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  - Reflect
  - Recite
  - Review
Which of the following statements are the truth, and which are fiction? Look for the Truth-or-Fiction icons on the pages that follow to find the answers.

1. Women, but not men, have a sex organ whose only known function is the experiencing of sexual pleasure.  
   **T F**

2. Women urinate and engage in sexual intercourse through the same bodily opening.  
   **T F**

3. One may determine whether or not a woman is a virgin by examining her hymen.  
   **T F**

4. Women with larger breasts produce more milk while nursing.  
   **T F**

5. Women who have had abortions are at greater risk of breast cancer.  
   **T F**

6. The American Cancer Society recommends that women engage in a breast self-examination once a month.  
   **T F**

7. The ancient Romans believed that menstrual blood soured wine and killed crops.  
   **T F**

8. Sex during menstruation is harmful.  
   **T F**

9. At menopause, women experience debilitating hot flashes.  
   **T F**

10. Menopause signals an end to women’s sexual appetite.  
    **T F**
Despite hundreds of years of tradition, Hajia Zuwera Kassindja would not let it happen to her 17-year-old daughter, Fauziya. Hajia’s own sister had died from it. So Hajia gave her daughter her inheritance from her deceased husband, amounting to only $3,500, which left Hajia a pauper. Fauziya used the money to buy a phony passport and flee to the United States from the African country of Togo.

On arrival in the United States, Fauziya requested asylum from persecution. However, she was imprisoned for more than a year due to her illegal entry into the country. But the Board of Immigration Appeals finally agreed that Fauziya was fleeing persecution, and she was allowed to remain in the United States.

From what had Hajia’s sister died? From what was Fauziya escaping? Clitoridectomy, a form of female genital mutilation practiced in her home country. Some cultures in Africa and the Middle East ritually mutilate the female genitals, removing the clitoris and surrounding genital structures. Clitoridectomy—cutting out the clitoris—is a rite of initiation into womanhood in many Islamic cultures (Jaeger et al., 2009). It is often performed as a puberty ritual in late childhood or early adolescence (not within a few days of birth, like male circumcision). In modern-day Egypt, the vast majority of female adolescents, aged 10 to 19, have the clitoris removed (El-Gibaly et al., 2002; Jaeger et al., 2009).

The clitoris gives rise to feelings of sexual pleasure in women. Its destruction is an attempt to ensure the girl’s chastity, because it is assumed that uncircumcised girls are consumed with sexual desires.

The French have a saying, “Vive la différence!” (“Long live the difference!”). The well-known saying is a celebration of the differences between men and women. Given their possession of a clitoris, some might assert that women in particular have much to celebrate.

Truth or Fiction Revisited: The historic view of women as unresponsive to sexual stimulation is ironic because only women possess a sex organ—the clitoris—that is solely devoted to pleasurable sensations. The clitoris is the woman’s most erotically charged organ; women most often masturbate through clitoral stimulation, not vaginal insertion.

This chapter explores women’s sexual anatomy and physiology. We will tour and study the female sex organs. Even generally sophisticated students may fill in some gaps in their knowledge. For example, most of you know what a vagina is, but how many of you realized that only the female has an organ that is exclusively dedicated to pleasure? Or that a woman’s passing of urine does not involve the vagina?

Chapter 4 describes the sexual anatomy and physiology of men. Despite the obvious differences, we will see that there may be more similarities in the sex organs than you would imagine. In Chapter 5 we discuss similarities and differences between men and women in intellectual functioning, personality, and behavior. Once more we will see that women and men may be more alike than you had anticipated.
As women readers encounter the features of their sexual anatomy in their reading, they may wish to examine their own genitals with a mirror. By following the text and the illustrations, students may discover some new anatomic features. They will see that their genitals can resemble those in the illustrations yet also be unique.

**External Sex Organs**

_When I was six years old I climbed up on the bathroom sink and looked at myself naked in the mirror. All of a sudden I realized I had three different holes. I was very excited about my discovery and ran down to the dinner table and announced it to everyone. “I have three holes!” Silence. “What are they for?” I asked. Silence even heavier than before. I sensed how uncomfortable everyone was and answered for myself. “I guess one is for pee-pee, the other for doo-doo and the third for ca-ca.” A sigh of relief; no one had to answer my question. But I got the message—I wasn’t supposed to ask “such” questions, though I didn’t fully realize what “such” was about at that time._

—Boston Women’s Health Book Collective (2005)

**Talking about one’s sexual anatomy**, as this 6-year-old discovered, is often met with prejudice and misunderstanding. The derivation of the word _pudenda_, which refers to the external female genitals, speaks volumes about sexism in the ancient Mediterranean world.

Even today, this cultural heritage may lead women to develop negative attitudes toward their genitals. Girls and boys are both sometimes reared to regard their genitals with shame or disgust. Both may be reprimanded for expressing normal curiosity about them. They may be reared with a “hands-off” attitude, to keep their “private parts” private, even from themselves. This is unfortunate, because knowledge of one’s sexual anatomy contributes both to sexual health and pleasure.

Taken collectively, the external sexual structures of the female are termed the _pudendum_, or the vulva. _Vulva_ is a Latin word that means “wrapper” or “covering.” The vulva consists of the _mons veneris_, the _labia majora_ and _minora_ (major and minor lips), the _clitoris_, and the vaginal opening (see Figure 3.1). Figure 3.2 shows variations in the appearance of women’s genitals.

**The Mons Veneris**

The _mons veneris_ consists of fatty tissue that covers the joint of the pubic bones in front of the body, below the abdomen and above the clitoris. At puberty, the mons becomes covered with pubic hair that may be thick and curly but varies from person to person in waviness, texture, and color. The pubic hair captures the chemical secretions that exude from the vagina during sexual arousal. Their scent may allure lovers. The mons cushions a woman’s body during sexual intercourse, protecting her and her partner from the pressure against the pubic bone that stems from thrusting. There is an ample supply of nerve endings in the mons, so that caresses can produce pleasurable sensations.
The Labia Majora
The labia majora are large folds of skin that run downward from the mons along the sides of the vulva. In some women, the labia majora are thick and bulging. In others, they are thinner, flatter, and less noticeable. When close together, they hide the labia minora and the urethral and vaginal openings. The outer surfaces of the labia majora, by the thighs, are covered with pubic hair and darker skin than that found on the thighs or labia minora. The inner surfaces of the labia majora are hairless and lighter in color. They are amply supplied with nerve endings that respond to stimulation and can produce sexual pleasure. The labia majora also shield the inner female genitals.

The Labia Minora
The labia minora are hairless, light-colored membranes, located between the major lips. They surround the urethral and vaginal openings. The outer surfaces of the labia minora merge with the major lips. At the top they join at the prepuce (hood) of the
clitoris. The labia minora differ in appearance from woman to woman. The labia minora of some women form protruding flower shapes that are valued greatly in some cultures, such as that of the Hottentots of Africa. (Hottentot women purposely elongate their labia minora by tugging at them.) Rich in blood vessels and nerve endings, the labia minora are highly sensitive to sexual stimulation. When stimulated, they darken and swell, engorging with blood.

The Clitoris

What’s the matter, papa? please don’t stall.
Don’t you know I love it and want it all?
I’m wild about that thing. Just give my bell a ring.
You pressed my button. I’m wild about that thing.

—“I’m Wild about That Thing,” recorded by Bessie Smith, 1929

Worldwide, the clitoris is known by many names, from bijou (French for “jewel”) to pokhotnik (Russian for “lust”). The Tuamotuan people of Polynesia have ten words for it, emblematic of their interest in female sexuality.

The word clitoris derives from the Greek word kleitoris, meaning “hill” or “slope.” It receives its name from the manner in which it slopes upward in the shaft and forms a mound of spongy tissue at the glans (see Figure 3.1). The body of the clitoris—the clitoral shaft—is about 1 inch long and ¼ inch wide. The shaft consists of erectile tissue that contains two spongy masses called corpora cavernosa (“cavernous bodies”) that fill with blood (become engorged) and become erect in response to sexual stimulation. The stiffening of the clitoris is less apparent than the erection of the penis, because the clitoris does not swing free from the body. The prepuce (meaning “before a swelling”), or hood, covers the clitoral shaft. It is a sheath of skin formed by the upper part of the labia minora. The clitoral glans is a smooth, round knob or lump of tissue above the urethral opening. The glans is revealed by gently separating the labia minora and retracting the hood. It is highly sensitive to touch because of the rich supply of nerve endings.

The size of the clitoris varies from woman to woman. Because the clitoral glans is highly sensitive to touch, women usually prefer to be stroked or stimulated on the mons, or on the clitoral hood, rather than directly on the glans.

In some respects, the clitoris is the female counterpart of the penis. Both organs—clitoris and penis—develop from the same embryonic tissue, which makes them similar in structure, or homologous (see Chapter 4). They are not fully similar in function, or analogous, however. Both organs receive and transmit sexual sensations, but the penis is directly involved in reproduction and excretion by serving as a conduit for sperm and urine, respectively.

Cutting out the clitoral hood—clitoridectomy—is common among Muslims in the Near East and Africa. As we see in “A World of Diversity” on page 64, it is a “rite of passage” to womanhood that leaves scars—physical and emotional.

The Vestibule

The word vestibule, which means “entranceway,” refers to the area within the labia minora that contains the openings to the vagina and the urethra. The vestibule is richly supplied with nerve endings and is very sensitive to tactile or other sexual stimulation.
Female Genital Mutilation

Dateline, Kafr al Manshi Abou Hamar, Egypt—The men in this poor farming community were seething. A 13-year-old girl was brought to a doctor’s office to have her clitoris removed, a surgery considered necessary here to preserve chastity and honor. The girl died, but that was not the source of the outrage. After her death, the government shut down the clinic, and that got everyone stirred up.

—Slackman (2007)

Approximately 130 million women and girls have undergone genital mutilation. Feminists note that female genital mutilation is an attempt by patriarchal societies to control the bodies and behavior of women (www.feminist.com, 2006). In terms of their own perceptions, some groups in Egypt and in the Sudan simply perform clitoridectomies because it is a social custom that has been unchallenged in their own experience (Missalidis & Gebre-Medhin, 2000). Because women tend to adopt the values of the larger cultures in which they dwell, female genital mutilation is usually carried out by women who have undergone the process themselves (Nour, 2000). Some perceive it as part of their submission to Islam. However, there is no support for it in the Koran—the Islamic bible (Nour, 2000).

The typical young woman in this culture—like the typical woman in most patriarchal cultures—does not grasp that she is a victim (www.feminist.com, 2006). She assumes that clitoridectomy is part of being female. As one young woman told gynecologist Nawal M. Nour (2000), the clitoridectomy hurt but was a good thing, because now she was a woman.

What effects does “circumcision” have on women? A study of 250 female patients from the Maternal and Childhood Centers of Ismailia, Egypt, found that those who were circumcised were 80% more likely to complain of painful menstruation, 49% more likely to complain of vaginal dryness during intercourse, 45% more likely to lack sexual desire, 49% less likely to be pleased by sex, and 61% more likely to have difficulty reaching orgasm (El-Defrawi et al., 2001). Medical complications include infections, bleeding, tissue scarring, painful menstruation, and obstructed labor.

A more radical form of clitoridectomy, called excision, is practiced widely in the Sudan, Ethiopia, and some other African nations (Eltahawy, 2003). Excision is removal of the clitoris along with the labia minora and labia majora. Only a tiny opening is left to allow passage of urine and menstrual discharge. The sewing together of the vulva is intended to ensure chastity until marriage. Medical complications, including menstrual and urinary problems, are common; even deaths have occurred. After marriage, the opening is enlarged to permit intercourse. Hemorrhaging and tearing of surrounding tissues are common. Some African countries, including Egypt and Kenya, have outlawed clitoridectomies, although such laws often go unenforced.

More than 100 million women in Africa and the Middle East have undergone excision. Clitoridectomies remain routine, even universal, in nearly 30 countries in Africa, in many countries in the Middle East, and in parts of Malaysia, Yemen, Oman, Indonesia, and the India–Pakistan subcontinent. Thousands of African immigrant girls living in European countries and the United States have also been mutilated (Nour, 2000).

Do not confuse male circumcision with the maiming inflicted on girls in the name of circumcision. Nour (2000) depicts the male equivalent of female genital mutilation as cutting off the penis. The Pulitzer Prize–winning, African American novelist Alice Walker drew attention to the practice in her best-selling novel Possessing the Secret of Joy and called for its abolition in her book and film Warrior Marks.

