The Reproductive System

FOCUS: Reproductive organs in males and females produce sex cells. The reproductive organs sustain the sex cells, transport them to the site where fertilization can occur, and, in the female, nurture the developing offspring both before and, for a time, after birth. Reproductive organs also produce hormones that play important roles in the development and maintenance of the reproductive system. These hormones help determine sexual characteristics, influence sexual behavior, and play a major role in regulating the physiology of the reproductive system.

CONTENT LEARNING ACTIVITY

Formation of Sex Cells

The formation of sex cells takes place by meiosis.

Match these terms or numbers with the correct statement or definition:

- Fertilization
- Oocyte
- Polar body
- Sperm cell
- Zygote

1. The number of cell divisions that occur during meiosis.
2. The number of chromosomes in human cells before meiosis.
3. The number of chromosomes produced by meiosis in the sex cells of humans.
4. In females, the developing sex cell that receives most of the cytoplasm.
5. The uniting of a male and female sex cell.
6. The cell that results from fertilization.
Scrotum and Testes

The testes are the male’s primary reproductive organs.

Match these terms with the correct statement or definition:

Cremaster muscle | Lobules
Dartos muscle | Seminiferous tubules
Interstitial cells | Scrotum

1. Sac containing the testes.
2. Two structures that regulate the temperature of the testes.
3. Subdivisions of the testes.
4. Site of sperm cell development.
5. Responsible for testosterone production.

If the testes become too warm or too cold, normal sperm cell development does not occur.

Spermatogenesis

Spermatogenesis is the formation of sperm cells.

Match these terms with the correct statement or definition:

Acrosome | Sperm cell
Primary spermatocytes | Spermatid
Secondary spermatocytes | Spermatogonia
Sertoli cells

1. Large cells that nourish the germ cells and produce hormones.
2. Most peripheral cells; they divide by mitosis.
3. Germ cells produced from spermatogonia, which divide into two cells during the first meiotic division.
4. Formed from primary spermatocytes these cells undergo a second meiotic division.
5. Produced from a secondary spermatocyte; each has 23 chromosomes.
6. Develop from a spermatid by forming a head, midpiece, and flagellum; spermatozoon.
7. Sperm cell vesicle containing enzymes released during fertilization.
**Ducts**

*Sperm cells leave the testes and pass through a series of ducts to reach the exterior of the body.*

<table>
<thead>
<tr>
<th>Match these terms with the correct statement or definition:</th>
<th>Ductus deferens</th>
<th>Rete testis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Efferent ductules</td>
<td>Spermatid cord</td>
</tr>
<tr>
<td></td>
<td>Ejaculatory duct</td>
<td>Urethra</td>
</tr>
<tr>
<td></td>
<td>Epididymis</td>
<td></td>
</tr>
</tbody>
</table>

1. Receive sperm cells from the seminiferous tubules.
2. Tubes that exit the testis.
3. Receives the efferent ductules from the testis; a comma-shaped structure on the outside of the testis.
4. Site of sperm cell maturation.
5. Duct that passes through the abdominal wall.
6. Blood vessels and nerves that supply the testis, the cremaster muscle, and the ductus deferens.
7. Formed by the ampulla of the ductus deferens and a duct from the seminal vesicle; empties into the urethra.
8. Extends to the tip of the penis.

A vasectomy is a surgical procedure for producing sterility in males.

