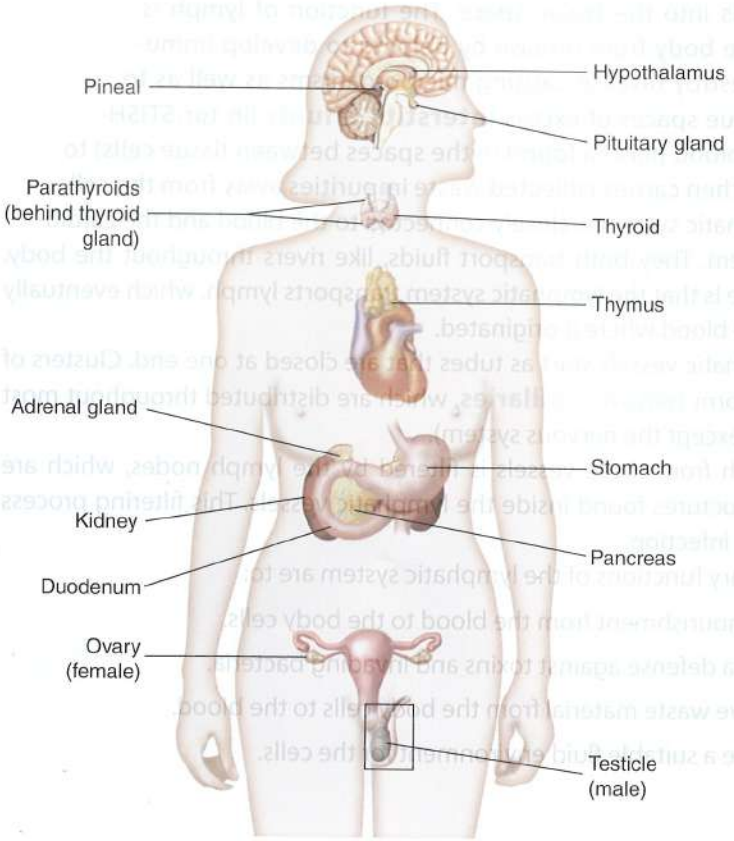
THE ENDOCRINE SYSTEM

The **endocrine** (EN-duh-krin) **system** is a group of specialized glands that affect the growth, development, sexual activities, and health of the entire body. **Glands** are specialized organs that remove certain elements from the blood to convert them into new compounds. There are two main types of glands.

- **Exocrine glands** (EK-suh-krin GLANDZ), or **duct glands**, produce a substance that travels through small, tube-like ducts. Sweat and oil glands of the skin belong to this group.
- **Endocrine glands** or **ductless glands**, such as the thyroid and pituitary glands, release secretions called **hormone** (HOR-mohnz) directly into the bloodstream, which, in turn, influence the welfare of the entire body. Hormones, such as insulin, adrenaline, and estrogen, stimulate functional activity or secretion in other parts of the body.

Here is a list of the endocrine glands **(Figure 6–23)** and their functions.

- The **pineal gland** (PY-nee-ul GLAND) plays a major role in sexual development, sleep, and metabolism.
- The **pituitary gland** (puh-TOO-uh-tair-ee GLAND) is the most complex organ of endocrine system. It affects almost every physiologic process of the body: growth, blood pressure, contractions during childbirth, breast milk production, sex organ functions in both women and men, and thyroid gland function, the conversion of food into energy (metabolism).



▶ **Figure 6–23** The endocrine glands.

- The **thyroid gland** (THY-royd GLAND) controls how quickly the body burns energy (metabolism), makes proteins, and how sensitive the body should be to other hormones.
- The **parathyroid glands** (payr-uh-THY-royd GLANDZ) regulate blood calcium and phosphorus levels so that the nervous and muscular systems can function properly.
- The **pancreas** (PANG-kree-us) secretes enzyme-producing cells that are responsible for digesting carbohydrates, proteins, and fats. The islet of Langerhans cells within the pancreas control insulin and glucagon production.
- The **adrenal glands** (uh-DREEN-ul GLANDZ) secrete about 30 steroid hormones and control metabolic processes of the body, including the flight-or-flight response.
- The **ovaries** and **testes** function in sexual reproduction as well as determining male and female sexual characteristics.

THE DIGESTIVE SYSTEM

The **digestive system** (dy-JES-tiv SIS-tum), also called the **gastrointestinal** (gas-troh-in-TES-tunul) **system**, is responsible for breaking down food into nutrients and waste.

Digestive enzymes (EN-zymz) are chemicals that change certain kinds of food into a form that can be used by the body. The food, now in soluble form, is transported by the bloodstream and used by the body's cells and tissues. The entire process of digesting food that has been eaten takes about 9 hours.

THE EXCRETORY SYSTEM

The **excretory system** (EK-skre-tor-ee SIS-tum) is responsible for purifying the body by eliminating waste matter. The metabolism of body cells forms toxic substances that, if retained, could poison the body.

