INTRODUCTION

Anatomy is the study and science of the structure of an organism and its parts.

Physiology is the branch of science dealing with the normal chemical and physical functioning of a living organism.

In this Lesson we will be learning about human anatomy and physiology. The information is designed to provide an overview of the human body and how it works. It is not intended as an in-depth study of anatomy-physiology, which could comprise several volumes, but is a guide and introduction to basic terminology dealing with the anatomy of the body, and an overview of how the body works.

Knowledge of terminology is required to locate specific words related to anatomy. If a report or a code describes surgery on the arm, you need to know at a minimum where to locate in reference material various muscles, tendons, blood vessels, nerves and bones; at least a basic knowledge of the physiologic interaction of how the body works will be helpful too.

An alphabetic listing is provided in the Appendix of this course. It lists the most common arteries, veins, bones, joints, ligaments, and muscles in alphabetic order by category. You will find this a good resource in the process of learning and locating medical words now and in your work world. Your medical dictionary is a much better resource. If you do not have a medical dictionary, you will find most of the information you need on the Internet.
Good resources for anatomy are available on the Internet. Go now to this Human Anatomy Website: http://www.innerbody.com/text/descriptions.html and bookmark it.

Note on the left side of the page are a list of “Systems.” Hover on the first one, Skeletal, and you will see a pop-up list of all the categories under that system. Click on a couple so you can see how it all works. Also note the alphabetic descriptions on the main page; click on a couple of those. Interesting, isn’t it?

As you complete each of the body systems in this Lesson, go back to the Innerbody website and read about the system there. The illustrations are great too.

Many other fun and informative websites exist to learn about the body.

FOUR BODY SYSTEMS

A. Systems for Standing and Moving

We are starting from the top - the head. The skeletal and muscular systems provide support and allow you to move. They get you from one place to another, allow you to lift, carry, run, walk, sleep, and permit you to read this book.

B. Systems for Energy and Waste Disposal

Various systems work to provide you with energy. The digestive system turns food into fuel; the respiratory supplies oxygen to release the energy from that fuel; the circulatory system carries the fuel, raw materials and oxygen to all parts of the body. The urinary, bowel and integumentary (skin) are related to the eliminatory and waste removal process.
C. Systems for Coordination and Control

Sensory systems report to your brain what is happening everywhere. The brain then sends its instructions to the other body systems to move, alert, feed, repair, and repel invaders.

D. Systems for Producing Life

The reproductive system creates new life. Male sperm find egg cells in females, form embryos and produce new people.

A. SYSTEMS FOR STANDING AND MOVING

1. HEAD & NECK

The head contains the brain, which weighs about three pounds, and is the largest part of the central nervous system. It is the master computer with many tasks to perform, movement, breathing, emotion, and memory. It has to process light passing through the eye and translate that into images we can then label as something we know, or don't for that matter. It has to process vibrational waves passing through the ear and translate them into sounds we can comprehend. It has to process sensual stimuli and report back to the action center that the memory capacity is “hurting,” (doing this course, for instance) from doing all this reading and thinking, at which time the action center sends a "stop" signal.

All of the information about the external world and us is aggregated, sorted, collated and managed masterfully by this organ. It is the true CEO (Chief Executive Officer) of this large and complex corporation - the human body.

The brain has three basic parts, the brain stem, the cerebrum (the largest part) and the cerebellum. It uses neurons to transmit electrical signals. Hormones are stored in the brain stem, which dictate how well one grows, how tall, whether one is fat or thin. The pituitary gland, which is sort of the
master controller, is located here; it controls all of the hormonal glands located in the body. The cerebellum is at the back of the head and is the muscle coordinator.

The cerebrum has four main lobes, the parietal, occipital, temporal and frontal. Each has its own responsibilities. If you drew a line from the middle of the eyebrows over the top of the head looking down from the top, you would see how the hemispheres of the brain are divided. The corpus callosum is a commissure of fibers that connects the hemispheres.

The head also contains the organs for taste, smell, and hearing, and for utilization of oxygen. The digestive process starts in the mouth with three pairs of glands (salivary) producing saliva, starting the digestive process. The head skeleton has strong, interlocking bones to protect the brain.

Stretched over the skull and jaw are the many muscles of the face. These open and close the jaws and eyes, allow us to wriggle the ears, create facial expressions, move the tongue, and make swallowing possible.

Within the neck is the larynx (‘voice box’), which allows speech. The hyoid bone is a large piece of cartilage in the larynx; it is referred to commonly as the “Adam’s apple.”

In the mouth are three pairs of glands that provide saliva needed for digestion. The tonsils repose quietly in the back of the throat (unless the throat is sore and the tonsils infected).

Look at the illustrations of the brain on the following pages (and visit Innerbody too).
The Brain from the Top View
2. SKELETAL SYSTEM

The musculoskeletal part of the body is the *organ system* that gives animals the ability to physically move using muscles and skeletal framework. Apart from locomotion, the skeleton also lends support and protects the internal organs. In many organisms, the skeleton is also used to store fat and minerals, and to produce blood cells. Bone-to-bone attachments are made with joints, and the skeletal muscle needed, plus the tendons to complete the attachments. In most animals with solid skeletons, yellow bone marrow is used to store energy for the muscles and the red marrow produces blood cells that carry oxygen to the body.

Muscles are the hydraulic mechanisms allowing movement of the fixed, but jointed, limbs. Still, with all that rigidity, the skeletal system is light in weight and is composed of about 25% water. Since bones are living tissue they require a constant supply of nutrients and oxygen supplied by the blood vessels.

The bones of the body are divided into two divisions, the *axial skeleton* and the *appendicular skeleton*. The axial component consists of the head, neck, vertebral column, and chest, comprising 80 of the body's 206 bones. The appendicular skeleton includes the bony structure that makes up the shoulder girdle and upper extremities (64 bones) and the pelvis and lower extremities (62 bones).

The bones of the skull are 29 in number and form a very strong container for protection of the brain, eyes, and most of the ears. The heart and lungs are protected by the rigid rib cage and sternum. Twenty-four ribs are attached to the spinal column, with some 26 vertebrae that make the tunnel through which move the nerve fibers of the spinal cord.