**Penis**

*The penis is the male organ of copulation and it transfers sperm cells from the male to the female.*

<table>
<thead>
<tr>
<th>Match these terms with the correct statement or definition:</th>
<th>Erection</th>
<th>Corpus spongiosum</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>External urethral orifice</td>
<td>Glans penis</td>
</tr>
<tr>
<td></td>
<td>Circumcision</td>
<td>Prepuce</td>
</tr>
<tr>
<td></td>
<td>Corpora cavernosa</td>
<td></td>
</tr>
</tbody>
</table>

1. Engorgement of penile erectile tissue with blood.
2. Paired columns of erectile tissue in the penis.
3. Single column of erectile tissue in the penis; the urethra passes through it.
4. Expanded distal end of the penis.
5. Opening of the urethra to the exterior.
6. Skin that covers the glans penis; foreskin.
7. Surgical removal of the prepuce.
A. **Match these terms with the correct statement or definition:**

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bulbourethral glands</td>
<td>Two sac-shaped glands near the ampulla of the ductus deferens.</td>
</tr>
<tr>
<td>Prostate gland</td>
<td>Gland the size and shape of a walnut that surrounds the urethra and the two ejaculatory ducts.</td>
</tr>
<tr>
<td>Semen</td>
<td>Small glands located near the base of the penis.</td>
</tr>
<tr>
<td>Seminal vesicles</td>
<td>Mixture of sperm cells and glandular secretions.</td>
</tr>
<tr>
<td></td>
<td>Glands producing a mucous secretion that neutralizes the acidic urethra.</td>
</tr>
<tr>
<td></td>
<td>Glands producing thick, mucuslike secretions containing nutrients that nourish the sperm cells.</td>
</tr>
<tr>
<td></td>
<td>Gland producing thin, milky secretions with an alkaline pH that neutralizes acidic secretions of the testes, seminal vesicles, and the vagina.</td>
</tr>
</tbody>
</table>

B. **Match these terms with the correct parts labeled in figure 19.1:**

Bulbourethral gland  
Ductus deferens  
Ejaculatory duct  
Epididymis  
External urethral orifice  
Penis  
Prostate gland  
Scrotum  
Seminal vesicle  
Testis  
Urethra

1. ______________________ 5. ______________________ 9. ______________________
2. ______________________ 6. ______________________ 10. ______________________
3. ______________________ 7. ______________________ 11. ______________________
4. ______________________ 8. ______________________
Male Sex Hormones

“Hormones are responsible for the development and maintenance of reproductive structures.”

Match these terms with the correct statement or definition:

<table>
<thead>
<tr>
<th>FSH</th>
<th>LH</th>
</tr>
</thead>
<tbody>
<tr>
<td>GnRH</td>
<td>Testosterone</td>
</tr>
<tr>
<td>Inhibin</td>
<td></td>
</tr>
</tbody>
</table>

1. Hormone released from the hypothalamus; stimulates the anterior pituitary to secrete two hormones.

2. Released from the anterior pituitary; stimulates interstitial cells to secrete testosterone.

3. Released from the anterior pituitary; binds to Sertoli cells and promotes sperm cell development and inhibin secretion.

4. Secreted by Sertoli cells; inhibits FSH secretion.

5. Before puberty, small amounts are produced by the testes and adrenal gland; inhibits GnRH, LH, and FSH secretion.

6. Causes the enlargement and differentiation of the male genitalia; promotes the development of secondary sexual characteristics; necessary for spermatogenesis.

Male Sexual Behavior and the Male Sex Act

“Neural mechanisms are primarily involved in controlling the sexual act.”

Match these terms with the correct statement or definition:

<table>
<thead>
<tr>
<th>Ejaculation</th>
<th>Orgasm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emission</td>
<td>Resolution</td>
</tr>
<tr>
<td>Erection</td>
<td>Testosterone</td>
</tr>
<tr>
<td>Impotence</td>
<td></td>
</tr>
</tbody>
</table>

1. Hormone required for normal sexual behavior.

2. Pleasurable sensation associated with ejaculation.

3. Inability to accomplish the sexual act.

4. Occurs when parasympathetic action potentials cause the dilation of the arteries that supply blood to the erectile tissue of the penis.

5. Sympathetic action potentials stimulate the seminal vesicles and prostate gland to release their secretions.

6. Rhythmic contractions that force semen out of the urethra; caused by action potentials sent to skeletal muscles at the base of the penis.

