LaFleur Brooks' Health Unit Coordinating

7th edition

Chapter 22

Medical Terminology, Basic Human Structure, Diseases, and Disorders

Lesson 22.9

Unit 9: The Urinary System and the Male Reproductive System

1. Describe the overall functions of the urinary system.
2. Name the organs of the urinary system and describe the function of each organ.
3. Name the components of urine.
4. Describe the overall functions of the male reproductive system.
5. Name the organs of the male reproductive system and describe the function of each organ.

Lesson 22.9

Unit 9: The Urinary System and the Male Reproductive System (cont'd)

6. State the location and describe the function of the seminal vesicle glands and the prostate gland.
7. Describe the passageway of sperm from the testes to the outside of the body.
8. Discuss pyelonephritis, renal calculi, and tumors of the prostate gland.
9. Read the objectives related to medical terminology and demonstrate ability to meet the objectives by correctly completing Exercises 1 through 7.
10. Define the unit abbreviations.

Functions of the Urinary System

- Monitors and regulates extracellular fluids
- Removes waste products from the blood and excrete them from the body
- The urinary system is a major contributor to homeostasis in the body because it maintains the proper balance of water, electrolytes, and pH of body fluids.
- The urinary system also may be referred to as the excretory system.

Organs of the Urinary System

- Kidneys (2)
- Ureters (2)
- Bladder (1)
- Urethra (1)

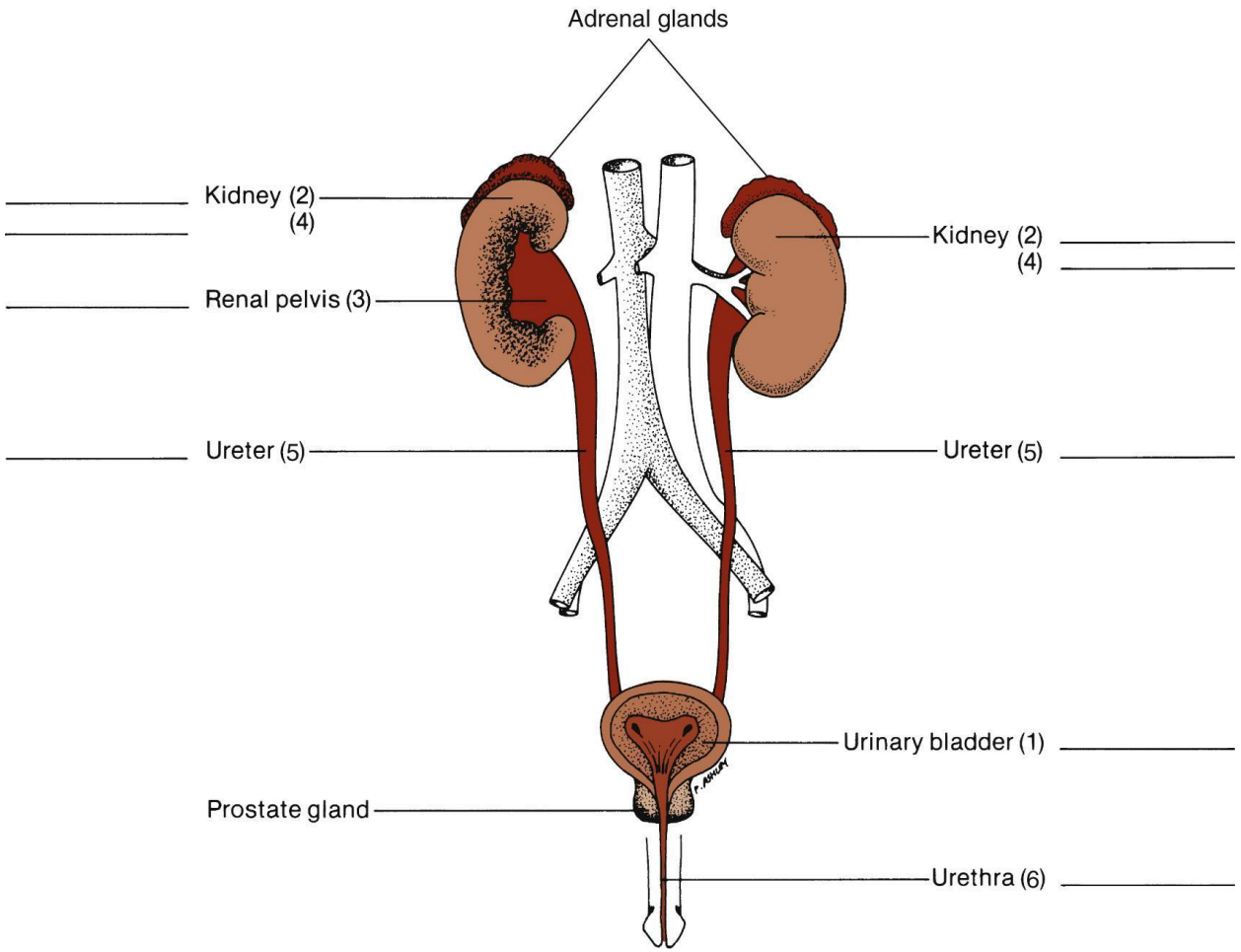
Functions of the Organs of the Urinary System

- Kidneys:
  - Remove waste from the blood
  - Balance the water and electrolytes in the body by removing and retaining water
  - Assist in RBC production by releasing erythropoietin
- Nephrons, the basic functional unit of the kidney, begin to remove waste and water as the blood flows into the kidney through the renal artery.
- After urine is produced, it drains into a space in the kidney called the renal pelvis.