The largest bones in the body make up the *pelvic girdle, ilium, ischium and pubis*. These bones provide the strong platform needed to support the organs of the pelvis and abdomen. They also
help create stability for body balance. The smallest bones (a tenth of an inch long) are located in the middle ear.

The tough bone covering is called the periosteum. Inside the bones (endo-osteal), honeycombs of spongy-like material, marrow are present, and this is where most red and white blood cells are manufactured. Minerals, including calcium, phosphorus and others are stored in the bones. When the brain sends the message that these minerals are needed, they are sent, a function controlled by the parathyroid glands.

If bone is fractured, blood clots form between and around the fracture fragments. The clots are invaded by immature bone cells, which produce a callus that acts as a glue-like substance and holds the bone fragments together. Eventually, through the healing process, the bone is restored to its former shape and strength.
Whole Body View
HUMAN SKULL

Skull Side View

Frontal bone  Parietal bone

Sphenoid bone  Temporal bone

Maxillary bone  Occipital bone

Mandible
BONES OF THE HAND

LEFT HAND

Scaphoid
Lunate
Trapezium
Trapezoid
Capitate
Hamate

RIGHT HAND

Carpal Bones
Lunate
Triquetrum
Pisiform
Hamate

Metacarpal Bones

Scaphoid
Trapezium
Trapezoid
Capitate

Phalanges
3. SPINE

The main support system for the entire body is the spine. It is made up of small bones called vertebrae (a single vertebra is pluralized by adding the “e”). The ribs curve out from the vertebrae and move around the front of the body to cover the chest cavity. The lower vertebrae are the thickest and heaviest since, dynamically, they hold most of the skeletal weight.

The spinal cord runs through these vertebrae and is the information super freeway of the nervous system. In adults, it is about 18 inches long and stretches from the brain to just below the lowest vertebra of the chest cavity.

To prevent the bones from grating against each other, cushions of soft cartilage (discs) are present between the vertebral bodies. This soft cartilage cushions and absorbs the shock for both the spinal bones and the brain.

Throughout the day, sitting and standing, gravity pulls the spine earthward. The discs are pushed closer together and create a shorter body by the end of the day (as much as one quarter to one half inch). It returns to its normal shape while sleeping so that in the morning it has resumed its normal height. The discs in the spine are designed for flexibility, and by their "universal" mechanical design, allow one to turn and bend in many directions.

The vertebral column has 33 bones. The seven vertebrae in the neck are called the cervical spine or C-spine (older women with a dowager's hump, sometimes develop osteoporosis, and will find those humps right around C6 and C7). The next 12 are called the thoracic spine or T-spine. The lower vertebrae below the thoracic spine are five in number and are called the lumbar spine or L-spine. Then the next five are designated as the sacral spine, and are fused to form the sacrum. The next four are fused to form the coccyx. So, at the base of the lumbar spine is the sacroiliac joint, then the sacrum, and last of all, the little bones at the terminus (ending, like a train track's
terminal or computer terminal, where the direction of communications is only to go back the same way you’ve come) of the spine, the coccyx.

4. JOINTS
The long and short bones are hooked to joints. Some joints are astonishingly movable, almost going through a full circular rotation. Not all joints are movable (the skull has joints which become fixed after infancy and which do not move thereafter). The hip, shoulder and thumb joints are those allowing movement in almost any direction.

The ends of the bones attached to the joints have a smoothed cartilaginous finish where they enter into the joint capsule. The joint capsule itself is filled with fluid-like oil called synovial fluid much like motor oil in a car, used to prevent friction. Some joints also have what are called bursal sacs (little sacs filled with fluid) acting as shock absorbers.

When the joints are injured, they hurt (this is not a theory!); injuries include rupture of the bursal sacs which may create bursitis; stretching a joint too far causes sprains, strains and tears; pulling
too hard may cause the joint to become dislocated (where the bone is pulled out of the joint socket). Wear and tear (a constant problem) ultimately create some form of problem(s), arthritis being a common one, which can also be attributed to improper maintenance of the body *machine* lack of exercise and poor nutrition.

### Where Two Bones Meet

![Diagram of joint with cartilage, fluid, bone, ligament, and periosteum]

### 5. MUSCULAR SYSTEM

Three kinds of muscles make the body work one way or another:

- The first group is the *skeletal muscles* attached to bone which act upon the bone structures to control movement. These are termed *voluntary muscles*. The skeletal muscles in a man make up more than 40% of the body weight. In a woman, muscle mass is lower because fat tissues are greater. The smallest muscles are the tiny muscles of the middle ear, which are barely visible. The largest is the huge *gluteus maximus* (the term *maximus* is no accident!) which forms the largest part of the buttock (both are termed *buttocks*).

- The second group of muscles consists of the *smooth muscles*, termed *involuntary*. They control movement of the *internal systems* of the body - digestive, circulatory, waste, and reproductive. Though these movements are hardly noticed, these muscles keep those systems working efficiently.

- The third is the *cardiac* muscle, the one that makes the heart beat.
Muscles come in various sizes and shapes designed for their particular function. Most are rather long and thin, and attach to bones on both sides of a joint so that there is bilateral versus unilateral, movement. The diaphragm contains what are called flat muscles, used for breathing. Muscles of the face are attached to skin rather than bone. The sphincter muscles (anus, bladder and uterus) are completely circular in shape and function more or less like an aperture of a camera.

Abdominal muscles protect the abdominal organs. The abdomen is not surrounded by bone as in the chest, and the organs internally swell when food is ingested, or during pregnancy, or with other pathology, so the abdomen relies on protection by strong layers of muscle. Strong abdominal muscles assist in keeping the spine healthy and aligned by holding and supporting the abdominal organs thereby facilitating better balance. If these muscles are lax, the forward pull of the abdominal contents pulls the spine unnaturally forward and ultimately may create back problems.

Some muscles are attached to bones with the use of strong, tensile material called tendons. These tendons are clearly visible in the hands from the fingers to the wrists. Those visible tendons actually begin at the upper end of the lower arm. The insertions from there lead to each finger, which can be seen through the skin of the hand. Interestingly, only four tendons control the five fingers; two fingers share one tendon.

