HKU Med LKS Faculty of Medicine
School of Biomedical Sciences
香港大學生物醫學學院

BMSC1101/BMSN1601

Anatomy of Reproductive Systems (Male)

Guilherme RBC Fonseca, Assistant Lecturer
gfonseca@hku.hk
2022/2023

Learning Outcomes

HKU Med

By the end of this lecture, you should be able to:

1. Understand the general organization of the reproductive systems
2. Describe the structure and function of the male internal and external genitalia
3. Relate the anatomy of the reproductive systems to relevant developmental, functional and clinical features

Main references:

- Saladin K. *Human Anatomy*
- Drake R. *Gray's Anatomy for Students*

For any questions:

- gfonseca@hku.hk with subject Nurse / TCM

1. Overview of the Reproductive Systems

1. Overview of Reproductive Systems

A) Structures and functions

i. Primary genitalia (gonads) produce the gametes essential for fertilization.

- Male – testes.
- Female – ovaries.

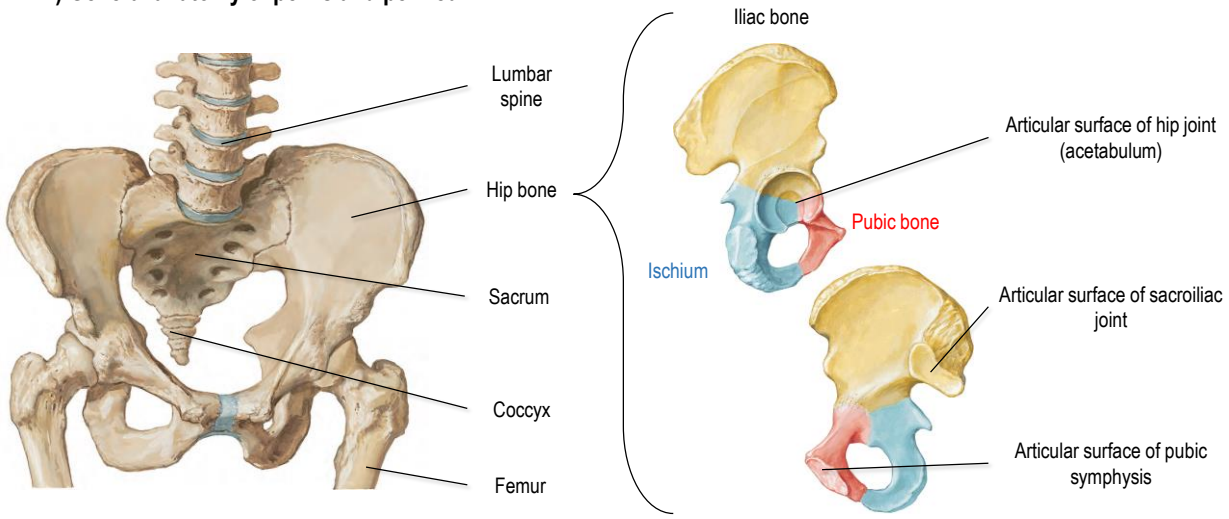
ii. Secondary genitalia are organs, other than gonads, that are necessary for reproduction.

- Male – system of ducts, glands and the penis, concerned with the storage, survival, and conveyance of sperm.
- Female – uterine tubes, uterus, vagina, and glands, concerned with uniting the sperm and egg and harboring the fetus.

