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Male Reproductive System

Answers and Explanations

I. Introduction to the Male Reproductive System

A. Multiple Choice Questions

1. (e) – Sexual reproduction ensures genetic diversity within a population.
2. (b) – The gonads are the primary sex organs. They produce gametes and secrete sex hormones.
3. (d) – The secondary sex organs keep the gametes viable and provide the mechanism for fertilization.

B. True–False Questions

1. True – The reproductive system is not vital for a person's survival. It is vital, however, for the propagation of the species.
2. True – Testes are male gonads and ovaries are female gonads.
3. False – The glans penis is not a gland, but rather a portion of the penis.

II. Perineum and Scrotum

A. Multiple Choice Questions

1. (b) – The scrotal septum completely separates one testis from the other.
2. (e) – Autonomic contraction of the dartos and cremaster muscles in response to low temperatures draws the testes closer to the body, thus maintaining a temperature conducive for sperm production.
3. (a) – The optimal temperature for sperm production is 3.6 degrees below normal body temperature.

B. True–False Questions

1. True – Voluntary or involuntary contraction of the cremaster muscle draws the testes closer to the body.
2. False – The spermatic cord is the organ that contains the nerves, genital tube, and vessels that serve the testis.

III. Testes

A. Multiple Choice Questions

1. (e) – Because the seminiferous tubules nourish spermatids and produce spermatozoa, they are frequently referred to as the functional units of the male reproductive system.
2. (b) – Produced by the interstitial cells, testosterone is a hormone that promotes production of spermatozoa and maintains masculinity.
3. (c) – Following their production, sperm cells are moved through a series of tubules for maturation and storage.
4. (e) – A spermatozoon lacks cilia; rather, it is propelled by the movement of a flagellum.
5. (d) – Recent evidence indicates that ejaculated sperm can survive in the female reproductive tract for up to 5 days.

B. True–False Questions

1. False – The tunica vaginalis and tunica albuginea are membranes covering the testis; they are not layers of the scrotum.
2. True – The maturation time is approximately 2 months.
3. True – Blockage of venous blood flow from a testis generally results in a varicocele.
4. True – Androgens are valuable in maintaining homeostasis in both males and females.
5. False – Most of the tissues of the testes are maintained through mitosis, and only the reproductive cells undergo meiosis.
6. False – One primary spermatocyte produces four spermatids.

IV. Spermatic Ducts, Accessory Reproductive Glands, and the Urethra

A. Multiple Choice Questions

1. (b) – Spermatic ducts transport spermatozoa. The male urethra transports urine during urination and semen (sperm plus additives) during ejaculation.
2. (c) – The ductus deferens conveys spermatozoa toward the urethra by means of peristaltic contractions of the layers of smooth muscle in its walls.
3. (e) – Once produced and matured, spermatozoa are stored in the epididymides and the beginning portion of the ductus deferentia prior to being ejaculated.
4. (b) – The ampulla is the terminal portion of the ductus deferens that joins the ejaculatory duct. It is where additives mix with the spermatozoa to form semen prior to ejaculation.
5. (e) – During development, the testis descends through the inguinal canal as it enters the scrotum. Containing the ductus deferens, the spermatic cord is the vascular and nerve connection between the testis and pelvic structures. The inguinal canal is of clinical concern because it is a common site for hernias.
6. (a) – During emission, the stored spermatozoa are forced from the epididymis and lower portion of the ductus deferens through the region of the inguinal ring to the ejaculatory duct.
7. (c) – The glans penis is the bulbular end structure of the penis. It is covered by the prepuce in an uncircumcised male.
8. (a) – Over 99% of the volume of ejaculate is composed of the additives from the prostate and the seminal vesicles.
9. (b) – The ejaculatory duct is posterior to the urinary bladder and receives the secretions from the seminal vesicle and prostate just prior to ejaculation.
10. (a) – Mucus is secreted from the urethral glands into the lumen of the urethra.

B. True–False Questions

1. True – Maturation of spermatozoa occurs during the 2-month period when the gametes are within the rete testis and efferent ductules.
2. False – The ductus deferens extends from the epididymis to the ejaculatory duct.
3. False – Spermatozoa and additives are not stored in the ejaculatory ducts, but just prior to ejaculation, the mixing of the two does occur there.
4. True – The additives in semen account for over 99% of the volume of an ejaculate.
5. True – The fluid additives from the seminal vesicles account for approximately 60% of the volume of an ejaculate, and fluid additives from the prostate account for approximately 40% of the volume.
6. True – A series of muscular contractions causes the semen to be ejaculated in a series of spurts.
7. False – The secretion from the bulbourethral glands lubricates the urethra and glans penis.
8. False – The spongy portion of the urethra through the penis is the longest.

V. Penis

A. Multiple Choice Questions

1. (e) – The root of the penis expands posteriorly to form the bulb of the penis and the crus of the penis.
2. (b) – The penis contains three columns of erectile tissue.
3. (c) – There are three columns of erectile within the penis. The median septum separates the two corpora cavernosa, and the urethra is contained within the corpus spongiosum.