The United States has outlawed ritual genital mutilation within its borders and directed American representatives to world financial institutions to deny aid to countries that have not established educational programs to bring an end to the practice. Yet, calls from Westerners to ban the practice have sparked arguments that people in one culture cannot dictate the cultural traditions of another. For Alice Walker, however, “Torture is not culture.” As the debate continues, some 2 million African girls are mutilated each year.

The Urethral Opening

Urine passes from the female’s body through the urethral opening (see Figure 3.1 on page 61), which is connected by a short tube (the urethra) to the bladder (see Figure 3.3). The urethral opening lies below the clitoral glans and above the vaginal opening. The urethral opening, urethra, and bladder are unrelated to the reproductive system.
**Truth or Fiction Revisited:** Many males (and even some females) believe erroneously that, for women, urination and coitus occur through the same bodily opening. The confusion may arise from the fact that urine and semen both pass through the penis of the male or because the urethral opening lies near the vaginal opening.

The proximity of the urethral opening to the external sex organs can pose hygienic problems for sexually active women (Sheffield & Cunningham, 2005). The urinary tract, which includes the urethra, bladder, and kidneys, may become infected by bacteria from the vagina or rectum. Disease organisms may pass from the partner’s sex organs or hands to the urethral opening during sexual activity. Anal intercourse followed by vaginal intercourse may transfer disease organisms from the rectum to the bladder. For similar reasons, women should first wipe the vulva, then the anus, when using the toilet.

**Cystitis** is a bladder inflammation that may stem from any of these sources. Its symptoms include burning and frequent urination (also called urinary urgency). Pus or a bloody discharge is common, and there may be discomfort above the pubic bone. These symptoms may disappear after several days, but consultation with a gynecologist is recommended because untreated cystitis can lead to kidney infections. “Honeymoon cystitis” is caused by the tugging on the bladder and urethral wall that occurs during vaginal intercourse. It may occur when beginning coital activity (although not necessarily on one’s honeymoon) or when resuming coital activity after lengthy abstinence. Figure 3.3 shows the close proximity of the urethra and vagina.

A few precautions may help women prevent serious inflammation of the bladder:

- Drinking two quarts of water a day to flush the bladder.
- Drinking orange or cranberry juice to maintain an acid environment that discourages growth of infectious organisms.
- Decreasing use of alcohol and caffeine (from coffee, tea, or cola drinks) that may irritate the bladder.
- Washing the hands prior to masturbation or self-examination.
- Washing one’s partner’s and one’s own genitals before and after intercourse.
- Preventing objects that have touched the anus (fingers, penis, toilet tissue) from subsequently coming into contact with the vulva.
- Urinating soon after intercourse to help wash away bacteria.

**The Vaginal Opening**

When I was five or six, my mother told me about sex. I remember that I was confused about what my mother said, because somehow I couldn’t conceptualize what the female vagina looked like. I was curious to see an actual vagina and not just how it looked diagramed in a book. (Morrison et al., 1980, p. 35)

One does not see an entire vagina, but rather the vaginal opening, or introitus, when one parts the labia minora. The

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**Figure 3.3** The Female Reproductive System.

This cross-section locates many of the internal sex organs that compose the female reproductive system. Note that the uterus is normally tipped forward.
introitrus lies below and is larger than the urethral opening. Its shape resembles that of the hymen.

The hymen is a fold of tissue across the vaginal opening that is usually present at birth and may remain at least partly intact until a woman engages in coitus. For this reason the hymen has been called the “maidenhead.” Its presence has been taken as proof of virginity, and its absence as evidence of coitus. However, some women are born with incomplete hymens, and other women’s hymens are torn accidentally, such as during horseback riding, strenuous exercise or gymnastics, or even when bicycling. A punctured hymen is therefore poor evidence of coital experience. A flexible hymen may also withstand many coital experiences, so its presence does not guarantee virginity. Nevertheless, many Muslim women in Europe are having hymenoplasty prior to marriage—an operation that restores the hymen to provide the illusion of virginity on their wedding night (Sciolino & Mekhennet, 2008). One woman having the operation remarked, “In my culture, not to be a virgin is to be dirt. Right now, virginity is more important to me than life” (cited in Sciolino & Mekhennet, 2008).

Truth or Fiction Revisited: Contrary to myth, it is not true that one may determine whether or not a woman is a virgin by examination of the hymen. Some people believe incorrectly that virgins cannot insert tampons or fingers into their vaginas, but most hymens will accommodate these intrusions without great difficulty.

Figure 3.4 illustrates various vaginal openings. The first three show common shapes of hymens among women who have not had coitus. The fifth drawing shows a parous (“passed through”) vaginal opening, typical of a woman who has delivered a baby. Now and then the hymen consists of tough fibrous tissue and is closed, or imperforate, as in the fourth drawing. An imperforate hymen may not be discovered until after puberty, when menstrual discharges begin to accumulate in the vagina. In these rare cases, a surgical incision will perforate the hymen. A woman may also have a physician surgically perforate her hymen if she would rather forgo the tearing and discomfort that may accompany her initial coital experiences. A woman may also stretch the vaginal opening over several days in preparation for intercourse by inserting a finger and gently pressing downward toward the anus. After several repetitions, she may insert two fingers and repeat the process, spreading the fingers slightly after insertion.

The hymen is found only in female horses and humans. It is not present in animal species closest to humans on the evolutionary scale, such as chimps and gorillas. The hymen remains something of a biological mystery, because it serves no apparent biological function.
The Perineum

The perineum incorporates the skin and underlying tissue between the vaginal opening and the anus. The perineum is rich in nerve endings. Stimulation of the area may heighten sexual arousal. Many physicians make a routine perineal incision during labor, called an episiotomy, to facilitate childbirth.

Structures That Underlie the External Sex Organs

Figure 3.5 shows what lies beneath the skin of the vulva. The vestibular bulbs and Bartholin’s glands are active during sexual arousal and are found on both sides (shown on the right in Figure 3.5). Muscular rings (sphincters) that constrict bodily openings such as the vaginal and anal openings are also found on both sides.

The clitoral crura are wing-shaped, leglike structures that attach the clitoris to the pubic bone beneath. The crura contain corpora cavernosa, which engorge with blood and stiffen during sexual arousal.

The vestibular bulbs are attached to the clitoris at the top and extend downward along the sides of the vaginal opening. Blood congests them during sexual arousal, swelling the vulva and lengthening the vagina. This swelling contributes to coital sensations for both partners.

Bartholin’s glands lie just inside the minor lips on each side of the vaginal opening. They secrete a couple of drops of lubrication just before orgasm. This lubrication is not essential for coitus. In fact, the fluid produced by the Bartholin’s glands has no known purpose. If the glands become infected and clogged, however, a woman may notice swelling and local irritation. It is wise to consult a gynecologist if these symptoms do not fade within a few days.

It was once believed that the source of the vaginal lubrication or “wetness” that women experience during sexual arousal was produced by the Bartholin’s glands. It is now known that engorgement of vaginal tissues during sexual excitement results in a form of “sweating” by the lining of the vaginal wall. During sexual arousal, the pressure from this engorgement causes moisture from the many small blood vessels that lie in the vaginal wall to be forced out and to pass through the vaginal lining, forming the basis of the lubrication. In less than 10 to 30 seconds, beads of vaginal lubrication or “sweat” appear along the interior lining of the vagina in response to sexual stimulation, in much the same way that rising temperatures cause water to pass through the skin as perspiration.
Pelvic floor muscles permit women to constrict the vaginal and anal openings. They contract automatically, or involuntarily, during orgasm, and their tone may contribute to coital sensations.

Internal Sex Organs

THE INTERNAL SEX ORGANS OF THE FEMALE include the innermost parts of the vagina, the cervix, the uterus, and two ovaries, each connected to the uterus by a fallopian tube (see Figures 3.3 and 3.6). These structures comprise the female reproductive system.

The Vagina

The vagina extends back and upward from the vaginal opening (see Figure 3.3). It is usually 3 to 5 inches long at rest. Menstrual flow and babies pass from the uterus to the outer world through the vagina. During coitus, the penis is contained within the vagina.

The vagina is commonly pictured as a canal or barrel; but, when at rest, it is collapsed, like the inner tube of a bicycle tire. When in a relaxed state, the walls of the vagina touch. The vagina expands in length and width during sexual arousal. The vagina can also expand to allow insertion of a tampon, as well as the passage of a baby’s head and shoulders during childbirth.

The vaginal walls have three layers. The inner lining, or vaginal mucosa, is made visible by opening the labia minora. It is a mucous membrane similar to the skin that lines the inside of the mouth. It feels fleshy, soft, and corrugated. It may vary from very dry (especially if the female is anxious about something like examinations) to very wet. The middle layer of the vaginal wall is muscular. The outer or deeper layer is a fibrous covering that connects the vagina to other pelvic structures.

The vaginal walls are rich with blood vessels but poorly supplied with nerve endings. Unlike the sensitive outer third of the vaginal barrel, the inner two-thirds are so insensitive to touch that minor surgery may sometimes be performed on those portions without anesthesia. The entire vaginal barrel is sensitive to pressure, however, which can be experienced as pleasurable.

The vaginal walls secrete substances that help maintain the vagina’s normal acidity (pH 4.0 to 5.0). Normally they taste salty, but their odor and taste may vary during the menstrual cycle. The secretions may contain substances that act as sexual attractants. Women who frequently douche or use feminine deodorant sprays may remove or mask substances that arouse sex partners. Douching or spraying may also alter the natural chemical balance of the vagina, which can increase the risk of infections. Feminine deodorant sprays can also irritate the vagina and evoke allergic reactions. The normal, healthy vagina cleanses itself through regular chemical secretions that are evidenced by a mild white or yellowish discharge.

Vaginitis refers to any vaginal inflammation, whether it is caused by an infection, birth-control pills, antibiotics that alter natural body chemistry, an allergic reaction, chemical
irritation, or lowered resistance, as may be caused by fatigue or poor diet. Changes in body chemistry or lowered resistance permit microscopic organisms normally found in the vagina to multiply to infectious levels. Vaginitis may be recognized by abnormal discharge, itching, burning of the vulva, and urinary urgency. Women with vaginitis are advised to seek medical attention, but let us note some suggestions that may help prevent vaginitis:

- Wash your vulva and anus regularly with mild soap. Pat dry (taking care not to touch the vulva after dabbing the anus).
- Wear cotton panties. Nylon underwear retains heat and moisture that cause harmful bacteria to flourish.
- Avoid pants that are tight in the crotch.
- Be certain that sex partners are well-washed. Condoms may also reduce the spread of infections from one’s sex partner.
- Use a sterile, water-soluble jelly such as K-Y jelly if artificial lubrication is needed for intercourse. Do not use Vaseline. Birth-control jellies can also be used for lubrication.
- Avoid intercourse that is painful or abrasive to the vagina.
- Avoid diets high in sugar and refined carbohydrates; they alter the normal acidity of the vagina.
- Women who are prone to vaginal infections may find it helpful to douche occasionally with plain water, a solution of 1 or 2 tablespoons of vinegar in a quart of warm water, or a solution of baking soda and water. Douches consisting of unpasteurized, plain (unflavored) yogurt may help replenish the “good” bacteria that are normally found in the vagina and that may be destroyed by use of antibiotics. Be careful when douching, and do not douche when pregnant or when you suspect you may be pregnant. Consult your physician before deciding to douche or to apply any preparations to the vagina.
- Watch your general health. Eating poorly or getting insufficient rest will reduce your resistance to infection.

Real Students, Real Questions

Q I feel like I have an unpleasant odor from my vagina. Should I douche?

A Most health-care providers will recommend regular superficial washing, as when taking a shower, and then, if the issue remains in your mind, talking to your gynecologist about it. An unpleasant odor can be a sign of a health problem. If you’re 18 or younger and sexually active, you need to have a gynecologist and to see her (or him) regularly. Some vaginal odor is normal. If you are attending to your personal hygiene and are not diagnosed with a health problem, a partner is as likely—or more likely—to find normal vaginal odors attractive rather than repulsive.
The G Spot and Female Ejaculation: Sexual Realities or Gynecological Myths?