Sensory action potentials from the genitals activate sexual reflexes. Psychic stimuli such as sight, sound, odor, or thoughts, also have a major effect on sexual responses.
Ovaries

The ovaries are attached to ligaments that suspend them in the pelvic cavity.

A. Match these terms with the correct statement or definition:

<table>
<thead>
<tr>
<th>Term</th>
<th>Broad ligament</th>
<th>Mesovarium</th>
<th>Ovarian ligament</th>
<th>Suspensory ligament</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Holds the uterus, uterine tubes, and ovaries in place.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Peritoneum that attaches the ovaries to the broad ligament.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Ligament that extends from the lateral body wall to the ovary.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Attaches the ovary to the uterus.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

B. Match these terms with the correct statement or definition:

<table>
<thead>
<tr>
<th>Term</th>
<th>Mature follicle</th>
<th>Primary follicle</th>
<th>Oocyte</th>
<th>Primary oocyte</th>
<th>Oogonia</th>
<th>Primordial follicle</th>
<th>Ovarian follicle</th>
<th>Secondary follicle</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. General term for the female germ cell.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. General term for an oocyte and the cells that surround it.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Cells from which oocytes develop.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. An oocyte that has started the first meiotic division.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>5. The primary oocyte surrounded by a single layer of flat granulosa cells.</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Consists of several layers of granulosa cells surrounding the primary oocyte; a clear layer, the zona pellucida, surrounds the oocyte.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Follicle that has just developed an antrum; the oocyte is surrounded by the cumulus mass; the follicle is surrounded by the theca.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>8. Enlarged secondary follicle on the surface of the ovary; a Graafian follicle.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The developing follicles secrete estrogen that prepares the uterus to receive the fertilized ovum.
C. Using the terms provided, complete these statements:

1. ________________
2. ________________
3. ________________
4. ________________
5. ________________
6. ________________
7. ________________
8. ________________

Rupture of the mature follicle and release of the oocyte from the ovary is called (1). Near this time the primary oocyte completes the first meiotic division to form the (2), which begins the second meiotic division. The second meiotic division is completed only if (3) occurs. The ruptured follicle becomes the (4), which secretes (5) and (6). If fertilization occurs, the placenta secretes (7), which causes the corpus luteum to persist and continue to produce hormones that are necessary to maintain the pregnancy. After the first trimester the (8) produces hormones and the corpus luteum degenerates.

Uterine Tubes, Uterus, and Vagina

“"The uterus is the site of development of a new individual.""

A. Match these terms with the correct statement or definition:

- Body of uterus
- Myometrium
- Cervical canal
- Perimetrium
- Cervix
- Uterine cavity
- Endometrium
- Uterine tubes
- Fimbriae
- Vagina
- Hymen
- Uterine cavity
- Myometrium
- Cervical canal
- Perimetrium
- Cervix
- Uterine cavity
- Endometrium
- Uterine tubes
- Fimbriae
- Vagina
- Hymen

1. ________________
   - Extend from the ovaries to the uterus; conduct the oocyte to the uterus; also called fallopian tubes or oviducts.

2. ________________
   - Long processes that surround the ovary and sweep the oocyte into the uterine tube.

3. ________________
   - Fertilization usually occurs here.

4. ________________
   - The inferior, narrow neck of the uterus.

5. ________________
   - Cavity that opens into the vagina.

6. ________________
   - Outer layer of the uterine wall consisting of peritoneum.

7. ________________
   - Middle muscular layer of the uterine wall.

8. ________________
   - Inner epithelial and connective tissue layer of the uterus.

9. ________________
   - The female organ of copulation; also allows menstrual flow and childbirth.