Functions of the Organs of the Urinary System, cont'd

- Ureters:
  - Provide the drainage system for urine from the renal pelvis of each kidney to the bladder
  - Ureters have muscular walls that contract to keep urine moving toward the bladder.
- A backup of urine into the kidney is prevented by a flap fold of mucous membrane at the entrance of the ureters into the bladder.

The Urinary System



Functions of the Organs of the Urinary System, cont'd

- Urinary Bladder:
  - A temporary reservoir for the urine it receives from the ureters
- Urethra:
  - Urine passes from the bladder to the outside of the body.

Components of Urine

- Made up of approximately:
  - 95% water
  - 5% waste material (urea, uric acid, creatinine, and ammonia)

Production and Pathway of Urine

blood flows via the renal artery into the nephrons of the kidneys, where filtering of the blood takes place and urine is produced → renal pelvis → ureter → bladder → urethra → outside

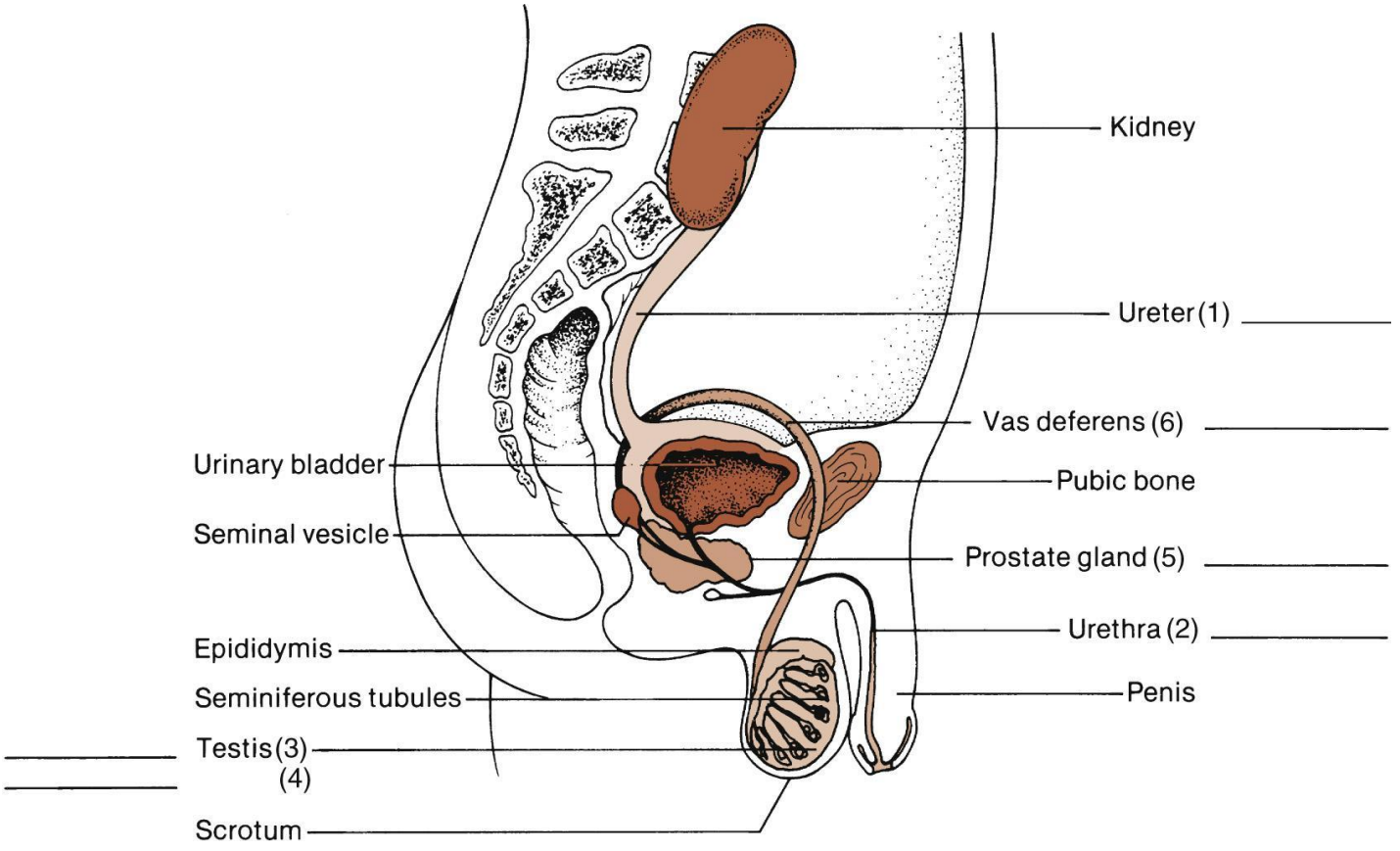
Functions of the Male Reproductive System

- Produce and eject the male reproductive cell (sperm, or spermatozoa)
- Secrete the hormone testosterone

Organs of the Male Reproductive System

- Testes
- Scrotum
- Vas deferens
- Urethra
- Seminal vesicles
- Prostate
- Penis

The Male Reproductive System



Functions of the Organs of the Male Reproductive System

- Testes (singular: testis) or testicles:
  - Produce sperm (sex cells) and
  - Produce testosterone (hormone)
- Scrotum: sac
  - Contains the testes
- Testosterone is responsible for the development of male secondary sex characteristics, such as beard and deep voice, and for the function of certain reproductive organs.