Other musculoskeletal tissues include fascia (fasciae), aponeurosis (aponeuroses), and tendons. These are typically named after the muscles to which they are related. The fascia is made of fibrous connective tissues, which cover, separate and support muscles as well as other organs. Three levels are defined:

- deep
- subserosal
- superficial
The subserosal layers lie within body cavities and cover and support the *viscera* (abdominal organs). This is the fibrous layer of *serous membrane* such as the *peritoneum*, the *pericardium* and the *pleura*, which provide the attachment for *parietal* (pertaining to the walls of a cavity or located near parietal bone) serous membranes to the deeper fasciae situated on the inner surface of the body wall. The superficial fasciae permit movement of the skin by providing a layer of separation between the deep fasciae and the skin.

*Aponeurosis* is the substance that extends from muscle as a flattened tendon; it is the cord that assists in the contraction of a muscle. Where tendons are attached, an envelope of *fibroelastic* sheath is assigned as the connector (connective tissue).

The muscles that flex or bend joints are called *flexors*. The muscles that oppose that function, extending or straightening the joint are called *extensors*. For example, *the flexor digitorum profundus* is the flexing muscle of the fingers. If the finger is closed, the flexor digitorum has been used; when opened the *extensor digitorum* is at work. When the hand is turned over at the wrist with the palm up, it is in a position called *supination*.

Contraction of muscle is triggered by a chemical process, which makes the *myofibrils* of a muscle cell slide over each other to shorten the cells. The chemical process involves two proteins, *myosin* and *actin*, which give the muscle a striped (or *striated*) appearance.

In any medical dictionary or anatomy resource, the many muscles are listed, page after page of them, complete with illustrations, thus no attempt will be made in this study to duplicate those listings. Note that when the full Latin name is listed in reference resources, e.g., *musculus auricularis posterior*, in medicine in the U.S., we have *Anglicized* such words by converting the Latin name to *posterior auricular muscle*. 
MUSCLES - REAR VIEW

- sternocleidomastoideus
- trapezius
- deltoid
- biceps
- triceps
- teres major
dorsal
- latissimus
- muscles to fingers
- gluteus maximus (buttock)
human muscles
- gastrocnemius (calf)
- Achilles tendon
MUSCLES OF THE BACK

Splenius

Levator scapulae

Rhomboid minor

Supraspinatus

Infraspinatus

Teres minor

Rhomboid major

External oblique

Gluteus medius

Gluteus maximus

Sternocleidomastoid

Trapezius

Deltoid

Infraspinatus

Latissimus dorsi
MUSCLES / TENDONS - LEG

- Semitendinosus
- Biceps femoris
- Semimembranosus
- Gastrocnemius
- Popliteus
- Plantaris
- Soleus
- Achilles tendon
- Tibialis posterior
- Flexor digitorum longus
- Flexor hallucis longus
- Peroneus longus
- Peroneus brevis
- Calcaneus
B. SYSTEMS FOR ENERGY & WASTE DISPOSAL

1. DIGESTIVE SYSTEM

The cells in the body require energy and energy requires fuel. Fuel comes from the food consumed. The digestive system manages the food and makes the fuel. During an average lifetime it may process as much as 100,000 pounds of food.

Digestion breaks down the food into the fuel the body needs. This process is primarily done in the alimentary canal, a tube approximately 27 feet long, beginning at the mouth and ending at the anus. The liver, gallbladder and pancreas aid in the work of digestion.

The digestive system is a magnificent food processor. First, the food is chopped up by the teeth, with the tongue helping in that process, while the salivary glands do their thing by starting to produce the digestive juices in the mouth. The smell and sight of food actually starts the salivation process, e.g., the mouth "waters" in anticipation. A rich blood supply to the mouth also assists in cooling or warming the food for more efficient processing. When sufficiently chewed, the muscular action of the tongue moves the food to the back of the throat preparing it for swallowing.

In the back part of the mouth, the soft palate also moves to shut off the nasal passage. When small particles of food enter the trachea, “swallowing down the wrong throat,” coughing is induced removing the particles back into the digestive process. The throat is also connected to part of the body’s breathing apparatus, the trachea so breathing is suspended for a few seconds while a trapdoor called the epiglottis closes the opening to the lungs.

When swallowed, the "stewy" aftermath is then moved through the esophagus with an action called peristalsis where it is pushed into the stomach; this is an action performed by "smooth
"muscles" pushing the food to the stomach even when lying down. The stomach makes its enzymes and acids to further transfer food for the next step.

The stomach is a kind of elastic bag, which fits under the diaphragm on the left side of the abdomen. Food remains there for two to four hours in the digestive process. It contracts and expands, churning the food and mixing it with liquid, enzymes and acids. When this process is complete, small amounts of food are moved into the duodenum, (part of the small intestine), then ultimately to the intestine. The intestine is about 21 feet long and is coiled and folded to fit neatly within the abdomen. The first portion of the small intestine is the duodenum, the middle section the jejenum, and the final section is the ileum.

The duodenum receives bile and enzymes from the pancreas and liver and then the partly digested food is sent to the other two sections of the small intestine. When the food has finally been broken down into amino acids, sugars and fatty acids, the resultant product is small enough to be absorbed into the bloodstream. Indigestible food moves from the small intestine into the large intestine; water and chemicals are absorbed back into the bloodstream for recycling. The remaining waste travels on to the rectum and then out of the body through the anus.
DIGESTIVE SYSTEM

- **Mouth**
- **Pharynx** (throat)
- **Esophagus**
- **Stomach**
- **Duodenum**
- **Liver**
- **Bile and enzymes from liver**
- **Enzymes from pancreas**
- **Small intestine**
- **Fats into bloodstream (to liver)**
- **Fats into lymph nodes**
- **Proteins, carbohydrates, vitamins, and minerals into bloodstream**
- **Large intestine**
- **Water into bloodstream**
- **Solid waste out**
2. RESPIRATORY SYSTEM

The respiratory system is part of the energy exchange system. The oxygen you breathe is processed through the lungs, which then move it to the rest of the body through the bloodstream. This process enables the fuel distribution. By the process of respiration (breathing), air enters the lung. The lung moves the inspired oxygen into the bloodstream and expired carbon dioxide is moved out.

