

“Female” and “Male”

Sexual Health,

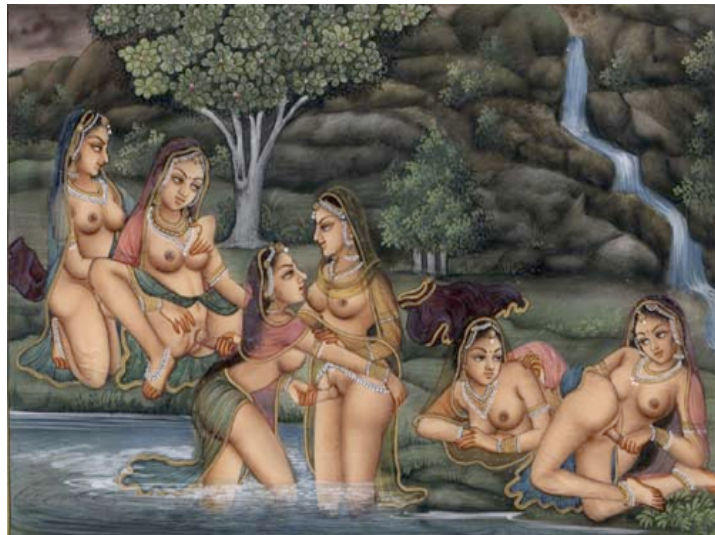
Anatomy and Function

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Stanford Prevention Research Center

Professor of Obstetrics & Gynecology



**Director, Stanford
WSDM Center
Women and Sex Differences**

**Stanford University
School of Medicine**

hot pink: sexuality
red: life
orange: healing
yellow: sunlight
green: nature
turquoise: magic/art
indigo/blue: serenity/harmony
violet: spirit

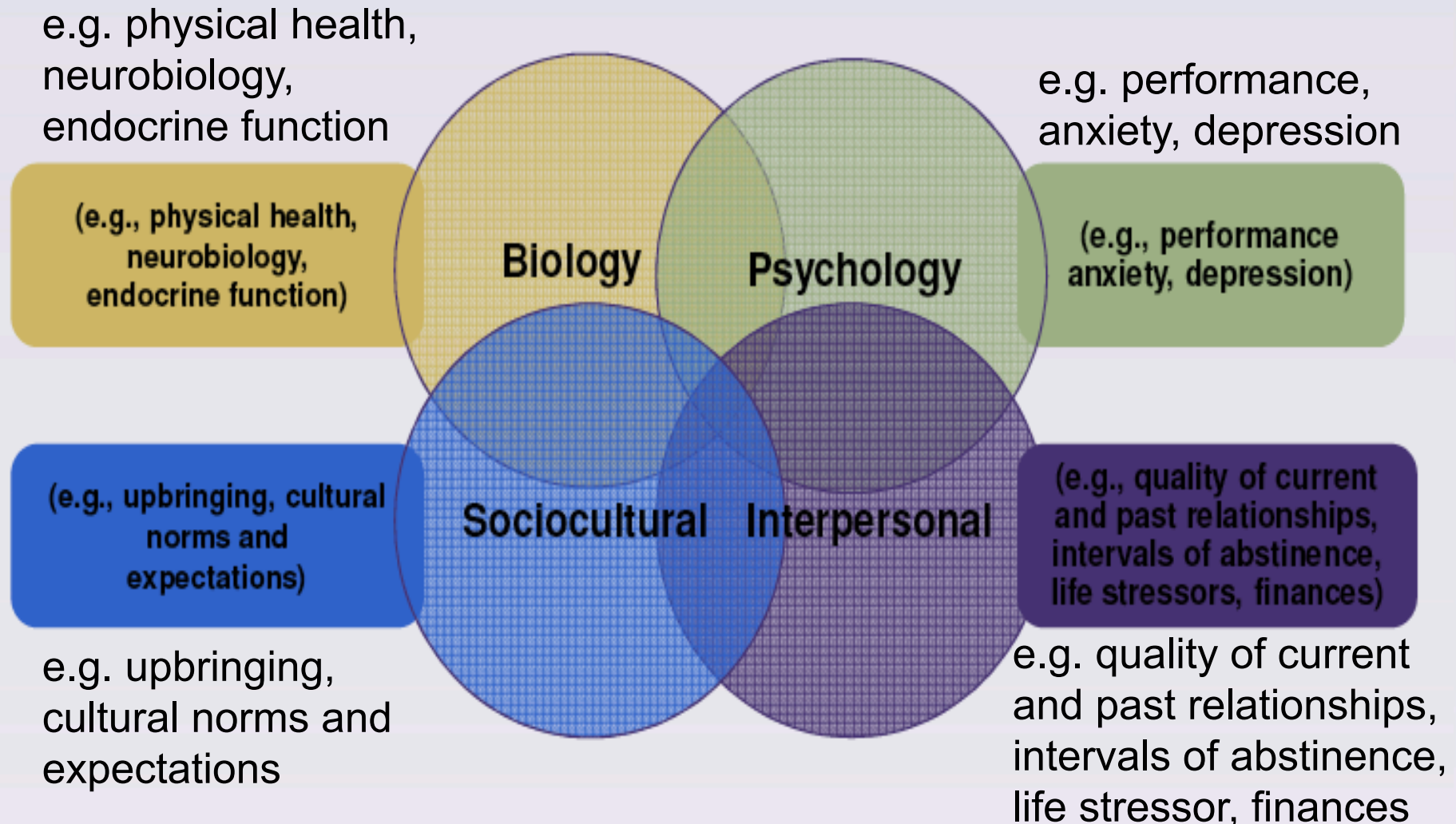
SEXUAL HEALTH

- **Sexual health** has been defined as “a **state of well-being** in relation to sexuality across the life span that involves physical, emotional, mental, social, and spiritual dimensions.”
- It is **not** merely **the absence of disease, dysfunction or infirmity**
- **Sexual health** requires a **positive and respectful approach to sexuality and sexual relationships**, as well as the **possibility of having pleasurable and safe sexual experiences**, free of coercion, discrimination and violence.
- Sexual health is an **intrinsic element of human health**. It includes: the ability to understand the **benefits, risks, and responsibilities of sexual behavior**; the prevention and care of disease and other adverse outcomes; and the **possibility of fulfilling sexual relationships**.
- For sexual health to be attained and maintained, the **sexual rights of all persons must be respected, protected and fulfilled**.

Sex-Negativity versus Positive Sexuality

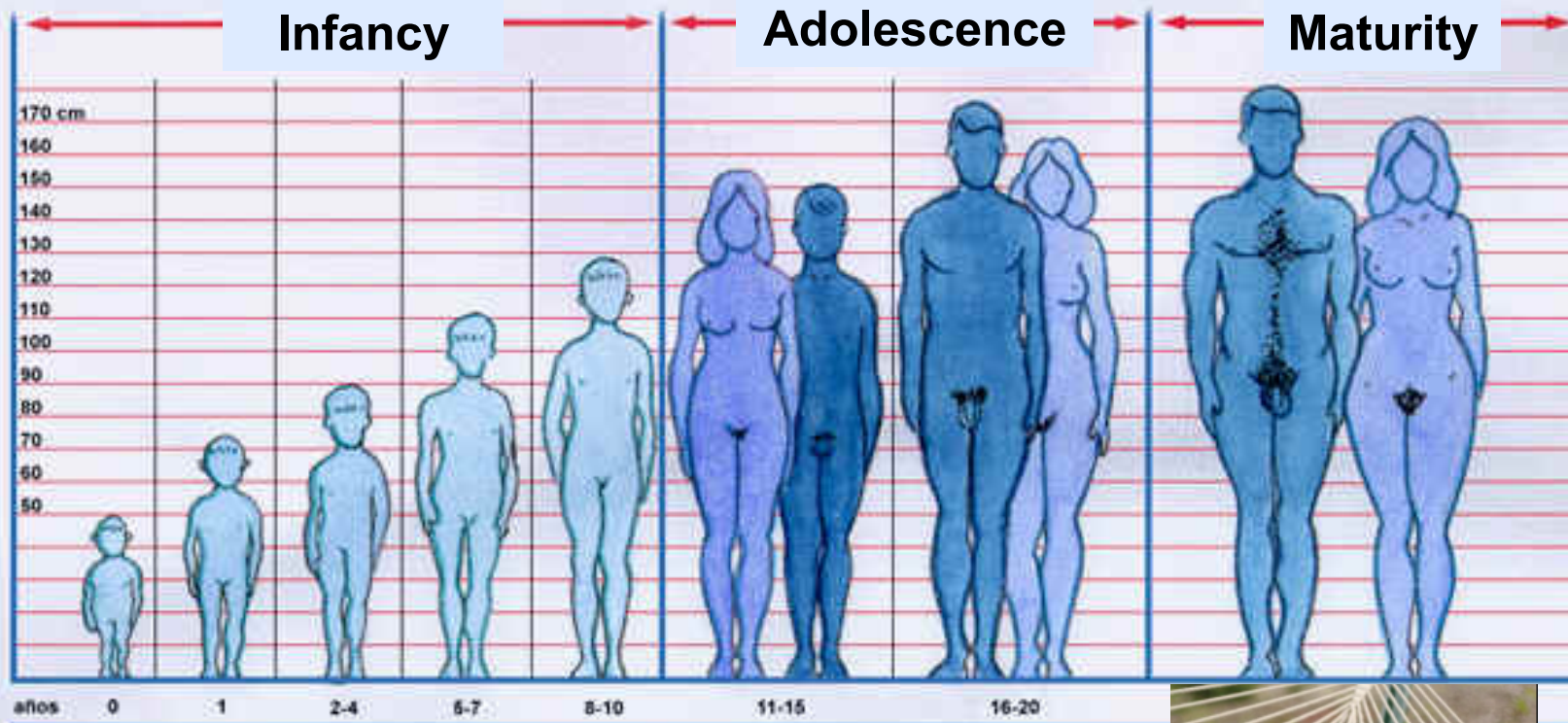
- There is tremendous variation in **sexual norms** across and within cultures, historic periods, common moral judgments & formal laws that govern sexual behavior.
- **Sexual health** is impacted by **socioeconomic and cultural contexts** — including **policies, practices, and services** — that support healthy outcomes for individuals, families, and their communities.
- **Sex-negativity** - Sex-negative societies construct sexual behavior as **risky, problematic, adversarial; narrow range of acceptable practices** (“good, normal, natural”= heterosexual, married, monogamous, procreative, in pairs, relationships, same generation, in private, no masturbation; **restricted communication**)
- **Positive sexuality** embraces **sexual diversity**; encourages open, honest communication & empowering individuals in sexual choices; acknowledges **importance of pleasure** along with **consideration of risk**; is consistent with restorative justice.

Biopsychosocial Model of Human Sexual Response



Normal Sexual Development

Lindau et al,
NEJM, 2007:



W 1550 M 1455
57-85 yrs old

**Prevalence of
sexual activity with
a partner
($\geq 2-3$ x/mo)
[Masturbation]**

ages 57-64 (N)

W (492); M (528)

63% [32%]; 68% [63%]

ages 65-74 (N)

W (545); M (547)

65% [22%]; 65% [53%]

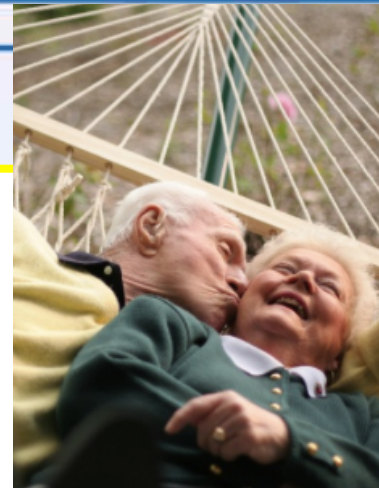
ages 75-85 (N)

W (513); M (380)

54% [16%]; 54% [28%]

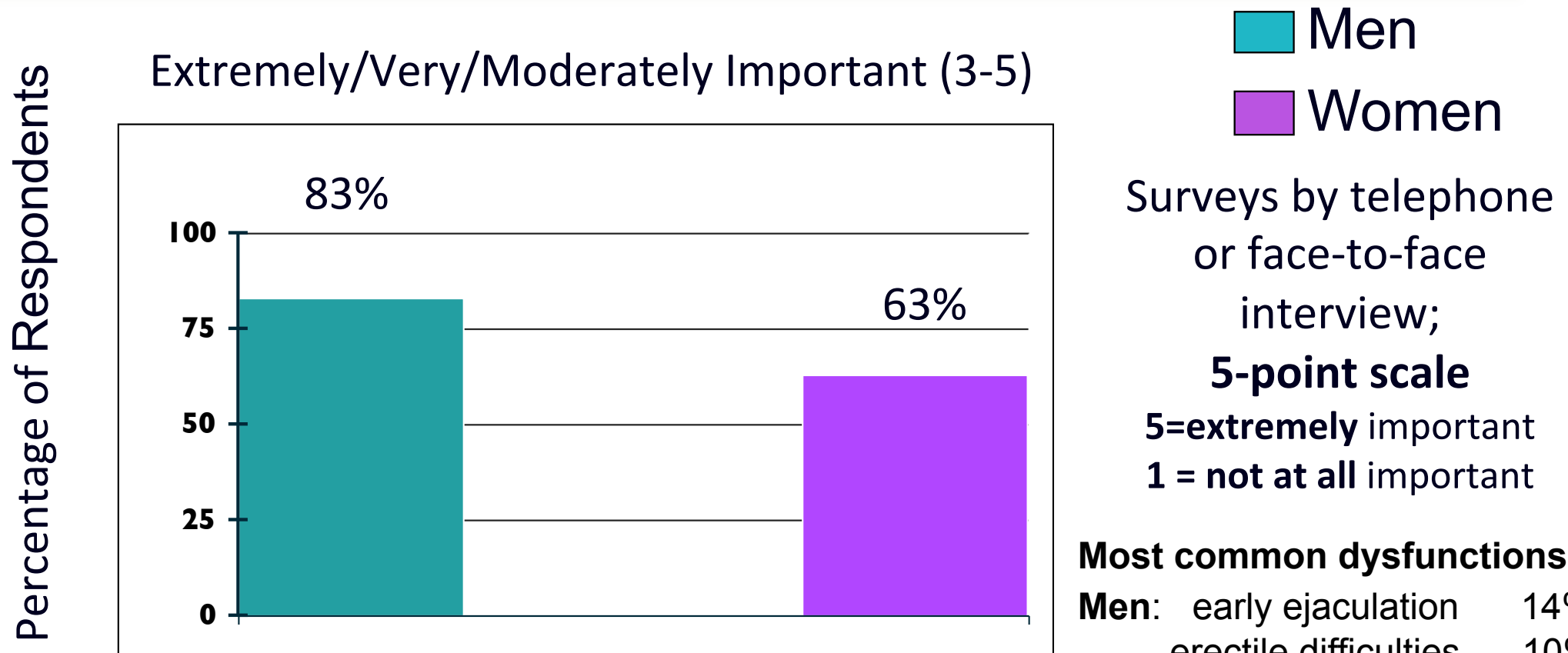
from: **National Social Life, Health and Aging Project***
<https://www.nia.nih.gov/newsroom/2007/08/study-sheds-new-light-intimate-lives-older-americans>

Accessed November 15, 2015 *supported by the NIH



Most Men and Women Rate Sex as Important to Their Overall Life

26,000 men and women aged 40 - 80 years in 29 countries



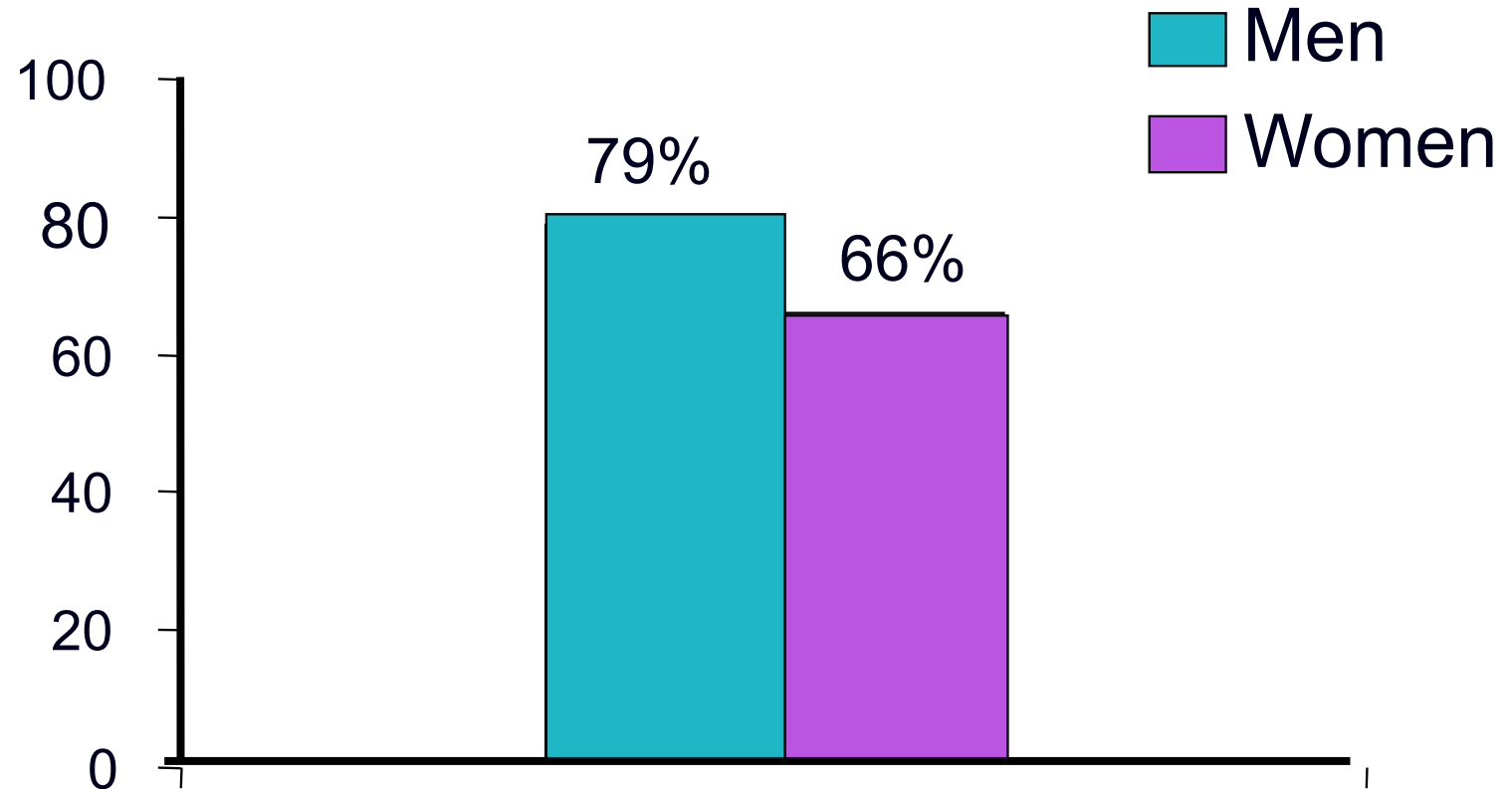
Nicolosi A, et al. **Sexual behavior and sexual dysfunctions after age 40: the global study of sexual attitudes and behaviors.**
Urology 2004 Nov;64(5):991-7

Most Men and Women Report That Sex Is Important to Their Relationship

Random survey* 1300 Americans aged 60+ years

Percentage*
reporting that
Sex is an important
aspect of their
relationship
with their partner

* among “sexually
active”, i.e.
engage in sexual
activity at least
once per month



* Conducted by the
National Council
on the Aging

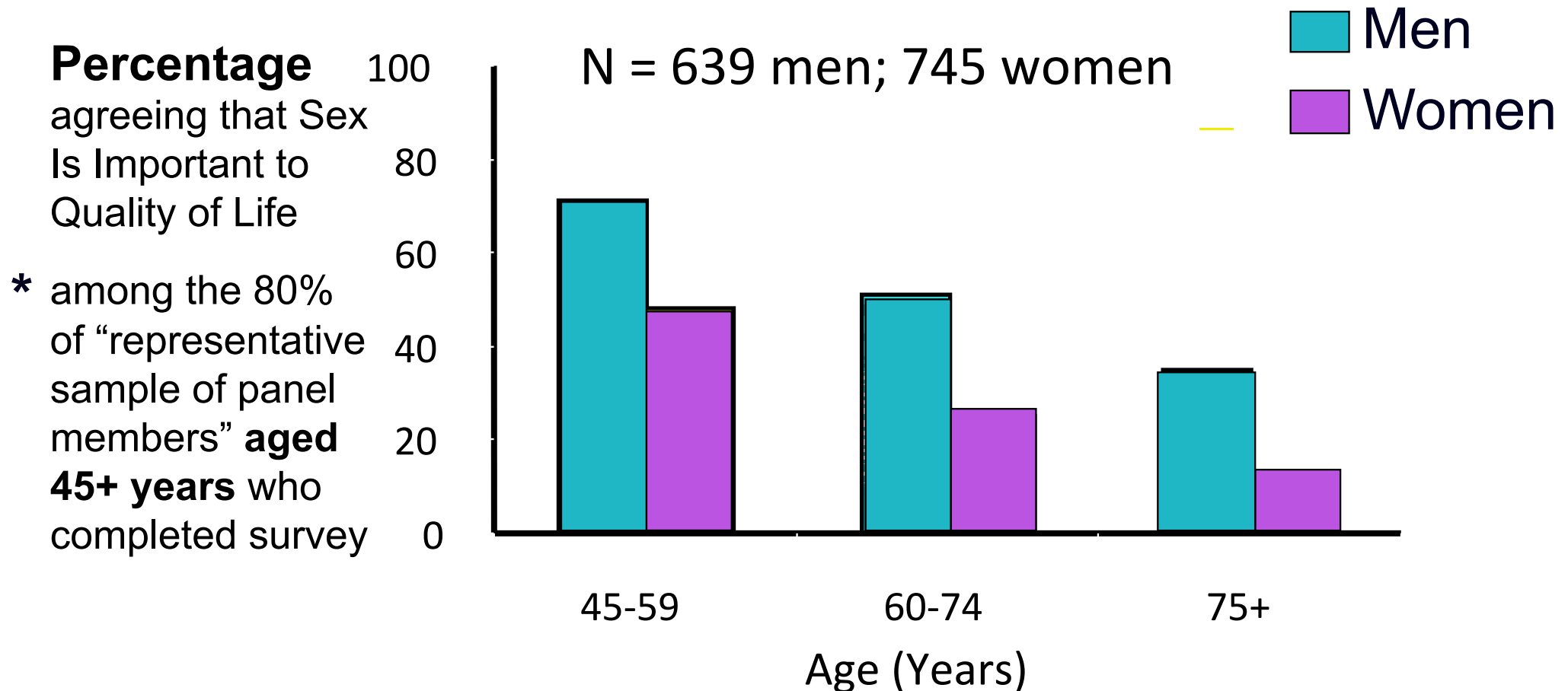
**Half of older Americans report they are sexually active.
4 in 10 want more sex.** *Press release from Sept 28, 1998.

