FEMALE REPRODUCTIVE ANATOMY

**Vulva** –
All female external genital structures: hair, folds of skin, urinary and vaginal openings

**Mons veneris** (mons pubis, “mound of Venus”) –
The area covering the pubic bone consisting of fatty tissue, with numerous nerve endings producing sexually pleasure. The pubic hair distribution covers the **mons** with an inverted triangle appearance.

**Labia Majora** (“outer lips”) –
Located beneath the mons, containing fat and nerve endings as at the mons. A **nulliparous** woman - only the **labia majora** are visible. They are endowed with fat at this time.

**Labia Minora** (“inner lips”) –
Hairless, devoid of fat but highly vascular as is the labia majora. Anteriorly the labia minora converge and bifurcate where the inner folds merge to form the **frenulum** of the clitoris and the outer folds form the **prepuce or hood** enveloping the clitoris. Posteriorly, the labia minora join to form the **fourchette**. Sweat and oil glands are present with extensive nerve endings. Size, shape, and color are all variable between women.

**Clitoris** –
Primarily a sensory organ with an intensive sensory nerve supply in the **glans**. Its body is formed from two **corpora cavernosa** and a single **corpus spongiosum** forming an external shaft. **Smeagma** may form under the hood causing pain during sexual arousal and activity.

It is firmly anchored by the **internal crura** (roots) of the cavernosa. They form a resilient padding along the bony margins to promote comfort during penile thrusting and provide stimulation to the deeper parts of the clitoris. During engorgement these erectile structures will lengthen the vagina anteriorly during arousal.

**Vestibule** –
The area bound by the clitoris, labia minora, and fourchette; the area of the vulva inside the labia minora. The urinary and vaginal opening are within the vestibule; the clitoris is not.

**Urethral Meatus** –
Located between the clitoris and the vaginal opening. This location makes it easy for obtaining bladder infections - “honeymoon cystitis”
**Introitus**

Opening of the vagina.

**Hymen**

Thin fold of skin, the size of the orifice at the introitus; thickness and elasticity are variable. A strand may remain after vaginal penetration becoming caught or stretched during intercourse causing discomfort.

**Bartholin glands**

Greater vestibular glands: The ducts lie at the attachments of the hymen. They discharge mucoid secretions late during sexual arousal.

**Vagina**

A tube where in the non-aroused state it is collapsed and resembles the letter “H”, 3-5 inches long, angles upward and posteriorly.

It appears like an inverted flask with the lower two thirds closed; it is invested by the pelvic floor muscles - the levator ani being the strongest; it may spasm in the nulliparous female and can cause *vaginismus* with total occlusion of the vagina. Poor tone in these muscles has been blamed for loss of sexual pleasure and possibly orgasmic difficulties.

There are three tissue layers within the vagina: 1) mucosa with rugae, producing secretions maintaining chemical balance of the vagina and acting as a lubricating substance with sexual arousal; 2) muscle tissue, concentrated at vaginal opening; 3) fibrous tissue, aiding in vaginal contractions and expansions.

**Vaginal secretions**

The vaginal walls and cervix produce secretions.  
white or yellow in color = a sign of vaginal health;  
they change with hormonal levels;  
taste and smell change can occur.

**Uterus**

Pear shaped organ. The cervix protrudes into the anterior wall of the vagina. The recesses at the upper end of the vagina surrounding the cervix are called the *fornices*.  
The cervix contains mucus secreting glands. Usually the uterus inclines forward from its attachment to the upper vagina - *anteverted*. If *retroverted*, the cervix points more downward and forward into the vagina.

**Parametrium**

A radiating mesh of connective tissue that connects the upper vagina and cervix to the side walls of the pelvis.

**Ovaries**

Almond shaped containing 40,000 to 400,000 mature ova.

**Perineum**

Area between the vaginal opening and the anus. It is the area involved in an episiotomy
MALE REPRODUCTIVE ANATOMY

Scrotum –
The superficial pouch that has within it the testes; an out pocket of the abdominal wall; two separate compartments within; each compartment with a teste suspended by its spermatic cord. A cooler environmental temperature is needed for normal spermatogenesis hence the scrotum suspends the testis outside of the abdominal cavity. Heat with steam rooms, hot baths, hot tubs can arrest sperm production for as long as several weeks if subject to 30 minutes of exposure. Tight clothing with increased body temperature exposure may also inhibit sperm production. (But it would be reckless to assume this as a form of birth control!)

Testes –
The testes develop in the abdominal cavity and migrate down the inguinal canal as part of fetal development or during the pressure of vaginal birth. Cryptorchidism refers to the failure of a testis to completely descending into the scrotum. Desention was required prior to 5 years of age to prevent cancer development, now the age could be 1 year, per some urologists. Level of testes is controlled by the dartos muscle, the tunica dartos being the second layer of the scrotal sac, which can corrugate and shrink the scrotal walls, and the cremaster muscle forms a sling encircling the testes and spermatic cord within the scrotum. During impending orgasm the cremaster pulls the testicles up to maximum elevation; fear also has the same effect with a rise of the testes.

