

Chapter 28: Reproductive System

I. Anatomy of the Male Reproductive System

A. Scrotum

1. What does the scrotum contain? _____
2. An incomplete connective tissue septum divides the scrotum into _____
3. Externally the scrotum has an irregular ridge on the midline called the _____
4. The outer layer of the scrotum includes:
 - a. The _____
 - b. Layer of _____ consisting of _____
 - c. Layer of _____ called the _____
5. The dartos muscle contracts in response to _____
 - a. Causes the skin of the scrotum to _____
 - b. At the same time the cremaster muscles contract and help pull the _____
 - c. This response helps keep the testes _____
6. When the scrotum is exposed to warm temperatures:
 - a. _____ & _____ relax
 - b. Skin of the scrotum becomes _____
 - c. Allowing the testes to _____ which helps keep the testes _____
7. This response is important since if the testes become too warm or too cold _____

B. Perineum

1. The perineum is the area between the thighs bounded:
 - a. Anteriorly by the _____
 - b. Posteriorly by the _____
 - c. Laterally by the _____
2. The perineum is divided into _____ by a set of muscles
3. The muscles run transversely between the _____

- a. Superficial _____
- b. Deep _____
- 4. The anterior triangle is called _____
 - a. Contains the _____ & the _____
- 5. The posterior triangle is called _____
 - a. Contains the _____

C. Testes

1. Testicular Histology

- a. Describe the shape of the testes: _____
- b. The testes are both _____ & _____ glands
 - 1. The major exocrine secretion is _____
 - 2. The major endocrine secretion is _____
- c. What is the tunica albuginea? _____

- d. Extensions of the tunica albuginea form incomplete _____
- e. The septa divide each testis into about _____
- f. Inside each lobule are two types of tissue:
 - 1. Seminiferous tubules in which _____
 - 2. Loose connective tissue stroma that _____
and contains clusters of _____ called
_____ or _____
 - a. These cells secrete _____
- g. The seminiferous tubules empty into:
 - 1. Set of short, straight tubules called _____ that empty into
 - 2. Tubular network called _____, which empties into
 - 3. 15-20 tubules called _____
 - a. They have a ciliated pseudostratified columnar epithelium that

 - 4. The efferent ductules pierce the _____

2. Descent of the Testes

- a. The testes develop inside the abdominopelvic cavity as _____

- b. What is a gubernaculum? _____
- c. The testes pass into the scrotum through the _____
- d. Each testis is preceded by an outpocketing of the peritoneum called _____
 1. The superior part usually becomes _____
 2. The inferior part remains as a small, closed sac called the _____
 - a. Surrounds most of the testis like the _____
surrounds the _____
- e. The inguinal canals are _____
in the abdominal wall
 1. They originate at the _____
which open through _____
 2. The canals extend _____ & _____
 3. They end at the _____
openings in the _____
- f. Do inguinal canals develop in females? _____
- g. Cryptorchidism
 1. What is cryptorchidism? _____
 2. This is a problem because the higher temperature of the abdominal
cavity _____

D. Sperm Cell Development

1. Before puberty:
 - a. The testes remain _____
 - b. The interstitial cells are not _____
 - c. Seminiferous tubules _____ & _____
2. At 12-14 years of age:
 - a. Interstitial cells _____

- b. Lumen develops _____
 - c. Sperm cell _____
3. What is spermatogenesis? _____
 4. The seminiferous tubules contain two types of cells:
 - a. _____ &
 - b. _____ or _____
 5. Sustentacular cells are large cells that extend from the _____ to the _____ of the _____
 - a. Functionally sustentacular cells:
 1. _____ the germ cells
 2. Produce a number of _____
 - b. Tight junctions between the sustentacular cells form a _____, which isolates sperm cells from _____
 1. Why is this isolation necessary? _____
 6. The interstitial cells produce testosterone that passes into the sustentacular cells and _____
 - a. The combination is required for the sustentacular cells _____
 7. Inside the sustentacular cells testosterone can also be converted to:
 - a. _____
 - b. _____
 8. Sustentacular cells also secrete a protein called _____ into the seminiferous tubules
 9. What hormones bind to androgen-binding protein?
 - a. _____
 - b. _____
 1. These are carried with other secretions to the _____
 2. These may be the active hormones that _____
 10. Scattered between the sustentacular cells are _____ from which _____

11. The germ cells are arranged so that:
 - a. Most immature cells are _____
 - b. Most mature cells are _____
12. Where are spermatogonia located? _____
 - a. These cells divide by _____
 1. Some of the daughter cells _____
 2. Others differentiate to become _____
13. Meiosis begins when the _____ divide
 - a. Each primary spermatocyte passes through the first meiotic division to become _____
 - b. Each of these cells goes through a second meiotic division to produce two even smaller cells called _____
 - c. Each of these cells goes through the last phase called _____ to form a mature _____ or _____
 1. In this process each spermatid develops:
 - a. _____
 - b. _____
 - c. _____ or _____
 - d. The spermatozoan head contains _____
 1. At the leading end it has a cap called _____
 - a. Which contains _____
 - e. What causes the tail to move and propel the sperm cell? _____

