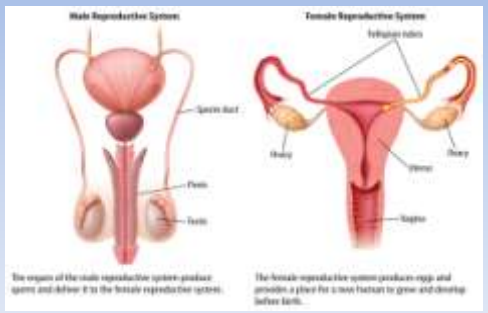
Anatomy of Reproductive System

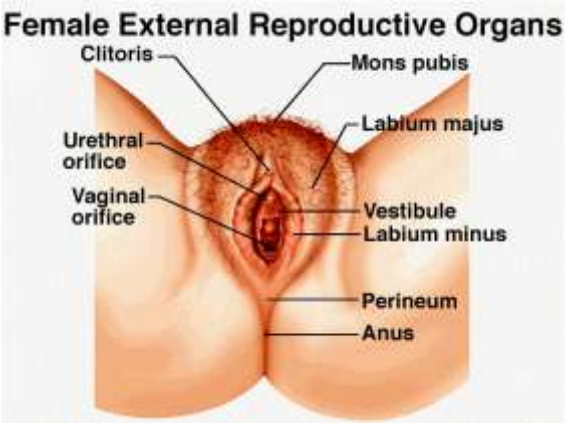
Lector: MD Ganna Pola

Anatomy of Reproductive System



Anatomy of Female Reproductive System

The female reproductive system (or female genital system) contains two main parts: **the uterus**, which hosts the developing fetus, produces vaginal and uterine secretions, and can pass sperm through to the Fallopian tubes; and **the ovaries**, which produce the female's egg cells



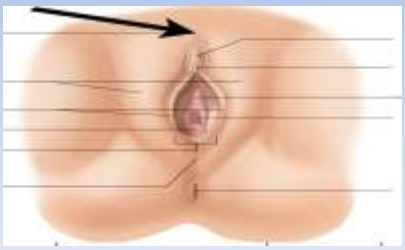
Female External Reproductive Organs

The external genital organs include the mons pubis, labia majora, labia minora, bartholin glands and clitoris. The area containing these organs is called the vulva.

The external genital organs have three main functions:

- Enabling sperm to enter the body
- Protecting the internal genital organs from infectious organisms
- Providing sexual pleasure

The mons pubis is a rounded mound of fatty tissue that covers the pubic bone. During puberty, it becomes covered with hair. The mons pubis contains oil-secreting (sebaceous) glands that release substances that are involved in sexual attraction (pheromones)



Female External Reproductive Organs

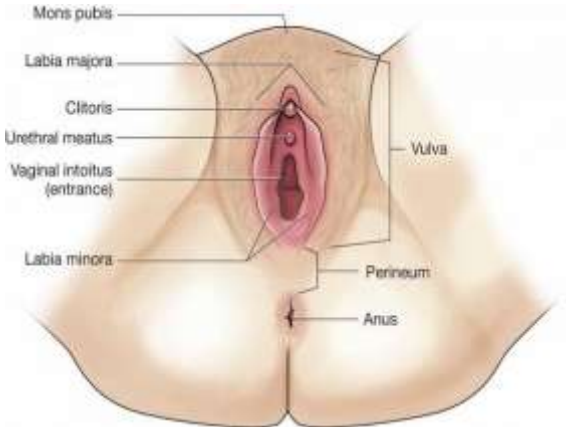
The labia majora (literally, large lips) are relatively large, fleshy folds of tissue that enclose and protect the other external genital organs. They are comparable to the scrotum in males. The labia majora contain sweat and sebaceous glands, which produce lubricating secretions. During puberty, hair appears on the labia majora

Female External Reproductive Organs

The labia minora (literally, small lips) can be very small or up to 2 inches wide. The labia minora lie just inside the labia majora and surround the openings to the vagina and urethra. A rich supply of blood vessels gives the labia minora a pink color. During sexual stimulation, these blood vessels become engorged with blood, causing the labia minora to swell and become more sensitive to stimulation

Female External Reproductive Organs

- The area between the opening of the vagina and the anus, below the labia majora, is called the perineum. It varies in length from almost 1 to more than 2 inches (2 to 5 centimeters)
- The labia majora and the perineum are covered with skin similar to that on the rest of the body. In contrast, the labia minora are lined with a mucous membrane, whose surface is kept moist by fluid secreted by specialized cells



Female External Reproductive Organs

The opening to the vagina is called the introitus. The vaginal opening is the entryway for the penis during sexual intercourse and the exit for blood during menstruation and for the baby during birth. When stimulated, Bartholin glands (located beside the vaginal opening) secrete a thick fluid that supplies lubrication for intercourse. The opening to the urethra, which carries urine from the bladder to the outside, is located above and in front of the vaginal opening