The oxygen passes the oxygen rich blood from the lungs to the left side of the heart. It is then pumped through the largest artery, the aorta, to all parts of the body. Blood carrying carbon dioxide goes into the right side of the heart and is pumped to the lungs for the exchange of gases. This exchange is done in the alveoli, tiny air sacs that work with the capillaries of the blood circulatory system.

The lungs are soft, spongy, elastic and light, weighing about a pound each. Surrounding each lung is an airtight covering called the pleura. Since the lung has no muscle of its own, the muscles of the chest cavity, and the diaphragm, do the work of breathing. The diaphragm, a sheet of muscle stretching from the spinal column to the front of your rib cage, does most of it. The average adult inhales and exhales about 15 times per minute. This process is called respiration.
3. CIRCULATORY SYSTEM

The heart pumps blood through a system of vessels throughout the body. The blood carries nutrients, oxygen, antibodies and hormones to the cells. It also carries waste products away.

The heart is nestled between the lungs in the middle of the chest, and is protected by the breastbone (sternum) and ribs. A double-layered membrane called the pericardium surrounds the heart as a sac. A coating of fluid separates the two layers allowing the heart to move as it beats.

The heart has four chambers, the two upper are the left and right atria, (atrium is the singular of atria) and the lower are the left and right ventricles. The septum is a wall of muscle separating the atria from the ventricles. The left ventricle is the largest and strongest chamber in the heart and though the walls are only about one-half inch thick, have sufficient force to push the blood through the aortic valve and into the rest of the body.

Veins bring blood into the heart, which enters the right atrium, then passes through the cuspid valve into the right ventricle, which pumps blood via the pulmonary valve, then pulmonary artery
to the lung for oxygenation, returning to the heart, entering the left atrium, passing through the \textit{mitral (bicupid) valve} to the left atrium which pumps via the \textit{aortic valve} to the \textit{aortic arch} and out to the body. The main artery of the body is called the \textit{aorta}. Blood vessels are like branches on a tree with the smallest being the \textit{capillaries}.

The \textit{brachial artery} in the arm is used to measure blood pressure. As the artery receives each new spurt of blood the pressure is \textit{highest}; this is called \textit{systolic pressure}. When the ventricles relax, the pressure is \textit{lowest}; this is called \textit{diastolic pressure}. It is recorded with the systolic listed first and then the diastolic, e.g., 120/80 (which is considered normal).
RESPIRATORY - CIRCULATORY SYSTEMS

- Jugular vein
- Carotid artery
- Superior vena cava
- Aorta
- Heart
- Brachial artery
- Lungs
- Stomach
- Kidney
- Intestines
- Reproductive organs
- Femoral arteries
- Capillaries
- Femoral vein
-_capillaries
4. URINARY SYSTEM

The urinary system has three important jobs:

- cleans the blood
- regulates the amount of water in the body
- eliminates waste

The kidneys are located just inside the lowest ribs in the back, and are each five inches long and two inches wide (11 by 5 centimeters). The artery entering each kidney divides into a network of blood vessels. Each vessel ends in a tuft of capillaries called glomeruli (plural for glomerulus). The glomeruli have tubes around them (capsules), which accept the blood passing through. Certain amounts of blood plasma are filtered through the thin walls into the capsule. This fluid is called the filtrate. The amount of filtrate from all the glomeruli averages 180 quarts per day. The filtrate passes through the capsule through a series of tubes to the entrance of the ureter.

In the tubes, the fluid is altered to become urine. Most of the water in this process is returned to the bloodstream, as are other substances important to the body including glucose, amino acids, and salts. Waste products from the liver and other organs are eliminated in the urine. By the time the urine enters the ureters it has dwindled (or filtrated) down to 1.5 quarts a day.

Urine flows down the ureters into the bladder, which is a collapsible bag located in front of the pelvis. The bladder wall contains smooth, elastic muscles. When the bladder is filled, nerve endings in the wall are stimulated and send a message to the central nervous system conveying the need to urinate.

The bladder is connected to the urethra, a tube that leads outside the body. The opening from the bladder to the urethra is kept closed by sphincter muscles (one of the circular muscles we’ve discussed). When urinating, the muscles relax the sphincter so the fluid will flow out.
URINARY SYSTEM

Female

1. Aorta brings uniltered blood from heart.
2. Kidney filters blood.
3. Inferior vena cava takes filtered blood to heart.
4. Urina flows through ureters.
5. Bladder holds urine.

Bladder
Urethra
Sphincter muscle opens to release urine.
C. SYSTEMS FOR COORDINATION & CONTROL

1. NERVOUS SYSTEM

The interstate system of the body is the nervous system. This integrated circuitry controls the actions and sensations of all the body systems, including all of the bodily functions, thoughts, emotions and memories. The spinal cord, the super freeway, carries the messages back and forth. The brain is the message sender. Through a complex network of nerves, electrical signals carry messages to and from the brain. It is constantly collecting information from both external and internal sources.

As this manual is read, the nervous system is performing many different tasks at a very rapid pace. It is directing certain muscles to move the eyes appropriately. The eyes then send the information (we hope) to the brain, where it is sorted, compiled and stored. As the eye communicates what it sees, the brain identifies the letters, then combines the letters into words and sentences, then stores some in short-term memory or moves the information into long-term storage.

While the learning process above is being processed, the nervous system is busy sending other instructions, which keep the body sitting or lying down, or pacing around the room. It instructs the eye muscles when to blink, notifies the conscious "actuator" that the body is thirsty, and is sending and receiving messages from internal organs which control the heart rate, blood pressure, breathing rate, body temperature, digestion, and other bodily functions.

The peripheral nervous system consists of nerves emerging from the brain (cranial nerves) and others from the spinal cord (spinal nerves). These form the somatic nervous system, which controls the body's relationship to the world outside itself, or the external environment. Many peripheral nerves also contain fibers leading to and from the internal organs or the glands of the
various body systems. These belong to the autonomic nervous system and refer to activities that are involuntary, or outside conscious control.

The control center for the autonomic nervous system is in the brain stem, deep in the hypothalamus. The autonomic nerve system works through two sets of nerves, the sympathetic and the parasympathetic nerves. These nerves work closely to integrate the functions of the hormones of the endocrine system.