The Grafenberg spot, or G spot, is theorized to be a part of the vagina—a bean-shaped area in the anterior (front) wall that may have special erotic significance. The G spot is believed to lie about 1 to 2 inches from the vaginal entrance and to consist of a soft mass of tissue that swells from the size of a dime to a half dollar when stimulated (see Figure 3.7). The name derives from the gynecologist Ernest Grafenberg, who first suggested the possible erotic import of the area. The spot can be directly stimulated by the woman’s or her partner’s fingers or by penile thrusting in the rear entry or the female-superior positions. Some researchers suggest that stimulation of the spot produces intense erotic sensations and that, with prolonged stimulation, a distinct form of orgasm that is characterized by intense pleasure and, in some cases, a biological event formerly thought to be exclusively male: ejaculation (Geddes, 2008; Jannini et al., 2008). These claims have been steeped in controversy.

In a laboratory experiment, Zaviacic and his colleagues (1988a, 1988b) found evidence of an ejaculate in 10 of 27 women studied. Some researchers believe that this fluid is urine that some women release involuntarily during orgasm. Others believe that it differs from urine (Zaviacic & Whipple, 1993). The nature of this fluid and its source remain unclear, but Zaviacic and Whipple (1993) suggest that it may represent a fluid that is released during sex by a “female prostate,” a system of ducts and glands called Skene’s glands, in much the same way that semen is released by the prostate gland in men. Zaviacic and Whipple suggest that “many women who felt that they may be urinating during sex . . . [may be helped by] the knowledge that the fluid they expel may be different from urine and a normal phenomenon that occurs during sexual response” (1993, p. 149). Some women, however, may expel urine during sex, perhaps because of urinary stress incontinence (Zaviacic & Whipple, 1993). Zaviacic and Whipple also suggest that stimulation of the G spot may cause some women to ejaculate but not others.

Even supporters of the existence of the G spot admit that it is difficult to locate because it is not apparent to the eye or touch (Geddes, 2008; Jannini et al., 2008). Terence Hines (2001) summarizes criticisms of the research on the G spot by noting that it is based on anecdotes and case studies with small numbers of subjects. Hines characterizes the evidence for the existence of the G spot as weak and unsupported by more rigorous anatomic and biochemical research. He dubs the G spot a “modern gynecological myth.”

Contemporary sexologists seem to agree on a number of points concerning the G spot and “female ejaculation.” One is that most or even all of the anterior wall of the vagina, not just one area, is richly supplied with nerve endings and may be sensitive to erotic stimulation (Jannini et al., 2008; Levin 2003a). However, it has not been adequately demonstrated that any particular zone of the anterior wall functions as a discrete sex organ; the area or areas that are exquisitely sensitive may vary from woman to woman (Maaita et al., 2002). Second, many females may exude a fluid through the urethra at about the time of orgasm. However, it is not clear what such fluid might be, and even less clear that it might correspond in some way to male ejaculation (Alzate & Hoch, 1986; Hines, 2001). Third, many sexologists wonder why other sexologists are so “sensitive” about this issue and why it has become so politicized (Alzate & Hoch, 1986).

**CRITICAL THINKING**

Some observers of the research on human sexuality suggest that the arguments over the existence of the G spot and female ejaculation have political as well as scientific implications. How do you think that the debates might relate to larger issues concerning female sexuality and male sexuality—namely, as to whether females or males are sexually superior, or more sexually active, or more sexually responsive? Explain.
The Cervix

When someone first said to me two years ago, “You can feel the end of your own cervix with your finger,” I was interested but flustered. I had hardly ever put my finger in my vagina at all, and felt squeamish about touching myself there, in that place “reserved” for lovers and doctors. It took me two months to get up nerve to try it, and then one afternoon, pretty nervously, I squatted down in the bathroom and put my finger in deep, back into my vagina. There it was, feeling slippery and rounded, with an indentation at the center through which, I realized, my menstrual flow came. It was both very exciting and beautifully ordinary at the same time. Last week I bought a plastic speculum so I can look at my cervix. Will it take as long this time?

—Boston Women’s Health Book Collective (2005)

The cervix is the lower end of the uterus. Its walls, like those of the vagina, produce secretions that contribute to the chemical balance of the vagina (Levin, 2005b). The opening in the middle of the cervix, or os, is normally about the width of a straw, although it expands to permit passage of a baby from the uterus to the vagina during childbirth. Sperm pass from the vagina to the uterus through the cervical canal.

CERVICAL CANCER Cervical cancer is relatively uncommon in the United States, although there are about 11,270 new cases a year as well as 4,070 deaths (American Cancer Society, 2009). The primary cause of cervical cancer is infection with the human papilloma virus (HPV; see Chapter 16). A vaccine has been developed that makes most women immune to the form of HPV connected with cancer. The woman is best vaccinated before she becomes sexually active and may be exposed to the virus (American Cancer Society, 2009). Cervical cancer is more common among women who have had many sex partners, became sexually active at a relatively early age, and smoke (Duggirala et al., 2003). The mortality rate is higher for African American women than for European American women, at least in part because it tends to be diagnosed later in African Americans (American Cancer Society, 2009).

A Pap test examines a sample of cervical cells that are smeared on a slide to screen for cervical cancer and other abnormalities. The American Cancer Society (2009) recommends annual Pap tests along with a pelvic examination for women who are, or have been, sexually active or who have reached age 18. Most cases of cervical cancer can be successfully treated by surgery and radiotherapy if they are detected early. For women diagnosed with localized cancer, the survival rate is nearly 100% (American Cancer Society, 2009). Cervical cancer can also be prevented by removal or destruction of precancerous tissue. The overall five-year survival rate is about 70%.

The Uterus

The uterus, or womb (see Figures 3.3 and 3.6), is the organ in which a fertilized ovum implants and develops until birth. The uterus usually slants forward (is antverted), although about 10% of women have uteruses that tip backward (are retroverted). In most instances a retroverted uterus causes no problems but some women with one find female–male coitus in certain positions painful. A retroverted uterus normally tips forward during pregnancy. The uterus is suspended in the pelvis by flexible ligaments. In a woman who has not given birth, it is about 3 inches long, 3 inches wide,
and 1 inch thick near the top. The uterus expands to house a fetus during pregnancy and shrinks after pregnancy, although not to its original size.

The uppermost part of the uterus is called the **fundus** (see Figure 3.6). The uterus is shaped like an inverted pear. If a ceramic model of a uterus were placed on a table, it would balance on the fundus. The central region of the uterus is called the **body**. The narrow lower region is the **cervix**, which leads downward to the vagina.

Like the vagina, the uterus has three layers (also shown in Figure 3.6). The innermost layer, or **endometrium**, is richly supplied with blood vessels and glands. Its structure varies according to a woman’s age and phase of the menstrual cycle. Endometrial tissue is discharged through the cervix and vagina at menstruation. In some women, endometrial tissue may also grow in the abdominal cavity or elsewhere in the reproductive system. This condition is called **endometriosis**, and the most common symptom is menstrual pain. If untreated, it may lead to infertility.

**ENDOMETRIAL CANCER** Cancer of the endometrial lining is called *endometrial cancer*. There are about 42,160 new cases each year and 7,780 deaths (American Cancer Society, 2009). Risk factors for endometrial cancer include high exposure to estrogen as from early menarche, late menopause, or estrogen replacement therapy. For women who obtain hormone replacement therapy (HRT), combining estrogen with progestin lessens the risk of endometrial cancer. Not having children places the woman at risk, whereas pregnancy and hormonal contraceptives appear to lessen the risk. Endometrial cancer is symptomized by abnormal uterine staining or bleeding, especially after menopause. The most common treatment is surgery (American Cancer Society, 2009). The five-year survival rate for endometrial cancer is up to 92% if it is discovered early and limited to the endometrium. (Endometrial cancer is usually diagnosed early because women tend to report post-menopausal bleeding to their doctors quickly.) The survival rate drops when the cancer invades surrounding tissues or metastasizes.

The second layer of the uterus, the **myometrium**, is well muscled. It endows the uterus with flexibility and strength and creates the powerful contractions that propel a fetus outward during labor. The third or outermost layer, the **perimetrium**, provides an external cover.

**The Fallopian Tubes**

The **fallopian tubes** are about 4 inches in length and extend from the upper end of the uterus toward the ovaries (see Figure 3.6). The part of each tube nearest the uterus is the **isthmus**, which broadens into the **ampulla** as it approaches the ovary. The outer part, or **infundibulum**, has fringelike projections called **fimbriae** that extend toward, but are not attached to, the ovary. Ova pass through the fallopian tubes on their way to the uterus. The fallopian tubes are not just passageways. They help nourish and conduct ova. The tubes are lined with tiny hairlike projections termed **cilia** (“lashes”) that help propel ova through the tube at about 1 inch per day. Because ova must be fertilized within a day or two after they are released from the ovaries, fertilization usually occurs in the infundibulum within a couple of inches of the ovaries. The form of sterilization called **tubal ligation** ties off the fallopian tubes, so that ova cannot pass through them or become fertilized.

In an **ectopic pregnancy**, the fertilized ovum implants outside the uterus, most often in the fallopian tube where fertilization occurred. Ectopic pregnancies can eventually burst fallopian tubes, causing hemorrhaging and death, and so such pregnancies are terminated before the tube ruptures. Ectopic pregnancies are not easily
recognized, however, because their symptoms—missed menstrual period, abdominal pain, irregular bleeding—suggest many conditions. Any of these symptoms is an excellent reason for consulting a gynecologist. Women who are of advanced age, who have had pelvic inflammatory disease (PID), who have undergone tubal surgery, or who have used intrauterine devices (IUDs) are at increased risk of developing ectopic pregnancies (Boston Women’s Health Book Collective, 2005).

The Ovaries

The two ovaries are almond-shaped organs that are each about 1½ inches long. They lie on either side of the uterus, to which they are attached by ovarian ligaments. The ovaries produce ova (egg cells) and the female sex hormones estrogen and progesterone. Estrogen is a generic term for several hormones (such as estradiol, estriol, and estrone) that promote the changes of puberty and regulate the menstrual cycle. Estrogen also helps older women maintain cognitive functioning and feelings of psychological well-being (Ross et al., 2000). Progesterone also has multiple functions, including regulating the menstrual cycle and preparing the uterus for pregnancy by stimulating the development of the endometrium (uterine lining). Estrogen and progesterone levels vary with the phases of the menstrual cycle.

The human female is born with all the ova she will ever have (about 2 million), but they are immature in form. Of these, about 400,000 survive into puberty, each of which is contained in the ovary within a thin capsule, or follicle. During a woman’s reproductive years, from puberty to menopause, only 400 or so ripened ova, typically 1 per month, will be released by their follicles for possible fertilization. How these ova are selected remains a mystery.

OVARIAN CANCER Each year some 21,550 women in the United States are diagnosed with ovarian cancer, and about 14,600 die from it (American Cancer Society, 2009). Ovarian cancer most often strikes women between the ages of 40 and 70 and ranks as the fourth leading cancer killer of women, behind lung cancer, breast cancer, and colon cancer. Women most at risk are those with blood relatives who had ovarian cancer or breast cancer, especially a first-degree relative (mother, sister, or daughter). Other risk factors are high body weight and never having given birth.

Early detection is the key to fighting ovarian cancer. When it is detected before spreading beyond the ovary, 94% of victims survive. However, the overall five-year survival rate is about 44% (American Cancer Society, 2009). Unfortunately, ovarian cancer is often “silent” in the early stages, showing no obvious signs or symptoms. The most common sign is enlargement of the abdomen, which is caused by the accumulation of fluid. Periodic, complete pelvic examinations are important. The Pap test, which is useful in detecting cervical cancer, does not reveal ovarian cancer. The American Cancer Society (2009) advises women over the age of 40 to have a cancer-related checkup every year.

Surgery, radiation, and drug therapy are treatment options. Surgery usually includes the removal of one or both ovaries, the uterus, and the fallopian tubes.

HYSTERECTOMY One woman in three in the United States has a hysterectomy by the age of 60. Most women who obtain them do so between the ages of 35 and 45. The hysterectomy is the second most commonly performed operation on women in the United States. (Cesarean sections are the most common.) A hysterectomy may be performed when a woman develops cancer of the uterus, ovaries, or cervix, or another disease that causes pain or excessive uterine bleeding. A complete hysterectomy
is the surgical removal of the ovaries, fallopian tubes, cervix, and uterus. It is usually performed to reduce the risk of cancer spreading throughout the reproductive system. A **partial hysterectomy** is the removal of the uterus, but the ovaries and fallopian tubes are spared; thus, the woman continues to ovulate and produce adequate quantities of female sex hormones. The hysterectomy can relieve symptoms associated with various gynecological disorders and improve the quality of life for many women (Kjerulff et al., 2000). However, many gynecologists believe that hysterectomies are recommended too often, before proper diagnostic steps are taken or when less radical interventions might alleviate the problem (Broder et al., 2000). We strongly suggest that women whose physicians advise a hysterectomy seek a second opinion before proceeding.