B. True–False Questions

1. True – The distal end of the corpus spongiosum expands to form the cone-shaped glans penis.
2. False – Smegma is a sebaceous secretion from the glans penis that accumulates along the border of the corona glandis if good hygiene is not practiced.
3. True – The prepuce is a retractable sheath of skin over the glans penis. When the prepuce is removed through circumcision, the glans penis is permanently exposed.

VI. Mechanisms of Erection, Emission, and Ejaculation

A. Multiple Choice Questions

1. (e) – Erection is a parasympathetic response, and under normal circumstances a sustained erection is necessary for ejaculation to occur.
2. (a) – Sexual nuclei are located within the hypothalamus, and the direct innervation to the penis is through nerves from the sacral portion of the spinal cord.
3. (c) – Spermatozoa are produced in the testes and they are discharged from the epididymides during emission. Semen is spermatozoa plus the additives and is the fluid that is expelled from the ejaculatory ducts during ejaculation.
4. (a) – A normal ejaculate contains 60–150 million sperm per milliliter, and between 1.5 and 5.0 milliliters are generally expelled during ejaculation.

B. True–False Questions

1. False – Erection is a parasympathetic response.
2. True – The bulbourethral gland is homologous to the lubricating vestibular gland in the female.
3. True – Ejaculation is the actual expulsion of semen from the erect penis in a series of spurts.
4. False – Ejaculation is the expulsion of semen from the ejaculatory duct and the urethra.

VII. Developmental Exposition of the Reproductive System

A. Multiple Choice Questions

1. (d) – If the fertilizing spermatozoon contains an X chromosome, it will pair with the X chromosome of the ovum and a female child will develop. If the fertilizing spermatozoon contains a Y chromosome, it will pair with the X chromosome of the ovum and a male child will develop.
2. (a) – Androgens secreted by the developing testes cause the male external genitalia to develop.
3. (a) – The gonadal ridge develops in male and female embryos during the fifth week.
4. (d) – The prostate arises from an endodermal outgrowth of the urogenital sinus.
5. (e) – Prior to the twelfth week, the external genitalia are in an indifferent stage and are indistinguishable as male or female.
6. (d) – The labioscrotal swellings fuse in a developing male to become the scrotum; they remain unfused in a female to become the labia majora.

B. True–False Questions

1. True – Because genetics determines the distinction of the gonads, it also determines the nature of the sex hormones that will be secreted to promote development of male or female reproductive structures.
2. False – Differentiation of the external genitalia is not complete until the twelfth week.
3. False – Homologous organs have a common developmental basis but may differ with respect to function.
4. True – The glans penis of the male and the glans clitoris of the female are homologous.
5. True – Having descended prenatally by the twenty-eighth week of development, the testes should be within the scrotum at birth.
6. True – The shortening of the gubernaculum pulls the testis through the inguinal canal into the scrotum.

VIII. Clinical Considerations

A. Multiple Choice Questions

1. (d) – Pseudohermaphroditism is caused either by inadequate secretion of androgenic hormones or by the delayed development of the reproductive organs after the period of tissue sensitivity has passed.
2. (d) – A person with Klinefelter's syndrome has an XXY chromosome constitution. The individual develops breasts and male genitalia, but has underdeveloped seminiferous tubules and is generally retarded.
3. (e) – *Cryptorchidism* means "hidden testis" and is characterized by the failure of one or both testes to descend into the scrotum.
4. (c) – If a cryptorchid testis is treated before the child is 5 years old, there usually are no infertility complications.
5. (d) – Infertility is the inability of the sperm cell to fertilize the ovum. Impotence is the inability of a male to maintain an erection.

6. (c) – Ejaculation may still occur following ligation of the ductus deferentia, but the discharge does not contain sperm cells. The volume of the ejaculate is not altered because over 99% comes from the accessory reproductive glands.

B. True–False Questions
1. False – Turner's syndrome occurs when only one X chromosome is present.
2. False – Cryptorchidism should be treated before the infant has reached the age of 5.
3. False – Impotence refers to the inability of a male to maintain an erection for a sufficient time to have an ejaculation.
4. True – Infertility may be successfully treated, whereas sterility is a permanent condition.
5. True – Syphilis is contagious when lesions, called chancres, are present during the primary stage of the disease.
6. True – Because of the high incidence of prostatic carcinoma, males over the age of 60 should be checked yearly for possible symptoms.
7. False – A hydrocele is a swelling of a testis caused by retention of interstitial fluid. It may be a complication of mumps.

IX. Chapter Review

A. Completion Questions
1. Puberty
2. testes
3. spermatic cord
4. anabolic
5. gubernaculum
6. testosterone
7. dartos
8. tunica vaginalis/tunica albuginea
9. interstitial
10. Spermatogonia
11. acrosome
12. epididymis
13. ampulla
14. seminal vesicles
15. acid phosphatase
16. corona glandis
17. Emission
18. indifferent
19. phallus, glans clitoris
20. oligospermia

B. Matching Questions
1. (j)
2. (a)
3. (e)
4. (d)
5. (h)
6. (c)
7. (i)
8. (g)
9. (b)
10. (f)