Functions of the Organs of the Male Reproductive System, cont'd

- Seminiferous tubules: located inside the testes
  - Sperm is produced – passed on to the epididymis.
- Epididymis:
  - Sperm is stored for a short time – matures and becomes motile, then travels through the vas deferens.
- Vas deferens:
  - Carries sperm to the urethra

Location and Function of the Seminal Vesicles and Prostate Gland

- Seminal vesicles: glands located near the bladder
  - Opens into the vas deferens just prior to its joining with the urethra
  - Produces a secretion that nourishes the sperm
- Prostate gland: surrounds the junction of the vas deferens and the urethra
  - Secretes a fluid that aids in the motility of sperm
  - Aids in ejaculation

Location and Function of the Seminal Vesicles and Prostate Gland, cont'd

- Urethra: connects with both the bladder and the vas deferens and passes through the penis to the outside
  - Passageway for both semen and urine
- Penis: erection (stiffening) of the penis, produced by an increased blood supply to the sponge-like tissue of the penis
  - Allows for the deposit of sperm in the female vagina during ejaculation

Passageway of Sperm

from the seminiferous tubules (production) → epididymis (sperm matures and becomes motile) → vas deferens (passageway) → seminal vesicles (add nourishing secretions) → prostate (add motility secretions) → urethra (passageway) → to the outside

Pyelonephritis

- An infection of the renal pelvis and the kidney that is caused by bacterial invasion of the urinary tract; three stages of the disease process include:
- pyelitis: inflammation of the renal pelvis
- pyelonephritis: inflammation of the renal pelvis and kidney
- pyonephrosis: collection of pus in the renal pelvis
- Symptoms include dysuria, nocturia, and hematuria.
- Treatment includes antibiotic therapy.

Renal Calculi (Kidney Stones)

- Usually form in the renal pelvis, where they may remain, or they may enter the ureter and cause an obstruction
- Symptom: back pain or renal colic, resulting from the obstruction
- Treatment: promote normal passage of the stone
  - Extracorporeal shock wave lithotripsy (ESWL)
  - Endoscopy is also used to remove small calculi from the lower part of the ureters.
  - If indicated, a stone may be removed through a small incision in the skin (percutaneous nephrolithotomy).

Tumors of the Prostate Gland

- May be malignant (cancer of the prostate) or benign (benign prostatic hyperplasia)
- Treatment of choice is surgical removal of the tumor.
  - Radical, or perineal, prostatectomy: excision of the entire gland and its capsule through an incision in the perineum
  - Suprapubic prostatectomy: removal of the prostate gland through an incision in abdomen and bladder

Tumors of the Prostate Gland, cont'd

- Treatments, cont'd:
  - Retropubic prostatectomy: removal of the prostate gland through an incision in the abdomen; bladder is not excised.
  - Transurethral resection of the prostate (TURP): removal of a portion of the prostate gland through the urethra (No surgical incision is required.)

Unit 9 Abbreviations

ADH	antidiuretic hormone
BPH	benign prostatic hyperplasia
BPM	benign prostatomegaly
BUN	blood urea nitrogen
Cr	creatinine
IVP	Intravenous pyelogram
IVU	intravenous urogram

Unit 9 Abbreviations, cont'd

KUB	kidneys, ureters, and bladder
TURP	transurethral resection of the prostate
UA	urinalysis
UTI	urinary tract infection

Lesson 22.10

Unit 10: The Female Reproductive System

1. Describe the primary functions and identify the organs of the female reproductive system.
2. Discuss the structure of the uterus and describe its role in pregnancy and in menstruation.
3. Describe the function of the ovaries and name and describe the functions of two hormones produced by the ovaries.
4. Describe the functions of the fallopian tubes and vagina.
5. Identify the term that describes the pelvic floor of both the male and the female—most frequently refers to the area between the vaginal opening and the anus of the female.