 - f. The midpiece has _____ that produce _____ necessary for _____
 - g. At the end of spermatogenesis the sperm cells gather around the lumen with their heads directed toward the _____ and their tails directed toward the _____

E. Ducts

1. Epididymis

- a. The efferent ductules become extremely convoluted and from a _____ on the _____ called the _____
- b. Functionally the final _____ occurs within the epididymis
- c. Each epididymis consists of a _____, _____, & _____
 1. The head contains _____
 2. The body contains a single convoluted tube _____
 - a. What empties into this tube? _____
 - b. What is the function of stereocilia? _____
 3. Where is the tail of the epididymis located? _____
 - a. What tube ends here? _____

2. Ductus Deferens

- a. The ductus deferens, or vas deferens, emerges from:
 1. Tail of _____ &
 2. Ascends _____
 3. Medial to _____ &
 4. Becomes associated with _____
- b. The spermatic cord consists of:
 1. _____
 2. _____ & _____
 3. _____
 4. _____ &
 5. _____
- c. The coverings of the spermatic cord include:
 1. _____
 2. _____
 3. _____
- d. The ductus deferens and the rest of the spermatic cord structures:
 1. Ascend and pass through the _____ to enter the _____

- e. The ductus deferens crosses the _____ & _____ walls of the pelvic cavity
 - 1. Travels over the _____
 - 2. Loops over the _____ to
 - 3. Approach the _____
 - f. The end of the ductus deferens enlarges to form an _____
 - g. The wall of the ductus deferens contains smooth muscle capable of _____ that help _____
3. Ejaculatory Duct
- a. Adjacent to each ampulla is a sac-shaped gland called the _____
 - b. The ductus deferens and a short duct from the seminal vesicle join to form the _____
 - c. The _____ project into the _____ and end by opening into the _____
4. Urethra
- a. The male urethra extends from the _____ to the _____
 - b. It is a passageway for both _____ & _____
 - c. The urethra is divided into three parts:
 - 1. Prostatic Urethra
 - a. Connected to the _____ & passes _____
 - b. What ducts empty into the prostatic urethra? _____
 - 2. Membranous Urethra
 - a. Shortest part of the urethra extends from the _____ through the _____
 - 3. Spongy Urethra
 - a. Is also called _____
 - b. Extends from the _____ through the _____

d. What do urethral glands secrete into the urethra? _____

F. Penis

1. The penis contains three columns of _____
 - a. Engorgement of the erectile tissue with _____ causes the penis to _____ & become _____ a process called _____
2. The penis is the male organ of _____ through which sperm cells are transferred from the _____ to the _____
3. Two of the erectile columns form the:
 - a. _____ and _____ of the penis
 - b. They are called _____
4. The third column is called _____ and forms the _____ of the penis
 - a. It expands to form a cap called the _____ over the _____
5. The spongy urethra:
 - a. Passes through the _____
 - b. Penetrates the _____
 - c. Opens as the _____
6. At the base of the penis the
 - a. _____ expands to form the _____
 - b. Each _____ expands to form a _____
 1. Together these structures constitute the _____
 2. The crura attach the penis to the _____
7. Skin is loosely attached to the _____ in the shaft of the penis
8. Skin is firmly attached at the _____
9. A thinner layer of skin covers the _____
10. The skin of the penis is well supplied with _____
11. What is the prepuce or foreskin? _____
12. Where are the primary nerves, arteries, and veins located? _____
13. Deep arteries lie within the _____

G. Accessory Glands

1. Seminal Vesicles

- a. The seminal vesicles are _____ located next to the _____
- b. Each gland is about _____ long and tapers into a short duct that joins with the _____ to form _____
- c. The seminal vesicles have a capsule containing:
 1. _____ &
 2. _____

2. Prostate Gland

- a. The prostate gland consists of both _____ and _____ tissue
- b. It is located _____ to the _____ at the base of the _____
 1. It surrounds the:
 - a. _____ &
 - b. Two _____
- c. The gland is composed of a _____ containing distinct _____ and numerous _____ also containing _____
 1. The fibrous partitions radiate inward toward the _____
- d. What covers these muscular partitions? _____
- e. The prostatic secretions are carried into the _____ by _____

3. Bulbourethral Glands

- a. Pair of small glands located near the _____
- b. In young males they are about the size of a _____
- c. Each bulbourethral gland is a _____ gland
- d. The single duct from each bulbourethral gland enters the _____ at the _____