The spinal cord has two main functions - it carries impulses between the brain and other parts of the body. It also serves as a reflex center. Reflexes are automatic responses to stimuli, which may not require any communication with the brain. Stick the finger with a needle and the hand jerks. This action is governed by the reflex center.

Nerves work in pairs. There are 12 cranial nerve pairs that control the head and sensory organs and eight cervical pairs for the neck and arms. The thoracic nerves have 12 pairs controlling the thorax and chest cavity. The lumbar nerves are five in number and control the legs and feet. The sacrum and coccyx have 6 pairs and control the pelvic organs and buttock muscles.
The Nervous System

ELECTRICAL MESSAGE SERVICE

Cervical nerves (8 pairs) control your neck and arms.

Thoracic nerves (12 pairs) control your chest cavity (thorax).

Lumbar nerves (5 pairs) control your legs and feet.

Nerves from the sacrum and coccyx (6 pairs) control your pelvic organs and buttock muscles.

Cranial nerves (12 pairs) control your head and its sense organs, as well as some autonomic reactions.

Your sympathetic nerve trunk controls some autonomic reactions.

SOMATIC NERVOUS SYSTEM
The somatic nervous system controls your body's relationship to the external environment. It receives information mostly from the outside and controls your voluntary actions.

AUTONOMIC NERVOUS
The autonomic nervous system controls body's internal environment. It receives information mostly about your inner organs, regulates their activities.
2. ENDOCRINE SYSTEM

The endocrine system is the network of glands throughout the body, which govern and control the function of hormones. While the nerves carry the electrical impulses, the endocrine glands provide the chemical instructions, which are carried to distant cells.

The exocrine glands produce liquids (sweat, saliva, digestive juices, and mucus), and reach the using organs through ducts via a network of channels, the lymphatic system, much like the bloodstream. The endocrine glands are ductless and pour the hormones into the bloodstream itself.

The hypothalamus is the brain control center, which links the autonomic nervous system to the endocrine system. It regulates the performance and job of the pituitary gland, the master gland for the endocrine system. This gland controls the amount of the hormone circulated in very precise amounts. One of the hormones attributed to the pituitary is the growth hormone; this hormone also works with insulin to control the level of the blood sugar. Insulin is a hormone produced by the pancreas, which works synergistically with the pituitary control center. Malfunctions in this process are closely related to diabetes where insufficient insulin is produced to metabolize blood sugar.

The thyroid gland produces a hormone that regulates body metabolism. Parathyroid glands regulate levels of minerals (i.e. calcium, etc.) used by the bones. The thymus gland is in charge of the function of the lymphatic and immune systems. It increases in size until puberty and then decreases in size as we age.

The adrenal glands work with the sympathetic nervous system and produce the hormones needed to protect the body from shock-like assaults (adrenalin, for instance, is released with anger, fright,
flight or fight reactions where the blood pressure rises, circulation is forced to the most vital points for rapid response). The adrenal glands also arrange for the production of hormones, which regulates metabolism, and the use of carbohydrates, fats and proteins, and the mineral and water balance maintained in the body.
D. SYSTEMS FOR PRODUCING LIFE
1. REPRODUCTIVE SYSTEM - MALE
The chief purpose of the male reproductive system is to create and move sperm. The organs involved are the testes (testicles), which produce the sperm, and the penis, which releases them.

The scrotum houses the testes and keeps the temperature at an ideal suitable for storage. Sperm then develop and pass to the epididymis, a tube-like structure that stores them while they complete their growth.

During sexual arousal, the sperm move to the urethra and mix with other fluids filled with nutrients called semen. The urethral muscles close the connection from the urethra to the bladder so that only semen is present within the urethral tube.

A rapid flow of blood fills the cavities of spongy material in the penis so it lengthens and thickens sufficient to penetrate the female vagina. At ejaculation, the sperm are released.
2. REPRODUCTIVE SYSTEM - FEMALE

The chief function of the female reproductive process is to provide an egg cell for fertilization, then incubate the fertilized product within the uterine cavity. The ovaries and uterus are the primary organs involved in this process. The ovaries store thousands of immature egg cells, one of which is expelled every 28 days. It passes through the fallopian tube to the uterus.

The pituitary gland is the regulator of the female reproductive cycle, controlling the hormone balance, using progesterone and estrogen).

The uterus is hollow and pear-shaped, and is lined with endometrium, later expelled during menstruation if a fertilized egg is not implanted.
If an egg is fertilized in transit, it attaches itself to the endometrium and no *menses* occurs. The *placenta* becomes the feeding device through the endometrial attachment for the *fetus* and it also removes fetal waste throughout pregnancy. The fetus lives in a sac filled with *amniotic* fluid until it is delivered.
### EXERCISES ANATOMY AND PHYSIOLOGY

Using both the narrative descriptions and the illustrations, answer the questions. Provide the corresponding medical word for the common English word listed.