1. Overview of Reproductive Systems

HKU Med

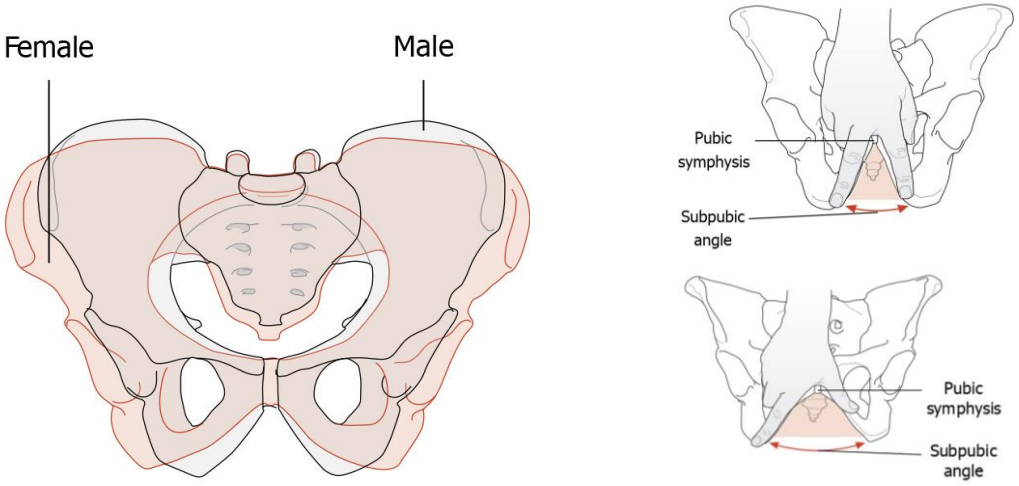
B) General anatomy of pelvis and perineum



1. Overview of Reproductive Systems

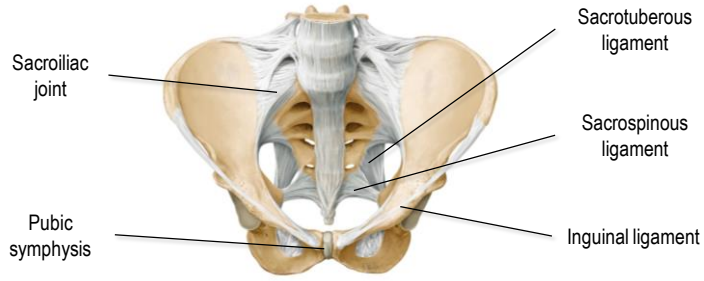
HKU Med

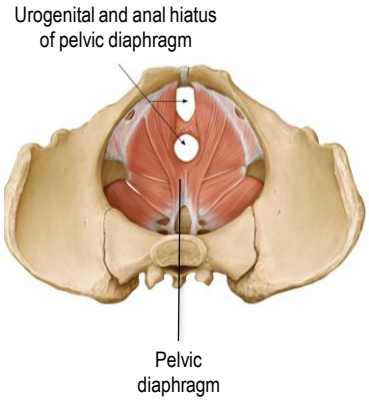
B) General anatomy of pelvis and perineum



1. Overview of Reproductive Systems

B) General anatomy of pelvis and perineum

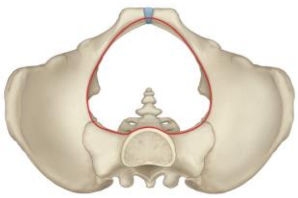




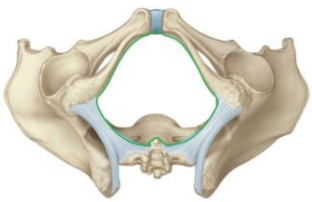
1. Overview of Reproductive Systems

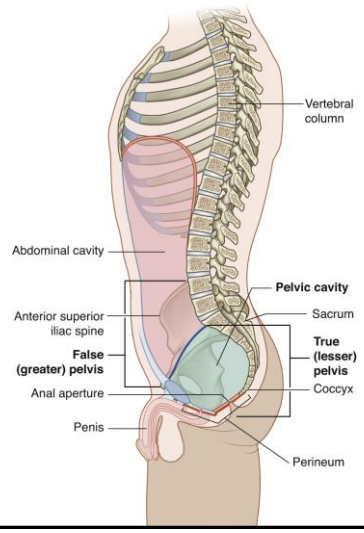
B) General anatomy of pelvis and perineum

- Pelvic inlet = superior pelvic aperture. Divides true pelvic cavity from abdominal cavity



- Pelvic outlet = inferior pelvic aperture. Normally enclosed by the pelvic diaphragm





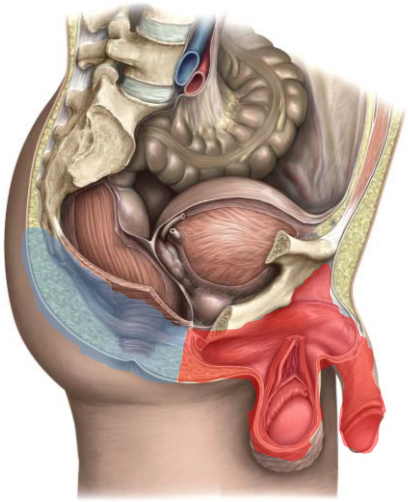
1. Overview of Reproductive Systems

B) General anatomy of pelvis and perineum

i. Pelvic cavity = bowl shaped cavity divided from perineum by the pelvic diaphragm