4. Secretions

- a. Semen is a composite of _____ and secretions from the _____
- b. How much of the semen is produced by each of the following?
 1. Seminal vesicles _____
 2. Prostate gland _____
 3. Testes _____
 4. Bulbourethral glands _____
- c. What is emission? _____
- d. What is ejaculation? _____

- e. The bulbourethral glands and urethral mucous glands produce a _____ just before _____ which
 1. Lubricates _____
 2. Neutralizes _____
 3. Provides a small _____
 4. Helps reduce _____
- f. Testicular secretions include _____, a small amount of _____, and _____
- g. The secretion of the seminal vesicles is _____
 1. Contains large amounts of _____ and other nutrients that _____
 2. Fibrinogen, which is involved in a weak _____
 3. Prostaglandins, which can cause _____
- h. The prostate gland produces _____ secretions
 1. Have a rather _____
 - a. Helps to _____ urethra with secretions from other glands
 2. Secretions of the prostate and seminal vesicles also help neutralize _____ & those of the _____
 3. Prostatic secretions are also important in the _____

_____ of semen

a. Contain _____

b. Convert _____ from the seminal vesicles to _____

n. Once the acrosomal fluid is depleted the sperm cell is no longer

II. Physiology of Male Reproduction

A. Regulation of Sex Hormone Secretion

1. Where is gonadotropin-releasing hormone (GnRH) produced? _____
2. How does GnRH reach the anterior pituitary gland? _____

3. GnRH stimulates the anterior pituitary to release _____
 - a. What are gonads? _____
4. The two gonadotropins are:
 - a. _____
 - b. _____
5. Functionally in males LH binds to the _____

 - a. Luteinizing hormone in males is sometimes called _____

6. Functionally in males follicle-stimulating hormone binds to _____

7. To stimulate FSH and LH release from the anterior pituitary, GnRH must be secreted in a series of brief _____ & _____
8. What structure secretes testosterone? _____
 - a. Testosterone is classified as an _____
9. Testosterone has a major influence on many tissues, including:
 - a. Essential role _____ &
 - b. Further _____
 - c. Development of _____
 - d. Maintenance of _____
 - e. Regulation of _____
 - f. Influences _____

10. Inside some target tissue cells testosterone is converted to other forms of active hormone by enzymes:
 - a. In the scrotum and penis it is converted to _____
 - b. In some other tissues it is converted to _____
 - c. Some brain cells convert it to _____
11. What hormone do the sustentacular cells produce? _____
 - a. What is the action of this hormone? _____

B. Puberty

1. The placenta produces a gonadotropin-like hormone called _____
 - a. This hormone stimulates the testes of the male fetus to _____ and _____
 - b. After birth the testes of the newborn male _____ and secrete only _____
2. How is the term puberty defined? _____
3. Before puberty the release of GnRH from the hypothalamus is inhibited by _____
4. At puberty the hypothalamus increases GnRH secretion because it has become _____
5. Increased levels of GnRH lead to increased levels of _____ & _____
6. Elevated FSH levels promote _____
7. Elevated LH levels cause _____

C. Effects of Testosterone

1. Testosterone causes:
 - a. Enlargement & _____ & _____
 - b. Necessary for _____
 - c. Required for _____
 - d. Stimulates hair growth by causing _____ hair to be converted to _____, which are _____
 - e. Texture of skin to _____

- f. Quality of melanin _____
- g. Increases the rate of secretion from _____
- h. Hypertrophy of the _____
- i. General stimulatory effect on _____
- j. Increased erythropoietin production resulting in _____
- k. Minor mineralocorticoid-like effect causing _____
- l. Promotes _____ in most body tissues
 - 1. Results in _____ increase at puberty
- m. Rapid _____ & increases _____ in bone
 - 1. Resulting in _____
 - 2. The effect is limited because testosterone also causes _____

D. Male Sexual Behavior and the Male Sex Act

- 1. Testosterone is required to _____ & _____ male sexual behavior
 - a. Testosterone enters cells within the _____ and the _____ & influences _____
 - b. Male sexual behavior may depend, partially, on conversion of testosterone to _____ in the cells of the brain
- 2. Declining blood levels of testosterone after age 40 result in _____
- 3. The male sex act is a complex series of _____ that result in _____, _____, _____, & _____
- 4. Pleasurable sensations during the male sex act result in a _____ sensation called _____ associated with _____
- 5. What is resolution? _____
- 6. Sensory Action Potentials and Integration
 - a. Action potentials are conducted by sensory neurons from _____ through the _____ nerve to the _____ region of the spinal cord where _____ integrated
 - b. Action potentials travel from the spinal cord to the _____ to

produce _____

c. An extremely important source of sensory action potentials that initiate erection and ejaculation is _____ especially _____

1. Sexual sensations are reinforced by sensory action potentials _____

2. Sexual sensations are caused when the _____ & _____ are engorged with secretions

d. What kind of psychic stimuli have a major effect on sexual reflexes?

