

UNIT VII: THE ABDOMINAL VISCERAL SYSTEMS

Instructional Objectives:

At the completion of this unit the student should be able to:

1. Recognize the derivation of key examples of anatomical terms used in this unit.
2. Describe the general function of the digestive system and define the activities involved.
3. Differentiate between the mechanical and chemical aspects of digestion.
4. Identify from a model peritoneal mesenteries. (See list.)
5. Recognize the four structural layers of the digestive tract. (See list.)
6. Identify from a model the structures of the digestive system. (See list.)
7. State the general function of each of the major structures of the digestive tract and of the accessory digestive organs.
8. List the general functions of the urinary system and of the structures composing it.
9. Identify the gross features of a kidney as seen in an external examination and in a coronal section. (See list.)
10. Identify the gross vascular blood supply to the kidney. (See list.)
11. Recognize the microscopic structures of a nephron, including the vascular and tubular components. (See list.)
12. Locate and describe the general structure of the ureters, urinary bladder and urethra. (See list.)
13. Identify from a model the important structures of the male and of the female reproductive systems. (See list.)
14. Summarize the functions of the male and of the female reproductive systems.
15. Differentiate among primary and secondary sex organs.
16. Describe the major homologies between the male and female reproductive structures.

LIST

Objective 4

PERITONEAL MESENTERIES

- mesentery proper
- transverse mesocolon
- sigmoid mesocolon
- greater omentum
- falciform ligament

Objective 5

DIGESTIVE TRACT LAYERS

- mucosa
 - villi
- submucosa
- muscularis
- serosa

Objective 6

DIGESTIVE SYSTEM

- tongue
- salivary glands
 - parotid gland
 - submandibular gland
- esophagus
- stomach
 - lesser curvature
 - greater curvature
 - cardia
 - fundus
 - body
 - pylorus
 - pyloric sphincter
 - rugae (gastric folds)
- small intestine
 - duodenum
 - duodenal papilla
 - plicae (circular folds)
 - jejunum
 - ileum
 - ileocecal valve
 - plicae (circular folds)

DIGESTIVE SYSTEM (continued)

large intestine

cecum

vermiform appendix

ascending colon

hepatic (right colic) flexure

transverse colon

splenic (left colic) flexure

descending colon

sigmoid colon

teniae coli

haustra

rectum

anus

internal anal sphincter

external anal sphincter

liver

four lobes (left, right, quadrate, caudate)

hepatic ducts – left, right, and common

common bile duct

gallbladder

cystic duct

pancreas

pancreatic duct

NOTES – DIGESTIVE SYSTEM

salivary glands – in saliva: enzyme (amylase) to break down starch to a disaccharide
parotid gland
submandibular

esophagus – muscular tube from pharynx to stomach; peristalsis begins

stomach – HCl and enzyme (pepsin) to begin protein digestion

lesser curvature – superior curve

greater curvature – inferior curve

cardiac orifice – opening between esophagus and stomach (heart is nearby)

fundus – part of stomach superior to orifice

body – main part

pylorus – narrowed distal part

pyloric sphincter – muscle around opening into duodenum

rugae – ridges in mucosal lining

small intestine – up to 20+ feet long, in a cadaver

duodenum – 1st 10-12"; most digestion and absorption here

duodenal papilla – where pancreatic and common bile ducts enter duodenum

jejunum – 2-3 meters (8 feet)

ileum – remaining 4 meters (11 feet); leading to colon (at the cecum)

ileocecocolic sphincter (valve) – where small intestine joins colon

circular folds (plicae circularis) – mucosal folds in small intestine – increases surface area

villi – finger-like projections of mucosa for absorption – increases surface area; contains blood and lymph vessels

large intestine (= colon) – water reabsorption feces form

cecum – expanded pouch

appendix – attached to cecum

ascending colon – segment on right side

transverse colon – segment inferior to stomach, from side to side

descending colon – segment on left side

sigmoid colon – S-shaped segment, returning colon to medial body

hepatic flexure – bend near the liver (ascending meets transverse)

splenic flexure – bend near the spleen (transverse meets descending)