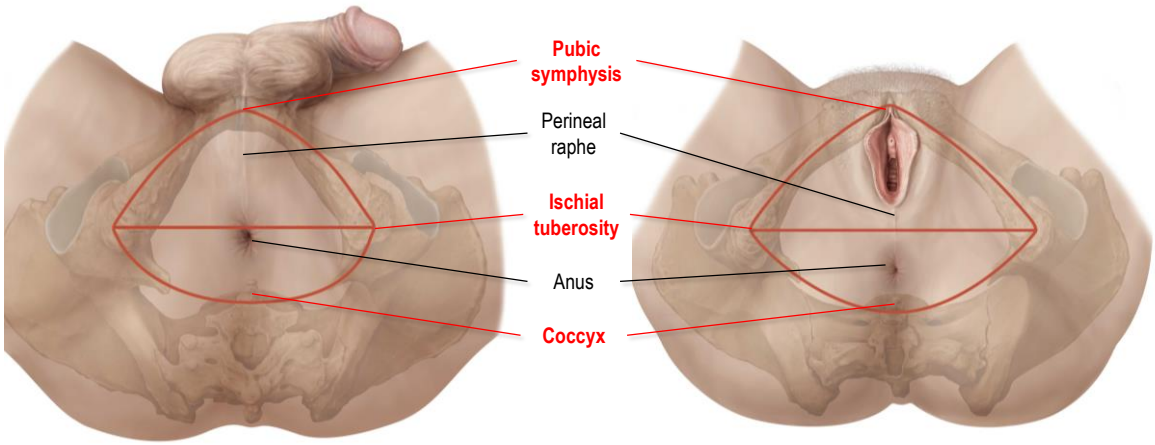
ii. Perineum = space between pelvic diaphragm and perineal skin

- Anterior perineum → Urogenital triangle. Transmits distal segments of urinary and reproductive tracts
- Posterior perineum → Anal triangle. Transmits distal segment of gastrointestinal tract



1. Overview of Reproductive Systems

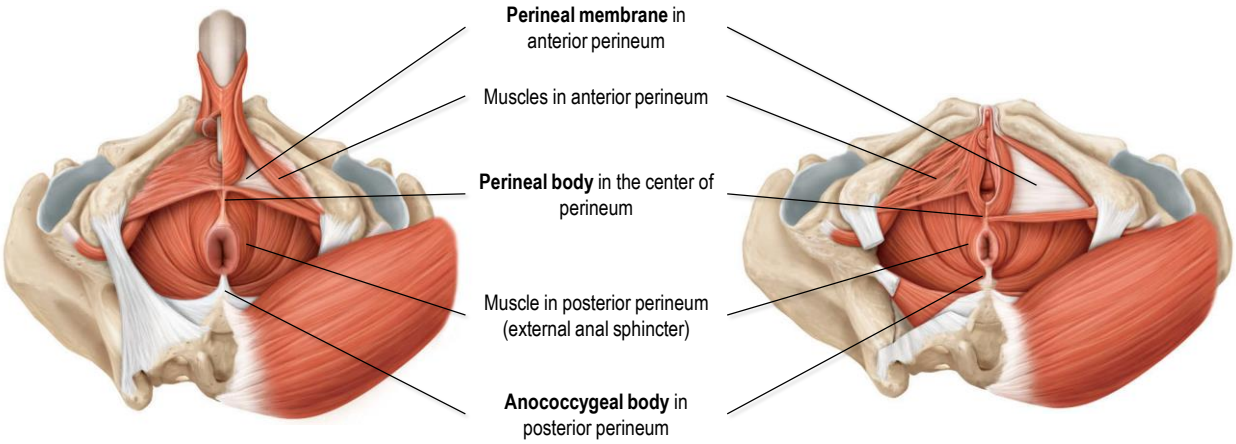
B) General anatomy of pelvis and perineum