### The Pelvic Examination

Women are advised to have an internal (pelvic) examination at least once a year by the time they reach their late teens (or earlier if they become sexually active) and twice yearly if they are over age 35 or use birth-control pills. The physician (usually a gynecologist) first examines the woman externally for irritations, swellings, abnormal vaginal discharges, and clitoral adhesions. The physician normally inserts a speculum to help inspect the cervix and vaginal walls for discharges (which can be signs of infection), discoloration, lesions, or growths. This examination is typically followed by a Pap test to detect cervical cancer. A sample of vaginal discharge may also be taken to test for the sexually transmitted infection (STI) gonorrhea (see Chapter 16).

To take a Pap test, or a Pap smear, the physician will hold open the vaginal walls with a plastic or (hopefully prewarmed!) metal speculum so that a sample of cells (a “smear”) may be scraped from the cervix with a wooden spatula (see Figure 3.8). Women should not douche prior to Pap tests or schedule them during menstruation, because douches and blood confound analysis of the smear.

The speculum exam is normally followed by a bimanual vaginal exam in which the index and middle fingers of one hand are inserted into the vagina while the lower part of the abdomen is palpated (touched) by the other hand from the outside. The physician uses this technique to examine the location, shape, size, and movability of the internal sex organs, searching for abnormal growths and symptoms of other problems. Palpation may be somewhat uncomfortable, but severe pain is a sign that something is wrong. A woman need not hide such discomfort from the examiner. She may only be masking a symptom (that is, depriving the physician of useful informa-
tion). Physical discomfort is usually mild, however, and psychological discomfort is sometimes lessened by discussing it.

Finally, the physician should do a recto-vaginal examination in which one finger is inserted into the rectum while the other is inserted into the vagina. This procedure provides additional information about the ligaments of the uterus, the ovaries, and the fallopian tubes. The procedure also helps the physician evaluate the health of the rectum.

Although it may be somewhat uncomfortable, the pelvic examination is not ordinarily painful. It is normal for a woman who has not had one, or who is visiting a new doctor, to be anxious about the exam. The doctor should be reassuring if the woman expresses concern. If the doctor is not, the woman should feel free to consult another doctor. She should not forgo the pelvic examination itself, however. It is essential for early detection of problems.

The Breasts

College women recall:

I was very excited about my breast development. It was a big competition to see who was wearing a bra in elementary school. When I began wearing one, I also liked wearing see-through blouses so everyone would know. . . .

My breasts were very late in developing. This brought me a lot of grief from my male peers. I just dreaded situations like going to the beach or showering in the locker room. . . .

All through junior high and high school I felt unhappy about being “overendowed.” I felt just too uncomfortable in sweaters—there was so much to reveal and I was always sure that the only reason boys liked me was because of my bustline. . . .

By the time I was eleven I needed a bra. . . . The girls in my gym class in sixth grade laughed at me because my breasts were pretty big and I still didn’t have a bra. I tried to cover myself up when I dressed and undressed. On my eleventh birthday my mom gave me a sailor blouse and inside was my first bra. . . . (It) was the best present I could have received. The bra made me feel a lot better about myself, but I was still unsure of my femininity for a long time. . . .

—Morrison et al. (1980, pp. 66–70)

IN SOME CULTURES THE BREASTS ARE VIEWED merely as biological instruments for feeding infants. In U.S. culture, however, breasts have taken on such erotic significance that a woman’s self-esteem may become linked to her bustline.

The breasts are secondary sex characteristics. That is, like the rounding of the hips, they distinguish women from men, but they are not directly involved in reproduction. Each breast contains 15 to 20 clusters of milk-producing mammary glands (see Figure 3.9). Each gland opens at the nipple through its own duct.

Secondary sex characteristics Traits that distinguish the sexes from one another but are not directly involved in reproduction.

Mammary glands Milk-secreting glands.

![Figure 3.9 - Breast of an Adult Woman](image_url)
Real Students, Real Questions

Q Is there any way to make my breasts larger without having plastic surgery?

A You’ll come across advertisements for dietary supplements that supposedly do the job, but we advise you not to take anything without discussing it with your health-care provider. But think about why you are concerned about your breast size. Is it because you are succumbing to the popular idea that a sex partner will prefer a woman with large breasts? Some do, but many do not, and who you are as a person is more important than your bra cup size! If your partner doesn’t agree with that, you need another partner, not larger breasts. In any case, small breasts are as sensitive to sexual stimulation as larger breasts, so show your partner what you want.

The mammary glands are separated by soft, fatty tissue. It is the amount of this fatty tissue, not the amount of glandular tissue, that largely determines the size of the breasts (Levin, 2006). Truth or Fiction Revisited: Women vary little in their amount of glandular tissue, so breast size does not determine the quantity of milk that can be produced.

The nipple, which lies in the center of the areola, contains smooth muscle fibers that erect the nipple when they contract. The areola, or area surrounding the nipple, darkens during pregnancy and remains darker after delivery. Oil-producing glands in the areola help lubricate the nipples during breast feeding. Milk ducts conduct milk from the mammary glands through the nipples. Nipples are richly endowed with nerve endings, so that stimulation of the nipples heightens sexual arousal for many women. Male nipples are similar in sensitivity (Levin, 2006).

Figure 3.10 shows some of the normal variations in the size and shape of the breasts of adult women. The sensitivity of the breasts to sexual stimulation is unrelated to their size. Small breasts may have as many nerve endings as large breasts, but they will be more densely packed.

Women can prompt their partners to provide breast stimulation by informing them that their breasts are sensitive to stimulation. They can also guide a partner’s hands in ways that provide the type of stimulation they desire. The breasts vary in sensitivity with the phases of the menstrual cycle, and some women appear less

Figure 3.10  Normal Variations in the Size and Shape of the Breasts of Adult Women. The size and shape of the breasts have little bearing on their ability to produce milk or on sensitivity to sexual stimulation. Breasts have become highly eroticized in our culture.

Areola  The dark ring on the breast that encircles the nipple.
responsive to breast stimulation than others. However, some less sensitive women may learn to enjoy breast stimulation by focusing on breast sensations during lovemaking in a relaxed atmosphere.

**Real Students, Real Questions**

**Q** One of my breasts is bigger than the other. Is this normal?

**A** Sure. Unless there’s a huge difference, don’t worry about it. It is mostly the amount of fatty tissue in the breasts that accounts for differences in the size of the breasts among women. Moreover, breasts expand with pregnancy, and smaller breasts tend to increase more dramatically in size than larger breasts. And because production of milk depends on the amount of glandular tissue in the breasts, not fatty tissue, the size of your breasts has nothing to do with the amount of milk you can produce if you have children. On the other hand, if you have noticed a change in the size of one breast relative to the other, or in the texture of your breast tissue or in the nipple or areola, bring it to the attention of your health-care provider. It could mean nothing, but it’s better to be sure.

**Breast Cancer**

Susan contracted breast cancer in her 30s. A lump “suddenly” appeared in her mammography. She and her family dwelled in fear over the next couple of weeks as tissue from the tumor was biopsied, found to be malignant, and arrangements were made to remove the breast. Given the “aggressiveness” of the tumor—the rapidity with which it had grown—every physician she consulted recommended **mastectomy** (surgically removing the breast) rather than **lumpectomy** (surgically removing a lump from the breast). The question arose as to whether Susan should remove the healthy breast as a precautionary measure. A blood test determined that she did not possess genetic mutations (BRCA1 or BRCA2) that are connected with early-onset breast cancer, so the healthy breast was preserved. There was additional anxiety following the removal of the breast as tissues were examined to determine whether the cancer had spread within the breast or to lymph nodes. Fortunately, it had apparently remained within a duct despite the rapidity of its growth.

Susan then dealt with the psychological issues of feeling unwhole, which were to some degree mitigated by attending a support group of women undergoing similar experiences. Reconstruction of the breast was an unexpected and lengthy process during which the muscles that normally underlie breasts were gradually ballooned out to surround and support a silicone implant. A new cosmetic nipple was constructed from thigh tissue. It was decided that she did not need chemotherapy or radiation, but she did go on tamoxifen, a drug that decreases the body’s supply of estrogen—a factor in the development of cancerous tissue in the breast. There is no evidence of remaining malignant tissue as Susan approaches the “magical” five-year postsurgical survival date.

Breast cancer strikes nearly 192,370 women in the United States each year and takes about 40,170 lives (American Cancer Society, 2009). An estimated 440 men

**Mastectomy** Surgical removal of the entire breast.

**Lumpectomy** Surgical removal of a lump from the breast.
also die of breast cancer each year. It is not cancer in the breast that kills, but rather its spread to vital body parts, such as the brain, bones, lungs, or liver.

More early cases of breast cancer are apparently being detected because of an increased use of mammography, a kind of X-ray that detects cancerous lumps in the breast. Advances in early detection and treatment have led to increased rates of recovery. On the other hand, some critics argue that mammography has led to the detection and treatment of some localized cancers that might never have grown (Keen & Keen, 2009). The American Cancer Society (2009) counters that the majority of these small tumors would grow. In any event, the five-year survival rate for women whose breast cancers have not spread beyond the breast is about 98%, up from nearly 80% in the 1950s (American Cancer Society, 2009). The five-year survival rate drops to about 80% if the cancer has spread to the surrounding region and to about 26% if it has spread to more distant sites.

**RISK FACTORS** Breast cancer is rare in women under age 25. The risk increases sharply with age. About four of five cases develop in women over the age of 50. The risk of developing breast cancer is about 1 in 229 for women aged 30 to 39 (National Cancer Institute, 2009), and it increases with each decade of life. The National Cancer Institute (2009) puts the probability that a woman will be diagnosed with breast cancer at some time is about 1 in 7 to 8 (13.2%).

Genetic factors are involved in breast cancer, in particular among women who inherit the genetic mutations associated with breast cancer (BRCA1 and BRCA2) and among women with a family history of the disease (American Cancer Society, 2009). A study of more than 100,000 women nurses showed that those with mothers or sisters who had breast cancer had nearly twice the chance of developing the disease themselves (Colditz & Rosner, 2000). Women who have or had both a mother and a sister with the disease have between two and three times greater risk. Moreover, women who inherit BRCA1 or BRCA2 mutations have a 50 to 85% chance of developing breast cancer (American Cancer Society, 2009), as compared with one woman in eight or nine in the general population. They also have an increased risk of developing ovarian cancer.

Genes for breast cancer appear to predict not only whether women will contract the disease but also how deadly it will be. Health professionals can test the genomes of women with breast cancer to help determine how aggressively they should treat the disease by means such as chemotherapy and radiation once the tumors have been removed surgically (American Cancer Society, 2009).

A key risk factor in breast cancer is prolonged exposure to estrogen, which stimulates breast development in young women and also the proliferation of breast cancer cells (Colditz et al., 2004; Tamini et al., 2006). All of the following conditions heighten the risk of breast cancer because they increase the woman’s exposure to estrogen: early onset of menstruation (before age 14), late menopause (after age 55), delayed childbearing (after age 30), and never giving birth (American Cancer Society, 2009). Exercise, by the way, may reduce the risk of breast cancer by decreasing the amount of fatty tissue in the body. Fat is connected with higher levels of estrogen production. Heavy drinking of alcohol also heightens the risk of breast cancer (American Cancer Society, 2009; Stein & Colditz, 2004) as do high amounts of fatty tissue in the body (American Cancer Society, 2006; Stein & Colditz, 2004). However, a study of
Overall, African Americans are more likely than European Americans to develop cancer. The case is somewhat different with breast cancer. As a group, African American women are somewhat less likely than European American women to develop breast cancer. However, when they do, they frequently do so at an earlier age (Stead et al., 2009). They tend to be diagnosed with the disease somewhat later, and they are also more likely to die from it (American Cancer Society, 2009). Some aspects of the racial differences, such as the tendency to be diagnosed later, may reflect less access to health care. On the other hand, genetic factors are also likely to be involved. It is usually estrogen that causes the proliferation of breast cancer cells, and thus some drugs, such as tamoxifen, treat breast cancer by suppressing the body’s supply of estrogen. However, African Americans are more likely to develop tumors that are “estrogen-receptor negative.” That is, they develop rapidly even in the absence of estrogen (Stead et al., 2009). These tumors are highly aggressive—they grow very rapidly—and are a major factor in the higher mortality rate for African American women (Stead et al., 2009).

nearly 49,000 women age 50 to 79 whose health was tracked for a period of 8 years showed that those who were assigned to a low-fat diet did not significantly differ in rates of breast cancer from women who ate as they wished (Prentice et al., 2006).