10. ________________
    - Mucous membrane covering the opening of the vagina in young females.
B. **Match these terms with the correct parts labeled in figure 19.2:**

- Body of uterus
- Cervical canal
- Cervix
- Endometrium
- Myometrium
- Ovary
- Ovarian ligament
- Perimetrium
- Round ligament
- Suspensory ligament
- Uterine cavity
- Uterine tube
- Vagina

<p>| | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
</tr>
</tbody>
</table>

![Figure 19.2](image)

**External Genitalia**

*The external genitalia is also called the vulva or pudendum.*

A. **Match these terms with the correct statement or definition:**

<table>
<thead>
<tr>
<th></th>
<th>Clinical perineum</th>
<th>Mons pubis</th>
<th>Clitoris</th>
<th>Pudendal cleft</th>
<th>Labia majora</th>
<th>Vestibular glands</th>
<th>Labia minora</th>
<th>Vestibule</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>The space into which the vagina and urethra open.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Thin, longitudinal skin folds bordering the vestibule.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Small erectile structure covered by the prepuce.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Glands that maintain the moistness of the vestibule.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Rounded folds of skin lateral to the labia minora.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Elevation of tissue located over the pubic symphysis.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Space between the labia majora.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>The region between the vagina and anus; the location where an episiotomy is performed.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
B. Match these terms with the correct parts labeled in figure 19.3:

Clinical perineum
Clitoris
Labia majora
Labia minora
Mons pubis
Prepuce
Urethra
Vagina
Vestibule

<table>
<thead>
<tr>
<th>1.</th>
<th>2.</th>
<th>3.</th>
<th>4.</th>
<th>5.</th>
<th>6.</th>
<th>7.</th>
<th>8.</th>
<th>9.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clitoris</td>
<td>Labia majora</td>
<td>Mons pubis</td>
<td>Urethra</td>
<td>Prepuce</td>
<td>Vagina</td>
<td>Clinical perineum</td>
<td>Labia minora</td>
<td>Anus</td>
</tr>
</tbody>
</table>

Figure 19.3

---

**Mammary Glands**

The mammary glands are the organs of milk production and are located in the breasts or mammae.

A. Match these terms with the correct statement or definition:

<table>
<thead>
<tr>
<th>Alveoli</th>
<th>Areola</th>
<th>Gynecomastia</th>
<th>Lobe</th>
<th>Lobule</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Circular, pigmented area surrounding the nipple.</td>
<td>2. Enlarged breasts in males.</td>
<td>3. Glandular compartment of the mammary glands, each of which possesses a single duct that opens on the surface of the nipple.</td>
<td>4. Subdivision of the lobes; contains the milk-producing structures.</td>
<td>5. Secretory sacs that produce milk.</td>
</tr>
</tbody>
</table>
B. Match these terms with the correct parts labeled in figure 19.4:

<table>
<thead>
<tr>
<th>Areola</th>
<th>Lobule</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lactiferous duct</td>
<td>Nipple</td>
</tr>
<tr>
<td>Lobe</td>
<td></td>
</tr>
</tbody>
</table>

1. __________________
2. __________________
3. __________________
4. __________________
5. __________________

![Figure 19.4](image)

**Puberty**

“Puberty in females is marked by the first episode of menstrual bleeding, which is called menarche.

Using the terms provided, complete these statements:

1. __________________
2. __________________
3. __________________
4. __________________
5. __________________

Using the terms provided, complete these statements:

- **Cyclic**: GnRH
- **Estrogen and progesterone**: High
- **FSH and LH**: Low

The changes associated with puberty in the female are primarily the result of elevated levels of (1) secreted by the ovaries. Before puberty, the rate of secretion of (2) from the hypothalamus, and (3) from the anterior pituitary are very (4). After puberty, the rate of secretion of GnRH, FSH, and LH increases and becomes (5), and is responsible for the pattern of estrogen and progesterone secretion of the adult.
Menstrual Cycle

The term menstrual cycle refers to the series of changes that occur in sexually mature, nonpregnant women that culminate in menses.