1. Overview of Reproductive Systems

HKU Med

B) General anatomy of pelvis and perineum



1. Overview of Reproductive Systems

HKU Med

B) General anatomy of pelvis and perineum

		Male	Female
Anterior perineum	Superficial perineal space (between perineal skin and perineal membrane)	• Urethra • Bulb and crus of penis • Muscles (bulbospongiosus; ischiocavernosus)	• Urethra and vagina • Bulb and crus of clitoris • Muscles (bulbospongiosus; ischiocavernosus) • Greater vestibular glands (Bartholin) • Lesser vestibular glands • Paraurethral glands (Skene)
	Deep perineal space (between perineal membrane and pelvic diaphragm)	• Urethra • Muscles (external sphincter of urethra) • Bulbourethral glands (Cowper)	• Urethra and vagina • Muscles (external sphincter of urethra)
Posterior perineum		• Anal canal • Muscle (external anal sphincter)	

2. Male Genitalia

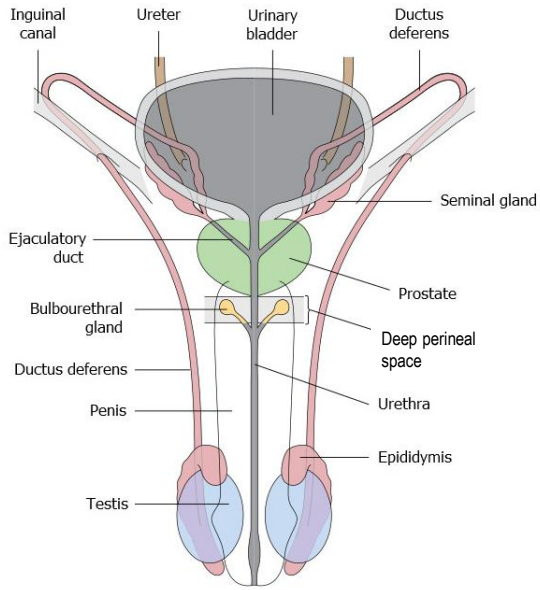
2. Male Genitalia

Internal genitalia

- Testicle
- Epididymis
- Vas deferens
- Ejaculatory duct
- Seminal vesicle
- Prostate
- Bulbourethral gland (Cowper)
- Urethra

External genitalia

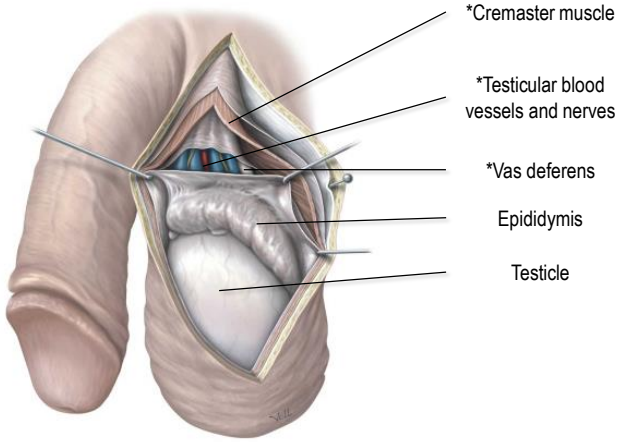
- Scrotum
- Penis
- Urethra (spongy)



2. Male Genitalia

A) Scrotum

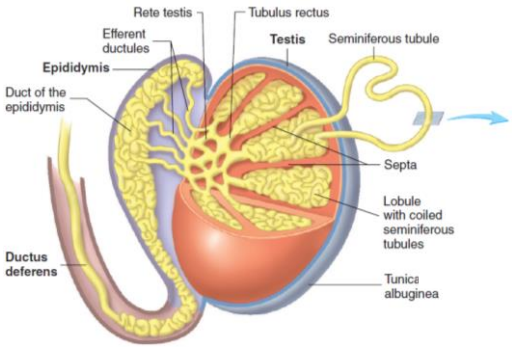
- Pouch that contains testes, epididymis and spermatic cords*.
- Each spermatic cord* transmits blood vessels and nerves to the testicle and epididymis. It also transmits the vas deferens to the abdomen via the inguinal canal.
- The scrotum keeps the testicles at a temperature of 35ºC, ideal for sperm production.