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<table>
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| 1 | Name the three parts of the brain.  
   a.  
   b.  
   c.  |
| 2 | Find and list from the illustrations at least one muscle involved with eye movement.  
   |  
| 3 | The medical word for shin bone is _________.  
   |  
| 4 | The medical word for glands in the mouth that begin the digestive process is _________.  
   |  
| 5 | The medical word for hand bones is _________.  
   |  
| 6 | The cerebellum is located where?  
   |  
| 7 | The medical word for the voice box is _________.  
   |  
| 8 | Name the largest three bones in the body  
   a.  
   b.  
   c.  |
| 9 | The medical word for thigh bone is _________.  
   |  
| 10 | Name two shoulder muscles.  
   a.  
   b.  |
| 11 | The medical word for material covering bones is _________.  
   |  
| 12 | Where are most red and white blood cells produced?  
   |  
| 13 | The medical word for the upper arm bone is _________.  
   |  
| 14 | If T-12 was spelled out, how would you write it?  
<p>|</p>
<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>What is the nickname for the hyoid bone?</td>
</tr>
<tr>
<td>16</td>
<td>The medical word for wrist bones is _________.</td>
</tr>
<tr>
<td>17</td>
<td>What does the pituitary gland do?</td>
</tr>
<tr>
<td>18</td>
<td>What is the medical word for the lower (distal) bone of the forearm?</td>
</tr>
<tr>
<td>19</td>
<td>The medical word for finger bones is _________.</td>
</tr>
</tbody>
</table>
| 20 | Name four carpal bones  
  a.  
  b.  
  c.  
  d. |
| 21 | The thyroid gland does what? |
| 22 | The medical word for the coccyx bone is _________. |
| 23 | The medical word for lubricating fluid in the joints is ____. |
| 24 | The medical word for collar bone is _________.  
  collar bone |
| 25 | What causes bursitis? |
| 26 | Name five glands related to endocrine function.  
  a.  
  b.  
  c.  
  d. |
| 27 | Name four leg muscles and/or tendons.  
  a.  
  b.  
  c.  
  d. |
<p>| 28 | What do smooth muscles do? |
| 29 | Name the cephalad (top-toward the head) bone of the forearm. |</p>
<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>30</strong> Why does it help the back to have properly conditioned abdominal muscles?</td>
<td></td>
</tr>
<tr>
<td><strong>31</strong> What is a single term describing the abdominal organs?</td>
<td></td>
</tr>
<tr>
<td><strong>32</strong> What do aponeuroses do?</td>
<td></td>
</tr>
<tr>
<td><strong>33</strong> Mechanisms that bend or flex muscles are called _________.</td>
<td></td>
</tr>
<tr>
<td><strong>34</strong> What extends or straightens muscles?</td>
<td></td>
</tr>
</tbody>
</table>
| **35** What two proteins give muscles their striated appearance? | a.  
  b.  |
| **36** Where does the alimentary canal begin and end? | a.  
  b.  |
| **37** When the mouth waters, what is produced? | |
| **38** What does hemisphere mean? | |
| **39** The trachea is located where? | |
| **40** What job does the epiglottis do? | |
| **41** Name ten main heart components | a.  
  b.  
  c.  
  d.  
  e.  
  f.  
  g.  
  h.  
  i.  
  j.  |
| **42** What two of the three main functions of the urinary system? | a.  
  b.  |
43. Ureters do what?