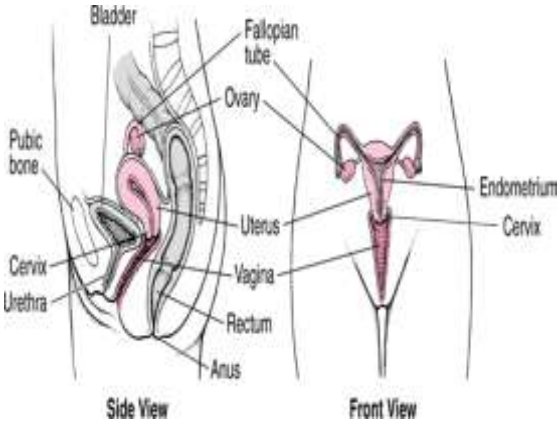
Female External Reproductive Organs

The clitoris, located between the labia minora at their upper end, is a small protrusion that corresponds to the penis in the male. The clitoris, like the penis, is very sensitive to sexual stimulation and can become erect. Stimulating the clitoris can result in an orgasm

The Internal Genital Organs

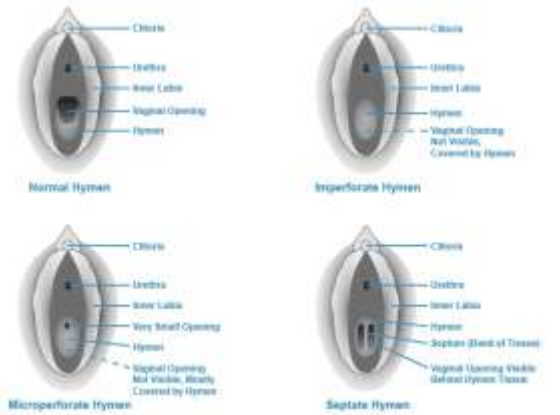
The internal genital organs form a pathway (the genital tract). This pathway consists of the following:

- Vagina (part of the birth canal), where sperm are deposited and from which a baby can emerge
- Uterus, where an embryo can develop into a fetus
- Fallopian tubes (oviducts), where a sperm can fertilize an egg
- Ovaries, which produce and release eggs



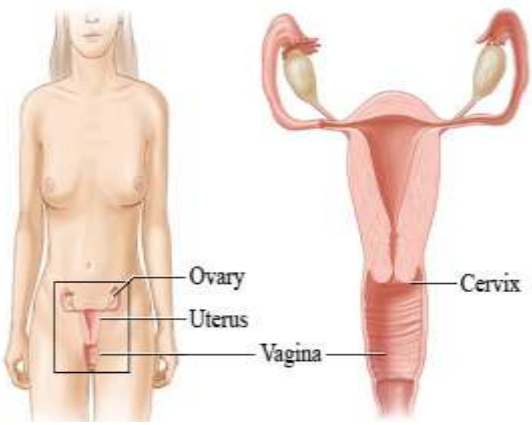
The Internal Genital Organs

At the beginning of the tract, just inside the opening of the vagina, is the hymen, a mucous membrane. In virgins, the hymen usually encircles the opening like a tight ring, but it may completely cover the opening. The hymen helps protect the genital tract but is not necessary for health. It may tear at the first attempt at sexual intercourse, or it may be so soft and pliable that no tearing occurs. The hymen may also be torn during exercise or insertion of a tampon or diaphragm. Tearing usually causes slight bleeding. In women who have had intercourse, the hymen may be unnoticeable or may form small tags of tissue around the vaginal opening



The Internal Genital Organs

The vagina is a tube like, muscular but elastic organ about 4 to 5 inches long in an adult woman. It connects the external genital organs to the uterus. The vagina is the organ of sexual intercourse in women. The penis is inserted into it. It is the passageway for sperm to the egg and for menstrual bleeding or a baby to the outside

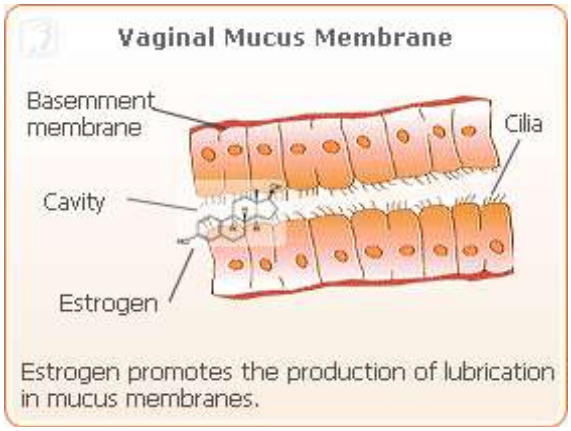


The Internal Genital Organs

Usually, there is no space inside the vagina unless it is stretched open—for example, during an examination, sexual intercourse, or childbirth. The lower third of the vagina is surrounded by elastic muscles that control the diameter of its opening. These muscles contract rhythmically and involuntarily during orgasm

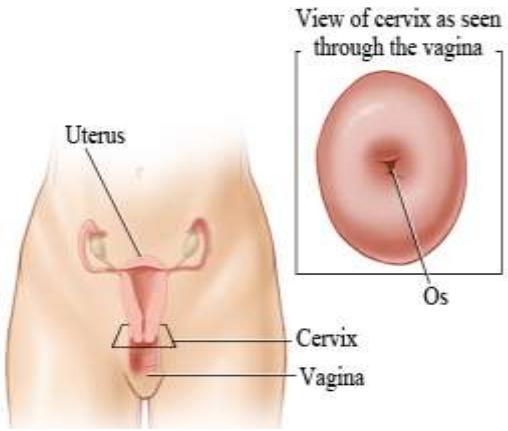
The Internal Genital Organs

The vagina is lined with a mucous membrane, kept moist by fluids produced by cells on its surface and by secretions from glands in the cervix (the lower part of the uterus). A small amount of these fluids may pass to the outside as a clear or milky white vaginal discharge, which is normal. During a woman's reproductive years, the lining of the vagina has folds and wrinkles. Before puberty and after menopause, the lining is smooth