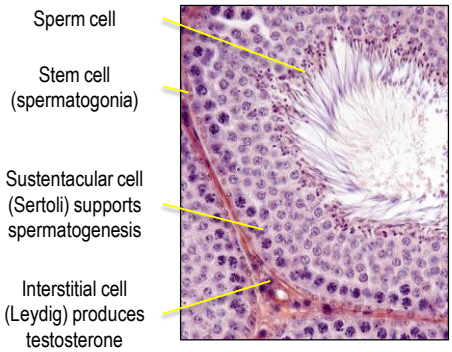


2. Male Genitalia

B) Testes

- Male gonads. Combined endocrine and exocrine glands that produce sex hormones and sperm (spermatogenesis).

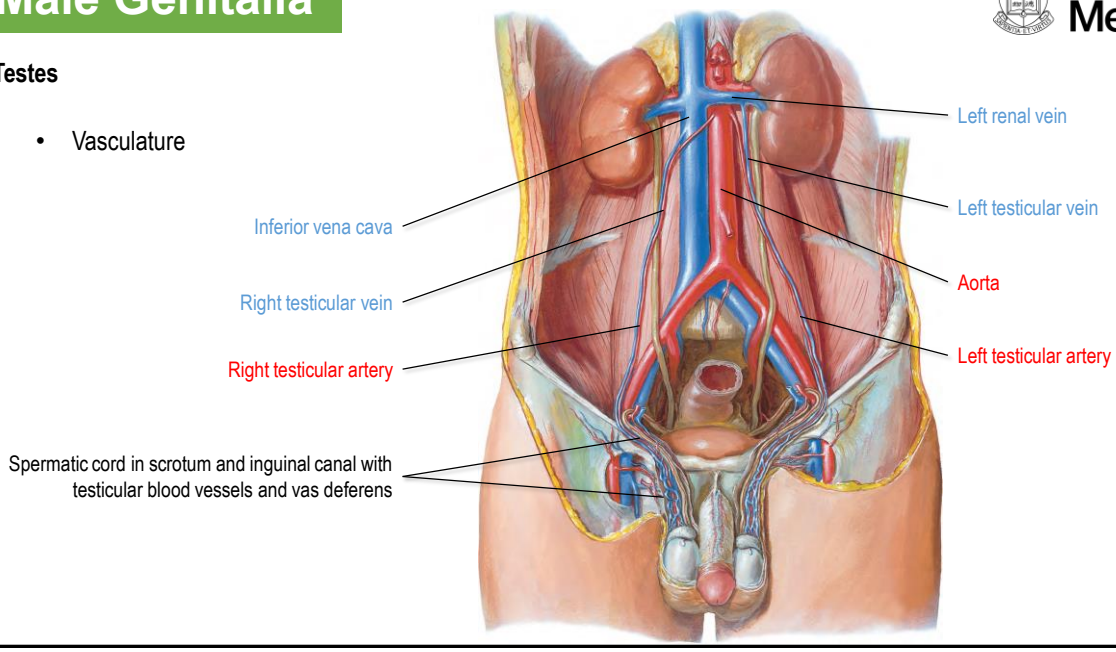




2. Male Genitalia

B) Testes

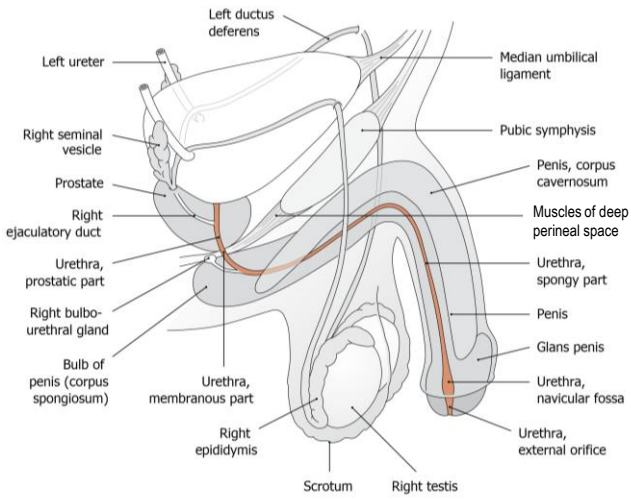
- Vasculature



2. Male Genitalia

C) Ducts

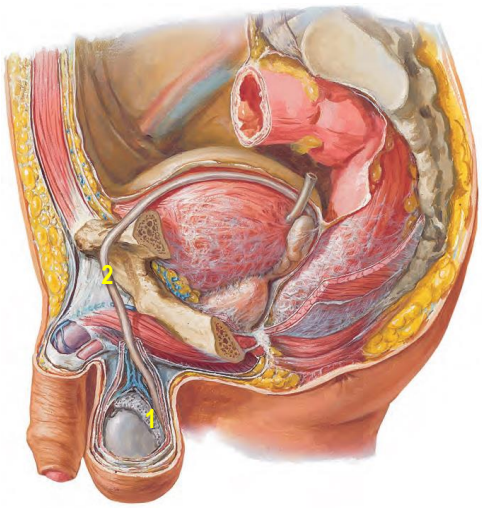
1. Epididymis → adjacent to testicle, in scrotum. It stores and activates sperm cells.
2. Vas deferens → ascends in spermatic cord (scrotum), passes inguinal canal and enters abdominopelvic cavity. Goes into prostate.
3. Ejaculatory duct → in prostate. Links vas deferens and duct of seminal vesicle. Opens into prostatic urethra.
4. Urethra → continuous tube present in prostate, perineum, and penis.