Does abortion increase a woman’s risk of breast cancer? Some writers have speculated that because pregnancy decreases the risk of breast cancer, having an abortion will indirectly increase the risk (Malec, 2003).  

Truth or Fiction Revisited: However, carefully controlled studies do not find abortion to increase a woman’s risk of breast cancer (American Cancer Society, 2009; Tang et al., 2000). Similarly, silicone breast implants have not been shown to increase the risk of breast cancer either—but they can lead to the development of scar tissue and obscure mammography readings (Lipworth et al., 2008).

DETECTION AND TREATMENT  
Women with breast cancer have lumps in the breast, but most lumps are not cancerous. Most are either cysts or benign tumors called fibroadenomas. Breast cancer involves lumps in the breast that are malignant.

Early detection and treatment reduce the risk of mortality. The sooner cancer is detected, the less likely it is to have spread to critical organs.

Breast cancer may be detected in various ways, including breast self-examination (BSE), physical examination (clinical breast examination, or CBE), mammography, and ultrasound. Through mammography, tiny, highly curable cancers can be detected—and treated—before they can be felt by touch. By the time a malignant lump is large enough to be felt by touch, it already contains millions of cells and may have metastasized—splintered off to form colonies elsewhere in the body. A mam-

Cysts  Sac-like structures filled with fluid or diseased material.
Benign  Doing little or no harm.
Fibroadenoma  A benign, fibrous tumor.
Malignant  Lethal; causing or likely to cause death.
Breast Self-Examination

Regular visits to a physician and mammograms provide the best protection against breast cancer, because they may lead to early detection and treatment. But many women find lumps themselves. It was once recommended that women conduct breast self-examinations (BSEs) at least once a month, but now the American Cancer Society considers BSEs to be optional. On the other hand, BSE may have psychological advantages for many women—empowering them to investigate their own bodies and to actively participate in their own disease prevention. Moreover, the American Cancer Society (2006) continues to recommend that women be aware of what is going on in their bodies. Breast self-exams would appear to be one way to cultivate awareness.

The following instructions for breast self-examination are based on American Cancer Society guidelines (see Figure 3.11). Additional material on breast self-examination may be obtained from the American Cancer Society by calling 1-800-ACS-2345. However, women are advised to initiate BSEs with a health professional in order to determine their baseline “lumpiness” and to learn the proper technique.

1. In the shower. Examine your breasts during your bath or shower; hands glide more easily over wet skin. Keep your fingers flat and move gently over every part of each breast. Use the right hand to examine the left breast and the left hand for the right breast. Check for any lump, hard knot, or thickening.

2. Before a mirror. Inspect your breasts with your arms at your sides. Next, raise your arms high overhead. Look for any changes in the contour of each breast, a swelling, dimpling of skin, or changes in the nipple. Then rest your palms on your hips and press down firmly to flex your chest muscles. Your left and right breasts will not exactly match. Few women’s breasts are symmetrical. Regular inspection will allow you to determine what is normal for you and will give you confidence in your examination.

3. Lying down. To examine your right breast, put a pillow or folded towel under your right shoulder. Place your right arm behind your head. This position distributes breast tissue more evenly on the chest. With your left hand, fingers flat, press gently with the finger pads (the top thirds of the fingers) of the three middle fingers in small circular motions around an imaginary clock face. Begin at the outermost top of your right breast for 12 o’clock, then move to 1 o’clock, and so on around the circle back to 12 o’clock. A ridge of firm tissue in the lower curve of each breast is normal. Then move in 1 inch, toward the nipple. Keep circling to examine every part of your breast.

Mammography can detect tiny tumors before metastasis. A Department of Health and Human Services panel of experts recommends that mammograms can begin at age 50 and be conducted every two years (U.S. Preventive Services Task Force, 2009). Women in high-risk groups can begin at about age 40 and have mammograms annually. However, perhaps in response to concerns expressed by the American Cancer Society and others, the Department of Health and Human Services did not change its position that mammograms should begin at age 40 and be done annually (Phillips, 2009).

Many drugs are also used to treat breast cancer, and others are in the research pipeline. For example, tamoxifen locks into the estrogen receptors of breast cancer cells, thereby blocking estrogen’s stimulation of the cells to grow and proliferate. However, tamoxifen increases the risks of uterine cancer and of blood clots in the lungs, along with some other side effects. The risks of these side effects were lowest among women below the age of 50. The drug raloxifene has also been shown to reduce the risk of breast cancer (Cummings et al., 1999). Moreover, raloxifene does not appear to have the side effects associated with tamoxifen. Other drugs are also being studied for use against breast cancer. Ask your gynecologist for the latest research results and which drugs, if any, are right for you.
including the nipple. This requires at least three more circles. Now slowly repeat the procedure on your left breast. Place the pillow beneath your left shoulder, your left arm behind your head, and use the finger pads on your right hand. After you examine your left breast fully, squeeze the nipple of each breast gently between your thumb and index finger. Any discharge, clear or bloody, should be reported to your doctor immediately.

Many women who have had mastectomies have had surgical breast implants to replace the tissue that has been removed. Other women have breast implants to augment their breast size. Research suggests that breast implants probably have no effect on the probability of developing breast cancer, rheumatoid arthritis, and a number of other health problems, casting doubts on previous studies that had implicated them in the development of these problems (Spiegel, 2001; Wooster & Weber, 2003). Again, consult your gynecologist.

The American Cancer Society (2006) recommends that women have a clinical breast exam every three years when they are between 20 and 39 years of age and annually thereafter. In 1985, 20% of women had had a mammogram within the past 2 years, as opposed to more than 70% in 2005 (Kolata, 2005). The New England Journal of Medicine reported that mammography was likely to be responsible for anywhere from 28 to 65% of the increase in the breast cancer survival rate over the past two decades (Berry et al., 2005).

Truth or Fiction Revisited: The American Cancer Society no longer recommends monthly breast self-examinations (BSEs). However, the “A Closer Look” feature provides instructions for women who choose to engage in breast self-examination.
The Menstrual Cycle

MENSTRUATION IS THE CYCLICAL BLEEDING that stems from the shedding of the uterine lining (endometrium). Menstruation takes place when a reproductive cycle has not led to the fertilization of an ovum. The word menstruation derives from the Latin mensis, meaning “month.” The menstrual cycle averages 28 days.

The cycle is regulated by the hormones estrogen and progesterone and can be divided into four phases. The first phase, the proliferative phase, follows menstruation. During this phase, estrogen levels increase, causing the ripening of perhaps 10 to 20 ova (egg cells) within their follicles and the proliferation of endometrial tissue in the uterus. During the second phase of the cycle, estrogen reaches peak blood levels, and ovulation occurs. Normally only 1 ovum reaches maturity and is released by an ovary during ovulation. Then the third phase—the secretory, or luteal, phase—of the cycle begins. The luteal phase begins right after ovulation and continues through the beginning of the next cycle.

The term luteal phase is derived from corpus luteum, the name given to the follicle that releases an ovum. The corpus luteum functions as an endocrine gland and produces large amounts of progesterone and estrogen. Progesterone causes the endometrium to thicken, so that it will be able to support an embryo if fertilization occurs. If the ovum goes unfertilized, however, estrogen and progesterone levels plummet. The drops trigger the fourth phase, the menstrual phase, which leads to the beginning of a new cycle.

Ovulation may not occur in every menstrual cycle. Anovulatory (“without ovulation”) cycles are most common in the years just after menarche (the first menstrual period). They may become frequent again in the years prior to menopause, but they may also occur irregularly at any age.

Although the menstrual cycle averages 28 days, variations among women, and in the same woman from month to month, are common. Girls’ cycles are often irregular for a few years after menarche but later assume regular patterns. Variations from cycle to cycle tend to occur during the proliferative phase that precedes ovulation. Menstruation tends to reliably follow ovulation by about 14 days.

Hormones regulate the menstrual cycle, but psychological factors can affect the secretion of hormones. Stress can delay or halt menstruation. For example, many women in otherwise good health stopped menstruating during imprisonment in Nazi concentration camps during World War II (Ofer & Weitzman, 1998; Ritner & Roth, 1993).

Regulation of the Menstrual Cycle

The menstrual cycle involves finely tuned relationships between structures in the brain—the hypothalamus and the pituitary gland—and the ovaries and uterus. All these structures are parts of the endocrine system, which means that they secrete chemicals directly into the bloodstream (see Figure 3.12). The chemicals secreted by endocrine glands are called hormones. The ovaries and uterus are also reproductive organs.

The gonads—the ovaries in the female and the testes (or testicles) in the male—secrete sex hormones directly into the bloodstream. The female gonads, the ovaries, produce the sex hormones estrogen and progesterone. The male gonads, the testes, produce the male sex hormone testosterone. Males and females also produce relatively small amounts of the sex hormones of the other sex.
The hypothalamus is a pea-sized structure in the front part of the brain. It lies above the pituitary gland and below (hence the prefix hypo-, for “under”) the thalamus. Despite its small size, it is involved in regulating many states of motivation, including hunger, thirst, aggression, and sex. For example, when the rear part of a male rat’s hypothalamus is stimulated by an electric probe, the rat runs through its courting and mating sequence. It nibbles at a female’s ears and at the back of her neck. When she responds, they copulate. Human sexuality is not so stereotyped or mechanical—although in the cases of people who have fallen into ruts, it may seem to be.

The pituitary gland, which is also about the size of a pea, lies below the hypothalamus at the base of the brain. Because many pituitary secretions regulate other endocrine glands, the pituitary has also been called the master gland. Pituitary hormones regulate bone and muscle growth and urine production. Two pituitary hormones are active during pregnancy and motherhood: prolactin, which stimulates production of milk, and oxytocin, which stimulates uterine contractions in labor and the ejection of milk during nursing. The pituitary gland also produces gonadotropins (literally, “that which ‘feeds’ the gonads”) that stimulate the ovaries: follicle-stimulating hormone (FSH) and luteinizing hormone (LH). These hormones play key roles in regulating the menstrual cycle.

**Figure 3.12 ● Major Glands of the Endocrine System.** The endocrine system consists of glands that secrete chemicals called hormones directly into the bloodstream.

- **Prolactin** A pituitary hormone that stimulates production of milk.
- **Oxytocin** A pituitary hormone that stimulates uterine contractions in labor and the ejection of milk during nursing.
- **Gonadotropins** Pituitary hormones that stimulate the gonads.
- **Follicle-stimulating hormone (FSH)** A gonadotropin that stimulates development of follicles in the ovaries.
- **Luteinizing hormone (LH)** A gonadotropin that helps regulate the menstrual cycle by triggering ovulation.
The hypothalamus receives information about bodily events through the nervous and circulatory systems. It monitors the blood levels of various hormones, including estrogen and progesterone, and releases a hormone called gonadotropin-releasing hormone (Gn-RH), which stimulates the pituitary to release gonadotropins. Gonadotropins, in turn, regulate the activity of the gonads. It was once thought that the pituitary gland ran the show, but it is now known that the pituitary gland is regulated by the hypothalamus. Even the “master gland” must serve another.

**Phases of the Menstrual Cycle**

The menstrual cycle has four stages or phases: proliferative, ovulatory, secretory, and menstrual (see Figure 3.13). It might seem logical that a new cycle begins with the first day of the menstrual flow, because this is the most clearly identifiable event of the cycle. Many women also count the days of the menstrual cycle beginning with the onset of menstruation. Biologically speaking, however, menstruation is really the culmination of the cycle. In fact, the cycle begins with the end of menstruation and the initiation of a series of biological events that lead to the maturation of an immature ovum in preparation for ovulation and possible fertilization.

**THE PROLIFERATIVE PHASE** The first phase, or proliferative phase, begins with the end of menstruation and lasts about 9 or 10 days in an average 28-day cycle (see Figures 3.13 and 3.14). During this phase the endometrium develops, or “proliferates.” This phase is also known as the preovulatory or follicular phase, because certain ovarian follicles mature and the ovaries prepare for ovulation.