A. Match these terms with the correct statement or definition:

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female climacteric</td>
<td>Cessation of menstrual cycles.</td>
</tr>
<tr>
<td>Menopause</td>
<td>Period from the onset of irregular menstrual cycles to their complete cessation.</td>
</tr>
<tr>
<td>Menses</td>
<td>8. Period from the onset of irregular menstrual cycles to their complete cessation.</td>
</tr>
<tr>
<td>Ovulation</td>
<td>1. Phase in which the endometrium of the uterus is sloughed; day 1 to days 4 or 5 of the cycle.</td>
</tr>
<tr>
<td>Proliferative phase</td>
<td>2. Phase in which the endometrium begins to thicken and form glands; time between ending of menses and ovulation; days 4 or 5 to day 14 of the cycle.</td>
</tr>
<tr>
<td>Secretory phase</td>
<td>4. Phase in which the endometrium reaches its greatest degree of development and glands secrete a small amount of fluid; time between ovulation and the next menses; days 14 to 28 of the cycle.</td>
</tr>
<tr>
<td></td>
<td>5. Phase in which a mature follicle is produced.</td>
</tr>
<tr>
<td></td>
<td>6. Phase in which the corpus luteum is formed.</td>
</tr>
<tr>
<td></td>
<td>7. Cessation of menstrual cycles.</td>
</tr>
<tr>
<td></td>
<td>3. Release of the oocyte from the ovary; day 14 of the cycle.</td>
</tr>
</tbody>
</table>

During the climacteric, some women experience “hot flashes,” irritability, fatigue, anxiety, and occasionally severe emotional disturbances. Many of these symptoms can be effectively treated with estrogen.

B. Match these terms with the correct parts labeled in figure 19.5:

<table>
<thead>
<tr>
<th>Term</th>
<th>Labeled Part</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corpus luteum</td>
<td>1. Degenerated corpus luteum</td>
</tr>
<tr>
<td>Degenerated corpus luteum</td>
<td>11. Mature follicle</td>
</tr>
<tr>
<td>Estrogen</td>
<td>6. Menses</td>
</tr>
<tr>
<td>FSH</td>
<td>7. Menses</td>
</tr>
<tr>
<td>GnRH</td>
<td>8. Menses</td>
</tr>
<tr>
<td>LH</td>
<td>9. Menses</td>
</tr>
<tr>
<td>Mature follicle</td>
<td>10. Menses</td>
</tr>
</tbody>
</table>

1. Degenerated corpus luteum

2. Estrogen

3. FSH

4. GnRH

5. LH

6. Menses

7. Menses

8. Menses

9. Menses

10. Menses

11. Mature follicle

12. Primary follicle

13. Primordial follicle

14. Progesterone

15. Proliferative phase
C. **Match these terms with the correct statement or definition:**

<table>
<thead>
<tr>
<th>Term</th>
<th>Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estrogen</td>
<td>1. Decline in this hormone causes the endometrium to be sloughed and results in menses.</td>
</tr>
<tr>
<td>LH</td>
<td></td>
</tr>
<tr>
<td>FSH</td>
<td>2. Increased secretion of this hormone from developing follicles causes the endometrium to thicken during the proliferative phase.</td>
</tr>
<tr>
<td>Progesterone</td>
<td>3. A large increase in this hormone results in ovulation.</td>
</tr>
<tr>
<td>GnRH</td>
<td>4. At the time of ovulation this hormone acts on immature follicles and stimulates them to start developing; the follicles mature in the next menstrual cycle.</td>
</tr>
<tr>
<td></td>
<td>5. Produced by the corpus luteum; primarily responsible for the secretory phase of the uterus.</td>
</tr>
<tr>
<td></td>
<td>6. Stimulates the secretion of FSH and LH from the anterior pituitary.</td>
</tr>
<tr>
<td></td>
<td>7. Hormone that stimulates the secretion of estrogen from follicles.</td>
</tr>
</tbody>
</table>

Premenstrual syndrome results in mood changes just before menses. In severe cases, aggression and other socially unacceptable behaviors may occur. The cause of premenstrual syndrome is unknown, but it may be caused by fluctuations in estrogen and progesterone.
Female Sexual Behavior and the Female Sex Act

Sexual drive in females, like sexual drive in males, is dependent upon hormones.