See: <https://www.nia.nih.gov/health/publication/sexuality-later-life>

Importance of Sexuality to Quality of Life

American Association of Retired Persons (AARP)

National Family Opinion Research, Inc completed survey March 1999



AARP/Modern Maturity Sexuality Study. Washington, DC: American Association of Retired Persons: 1999
<http://assets.aarp.org/rgcenter/health/mmsexsurvey.pdf> Accessed Nov 15, 2015

Pain experienced during Vaginal and Anal Intercourse

- Subsample of 864 women* and 874 men* in 2012 National Survey of Sexual Health Behavior, a nationally representative probability survey of Americans aged 18+ collected via Internet. *Mostly (~97%) heterosexual
- **Painful Vaginal Intercourse: 30% of women, 7% of men**
 - Most reported mild and of short duration (**most didn't tell partner**)
 - For women, hormonal status (e.g. lactation, menopause), vulvar dermatoses (e.g. lichen sclerosus), gynecological health (e.g. endometriosis), infections (e.g. bacterial vaginosis or candidiasis), medications (e.g. reduced vaginal lubrication from hormonal contraception), and mechanical issues (e.g. tight genital fit, vaginal penetration)
- **Painful Anal Intercourse: 72% of women, 15% of men**
 - More of these included moderate or severe pain (for women) and of mixed duration (**majority ~70% told partner**)

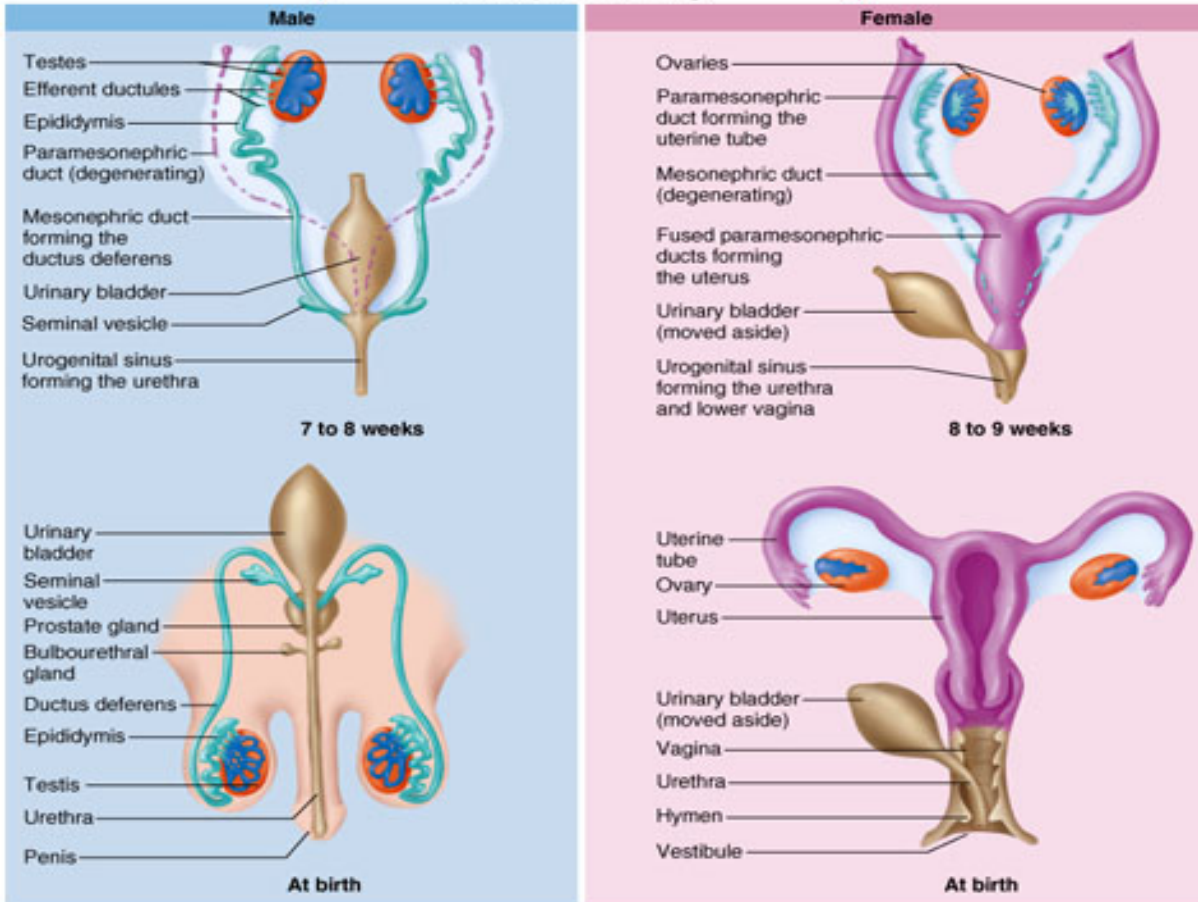
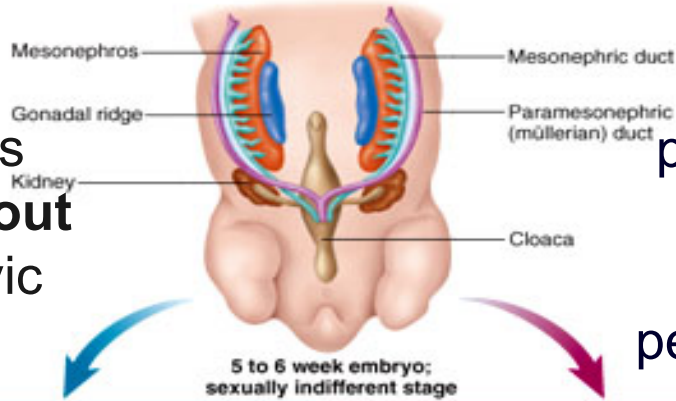
Herbenick D, et al. Pain experienced during vaginal and anal intercourse **with other-sex partners**: Findings from a nationally representative probability study in the United States. **J Sex Med 2015; 12:1040–1051.**

Male

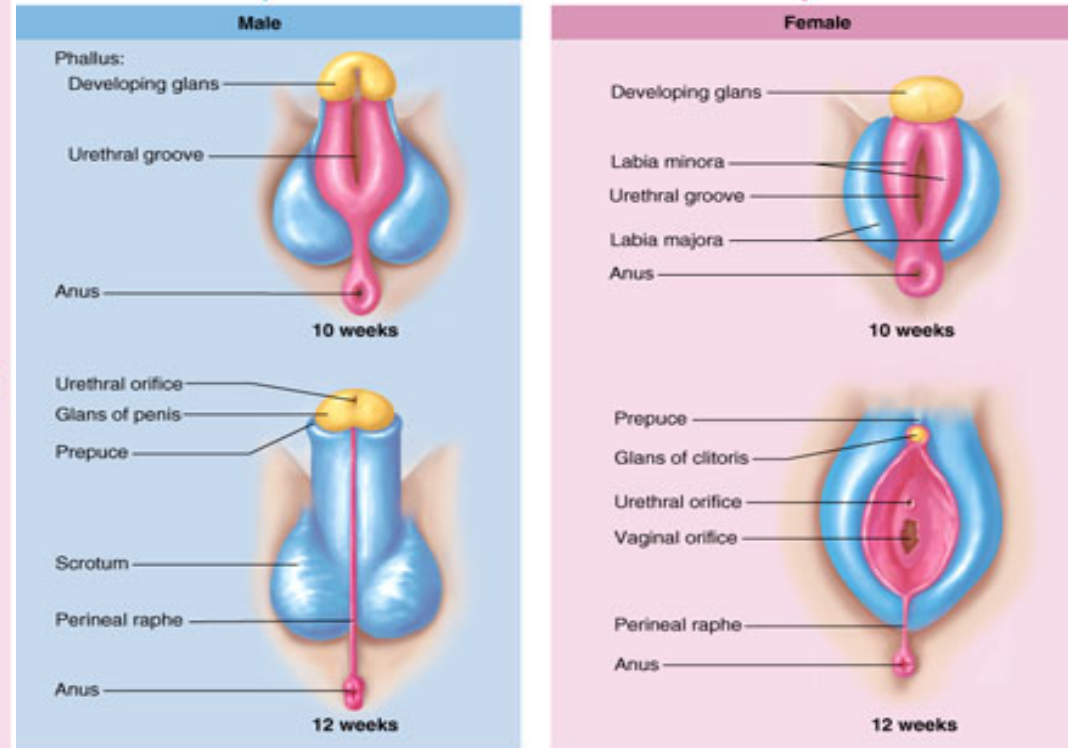
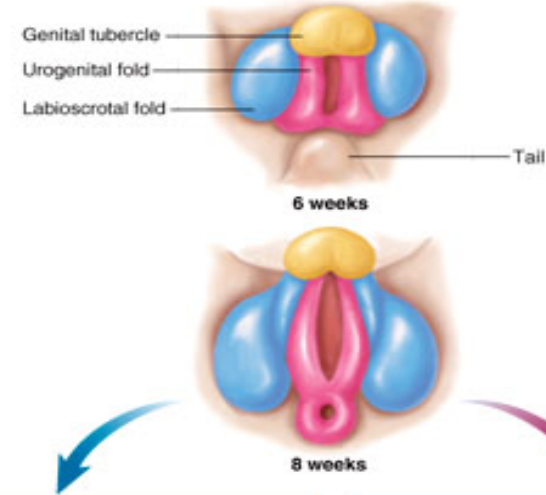
sex organ progenitors descend out of the pelvic cavity

Female

sex organ progenitors remain within the pelvic cavity

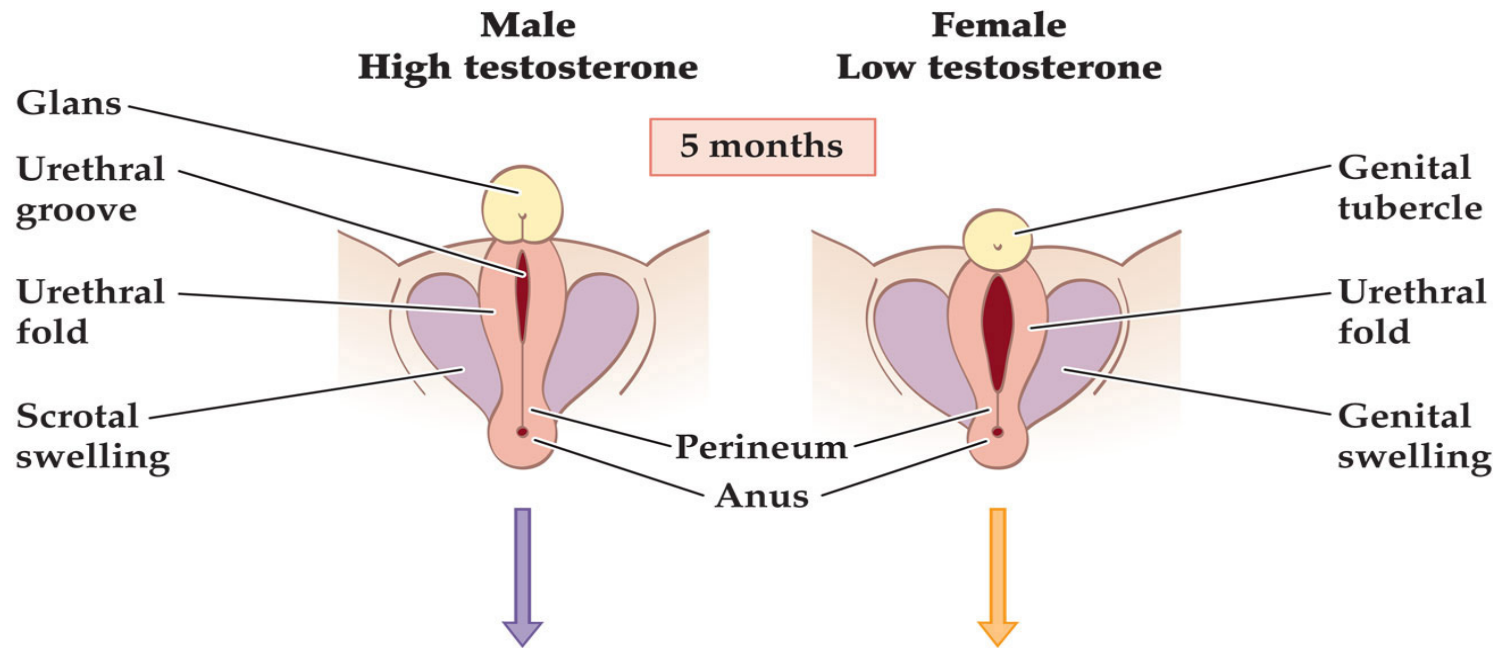


Descension of the sex organs

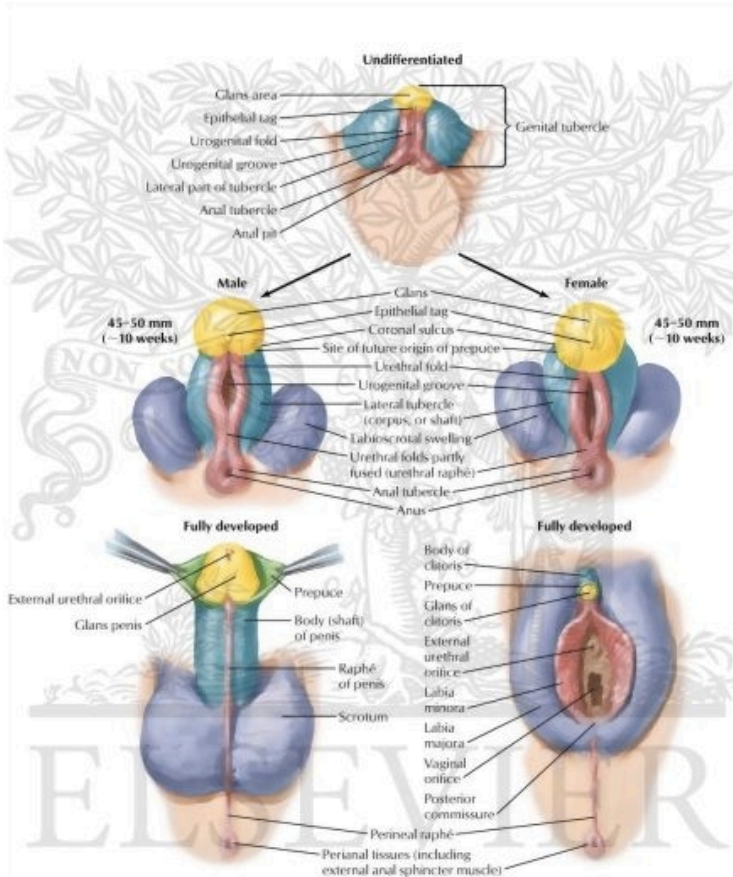


External homologous structures

Development of male and female external genitalia



DISCOVERING HUMAN SEXUALITY 2e, Figure 4.3 (Part 2)
© 2012 Sinauer Associates, Inc.

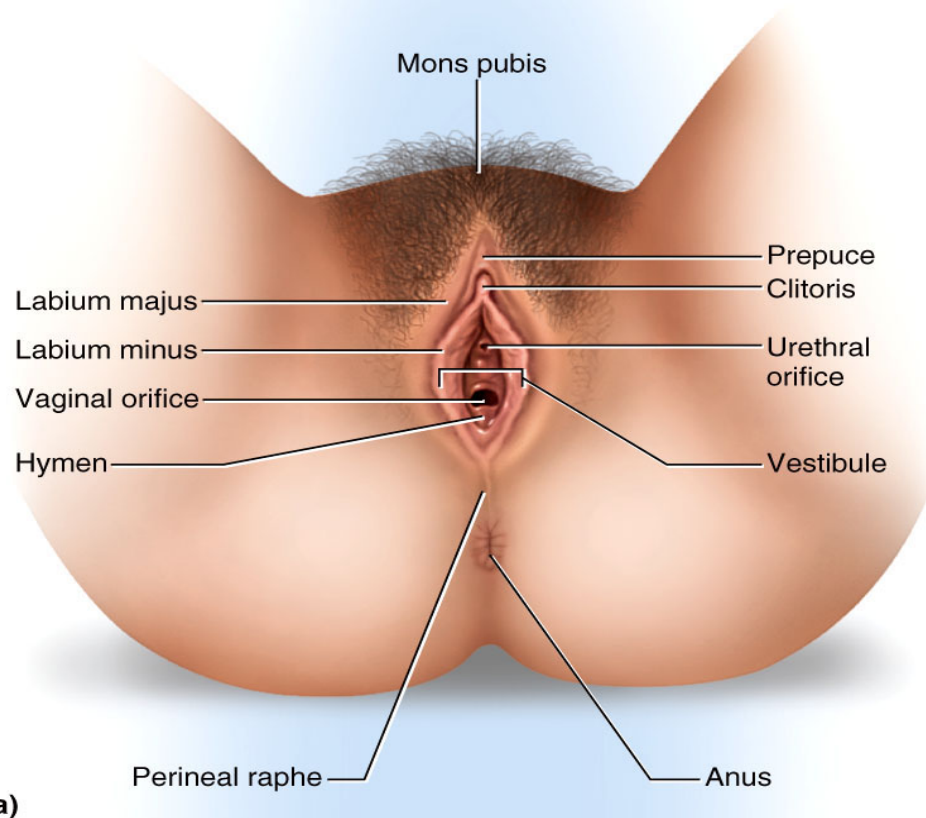


Undifferentiated	Male	Female
Gonad	Testis/testes	Ovary/ovaries
Genital swelling	Scrotum	Labia majora
Urogenital folds	Spongy urethra	Labia minora
Genital tubercle	Penis	Clitoris
Prepuce	Foreskin	Clitoral hood
	Glans	Clitoral glans

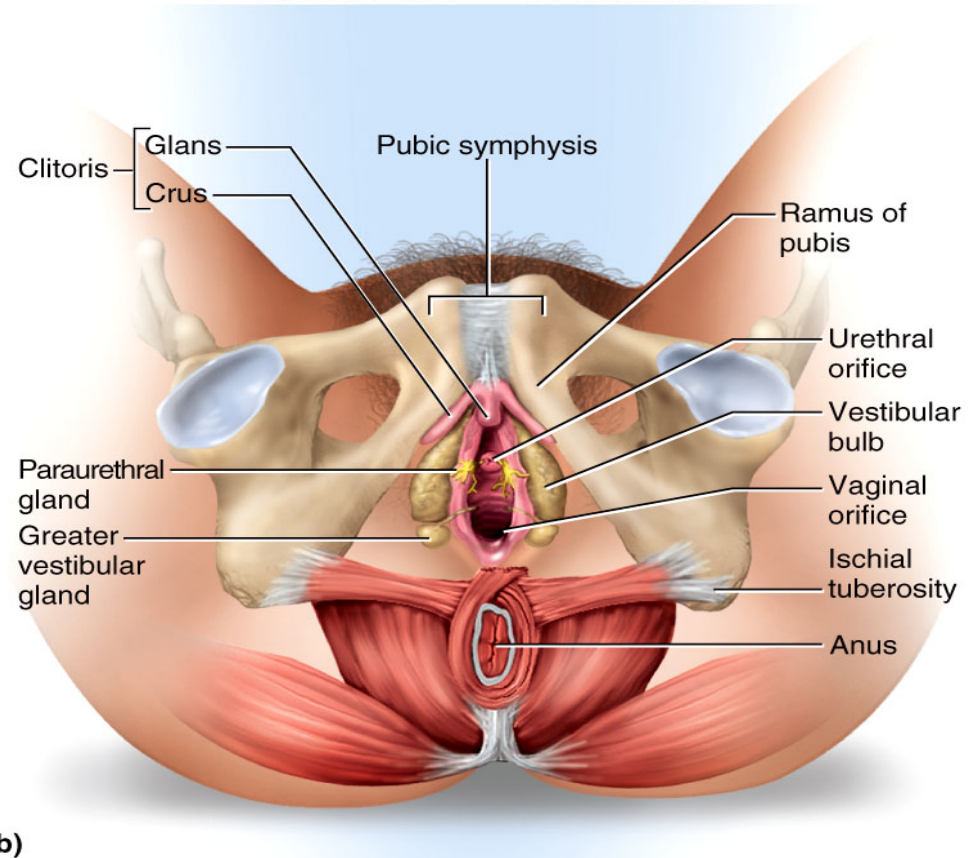
Female Reproductive Organs

- External genitalia = vulva

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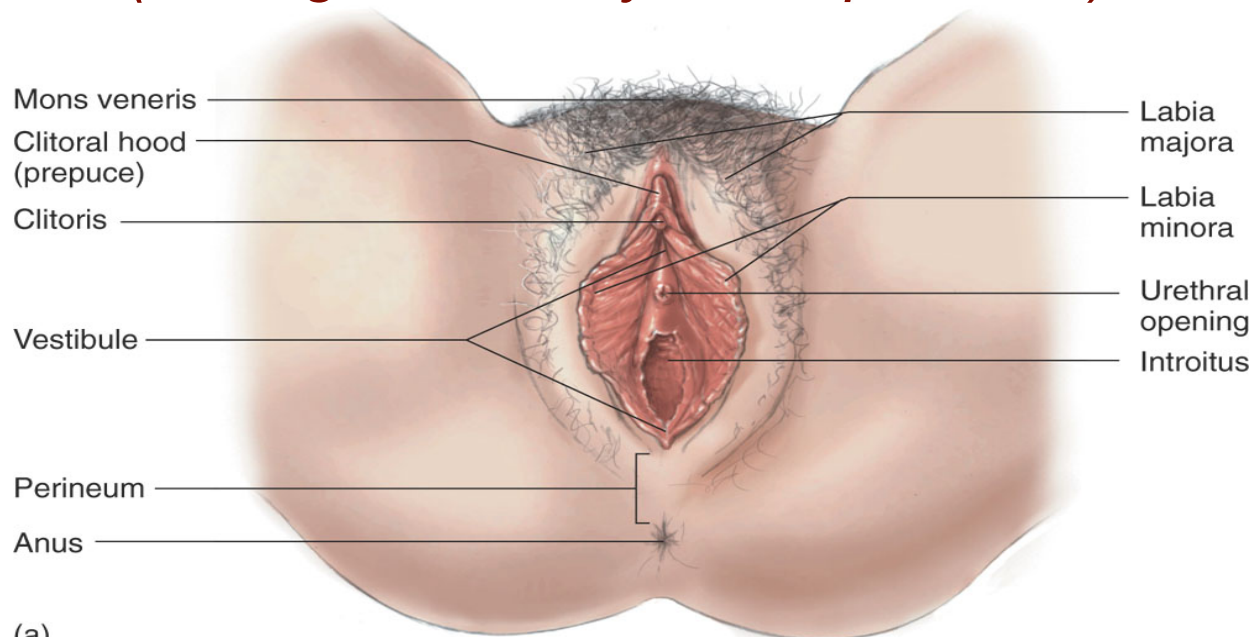


The **labia majora** have hair & sebaceous glands & are homologous to male scrotum. The labia minora are hairless, have sebaceous glands; homologous to spongy urethra.

The Vulva (continued)

Mons veneris (from Latin “mound of Venus”):

- Triangular mound over the pubic bone.
- Consists of **pads of fatty tissue between pubic bone and skin.**
- **Touch & pressure can be pleasurable due to numerous nerve endings**
- **At puberty, becomes covered with pubic hair**
- ***Speculated that hair traps pheromones from vaginal secretions***
(adding to sensory erotic pleasure).



(a)

Vestibule: Area inside labia minora.

Labia majora (outer lips):

- Extend downward from mons veneris on each side of vulva
- **Touch & Pressure can be pleasurable** due to numerous nerve endings.

Perineum:

- Area of skin between vaginal opening and the anus

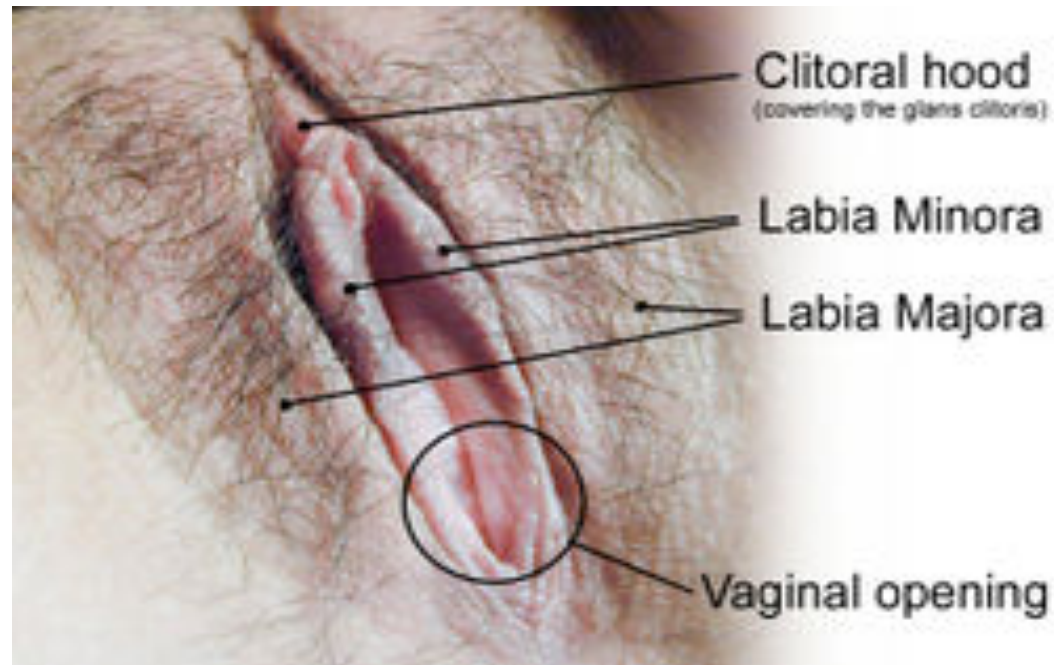
The Vulva *(continued)*

Labia minora (inner lips):

- Located within outer lips and may protrude between them.
- **Hairless folds of skin that join at the prepuce (clitoral hood) and extend down past urinary & vaginal openings**
- **Contain sweat glands, blood vessels, and nerve endings.**
- **Vary considerably in size, shape, and color; become darker in color during pregnancy.**

Vestibule:

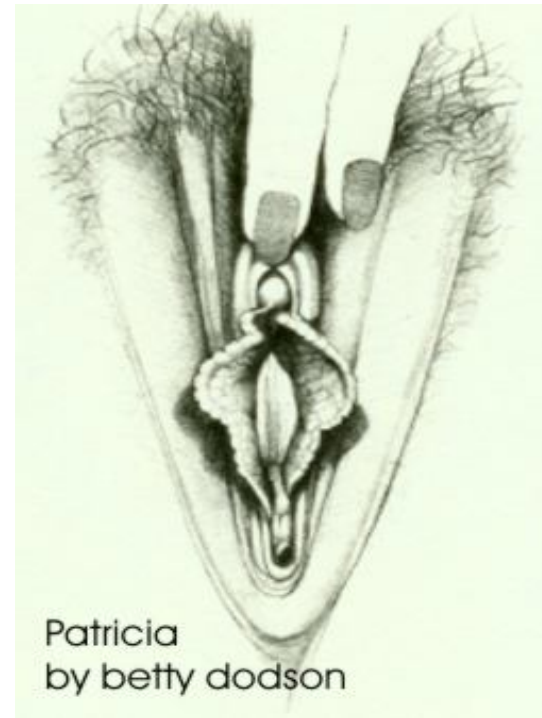
- Area inside labia minora.
- Urinary and vaginal openings are located within the vestibule.



