

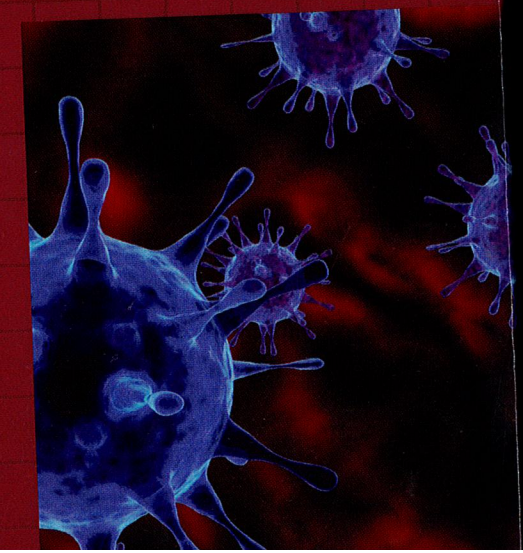
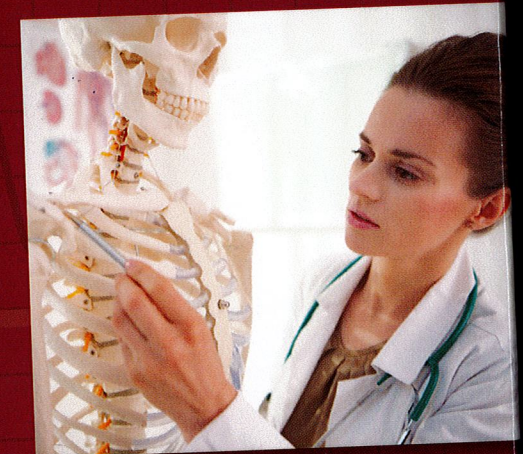
Teacher's Wraparound Edition

Health Science Fundamentals

Exploring Career Pathways

Second Edition

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8. Answer: A neurologist is a physician who specializes in nervous system disorders. This includes diseases of the brain, spinal cord, nerves, muscles, and the blood vessels that relate to these structures. To become a neurologist, you must complete medical school followed by a one-year internship. At least eight months of that internship must be spent in internal medicine. Then, you must complete a three-year residency in neurology and pass an exam to become a certified neurologist.

FOCUS AND ENGAGE

Introduce the Section

- a. Review the content of the Background paragraph, explaining that reproduction is the way that animals, plants, and other organisms make offsprings or new versions of themselves.
- b. Emphasize that reproduction is controlled by hormones and remind students that the endocrine system controls hormones.
- c. Review the objectives for the section.

Vocabulary Review

- a. Direct students to the key terms.
- b. Pronounce each word, and have the students repeat the pronunciation out loud.
- c. Discuss the definition of each word.

TEACH

Discuss

- Ask students to share stories about family members, friends, or even pets, reproducing—having babies.

SECTION 13.11 The Reproductive System

Background

The reproductive system allows humans to reproduce. This system produces sex cells that unite to form a fertilized egg that can develop into offspring. The reproductive system is controlled by hormones. This system usually becomes active during the teenage years. As a health care worker, you should be familiar with this system in order to monitor pregnant patients and prevent or treat reproductive disorders.

Objectives

When you have completed this section, you will be able to do the following:

- Match key terms with their correct meanings.
- Label a diagram of the male and female reproductive systems.
- Match the various organs in the reproductive systems with their functions.
- Match common disorders of the reproductive system with their descriptions.
- Describe how the reproductive system affects the body.
- Explain why the health care worker's understanding of the reproductive system is important.

Introduction to the Reproductive System

Reproduction occurs in all species. Tiny one-celled organisms divide or separate by themselves to reproduce. Most animals require a male and female, each with their own special cells that unite to reproduce. The male and female reproductive systems have several characteristics in common. They are gonads, tubes that carry secretions, and exocrine glands.