44. Name the 9 primary male reproductive system components.
   a.
   b.
   c.
   d.
   e.
   f.
   g.
   h.
   i.

45. Name 7 of the female reproductive system components.
   a.
   b.
   c.
   d.
   e.
   f.
   g.

46. The medical word for shoulder blade is __________.

47. Use one sentence to describe the function of the endocrine system.

48. What device transmits electrical signals to the brain?

49. The job of the thymus gland is?

50. Name three main small intestine segments.
   a.
   b.
   c.

51. The medical word for jaw bone is __________.

52. The medical word for the main artery of the body is __________.
<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
</table>
| 53 | In the neck are located two important arteries and veins. Name them.  
a.  
b. |
| 54 | In the inner ear is a nerve called _______(see illustration of Head and Neck) |
| 55 | Why is parathyroid spelled with a *para* prefix instead of a *peri*? |
| 56 | The tube which leads from the throat to the ear is? |
| 57 | The medical word for knee cap is _________. |
| 58 | What is a single bone component in the spinal column called? |
| 59 | What are the ribs hooked to? |
| 60 | Name a bone in the area of the temple (temporal). |
| 61 | Are toe bones called the same as finger bones? |
| 62 | What prevents the vertebral bones from grating against each other? |
| 63 | What causes the body to “shorten” during the day? |
| 64 | How are these terms expressed in their shortened form?  
a. cervical spine  
b. thoracic spine |
| 65 | If you count down to the next vertebrae below the thoracic spine, what is that section called? |
| 66 | The muscle in the front of the abdomen is? |
| 67 | The muscle right at the top of the arm and shoulder region is? |
| 68 | What is the largest-appearing muscle in the neck is (see Muscles of the Back)? |
| 69 | Brachioradialis (break-ee-oh-raid-ee-alice) is a muscle in the forearm; it is made up of two root words which are:  
a.  
b. |
<table>
<thead>
<tr>
<th>Question Number</th>
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</tr>
</thead>
<tbody>
<tr>
<td>70</td>
<td>If you do 50 squats, or deep knee bends, what muscles will get stiff? (Name at least three.)</td>
</tr>
<tr>
<td>71</td>
<td>The muscle located just below the deltoid is? (Muscles of the Back Illustration)</td>
</tr>
<tr>
<td>72</td>
<td>At the lower end of the right scapula is a muscle which goes up toward the spinal column called __________.</td>
</tr>
<tr>
<td>73</td>
<td>A bunch of tendons are located in the area of the lower leg and heel. Name them.</td>
</tr>
<tr>
<td></td>
<td>a.</td>
</tr>
<tr>
<td></td>
<td>b.</td>
</tr>
<tr>
<td></td>
<td>c.</td>
</tr>
<tr>
<td></td>
<td>d.</td>
</tr>
<tr>
<td></td>
<td>e.</td>
</tr>
<tr>
<td></td>
<td>f.</td>
</tr>
<tr>
<td>74</td>
<td>Extensor digiti minimi is one of the tendons of the forearm; use what you now understand about Latin to interpret the two words.</td>
</tr>
<tr>
<td></td>
<td>digiti =</td>
</tr>
<tr>
<td></td>
<td>minimi =</td>
</tr>
<tr>
<td>75</td>
<td>Flexor carpi radialis is a tendon in the forearm.</td>
</tr>
<tr>
<td></td>
<td>a. Flexor means</td>
</tr>
<tr>
<td></td>
<td>b. Radialis relates to</td>
</tr>
<tr>
<td>76</td>
<td>The duodenum is located where?</td>
</tr>
<tr>
<td>77</td>
<td>Approximately when are bile and enzymes injected into the digestive process related to the location in the intestine?</td>
</tr>
<tr>
<td>78</td>
<td>T or F: We don’t require any liquid to digest food.</td>
</tr>
<tr>
<td>79</td>
<td>Inspiratory wheezes would be heard in the lungs in what phase of breathing?</td>
</tr>
<tr>
<td>80</td>
<td>Likewise, expiratory wheezes would be heard in the lungs in what phase of breathing?</td>
</tr>
<tr>
<td>81</td>
<td>The blood pressure is 120/80; the higher number represents (a) _______________. The lower number represents (b) _______________.</td>
</tr>
<tr>
<td>82</td>
<td>If the blood pressure was 200/100 what would the condition be called?</td>
</tr>
<tr>
<td>Question</td>
<td>Answer</td>
</tr>
<tr>
<td>----------</td>
<td>--------</td>
</tr>
<tr>
<td>Tiny air sacs exchange gas (in respiration); they are __________.</td>
<td>Tiny air sacs exchange gas (in respiration); they are <em>alveoli</em>.</td>
</tr>
<tr>
<td>What is the singular word for the answer in #83?</td>
<td>Tiny air sacs exchange gas (in respiration); they are <em>alveoli</em>.</td>
</tr>
<tr>
<td>Tiny blood vessels are called __________.</td>
<td>Tiny blood vessels are called <em>capillaries</em>.</td>
</tr>
<tr>
<td>What is the average number of breaths (adult respiratory rate) per minute?</td>
<td>Average number of breaths (adult respiratory rate) per minute is <em>12-20 breaths per minute</em>.</td>
</tr>
<tr>
<td>Strong circular muscles which dilate when required to are called __________.</td>
<td>Strong circular muscles which dilate when required to are called <em>smooth muscles</em>.</td>
</tr>
<tr>
<td>Urine exits the kidney via the __________.</td>
<td>Urine exits the kidney via the <em>ureter</em>.</td>
</tr>
<tr>
<td>Urine exits the body through the __________.</td>
<td>Urine exits the body through the <em>urethra</em>.</td>
</tr>
<tr>
<td>What do the kidneys filter?</td>
<td>The kidneys filter <em>blood</em>.</td>
</tr>
<tr>
<td>If the kidneys stopped doing their job, what would happen to the body?</td>
<td>If the kidneys stopped doing their job, the body would have <em>inability to excrete waste</em> and <em>regulate body fluid</em>.</td>
</tr>
</tbody>
</table>
| How many nerve pairs control the movement of:  
a. neck and arms  
b. thoracic area (thorax)  
c. legs and feet  
d. sacrum and coccyx  
e. | How many nerve pairs control the movement of:  
a. neck and arms  
b. thoracic area (thorax)  
c. legs and feet  
d. sacrum and coccyx  
e. |
| What functions do the cranial nerves control? | What functions do the cranial nerves control? |
| What do the following do?  
a. “Somatic nervous system”  
b. “Autonomic nervous system” | What do the following do?  
a. “Somatic nervous system”  
b. “Autonomic nervous system” |
1. brain stem, cerebrum, cerebellum
2. orbicularis oculi
3. tibia
4. salivary
5. metacarpals
6. the back and lower part of the skull
7. larynx
8. ilium, ischium and pubis
9. femur
10. rhomboid major, rhomboid minor, trapezius, infraspinatus, latissimus / dorsi, levator, scapula, deltoid
11. periosteum
12. bone marrow
13. humerus
14. thoracic twelve (spinal vertebra)
15. Adam's Apple
16. carpals
17. master gland of the endocrine system, controls the growth hormone
18. ulna (and radius)
19. phalanges - phalanx
20. any 4 listed on the illustration will work for a correct answer
21. regulates metabolism through hormone production
22. base (or bottom) of the spine – also known as tailbone
23. synovial
24. clavicle
25. ruptured bursal sacs (overuse)
26. hypothalamus, pineal, pituitary, thyroid, parathyroid, thymus, adrenal, pancreas
27. semitendinosus, biceps femoris, semimembranosus, gastrocnemius, popliteus, plantar (plantar), soleus, Achilles, tibialis posterior, flexor digitorum longus, flexor hallucis longus, peroneus longus, peroneus brevis, calcaneus
28. control movement of the internal systems of the body
29. radius or ulna
30. prevents the viscera from sagging forward and pulling on the lumbar spine
31. viscera
32. they extend from muscle as a flattened tendon and assist in muscle contraction
33. flexors
34. extensors
35. myosin and actin
36. begins at mouth, ends at anus
37. saliva
38. half a sphere
39. near the larynx between the esophagus and bronchi
40. functions as a door to allow air into the lungs but to close when food is traveling into the esophagus
41. superior vena cava, aorta, pulmonary artery, pulmonary veins, right atrium, left atrium, coronary artery, coronary vein, right ventricle, left ventricle, plus the four valves – if you listed ten you did just fine
42. to clean the blood and to regulate water in the body, elimination
43. deliver fluid to the bladder
44. seminal vesicle, vas deferens, prostate gland, sphincter muscle, Cowper's gland, epididymis, glans, testes, urethra
45. ovaries, fallopian tube, uterus, vagina, clitoris, labia minor, labia major
46 scapula
governs and controls the function and production of hormones
49 neurons
controls function of the lymphatic and immune systems
50 duodenum, jejunum, ileum
51 mandible
52 aorta
carotid arteries, jugular veins
54 auditory
two-sided, glands are on either side of the thyroid gland
56 eustachian (you-sta-shun)
57 patella
58 vertebra
59 spinal column or vertebral
60 sphenoid (ss-feen-oyd)
yes
cushions of soft cartilage, discs
62 gravity
64 a. C-spine, T-spine
65 lumbar spine, L-spine
66 rectus abdominis (wrecked us abdomi-us)
67 deltoid
68 sternocleidomastoid (stern-oh-clyde-oh-mass-toyd) or splenius (spleen-ee-us)
69 brachium and radius
70 quadriceps, sartorius, gastrocnemius (gas-trock-nee-mee-us), gluteus (glute-ee-us) maximus (big) and medius (not the maximum) and maybe the muscles in the ankle and foot (hamstrings are tendons)
71 infraspinatus (infra-spine-ah-tuss)
72 rhomboid major (rahm-boyd)
73 a. tibialis posterior, (tibee-alice), b: flexor digitorum longus, c: flexor hallucis (hal-lou-sis) longus, d: peroneus (pair-oh-knee-us), e: peroneus brevis (brea-viss), f: achilles
74 digit (pleural for digits or fingers/toes), minimi = minimum (English word) for small or smaller; see how maximus, minimis work to describe sizes, just as in English?
75 flex, radius (bone)
76 just below the stomach
77 right after food passes through the duodenum
78 F
79 inspiration – breathing in
80 expiratory – exhaling – breathing out
81 A: systolic, b: diastolic or systole/diastole
82 hypertension
83 alveoli (al-vee-oh-lie)
84 alveolus
85 capillaries
86 15
87 sphincter (sfeen-kter)
88 ureters (you’re it rrs)
89 urethra (you’re ee thruh)
90 blood
91 waste would back up causing uremic poisoning and the body would die
92 a. 8, b. 12, c. 5, d. 6
93 head and sense organs as well as some autonomic reactions
94 a. body’s relationship to external information; voluntary actions, 
b. internal environment (inner organs) regulating their activities
ANATOMY-PHYSIOLOGY ASSIGNMENT