Lesson 22.10

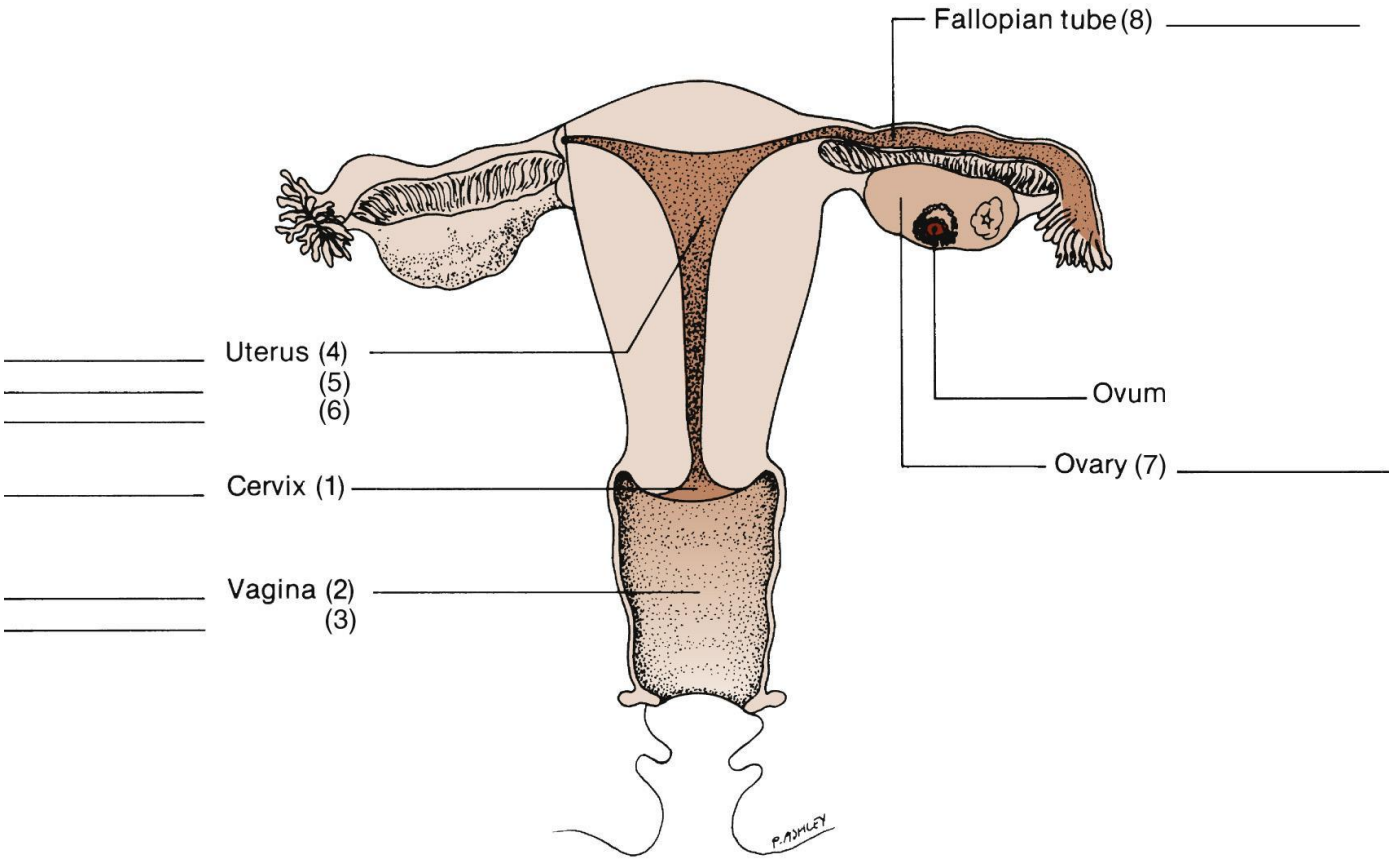
Unit 10: The Female Reproductive System (cont'd)

6. Describe the function of the mammary glands.
7. Name and describe the function of the external reproductive structures.
8. Discuss endometriosis, pelvic inflammatory disease, and ectopic pregnancy.
9. Read the objectives related to medical terminology and demonstrate ability to meet the objectives by correctly completing Exercises 1 through 10.
10. Define the unit abbreviations.

Organs of the Female Reproductive System

- Uterus (1)
- Ovaries (2)
- Fallopian tubes (2)
- Vagina (1)
- External genitalia
- Mammary and Bartholin's glands

Female Reproductive System



Functions of the Female Reproductive System

- Produce the female reproductive cell (ovum)
- Produce hormones
- Provide for conception and pregnancy

Structure of the Uterus

- Thick, muscular, pear-shaped
  - Fundus : upper rounded region of the uterus
  - Body: wide, central portion of the uterus
  - Cervix: lower, narrow end that extends into the vagina
- Layers:
  - Perimetrium: outer layer
  - Myometrium: middle layer
  - Endometrium: inner layer

Functions of the Uterus

- Contains and nourishes the unborn child during pregnancy
- Assists in the birthing process – (rhythmic myometrial contractions)
- Plays a role in menstruation as the endometrium disintegrates and sloughs off if a fertilized egg is not implanted

Function of the Ovaries

- Produce female reproductive cell ovum (plural: ova)
- At puberty, ovulation occurs every 28 days.
  - Occurs about halfway through the menstrual cycle in response to the follicle-stimulating hormone (FSH); the ovaries release a mature ovum.
- Produces two hormones (estrogen and progesterone)

Hormones Produced by Ovaries

- Estrogen: responsible for the development of the female reproductive organs and the development of female secondary sex characteristics, such as breasts and pubic hair
- Progesterone: plays a part in the menstrual cycle by helping to maintain the lining of the uterus for conception and in pregnancy