Using the terms provided, complete these statements:

<table>
<thead>
<tr>
<th>Clitoris</th>
<th>Psychic factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fertilization</td>
<td>Resolution</td>
</tr>
<tr>
<td>Orgasm</td>
<td>Vagina</td>
</tr>
</tbody>
</table>

1. ________________

2. ________________

3. ________________

4. ________________

5. ________________

6. ________________

Testosteronelike hormone and possibly estrogens affect brain cells and influence sexual behavior; however, (1) also play a role in sexual behavior. During sexual excitement, parasympathetic stimulation causes erectile tissue in the (2) and around the vaginal opening to become engorged with blood. Secretions from the (3) provide lubrication for the movement of the penis. Tactile stimulation during intercourse, as well as psychological stimuli, can trigger a(n) (4), the female climax. After the sexual act, there is a period of (5), characterized by an overall sense of satisfaction and relaxation. Although orgasm is a pleasurable component of sexual intercourse, it is not required for (6) to occur.

QUICK RECALL

1. List three functions of the male reproductive system.

2. List four functions of the female reproductive system.

3. List in the order of their formation the cells that are formed during spermatogenesis.

4. Starting at the site of sperm cell production, name in order the ducts sperm cells pass through to reach the exterior of the body.
5. Name the three types of glands in the male reproductive system and describe their secretions.


7. List six effects that testosterone has in the male.

8. List in the order of their formation the follicles of the ovary. Name the structure that develops from the follicle after ovulation.

9. Name the three phases of the menstrual cycle.

10. State the functions of GnRH, FSH, and LH in females.

11. List the effects of estrogen and progesterone on the uterus.
**WORD PARTS**

Give an example of a new vocabulary word that contains each word part.

<table>
<thead>
<tr>
<th>WORD PART</th>
<th>MEANING</th>
<th>EXAMPLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>semin-</td>
<td>semen</td>
<td>1.</td>
</tr>
<tr>
<td>-fer</td>
<td>to bear</td>
<td>2.</td>
</tr>
<tr>
<td>men-</td>
<td>month</td>
<td>3.</td>
</tr>
<tr>
<td>sperm-</td>
<td>seed</td>
<td>4.</td>
</tr>
<tr>
<td>oo-</td>
<td>an egg</td>
<td>5.</td>
</tr>
<tr>
<td>-genesis</td>
<td>origin</td>
<td>6.</td>
</tr>
</tbody>
</table>

**MASTERY LEARNING ACTIVITY**

Place the letter corresponding to the correct answer in the space provided.

_____ 1. If an adult male jumped into a swimming pool of cold water, which of the following would be expected to happen?
  a. the cremaster muscles contract
  b. the dartos muscles relax
  c. the skin of the scrotum becomes loose and thin
  d. the testes descend away from the body

_____ 2. Which of the following is correctly matched with its function?
  a. interstitial cells (cells of Leydig) - testosterone production
  b. Sertoli cells - nourish developing sperm cells
  c. seminiferous tubules - site of spermatogenesis
  d. all of the above

_____ 3. Given the following structures:
  1. ductus deferens
  2. efferent ductule
  3. epididymis
  4. ejaculatory duct
  5. rete testis

Choose the arrangement that lists the structures in the order sperm cells pass through them from the seminiferous tubules to the urethra.

a. 2, 3, 5, 4, 1
b. 2, 5, 3, 4, 1
c. 3, 2, 4, 1, 5
d. 3, 4, 2, 1, 5
e. 5, 2, 3, 1, 4
4. Given the following glands:
1. prostate gland
2. bulbourethral gland
3. seminal vesicle

