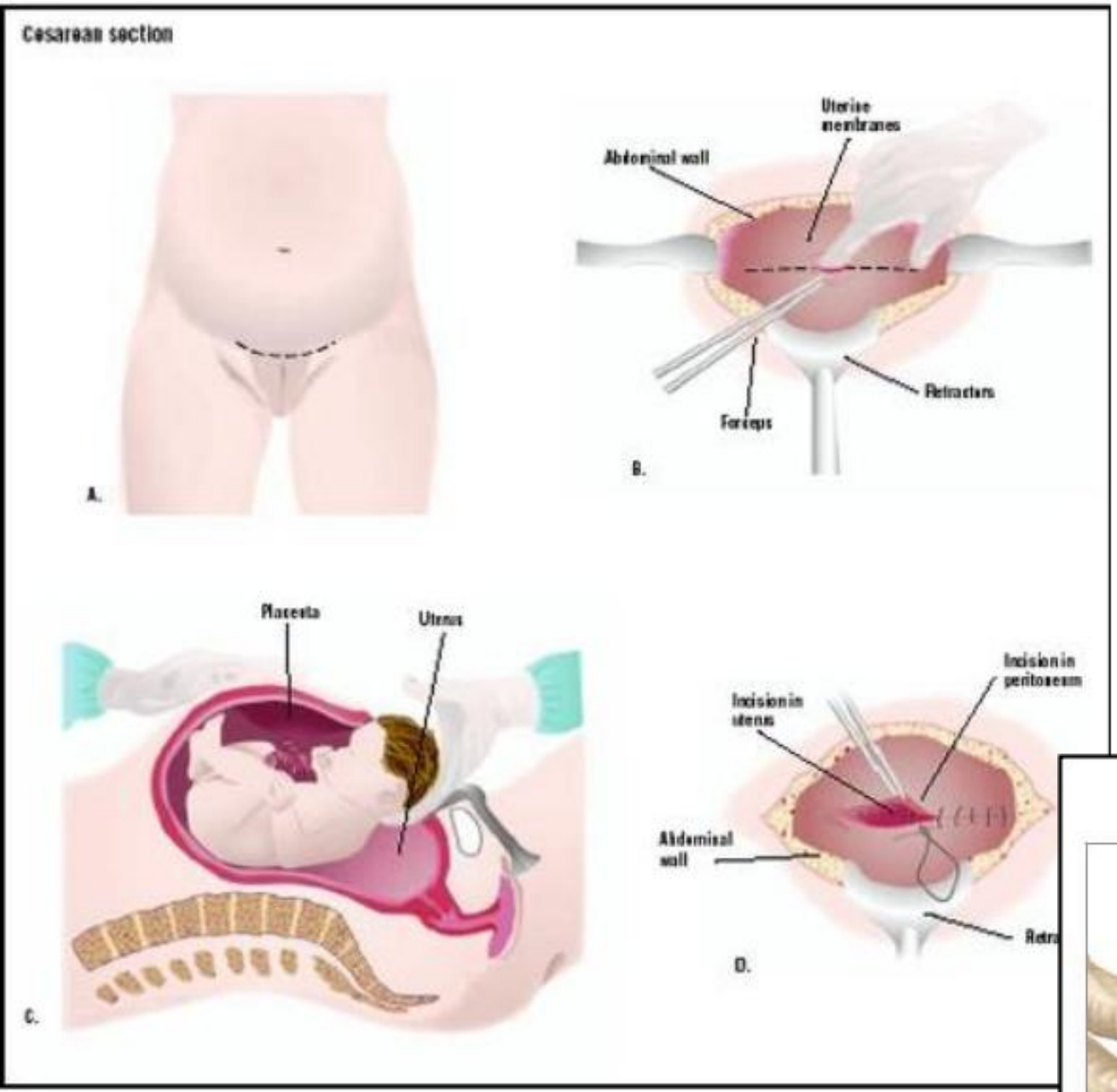
Tr

Stage 2



Stage 3





Cesarean section

With both hands, the surgeon reaches into the abdominal incision and lifts the baby's head as an assistant pushes down on the upper uterus