- *Gonads* (endocrine glands) or sex glands in the male are called *testes*, and they produce sperm. In the female they are called *ovaries*, and they produce ova.
- The *tubes* form passageways for the **sex cells**, sperm and ova.

The Female Reproductive System

The main function of the female reproductive system is to produce the ovum for fertilization and to house a developing **fetus**. Reproduction occurs when the male and female sex cells unite within the female. After the union of these cells, the fertilized egg divides and grows for 9 months or 40 weeks and develops into a new individual. Look at Figure 13.37 to identify parts of the female reproductive system.

sex cells
(SEX sel)
Cells that allow reproduction to occur.

fetus
(FEE tus)
Infant developing in the uterus after the first three months until birth.

- Explain that without reproduction, species would cease to exist.
- Emphasize that reproduction occurs in all life, not just humans or animals.
- Discuss different types of reproduction, such as budding on plants, fission in bacteria, and regeneration in starfish.

Reinforce and Review

- Review the information in Section 13.1: cells, tissues, organs, cavities, and body directions.
- Review the information in Section 13.9, The Endocrine Systems.

CUSTOMIZED INSTRUCTION

More Advanced Students

Assign more advanced students a research project comparing different types of reproduction. They might write a report or create a presentation that they can deliver to the class.

- **Female gonads**, the ovaries, are small oval-shaped structures that produce the female sex cells or ova and the hormone called **estrogen**. Approximately every 28 days an ovum **matures** and is forced from the ovary and received by the fallopian tube.
- **Fallopian tubes** are muscular tubes about five inches long. The tubes do not connect to the ovaries. When the **ovum** is forced from the ovary into the peritoneal cavity, it floats in the peritoneal fluid. At the end of each fallopian tube, fingerlike projections called **fimbriae** create a current that sweeps the ovum into the tube.
- Once inside the tube, the ovum is swept forward by small cilia and by peristalsis. **The ovum takes about five days to move through the fallopian tube and is then deposited into the uterus.**
- The **uterus**, a pear-shaped organ, is attached to the fallopian tubes. While the ovum is maturing, the uterus begins to build an interlining called the **endometrium**. If the ovum is not fertilized in the fallopian tube, it deteriorates shortly after entering the uterus. The endometrium then deteriorates, causing bleeding or **menstruation**. The main function of the uterus is to house and nourish the fertilized ovum until delivery of a fully developed fetus.
- The **vagina** is a muscular tube that houses the neck of the uterus or **cervix**. This tube extends approximately three inches to the outside of the body. The vagina is also known as the **birth canal**.

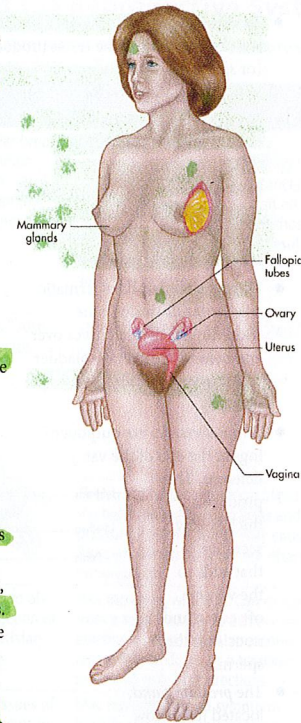


Figure 13.37
Where are the female sex cells (ova) produced?

estrogen
(ESS tro jen)
Female hormone.

matures
(me TCHOOR)
Becomes fully developed.

ovum
(OH vum)
Female reproductive cell that when fertilized by the male develops into a new organism.

endometrium
(en doh MEE tree um)
Interlining of the uterus.

menstruation
(men stroo AY shun)
Cyclic deterioration of the endometrium.

Apply It

Divide into small groups. Each group will create a set of game cards that include answers to specific categories and questions (like on "Jeopardy"), such as female reproductive organs, male reproductive organs, diseases, etc. One student on each team will be the category giver and will read the category to their team. The team can answer as many questions as they can in an allotted time period (i.e., one minute). Teams will get one point for each correct answer. The team with the most points wins.