1. Stimuli that trigger sexual reflexes are reinforced by thinking _____ or dreaming _____

2. Thoughts that are not sexual in nature tend to _____

e. What is impotence? _____

f. Are action potentials from the cerebrum required for the culmination of the male sex act? _____

7. Erection, Emission, and Ejaculation

a. Erection

1. Erection causes the penis to become _____

2. Action potentials travel to the arteries that supply _____ to the _____

3. The nerve fibers release _____ as well as _____ as neurotransmitter substances

a. Both neurotransmitters cause smooth muscle cells to _____ resulting in _____ to the erectile tissue

4. Simultaneously other arteries of the penis constrict to _____

5. Therefore, blood fills the _____ and compresses _____

6. Because venous outflow is partly occluded, the blood pressure in the sinusoids causes _____

7. Nerve action potentials that result in erection come from _____
 _____ & _____ in the spinal cord
 - a. Normally which centers are more important? _____
8. Parasympathetic nerve impulses also cause mucus secretion by:
 - a. _____ b. _____
- b. Emission
 1. What is emission? _____
 2. Sympathetic action potentials cause:
 - a. Peristaltic contractions of _____
 - b. Stimulate the _____ & _____
 to release their secretions
 3. The accumulation of secretions in the prostatic urethra produces sensory action potentials that _____
 - a. Integration of these nerve impulses result in:
 1. Sympathetic action potentials cause _____
 _____ so that semen and urine are not mixed
 2. Somatic motor action potentials are sent to _____
 _____ of the _____
 causing several _____ urethra
 4. The movement of semen out of the urethra is called _____

III. Anatomy of the Female Reproductive System

A. Ovaries

1. What attaches each ovary to the posterior surface of the broad ligament?

 - a. What is the mesovarium? _____
2. The suspensory ligament extends from _____ to _____
3. The ovarian ligament attaches the _____ to _____
4. Ovarian Histology
 - a. What is the ovarian or germinal epithelium? _____

- b. The tunica albuginea is a layer of _____ located immediately below the _____
 - c. The cortex is the more _____ of the ovary
 - d. The medulla is _____
 - e. Distributed throughout the cortex are numerous _____ called _____ each containing an _____
5. Follicle and Oocyte Development
- a. What is oogenesis? _____
 - b. What are oogonia? _____
 - c. When are oogonia produced? _____
 - d. By the time of birth:
 - 1. Many of the oogonia have _____
 - 2. Those remaining have _____
 - a. Meiosis stops at a stage called _____
 - b. The cell at this stage is called a _____
 - e. The primary oocyte is surrounded by a single layer of flat cells called _____; together they are called a _____
 - f. From birth to puberty the number of _____
 - g. At puberty the cyclical _____ stimulates the further development of a _____ each cycle
 - 1. The primordial follicle is converted to a _____ when
 - a. Oocyte _____
 - b. Granulosa cells become _____ & _____
 - 1. Eventually several layers of _____ form and a clear material is _____ called the _____
 - 2. Some of the primary follicles continue development and become _____
 - a. The granulosa cells _____ and form an _____ oocyte
 - b. Irregular _____ called _____, which are

- _____ form among the _____
- c. As the secondary follicle enlarges, surrounding cells are _____
_____ to form _____ or _____
 1. Two layers of thecae can be recognized:
 - a. Vascular _____
 - b. Fibrous _____
 3. The secondary follicle continues to _____
 - a. When the fluid-filled vesicles fuse to form _____
_____ called the _____ the follicle is called
_____ or _____
 - b. The antrum progressively _____ and _____
with _____ forming a lump on the side of the ovary
 1. The fluid is produced by the _____
 - c. The oocyte is pushed to one side and lies in a mass of follicular
cells called _____ or _____
 1. What is the corona radiata? _____

 4. Usually, only one graafian follicle reaches _____
_____ and is _____
 - a. The other developing follicles _____
 5. Just before ovulation the primary oocyte completes the _____
_____ and becomes a _____
and a _____
 - a. Division of the cytoplasm is _____
 1. Most of it goes to _____
 2. Very little goes to _____
 6. The secondary oocyte begins the second meiotic division, which stops
in _____
 6. Ovulation
 - a. The follicular cells secrete a _____ fluid and at an _____
so that the follicle swells _____

1. The granulosa cells and theca become _____
 - b. Eventually the mature follicle _____
 1. This forces a _____ out of the vesicle
 - c. Shortly after this initial burst, _____ surrounded by _____ and the _____ escapes from the follicle
 - d. This release of the secondary oocyte is called _____
 - e. If sperm cell penetration does not occur _____