**prepuce
of clitoris**

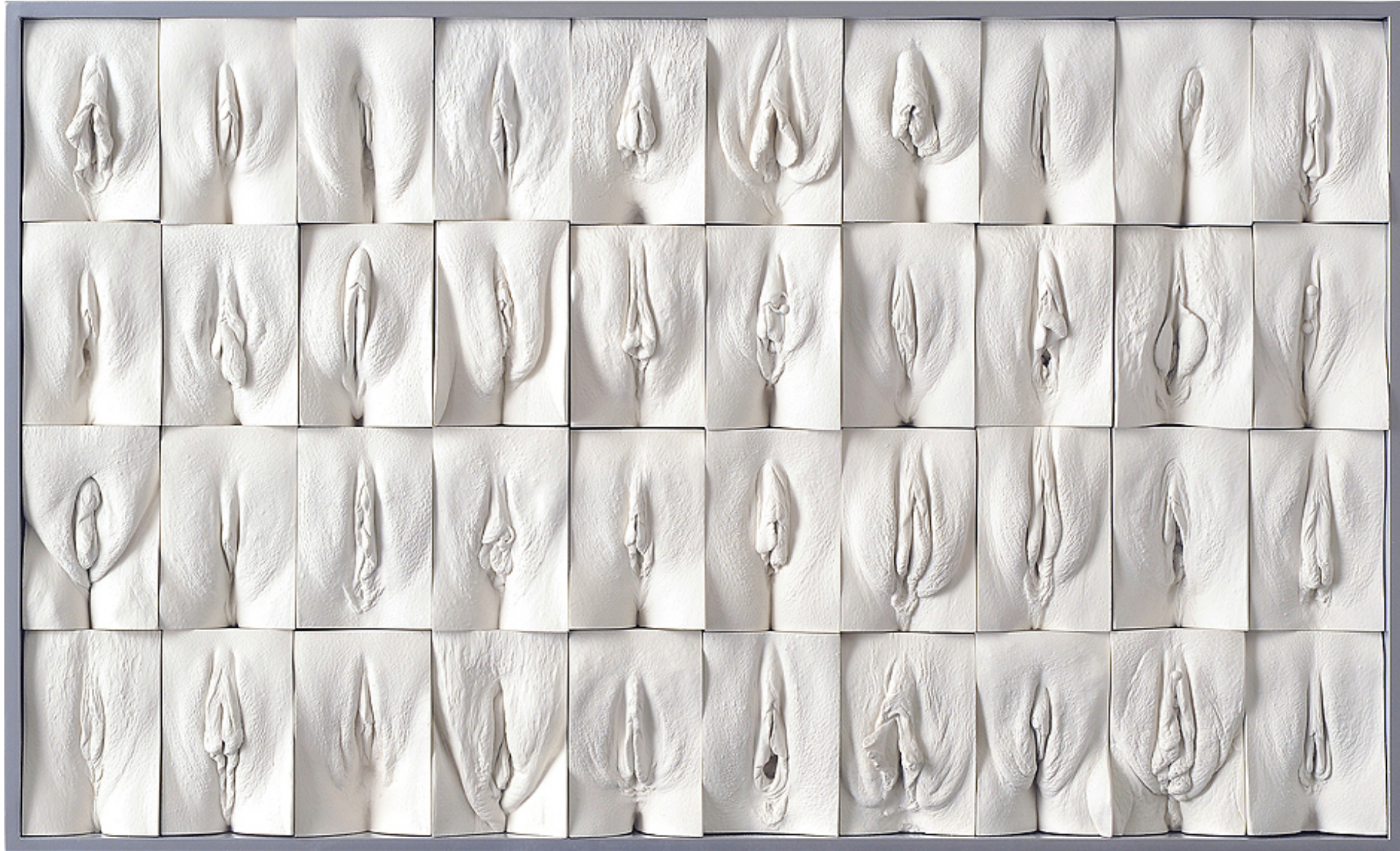
The Vulva

- Vulva = all female external genital structures
 - Includes hair, folds of skin, urinary & vaginal openings
 - Appearance varies from person to person



Great Wall of Vagina, *Panel 3 (of 10)* Jamie Mc Cartney

www.greatwallofvagina.co.uk/education



Jamie McCartney Interview <http://www.youtube.com/watch?v=27w3wR7ofl4>

The Dinner Party, Judy Chicago

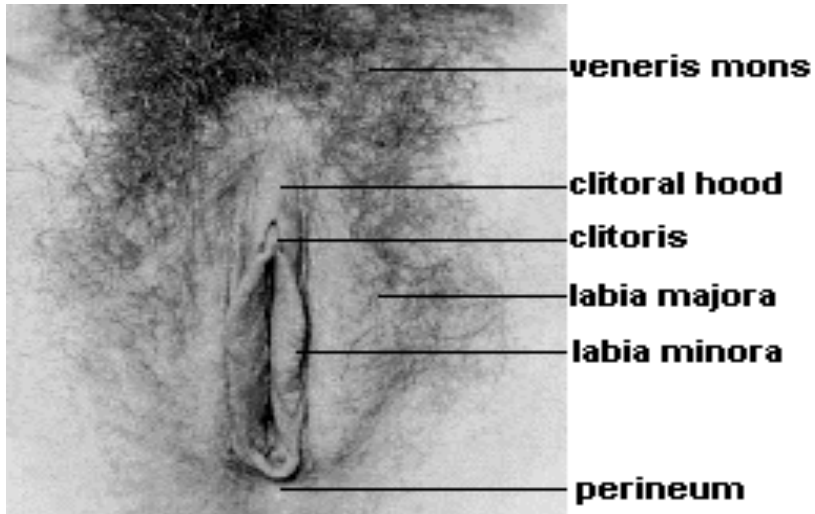
http://www.brooklynmuseum.org/exhibitions/dinner_party/



The Vulva (continued)

Clitoris (Glans):

- **Highly sensitive structure of female external genitals** - only known function is **pleasure**. [Stimulation of clitoris is most common way most women achieve orgasm.]
- **Covered by clitoral hood*** when not engorged
*(prepuce of clitoris)

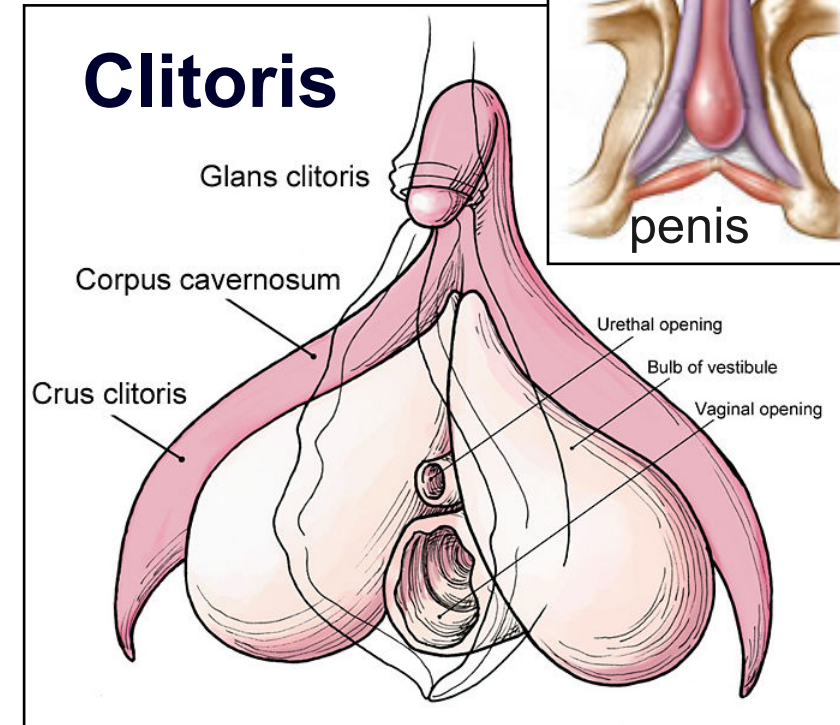


Consists of:

- **Glans**
- **Shaft:**

has small spongy structures that engorge with blood during sexual arousal.

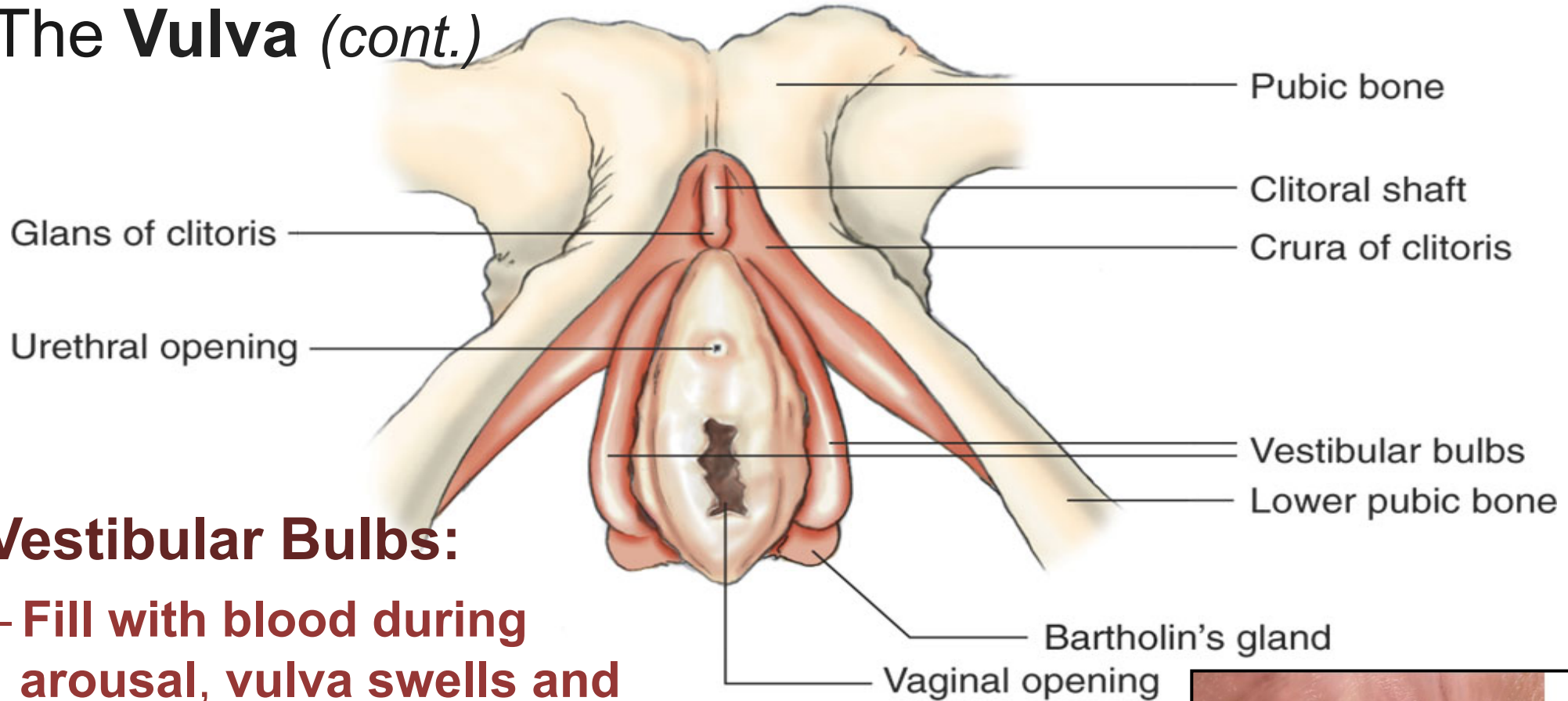
- **Internal crura** (roots): **Erectile** internal structure, two 3.5" long **crura** contain **corpora cavernosa** (fill with blood & swell during arousal)



External part of clitoris has

about the same number of nerve endings as the **head of the penis**.

The Vulva (cont.)

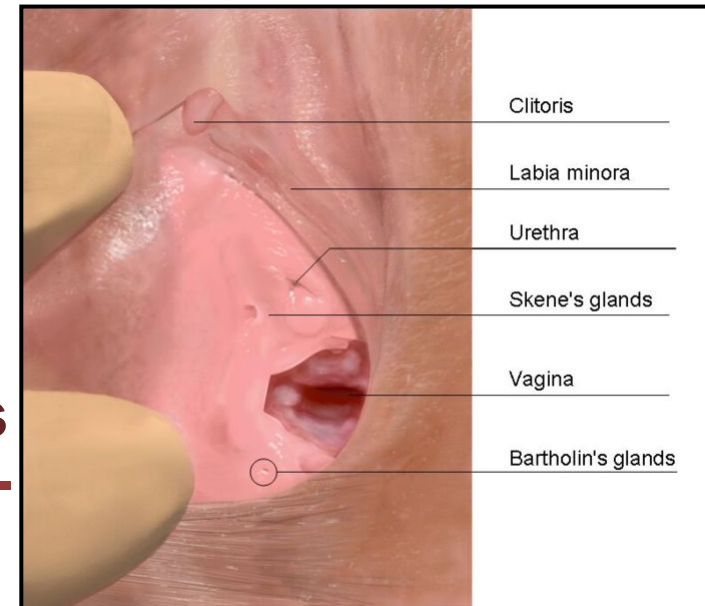


Vestibular Bulbs:

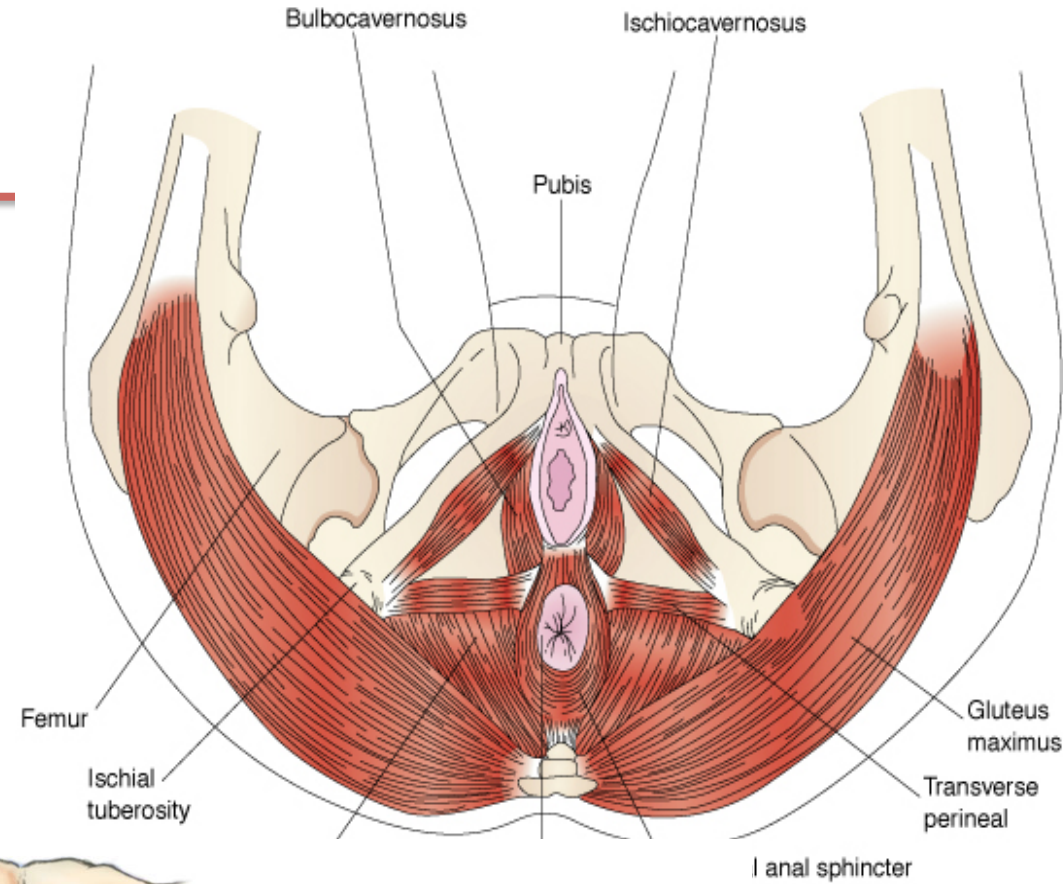
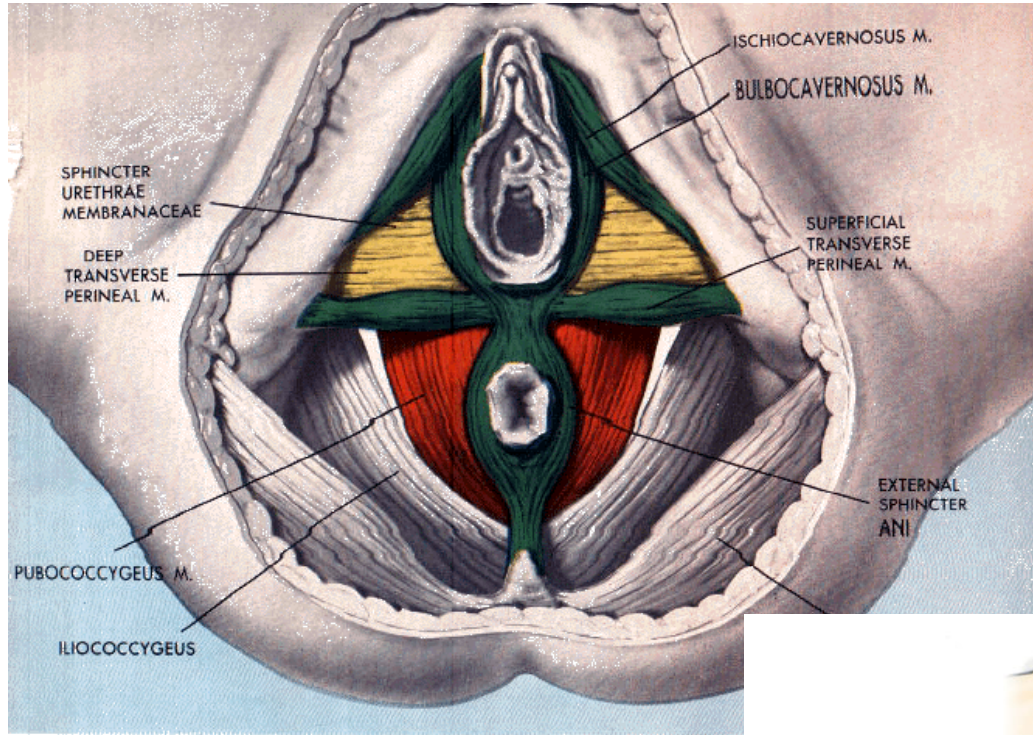
– Fill with blood during arousal, vulva swells and vagina increases in length.

Similar in structure and function to tissue in penis that engorges during arousal, causing erection.

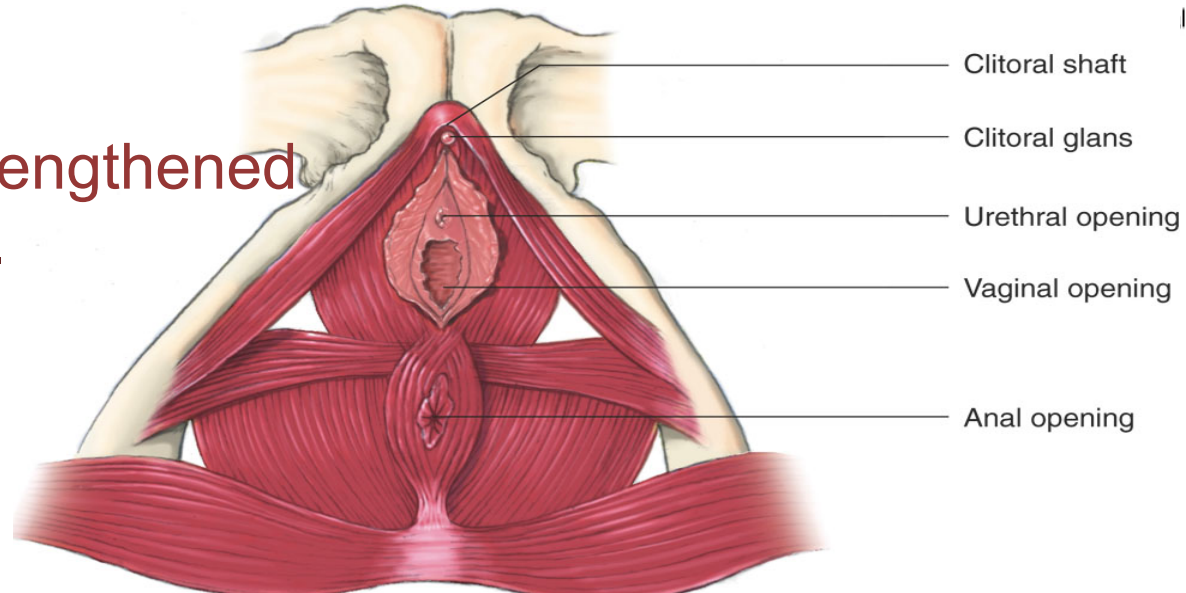
Bartholin's (vestigular) & **Skene's** (paraurethral) glands line outside of urethra, some ducts going into urethra -



Underlying Muscles of the Vulva



These muscles can be strengthened in using **Kegel exercises**.

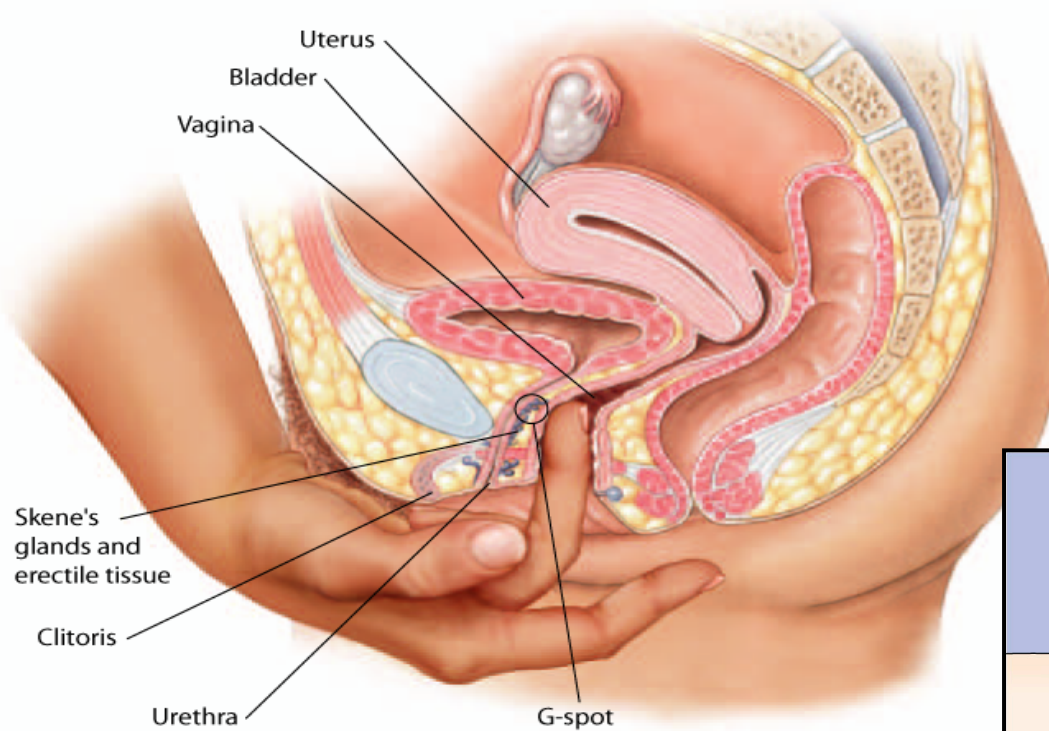


The American College of
Obstetricians and Gynecologists

FAQ

FREQUENTLY ASKED QUESTIONS
GYNECOLOGIC PROBLEMS
FAQ012

Grafenberg Spot (G-Spot)



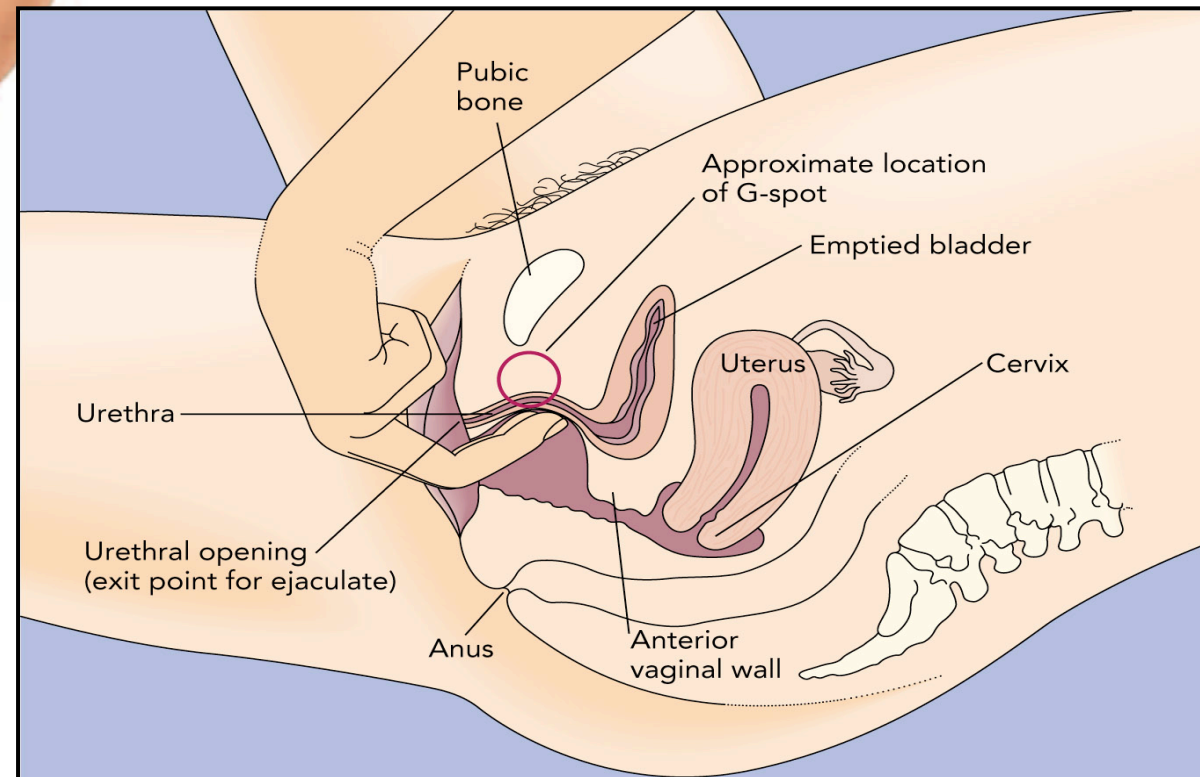
Somewhat Controversial:

An erotically sensitive area on front wall of the vagina mid-way between pubic bone and cervix

- **Female ejaculation**

FIGURE 3.12 The G-Spot

Some women report that stimulation of the G-spot enhances sexual arousal. For some women, especially those who have identified a G-spot, ejaculation accompanies orgasm. The fluid is theorized to come from Skene's glands, located along the urethra.