Apply It

- Divide the class into two or three teams for this activity.
- You might want to provide the categories, and allow each team to think up five or six questions for each category.
- Set up the game like the game show "Jeopardy." Students pick a category, and the other team reads one of its questions from that category. If the first team answers correctly, they continue. If not, the other team has a turn.

Teaching Tips

- Emphasize that all organisms must reproduce, or they will cease to exist.
- Explain that most animals require a male and a female to reproduce.
- Point out that, for the most part, males and females have different reproductive systems, but that they do share some common characteristics:
 - Gonads (endocrine glands): testes in males and ovaries in females
 - Tubes: passageways for the ova in females and sperm in males
 - Exocrine glands
- Describe the organs of the female reproductive system:
 - Female gonads: ovaries produce female sex cells, called ova
 - Fallopian tubes: help guide ova to uterus
 - Uterus: organ that houses and nourishes fertilized ovum
 - Vagina: muscular tube also called birth canal

Figure Focus

13.37 Where are the female sex cells (ova) produced?

Answer: In the ovaries

Teaching Tips

- Describe the organs of the male reproductive system:

- Male gonads: testes produce male sex cells, called sperm
- Penis: primary male sex organ
- Epididymis: tube where sperm are stored
- Vas deferens: passageway for sperm
- Seminal vesicles: pouches produce secretion to protect and nourish sperm
- Prostate gland: produce secretion to maintain mobility of sperm
- Ejaculatory duct: carries sperm through the prostate gland to the urethra
- Urethra: passage for urine and sperm, through the prostate gland and the penis to the outside of the body

Figure Focus

13.38 Which tube connects to the epididymis and provides a passageway for sperm?

Answer: The vas deferens

spermatozoa
(spur mat uh ZOH uh)
Male sex cells.

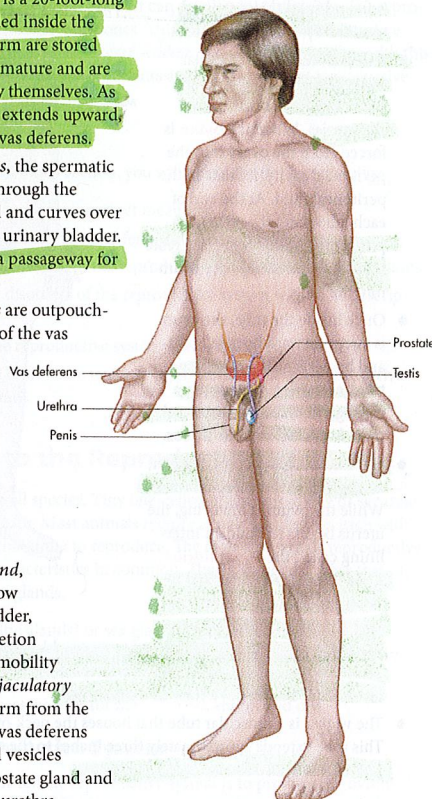
testosterone
(tess TOSS ter own)
Male hormone.

semen
(SEE mun)
Fluid from the testes, seminal vesicles, prostate gland, and bulbourethral glands. Contains water, mucin, proteins, salts, and sperm.

Figure 13.38
Which tube connects to the epididymis and provides a passageway for sperm?

The Male Reproductive System

- Male gonads or testes are found outside the body, between the legs, in a sac called the **scrotum**. The testes produce the male sex cells or **spermatozoa** (or **sperm**) and the hormone **testosterone**. The **penis** is the primary male sex organ. It lies anterior to the testes. (Figure 13.38)
- The **epididymis** is a 20-foot-long tube that is coiled inside the scrotal sac. Sperm are stored here until they mature and are able to move by themselves. As the epididymis extends upward, it becomes the vas deferens.
- The **vas deferens**, the spermatic cord, extends through the abdominal wall and curves over and behind the urinary bladder. It functions as a passageway for sperm.
- **Seminal vesicles** are outpouchings at the end of the vas deferens. They produce a thick yellow secretion that adds to the volume of **semen** and nourishes the sperm.
- The **prostate gland**, located just below the urinary bladder, produces a secretion that maintains mobility of sperm. The **ejaculatory duct** carries sperm from the junction of the vas deferens and the seminal vesicles through the prostate gland and connects to the urethra.
- The **urethra** is a small passage for urine and sperm, and leads from the urinary bladder through the prostate gland and the penis to the outside of the body.



