

Male Checklist

Male Reproductive System

Components of the male reproductive system	Testes; accessory glands and ducts; the penis; and the scrotum.
Functions of the male reproductive system	The male reproductive system produces sperm cells that can be transferred to the female, resulting in fertilization and the formation of a new individual. It also produces sex hormones responsible for the normal development of the adult male body and sexual behavior.
Penis	The penis functions as the common outlet for semen (sperm cells and glandular secretions) and urine. The penis is also the male copulatory organ, containing tissue that can fill with blood resulting in erection of the penis.
Prepuce	A fold of skin over the distal end of the penis. Circumcision is the surgical removal of the prepuce.
Corpus spongiosum	<p>A spongy body consisting of erectile tissue. It surrounds the urethra.</p> <p>Sexual excitement can cause erectile tissue to fill with blood. As a result, the penis becomes erect.</p>
Glans penis	The expanded, distal end of the corpus spongiosum. It is also called the head of the penis.
Bulb of the penis	The proximal end of the corpus spongiosum.
Bulbospongiosus muscle	<p>One of two skeletal muscles surrounding the bulb of the penis.</p> <p>At the end of urination, contraction of the bulbospongiosus muscles forces any remaining urine out of the urethra.</p> <p>During ejaculation, contractions of the bulbospongiosus muscles ejects semen from the penis.</p> <p>Contraction of the bulbospongiosus muscles compresses the corpus spongiosum, helping to maintain an erection.</p>
Corpus cavernosum (pl., corpora cavernosa)	One of two spongy bodies consisting of erectile tissue that form the sides and front of the penis. An incomplete septum resembling a comb joins the right corpus cavernosum to the left corpus cavernosum at the midline.
Crus (pl., crura) of the penis	<p>The proximal end of the corpus cavernosum. It attaches the penis to the coxa.</p> <p>The bulb and crura of the penis are sometimes referred to collectively as the root of the penis.</p>

Ischiocavernosus muscle	<p>Muscle surrounding the crus of the corpus cavernosum. Contraction of the ischiocavernosus muscle compresses the corpus cavernosum, helping to maintain an erection.</p>
Scrotum	<p>An external sac containing the testes. The external layer of the scrotal wall is skin. The scrotum is divided by an incomplete septum, with each half of the scrotum containing a testis.</p> <p>The scrotum helps to regulate the temperature of the testes.</p>
Testis (pl., testes)	<p>One of two located within the scrotum.</p> <p>The testes produce sperm cells, the male gametes or sex cells.</p> <p>The testis is an endocrine gland, primarily producing the male sex hormone, testosterone.</p>
Dartos muscle	<p>A layer of smooth muscle forming the inner part of the scrotum.</p> <p>The dartos muscle helps to regulate the temperature of the testes, which is necessary for normal sperm cell development.</p> <p>Contraction of the dartos muscle causes the scrotum to wrinkle and become smaller, pulling the testes closer to the body core, which raises their temperature.</p> <p>Relaxation of the dartos muscle causes the scrotum to stretch and become longer, moving the testes away from the body core, which lowers their temperature.</p>
Spermatic cord	<p>During development, the testes are formed in the abdominal cavity. They descend inferiorly, pass through the abdominal wall, and enter the scrotum by the 6th to 7th month of development.</p> <p>As a testis descends, ducts, nerves, blood vessels, and lymphatic vessels supplying the testis are pulled along and covered by a small part of the abdominal wall connective tissue and muscle to form the spermatic cord.</p> <p>The left spermatic cord is usually slightly longer than the right.</p>
External spermatic fascia	<p>Connective tissue forming the outermost covering of the spermatic cord and testis. It is derived from the aponeurosis (broad, flat tendon) of the external abdominal oblique muscle.</p>