Choose the arrangement that shows the order in which the glands contribute their secretions during the formation of semen.

a. 1, 2, 3
b. 2, 1, 3
c. 2, 3, 1
d. 3, 1, 2
e. 3, 2, 1

5. Which of the following glands is correctly matched with the function of the gland’s secretion?

a. bulbourethral gland - neutralizes acidic contents of the urethra
b. seminal vesicles - contains nutrients that nourish the sperm cells
c. prostate gland - alkaline pH that neutralizes the acidic secretions of the seminal vesicles and vagina
d. all of the above

6. LH in the male
a. stimulates GnRH secretion.
b. Sertoli cells to divide.
c. is higher before puberty than after puberty.
d. stimulates testosterone production.

7. Which of the following is consistent with erection?

a. parasympathetic stimulation of penile blood vessels
b. vasodilation of arteries
c. sinusoids fill with blood
d. compression of veins
e. all of the above

8. A polar body
a. is normally formed before fertilization.
b. is normally formed after fertilization.
c. is a sunbathing Eskimo.
d. normally receives most of the cytoplasm.
e. a and b

9. The corpus luteum
a. is formed from a primary follicle.
b. produces large amounts of testosterone.
c. degenerates in a few days if fertilization occurs.
d. functions until the placenta produces progesterone.

10. Given the following structures:
1. cervical canal
2. peritoneal cavity
3. uterine cavity
4. uterine tube

Assume a couple has just consummated the sex act and the sperm cells of the male have been deposited in the vagina. Trace the pathway of the sperm cells through the female’s reproductive tract to the ovary.

a. 1, 3, 2, 4
b. 1, 3, 4, 2
c. 3, 1, 2, 4
d. 3, 1, 4, 2
e. 4, 2, 1, 3

11. Given the following structures:
1. vaginal opening
2. clitoris
3. urethral opening
4. anus

Choose the arrangement that lists the structures in their proper order from the anterior to the posterior aspect.

a. 2, 3, 1, 4
b. 2, 4, 3, 1
c. 3, 1, 2, 4
d. 3, 1, 4, 2
e. 4, 2, 3, 1

12. Concerning the breasts,

a. even before puberty the female breast is quite different from the male breast.
b. the female breast enlarges in response to estrogens and progesterone.
c. ducts from the mammary glands open on the areola.
d. the alveoli subdivide to form lobules.
13. The major secretory product of the mature follicle is
   a. estrogen.
   b. progesterone.
   c. LH.
   d. FSH.
   e. GnRH.

14. Which of the following processes or phases in the menstrual cycle occur at the same time?
   a. maximal LH secretion and menstruation
   b. regression of the corpus luteum and an increase in ovarian progesterone production
   c. menstruation and an increase in ovarian progesterone production
   d. ovulation and menstruation
   e. proliferative phase of the uterus and increased estrogen production by the ovary

15. Menopause
   a. happens whenever a woman pauses to think about a man.
   b. occurs when a woman stops a man from making a pass.
   c. develops when follicles become less responsive to FSH and LH.
   d. results from high estrogen levels in 40 - 50 year old women.

Use a separate sheet of paper to complete this section.

1. What would happen to testosterone production in the testes in response to an injection of a large amount of testosterone in an adult male? Explain.

2. Suppose a 9 year-old boy had an interstitial cell tumor that resulted in very high levels of testosterone production. Describe the effects this would have on his development.

3. Birth control pills that consist of estrogen or progesterone are only taken for 21 days. The woman stops taking the birth control pill or takes a placebo pill for 7 days. Then she resumes taking the birth control pill. Why does she do this?

4. Sexually transmitted diseases such as gonorrhea can sometimes cause peritonitis in females. In males, however, sexually transmitted diseases do not cause peritonitis. Explain.