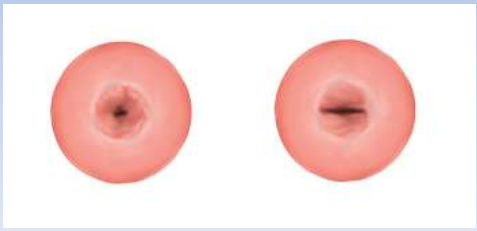


The Internal Genital Organs

The uterus is a thick-walled, muscular, pear-shaped organ located in the middle of the pelvis, behind the bladder, and in front of the rectum. The uterus is anchored in position by several ligaments. The main function of the uterus is to sustain a developing fetus. The uterus consists of the cervix and the main body (corpus)



The cervix is the lower part of the uterus, which protrudes into the upper part of the vagina. It can be seen during a pelvic examination. Like the vagina, the cervix is lined with a mucous membrane, but the mucous membrane of the cervix is smooth



The Internal Genital Organs

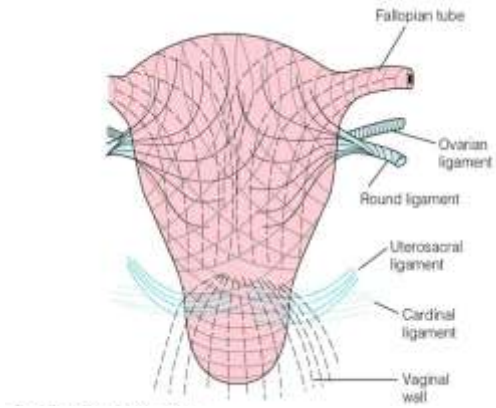
Sperm can enter and menstrual blood can exit the uterus through a channel in the cervix (cervical canal). The cervical canal is usually narrow, but during labor, the canal widens to let the baby through. The cervix is usually a good barrier against bacteria, except around the time an egg is released by the ovaries (ovulation), during the menstrual period, or during labor. Bacteria that cause sexually transmitted diseases can enter the uterus through the cervix during sexual intercourse

The Internal Genital Organs

The channel through the cervix is lined with glands that secrete mucus. This mucus is thick and impenetrable to sperm until just before ovulation. At ovulation, the consistency of the mucus changes so that sperm can swim through it and fertilization can occur. At this time, the mucus-secreting glands of the cervix can store live sperm for up to about 5 days, but occasionally slightly longer. These sperm can later move up through the corpus and into the fallopian tubes to fertilize an egg. Almost all pregnancies result from intercourse that occurs during the 3 days before ovulation

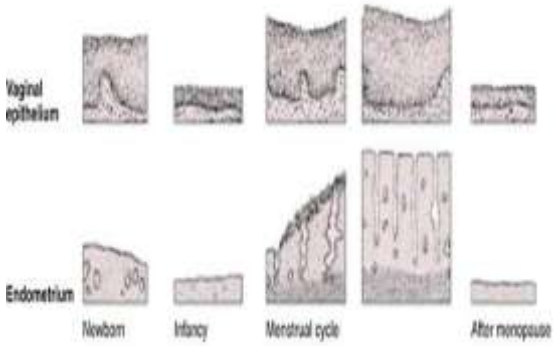
The Internal Genital Organs

The corpus of the uterus, which is highly muscular, can stretch to accommodate a growing fetus. Its muscular walls contract during labor to push the baby out through the cervix and the vagina. During the reproductive years, the corpus is twice as long as the cervix. After menopause, the reverse is true

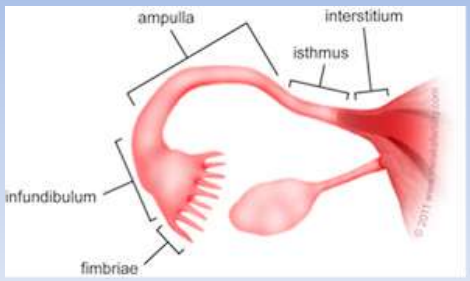


The Internal Genital Organs

As part of a woman's reproductive cycle (which usually lasts about a month), the lining of the corpus (endometrium) thickens. If the woman does not become pregnant during that cycle, most of the endometrium is shed and bleeding occurs, resulting in the menstrual period