taeniae coli – longitudinal smooth muscle bundles

haustra – sac-like segments along length of colon

rectum – last segment; storage of feces

anal canal – very short, leading to anus

anus – exit for undigested waste

internal anal sphincter – smooth muscle

external anal sphincter – skeletal muscle

liver – produces bile to emulsify fats (make smaller units)

four lobes

falciform ligament – separates right and left lobes

hepatic ducts – left, right and common – collect bile; common joins cystic duct

gallbladder – stores bile

cystic duct – leads from gallbladder; joins common hepatic duct

common bile duct – formed by common hepatic and cystic duct; enters the duodenum

pancreas – produces bicarbonate to neutralize stomach acid; produces digestive enzymes; all enter duodenum

pancreatic duct – conduct bicarbonate and enzymes to duodenum

Objectives 9-12

URINARY SYSTEM

kidney

fibrous capsule

cortex

renal columns

medulla

renal pyramids

renal papillae

calyx (calyces)

renal pelvis

renal artery and vein

segmental arteries

interlobar arteries and veins

arcuate arteries and veins

interlobular arteries and veins

afferent arteriole

glomerulus

efferent arteriole

peritubular capillaries

vasa recta

nephron (renal corpuscle and renal tubule)

renal corpuscle = glomerulus and glomerular (Bowman's) capsule

renal tubule = proximal convoluted tube, nephron loop (loop of Henle) and distal convoluted tubule

collecting duct

ureters

urinary bladder

trigone

detrusor muscle

rugae

urethra

NOTES – URINARY SYSTEM

kidney

hilum – location of renal artery and vein; ureter

capsule – fibrous outer coat

cortex – outer region

medulla – deeper region; made of sections (pyramids)

renal pyramids – rounded triangular shapes

renal columns – cortical regions between pyramids

calyx (calyces) – cup-like regions of the pelvis to collect urine

renal papillae – tip of pyramid with end of collecting duct

renal pelvis – central region to receive urine

renal artery and vein – carry nutrients/oxygen or wastes/carbon dioxide

segmental arteries – branch from the renal artery within the renal sinus

interlobar arteries and veins – between pyramids

arcuate arteries and veins – arch across the base of each pyramid

interlobular arteries and veins – in cortex; heading to afferent arteriole if an artery

nephron – renal corpuscle and renal tubule to process filtration from blood and make urine; the structural and functional unit

renal corpuscle – glomerular (Bowman's) capsule and glomerulus

afferent arteriole – leads into glomerulus

glomerulus – capillary bed in Bowman's capsule; filtration site

efferent arteriole – leads out of glomerulus, branching to form capillary networks

peritubular capillary network – around convoluted tubules

vasa recta network – around nephron loop

glomerular (Bowman's) capsule – (receives plasma, wastes, "extras" drugs) = filtrate

proximal convoluted tubule – first part; connected to capsule; nutrient reabsorption

nephron loop (descending and ascending limbs) – loop from which water is reabsorbed back into blood

distal convoluted tubule – last section; tubular secretion

collecting duct – receives urine from several distal convoluted tubules and conducts it to the pelvis

ureters – tube from kidney to urinary bladder

urinary bladder – muscular sac to hold urine; behind pubic bone

trigone – region in wall with three openings - two ureters, one urethra

urethra – tube from bladder to outside; long in males and also conducts semen

Objective 13

REPRODUCTIVE SYSTEM—MALE

- mons pubis
- scrotum
- spermatic cord
- cremaster muscle
- testes
 - tunica vaginalis (visceral layer)
 - tunica albuginea
 - septa
 - lobules
 - seminiferous tubules
 - rete testis
- epididymis
- ductus (vas) deferens
- ejaculatory duct
- seminal vesicles
- prostate gland
- bulbourethral glands
- urethra
- penis
 - body (shaft)
 - glans
 - corpora cavernosa
 - corpus spongiosum