Cremaster muscle and fascia	<p>Skeletal muscle and connective tissue forming the middle spermatic covering. They are derived from the internal abdominal oblique and transversus abdominis muscles and their fasciae.</p> <p>The cremaster muscles regulates the temperature of the testes.</p> <p>Contraction of the muscles pulls the testes closer to the body core, which raises their temperature. Relaxation of the muscles allows the testes to move away from the body core, which lowers their temperature.</p>
Internal spermatic fascia	<p>Connective tissue forming the innermost covering of the spermatic cord and testis. It is derived from the transversalis fascia, which is connective tissue lining the abdominal cavity.</p>
Tunica vaginalis	<p>A closed sac of peritoneum that covers most of the testis.</p> <p>During development, an evagination of the peritoneum precedes the testis into the scrotum. Usually, the superior part of this evagination becomes obliterated, and the inferior portion forms the tunica vaginalis.</p>
Epididymis	<p>A comma-shaped structure resting on the posterolateral surface of the testis. The epididymis receives 12-20 ducts from the testis, which open into the coiled duct of the epididymis.</p> <p>The epididymis stores sperm cells while they undergo maturation. Sperm cells leaving the testis are not able to fertilize a female gamete. The cells of the duct of the epididymis release enzymes that promote the chemical reactions necessary for sperm cell maturation.</p> <p>The epididymis has three parts: the head, body, and tail.</p>
First eight weeks of development	<p>During the first eight weeks of development the embryo is sexually undifferentiated, and the embryo has structures that can develop as female or male reproductive organs. For example, both females and males have mesonephric and paramesonephric ducts.</p>
Paramesonephric duct	<p>In females, the paramesonephric ducts become the uterus and uterine tubes, whereas the mesonephric ducts mostly degenerate.</p>
Mesonephric duct	<p>In males, the mesonephric ducts form the male reproductive duct system and the paramesonephric ducts mostly degenerate.</p>

Appendix of the epididymis	A small remnant of the mesonephric duct found on the head of the epididymis.
Appendix of the testis	A small remnant of the paramesonephric duct found on the superior end of the testis.
Ductus (vas) deferens	A duct transporting sperm cells from the epididymis into the abdominal cavity. The tail of the epididymis (duct of the epididymis) joins the ductus deferens.
Inguinal ligament	The thickened, inferior border of the aponeurosis of the external abdominal oblique muscle. It extends from the anterior superior iliac spine to the pubis bone and forms the floor of the inguinal canal.
Inguinal canal	A passageway through the abdominal wall that connects the abdominal wall to the scrotum. It is located parallel to the lower third of the inguinal ligament. The inguinal canal is the passageway through which the testis descends. It also contains the ductus deferens and other components of the spermatic cord.
Superficial inguinal ring	The superficial opening of the inguinal canal from which the spermatic cord emerges.
Deep inguinal ring	The entry into the inguinal canal from the abdominal cavity.
Ampulla of the ductus deferens	The expanded end of the ductus deferens. It is a site of sperm cell storage.
Semen	After the sperm cells pass through the ductus deferens, accessory reproductive glands produce secretions that are added to the sperm cells. The resulting mixture is called semen. Sperm cells account for 5% and glandular secretions 95% of semen's volume. The secretions of accessory reproductive glands help the sperm cells to survive and swim to a female gamete.
Seminal vesicle	One of two glands located on the posterior surface of the urinary bladder.

Functions of seminal vesicle secretions

Production of a thick, mucous secretion that accounts for 60% of semen's volume.

Fructose in the secretion provides sperm cells with an energy source, enabling them to swim.

Fibrinogen in the secretion causes semen to become sticky, which helps to keep the semen within the female reproductive tract.

The secretion is alkaline, helping to protect the sperm cells by neutralizing the acidic environment of the male's urethra and the female's reproductive tract.

Ejaculatory duct

One of two ducts formed by the union of a seminal vesicle duct with the ductus deferens. The ejaculatory ducts pass through the prostate gland.

The ejaculatory duct conducts sperm cells and seminal vesicle secretions into the urethra.

Prostate gland

A midline organ located inferior to the urinary bladder and anterior to the rectum, which is the inferior part of the digestive tract. Twenty to thirty small ducts empty prostatic secretions into the urethra.

Functions of prostate secretions

Production of a thin, milky secretion that accounts for 30% of semen's volume.

Enzymes in the secretion stimulate the activation of fibrinogen in seminal vesicle secretions.