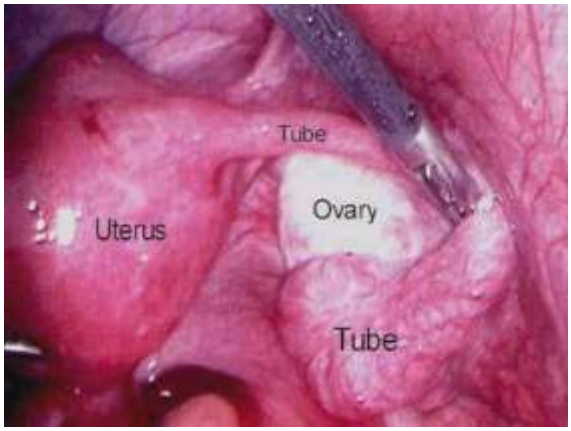


Fallopian tubes



Fallopian tubes

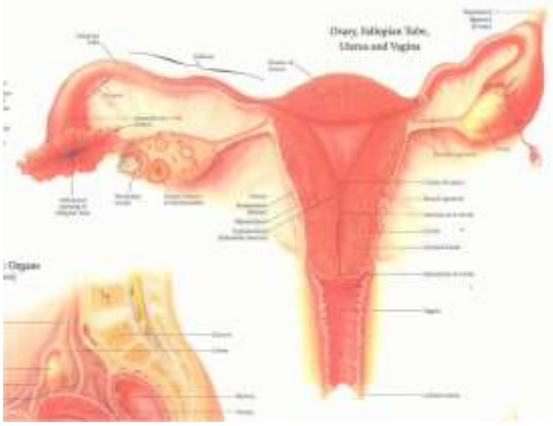
The two fallopian tubes, which are about 10 to 13 centimeters long, extend from the upper edges of the uterus toward the ovaries. The tubes do not directly connect with the ovaries. Instead, the end of each tube flares into a funnel shape with fingerlike extensions (fimbriae). When an egg is released from an ovary, the fimbriae guide the egg into the relatively large opening of a fallopian tube



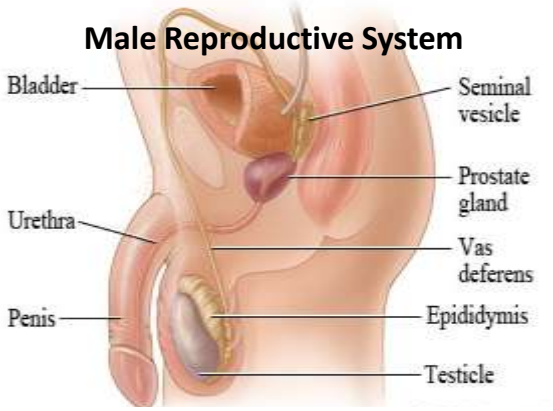
Ovaries

Ovaries

The ovaries are usually pearl-colored, oblong, and about the size of a walnut. They are attached to the uterus by ligaments. In addition to producing female sex hormones (estrogen and progesterone) and male sex hormones, the ovaries produce and release eggs. The developing egg cells (oocytes) are contained in fluid-filled cavities (follicles) in the wall of the ovaries. Each follicle contains one oocyte



Male Reproductive System



Male Reproductive System

The purpose of the organs of the male reproductive system is to perform the following functions:

- To produce, maintain, and transport sperm (the male reproductive cells) and protective fluid (semen)
- To discharge sperm within the female reproductive tract during sex
- To produce and secrete male sex hormones responsible for maintaining the male reproductive system

Male External Reproductive Organs

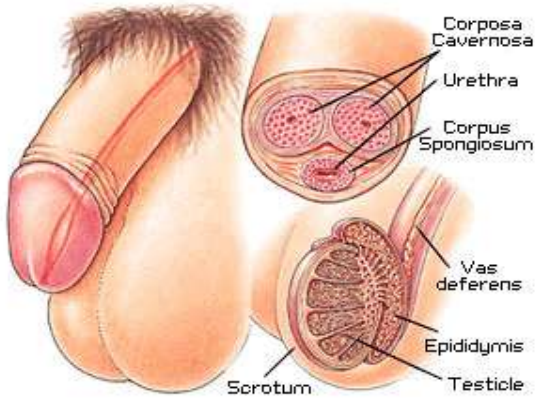
Penis
Scrotum
Testicles

Penis

Penis has three parts: the root, which attaches to the wall of the abdomen; the body, or shaft; and the glans, which is the cone-shaped part at the end of the penis. The glans, also called the head of the penis, is covered with a loose layer of skin called foreskin. This skin is sometimes removed in a procedure called circumcision. The opening of the urethra, the tube that transports semen and urine, is at the tip of the penis. The glans of the penis also contains a number of sensitive nerve endings

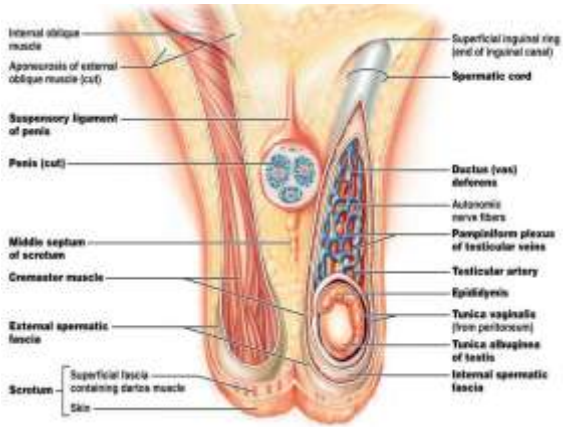
Penis

The body of the penis is cylindrical in shape and consists of three circular shaped chambers. These chambers are made up of special, sponge-like tissue. This tissue contains thousands of large spaces that fill with blood when the man is sexually aroused. As the penis fills with blood, it becomes rigid and erect, which allows for penetration during sexual intercourse. The skin of the penis is loose and elastic to accommodate changes in penis size during an erection. When the penis is erect, the flow of urine is blocked from the urethra, allowing only semen to be ejaculated at orgasm