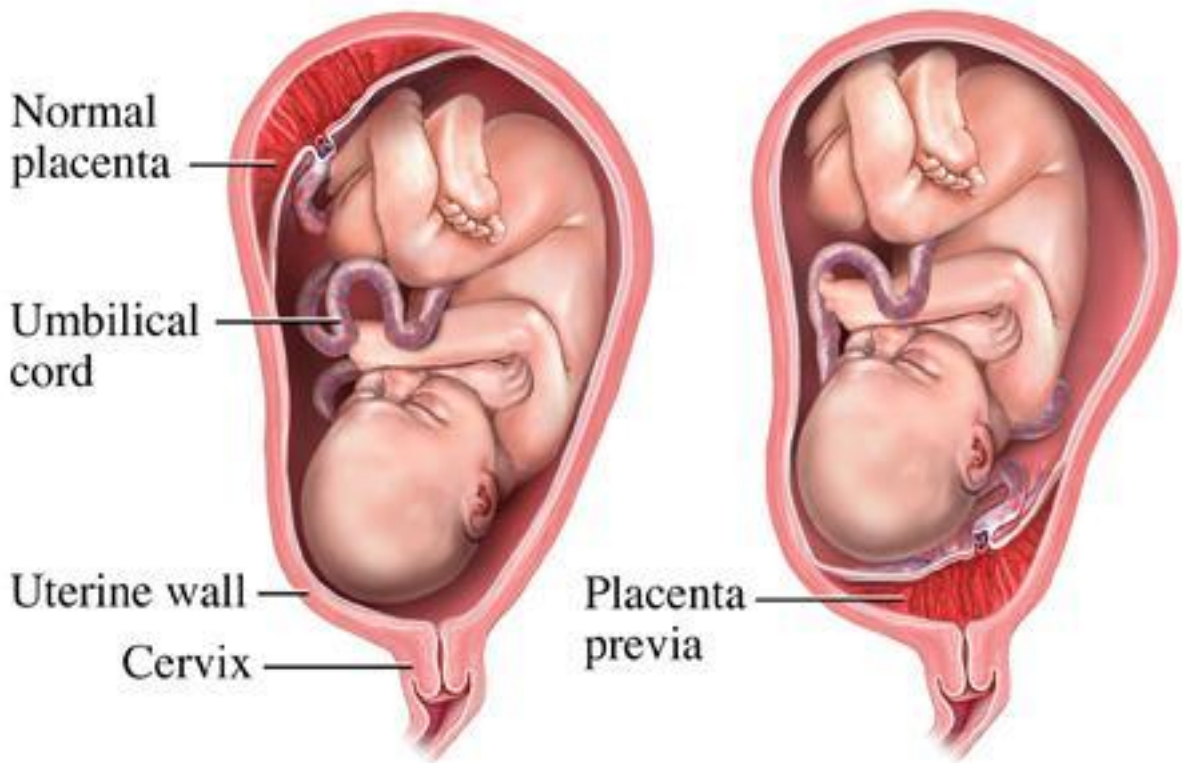

babycenter

Complications During Birth

Placenta Previa

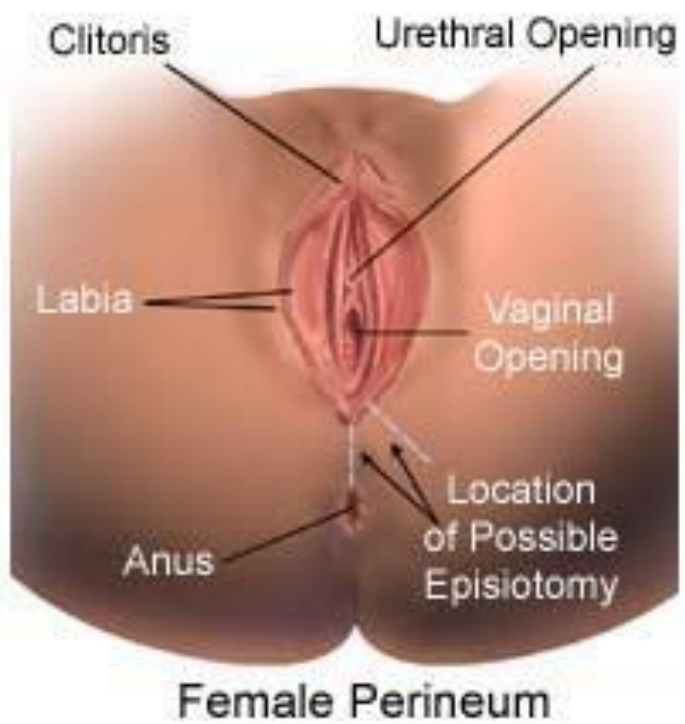
placenta is not attached to the top of the uterus, partially or fully blocks the cervix, this can cause bleeding during pregnancy