 - f. Completion of the second meiotic division is triggered by _____,

 - g. Once the sperm cell penetrates the secondary oocyte, _____
_____ & _____
 - h. The fertilized oocyte is now called a _____
7. Fate of the Follicle
- a. The follicle left in the ovary becomes transformed into a _____
_____ called the _____
 - b. What cells turn into the luteal cells? _____
 - c. The luteal cells _____ and begin to secrete:
 1. _____ & _____
 2. Smaller amounts of _____
 - d. If pregnancy occurs, the corpus luteum _____ and _____
_____ as the _____
 - e. If pregnancy does not occur, the corpus luteum remains _____
for _____ & then begins to _____
 1. Progesterone and estrogen secretion _____
 2. Connective tissue cells _____
 - a. The structure is called _____ due to its
_____ color
 - b. The corpus albicans continues to _____ and

B. Uterine Tubes

1. The uterine tubes are also called _____
2. A uterine tube is on each side of the uterus associated with _____
3. Where is each uterine tube located? _____
4. What is the mesosalpinx? _____
5. The uterine tube opens _____
6. The expanded opening is called the _____
7. The opening is surrounded by long thin processes called _____
8. The uterine tube nearest the infundibulum is called the _____
 - a. It is the _____ and _____ part of the tube
9. The part of the uterine tube nearest the uterus is called the _____
 - a. It is much _____ & has _____
10. What part of the uterine tube passes through the uterine wall? _____
 - a. The uterine tube ends at a _____ opening
11. The wall of the uterine tube consists of three layers:
 - a. Outer _____ formed by the _____
 - b. Middle _____
 1. Consists of _____ & _____ smooth muscle cells
 - c. Inner _____ consists of a _____ of simple _____
12. The mucosa of the uterine tubes provides _____ to the _____ or _____
13. The ciliated epithelium helps _____ through _____

C. Uterus

1. What is the general size and shape of the uterus? _____

2. The uterus is slightly flattened _____ and oriented with the
 - a. Larger, rounded part called _____ directed _____
 - b. Narrower part called _____ directed _____
3. The main part of the uterus is called the _____ and is

- between the _____ and _____
4. A slight constriction called the _____ marks the junction of the _____ and the _____
 5. The space inside the uterus, the uterine cavity, continues through the cervix as the _____ which opens through the _____ into the _____
 6. The major ligaments holding the uterus in place are the:
 - a. Broad Ligament
 1. The broad ligament is a _____ extending from the _____ to the _____
 2. It ensheaths the _____ and the _____
 - b. Round Ligaments
 1. Extend from the _____ through the _____ to the _____ of the _____
 - c. Uterosacral Ligaments
 1. Attach the _____ of the uterus to the _____
 7. What does anteverted mean? _____
 8. What does retroverted mean? _____
 9. What supplies support to the uterus inferiorly? _____
 10. What is a prolapsed uterus? _____
 11. The uterine wall is composed of three layers:
 - a. Perimetrium or Serous Layer
 1. The perimetrium is the _____ that covers the uterus
 - b. Myometrium or Muscular Layer
 1. Consists of a _____ of _____
 2. Accounts for the _____ of the uterine wall
 3. In the cervix, the myometrium contains:
 - a. Less _____ &
 - b. More _____
 1. Therefore, the cervix is, _____ and less _____ than the rest of the uterus

c. Endometrium or Mucous Membrane

1. The innermost layer consists of a:

- a. Simple _____
- b. Connective tissue layer, called the _____

2. Simple tubular glands are scattered about the _____ and open through the _____ into the _____

3. The endometrium consists of two layers:

a. Thin, deep basal layer:

1. Deepest part of the _____ and is continuous with the _____

b. Thicker, superficial functional layer:

1. Consists of most of the _____ & the _____

2. Lines the _____

3. Undergoes changes & _____

12. The cervical canal is lined with _____

which contains _____

a. The mucus fills _____ and acts as a _____

b. The consistency of the mucus changes near _____

1. Making the passage of _____

D. Vagina

1. The vagina is a _____ that extends from _____ to _____

2. The vagina is the female _____ functioning to

a. Receive _____

b. Allowing _____ and _____

3. Longitudinal ridges called _____ extend the length of the _____ & _____ vaginal walls

4. Several transverse ridges called _____ extend between the _____

5. The superior, domed part of the vagina is called the _____

a. It attaches to the sides of the _____ so that part of the cervix extends into the vagina

6. The wall of the vagina consists of:
 - a. Outer _____
 - b. Inner _____
7. The muscular layer is composed of _____ that allows the vagina to _____ to _____ & _____
8. The mucous membrane is a moist _____ that forms a _____
 - a. Releases most of the _____
9. What is the hymen? _____