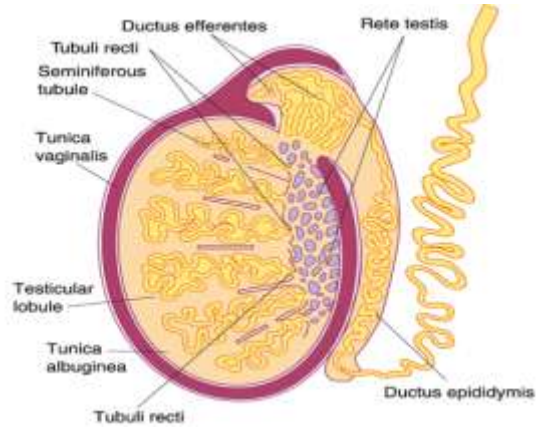
Scrotum

Scrotum: This is the loose pouch-like sac of skin that hangs behind and below the penis. It contains the testicles (also called testes), as well as many nerves and blood vessels. The scrotum acts as a "climate control system" for the testes. For normal sperm development, the testes must be at a temperature slightly cooler than body temperature. Special muscles in the wall of the scrotum allow it to contract and relax, moving the testicles closer to the body for warmth or farther away from the body to cool the temperature



Testes

Testicles (testes): These are oval organs about the size of large olives that lie in the scrotum, secured at either end by a structure called the spermatic cord. Most men have two testes. The testes are responsible for making testosterone, the primary male sex hormone, and for generating sperm. Within the testes are coiled masses of tubes called seminiferous tubules. These tubes are responsible for producing sperm cells

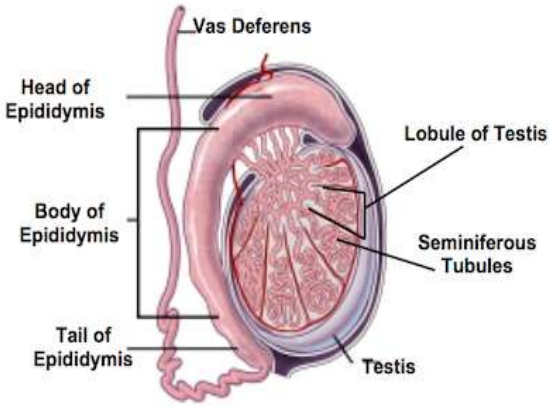


The internal organs of the male reproductive system

- **Epididymis**
- **Vas deferens**
- **Ejaculatory ducts**
- **Urethra**
- **Seminal vesicles**
- **Prostate gland**
- **Bulb urethral glands**

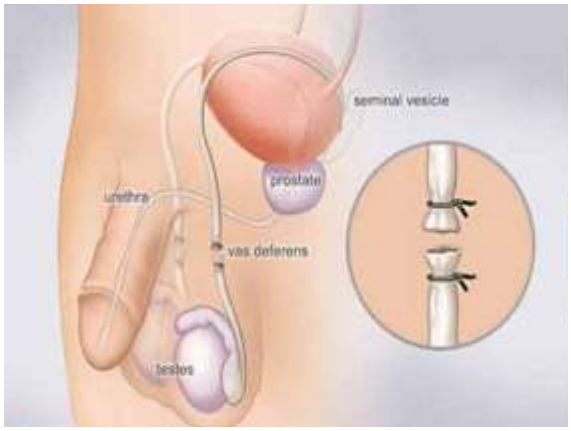
Epididymis

The epididymis is a long, coiled tube that rests on the backside of each testicle. It transports and stores sperm cells that are produced in the testes. It also is the job of the epididymis to bring the sperm to maturity, since the sperm that emerge from the testes are immature and incapable of fertilization. During sexual arousal, contractions force the sperm into the vas deferens



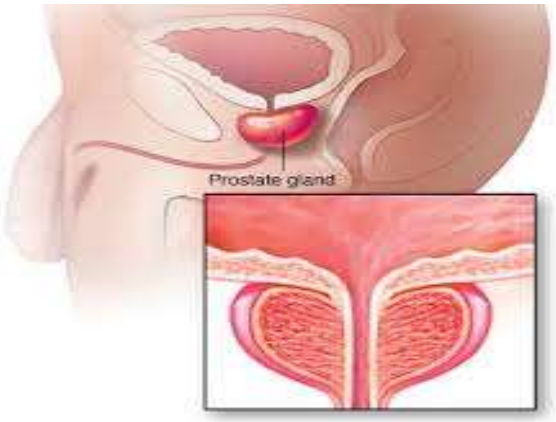
Vas deferens

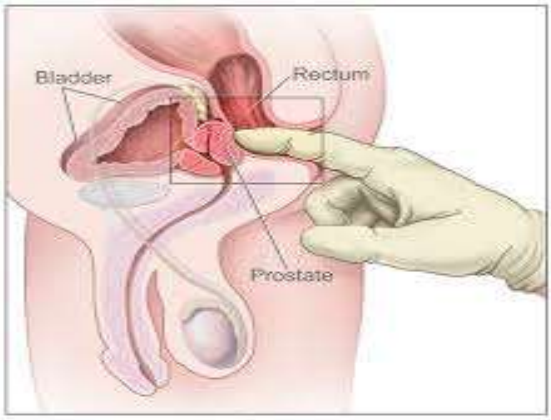
The vas deferens is a long, muscular tube that travels from the epididymis into the pelvic cavity, to just behind the bladder. The vas deferens transports mature sperm to the urethra, the tube that carries urine or sperm to outside of the body, in preparation for ejaculation