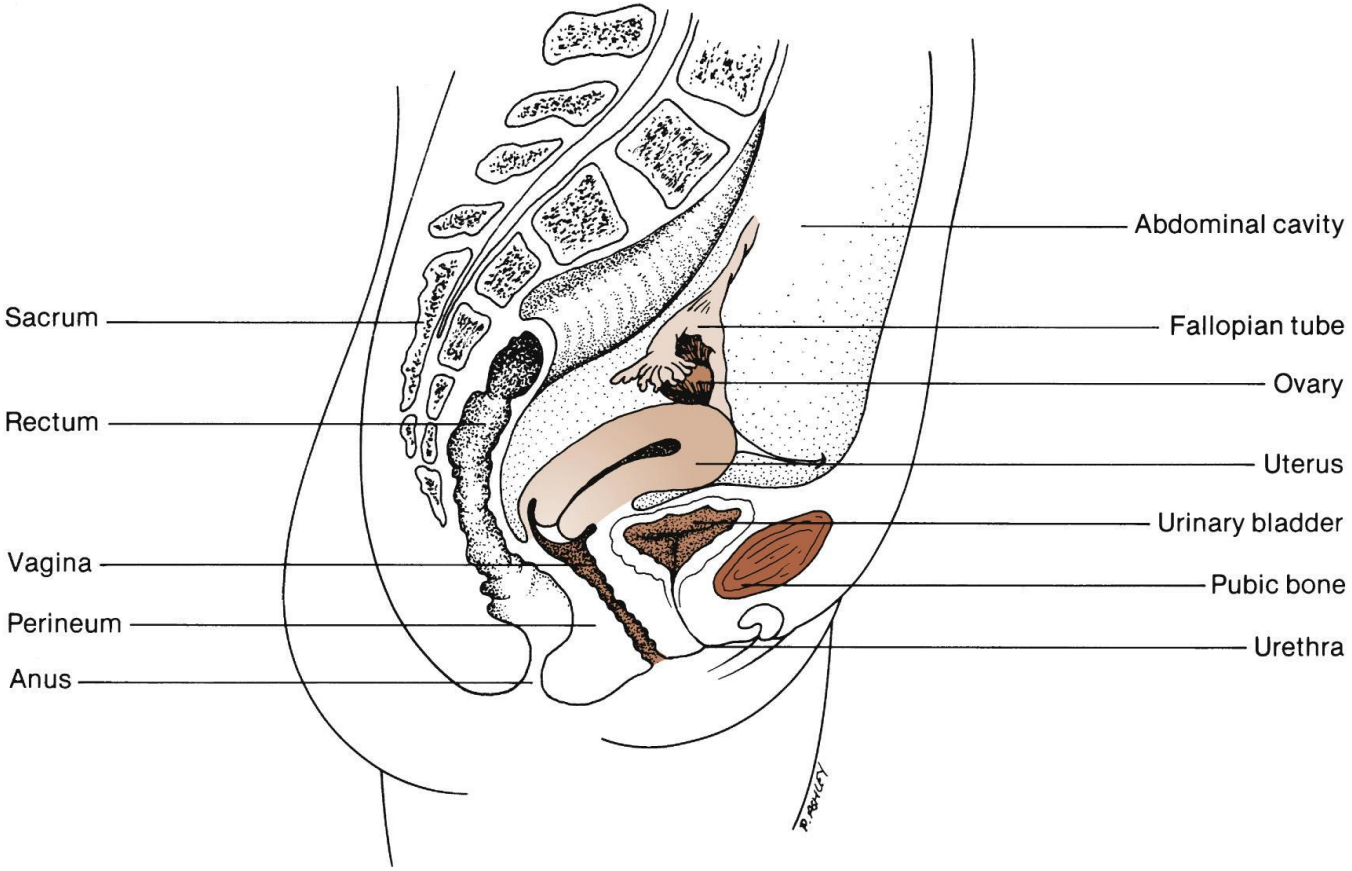
Function of the Fallopian Tubes

- Provide a passageway for the ovum from the ovaries to the uterus
- After ovulation, the ovum is swept into one of the fallopian tubes, which are connected to the uterus.
- Fertilization, the union of the sperm and the ovum, usually takes place within the fallopian tube.
  - It takes approximately five days for the ovum to pass through the fallopian tube to the uterus.

Function of the Vagina

- Receives the penis during sexual intercourse
- Lower part of the birth canal through which the newborn baby passes from the uterus to the outside of the body
- Bartholin's glands (or greater vestibular glands), mucus-producing glands at the external opening of the vagina, secrete lubricating substances.

Lateral View of the Female Reproductive System



The Perineum

- The pelvic floor of both the male and the female
- This term is used most frequently to refer to the area between the vaginal opening and the anus of the female.

Function of the Mammary Glands

- Specialized organs of milk production, located within the breasts
- Each adult mammary gland contains 15 to 20 glandular lobes.
- During pregnancy, estrogen and progesterone stimulate development of the mammary glands.