Low levels of estrogen and progesterone are circulating in the blood as menstruation draws to an end. When the hypothalamus senses a low level of estrogen in the blood, it increases secretion of Gn-RH, which in turn triggers the pituitary gland to release a follicle-stimulating hormone (FSH). When FSH reaches the ovaries, it stimulates some follicles (perhaps 10 to 20) to begin to mature. As the follicles ripen, they begin to produce estrogen. Normally, however, only one of them—called the graafian follicle—will reach full maturity in the days just preceding ovulation. As the graafian follicle matures, it moves toward the surface of the ovary, where it will eventually rupture and release a mature egg (see Figures 3.14 and 3.15).

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**Figure 3.13** The Four Phases of the Menstrual Cycle.
The menstrual cycle has proliferative, ovulatory, secretory (luteal), and menstrual phases.
Figure 3.14 • Changes That Occur during the Menstrual Cycle. This figure shows five categories of biological change: (a) changes in the development of the uterine lining (endometrium), (b) follicular changes, (c) changes in blood levels of ovarian hormones, (d) changes in blood levels of pituitary hormones, and (e) changes in basal temperature. Note the dip in temperature connected with ovulation.
Estrogen causes the endometrium in the uterus to thicken to about 1/8 inch. Glands develop that would eventually nourish an embryo. Estrogen also stimulates the appearance of a thin cervical mucus. This mucus is alkaline and provides a hospitable, nutritious medium for sperm. The chances are thus increased that sperm that enter the female reproductive system at the time of ovulation will survive.

**THE OVULATORY PHASE** During ovulation, or the **ovulatory phase**, the graafian follicle ruptures and releases a mature ovum near a fallopian tube—not into a fallopian tube (see Figure 3.15). The other ripening follicles degenerate and are reabsorbed by the body. If two ova mature and are released during ovulation, and both are fertilized, fraternal (nonidentical) twins will develop. Identical twins occur when one fertilized ovum divides into two separate **zygotes**.

Ovulation is set into motion when estrogen production reaches a critical level. The hypothalamus detects the high level of estrogen and triggers the pituitary to release copious amounts of FSH and LH (see Figures 3.14 and 3.15). The surge of LH triggers ovulation, which usually begins 12 to 24 hours after the level of LH in the body has reached its peak. The synthetic hormone **clomiphene** is chemically similar to LH and has been used by women who ovulate irregularly to induce reliable ovulation and thus increase the chances of conceiving.

A woman’s **basal body temperature**, taken by oral or rectal thermometer, dips slightly at ovulation (see Figure 3.14) and rises by about 1°F on the day following ovulation. Many women use this information to help them conceive or avoid conceiving.

Some women have discomfort or cramping during ovulation, termed **mittelschmerz**. This condition is sometimes confused with appendicitis. Mittelschmerz, however, may occur on either side of the abdomen, depending on which ovary is releasing an ovum. A ruptured appendix always causes pain on the right side.

**THE SECRETORY PHASE** The phase following ovulation is called the **postovulatory** or **secretory phase**. Some people refer to it as the **luteal phase**, which reflects the name given to the ruptured (graafian) follicle—the **corpus luteum**. Figures 3.14 and 3.15 show the transformation of the graafian follicle into the corpus luteum.

Under the influence of LH, the corpus luteum, which has remained in the ovary, begins to produce large amounts of progesterone and estrogen. Levels of these hormones peak at around the 20th or 21st day of an average cycle (see Figure 3.14). These hormones cause the glands in the endometrium to secrete nutrients to sustain a fertilized ovum that becomes implanted in the uterine wall.

If implantation does not occur, the hypothalamus responds to the peak levels of progesterone by signaling the pituitary to stop producing LH and FSH. This feed-
back process is similar to that of a thermostat in a house reacting to rising temperatures by shutting down the furnace. The levels of LH and FSH decline rapidly, leading the corpus luteum to decompose. After its decomposition, levels of estrogen and progesterone fall precipitously. The corpus luteum sows the seeds of its own destruction: Its hormones signal the brain to shut down secretion of substances that maintain it.

THE MENSTRUAL PHASE: AN END AND A BEGINNING

The menstrual phase occurs when decreasing estrogen and progesterone levels can no longer sustain the uterine lining. The lining then disintegrates and is discharged from the body along with the menstrual flow.

The low estrogen levels of the menstrual phase signal the hypothalamus to release Gn-RH, which in turn stimulates the pituitary to secrete FSH. The follicle-stimulating hormone, in turn, prompts ovarian secretion of estrogen and the onset of another proliferative phase. Thus, a new cycle begins. The menstrual phase is a beginning as well as an end.

Menstrual flow contains blood from the endometrium (uterine lining), endometrial tissue, and cervical and vaginal mucus. Although the flow can appear persistent and last for five days or more, most women lose only a total of 2 or 3 ounces of blood (4 to 6 tablespoonfuls). A typical blood donor, by contrast, donates 16 ounces of blood at a sitting. Extremely heavy or prolonged (over a week) menstrual bleeding may reflect health problems and should be discussed with a health-care provider.

Prior to 1933, women generally used external sanitary napkins or pads to absorb the menstrual flow. In that year, however, tampons were introduced. Tampons are inserted into the vagina and left in place to absorb menstrual fluid. Women who use tampons can swim without concern while menstruating, wear more revealing or

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**Real Students, Real Questions**

**Q** As a guy, I don’t really know what girls go through day to day when they have their period. I also don’t have a sister. Do they use more than one tampon a day? Do they leave the tampon in? Do all girls use tampons? I want to understand what they actually have to go through.

**A** In developed nations today, many women use tampons or feminine napkins and change them several times a day. So-called superabsorbent tampons, which could be left in for much or most of a day, have gone out of fashion because of the risk of toxic shock syndrome. In most cases, there is probably also less blood than you would imagine. However, many females experience premenstrual or menstrual pain (especially cramping) and some irritability, which are uncomfortable, but absolutely normal. At the time of the sexual revolution, sexologists and social critics minimized premenstrual syndrome (PMS) and other menstrual problems as a way of minimizing sex differences in general. Today, however, menstrual problems are accepted as widely occurring and reflective of female sexual anatomy and physiology. Today, the question is, how can we help women who encounter such difficulties, not how can we pretend they don’t exist.

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**Menstrual phase** The fourth phase of the menstrual cycle, during which the endometrium is sloughed off in the menstrual flow.

**Tampon** A plug made of cotton or a similar material that is inserted into the vagina to absorb the menstrual flow.
comfortable apparel, and feel less burdened. Questions have arisen about whether or not tampons cause or exacerbate infections, such as toxic shock syndrome (TSS), which is sometimes fatal. Signs of TSS include fever, headache, sore throat, vomiting, diarrhea, muscle aches, rash, and dizziness. Peeling skin, disorientation, and a plunge in blood pressure may follow. Toxic shock syndrome is caused by the Staphylococcus aureus (“staph”) bacterium, which is most likely to overbreed when highly absorbent tampons are left in place for many hours. As a result, many women now use regular rather than superabsorbent tampons. Others change their tampons three or four times a day, or alternate them with sanitary napkins. Women are encouraged to consult their health-care providers about TSS.

Sex during Menstruation

Many couples continue to have sex during menstruation; other couples abstain (Schneidewind-Skibbe et al., 2007). Some people abstain because of religious prohibitions. Others express concern about the “fuss” or the “mess” of the menstrual flow. Truth or Fiction Revisited: Despite traditional attitudes that associate menstruation with uncleanliness, there is no evidence that coitus during menstruation is physically harmful to either partner. Ironically, menstrual coitus may be helpful to the woman. The uterine contractions that occur during orgasm may help relieve cramping by dispelling blood congestion (Masters & Johnson, 1966). Orgasm from masturbation may have the same effect.

Women may be sexually aroused at any time during the menstrual cycle. The preponderance of the research evidence, however, points to a peak in sexual desire in women around the time of ovulation.

Human sexual patterns during the phases of the menstrual cycle reflect personal decisions and not just hormone fluctuations. Some couples may decide to increase their frequency of coitus at ovulation, in order to optimize the chances of conceiving, or to abstain during menstruation because of cultural or religious beliefs. Some may also increase their coital activity preceding menstruation to compensate for anticipated abstinence during menses, or to increase coital activity afterwards to make up for deprivation. In contrast, females of other species that are bound by the estrous cycle generally respond sexually only during estrus.

Menopause, Perimenopause, and the Climacteric

Menopause, or the “change of life,” is the cessation of menstruation. Menopause is a process that most commonly occurs between the ages of 46 and 50 and lasts for about two years. However, it may begin any time between the ages of 35 and 60.

Perimenopause refers to the beginning of menopause and is usually characterized by 3 to 11 months of amenorrhea (lack of menstruation) or irregular periods. Perimenopause ends with menopause. Menopause, in other words, is a specific event in a longer-term process known as the climacteric (“critical period”). The term climacteric specifically refers to the gradual decline in the reproductive capacity of the ovaries. The climacteric generally lasts about 15 years, from about ages 45 to 60. After age 35 or so, the menstrual cycles of many women shorten, from an average of 28 days to 25 days at age 40 and to 23 days by the mid-40s. By the end of her 40s, a woman’s cycle may become erratic, with some periods close together and others missed.

In menopause, the pituitary gland continues to pour normal levels of FSH and LH into the bloodstream; but, for reasons that are not well understood, the ovaries
The Menstrual Cycle

gradually lose their capacity to respond. The ovaries no longer ripen egg cells or produce the sex hormones estrogen and progesterone.

The deficit in estrogen may lead to a number of unpleasant perimenopausal sensations, such as night sweats and hot flashes (suddenly feeling hot) and hot flushes (suddenly looking reddened) (Bastian et al., 2003; Tuomikoski et al., 2009). Hot flashes and flushes may alternate with cold sweats, in which a woman feels suddenly cold and clammy. Anyone who has experienced “cold feet” or hands from anxiety or fear will understand how dramatic the shifting patterns of blood flow can be. Hot flashes and flushes stem largely from “waves” of dilation of blood vessels across the face and upper body. All of these sensations reflect vasomotor instability. That is, there are disruptions in the body mechanisms that dilate or constrict the blood vessels to maintain an even body temperature. Additional signs of estrogen deficiency include dizziness, headaches, pains in the joints, sensations of tingling in the hands or feet, burning or itchy skin, and heart palpitations. The skin usually becomes drier. There is some loss of breast tissue and decreased vaginal lubrication during sexual arousal. Women may also encounter sleep problems, such as awakening more frequently at night and having difficulty falling back to sleep. Many perimenopausal women also experience migraine headaches (MacGregor, 2009).

Contact with it turns new wine sour, crops touched by it become barren, grafts die, seeds in gardens are dried up, the fruit of trees falls off. . . . [The] edge of steel and the gleam of ivory are dulled, hives of bees die, even bronze and iron are at once seized by rust, and a horrible smell fills the air; to taste it drives dogs mad and infects their bites with an incurable poison.

Ancient societies—and some contemporary ones—have limited understanding of bodily processes, or else they rely on tradition more than science. Science teaches that there is no medical basis for isolating menstruating women or avoiding sex during menstruation.

We might laugh off these misconceptions as folly and ignorance, if it were not for their profound effect on women. Women who believe the myths about menstruation may see themselves as unclean and endure anxiety, depression, and lowered self-esteem. Negative cultural beliefs concerning menstruation may also exacerbate menstrual distress.
Long-term estrogen deficiency has been linked to brittleness and porosity of the bones—osteoporosis. Bones break more readily, and some women develop “dowager’s hump” (Seifert-Klauss et al., 2005). Osteoporosis can be handicapping, even life threatening. The increased brittleness of the bones increases the risk of serious fractures, especially of the hip, and many older women never recover from them (Mawick, 2000). Estrogen deficiency can also impair cognitive functioning and feelings of psychological well-being (Hill et al., 2009; Ross et al., 2000).

Hormone Replacement Therapy: Good Medicine or Menace?

Candace tried almost everything to manage her discomforts of perimenopause: a chiropractor, acupuncture, anti-anxiety pills, soy tablets, and herbal remedies. Finally, she relented and followed her doctor’s recommendation that she use hormone replacement therapy (HRT). The doctor believed that the immediate benefits, for Candace, age 51, outweighed the risks (Rabin, 2006).

Some women with severe physical symptoms, like Candace, have been helped by HRT medication, which typically consists of synthetic estrogen and progesterone. The hormones are used to offset the losses of their naturally occurring counterparts. Hormone replacement therapy may help reduce the hot flushes and other symptoms brought about by hormonal deficiencies during menopause (den Tonkelaar & Oddens, 2000). There is also evidence that estrogen replacement lowers women’s risks of osteoporosis (Studd, 2009). The connection between estrogen and colon cancer is unclear (Clendenen et al., 2009).