Prostate gland

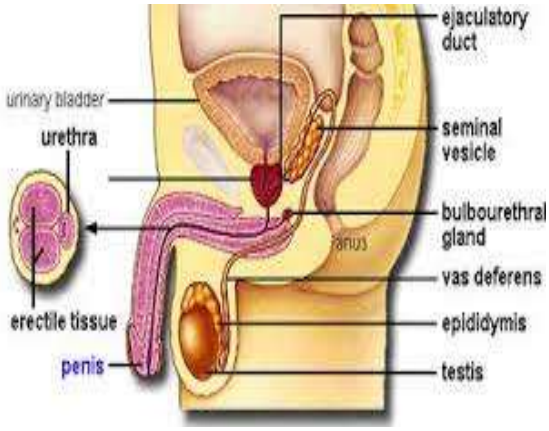
The prostate gland is a walnut-sized structure that is located below the urinary bladder in front of the rectum. The prostate gland contributes additional fluid to the ejaculate. Prostate fluids also help to nourish the sperm. The urethra, which carries the ejaculate to be expelled during orgasm, runs through the center of the prostate gland





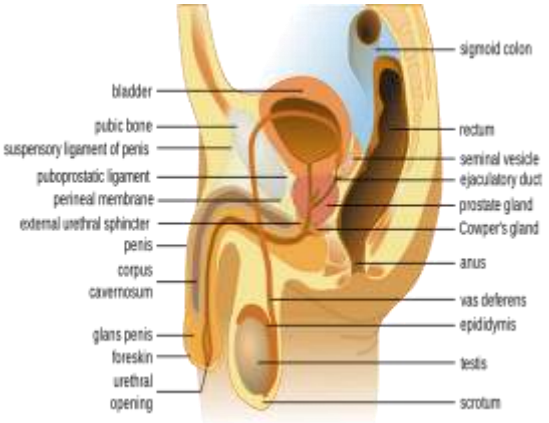
Bulbourethral glands

Also called Cowper's glands, these are pea-sized structures located on the sides of the urethra just below the prostate gland. These glands produce a clear, slippery fluid that empties directly into the urethra. This fluid serves to lubricate the urethra and to neutralize any acidity that may be present due to residual drops of urine in the urethra



Seminal vesicles

The seminal vesicles are sac-like pouches that attach to the vas deferens near the base of the bladder. The seminal vesicles produce a sugar-rich fluid (fructose) that provides sperm with a source of energy to help them move. The fluid of the seminal vesicles makes up most of the volume of a man's ejaculatory fluid, or ejaculate

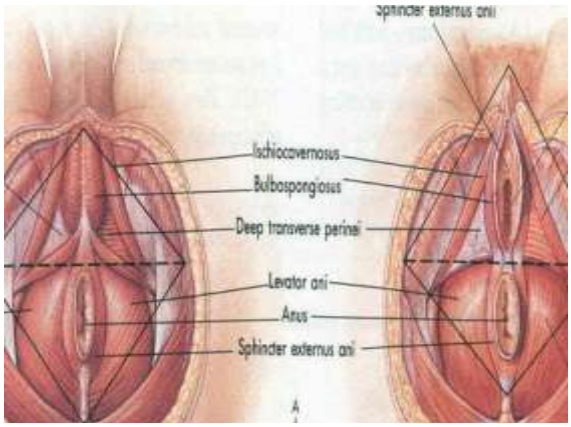


Urethra

The urethra is the tube that carries urine from the bladder to outside of the body. In males, it has the additional function of ejaculating semen when the man reaches orgasm. When the penis is erect during sex, the flow of urine is blocked from the urethra, allowing only semen to be ejaculated at orgasm

Supporting structures of female reproductive system

- Pelvic floor or pelvic diaphragm
- Bony Pelvis
- Pelvis ligaments
- Blood circulation
- Nerves



Pelvic diaphragm

The pelvic diaphragm is a muscular partition formed by the levatores ani and coccygei, with which may be included the parietal pelvic fascia on their upper and lower aspects. The pelvic floor separates the pelvic cavity above from the perineal region (including perineum) below. The levator ani is usually considered in three parts: pubococcygeus, puborectalis, and iliococcygeus. The pubococcygeus, the main part of the levator, runs backward from the body of the pubis toward the coccyx and may be damaged during parturition. Some fibers are inserted into the prostate, urethra, and vagina