DSM-5*: Female Sexual Interest/Arousal Disorder (FSIAD)

*American Psychiatric Association (2013). Diagnostic and Statistical Manual of Mental Disorders (5th ed)

Female Sexual Arousal Disorder, aka Candace Syndrome or FSIAD

DSM-5 diagnostic criteria includes a minimum of 3 of following:

- Little interest in sex
- Few thoughts related to sex
- Decreased start and rejecting of sex
- Little pleasure during sex most of the time
- Decreased interest in sex even when exposed to erotic stimuli
- Little genital sensations during sex most of the time

(One) FDA-approved medication for treatment of disorders of female libido, **flibanserin**.

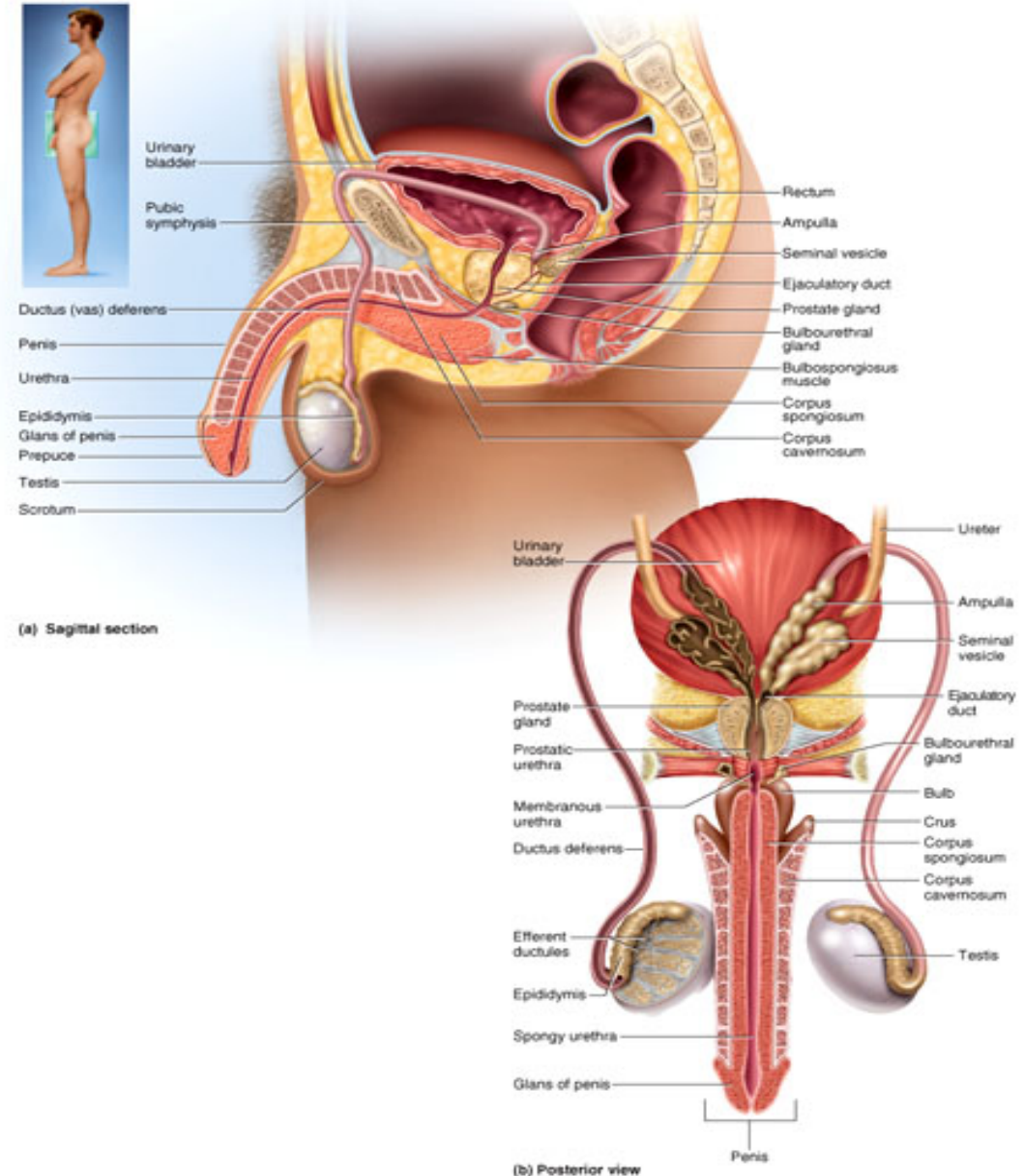
Suggested reading (posted in Oct 12 lecture folder): Balon R, Clayton AH. Female Sexual Interest/Arousal Disorder: A Diagnosis Out of Thin Air. *Arch Sex Behav* (2014) 43:1227-1229

“It appears that the primary reason for creation of this diagnosis was to dismantle the long-standing linear concept of the sexual response cycle (desire, arousal, orgasm, plateau/resolution) in women and to replace it with another concept of sexual response (circular model) for women, as the four phases/linear sexual response was retained for men.”

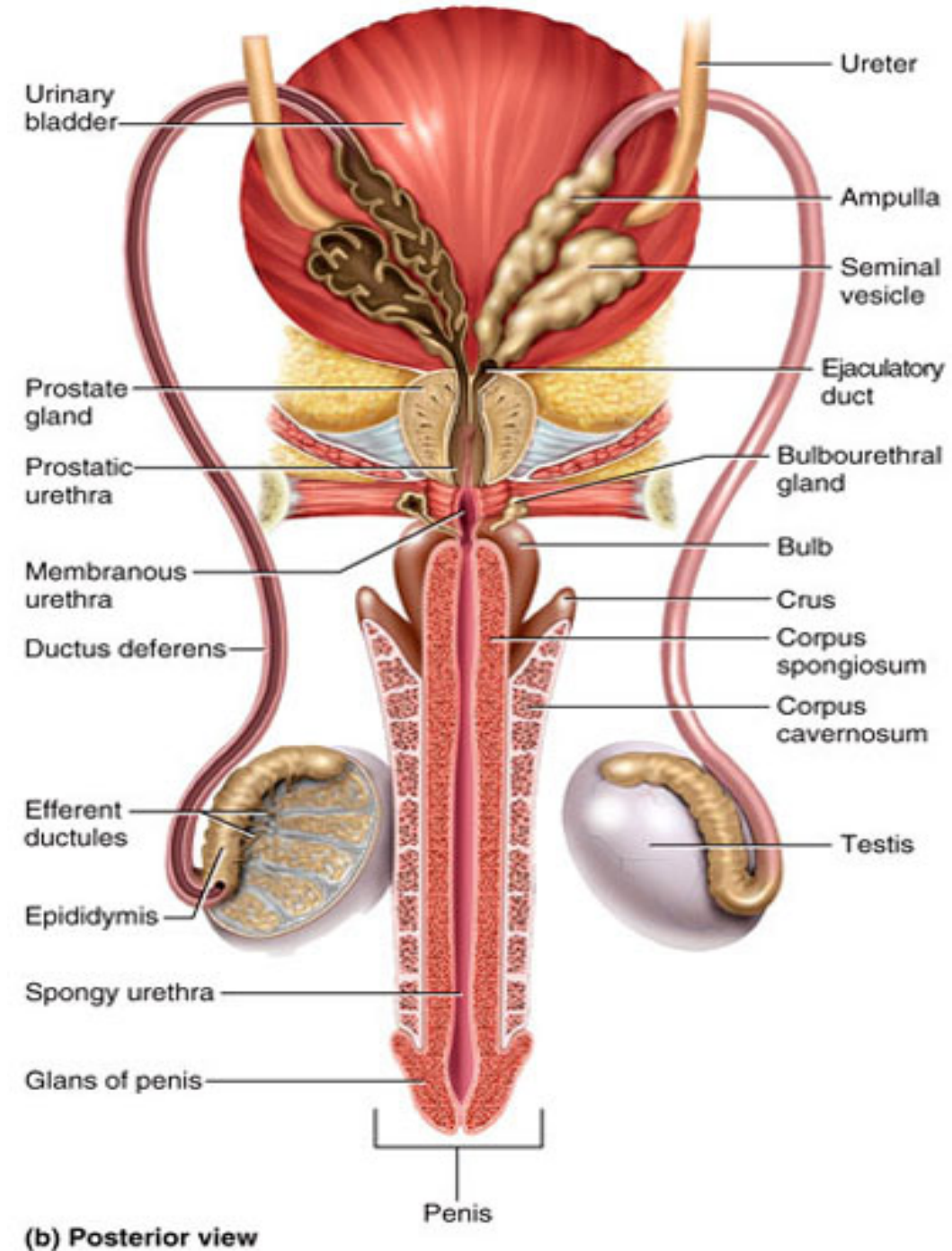
Male Reproductive Organs

- Primary sex organs:
 - **Testes (testicles)**
 - Produce the “gametes”, spermatozoa
 - Also produce androgen/hormones involved in secondary sex organ development
 - Physique, body hair, voice pitch etc.
- Secondary sex organs:
 - Sperm transport ducts: epididymides, ductus/vas deferentia, ejaculatory ducts, & urethra
 - Accessory glands: seminal vesicles, prostate gland & bulbourethral glands
 - **Copulatory organ: penis**
 - Scrotum

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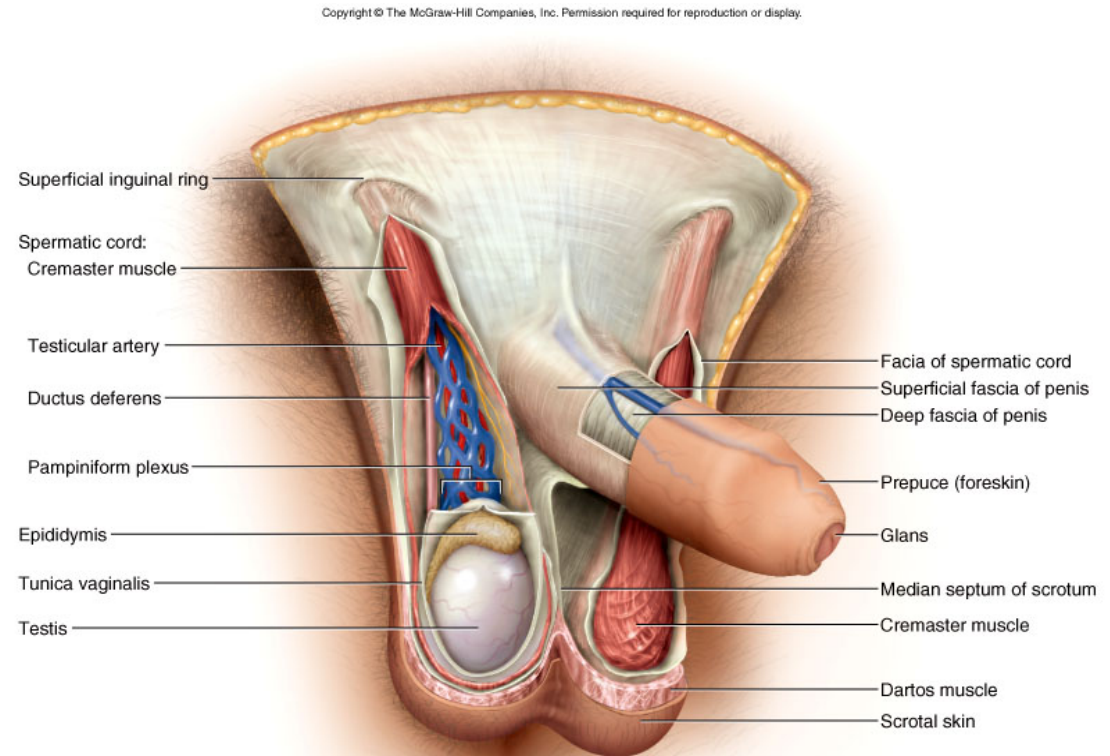


- **Ejaculatory duct:** connection between ductus deferens & seminal vesicle
- **Seminal vesicles:** secrete fructose-rich fluid to aid in spermatozoa viability
 - 60% ejaculatory volume
 - Heavily innervated by the sympathetic nervous system
- **Prostate gland:** glandular tissue encased by smooth muscle
 - Secretes alkaline buffer to neutralize vaginal acids (enhance spermatozoa viability)
 - 40% ejaculation volume
 - Heavily innervated by the sympathetic nervous system
- **Bulbourethral glands (Cowper's glands):** superficial to the pelvic diaphragm
 - Secrete mucus-rich solution to neutralize urethra & lubricate penis prior to coitus



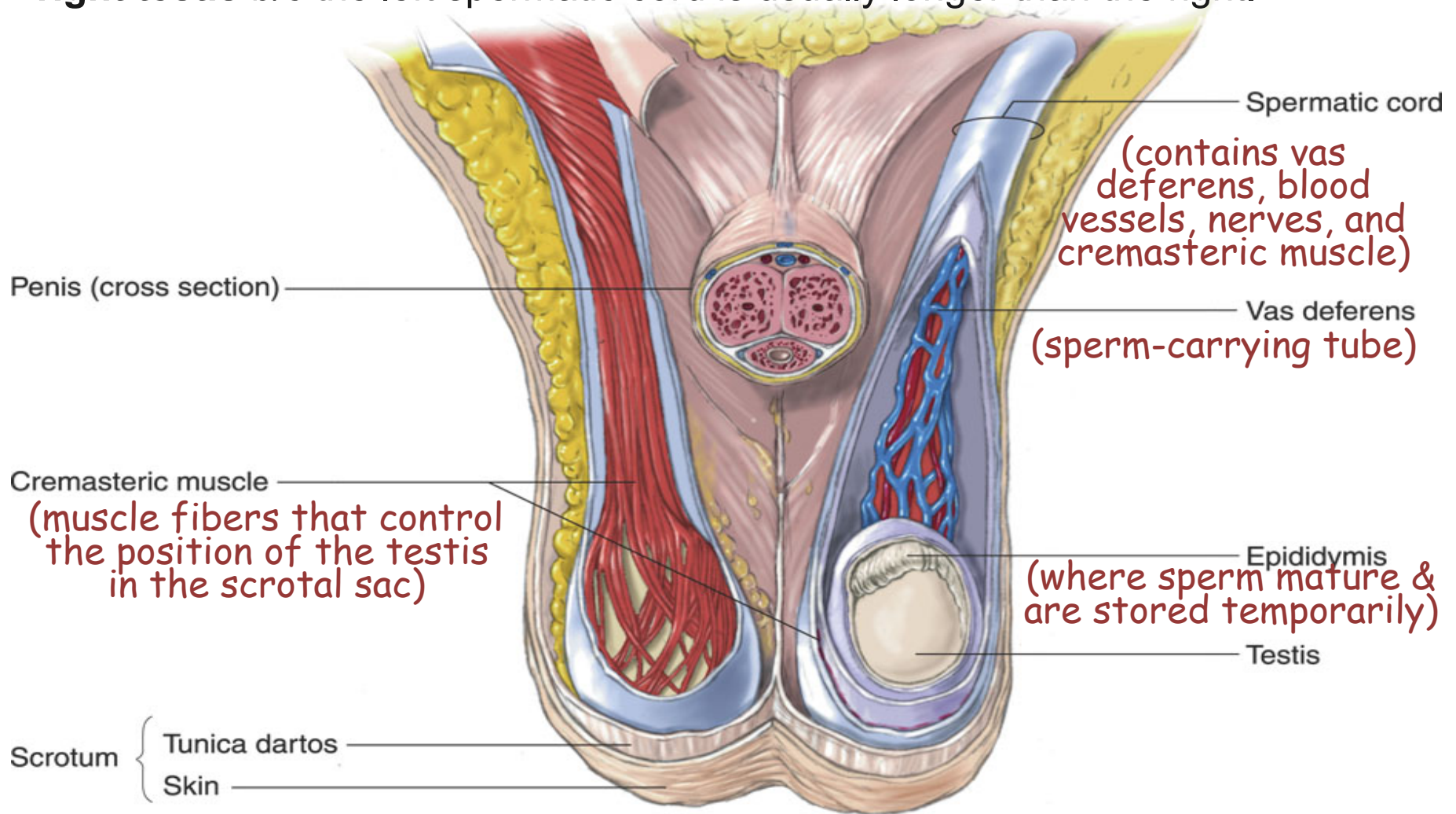
Testes

- Testes are suspended in the scrotum
- Spermatozoa development requires slightly lower temperature (35°C)
- Scrotum contains 2 separate muscle groups:
 - **Dartos muscle** = smooth muscle below epithelial layer
 - **Contracts when testicles are cold**
 - **Cremaster muscle** = skeletal muscle
- Testes are also separated from one another by scrotal septum
 - Externally visible as perineal raphe



Internal structures of the scrotum

Asymmetry is typical: More commonly, the left testis hangs lower than the right testis b/c the left spermatic cord is usually longer than the right.

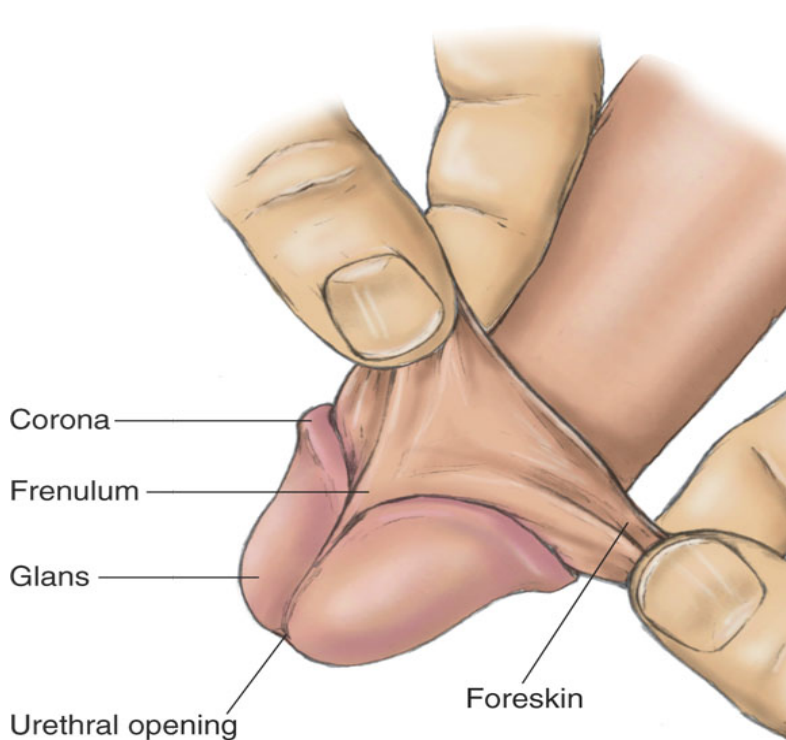


This illustration shows portions of the scrotum cut away to reveal the cremasteric muscle, spermatic cord, vas deferens, and a testis within the scrotal sac.

External Penile Structures

Scrotum and Testes

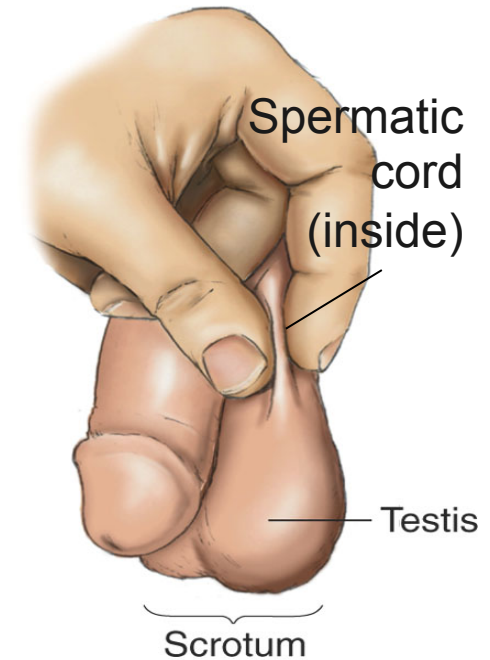
- **Frenulum:** thin strip of skin connecting glans to shaft on underside of penis



View of underside of penis, shows **location of corona and frenulum**

Scrotum (scrotal sac):

- 2 chambers; each contains one testis
- 2 layers: skin and muscle layer (*tunica dartos*)
- Normally hangs loosely from body wall (cold temperatures & sexual stimulation scrotum to move closer to body)