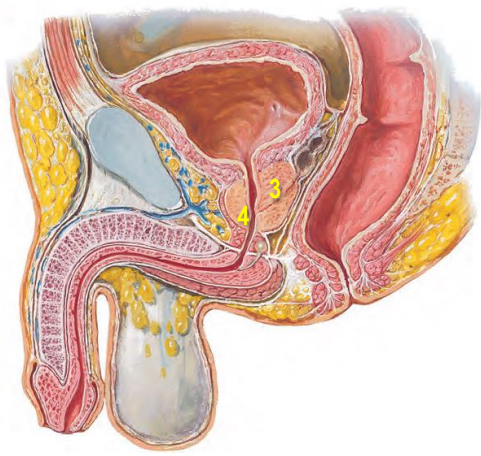


2. Male Genitalia

HKU Med

C) Ducts

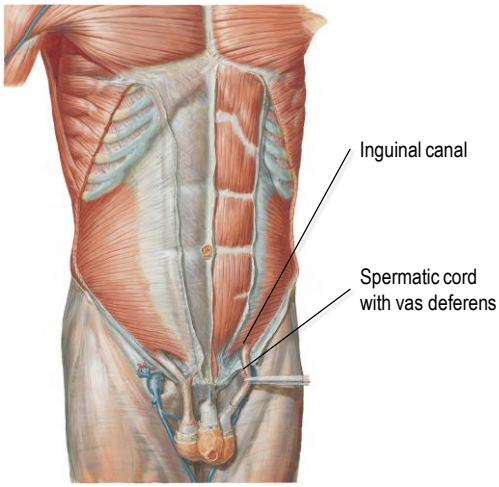




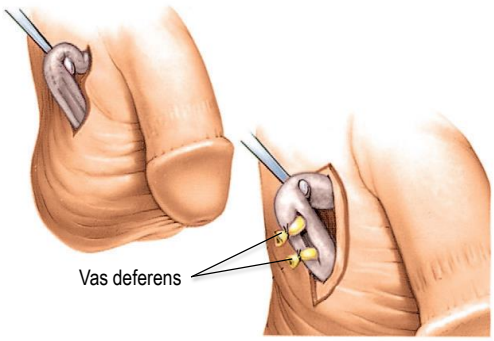
2. Male Genitalia

HKU Med

C) Ducts



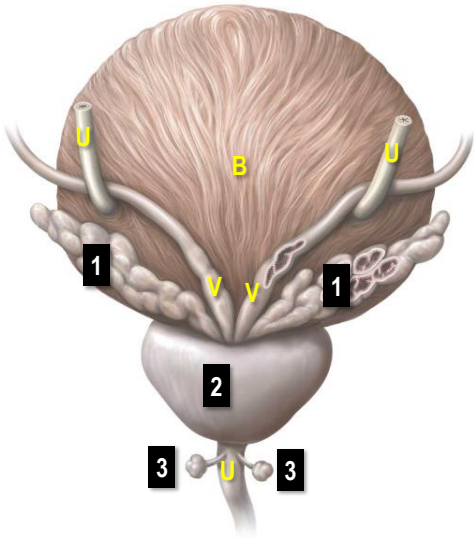
Vasectomy



2. Male Genitalia

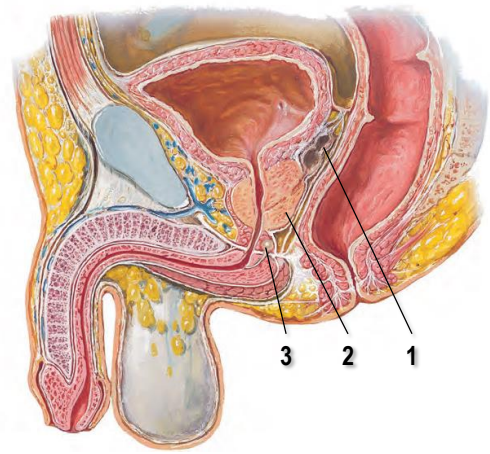
D) Accessory glands

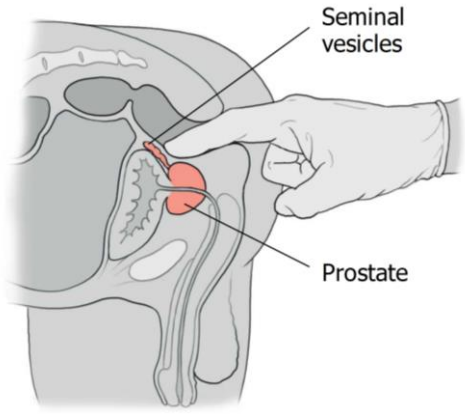
1. Seminal vesicles → secrete a milky fluid (~60% semen) with fructose to ejaculatory duct.