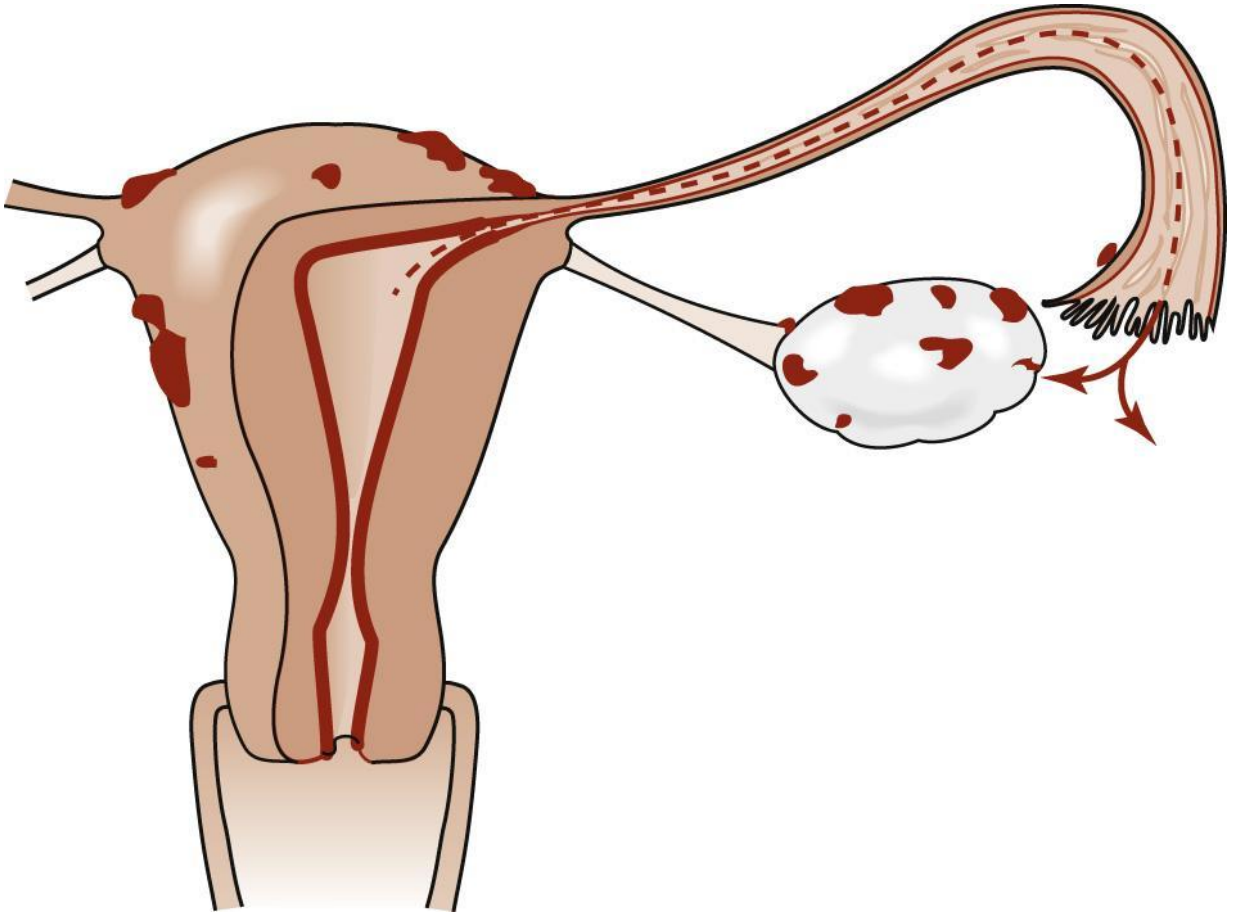
External Reproductive Structures

- Vulva (a collective term for the external genitalia): consists of the labia majora and the labia minora, two folds of adipose tissue surrounding the vagina, as well as the vestibule, the recess formed by the labia minora
- Clitoris, a small erectile structure, is located anterior to the urethra.

Endometriosis

- Endometrial tissue found outside of the uterus, especially in the pelvic area
  - It can appear anywhere in the body.
- Misplaced endometrial tissue undergoes changes, including bleeding, during menstruation.
- Symptoms include dysmenorrhea, which causes constant pain in the vagina and the lower abdomen.
- Cause is unknown.