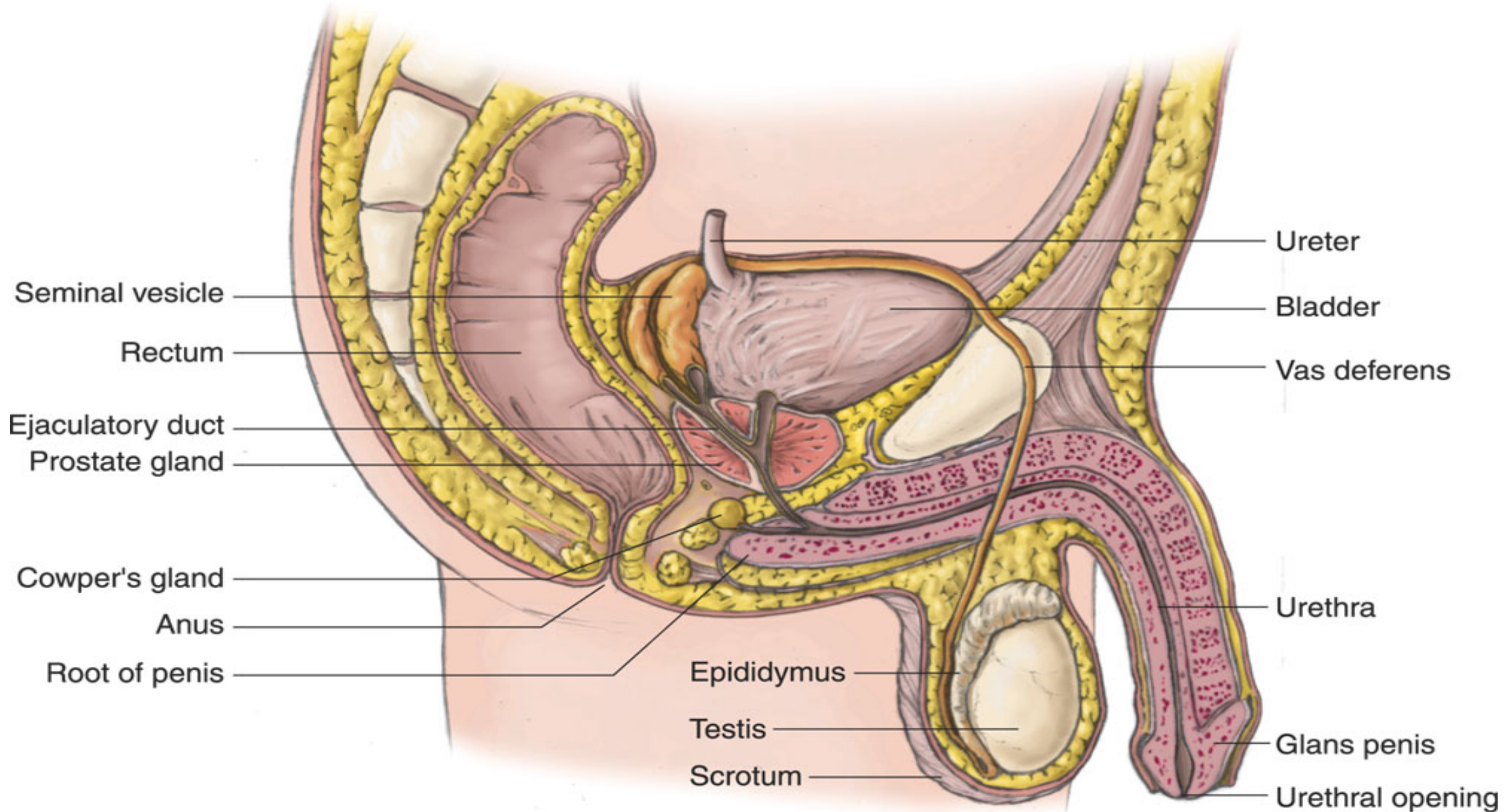


Spermatic cord

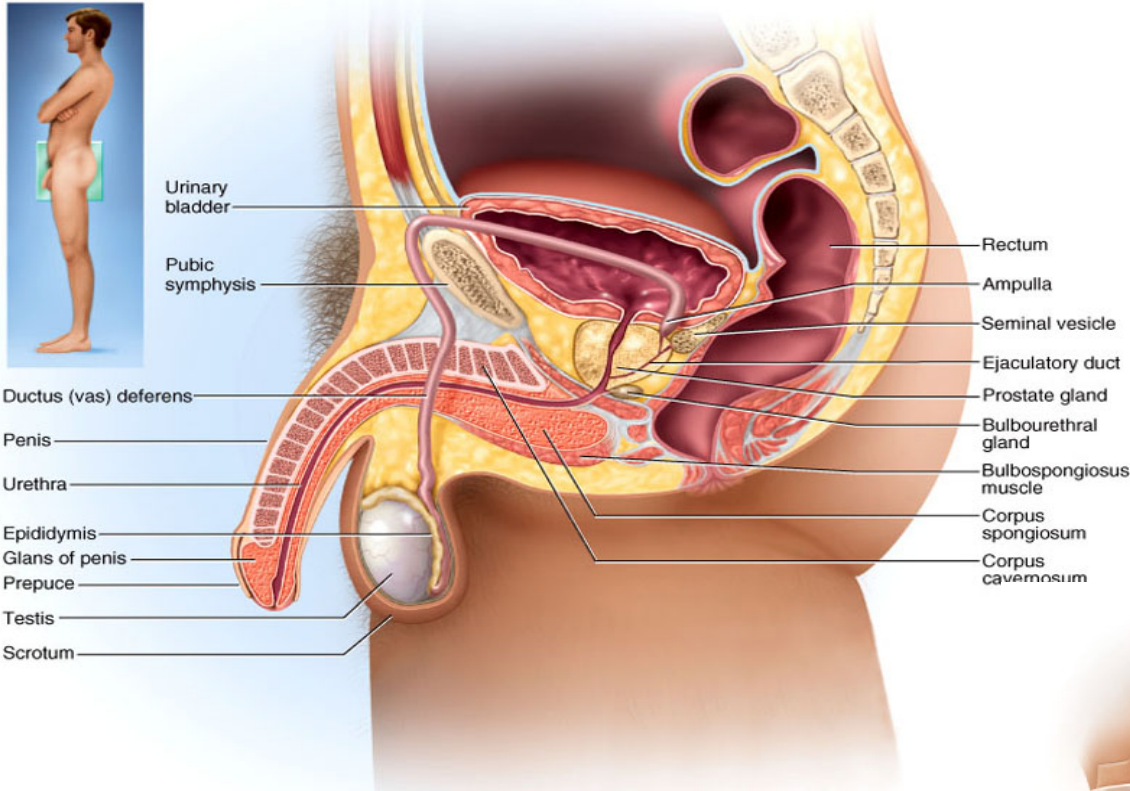
- Contains vas deferens, blood vessels, nerves, and muscle fibers

Spermatic cord can be located by palpating scrotal sac above either testicle with thumb & forefinger

Overview: Male Sexual Anatomy



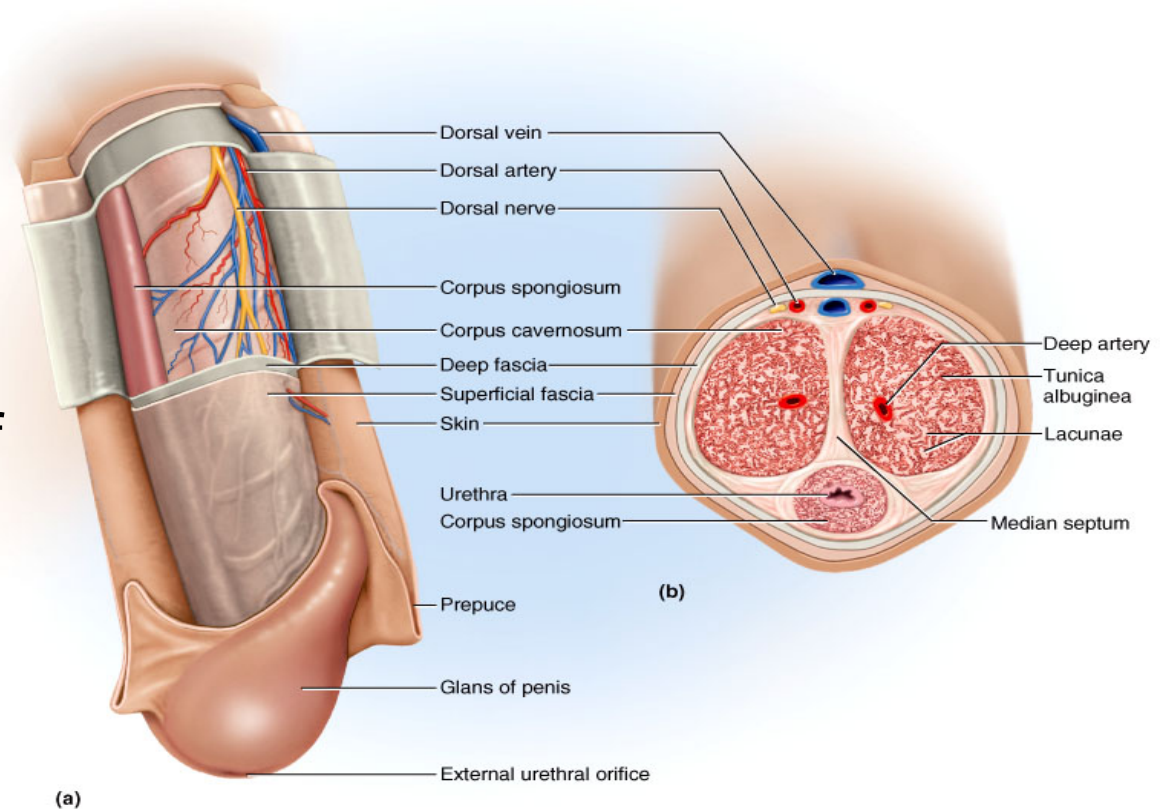
A cross-section side view of male reproductive organs.



(a) Sagittal section

During erection, parasympathetic nervous system “opens” the gates of the deep arteries within the corpora spongiosum penis in order to allow blood to enter the capillary bed.

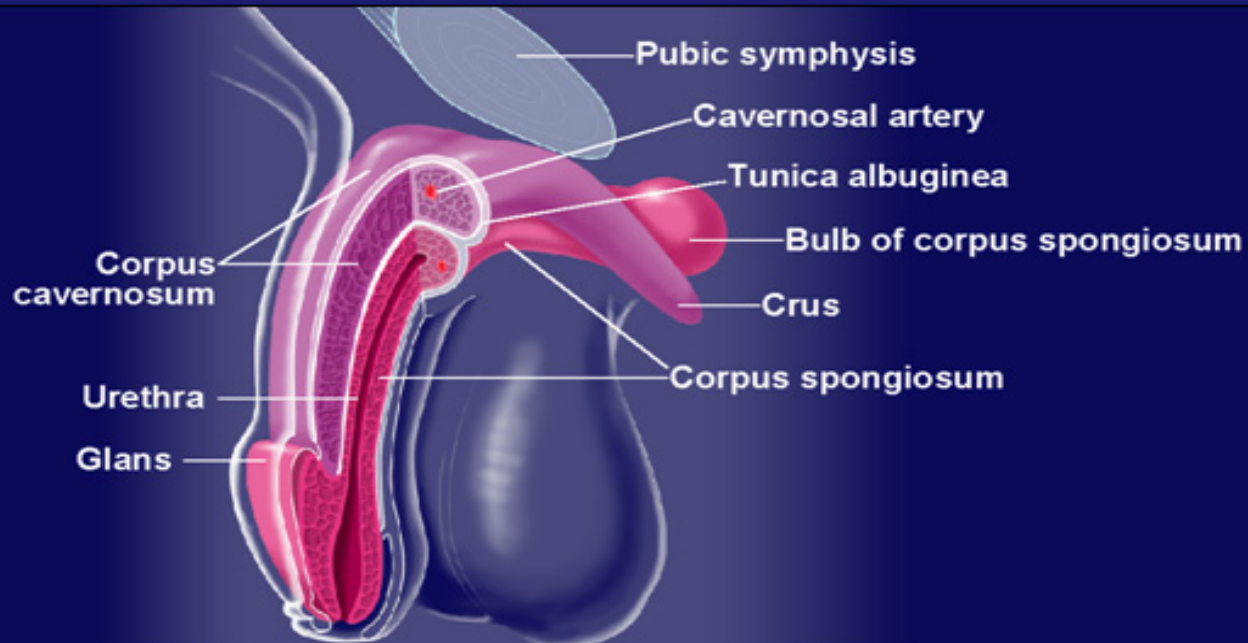
The “dorsal artery/vein” is in reference to “dorsal” on a 4-legged animal rather than the patient being “erect” in anatomical position



(a)

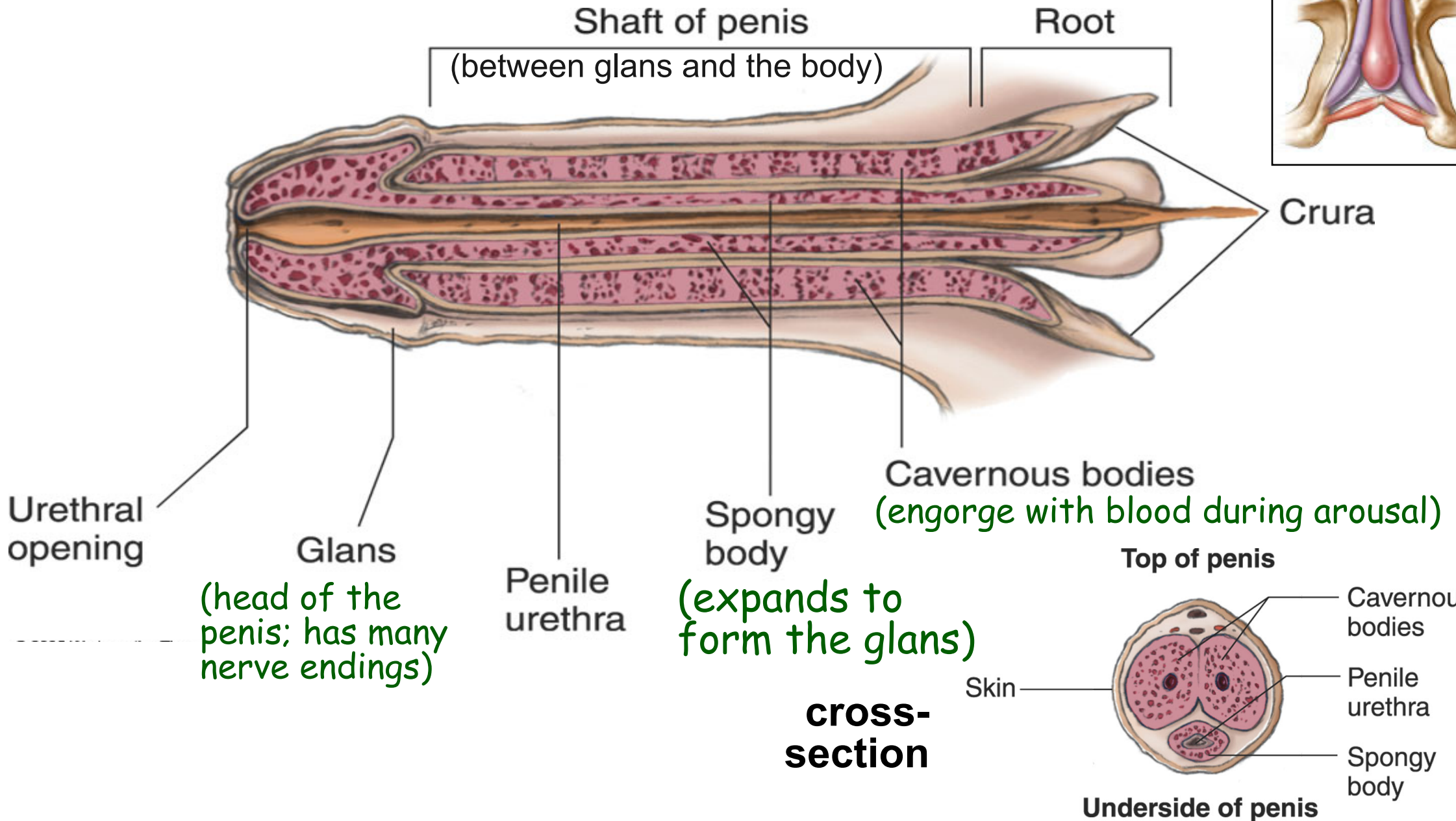
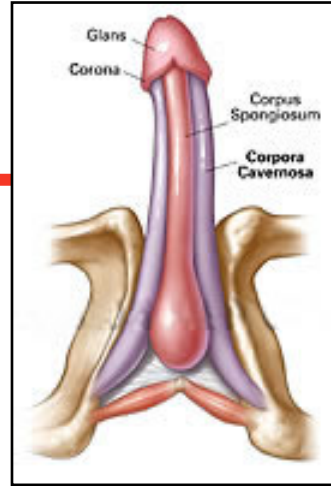
(b)

Penile Anatomy



- **Blood flows** from hypogastric arterial system into sinusoidal trabecular smooth muscle of corpora cavernosae
- **Pressure increases** within the rigid tunica albuginea outer sheath compressing and preventing venous outflow

Internal structure of the penis: top view



Male & Female Attitudes on Penis Size: Internet survey

25,000 heterosexual men

- 66% characterized penis size as average, 12% as small, 22% as large
- **55% satisfied with their size**
- 46% self-rated as average wanted to be larger
- 8% self-rated as small were satisfied

25K heterosexual women

- 67% characterized partner's penis size as average, 6% as small, 27% as large
- **84% satisfied with their partner's size**
- 86% rated as average were satisfied



More Attitudes on Penis Size

Psychology Today **survey of 1000 women**

- **Penis length:**
 - 8% care a great deal about; **58% care little to not at all**
- **Penis width:**
 - 13% care a great deal about; **49% care little to not at all**

Pertschuk M and Trisdorfer A, Psychology Today, November 1, 1994.

Survey of **251 white gay men in South Africa**

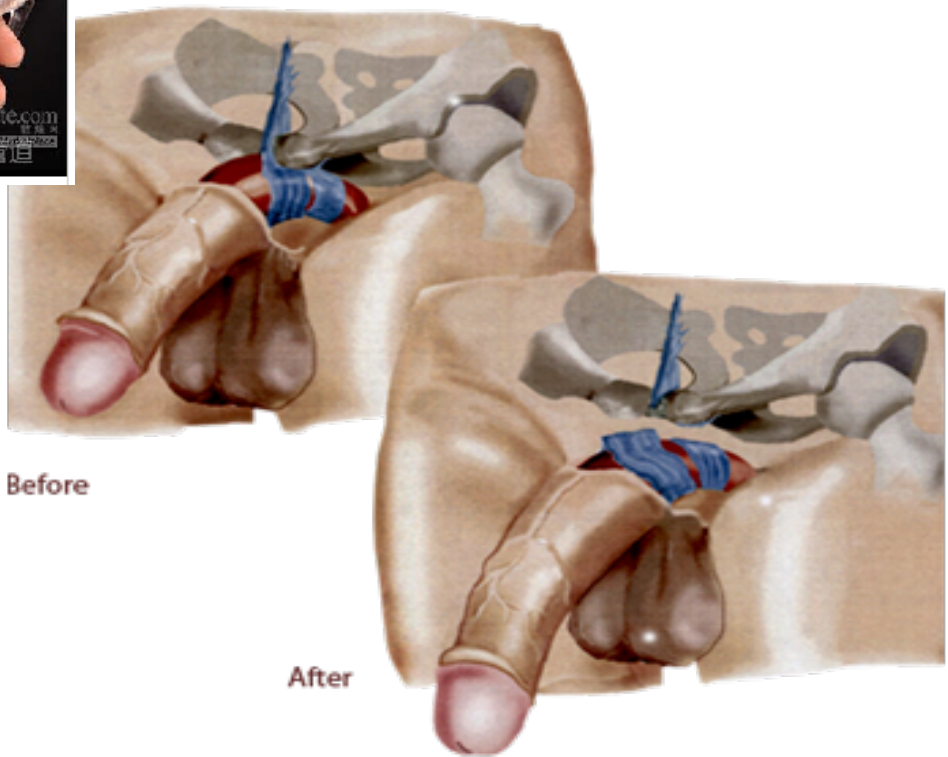
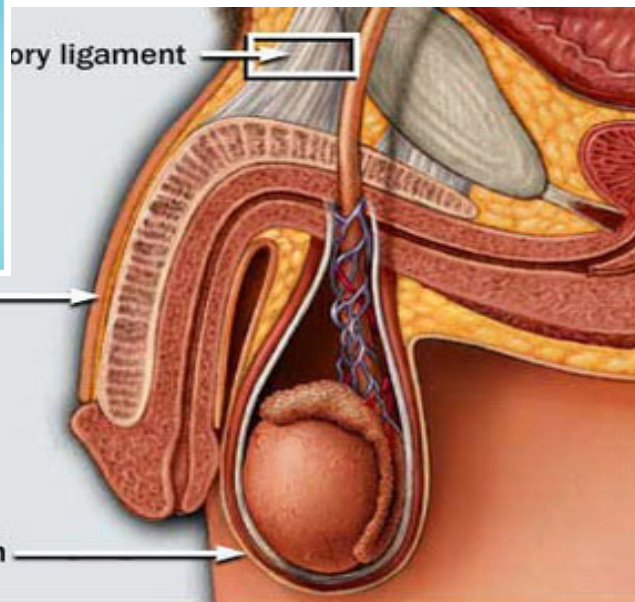
- Average age 29
- **Penis considered most attractive part of body**
- Direct link between self esteem and penis size
- Majority rated having a large penis as ideal

Breeman L et al, SOA AIDS Magazine 2006; 3(4):12-15.

Male Enhancement & Penis Enlargement Program



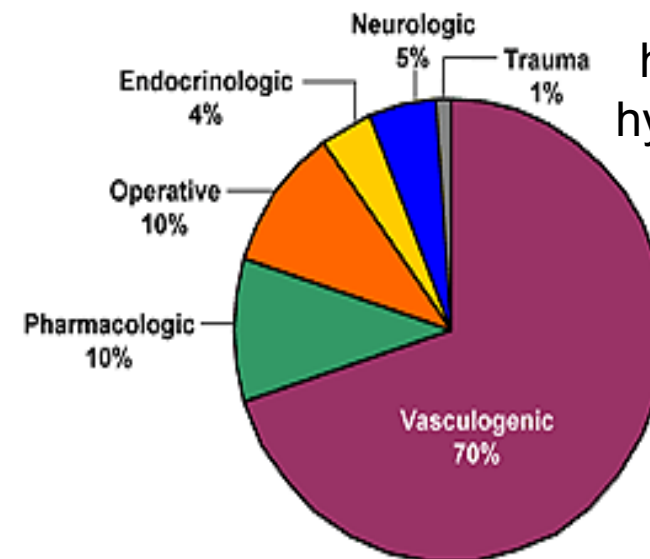
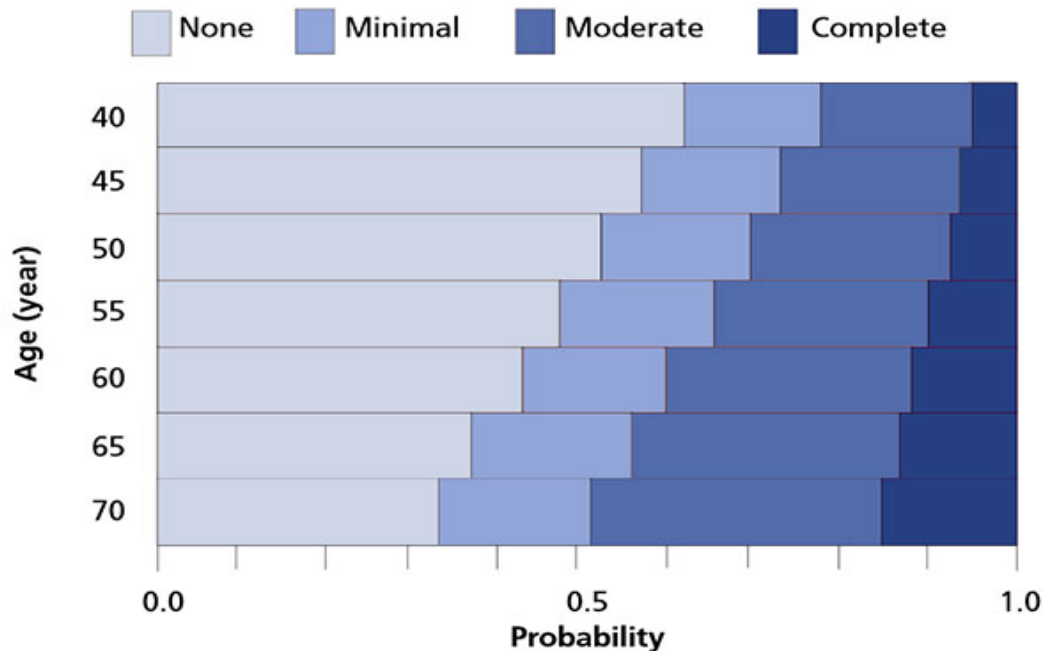
- ✓ Discreet Shipping & Billing Worldwide
- ✓ Enhance your Penis Naturally
- ✓ No Pumps, No Weights, No Surgery



Prevalence of Erectile Dysfunction

- Most common sexual problem in men
- May affect up to 20-30 million men in the US
- 52% prevalence among men aged 40-70
- Complete ED rose from 5% to 15% as age increased from 40-70 y/o

Causes of Erectile Dysfunction



Shared risk factors for ED & CVD include:
obesity, diabetes, hypercholesterolemia, hypertension, smoking, a sedentary lifestyle, and increasing age

Araujo AB et al, *J Am Geriatr Soc* 2004; 52(9):1502.