Solution: C-Section



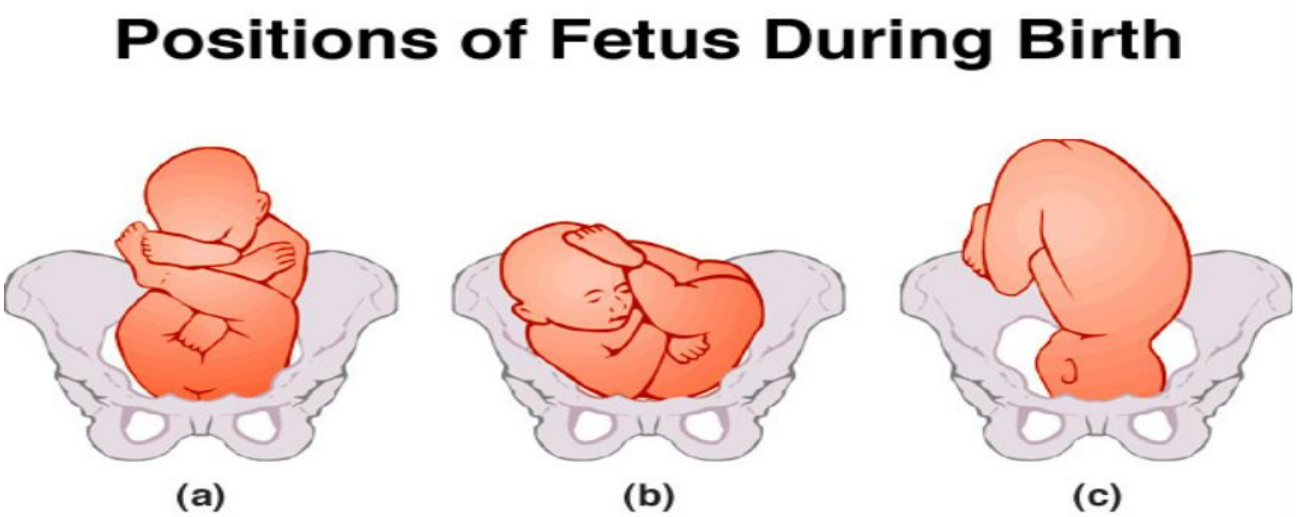
What Is An Episiotomy?

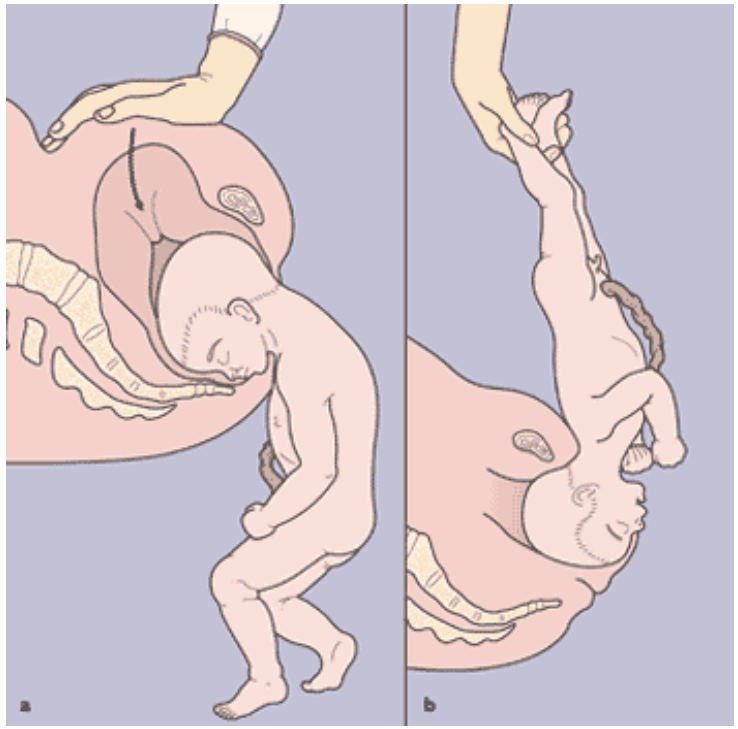
It is a surgical incision to open the perineum - the tissue between the anus and vagina. It is performed during the second stage of labor when the baby is being pushed through the vagina. The purpose of the procedure is to avoid tearing the delicate perineal tissue.