2. Prostate → secretes fluid (~20% semen) with enzymes, citric acid and antibacterial substances to prostatic urethra.
3. Bulbourethral gland (Cowper) → secretes pre-ejaculate fluid that neutralizes the acidity in urethra.



2. Male Genitalia

D) Accessory glands





Rectal palpation of prostate (screening for benign prostatic hyperplasia or prostatic cancer)

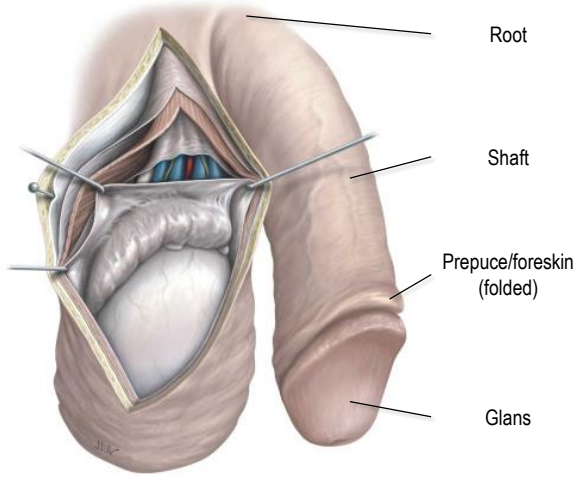
2. Male Genitalia

E) Penis

- Male copulatory organ. Formed by three erectile tissue bodies and the spongy urethra.