Historical Perspectives: Human Sexuality

Sexual Pioneers

- **Alfred Kinsey** Indiana University
 - Opened the door for the study of human sexuality, but only told us what people *say* they do - ***The Kinsey Reports, 1948, 1953***
- **William Masters and Virginia Johnson**
Washington University (in St. Louis), Dept of Ob/Gyn, 1957-1965
 - The role of the sexual revolution
 - Observed an estimated 10,000 complete sexual response cycles (direct observation of 382 women and 312 men)
 - Foundation for our current understanding of human sexual response
 - ***Human Sexual Response, 1966; Human Sexual Inadequacy, 1970***

Masters & Johnson's Four-Phase Model (EPOR Model)

- NOT Four Separate and Distinct Events
- Responses Occur In Reaction to ALL Forms of Sexual Stimulation
- Responses Occur In Men and Women

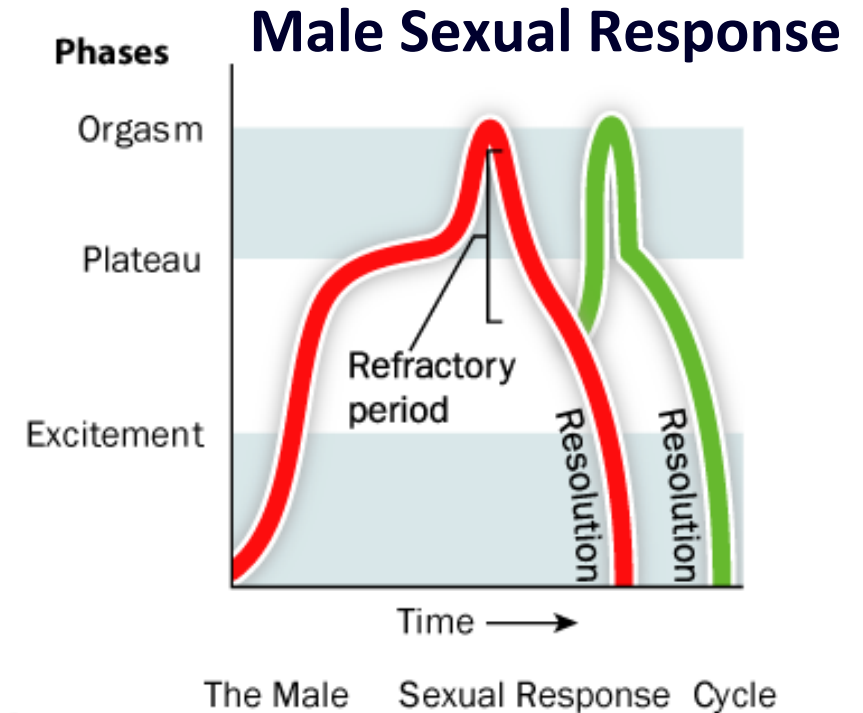
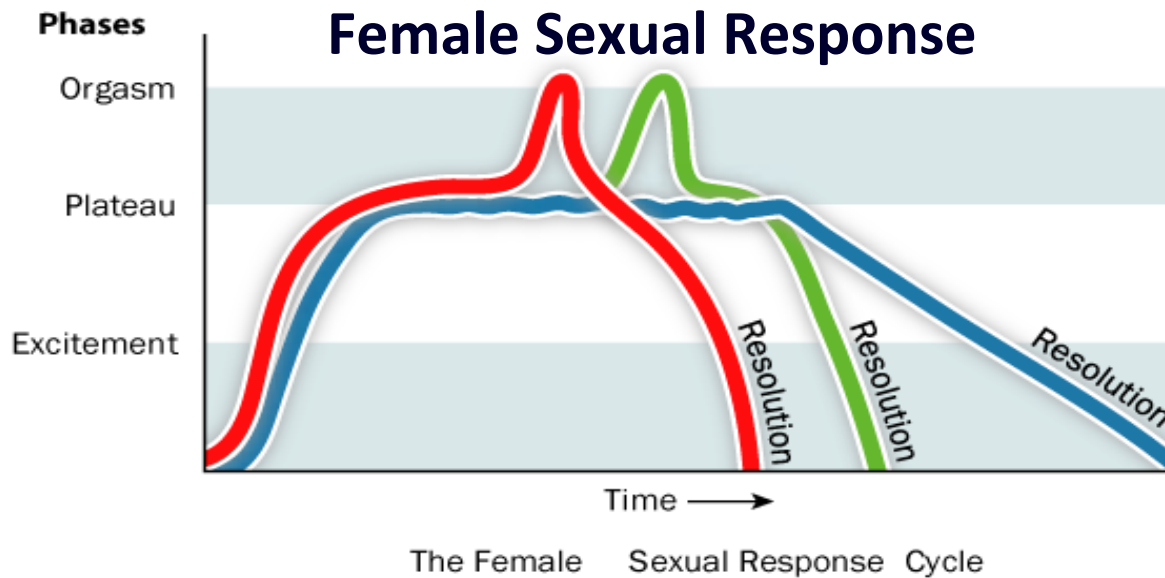
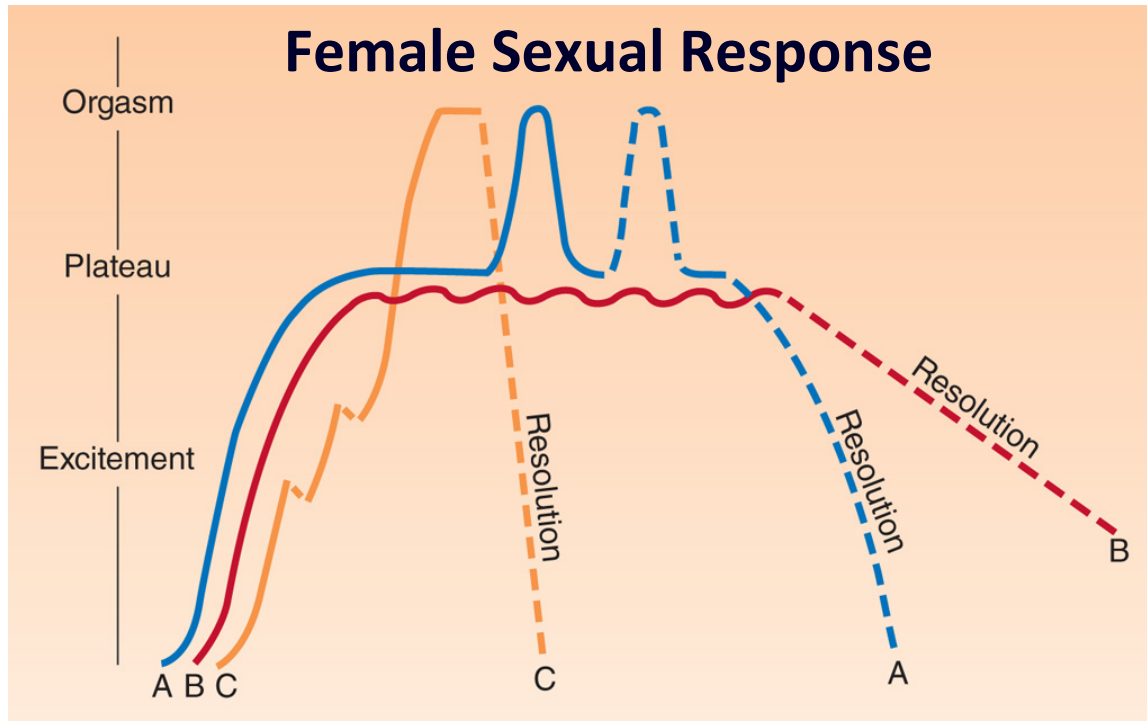


FIGURE 3.1 Masters and Johnson's Four-Phase Model of the Sexual Response Cycle

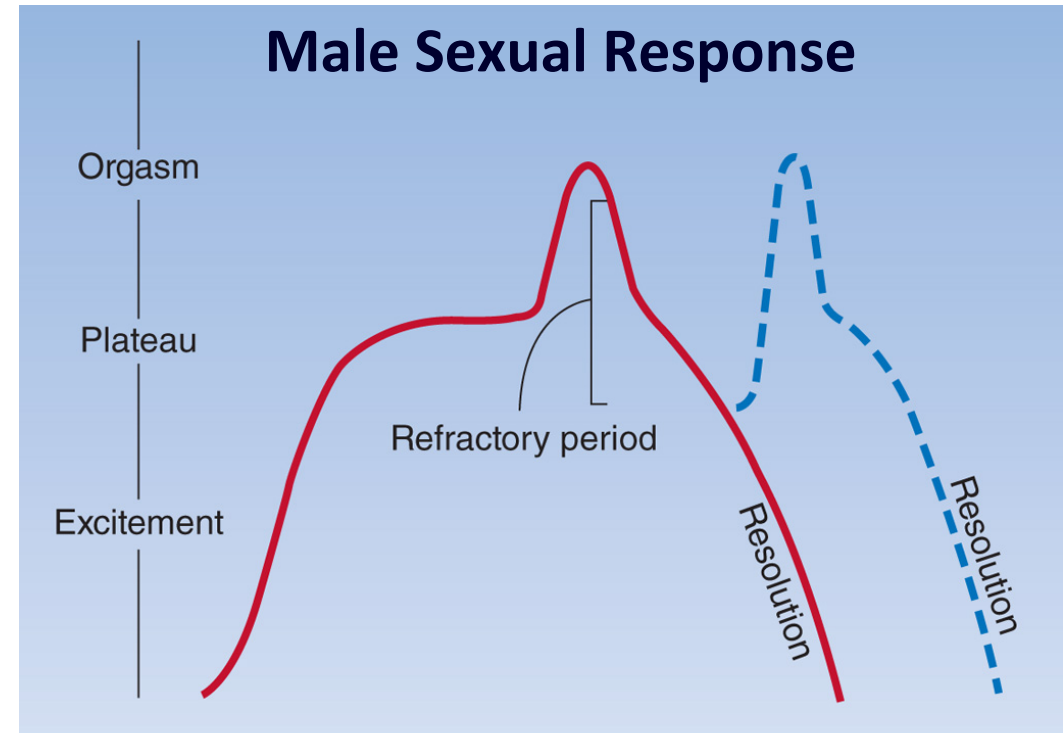
Masters and Johnson proposed that human sexual responding was more understandable when conceptualized in four phases: excitement, plateau, orgasm, and resolution. This diagram, adapted from their theory, shows how the female response cycle tends to be more varied than that of the male. Men generally progress fairly predictably through the four stages (red line) and require some time between orgasms, called a refractory period, before another orgasm (green line) is possible. In contrast, women may follow a similar pattern (red line) or may experience multiple orgasms without a refractory period (green line) or, as is quite common during heterosexual intercourse, may progress from excitement to plateau to resolution without experiencing an orgasm (blue line).

Source: Adapted from Masters and Johnson (1966).

Masters & Johnson's **Four-Phase Model (EPOR Model)**



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Orgasm: Shortest phase of sexual response cycle

- Men and women's subjective descriptions of orgasm are similar
- Most female orgasms result from stimulation of the clitoris
 - Grafenberg spot: Area on lower front wall of vagina
 - Sensitive to pressure
 - Sometimes results in "ejaculation"

Female Sexual Response Cycle—Subsequent Views

- These models assume
 - Men and women have similar sexual responses
- On the contrary, Many women don't move progressively and sequentially through the phases
 - May move from arousal to orgasm and satisfaction without experiencing desire
 - Or may have desire, arousal, and satisfaction without orgasm
- Largely biologic model; doesn't take into account non-biologic experiences such as pleasure and satisfaction or place sexuality in context of relationship

Kaplan's Tri-Phasic Model of Sexual Response

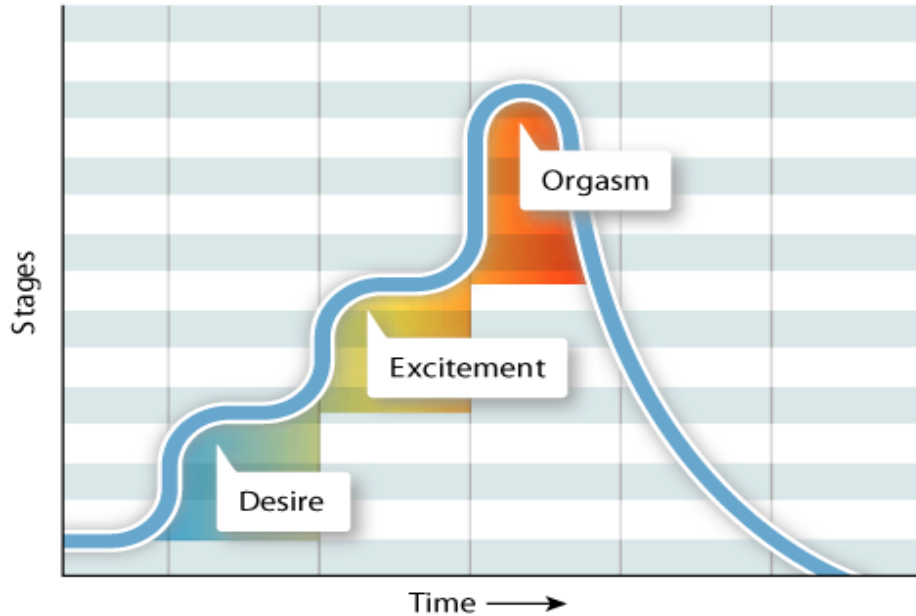


FIGURE 3.13 Kaplan's Three Stage Model of Sexual Response

- **Desire** ▪ **Excitement** ▪ **Orgasm**
- **Hypoactive Sexual Desire**
- **Addresses both Physiological & Psychological**

Loulan's Sexual Response Model

Incorporates biological and affective dimensions

- **Willingness** ▪ **Desire**
- **Excitement**
- **Engorgement**
- **Orgasm** ▪ **Pleasure**

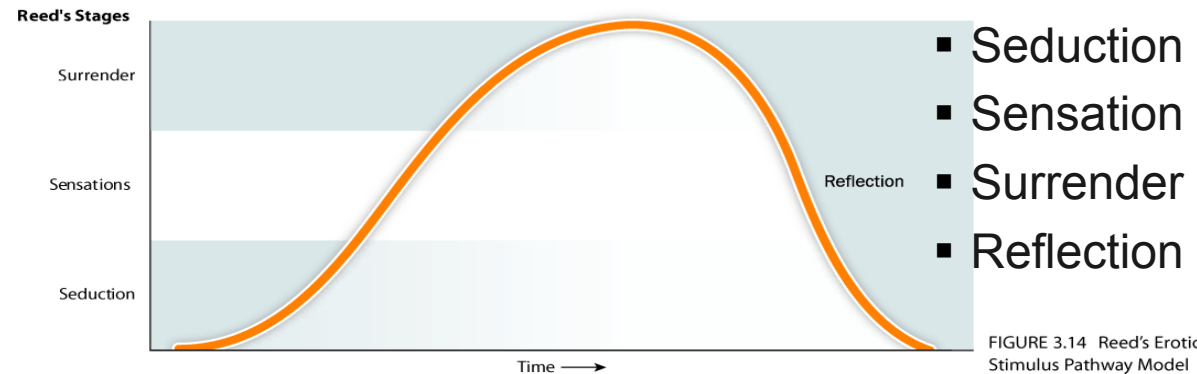
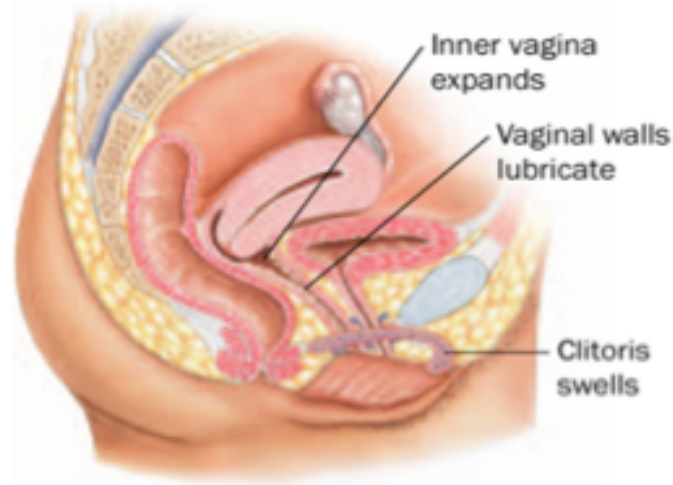


FIGURE 3.14 Reed's Erotic Stimulus Pathway Model

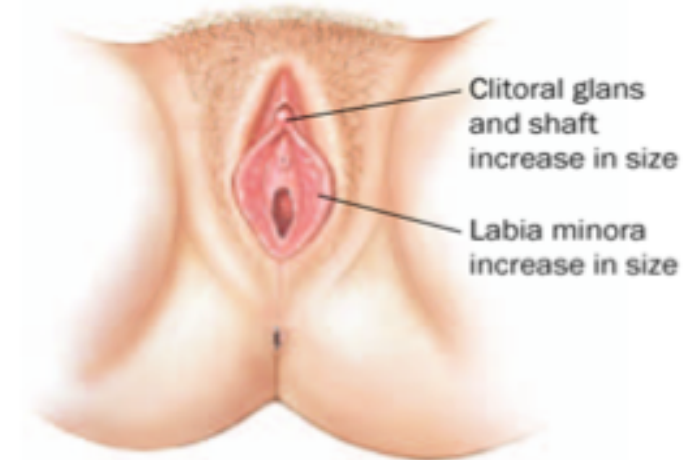
The “E” & “P” in EPOR Model: Excitement & Plateau

Excitement

- inner vagina expands
- vaginal walls lubricate
- clitoris swells (glans & shaft increase in size)
- Labia minora swell (increase in size; enclose vestibule)



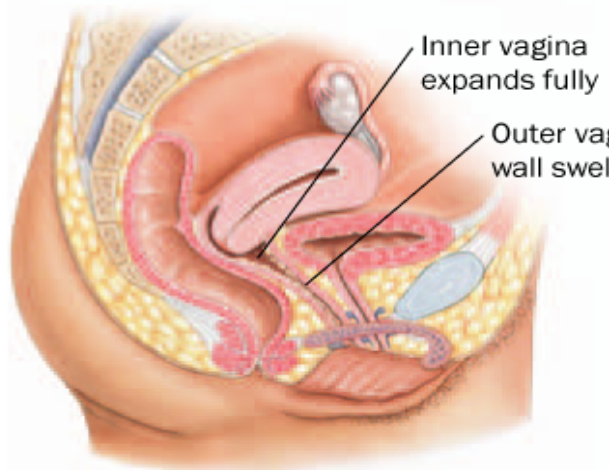
(a) Interior View



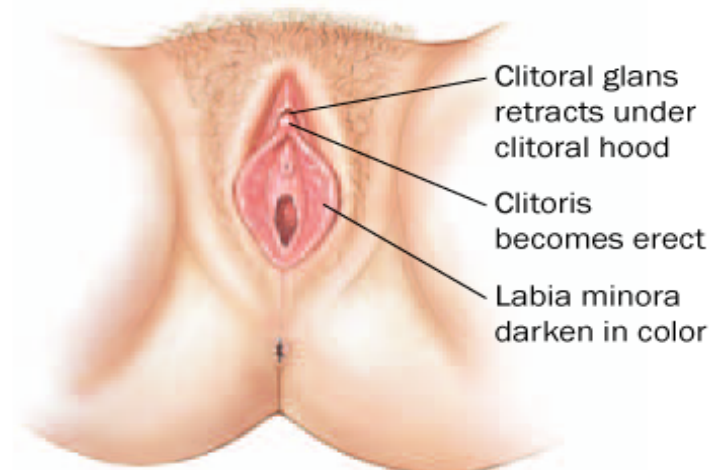
(b) Exterior View

Plateau

- inner vagina expands **fully**
- Outer vaginal wall swells
- Copious perspiration
- Increased myotonia
- HR, respiration rate, BP increase



(a) Interior View



(b) Exterior View

The “O” in the EPOR Model: Orgasm

FIGURE 3.7 Physical Changes in the Female during Orgasm

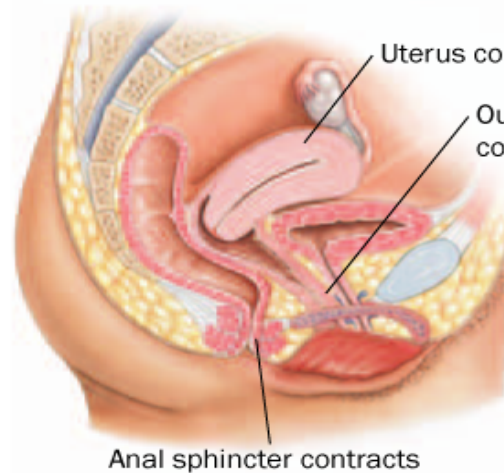
Orgasm

Uterus contracts

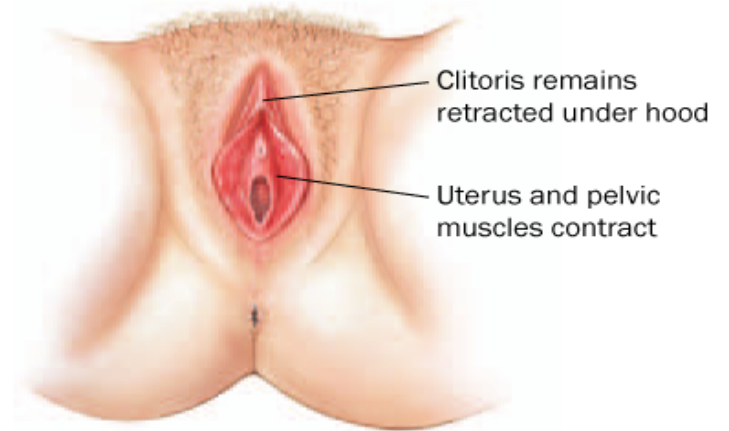
Pelvic muscles contract

Outer vagina contracts

Anal sphincter contracts



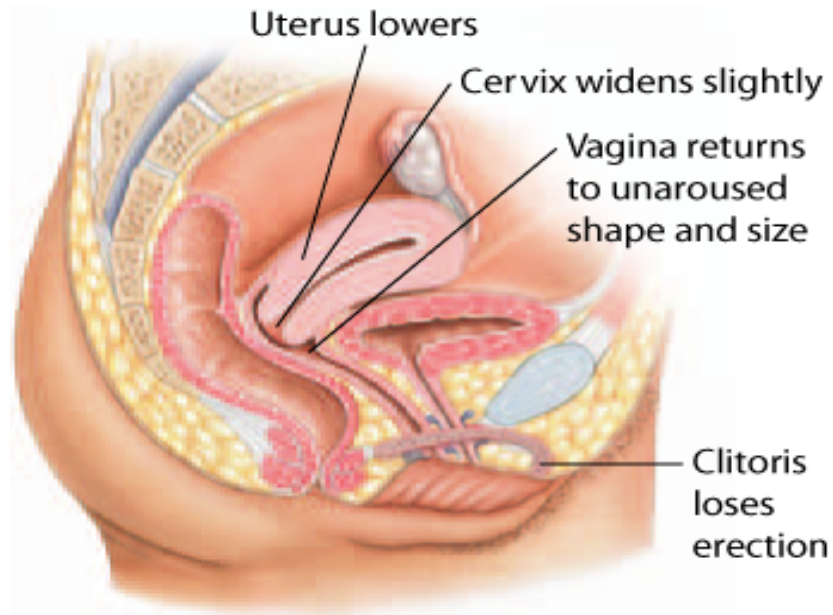
(a) Interior View



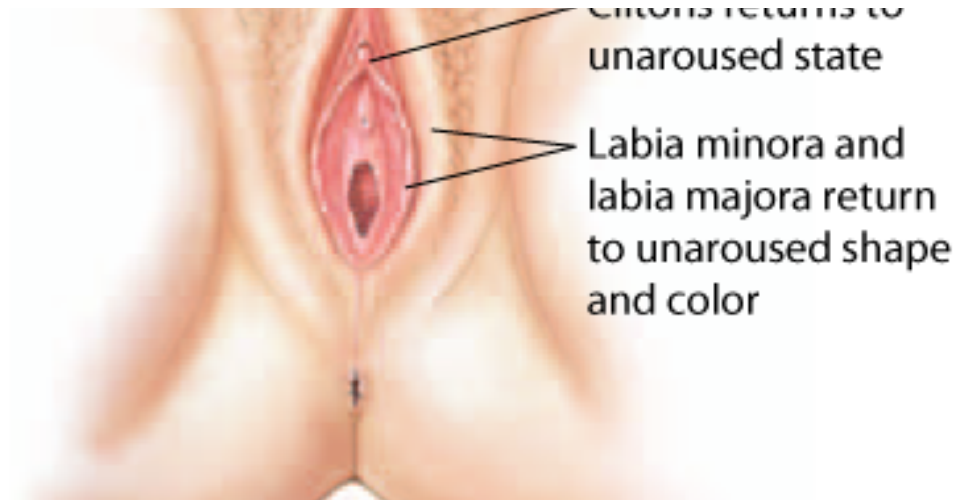
(b) Exterior View

- **Actual climax is preceded by distinct inner sensation that orgasm is imminent (orgasmic “inevitability”)**
- **Contractions of orgasmic platform**
- **Several orgasms possible, if stimulation continues**
- **Very high HR, BP, breathing**
- **Intense myotonia**
- **Oxytocin-** May be released by the pituitary when touching or being touched. Has been described as important for attachment, and is also involved in parental behaviours (*mostly, of voles*)
- **Clitoris** enlarges initially, then retracts beneath hood just before & during orgasm
- Follows **same pattern with repeated orgasms**, though swelling is less pronounced

The “R” in the EPOR Model: Resolution



(a) Interior View

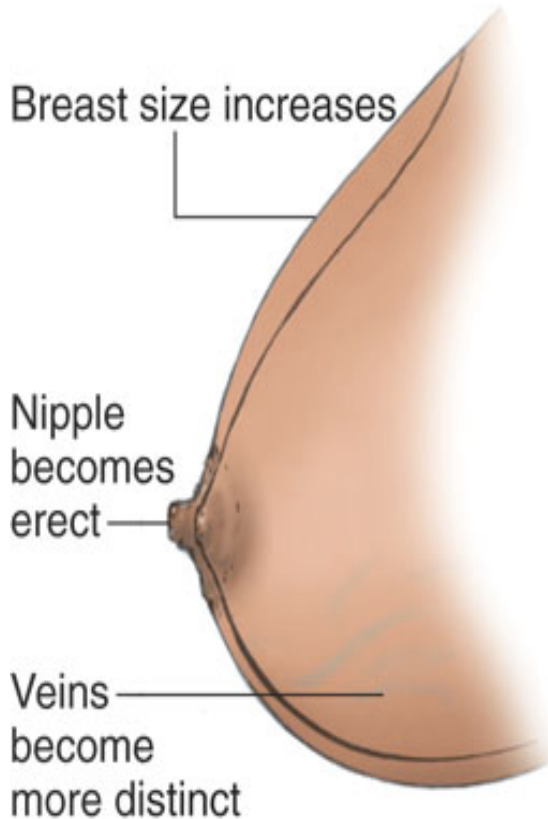


- Uterus lowers
- Cervix widens slightly
- Vagina returns to unaroused shape and size
- Clitoris loses erection