Yet, HRT is controversial. Although it has been helpful to many women, the Women’s Health Initiative study of some 16,600 postmenopausal women aged 50 to 79 found that exposure to a combination of estrogen and progestin appears to increase the risk of breast cancer, strokes and blot clots, and did not have a protective effect on the heart (Chlebowski et al., 2003; Tamini et al., 2006). (Progestin is used along with estrogen because estrogen alone exposes women to a greater risk of uterine cancer.) In addition to stimulating the growth of breast cancer, the combination of hormones also makes the tumors harder to detect, causing dangerous delays in diagnosis (Pommier et al., 2008). During the course of the Chlebowski study, of 8,506 women on HRT, 199 developed invasive breast cancers, as compared with 150 cases among the 8,102 women taking a placebo (Chlebowski et al., 2003). Also, despite having yearly mammograms, 25.4% of the women who developed cancer while using HRT had cancers that had begun to metastasize, as compared with 16% of those taking the placebo.

Although estrogen stimulates proliferation of breast cancer cells, research suggests that women who have had hysterectomies might not be placed at increased risk of breast cancer by estrogen replacement (Stefanick et al., 2006). This is one of those studies that challenge conventional thinking and need to be replicated (repeated) in order to put women contemplating estrogen replacement at ease.

Hormone replacement therapy also appears to increase the risk of lung cancer in postmenopausal women who smoke or smoked (Chlebowski et al., 2009). Rowan Chlebowski, the first author of the study that detected this association writes, “The clear message is don’t smoke and take hormones.”

Levels of LDL (“bad cholesterol”) are known to rise among menopausal women, while levels of HDL (“good cholesterol”) decrease (Hall et al., 2002). A number of studies suggest that HRT raises levels of HDL and lowers levels of LDL (Bray et al., 2008; Teo et al., 2009). Because high levels of LDL are connected with cardiovascu-
Menstrual Problems

Menopause is certainly a major life change for most women. For many women, menopause symbolizes the many midlife issues they face, including changes in appearance, sexuality, and health. And yet, exactly what types of changes do we find? Many of us harbor misleading ideas about menopause—ideas that can be harmful to women. Consider the following myths and the realities. To which myths have you fallen prey?

- **Menopause is abnormal.** Of course not. Menopause is a normal development in women’s lives.

- **The medical establishment considers menopause a disease.** No longer. Menopause is described as a “deficiency syndrome” today, referring to the decline in secretion of estrogen and progesterone. Unfortunately, the term deficiency also has negative meanings.

- **After menopause, women need complete replacement of estrogen.** Not necessarily. Some estrogen continues to be produced by the adrenal glands, fatty tissue, and the brain (Guzick & Hoeger, 2000).

- **Menopause is accompanied by depression and anxiety.** Sometimes but not necessarily. A number of reviews of the literature have found no consistent relationship between menopause and these psychological symptoms (Avis, 2003; Kessler, 2003). A Dutch study followed 2,103 females aged 46 to 54 for five years. During this time, the number of women who reached postmenopausal status doubled, and the percentage of women reporting depression increased from 18.5 to 23.7% (Maartens et al., 2002). The increase is unlikely to be due to chance, but more than three out of four women in the study did not report significant levels of depression or anxiety at any time during the experience of menopause.

- **At menopause, women experience debilitating hot flashes.** Truth or Fiction Revisited: Sometimes but not necessarily. Many women do not have hot flashes at menopause. Among those who do, the flashes are often mild. But let us recognize that some women do have disturbing hot flashes; we advise them to consult their gynecologists.

- **A woman who has had a hysterectomy will not undergo menopause afterward.** Actually, it depends on whether the ovaries (the major producers of estrogen) were also removed. If they were not, menopause should proceed normally.

- **Menopause signals an end to a woman’s sexual appetite.** Truth or Fiction Revisited: It is not true that menopause signals an end to women’s sexual appetite. In fact, some women feel newly sexually liberated because of the separation of sex from pregnancy.

- **A woman’s general level of activity is lower after menopause.** Many postmenopausal women become peppier and more assertive.
can increase the clotting of blood, it might pose a risk to the older women, even if it helps the younger women.

What can we conclude? Research results on the benefits and dangers of HRT are mixed, and women considering HRT are well advised to explore the latest findings with their health-care providers. They might also consider alternatives. Breast cancer specialist Larry Norton (cited in Duenwald, 2002) notes that progestin alone prevents or lessens hot flashes in about 70% of women. Selective serotonin reuptake inhibitors (SSRIs), such as Effexor, Paxil, and Prozac, are also of help (Stearns et al., 2003). Women using SSRIs to treat hot flashes usually take half the dose used to treat depression, which is their main usage, although they are also helpful with premenstrual syndrome (PMS), premenstrual dysphoric disorder (PMDD), eating disorders, and other problems.

Vaginal dryness can be treated with estrogens that are used locally—that is, placed in the vagina rather than the bloodstream, as hormones usually are. Creams (e.g., Estrace), suppositories (Vagifem), and a plastic ring (Estring) are available for the purpose.

Drinking milk, which is high in calcium, increases bone density among girls and is likely to help prevent against osteoporosis later in life. Calcium supplements and the bisphosphonates (Actonel or Fosamax) also help maintain bone strength.

Some women use HRT to help get through the years leading up to menopause and then stop it. At this time it appears that the one thing we can predict is that different health-care providers are likely to have different views on the matter.

**Menstrual Problems**

Although menstruation is a natural biological process, 50 to 75% of women experience some discomfort prior to or during menstruation (Sommerfeld, 2000). The Self-Assessment on page 96 concerns common premenstrual symptoms. The problems we explore in this section include dysmenorrhea, mastalgia, menstrual migraine headaches, amenorrhea, premenstrual syndrome (PMS), and premenstrual dysphoric disorder (PMDD).

**Dysmenorrhea**

Pain or discomfort during menstruation—**dysmenorrhea**—is the most common menstrual problem. Most women at some time have at least mild menstrual pain or discomfort, so it is perfectly normal, even if annoying. Pelvic cramps are the most common manifestation of dysmenorrhea. They may be accompanied by headache, backache, nausea, or bloated feelings. Women who develop severe cases usually do so within a few years of menarche. **Primary dysmenorrhea** refers to menstrual pain or discomfort in the absence of known organic pathology. Women with **secondary dysmenorrhea** have identified organic problems that are believed to cause their menstrual problems. Their pain or discomfort is caused by, or secondary to, these problems. Endometriosis, pelvic inflammatory disease, and ovarian cysts are just a few of the organic disorders that can give rise to secondary dysmenorrhea. Evidence is accumulating, however, that supposed primary dysmenorrhea is often secondary to hormonal changes, although the precise causes have not been delineated. For example, menstrual cramps sometimes decrease dramatically after childbirth, as a result of the massive hormonal changes that occur with pregnancy. Women who have been
Anorexia nervosa is a psychological disorder of eating characterized by intense fear of putting on weight and refusal to eat enough to maintain normal body weight. Prostaglandins are hormones that cause muscle fibers in the uterine wall to contract, as during labor. Most contractions go unnoticed, but powerful, persistent contractions are discomforting in themselves and may temporarily deprive the uterus of oxygen, another source of distress. Women with more intense menstrual discomfort apparently produce higher quantities of prostaglandins. Prostaglandin-inhibiting drugs, such as ibuprofen, indomethacin, and aspirin, are often helpful. Menstrual pain may also be secondary to endometriosis.

Pelvic pressure and bloating may be traced to pelvic edema (Greek for “swelling”)—the congestion of fluid in the pelvic region. Fluid retention can lead to a gain of several pounds, sensations of heaviness, and mastalgia—a swelling of the breasts that sometimes causes premenstrual discomfort. Masters and Johnson (1966) noted that orgasm can help relieve menstrual discomfort by reducing the pelvic congestion that spawns bloating and pressure. Orgasm may also increase the menstrual flow and shorten this phase of the cycle.

Headaches frequently accompany menstrual discomfort. Most headaches (in both sexes) stem from simple muscle tension, notably in the shoulders, the back of the neck, and the scalp. Pelvic discomfort may cause muscle contractions, therefore contributing to the tension that produces headaches. Women who are tense about their menstrual flow are thus candidates for muscle tension headaches. Migraine headaches may arise from changes in the blood flow in the brain, however. Migraines are typically limited to one side of the head and are often accompanied by visual difficulties.

**Amenorrhea**

Amenorrhea is the absence of menstruation and is a primary sign of infertility. Primary amenorrhea describes the absence of menstruation in a woman who has not menstruated at all by about the age of 16 or 17. Secondary amenorrhea describes delayed or absent menstrual periods in women who have had regular periods in the past. Amenorrhea has various causes, including abnormalities in the structures of the reproductive system, hormonal abnormalities, growths such as cysts and tumors, and psychological problems, such as stress. Amenorrhea is normal during pregnancy and following menopause. Amenorrhea is also a symptom of anorexia nervosa, an eating disorder characterized by an intense fear of putting on weight and a refusal to eat enough to maintain a normal body weight, which often results in extreme (and sometimes life-threatening) weight loss. Hormonal changes that accompany emaciation are believed responsible for the cessation of menstruation. Amenorrhea may also occur in women who exercise strenuously, such as competitive long-distance runners (Robert-McComb, 2008). It is unclear whether the cessation of menstruation in female athletes is due to the effects of strenuous exercise itself, to related physical factors such as low body fat, to the stress of intensive training, or to a combination of factors.

**Premenstrual Syndrome (PMS) and Premenstrual Dysphoric Disorder (PMDD)**

The term premenstrual syndrome (PMS) describes the combination of biological and psychological symptoms that may affect women during the 4- to 6-day interval that precedes their menses each month. For many women, premenstrual symptoms pregnant report a lower incidence of menstrual pain but a higher incidence of premenstrual symptoms and menstrual discomfort.

Menstrual cramps appear to result from uterine spasms that may be brought about by copious secretion of hormones called prostaglandins. Prostaglandins apparently cause muscle fibers in the uterine wall to contract, as during labor. Most contractions go unnoticed, but powerful, persistent contractions are discomfiting in themselves and may temporarily deprive the uterus of oxygen, another source of distress. Women with more intense menstrual discomfort apparently produce higher quantities of prostaglandins. Prostaglandin-inhibiting drugs, such as ibuprofen, indomethacin, and aspirin, are often helpful. Menstrual pain may also be secondary to endometriosis.

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The term premenstrual syndrome (PMS) describes the combination of biological and psychological symptoms that may affect women during the 4- to 6-day interval that precedes their menses each month. For many women, premenstrual symptoms
1. Feelings of sadness, hopelessness, or worthlessness
2. Tension, anxious, feeling “on edge”
3. Notable changes in mood, including frequent crying
4. Persistent irritability and anger, often leading to increased interpersonal conflict
5. Lessened interest in usual activities, possibly with withdrawal from social relationships
6. Difficulty concentrating
7. Fatigue, lethargy, lack of energy
8. Notable changes in appetite, such as binge eating or craving certain foods
9. Hypersomnia (sleeping too much) or insomnia
10. Feeling overwhelmed or out of control
11. Other physical symptoms, for example, tenderness or swelling of the breasts, headaches, joint or muscle pain, feelings of bloating, weight gain

Premenstrual dysphoric disorder (PMDD) is a more technical term used as a diagnostic category by the American Psychiatric Association in its *Diagnostic and Statistical Manual (DSM)*. PMDD is more severe than PMS, and is characterized by the symptoms shown in Figure 3.16. The term is not always used precisely, and some make the mistake of confusing it with PMS. But the diagnosis of PMDD requires that five or more of the symptoms be present most of the time during the week before the period and ending within a few days after the period begins. At least one symptom must be one of the first four. The symptoms must notably impair functioning at work or school or in social activities and relationships.