REPRODUCTIVE SYSTEM—FEMALE

- mons pubis
- labia majora
- labia minora
- clitoris
- vagina
 - rugae
- greater vestibular glands
- ovaries
- uterine tubes (fallopian tubes, oviducts)
 - infundibulum
 - fimbriae
- uterus
 - body
 - cervix
 - fundus
 - perimetrium
 - myometrium
 - endometrium
- broad ligament
- round ligament
- ovarian ligament

NOTES – THE REPRODUCTIVE SYSTEM (THE MALE)

1. Testes
 - a. Contain approximately 250 lobules or compartments each.
 - b. Each lobule has one to four long coiled seminiferous tubules.
 - c. Each seminiferous tubule is lined with germinal epithelia. These epithelia produce the sperm by the action of meiosis.
 - d. Between the coils of the seminiferous tubules are interstitial cells (cells of Leydig). These cells produce the male hormone, mainly testosterone, which has the function of maintaining male secondary sexual characteristics and stimulating sperm production.
 - e. Each tubule eventually releases its sperm into the epididymis.
2. Epididymis
 - a. Is a much coiled tube that will eventually become the vas deferens.
 - b. Cells in this structure secrete glycogen as a food for the maturing sperm.
3. Vas Deferens (Ductus Deferens)
 - a. Passes from the epididymis through the inguinal canal and to the posterior side of the urinary bladder where it ends by joining the duct of the seminal vesicle. This junction forms the ejaculatory duct.
 - b. Functions as a passageway for sperm.
4. Seminal Vesicle
 - a. A sac-like structure.
 - b. Cells inside this vesicle secrete an alkaline fluid (bicarbonate) which buffers the existing fluid.
 - c. Secretes also fructose, a simple sugar to nourish the sperm.
 - d. Secretes prostaglandins, hormone-like substances that promote the widening and slight dilation of the external os of the uterus.
5. Prostate Gland
 - a. Surrounds the urethra under the bladder.
 - b. Secretes a slightly milky fluid that is weakly acidic and rich in citric acid, seminal plasmin and prostate-specific antigen (PSA). The citric acid is a nutrient for sperm health, the seminal plasmin is an antibiotic that combats urinary tract infections in the male, and the PSA acts as an enzyme to help liquefy semen following ejaculation.
6. Bulbourethral Glands
 - a. Secretes a mucous fluid to lubricate the end of the penis for sexual intercourse.
7. The scrotum hangs outside the body cavity and holds the two testes.
8. Penis
 - a. Is composed of two main erectile tissues. The corpus spongiosum, which has the glans at its end and encloses the penile urethra, and the corpora cavernosa, which lie above the spongiosum.
 - b. The masses of erectile tissue fill with blood to produce an erection prior to sexual intercourse.

NOTES – THE REPRODUCTIVE SYSTEM (THE FEMALE)

1. Ovaries
 - a. Are held in position by the following ligaments: broad, suspensory and ovarian.
 - b. Contain a medulla and a cortex.
 - Medulla – loose connective tissue and blood vessels.
 - Cortex – contains ovarian follicles.
 - Before birth — primordial follicles (primary follicles).
 - After birth — at puberty, primary follicles start through the process of meiosis; they produce secondary follicles with secondary oocytes on the inside.
2. Uterine Tubes (Fallopian, Oviducts)
 - a. These tubes move egg cells to the uterus by cilia action and peristalsis.
 - b. The egg is usually fertilized in the upper one third of the tube.
3. Uterus
 - a. Houses the embryo throughout the gestation period.
 - b. Has an inner lining called the endometrium which is highly vascular during pregnancy and becomes the placenta.
4. Vagina
 - a. Is a tube that serves as a connector tube between the uterus and the vestibule.
 - b. Receives the erect penis.
 - c. Serves as the birth canal.

In the Vestibule

5. The labia majora are folds of fatty tissue and skin that enclose and protect the other structures of the vestibule.
6. The labia minora are blood-filled flattened folds that lie just inside the majora. They form the sides of the vestibule.
7. The clitoris is similar to the penis of the male and contains erectile tissue (corpora cavernosa) which erects during excitement.
8. The greater vestibular glands are glands that empty into the vestibule that lubricate before and during sexual intercourse.