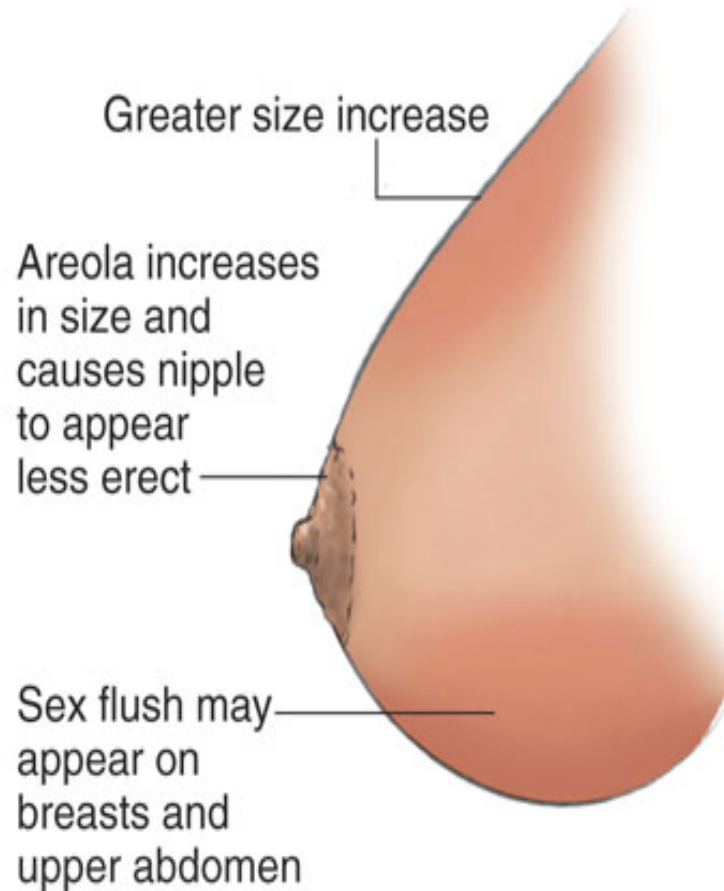
- Clitoris returns to unaroused state
- Labia minora and majora return to unaroused shape and color

Breasts—Sexual Response: Excitement, Plateau, Orgasm and Resolution Phase (*also in men*)

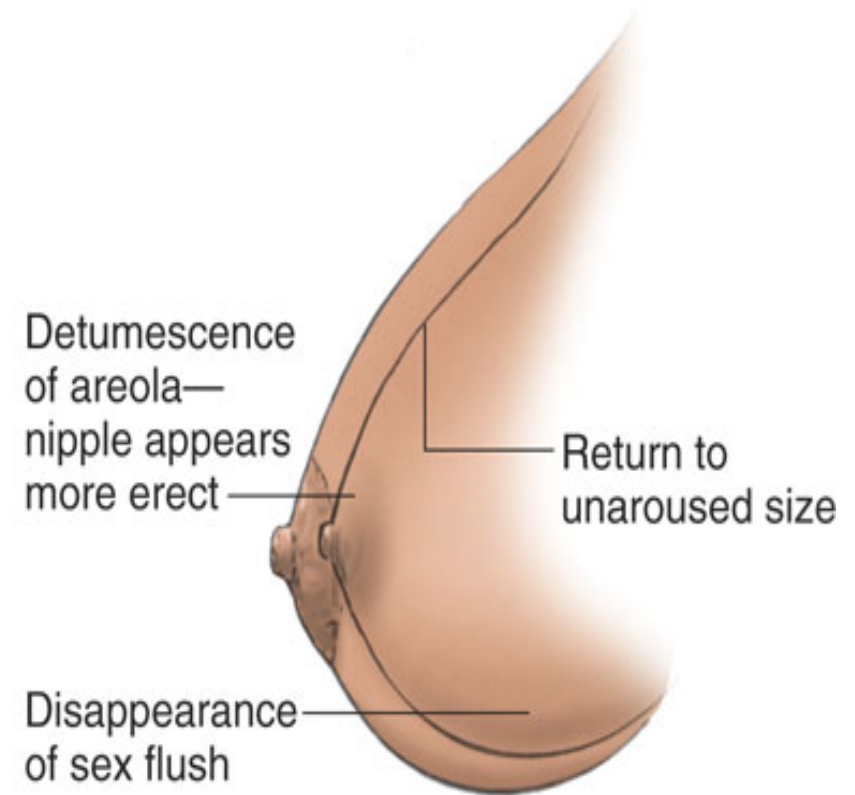
(a) Excitement phase



(b) Plateau and orgasm phase



(c) Resolution phase

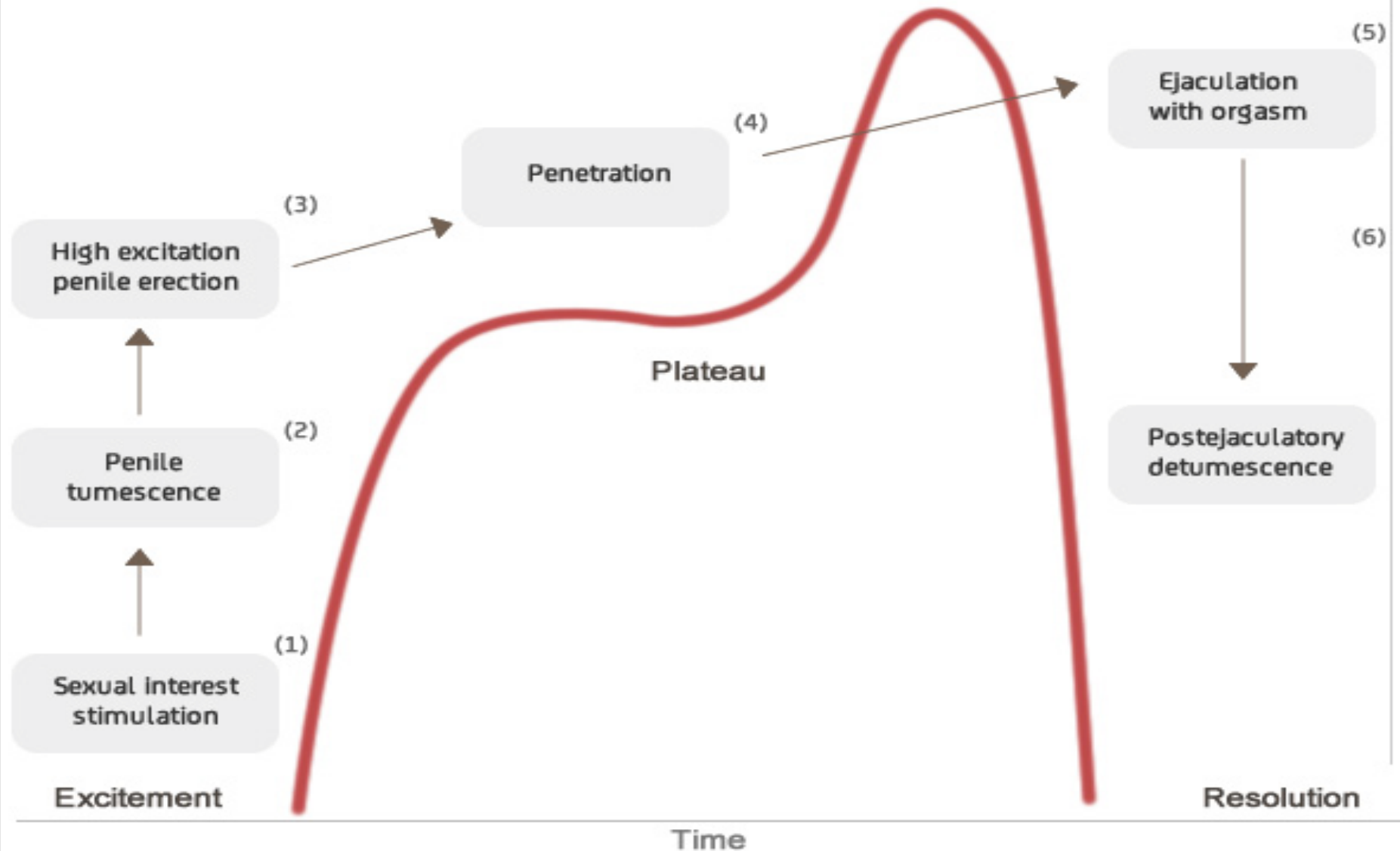


Female Sexual Arousal

- **Vaginal Lubrication**
- **Clitoris swells, erect**
(similar to penile erection)
- **Tenting** (Cervix & Uterus “stand up”); angle of cervical opening more receptive to sperm
- **Labia may enlarge or flatten and separate**
- **Inner lips of vulva swell & open, change color**
(darker)
- **Plateau:** Orgasmic platform - outer 1/3 of vagina thickens, swells; condition *sine qua non*: without it, no orgasm
- **Vasocongestion**
- **Sex flush**
- **Breathing & heart rate increase**
- **Generalized Myotonia**
- **Nipples become erect**
(myotonia: muscle contraction)
- **Breasts may enlarge**
(vasocongestion)

Normal ejaculation

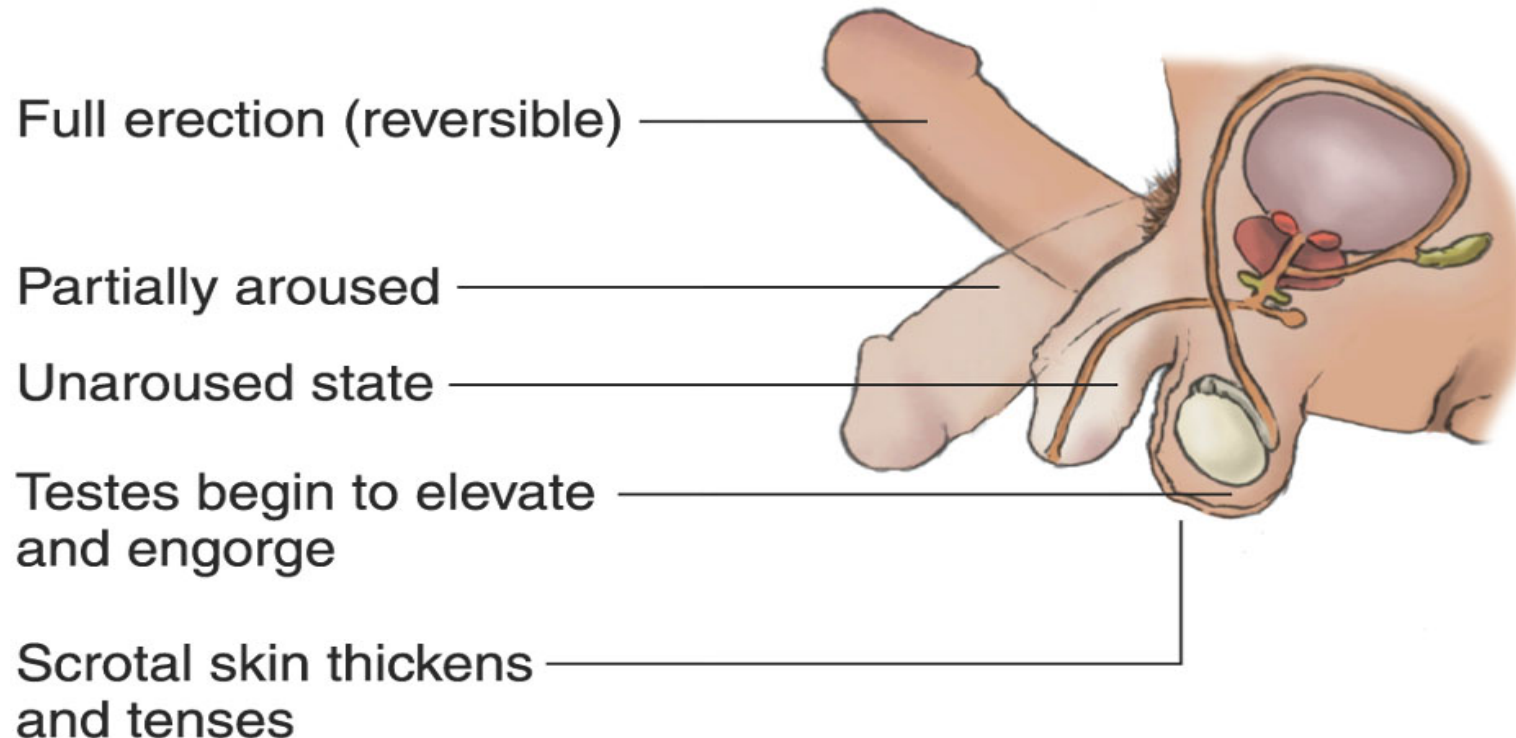
Male Sexual Response



Changes in external & internal Male Anatomy during sexual response

Excitement phase:

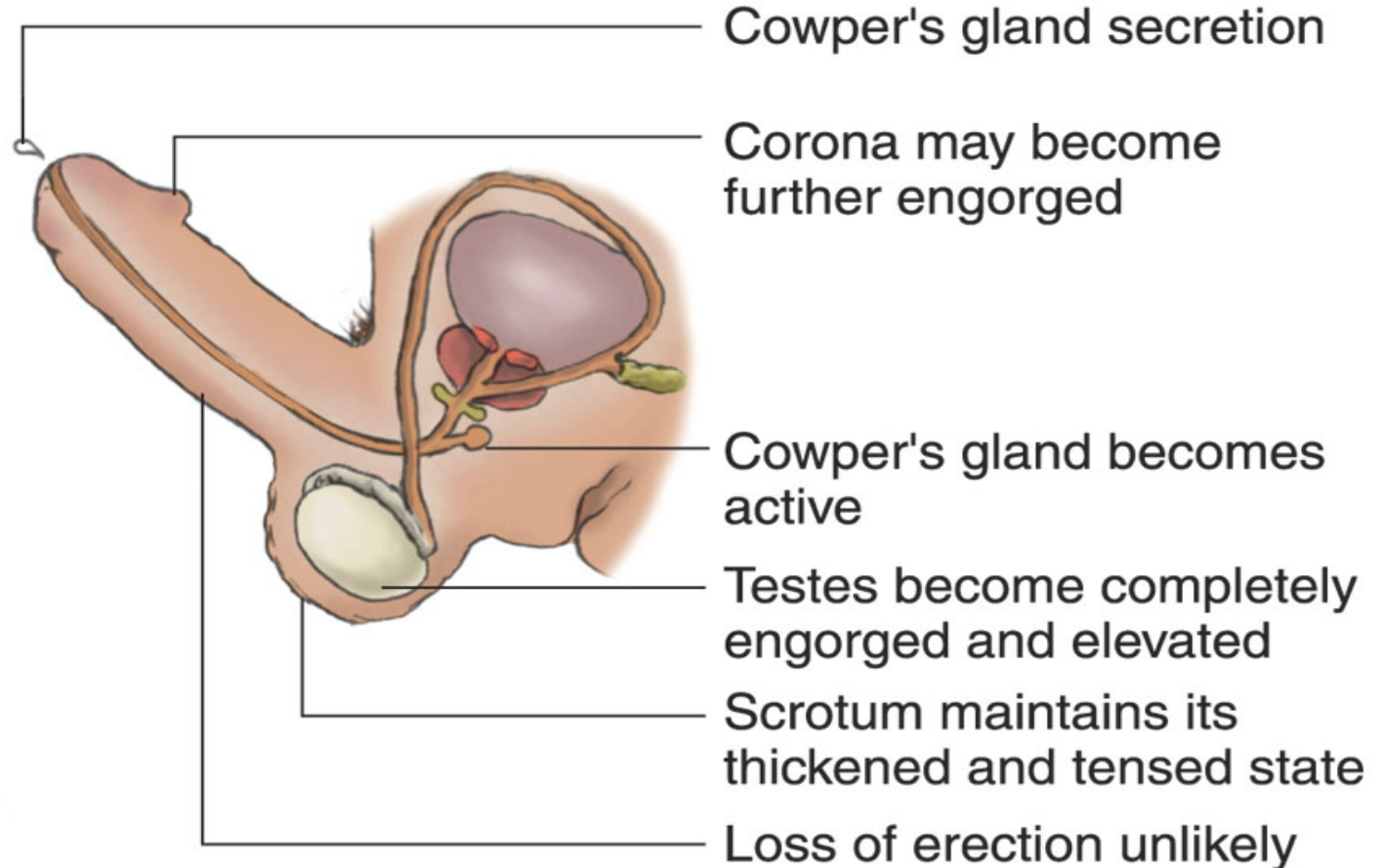
- engorgement of penis (cavernous and spongy bodies)
- engorgement of testes (vasocongestion)
- increase in muscle tension
- increased heart rate and blood pressure



Changes in external & internal **Male Anatomy** during sexual response (*continued*)

Plateau phase:

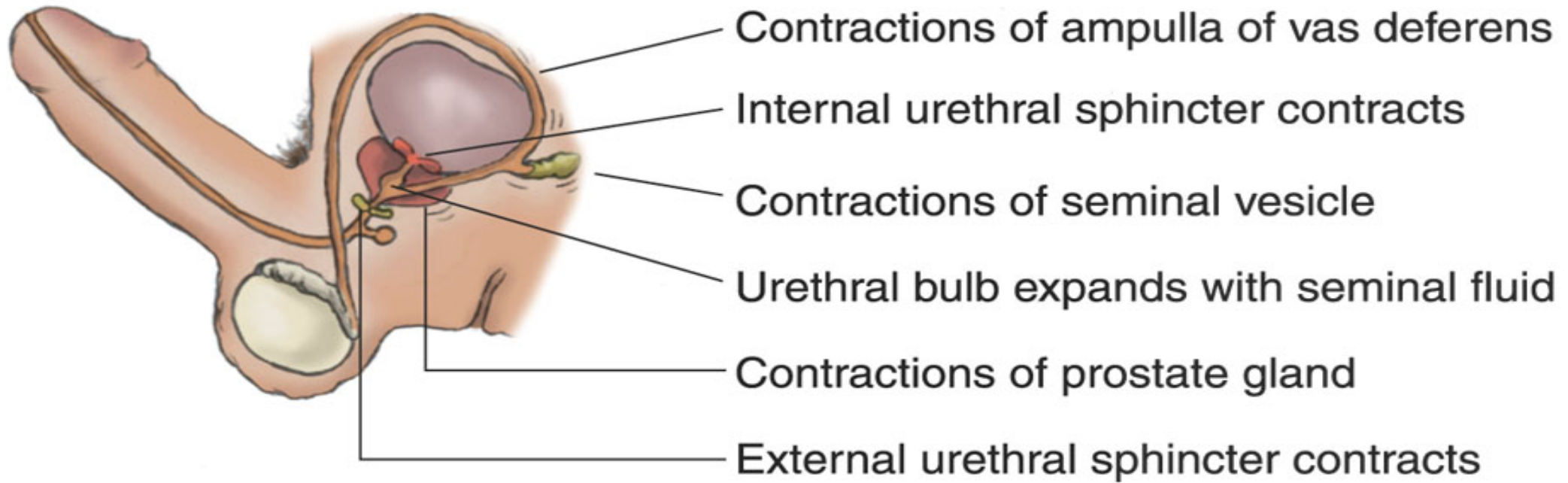
- engorgement and elevation of testes increases.
- further increase in muscle tension, heart rate and blood pressure
- Cowper's gland secretions may occur.



Changes in external & internal **Male Anatomy** during sexual response (*continued*)

Emission phase of Orgasm:

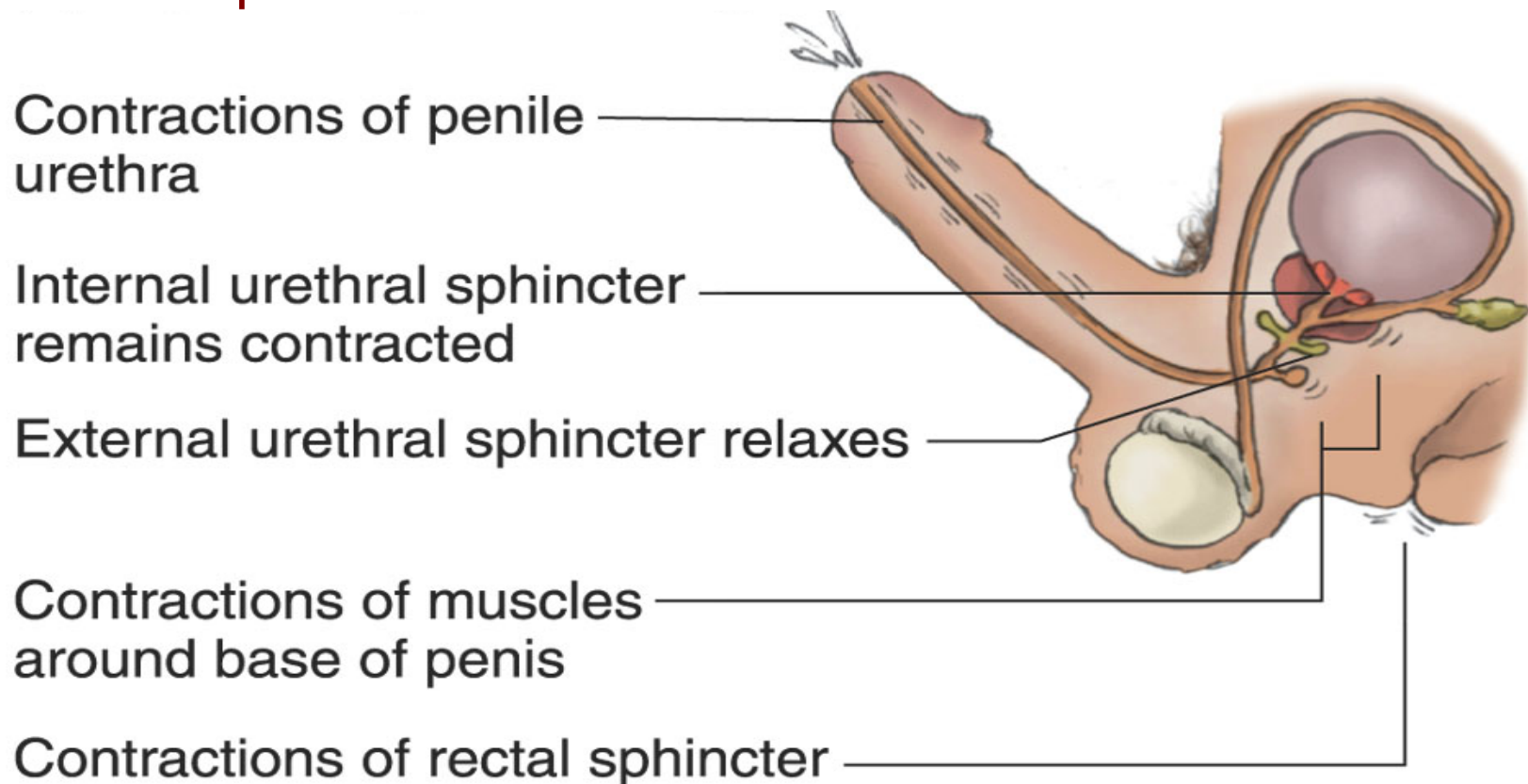
- **contractions of internal structures**
- **both internal and external urethral sphincters contract**
- **result: seminal fluid pools in urethral bulb**



Changes in external & internal **Male Anatomy** during sexual response (*continued*)

Expulsion phase of Orgasm:

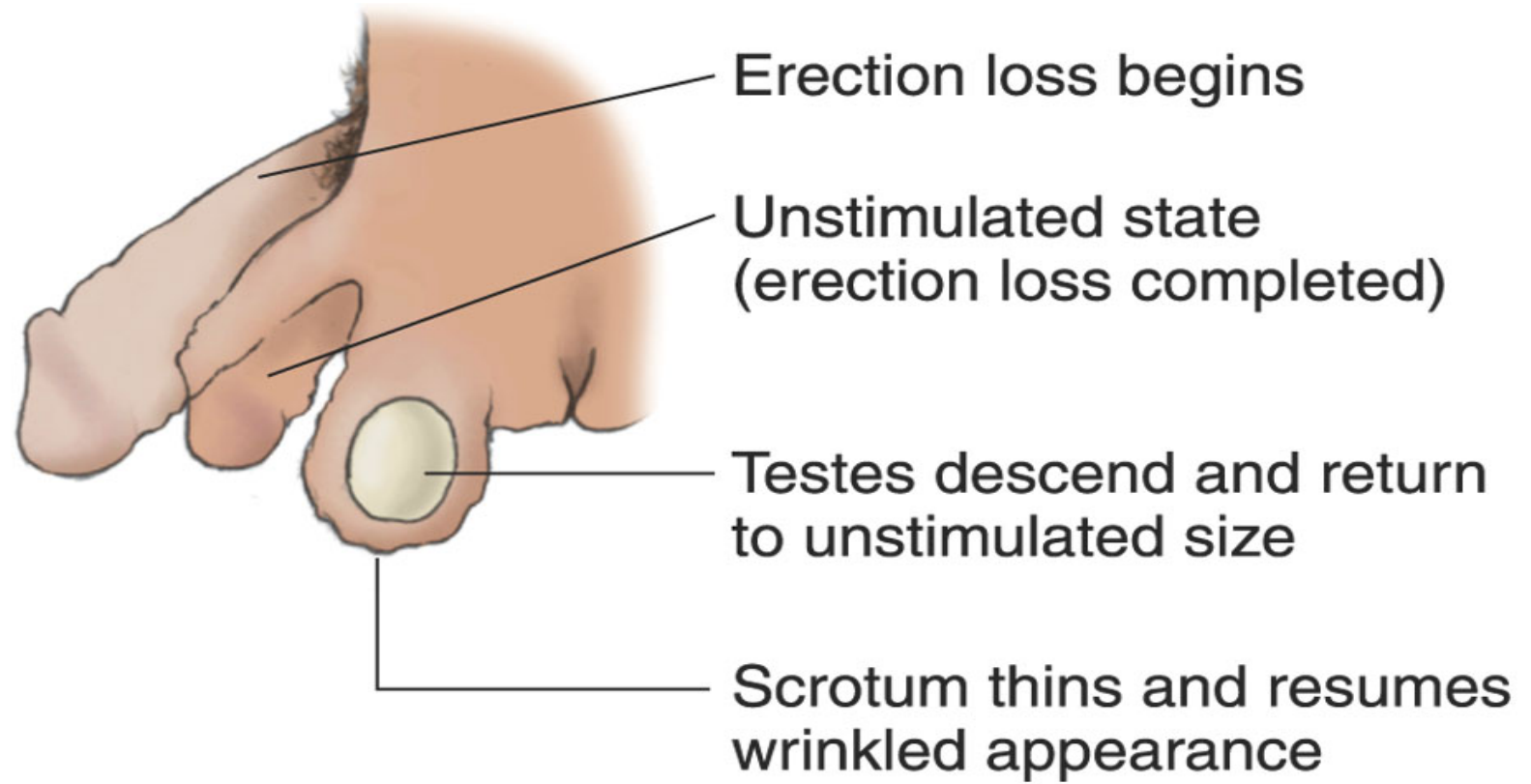
- contractions of muscles at base of penis and in penile urethra
- external urethral sphincter relaxes
- result: expulsion of semen