Pelvic Muscles

Female Pelvic Muscles

Pelvic Muscles Function

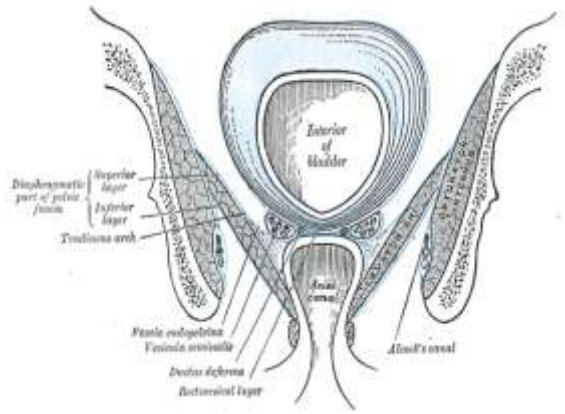
It is important in providing support for pelvic viscera (organs), e.g. the bladder, intestines, the uterus (in females), and in maintenance of continence as part of the urinary and anal sphincters. It facilitates birth by resisting the descent of the presenting part, causing the fetus to rotate forwards to navigate through the pelvic girdle. It helps maintain optimal intra-abdominal pressure

Pelvic fascia

The fascial sheaths of

– the Obturator internus muscle (Fascia of the Obturator internus)
– the Piriformis muscle (Fascia of the Piriformis)
– the pelvic floor

The fascia associated with the organs of the pelvis



Bony Pelvic

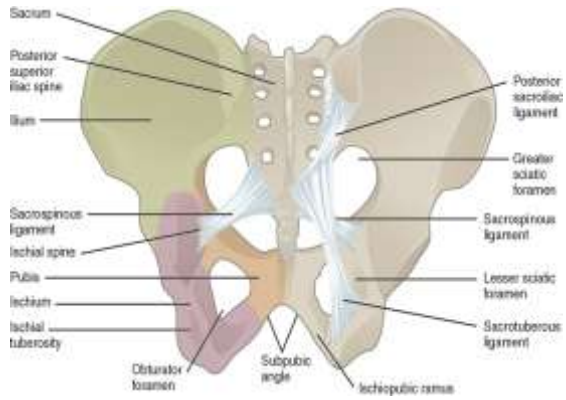
Bony Pelvic

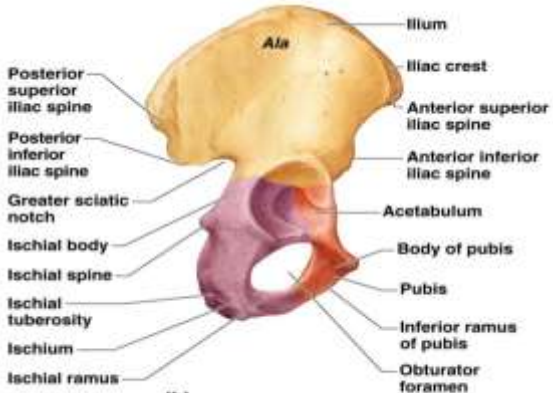
The bony pelvis serves three primary purposes:

- Protection of the pelvic structures
- Accommodation of the growing fetus during pregnancy
- Anchorage of the pelvic support structures

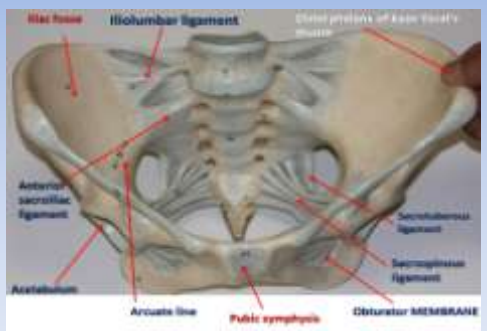
Bony Pelvic

The pelvic skeleton is formed in the area of the back, by the sacrum and the coccyx and anteriorly and to the left and right sides, by a pair of hip bones





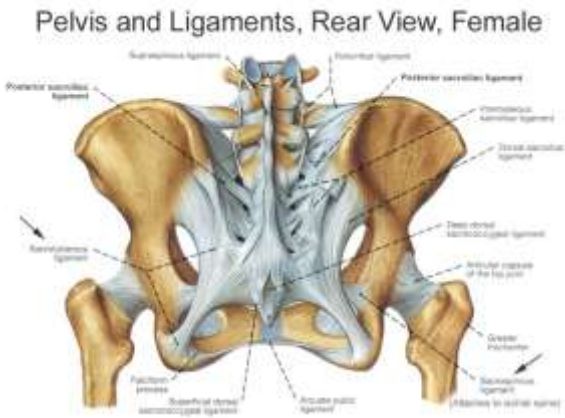
Ligaments of the Pelvis

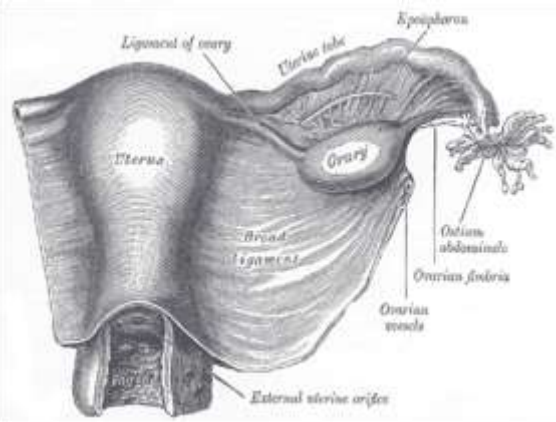


Ligaments of the Pelvis

- **Sacroiliac Ligaments**
- **Sacrococcygeal Ligaments**
- **Pubic Symphysis Ligaments**
- **Endopelvic Fascia – Ligaments**
- **Penile Suspensory Ligaments**