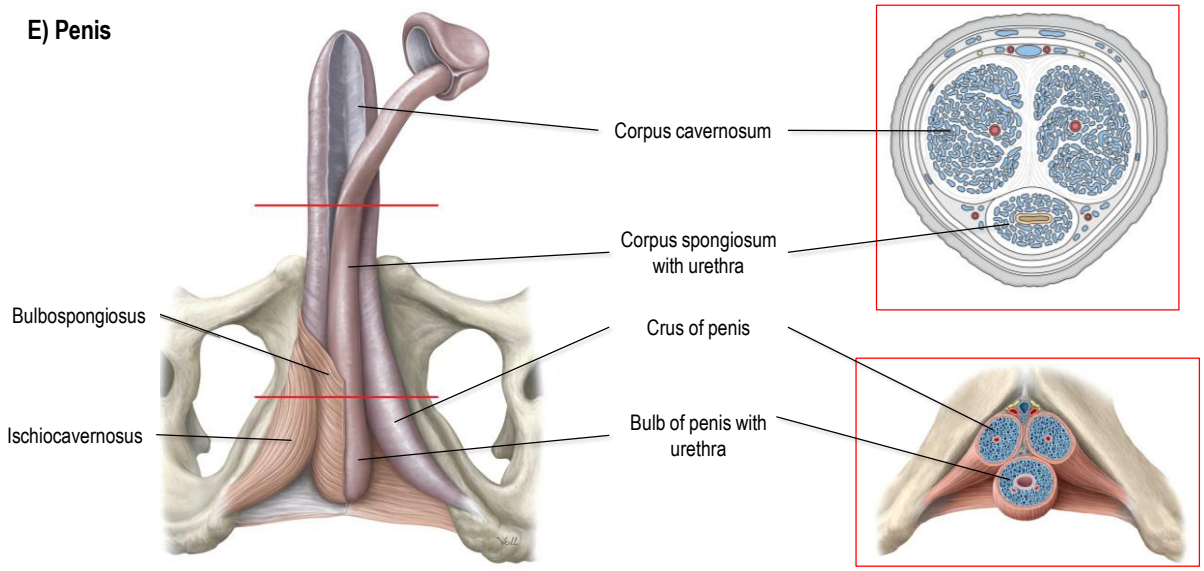
i. Erection → enlargement and stiffening of the penis. Caused by the entrance of blood in the erectile tissues of the penis.

ii. Ejaculation → release of semen from the urethra. Caused by contraction of smooth muscle (in spermatic ducts and glands) and rhythmic contractions of skeletal muscles (pelvic diaphragm and perineum).



2. Male Genitalia

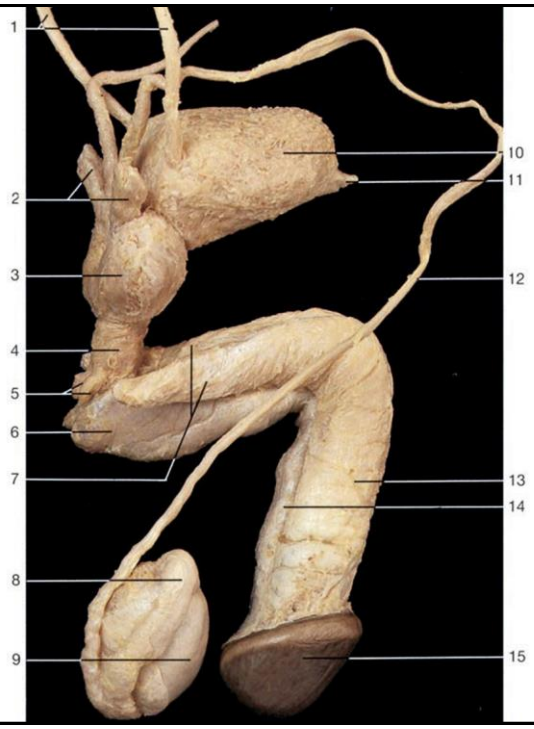
E) Penis



HKU Med LKS Faculty of Medicine
The University of Hong Kong
香港大學李嘉誠醫學院

Some problems…

Label the image



HKU Med

Some problems…

1. Ejaculation is a reflex that involves both somatic and autonomic motor responses triggered by sexual stimulus. Which of the following motor responses prevents retrograde ejaculation (when semen enters the bladder)?

A. Contraction of smooth muscle in prostate
B. Contraction of external urethral sphincter
C. Contraction of smooth muscle in seminal vesicle
D. Contraction of internal urethral sphincter

2. A rectal examination was performed in a 65-year-old man, who had been suffering from urinary incontinence. Which structure sits in front of the lower part of the anterior wall of the rectum?

A. Prostate
B. Seminal vesicle
C. Ureter
D. Bladder

Some problems…

Draw a diagram of a male pelvis and perineum (sagittal section)

Some solutions…

Label the images (slide 26)
1 ureters
2 seminal vesicles
3 prostate
4 external sphincter of urethra
5 bulbourethral glands (Cowper)
6 bulb of penis
7 crus of penis
8 epididymis
9 testicle
10 bladder
11 median umbilical ligament
12 vas deferens
13 corpus cavernosum
14 corpus spongiosum
15 glans penis

MCQ
1. D
2. A