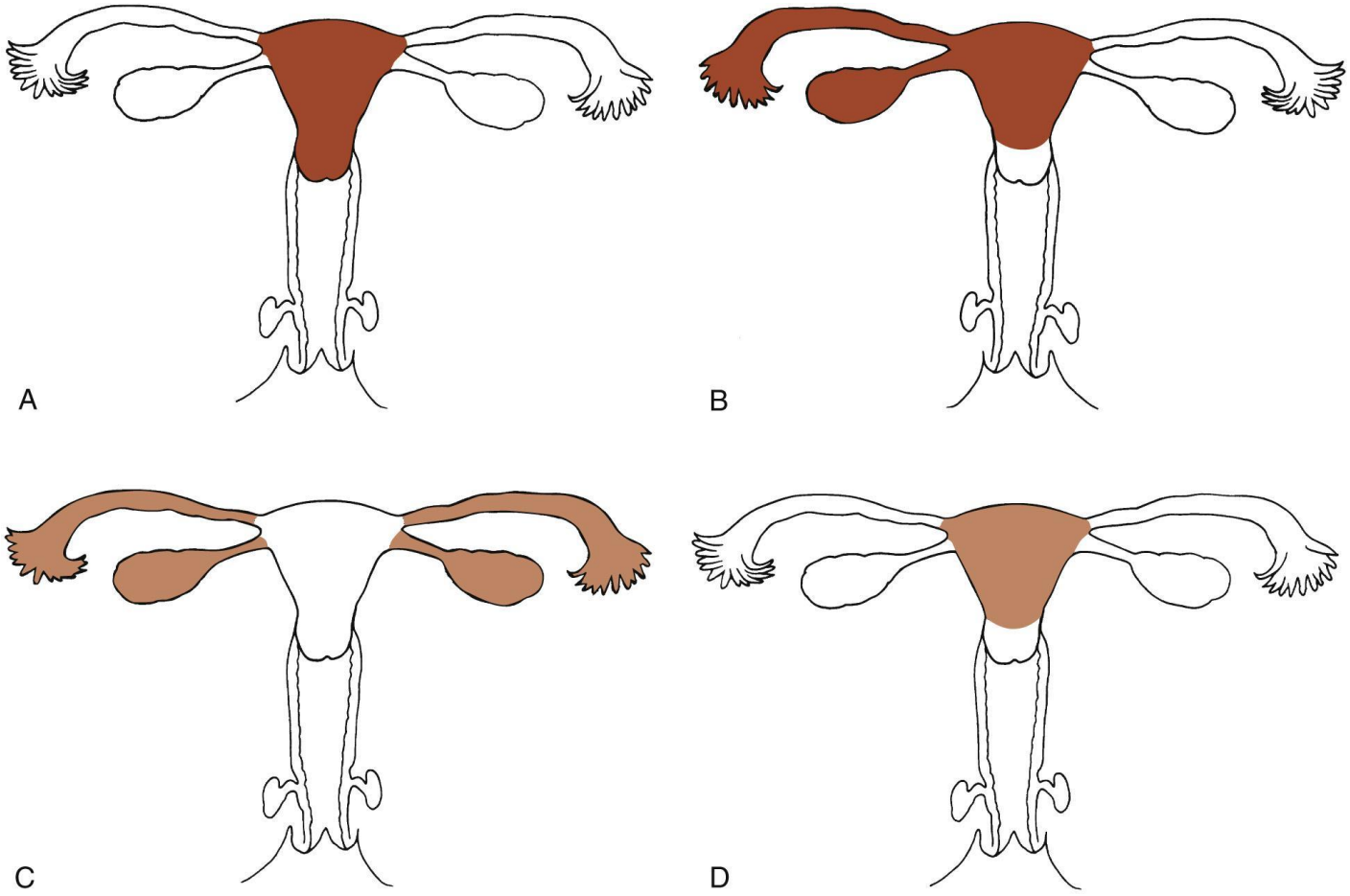
Endometriosis



Treatment of Endometriosis

- Treatment: varies according to the severity of the disease and according to the age and childbearing desires of the patient
  - Includes hormonal treatment for milder forms
  - Endometrial ablation to suppress ovarian function and halt the growth of endometrial tissue
  - Removal of cysts or lysis (freeing) of adhesions
  - For severe cases and for those women who do not wish to bear children, a total hysterectomy and bilateral salpingo-oophorectomy is recommended.

Endometriosis Treatments



Pelvic Inflammatory Disease (PID)

- Any infection of the female pelvic organs
- Most often, it is caused by bacterial infection.
- Early diagnosis and treatment prevent damage to the reproductive organs.
- If untreated, PID can lead to infertility and to other severe medical complications.
- Symptoms include vaginal discharge, abdominal pain, and fever.
- Treatment includes antibiotic therapy.

Ectopic (Tubal) Pregnancy

- Fertilized ovum implanted outside of the uterus; more than 90% implant in the fallopian tubes
- The fetus may grow large enough to rupture the tube, creating a life-threatening situation.
- Symptoms of a ruptured fallopian tube include severe abdominal pain on one side and vaginal bleeding.
- Treatment: surgical repair or removal of the fallopian tube and removal of the products of conception

Unit 10 Abbreviations

BSO	bilateral salpingo-oophorectomy
C/S or C- section	cesarean section
D & C	dilation and curettage
EDD	estimated date of delivery
FSH	follicle-stimulating hormone
OB	obstetrics, obstetric
PID	pelvic inflammatory disease

Unit 10 Abbreviations, cont'd

PP postpartum (after having given birth)

TPAL term-premature-abortions (terminations)-living

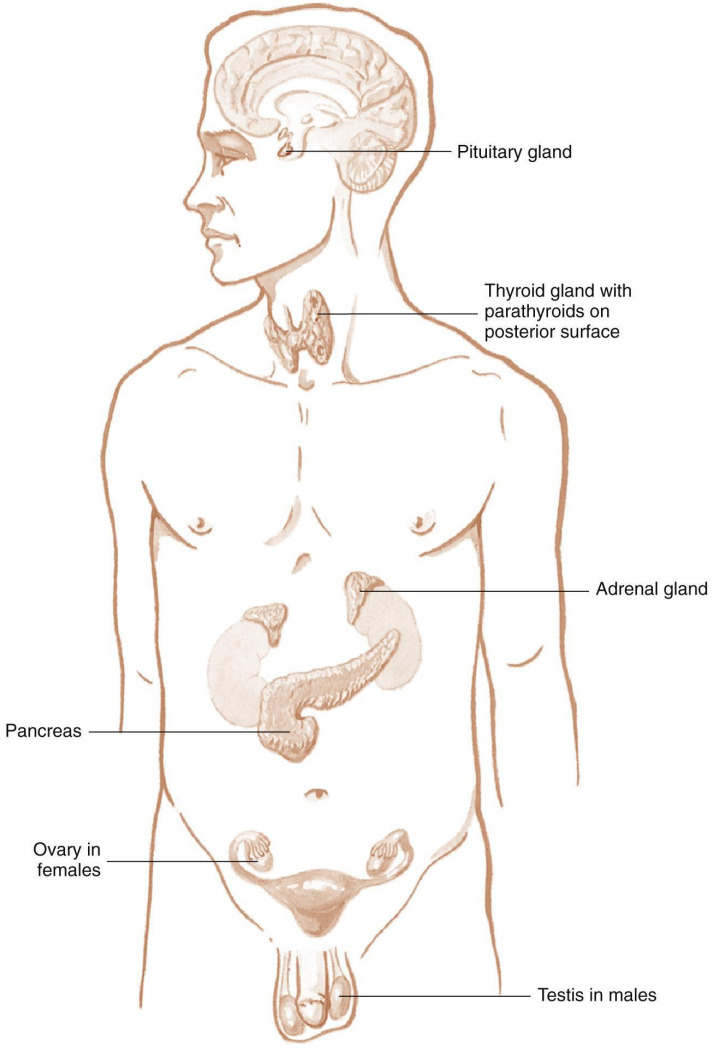
Lesson 22.11
Unit 11: The Endocrine System

1. Describe the overall function of the endocrine system.
2. Compare endocrine glands with exocrine glands.
3. Name the glands of the endocrine system and describe the hormones produced by each gland and the function of each of the hormones.
4. Discuss diabetes mellitus and Graves disease.
5. Read the objectives related to medical terminology and demonstrate ability to meet the objectives by correctly completing Exercises 1 through 6.
6. Define the unit abbreviations.