- **Parietal pelvic fascia** - lines the internal surface of the muscles of the pelvic floor and walls
- **Visceral pelvic fascia** - invests each pelvic organ
- **Endopelvic fascia -** meshwork of smooth muscle, ligaments, blood vessels and connective tissue lying between the parietal and visceral fascia





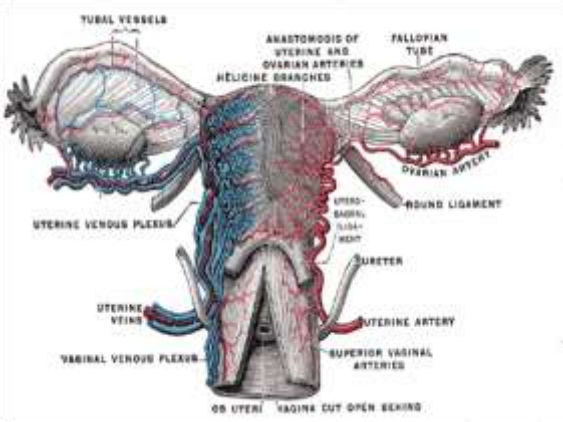
Blood circulation of woman's reproductive system

Three pairs of arterial blood vessels supplying the uterus:

- Uterine arteries branching from the hypogastric artery
- Ovarian arteries branching from the aorta
- Vesicle arteries coming from branch arteries

They all making the uterus anastomosis

Veins and arteries are seen the same way



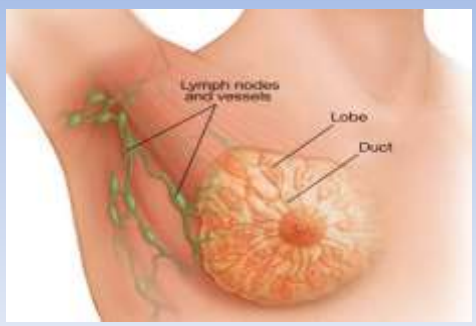
Nerves

Female and Male reproductive system controlling by sympathy and parasympathetic nervous system

The uterus is supplied by both efferent (motor) and afferent (sensory) nerves. The efferent nerves arise from the T5 through T10 spinal ganglia. The afferent – at T11 and T12

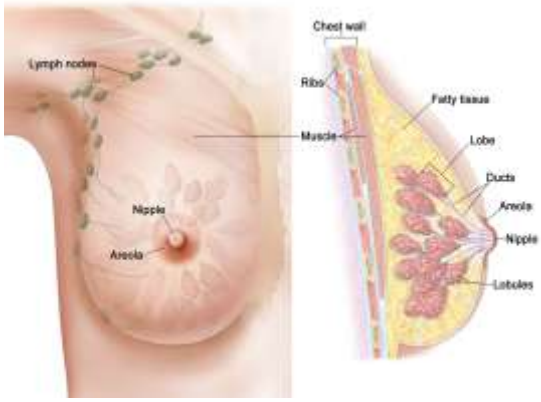
An anesthetic solution can be inject near the spinal column to stop the pain of uterine contractions

Breast



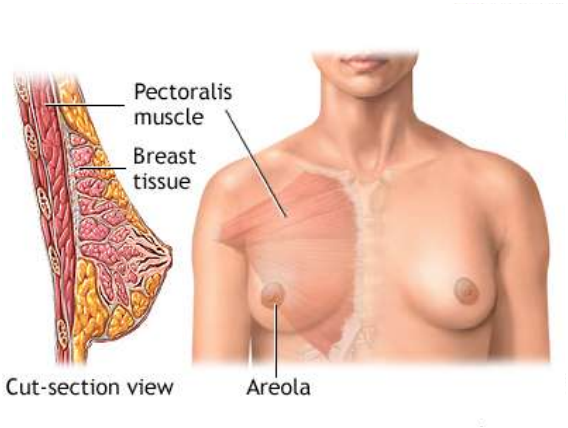
Breasts

The Breasts are paired mammary glands located between the second and six ribs. Each mammary gland is made of 15 to 20 lobes, which are divided into lobules. Lobules are clusters of acini. An acinus is the terminal part of a compound gland emptying through a narrow lumen or duct. The acini are lined with epithelial cells that secrete colostrum and milk



Breasts

The ducts from the clusters of acini that form the lobules merge to form larger ducts draining the lobes. Ducts from the lobes converge in a single nipple (mammary papilla) surrounded by an areola. Areola as usually more deeply pigmented than the skin of the breast



Breasts

The breast change in size and nodularity in response to cyclic ovarian changes throughout reproductive life. Increasing levels of both estrogen and progesterone in 3-4 days before menstruation increase vascularity of the breasts, induce growth of the ducts and acini, and promote water retention

THANK YOU FOR YOUR ATTENTION! ANY QUESTIONS?