Interstitial Leydig cells –
Produce steroid hormones

Tubular cells –
Give rise to spermatozoa.

Pathways of Sperm –
Seminal tubules empty into the epididymis of the testes where the sperm matures. From the epididymis the spermatozoa enter into the vas deferens ending in the ampulla of the vas, a storage chamber for sperm, lying behind the bladder. The vas deferens and the duct from the seminal vesicle form the ejaculatory duct. Sperm is stored for 30 - 60 days, then die, and are reabsorbed by the body.

Seminal vesicles –
Two elongated sacs behind the bladder and prostate; they secrete 70% accessory fluid to the seminal fluid as an alkaline, fructose rich fluid to supply nutrition to sperm for their motility.

Prostate –
The structure beyond the dilated urethral bulb and before the junction with the urinary bladder; the urethra traverses the prostate gland; a firm fibromuscular structure containing branching glands which contribute 30% of the accessory fluids to the seminal ejaculate, through the prostatic urethra. The secretions consist of a thin milky alkaline substance that counteracts the unfavorable acidity of the male urethra and the female vaginal tract.
Bulbourethral glands - Cowper’s –
Distal to the prostatic urethra, they lie along each side of the urethra producing secretions during sexual arousal - **pre-ejaculate fluid known as pre-cum**. This fluid is also produced by glands along the penile urethra. Therefore, there is potential discharge prior to ejaculation. The discharge is clear and viscous and varies considerably in amount between men. The **function of the fluid** is to alkalinize the urethra and lubricate it for ease of flow of the seminal fluids. **It may contain sperm!**

**Penis** –
- **Average size** - 3-4 inches flaccid and 6 inches erect
- **Diameter** - 1 inch flaccid to 1¼ inch at time of erection
- **Consists of**
  - fused pair of **corpus cavernosa** and
  - **corpus spongiosum** that envelopes the urethra
  (no bone; no abundance of muscular tissue)

There is a different appearance to each man’s penis. At the root of the penis the corpora cavernosa diverge and attach firmly to the **pelvic bones**; collectively these attachments are known as the crura. The **corpus spongiosum** expands around the dilated part of the urethra to form the **bulb of the urethra (bulb of the penis)** and expands at the tip to form the **glans**. At the root the erectile columns are invested by layers of muscle, the **bulbospongiosus** and **ischiocavernosus muscles**. These muscles contract rhythmically during orgasm and also semi-voluntarily during the development of an erection.

These muscles are involved in **Kegel exercises** in men:
While urinating voluntarily stopping and movement of the penis is achieved while flaccid or erect.
Theses exercises are used to achieve:
- Stronger and more pleasurable orgasms
- Better ejaculatory control.
- An increase in pelvic sensation with arousal

**Glans Penis** –
The tip of the penis where the corpus spongiosum expands, separating it from the shaft of the penis by a small grove - the **corona** (observe here for STDs). The entire glans is highly sensitive, but the rim or crown and frenulum are extremely sensitive.

**Prepuce/foreskin** –
The glans is covered by this lax skin.

**Frenulum** –
The longitudinal fold of skin where prepuce is attached to the glans. The separation of the prepuce from the glans is sometimes not complete.
PHYSIOLOGICAL RESPONSES

Four Phases of Sexual Response (Masters & Johnson)
1. Excitement Phase
2. Plateau phase
3. Orgasmic Phase
4. Resolution Phase

Vasoconstriction - occurring within 10 -30 seconds of the onset of stimulation is the major physiological sexual response. The two types are:
- psychic - mediated by the brain,
- reflexive - via reflex pathways in the spinal cord before any discernible physiologic changes have occurred.

Female Physiological Response

Local vasocongestion is more extensive and complex than in the male.
All of the following engorge:
- the venous plexus surrounding the lower part of the vagina.
- the corpus spongiosum - the erectile bulb of the vestibule.
- the corpora cavernosa of the clitoris.

During arousal, the deeper clitoral structures engorge along with the labia minora. The minora become everted, exposing an inner moist surface - supposedly in preparing for the vestibular entry of the penis. If penile entry is attempted in a sexually unaroused female, the flaccid minora may be carried into the vaginal opening causing discomfort. In a multiparous female, the minora may present as engorged even in the unaroused state due to a degree of varicosities from childbirth.

A rigid cuff forms narrowing and elongating the outer third of the coital canal. If stimulation continues the labia minora pouts outward and reddens. With the clitoris, early engorgement and then retraction occurs against the symphisis pubis. The uterus engorges and increases in size, and rises in the pelvis causing the upper two thirds of the vagina to balloon. Slow irregular contractions of the vaginal vault may occur as stimulation continues.

With engorgement, an increase in blood supply to the vagina, a fluid appears on the vaginal epithelium forming a lubricating coat - a modified plasma transudate - not coming from a gland; no mucous glands are seen in the vaginal squamous epithelium. Bartholin glands secrete mucus late in arousal and modest in amounts. Pain in late arousal could indicate Bartholin retention cyst. The congested and pouting labia invites penetration. This vaginal transudate lubricates within 10-30 seconds of arousal; the transudate like mucoid material is found on the vaginal mucosa – see Masters & Johnson.