E. External Genitalia

1. External female genitalia are referred to as _____ or _____
2. The vestibule is the space into which:
 - a. Posteriorly the _____ opens
 - b. Anteriorly the _____ opens
3. The borders on each side of the vestibule are formed by _____ called the _____
4. The clitoris is a small _____ located in the _____ of the vestibule
5. What is the prepuce? _____
6. The clitoris consists of a _____ and a _____
 - a. It is well supplied with _____ and functions to _____ & _____
 - b. Contains two erectile structures called the _____
 1. Each expands at the base of the clitoris to form _____ & attaches the clitoris to the _____
 - c. The corpora cavernosa of the clitoris is comparable to _____ & they _____
 1. The engorgement results in an _____
7. Bulb of the Vestibule
 - a. Erectile tissue that corresponds to _____ in males
 - b. Lies _____ & on the _____

- on either side of the _____
- c. Become engorged with blood and is _____
 - d. Expansion of bulbs causes _____ & produces _____
8. Greater vestibular glands are located:
 - a. On each side of the _____
 - b. The duct opening is between the _____ & _____
 9. The lesser vestibular glands are located near the _____ & _____
 - a. These glands are also known as the _____
 - b. They produce _____
 10. The secretions from both sets of vestibular glands:
 - a. Produce a _____
 - b. Helps maintain _____
 11. The labia majora lie lateral to the _____ and are described as _____
 - a. The prominence is primarily due to _____
 12. What is the mons pubis? _____
 13. The lateral surfaces of the labia majora and mons pubis are covered with _____
 14. The medial surfaces of the labia majora are covered with numerous _____ & _____
 15. What is the pudendal cleft? _____
- F. Perineum
1. The perineum is divided into two triangles by the _____ & _____ muscles
 - a. Anterior _____ contains _____
 - b. Posterior _____ contains _____
 2. What is the clinical perineum? _____
 - a. The skin and muscle of this region _____
 - b. What is an episiotomy? _____

G. Mammary Glands

1. The mammary glands are the _____
 - a. They are located within the _____ or _____
2. The mammary glands are modified _____
3. Externally the breasts of both males and females have a raised _____ surrounded by a _____
4. The slightly bumpy surface of the areolae is caused by the presence of _____ called _____
 - a. Secretions from these glands _____ the nipple and areola from _____
5. In prepubescent children both males and females a _____
 - a. Consists _____ with _____
6. At puberty the female breasts begin _____ under the influence of _____ & _____
7. What is gynecomastia? _____
8. Each adult female mammary gland usually consists of _____ covered by a _____
 - a. This superficial fat _____
 - b. Each lobe forms a _____ with _____ at the apex
 - c. Each lobe possesses a _____, which opens _____
 - d. Just deep to the surface each _____ enlarges to form a small, _____ which _____
 - e. Within a lobe the lactiferous duct subdivides to form smaller ducts, each supplying a _____
 - f. Within a lobule the ducts _____
 - g. In the milk-producing breast, the ends of the smallest ducts _____ to form _____ called _____
9. Excessive sagging of the breasts is prevented by _____
10. The nipples are very sensitive to _____ and contain _____ that contract causing _____

a. During sexual arousal _____

IV. Physiology of Female Reproduction

A. Puberty

1. During puberty females experience their first menstrual cycle called _____
 - a. Generally occurs between _____ and is
 - b. Completed by _____
2. Reproductive structures begin to enlarge including:
 - a. _____
 - b. _____
 - c. _____
 - d. _____
3. Fat is deposited around the _____ & _____ causing them to _____ and assume _____
4. The ducts of the breasts _____, _____ & _____ hair grows, and the voice _____
5. Also associated with puberty is development of _____
6. The changes associated with puberty are due to elevated secretion rates of _____ & _____ by the ovaries
7. At puberty _____, _____, & _____ secretion rates not only increase but establish the adult pattern of _____

B. Menstrual Cycle

1. Technically the term menstrual cycle refers to the _____
2. The typical menstrual cycle is about _____ long
3. Menses is a period of _____:
 - a. Occurs approximately _____
 - b. Uterine epithelium is _____
4. What is menstruation? _____
5. Events during the menstrual cycle include cyclic hormone secretion in the:
 - a. _____ &
 - b. _____

6. The first day of menses is defined as day _____ cycle
 - a. Menses usually lasts _____
7. Ovulation occurs on _____ of a _____
 - a. Timing of ovulation varies _____
8. The time between ovulation and the next menses is typically _____
9. The follicular phase is the time _____
 - a. Called this because of rapid _____
 - b. Also called the _____
 1. Because of the rapid _____
10. The luteal phase is the period _____
 - a. Called this because of the existence _____
 - b. Also called _____
 1. Because of maturation _____
11. Ovarian Cycle
 - a. The ovarian cycle specifically refers to the _____

 - b. The events are controlled by hormones from _____ & _____
 - c. FSH from the _____ is primarily responsible for _____