Changes in external & internal **Male Anatomy** during sexual response (*continued*)

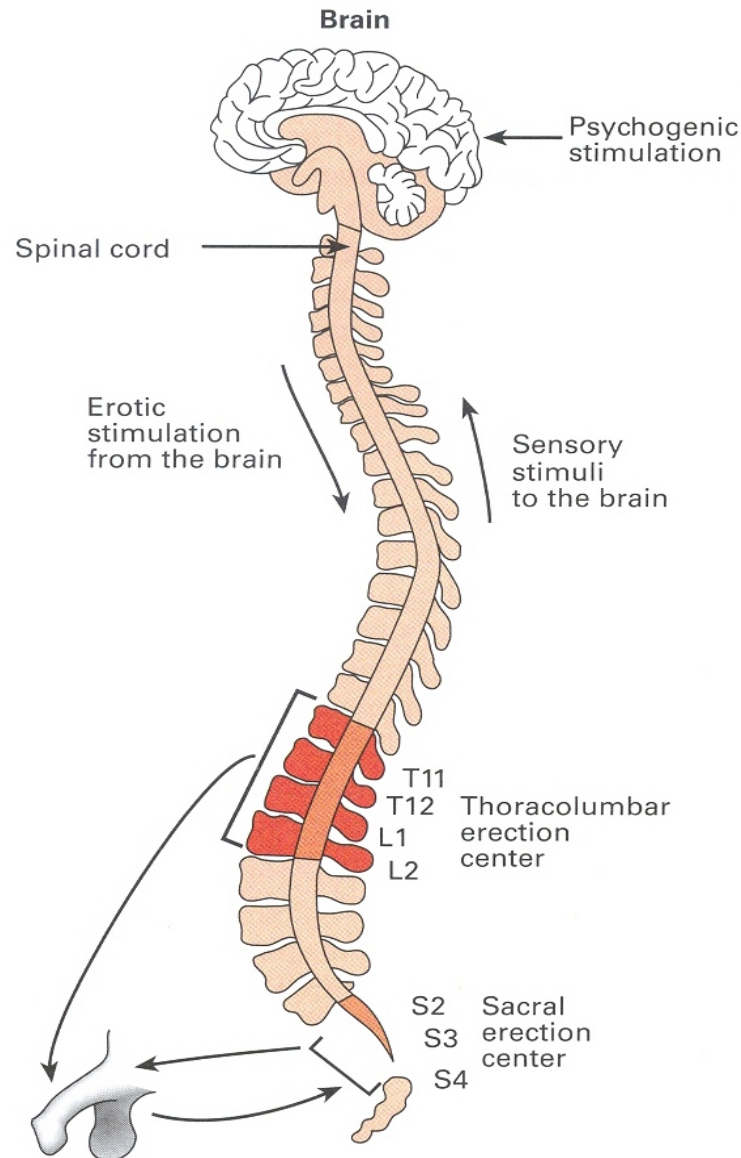
Resolution phase:

- sexual anatomy returns to the nonexcited state
- **Refractory period** (in men): time following orgasm in the male during which he cannot experience another orgasm.



Phase	Common in “Both” Sexes	“Female” Response	“Male” Response
Excitement	<ul style="list-style-type: none"> ▪ Increase in myotonia (slow muscle relaxation after a contraction) ▪ Increase heart rate, blood pressure ▪ Sex flush; Nipple erection (more common in females) 	<ul style="list-style-type: none"> ▪ Clitoris swells ▪ Labia majora separate away from vaginal opening ▪ Labia minora swell & darken ▪ Lubrication begins ▪ Uterus elevates ▪ Breasts enlarge 	<ul style="list-style-type: none"> ▪ Penis becomes erect ▪ Testes elevate and engorge ▪ Scrotal skin thickens and tenses
Plateau	<ul style="list-style-type: none"> ▪ Myotonia more pronounced some, Involuntary muscular contractions in hands & feet ▪ HR, BP, breathing increase 	<ul style="list-style-type: none"> ▪ Orgasmic platform forms (engorgement outer 1/3 vagina) ▪ Clitoris withdraws under hood ▪ Uterus more erect ▪ Areola more swollen 	<ul style="list-style-type: none"> ▪ Engorgement and elevation of testes becomes more pronounced ▪ Cowper’s gland secretions may occur
Orgasm	<ul style="list-style-type: none"> ▪ Involuntary muscle spasms throughout body ▪ BP, breathing, HR at max ▪ Involuntary contractions of rectal sphincter 	<ul style="list-style-type: none"> ▪ Orgasmic platform contracts rhythmically 3-15 times ▪ Clitoris remains retr. under hood ▪ Uterus contractions occur ▪ No further changes in breasts or nipples 	<ul style="list-style-type: none"> ▪ During emission phase, internal sex structures undergo contractions, causing pooling of seminal fluid in urethral bulb ▪ During expulsion phase, semen expelled by contractions of muscles around base of penis
Resolution	<ul style="list-style-type: none"> ▪ Myotonia subsides; HR, BP, breathing Rt return to normal ▪ Sex flush disappears rapidly ▪ nipple subsides slowly 	<ul style="list-style-type: none"> ▪ Clitoris descends, engorgement slowly subsides ▪ Labia return to unaroused state ▪ Uterus descends to normal position ▪ Lack of orgasm after period of high arousal may dramatically slow resolution 	<ul style="list-style-type: none"> ▪ Erection subsides over period of a few minutes ▪ Testes descend, return to normal size ▪ Scrotum resumes wrinkled appearance ▪ Resolution quite rapid in most men

Neurophysiology of the Sexual Response



- **Neural and hormonal involvement in sexual responses:**

- Parasympathetic: arousal

- Sympathetic: orgasm

- Spinal reflexes:

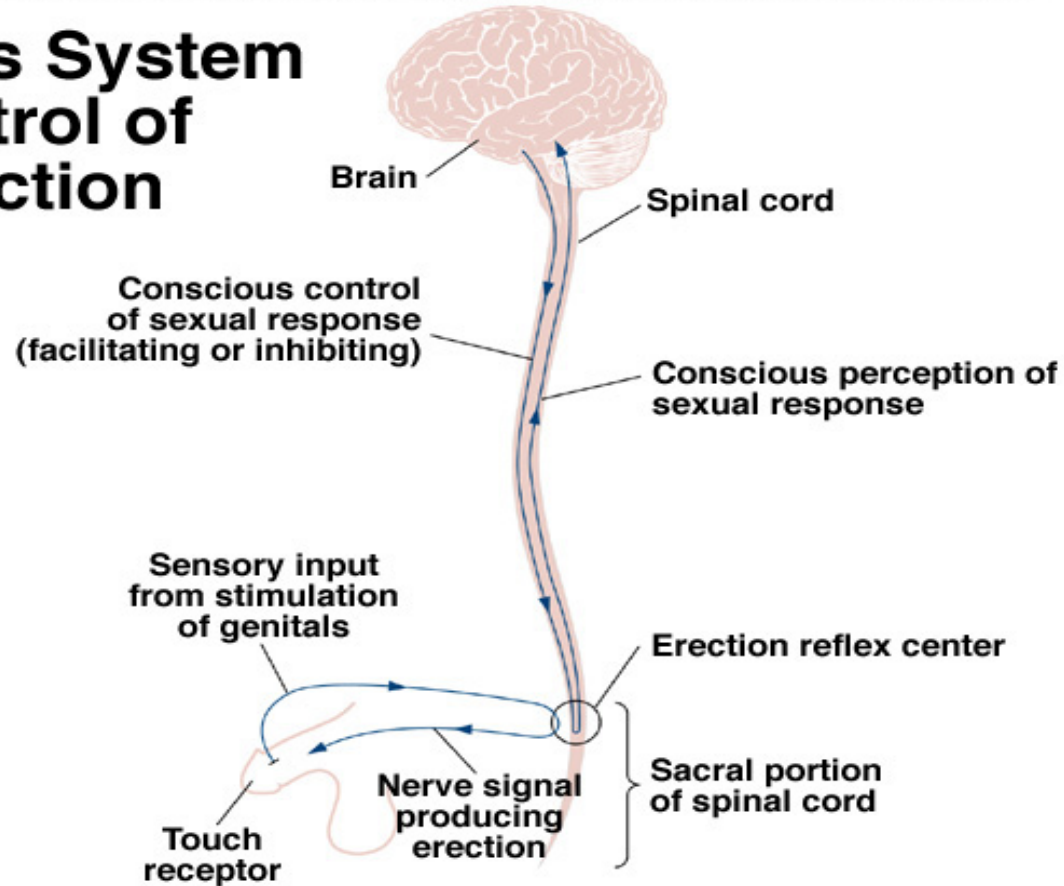
- **Erection & Lubrication:**

- **sacral cord responds to stimulation**, sends message via parasympathetic to relax penile arteries: more blood flows to penis; **message to brain, awareness** (not if spine severed above sacrum; but have psychological cues)

- **Orgasm (Ejaculation & Muscular Contractions)**

- higher in spinal cord, message to sympathetic NS causes muscle contractions. Also, message to brain, awareness, (other psychological cues, e.g. visual)

Nervous System Control of Erection



Psychogenic Erections: Originate in CNS in response to erotic stimuli.

Signals relayed to **T11-L2 thoracolumbar erection center**.

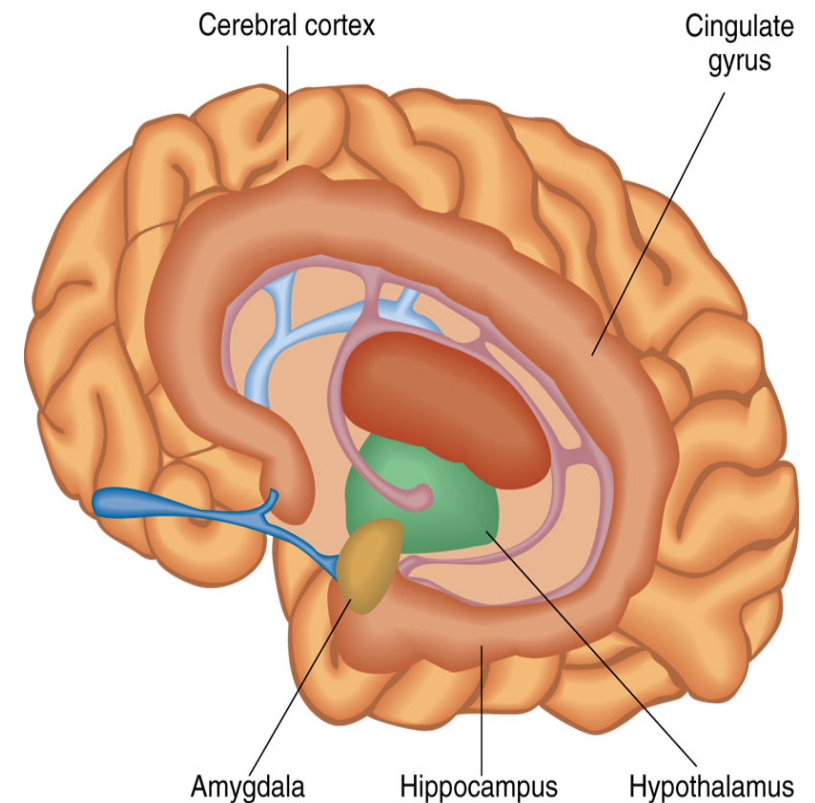
Neural impulses flow to vascular bed of corpora cavernosae

Reflex Erections: Sensory input from tactile stimuli to genital area transmitted via a reflex arc to S2-S4 sacral erection center

Nocturnal Erections: occur during REM sleep

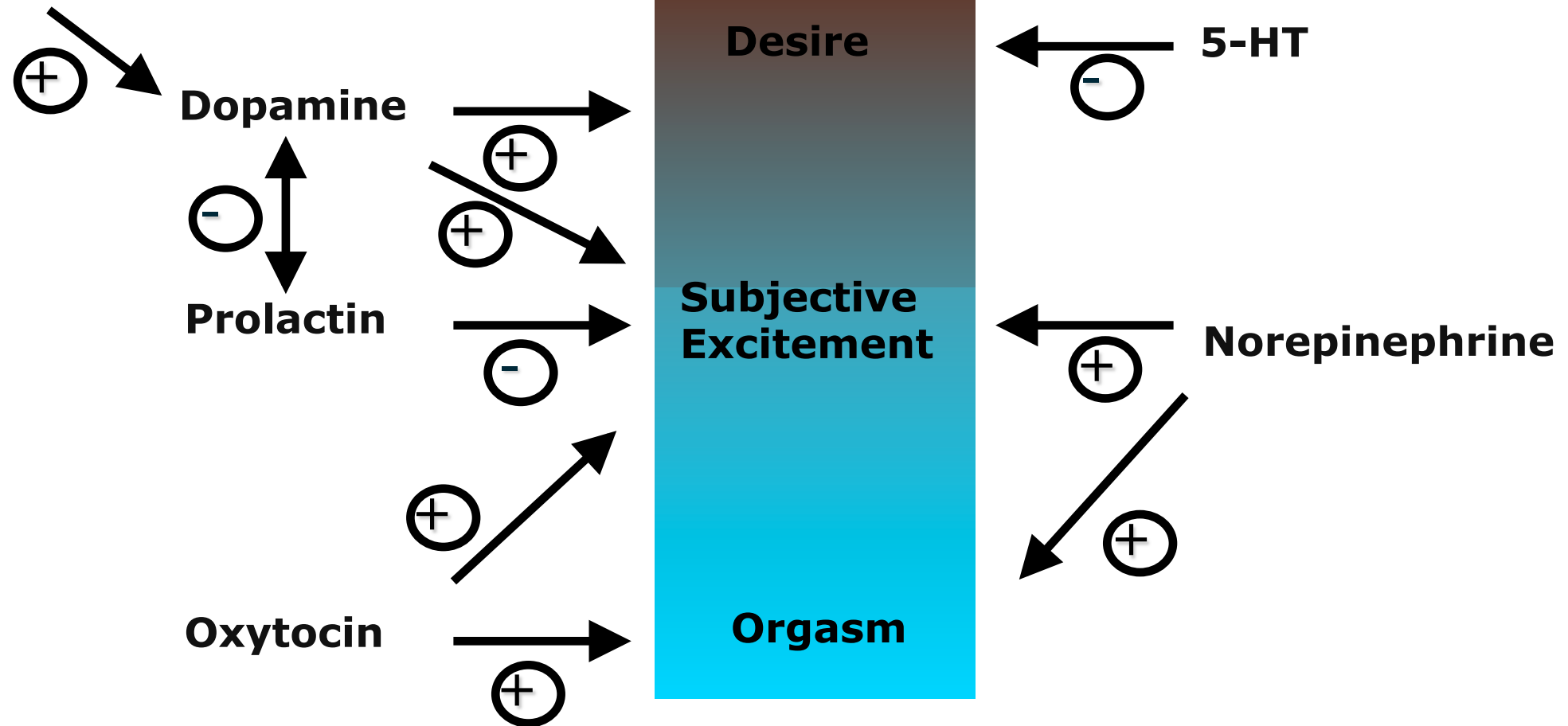
Sexual Arousal and the Brain

- Cerebral cortex (thinking)
- Limbic system (feeling and behaviors)
 - Cingulate gyrus
 - Amygdala
 - Hypocampus
 - Hypothalamus
- Neurotransmitters



Central Effects of Neurotransmitters and Neuroendocrine Hormones on Female Sexual Function

Melanocortins



Adapted from Clayton AH. *Psychiatr Clin North Am.* 2003;26:673-682, with Permission from Elsevier; Ben Zion IZ, et al. *Mol Psychiatry.* 2006;11:782-786.

Slide source: www.FemaleSexualDysfunctionOnline.org

Physiological

- Neurological problems
- Cardiovascular disease
- Cancer
- Urogenital disorders
- Medications
- Fatigue
- Hormonal loss or abnormality

Psychological

- Depression/anxiety
- Prior sexual or physical abuse
- Stress
- Alcohol/substance abuse

Female Sexual Dysfunction

Sociocultural influences

- Inadequate education
- Conflict with religious, personal, or family values
- Societal taboos

Interpersonal Relationships

- Partner performance and technique
- Lack of partner
- Relationship quality and conflict
- Lack of privacy

Medications That May Adversely Affect Sexual Function

<i>Class</i>	<i>Examples</i>
Antihypertensive agents	α_1 - and α_2 -blockers (clonidine, reserpine, prazosin) β -blockers (metoprolol, propranolol) Calcium channel blockers (diltiazem, nifedipine) Diuretics (hydrochlorothiazide)
Chemotherapeutic agents	Alkylating agents (busulfan, chlorambucil, cyclophosphamide)
Central nervous system agents	Anticholinergics (diphenhydramine) Anticonvulsants (carbamazepine, phenobarbital, phenytoin) Antidepressants (MAOIs, TCAs, SSRIs) Antipsychotics (phenothiazines, butyrophenones) Narcotics (oxycodone) Sedatives/anxiolytics (benzodiazepines)
Agents that affect hormones	Antiandrogens (cimetidine, spironolactone) Antiestrogens (tamoxifen, raloxifene)

MAOIs = monoamine oxidase inhibitors; TCAs = tricyclic antidepressants;
SSRIs = selective serotonin reuptake inhibitors.

Adapted from Berman JR, Goldstein I. *Urol Clin North Am*. 2001;28:405-16.

Cross-sectional, single specialized center study: **214 transwomen** (M-to-F) and **138 trans men** (F-to-M).

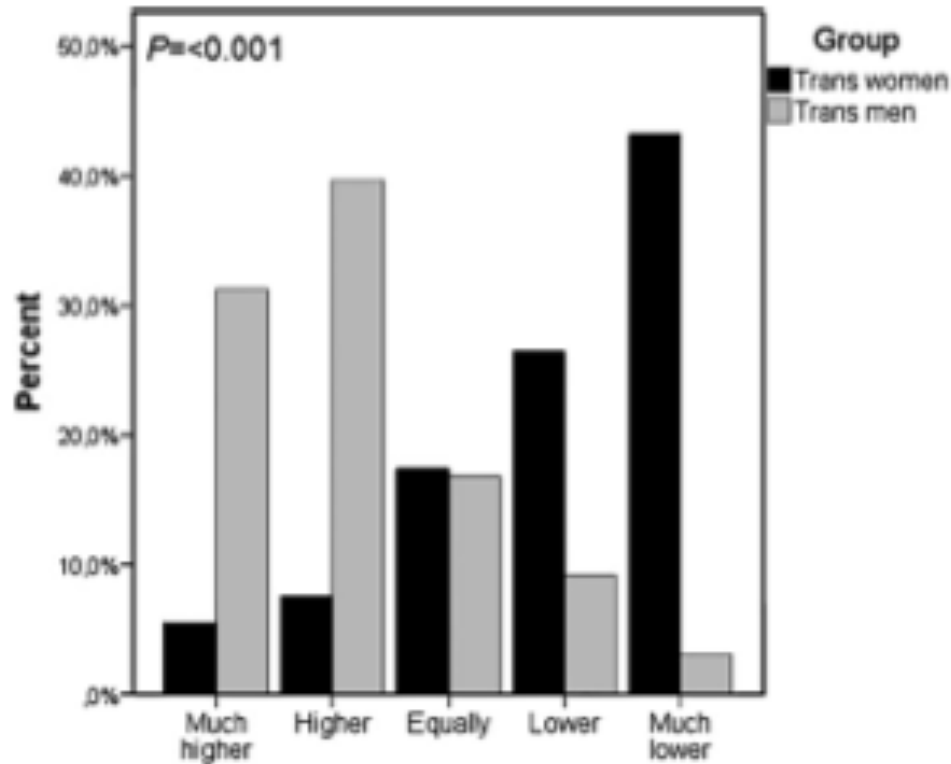
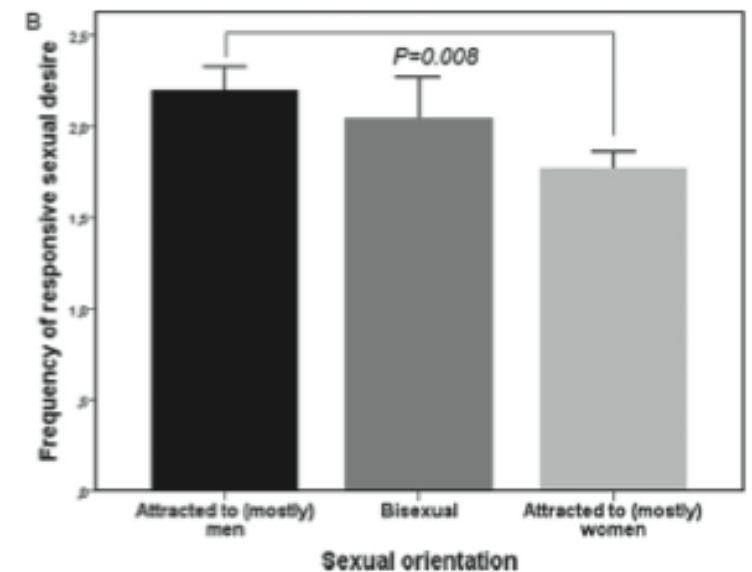
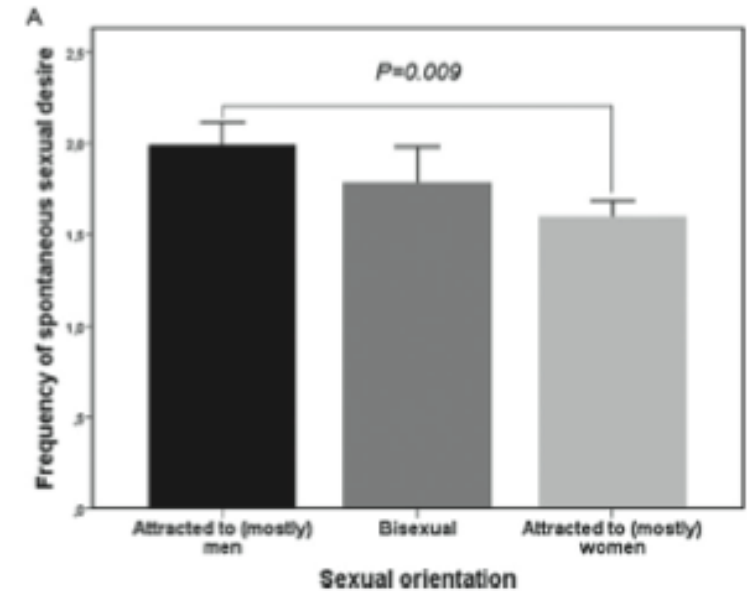


Figure 3 Current sexual desire in trans men and women compared with sexual desire before sex reassignment treatment.

Wierck K, et al (2014) Sexual desire in trans persons: associations with sex reassignment treatment. **J Sex Med 11:107-118**



Frequency of sexual desire according to sexual orientation in trans women. Bars represent mean; whiskers 2 standard error of mean. *P* value from post-hoc ANOVA

Outline of Presentation & Point of Reading Assignments

- **Sexual health – Positive Sexuality**
- **Overview of Biopsychosocial Model of Sexual Response**
- **Anatomy of Sexual Arousal & Study of Sexual Responses**
- **Psychobiology of Sexual Health versus Dysfunction**
- **Readings assigned for Sexual Assault course (*Discussion Topics*):**
 - **Gender norms - sexual self control; positive sexuality (guilt/shame?)**
 - **Consent** – Hookup Culture/"One night stand" vs Intimate Relationships;
Change in Desire/Consent during Sex (Psychological, Pain); Arousal during Rape
 - **Sexual Problems after SA** (single rape incidence vs repeated SA)
 - **Children & Adolescents** ▪ **Pre- vs Post-marital** ▪ **Young vs Older Adult**
 - **Rape Fantasies?**
 - **Other Topics related to Sexual Arousal, Response or Reactions?**