Common Disorders of the Reproductive System

Table 13.15 Common Disorders, Symptoms, and Preventive Measures/
Treatment of the Reproductive System

Condition	Disorder	Symptoms	Preventive Measures/ Treatment
Breast cancer	Cancer of the glandular breast tissue. Fifth most common cause of cancer death worldwide. Can occur in men (but rarely) as well as women.	Breast cancer symptoms vary widely—from lumps to swelling to skin changes. Many breast cancers have no obvious symptoms at all. Symptoms that are similar to those of breast cancer may be the result of non-cancerous conditions like infection or a cyst.	Monthly self exams and annual mammograms help early detection. Biopsies are used to confirm the diagnosis. Once detected, may be treated with surgery (lumpectomy, mastectomy, and lymph node dissection), then perhaps radiation, hormonal (anti-estrogen) therapy, and/or chemotherapy.
Cryptorchidism	Means “hidden testes.” Also called undescended testes.	One or both testes fail to descend into the scrotum.	Administering hormone injections if the testicle does not descend into the scrotum by the age of one year. If this treatment is unsuccessful by the age of five years, surgery is performed to locate the testicle and place it in the scrotum or remove it.
Fibroid tumors	Common in women over the age of 50. They are usually benign.	There may be breakthrough bleeding between menstrual cycles and pressure from the tumor may cause frequent urination. There are often no symptoms.	Physician will monitor size and growth and determine if surgical removal is necessary.
Impotence (Erectile Dysfunction)	The consistent inability to obtain or maintain an erection of sufficient quality for satisfactory sexual intercourse.	Risk increases with age. Can range from a total inability to achieve an erection or ejaculation, an inconsistent ability to do so, or a tendency to sustain only brief erections.	Healthier lifestyle, healthy diet, drink less and exercise more. Oral medications are available. In severe cases, patient may consider penile injections, or implants.
Prostate cancer	Cancer that forms in tissues of the prostate; usually occurs in older men.	May have little or no symptoms in early stages. Trouble passing urine; may gradually lose control of bladder function. A weak or interrupted stream of urine, an urgency to urinate, leaking or dribbling, and more often needing to urinate during the night. Difficulty in having an erection; painful ejaculation; blood in urine or semen.	Annual physical; physical (with attention to any enlargement of prostate); DRE and PSA tests can signal problems; biopsy to confirm. Slow growing so may watch and monitor at first. Treatment may include surgery, radiation therapy, hormone therapy, chemotherapy and other emerging treatments.
Sexually transmitted diseases (STDs)	Affect both male and female. The most common sexually transmitted diseases are acquired immune deficiency syndrome (AIDS), chlamydia, gonorrhea, and syphilis (see each that follow).	Symptoms vary as noted below.	For prevention, practice abstinence or use a protective barrier such as a condom during sex, and maintain monogamous relationships with uninfected partners. Some treatment options are listed below.

monogamous

(mun OG ah mus)

Having a sexual relationship with only one partner during a period of time.

(continued)

Teaching Tips

- Compare the organs of the male and female reproductive systems:
 - Point out common characteristics.
 - Point out differences.
- Explain how common disorders of the reproductive system affect the body.
- Review the first part of Table 13.15 together.
- Pronounce the name of each condition out loud:
 - Breast cancer
 - Cryptorchidism
 - Fibroid tumors
 - Impotence (erectile dysfunction)
 - Prostate cancer
 - Sexually transmitted disease (STD)
- Ask a student to read the description of each disorder.
- Discuss the symptoms of each.