After a few minutes, other enzymes cause the semen to liquefy, allowing the sperm cells to swim further into the female's reproductive tract.

The secretion is alkaline, helping to protect the sperm cells by neutralizing the acidic environment of the male's urethra and the female's reproductive tract.

Prostatic urethra

The part of the urethra passing through the prostate gland.

The prostate gland, especially in males over 50 years of age can enlarge. As a result, urination becomes more difficult because the prostatic urethra tends to collapse.

Prostate cancer	<p>Enlargement of the prostate gland can be benign or cancerous. As part of a routine physical exam, the status of the prostate gland is checked. By inserting a gloved finger into the rectum, it is possible to palpate (feel) the prostate gland through the rectal wall. Prostate cancer results in a nodular lump or swelling that can be felt.</p> <p>For men over the age of 50, a blood test is also used to screen for prostate cancer. If the levels of a protein called prostate specific antigen (PSA) are elevated, prostate cancer could be present, and further studies should be done.</p>
Membranous urethra	The part of the urethra passing through skeletal muscles within the floor of the pelvis.
Spongy urethra	The part of the urethra passing through the penis.
Bulbourethral gland	<p>One of two glands located lateral to the membranous urethra and enclosed within the fibers of the sphincter urethrae muscle.</p> <p>The bulbourethral glands produce a pre-ejaculatory mucous secretion that neutralizes the acidic urethra and may provide a small amount of lubrication during intercourse.</p> <p>The duct of the bulbourethral gland connects to the spongy urethra.</p>

Application Questions

3. Given the following structures, starting with the site of sperm cell production arrange them in the order sperm cells pass through them to exit the male's body.

Ductus deferens
Ejaculatory duct
Epididymis
Membranous urethra
Prostatic urethra
Spongy urethra
Testis

4. Given the following glands, list them in the order in which they contribute their secretions to semen.

Bulbourethral glands
Prostate gland
Seminal vesicles

5. A hernia is the protrusion of a structure or part of a structure through the tissue normally containing it. For example, an indirect inguinal hernia occurs when a loop of small intestine protrudes through the abdominal wall into the scrotum. In this type of inguinal hernia, the small intestine follows the same pathway as the testis did during development. Given the following structures, arrange them in the order in which the small intestine passes through them.

Deep inguinal ring
Inguinal canal
Superficial inguinal ring

6. A vasectomy is a procedure in which the ductus deferens on BOTH sides is tied off and cut. This effectively prevents sperm cells from leaving the male's body and results in sterilization. A vasectomy does not affect hormone production by the testes or sexual potency.

Given the following structures, arrange them in the order a surgeon encounters them while performing a vasectomy.

Blood vessels for testis
Cremaster muscle
Dartos muscle
Ductus deferens
External spermatic fascia
Internal spermatic fascia
Skin of scrotum

Application Answers

3. The order in which sperm cells pass from the site of their production to the exterior of the body is:

Testis
Epididymis
Ductus deferens
Ejaculatory duct
Prostatic urethra
Membranous urethra
Spongy urethra

4. The order in which glands contribute their secretions to semen is:

Seminal vesicles
Prostate gland
Bulbourethral glands

5. In an INDIRECT inguinal hernia, the loop of intestine passes through the deep inguinal ring, inguinal canal, and superficial inguinal ring. Indirect inguinal hernias account for about 75% of inguinal hernias.

In a DIRECT inguinal hernia, the loop of intestine passes through the posterior wall of the inguinal canal, into the inguinal canal, and out the superficial inguinal ring. Direct inguinal hernias account for about 25% of inguinal hernias.

6. A vasectomy is performed by making a small incision in the scrotum and pulling the spermatic cord through the opening. Another incision is made through the coverings of the spermatic cord and the ductus deferens is isolated from the blood vessels and nerves supplying the testis. The order the surgeon encounters the structures is:

Skin of scrotum
Dartos muscle
External spermatic fascia
Cremaster muscle
Internal spermatic fascia
Blood vessels for testis
Ductus deferens

A ligature is a thread tied tightly around a duct or vessel causing it to close off. After the ductus deferens is ligated (tied off) in two places slightly apart, the ductus deferens is cut between the two ligatures.