 1. As many as _____ begin to _____
 - d. Although several follicles begin to mature, normally _____
 1. The remaining follicles _____
 2. More mature follicles have an _____ effect on _____
 - e. Early in the menstrual cycle:
 1. Release of _____ from the hypothalamus _____
 2. Sensitivity of the _____ to GnRH _____
 - a. These changes stimulate _____

 - f. FSH and LH stimulate _____ & _____ and
an increase in _____ by the developing follicles

- a. The main effect of FSH is on the _____
- b. LH exerts its initial effect on _____ and later on the _____
- g. LH stimulates the _____ to produce _____ which diffuse to the _____
- h. FSH stimulates the _____ to convert _____ to _____
- i. FSH gradually increases _____
- j. Estrogen gradually increases _____
- k. After LH receptors in the granulosa cells have increased, LH stimulates
 - 1. Granulosa cells to produce some _____
 - 2. Which diffuses to the _____ where it is converted to _____
 - 3. Net effect is:
 - a. Production of androgens _____
 - b. Conversion of androgens to _____ by the _____ is responsible for _____
- l. During the follicular phase developing follicles produce _____
 - a. FSH levels decline because _____ has a _____ effect on FSH secretion
- m. Initially as estrogen levels begin to increase in the follicular phase they have a _____
- n. Then the gradual increase in estrogen levels, especially _____ have a _____
 - 1. What is necessary for this effect? _____
 - 2. Response is FSH and LH secretion increase _____ and in _____ just before _____
 - a. LH surge is _____ & FSH surge is _____
- o. The LH surge:
 - 1. Initiates _____
 - 2. Causes the _____ to become _____

3. Causes the primary oocyte to _____
- p. Several events are triggered by the LH surge that result in ovulation:
1. Follicle becomes _____
 2. Proteolytic enzymes _____
 3. Follicle _____
 4. Oocyte and _____
- q. Shortly after ovulation:
1. Estrogen production by _____
 2. Progesterone production _____
- r. After the corpus luteum forms:
1. Progesterone levels _____
 2. Some estrogen _____
- s. Increased progesterone and estrogen levels:
1. Negative-feedback effect on _____ release from _____
 - a. Causing decreased secretion of _____ & _____ from _____
 2. Cause down-regulation of _____
 - a. Therefore the _____ is less sensitive to _____
 3. Net effect is decline of _____ & _____ secretion to _____
- t. If the ovulated oocyte is fertilized:
1. Developing embryonic mass begins to secrete _____ called _____
 - a. This substance keeps the corpus luteum from _____
 - b. Blood levels of _____ & _____ do not _____ and _____ does not occur
- u. If fertilization does not occur corpus luteum begins to _____
- a. Blood levels of _____ & _____ decrease rapidly which results in _____
12. Uterine Cycle
- a. The term uterine cycle refers to _____
-
1. What is the primary cause of these changes? _____

- _____
- b. After menses the endometrium _____
1. Remaining epithelial cells _____
- _____
2. This produces a relatively uniform _____
 3. Later it becomes folded and forms _____
 4. Blood vessels called _____ project between the spiral glands to supply _____
- c. After ovulation the endometrium _____
1. Spiral glands develop _____
- _____
- d. How long after ovulation is the endometrium prepared to receive the developing embryonic mass? _____
- e. Proliferation of the endometrial cells is caused by _____
1. Also causes minor proliferation of the _____
 2. Stimulates uterine cells to synthesize _____ which makes the uterine tissue _____
- f. Progesterone from the _____ binds to the receptors:
1. Resulting in cellular hypertrophy in _____ & _____
 2. Endometrial cells become _____
- g. Uterine smooth muscle cells:
1. Estrogen _____ to contract in response to _____
 2. Contraction is inhibited by _____
 3. Contractions of uterine smooth muscle are reduced as a result of:
 - a. Increasing levels of _____
 - b. While _____ are low
- h. If pregnancy does not occur by _____
1. Corpus luteum _____ which results in
 - a. _____ & _____ dropping to low levels
 2. This causes the uterine lining to _____
 3. As progesterone levels fall, the spiral arterioles _____

-
4. Causes all but the basal part of the spiral glands to become _____ and then _____
 5. As the cells become necrotic they _____
 6. The menstrual fluid is composed of:
 - a. _____
 - b. _____
 - c. _____
 7. Uterine contractions are stimulated by:
 - a. Decreases in _____ levels
 - b. Increases in _____
 - c. The uterine contractions expel the menstrual fluid from the _____ through the _____ and into the _____

C. Female Sexual Behavior and the Female Sex Act

1. Sexual drive in females depends on _____
2. Steroids like progesterone are converted to androgens by tissues like the _____ & _____
3. Cells in the brain, especially the _____, are affected by _____ & _____ to influence sexual behavior
4. Sexual behavior is also affected by _____ factors
5. Neural pathways are the same in both males and females:
 - a. Sensory action potentials are conducted from the _____ to the _____ of the spinal cord for integration
 - b. Cerebral influences _____ reflexes
 - c. Reproductive organs receive nerve action potentials from both the _____ & _____
 - d. Skeletal muscles receive nerve action potentials from _____
6. During sexual excitement:
 - a. Parasympathetic stimulation causes erectile tissue to _____ blood:

1. Within the _____
 2. Around the _____
 - b. Nipples of the breast _____
 - c. Mucous glands within the vestibule secrete _____
 - d. Large amounts of mucuslike fluid are extruded into the _____ through _____
 1. Functionally these secretions act as _____
7. An orgasm is usually triggered by:
- a. Tactile stimulation _____ &
 - b. _____
 1. Rhythmic muscle contractions occur in:
 - a. _____
 - b. _____
 - c. _____
 2. Muscle tension increases _____
8. After the sexual act a period of _____ occurs, characterized by:
- a. Overall sense of _____ & _____

D. Female Fertility and Pregnancy

1. After the sperm cells are ejaculated into the _____ they are transported
 - a. Through the _____
 - b. Body _____ &
 - c. Uterine tubes to the _____
2. Movement of sperm cells is due to _____ & _____ of the uterus and uterine tubes
3. The muscle contractions are stimulated by:
 - a. Posterior pituitary releases _____ during sexual intercourse
 - b. Semen contains _____
4. What is capacitation? _____
 - a. Acrosomal enzymes allow sperm to penetrate _____
 - b. Where does capacitation take place? _____

5. How long does the oocyte have to be fertilized after ovulation? _____
6. How long do sperm cells remain viable in the female reproductive system?

7. Fertilization occurs when _____ enters _____
8. What happens while the fertilized egg is passing through the uterine tube?

9. When is the endometrium ready for implantation?
 - a. _____ days after ovulation
 - b. Day _____ of the menstrual cycle
10. The outer layer of the developing embryonic mass is called _____
 - a. It secretes _____ that digest _____
_____ and the mass _____
11. The trophoblast secretes HCG:
 - a. Transported in the blood to the _____
 - b. Causes the _____ functional
 1. _____ & _____ levels continue to _____
 - c. Secretion of HCG increases _____ and reaches a peak about
_____ fertilization
 - d. HCG levels decline by _____ and remain at _____

 - e. Detection of HCG in the urine is the basis for _____
12. Estrogen and progesterone secreted by the _____ are essential for _____
13. Placenta
 - a. Forms from the _____ & _____
 - b. Secretes _____ & _____
 1. By the end of the third month the placenta has become an _____
_____ that secretes _____
_____ pregnancy
 2. Making the corpus luteum no longer necessary to _____
14. Estrogen and progesterone levels _____

E. Menopause

1. When a female is _____, menstrual cycles become _____ and ovulation _____
2. Define menopause: _____
3. What is the female climacteric? _____
 - a. It is also called _____
4. Menopause is associated with changes _____
 - a. Number of follicles _____
 - b. Follicles that remain are less _____
 1. Fewer _____ & _____ are produced
 - c. Gradual _____
 1. In response to the reduced _____
5. A variety of symptoms may occur during the _____ including:
 - a. _____
 - b. _____
 - c. _____
 - d. _____ & _____
 - e. Occasionally _____
 - f. Some data indicate an increased _____
 1. Many of these symptoms can be treated by:
 - a. Administering _____ & _____
 - b. Then gradually _____
6. Administering estrogen after menopause may also help prevent _____
7. Estrogen therapy may:
 - a. Prolong symptoms associated _____
 - b. Increase the possibility of developing _____

V. Effects of Aging on the Reproductive System

A. Age-Related Changes in Males

1. May be a decrease in the size and weight of the _____
 - a. Associated with:
 1. Decrease in _____

2. Thinning of _____
- b. May be secondary to a decrease in _____ to the testes
or due to a gradual decrease in _____
2. Decrease in rate of _____ and an increase in _____
3. Prostate Gland
 - a. Decrease in _____
 - b. Increased thickness of _____
 - c. Decrease in functional _____
 1. Changes do not decrease _____
 - d. Substantial increase in the incidence of _____
 1. Can create difficulty in urination because _____
4. Impotence _____ in men with age
 - a. Increase in _____ in the _____
 1. Generally decreases _____

B. Age-Related Changes in Females

1. The most significant age-related change in females is _____
2. The uterus _____ & the endometrium _____
3. The time between menstruations _____
4. As the uterus decreases in size, it _____ and assumes _____
5. Uterine prolapse may occur caused by _____
6. The vaginal wall becomes _____ & _____
 - a. Less _____
 - b. Epithelial lining is _____
 - c. Rate of vaginal infections _____
 - d. Vaginal contractions, during intercourse, _____
 - e. Vagina _____
7. The incidence of cancer increases in various structures including:
 - a. _____

b. _____

c. _____

d. _____