Nearly three women in four experience some premenstrual symptoms (Sommerfeld, 2000). A study of Chinese women in Taiwan reported that the most common symptoms of PMS are minor psychological discomfort, muscle tension, and aches or pains (Hsiao et al., 2002). The great majority of cases involve mild to moderate discomfort. Only a small minority of women report menstrual symptoms severe enough to impair their social, academic, or occupational functioning. The causes of PMS and PMDD are unclear, but researchers are looking to possible relationships between menstrual problems, including PMS and PMDD, and chemical imbalances in the body. Researchers have yet to find differences in levels of estrogen or progesterone between women with PMDD and those with PMS or no symptoms (Bäckström et al., 2003), but possibly an abnormal response to these hormones (Schmidt et al., 1998). Also, PMS and PMDD appear to be linked with imbalances in neurotransmitters such as serotonin (Bäckström et al., 2003; Mortola, 1998). (Neurotransmitters are the chemical messengers in the nervous system.) Serotonin imbalances are also linked to changes in appetite. Women with PMS and PMDD show greater increases of appetite during the luteal phase than other women do. Another neurotransmitter, gamma-aminobutyric acid (GABA), also appears to be involved in premenstrual problems; medicines that affect the levels of GABA help many women with these problems (Bäckström et al., 2003). PMS and PMDD may well be caused by a...
Menstrual Problems

A couple of generations ago, premenstrual disorders were seen as “a woman’s lot”—something women must put up with. No longer. Today there are many treatment options. These include exercise; dietary control (for example, eating several small meals a day rather than two or three large meals, limiting salt and sugar, supplementing diet with vitamins); hormone treatments (usually progesterone); and medications that reduce anxiety or increase the amount of serotonin in the nervous system. You can get in touch with whether you have PMS, and how the symptoms affect you, by completing the nearby Self-Assessment. If you have severe or disabling symptoms, you may be diagnosable with PMDD. What can women do about PMS or PMDD? Check with your gynecologist and consider the suggestions in the following section.

How to Handle Menstrual Discomfort

Most women experience some menstrual discomfort. Women with persistent menstrual distress may profit from the suggestions listed here. Researchers are exploring the effectiveness of these techniques in controlled studies. You might consider trying the suggestions that sound right for you—all of them, if you wish. Try them for a few months to see if you reap any benefits.

- Don’t blame yourself! Menstrual problems were once erroneously attributed to women’s “hysterical” nature. This is nonsense. Menstrual problems appear, in large part, to reflect hormonal variations or chemical fluctuations in the brain during the menstrual cycle. Researchers have not yet fully identified all the causal elements and patterns, but their lack of knowledge does not mean that women who have menstrual problems are hysterical.

- Keep a menstrual calendar, so that you can track your menstrual symptoms systematically and identify patterns.

- Develop strategies for dealing with days that you experience the greatest distress—strategies that will help enhance your pleasure and minimize the stress affecting you on those days. Activities that distract you from your menstrual discomfort may be helpful. Go see a movie or get into that novel you’ve been meaning to read.

- Consider whether you harbor self-defeating attitudes toward menstruation that might compound distress. Do close relatives or friends see menstruation as an illness, a time of “pollution,” a “dirty thing”? Have you adopted any of these attitudes—if not verbally, then in ways that affect your behavior, such as by restricting your social activities during your period?

- See a gynecologist about your concerns, especially if you have severe symptoms. Severe menstrual symptoms can be secondary to medical disorders such as endometriosis and pelvic inflammatory disease (PID). Check it out.

- Ask your gynecologist about oral contraceptives that reduce the number of menstrual periods to four per year (Seasonale or Seasonique) or one per year (Lybrel). Still others shorten periods (Roan, 2006).

- Develop nutritious eating habits—and continue them throughout the entire cycle (that means always). Consider limiting intake of alcohol, caffeine, fats, salt, and sweets, especially during the days preceding menstruation. Research suggests...
Premenstrual syndrome (PMS) is a group of symptoms that may affect women for the period of about eight days prior to and during menstruation. Research evidence suggests that most women have some of these symptoms but that most often they are not severe enough to seriously impair daily functioning. When they do, these symptoms may qualify as premenstrual dysphoric disorder (PMDD). Women who have severe, even disabling, symptoms, are advised to discuss them with their gynecologists.

Do you experience PMS or PMDD? Complete the following self-assessment to gain insight into whether you do.

**Directions:** Following is a list of psychological and physical symptoms of PMS and PMDD. Indicate whether you encounter these symptoms and how severe they are by checking the appropriate box. Then turn to the answer key in Appendix A to assess your responses.

### Do You Experience PMS or PMDD?

#### Part I: Psychological Symptoms of PMS

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Do Not Have</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Disabling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accident prone</td>
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<tr>
<td>Depression</td>
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<tr>
<td>Anxiety</td>
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<td>Panic</td>
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<tr>
<td>Mood swings</td>
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<tr>
<td>Crying spells</td>
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<tr>
<td>Sudden anger</td>
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<td>Irritability</td>
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<td>Loss of interest in usual activities</td>
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<td>Difficulty concentrating</td>
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<tr>
<td>Lack of energy</td>
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<tr>
<td>Excessive use of alcohol</td>
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<tr>
<td>Frustration</td>
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<tr>
<td>Overeating or cravings for certain foods</td>
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<tr>
<td>Insomnia or excessive sleeping</td>
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<tr>
<td>Feelings of being out of control or overwhelmed</td>
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<tr>
<td>Paranoia</td>
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</table>

#### Part II: Physical Symptoms of PMS

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Do Not Have</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Disabling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Migraines</td>
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<tr>
<td>Breast tenderness</td>
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<tr>
<td>Joint or muscle pain</td>
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<td>Stiffness</td>
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<tr>
<td>Weight gain</td>
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<tr>
<td>Feeling bloated</td>
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<tr>
<td>Blurred vision</td>
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<tr>
<td>Poor motor coordination</td>
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<td></td>
<td></td>
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<tr>
<td>Exhaustion</td>
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<td>Dark circles under the eyes</td>
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<tr>
<td>Runny eyes</td>
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Source: Lois Fichner-Rathus and Spencer A. Rathus. All rights reserved.
that a low-fat, vegetarian diet reduces the duration and intensity of menstrual pain and the duration of premenstrual symptoms (Barnard et al., 2000).

- Eat several smaller meals (or nutritious snacks) throughout the day, rather than a few highly filling meals.

- Some women find that vigorous exercise—jogging, swimming, bicycling, fast walking, dancing, skating, even jumping rope—helps relieve premenstrual and menstrual discomfort. Evidence suggests that exercise helps to relieve and possibly prevent menstrual discomfort (Daley, 2009).

- Check with your doctor about vitamin and mineral supplements (such as calcium and magnesium). Vitamin B6 appears to have helped some women (Chavez & Spitzer, 2002).

- Ibuprofen (brand names: Medipren, Advil, Motrin, etc.) and other medicines available over the counter may be helpful for cramping. Prescription drugs such as anti-anxiety drugs (e.g., alprazolam) and anti-depressant drugs (selective serotonin reuptake inhibitors or SSRIs) may also be of help (Bäckström et al., 2003; Stearns et al., 2003). Anti-depressants affect levels of neurotransmitters in a way that can be helpful for women with PMS or PMDD. Their benefits do not mean that women with PMS or PMDD are depressed. Ask your doctor for a recommendation.

- Remind yourself that menstrual problems are time limited. Don’t worry about getting through life or a career. Just get through the next couple of days.

In this chapter we have explored female sexual anatomy and physiology. In the following chapter, we turn our attention to the male.
Female Sexual Anatomy and Physiology

The 3 R's: Reflect, Recite, and Review

Your text uses the PQ4R method. Congratulations on completing the first R—reading the chapter. The remaining 3 R’s—reflect, recite, and review—will help you understand and recall the material in the chapter, as well as test your mastery.

Reflect

- Are the female sex organs more complex than you had believed? If so, how? Were any erroneous ideas corrected by the information in this chapter?
- Feminist Germaine Greer wrote, “The degree of attention which breasts receive, combined with the confusion about what the breast fetishists actually want, makes women unduly anxious about them. They can never be just right; they must always be too small, too big, the wrong shape, too flabby.” How important is the size and shape of your breasts (or your partner’s breasts) to you? Why?
- Do people from your sociocultural background tend to hold any particular attitudes toward menstruation? What are they? Do you share these attitudes? Explain.
- Do you (or your loved ones) experience PMS or PMDD? What are you (or they) doing about it? Why?

CRITICAL THINKING: How has the material on female anatomy and physiology changed your views of the female sex organs? If your views have not changed, explain why.

Recite

1. What are the female external sex organs?
- The mons veneris is a mound of fatty tissue that covers the pubic area. The labia majora are large folds of skin that run downward from the mons along the sides of the vulva. The labia minora are hairless membranes that surround the urethral and vaginal openings. The clitoris is highly sensitive to sexual sensation but not directly involved in reproduction. The vestibule contains the openings to the vagina and the urethra. Urine passes from the female’s body through the urethral opening. The vaginal opening, or introitus, lies below the urethral opening.

2. What are the internal female sex organs?
- Menstrual flow and babies pass from the uterus to the outer world through the vagina. During coitus, the vagina contains the penis. The cervix contains an opening called the os. Cervical cancer is connected with HPV and detectable via a Pap test. The uterus is the pear-shaped organ in which a fertilized ovum implants and develops until birth. The uterine lining is called the endometrium. Ova pass through the fallopian tubes on their way to the uterus and are normally fertilized within these tubes. The ovaries produce ova and the sex hormones estrogen and progesterone.

3. What are the breasts?
- The breasts are secondary sex characteristics that contain mammary glands. Women with breast cancer have lumps in the breast, but most lumps are benign. Risk factors include family history, BRCA1 or BRCA2 mutations, exposure to estrogen, and alcohol.

4. What is the menstrual cycle?
- Menstruation is the cyclical bleeding that stems from the shedding of the endometrium when a reproductive cycle has not led to the fertilization of an ovum. The cycle has four phases: proliferative, ovulatory, secretory, and menstrual. During the first phase, ova ripen within their follicles and endometrial tissue proliferates. During the second phase, ovulation occurs. During the third phase, the corpus luteum produces copious amounts of progesterone and estrogen that cause the endometrium to thicken. If the ovum goes unfertilized, a plunge in estrogen and progesterone levels triggers the fourth, or menstrual, phase.
- Menopause is the cessation of menstruation. Perimenopause is the beginning of menopause and is characterized by irregular periods or amenorrhea. The climacteric is a multiyear process marked by declining levels of estrogen and ending in menopause. Hormone replacement ther-
5. What kinds of menstrual problems do women encounter?
- Dysmenorrhea—painful menstruation—is the most common menstrual problem, and pelvic cramps are the most common symptom. Amenorrhea—the lack of menstruation—can be caused by abnormalities in the structures of the reproductive system, hormonal abnormalities, cysts, tumors, and stress. Premenstrual syndrome (PMS) can be characterized by depression and anxiety, irritability, difficulty concentrating, migraines, breast tenderness, and bloating. Premenstrual dysphoric disorder (PMDD) is like a severe case of PMS, said to occur when symptoms are extreme and impair functioning in school, at work, or in relationships.

---

1. HPV is connected with
   (a) cervical cancer.
   (b) endometrial cancer.
   (c) breast cancer.
   (d) ovarian cancer.

2. Urine passes through the
   (a) uterus.
   (b) urethra.
   (c) cervix.
   (d) introitus.

3. Menstrual cramps are thought to be caused by
   (a) estrogen.
   (b) progesterone.
   (c) prostaglandins.
   (d) testosterone.

4. Hot flashes and flushes stem largely from waves of dilation of
   (a) the cervix.
   (b) blood vessels.
   (c) ovarian follicles.
   (d) muscles.

5. The endometrium develops during the ________ phase of the menstrual cycle.
   (a) ovulatory
   (b) menstrual
   (c) secretory
   (d) proliferative

6. A surge of ________ triggers ovulation.
   (a) follicle stimulating hormone
   (b) luteinizing hormone
   (c) oxytocin
   (d) prolactin

7. The ________ is the only organ whose only known purpose is the experiencing of sexual pleasure.
   (a) cervix
   (b) vagina
   (c) breast
   (d) clitoris

8. For women who obtain HRT, combining estrogen with ________ lessens the risk of endometrial cancer.
   (a) progestin
   (b) prolactin
   (c) oxytocin
   (d) prostaglandins

9. Skeptics concerning the G spot are most likely to argue that
   (a) the anterior vaginal wall is not sensitive to erotic stimulation.
   (b) the G spot is not a discrete sex organ.
   (c) no research has been done into the existence of the G spot.
   (d) G spot is a silly name for a sex organ.

10. When the hypothalamus senses a low level of estrogen in the blood, it increases secretion of Gn-RH, which in turn triggers the pituitary gland to release
    (a) FSH.
    (b) LH.
    (c) the graafian follicle.
    (d) prolactin.