Female Perineum

BREECH BIRTH (Footling)





If the baby is rear or feet first, it is called a BREECH BIRTH. Doctors will attempt to turn the baby or even do an emergency C section. Breech births are dangerous for baby because the head can get stuck or umbilical cord gets tangled.

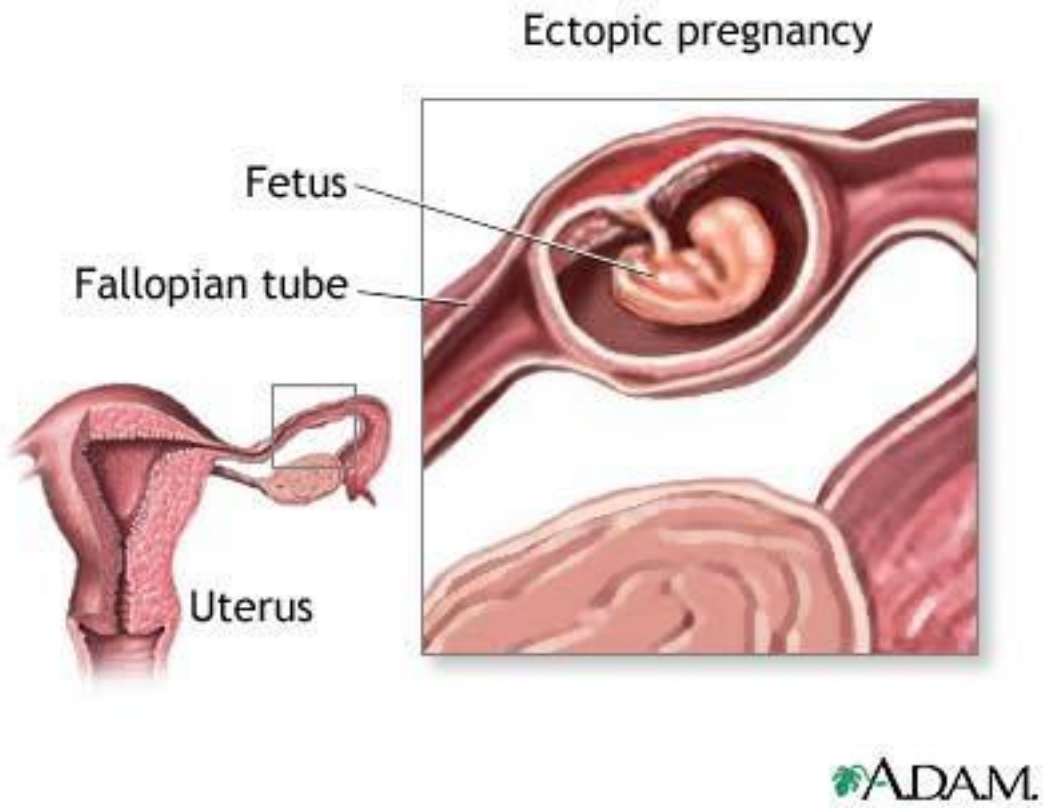
Solution: turning the baby before delivery, C-section, or footling birth - photos (graphic)
This video shows an episiotomy with a breech birth (graphic)

Ectopic Pregnancy

Fertilized egg attaches (or implants) someplace other than the uterus, most often in the fallopian tube. (sometimes called a tubal pregnancy.)

The pregnancy cannot continue to term, usually embryo is removed.

Can be very dangerous for woman.



Gestational Diabetes

Pregnancy hormones can block insulin from doing its job. When this happens, glucose levels may increase in a pregnant woman's blood.