The first sign of sexual arousal in the female as a result of the vasocongestion is pooling of blood in the pelvic area. This functions to:
1. enhances the possibility of conception by helping to alkaline the normally acidic (pH 4.0-5.0) vaginal chemical balance. Sperm travels faster and survives longer in alkaline environment. Seminal fluid also helps to alkalinize.
2. increase sexual enjoyment by increasing pleasure of touch and facilitating entry of the penis.

Items that inhibit lubrication are anxiety, drugs, changes in hormonal balance by BCP’s, and menopause.

The narrowing of the outer third of the vagina adds to stimulation of the penis - the "orgasmic plateau." The ballooning of the inner third of the vagina may, with the orgasmic plateau, aid in conception by encouraging formation of a seminal pool near the cervix and reducing drainage from the vagina. The elevation of the uterus pulls the cervix out of the path of the thrusting penis. "Buffeting" of the cervix can cause discomfort, where the penis hits the cervix, displaces uterus, jarring the ovaries which has the same embryonic tissue source as the testes. (Feels like falling onto the crossbar of a bike.)

The sole function of the clitoris, especially the glans, is to provide for the principle source of erotic stimulation for the female. Grafenberg Spot - G Spot is located at the anterior wall of vagina, 1 cm from the surface 1/3 to ½ way in from the vaginal opening consists of system of skene’s glands and ducts surrounding the urethra. It constitutes the female counterpart of the male prostate with the same embryonic tissue

Sexual activity during the menstrual cycle is a cultural taboo with no health reasons to avoid intercourse during menses except when the following exists: menstrual pathology, physical symptoms, increased bleeding. Orgasms during menses by any means of stimulation can be beneficial with uterine contractions and the release of vasocongestion, often reducing back aches, the feeling of pelvic fullness, and cramping.

Male
The testes rise due to retraction of the spermatic cords and contraction of cremaster muscle, the first sign of impending orgasm.

The scrotal walls become thicker and tighter due to vasocongestion and contraction of the dartos muscle. If stimulation is prolonged or intensified, the testes are pulled to the perineal floor and increase in size. Why? Possibly the testes rise so the full force of ejaculation is possible.

Penile erection occurs with the following purposes:
• adequate entry into the vagina
• deposition of semen
• stimulation of the female genitalia
• main tactile erotic input for the male

Rigidity depends on the blood filling the erectile tissue of the corpora cavernosa. Physiologic mechanism of erection is autonomic nervous system coordinated.
• relaxation of smooth muscle in the sinusoidal walls, arterial expansion in 3 erectile chambers -dilation of arteries
• passive compression of the venules
• inflow>outflow
• blood accumulates in the tissue
**Erection** –
Involves the following vasculature:
L & R internal pudental arteries - L & R perineal arteries + common penile artery - L & R deep artery of the penis + dorsal artery of the penis. The dorsal artery supplies the erectile tissue as the helicine arteries of the corporal bodies.

The helicine arteries are surrounded by smooth muscle that remains contracted during the flaccid state. During an erection, relaxation of the smooth muscle increases blood supply to the erectile tissue compressing the venules against the tunica albuginea - the occlusive mechanism. Flaccidity is a state of arterial vasoconstriction.

**Erection** is a state of arterial vasodilatation mediated by nitric oxide. Biochemically, nitric oxide activates cGMP which allows smooth muscle relaxation. **Viagra** inhibits PDE 5, which degradates cGMP, Increasing cGMP with Viagra promotes smooth muscle relaxation and erection.

During erection, the foreskin is partially retracted by tension of the skin along with the elongated penile shaft, exposing the tip of the glans and the urethral opening. During coital thrusting, the foreskin is intermittently retracted further by friction with the vaginal walls, exposing the glans completely. However if the mobility of the preputial skin is restricted, difficulty and discomfort may result during intercourse. **Positions of the erect penis varies.**

**Ejaculation**
Orgasm does not equal ejaculation.
- Men may have multiple orgasms with one resultant ejaculation.
- It is a spinal reflex where a (sexual ) stimulus to the penis (manual, oral, coital, fantasy) results in buildup of neural excitation leading to a critical level where a threshold is exceeded and an internal physical event occurs.

**2 stages of ejaculation**
- **Emission phase** – The prostate, seminal vesicles, and ampulla contract. Urethral sphincters close trapping seminal fluid in the urethral bulb (part of the prostatic urethra that lies between these two muscle sphincters) Men typically experience this first stage as a subjective sense that orgasm is inevitable - “point of no return.”

- **Expulsion phase** - Collected semen is expelled by strong rhythmic contractions of the muscles surrounding the bulb and crura of the penis.

Retrograde ejaculation
- S/P prostatectomy, illness, congenital anomaly, drugs (tranquilizers).

An orgasm with ejaculation without direct genital stimulation is known as a nocturnal emissions - “wet dreams.” This can also occur with an orgasm during sex play, kissing etc.