TEAMWORK

In small groups, prepare a skit demonstrating a common disorder of the reproductive system. One student should be a patient, describing symptoms to a health care worker or a team of health care workers. The health care workers should diagnose the disorder, explain it, and prescribe a treatment.

Teaching Tips

- Review the second part of Table 13.15 and the end of the table on p. 377 together.
- Pronounce the name of each condition out loud:
 - Acquired Immune deficiency syndrome (AIDS)
 - Chlamydia
 - Gonorrhea
 - Human Papilloma Virus (HPV)
 - Syphilis
 - Testicular cancer
- Ask a student to read the description of each disorder.
- Discuss the symptoms of each.
- Note that the conditions following the item Sexually transmitted diseases (STDs) are examples of specific STDs.
- Describe how the reproductive system affects the body.
- Discuss how hormones affect the body:
 - Appearance
 - Stages of life, such as puberty and menopause
 - Pregnancy
- Discuss organs that are part of different systems that might be affected by the reproductive system:
 - The urinary system
 - The endocrine system
- Remind students that preventative care is part of a healthy lifestyle. Screenings for diseases, such as breast cancer and testicular cancer, can improve the success of treatment and recovery. Discuss the procedures of a breast exam and a testicular exam.

Table 13.15 Common Disorders, Symptoms, and Preventive Measures/ Treatment of the Reproductive System (continued)

Condition	Disorder	Symptoms	Preventive Measures/ Treatment
STDs (cont)	<i>Acquired immune deficiency syndrome (AIDS):</i> AIDS is most commonly transmitted by sexual contact. It is a contagious disease that causes severe illness and often results in death. The AIDS virus enters the blood of a person from the blood or body fluids of a carrier.	Symptoms include swollen lymph glands, diarrhea, night sweats, abnormal or unusual bleeding, fungal infection of the mouth and throat, loss of memory, fatigue, extreme weight loss, and constant cough. All or some of these symptoms may be present.	Although research is making great strides toward finding a cure, there is no successful treatment that cures AIDS. There are some medications and lifestyle changes that help individuals maintain a fairly healthy state for long periods.
	<i>Chlamydia:</i> A contagious bacterium, <i>Chlamydia trachomatis</i> , that lives in the conjunctiva of the eye and in the urethra and cervix of the uterus.	Purulent discharge from the urethra in the male or the vagina in the female.	Treating with antibiotics.
	<i>Gonorrhea:</i> A contagious bacterium, <i>Neisseria gonorrhoeae</i> , that affects the genitourinary tract and occasionally the pharynx, conjunctiva, or rectum.	Urethritis, dysuria, purulent greenish-yellow urethral or vaginal discharge, red or swollen urethral meatus, itching, burning or pain around the vaginal or urethral opening.	Treating with antibiotics.
	<i>Human Papilloma Virus (HPV):</i> Transmitted through direct contact and causes genital warts and cervical cancer.	Cervical cancer symptoms include abnormal vaginal bleeding, pain in the pelvis or lower abdomen.	Vaccination is strongly recommended in addition to abstinence, decreased number of sexual partners, and protective barriers. Pap smears and pelvic exams are recommended for detection and treatment which includes cryotherapy, LEEP (Loop Electrosurgical Excision Procedure), and hysterectomies.
	<i>Syphilis:</i> Caused by a spirochete transmitted through sexual contact. It can affect any organ or system of the body. The spirochete is able to pass through the human placenta causing congenital syphilis in a newborn infant.	First stage—small, painless red pustule on the skin or mucous membrane (is contagious). Second stage—approximately two months later, generalized malaise, anorexia, nausea, fever, headache, loss of hair, bone and joint pain, skin rash that does not itch, sores in the mouth (remains contagious). Third stage—may not develop for many years. Appearance of soft, rubbery tumors that may cause a deep burrowing pain. Tumors may appear in any organ or system in the body.	Treating with antibiotics.

(continued)

ACTIVITY

Use models in a lab to have students perform a testicular exam and a breast exam.