Each of the following organs plays a crucial role in the excretory system:

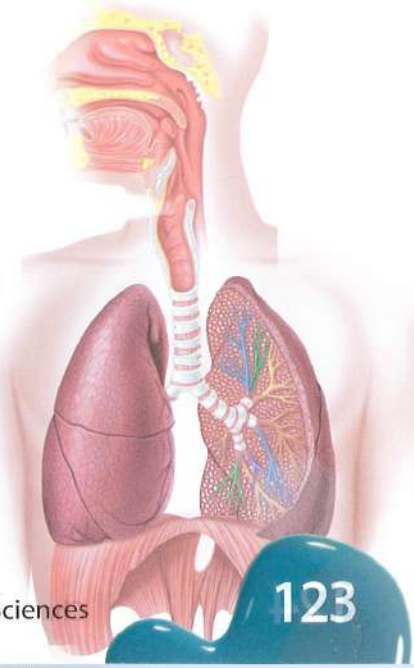
- The kidneys excrete waste containing urine.
- The liver discharges waste containing bile.
- The skin eliminates waste containing perspiration.
- The large intestine eliminates decomposed and undigested food.
- The lungs exhale carbon dioxide and other gases, such as formaldehyde, which is a normal by-product of metabolism that the body uses to build other important substances.

THE RESPIRATORY SYSTEM

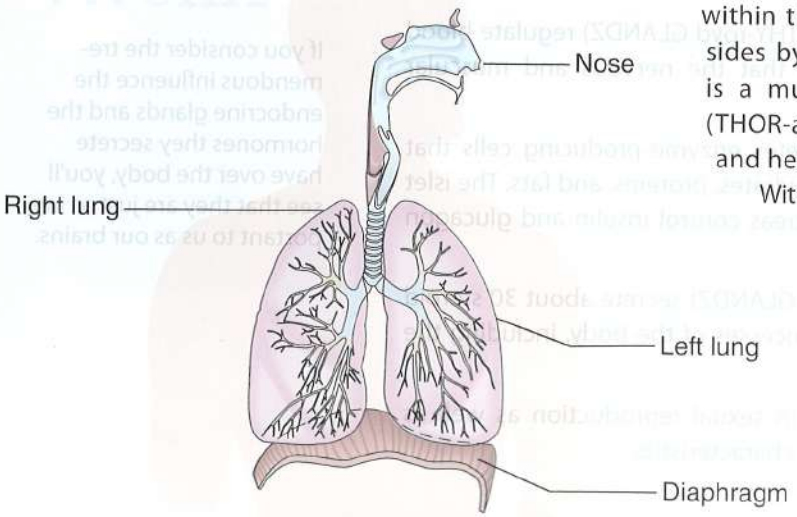
The **respiratory system** (RES-puh-ra-tor-ee SIS-tum) enables breathing (**respiration**, the exchange of carbon dioxide and oxygen in the lungs and within each cell) and consists of the lungs and air passages. The **lungs** are

Did You Know?

If you consider the tremendous influence the endocrine glands and the hormones they secrete have over the body, you'll see that they are just as important to us as our brains.



▼ **Figure 6–24** Respiratory system.



Respiratory system

spongy tissues composed of microscopic cells in which inhaled air is exchanged for carbon dioxide during one breathing cycle. The respiratory system is located within the chest cavity and is protected on both sides by the ribs. The **diaphragm** (DY-uh-fram) is a muscular wall that separates the **thorax** (THOR-aks), or chest, from the abdominal region and helps control breathing **(Figure 6–24).**

With each breathing cycle, an exchange of gases takes place. For instance, during **inhalation** (in-huh-LAY-shun), or breathing in through the nose or mouth, oxygen is passed into the blood. During **exhalation** (eks-huh-LAY-shun), or breathing outward, carbon dioxide (collected from the blood) is expelled from the lungs.

Oxygen is more essential than either food or water. Although people may survive for more than 60 days without food, and several days without water, if they are deprived of oxygen, they will die within minutes.

Did You Know?

The world record for holding one's breath is 19 minutes and 21 seconds, set by Peter Colat of Switzerland in 2009.

THE INTEGUMENTARY SYSTEM

The **integumentary system** (in-TEG-yuh-ment-uh-ree SIS-tum) is made up of the skin and its various accessory organs, such as the oil and sweat glands, sensory receptors, hair, and nails. (Skin structure and growth are discussed in detail in Chapter 7.)

THE REPRODUCTIVE SYSTEM

The **reproductive system** (ree-proh-DUK-tiv SIS-tum) performs the function of reproducing and perpetuating the human race. Although important to the perpetuation of the species, it is not of major importance to the nail tech.

Review Questions

1. Why is the study of anatomy, physiology, and histology important to the nail technician?
2. Define anatomy, physiology, and histology.
3. Name and describe the three basic structures of a cell.
4. Define metabolism and list the two phases of cell metabolism and their purpose.
5. List and describe the functions of the four types of tissue found in the human body.
6. What are organs?
7. List and describe the functions of the main organs found in the body.
8. Name the 11 body systems and their main functions.
9. List the primary functions of the skeletal system.
10. Name and describe the three types of muscular tissue found in the body.
11. Name and describe the types of nerves found in the body and how they react.
12. Name and briefly describe the three types of blood vessels found in the body.
13. List and describe the composition of blood.
14. Name and discuss the two main types of glands found in the human body.
15. List the organs of the excretory system and their functions.