Organs of the Endocrine System

- Hypothalamus
- Pituitary
- Thyroid gland
- Parathyroid gland
- Pancreas (Islets of Langerhans)
- Adrenal glands
- Ovaries (female) and Testes (male)

Primary Organs of the Endocrine System



Function of the Endocrine System

- Communication, Integration, and Control – much the same as those of the nervous system; however, endocrine functions are carried out in a much different manner.
- Both systems use chemicals (hormones and neurotransmitters), but neurotransmitters act immediately and are short-lived.
- The effects of endocrine system hormones are farther-reaching and longer-lasting.

Endocrine Glands and Exocrine Glands

- Endocrine, or ductless, glands: do not have tubes to carry their secretions to other parts of the body
  - Secretions go directly into the bloodstream, which carries them to other parts of the body.
- Exocrine glands: have tubes that carry secretions from the producing gland to other parts or organs of the body
- Some nonendocrine organs, such as the heart, lungs, kidneys, liver, and placenta, also produce and release hormones.

Endocrine Glands and the Hormones Produced

- Pituitary gland (anterior lobe, or adenohypophysis):
  - Adrenocorticotropic hormone (ACTH): stimulates the action of part of the adrenal gland
  - Thyroid-stimulating hormone (TSH): stimulates the action of the thyroid gland
  - Growth hormone (GH): promotes body growth
  - Prolactin (PRL): stimulates and sustains milk production in lactating females – has no known effect in males

Endocrine Glands and the Hormones Produced, cont'd

- Pituitary gland (anterior lobe), cont'd:
  - Gonadotropins: stimulate growth and maintenance of the gonads (ovaries [F] and testes [M]).
  - Follicle-stimulating hormone (FSH) stimulates follicles in the ovaries (F) and seminiferous tubes (M).
  - Luteinizing hormone (LH) stimulates ovulation (F) and production of the male sex cell (spermatogenesis).

Endocrine Glands and the Hormones Produced, cont'd

- Pituitary gland (posterior lobe, or neurohypophysis):
  - Antidiuretic hormone (ADH): stimulates reabsorption of water by the kidney
  - Oxytocin: stimulates uterine contractions while a woman is in labor
- Thyroid gland:
  - Thyroxine: maintains metabolism of body cells. Iodine is necessary in the body for the production of thyroxine by the thyroid gland, which is critical for normal growth and development.
- Parathyroid glands:
  - Parathyroid hormone: regulates the amount of calcium in the blood

Endocrine Glands and the Hormones Produced, cont'd

- Pancreas – Islets of Langerhans (microscopic bunches of cells scattered throughout the pancreas):
  - Insulin: necessary for metabolism of carbohydrates in the body
  - Glucagon: works with insulin to regulate blood glucose levels
- Adrenal glands – adrenal cortex (outer part):
  - Mineralocorticoids: regulate electrolyte balance, which is essential to normal body function and to life itself

Endocrine Glands and the Hormones Produced, cont'd

- Adrenal glands – adrenal cortex (outer part), cont'd:
  - Glucocorticoids
    - Cortisol and cortisone influence protein, sugar, and fat metabolism.
    - Cortisone is also used therapeutically.
    - Cortisol production increases during stress.
  - Androgens: responsible for the masculinizing effect in males

Endocrine Glands and the Hormones Produced, cont'd

- Adrenal glands – adrenal medulla (inner part):
  - Epinephrine (or Adrenaline) and Norepinephrine: help the body respond to emergency or stressful situations by increasing the function of vital organs (heartbeat and respiration), raising blood pressure, and providing extra nourishment for the voluntary muscles so they can perform extra work

Diabetes Mellitus

- Inability of the body to store and use carbohydrates in the usual manner
  - Type 1: beta cells of the pancreatic islets are destroyed, and the patient must take regular injections of insulin.
  - Type 2: the body is unable to respond normally to its insulin.
    - Patients tend to be overweight, a factor that is believed to be responsible for the characteristic insulin resistance.
    - Can be controlled with diet, exercise, oral hypoglycemics, and insulin injections

Diabetes Mellitus cont'd

- Symptoms include polyuria, polyphagia, polydipsia, glycosuria, and hyperglycemia.
- Diagnostic studies include urinalysis, fasting blood sugar, and hemoglobin A1C.
- Too much glucose in the blood may cause a condition called diabetic coma, whereas too much insulin in the blood may cause a condition called insulin shock.

Graves' Disease

- A form of hyperthyroidism, causes overproduction of thyroxine, an increase in the size of the thyroid gland (goiter), and many changes in the other systems
- Accompanying symptoms include intolerance to heat, nervousness, loss of weight, and goiter.
- The cause of Graves' disease is unknown, but it is five times more common in women than in men.

Graves' Disease, cont'd

- Diagnosis may include T_3 and T_4 uptake tests and a thyroid scan.
- Treatment includes antithyroid drugs, radioactive iodine, and subtotal thyroidectomy.

Unit 11 Abbreviations

ACTH adrenocorticotropic hormone
DKA diabetic ketoacidosis
DM diabetes mellitus
FSH follicle-stimulating hormone
HbA1c hemoglobin A1C, or glycosylated hemoglobin
LH luteinizing hormone
PRL prolactin
PTH parathyroid hormone
TSH thyroid-stimulating hormone