ANATOMY

Lesson Objectives:

- Reinforcing the logic of medical language with words that are rooted in descriptive languages (Greek and Latin)
- Build upon what you have learned about roots, prefixes, suffixes and combining words.
- Understand more about how the body works.
- Be able to use reference materials to locate terms you do not know.

To review, anatomy is subdivided into two categories, gross anatomy and microscopic anatomy. Gross anatomy (also called topographical anatomy, regional anatomy, and anthropotomy) is the study of anatomical structures that can be seen by the eye. Microscopic anatomy is the study of minute anatomical structures primarily with microscopes. Microscopic anatomy includes histology (the study of the organization of tissues) and cytology (the study of cells). Anatomy, physiology (the study of function) and biochemistry (the study of the chemistry of living structures) are complementary basic medical sciences when applied to the human body.

The human body consists of biological systems, organs, tissues, cells and connective tissue.

PHYSIOLOGY

Physiology is the science of the mechanical, physical, and biochemical functions of the organs, and the cells that make up every particle of the body. The primary level in physiology relates to the organs and systems and the systems within systems.

The relationship between form and function are clearly intrinsically linked.

As you know, Latin and Greek are both descriptive languages so it is useful to learn the bases of how words were created in those languages. They employ the use of shape, location, attachment, size, orientation, position, and function. Understanding the logic of name origin greatly assists in interpretation of anatomic terms.

Listed next are seven descriptors for muscles. Note how the names make sense?
### 1. Shape:
- **Rhomboideus**: A muscle of the back, shaped like a rhomboid.
- **Triangularis**: A face muscle triangular in shape.
- **Triceps**: A muscle with three (tri-) heads.
- **Biceps**: A muscle with two (bi-) heads.

### 2. Location:
- **Pectoralis**: Chest muscle located within the pectoral girdle.
- **Intercostal**: Muscle located between ribs (literally means between ribs).
- **Abdominis**: Located in the abdominal area.

### 3. Attachment:
Named for the bones to which they are attached. The muscle name may combine more than one name when more than one bone is involved.
- **Zygomaticus**: Attached to the zygoma (facial bone).
- **Sternocleidomastoid**: Attached to the sternum, clavicle, and mastoid process of the skull.

### 4. Size:
- **Maximus** or **Major**: Larger or largest.
- **Minimus** or **Minor**: Smaller or smallest.
- **Longus**: Long.
- **Brevis**: Short.

### 5. Orientation of fibers:
- **Oblique**: Slanting or inclined direction.
- **Rectus**: Straight.
- **Transverse**: Across or placed crosswise.

### 6. Relative position:
Directional planes and are used on similar muscles to designate a slightly different orientation.
- **Medial**: Closer to the middle or the midline.
- **Distal**: Further away from the midline.
- **Internal**: Within or on the inside.
- **External**: On the outside.
7. **Function:**

| Adductor: Draw toward a medial plane. |
| Extensor: Extends a joint. |
| Flexor: Flexes a joint. |
| Levator: Elevates or lifts. |

It is important to know generally how the pieces of the body model are named and how it all works. To that end, you will be visiting websites to read and answer questions. Much of what you will need to pursue career goals is readily available on the Internet. This assignment will help you develop your skills to find information rapidly and delivered in interesting ways.

**PART I** - First, go to [http://www.innerbody.com/htm/body.html](http://www.innerbody.com/htm/body.html)

**A. You will see the InnerBody page asking you to choose a system.**

**Click on “Muscular System.”** Move your mouse around the picture of the body and you will see the names of various muscles. On the right of the screen is a list of muscles, “definitions, pick points & zoom.” If you click on one of the muscles listed, in a window frame on the right of the displayed picture, it will describe in the left window the location and function of that muscle. The model in the picture has points over which you may hover and it will provide you the name of the anatomic element.

Using that page, answer the following questions:

1. The muscle on the left shoulder is the ________________.
2. On the right side of the rib cage is the ________________.
3. At the distal end of the left fourth finger is the ________________ tendon.
4. On the list on the right, select nasalis. What is the root word?
5. The mentalis muscle ________ and protrudes the lower lip and wrinkles the skin of the chin.
6. The peroneus brevis inserts at the base of the _____________ bone.
7. The flexor retinaculum is located in the ____________.
8. The palmaris longus muscle flexes the a) ________ at the b)__________.
9. What is the root word in palmaris?
10. Where is the omohyoid bone?

**ANSWERS:** 1. deltoid; 2. external abdominal oblique; 3. flexor digitoris profundus; 4. nose; 5. elevates; 6. metatarsal; 7. ankle; 8. a) hand, b) wrist; 9. palm; 10. neck
B. Now go back to the main page and select “Digestive System.”

1. Find sigmoid colon. Read the description on the Large Intestine. The last few inches of the colon is the ________, a storage site for solid waste.

2. The large intestine primarily serves as the ________ dump.

3. The spleen is composed of ________ tissue.

4. The spleen primarily works on the ________.

5. The omentum is a fold of ________ membrane in front of the intestines.

6. The large intestine consists of ____________, transverse, descending and sigmoid portions.

7. The sigmoid colon is ________ - shaped.

8. The parotid gland is related to the process of producing ____________.


10. The liver is located in the left upper quadrant. T/F

11. The liver is the body’s ____________ factory.

12. The liver has ________ lobes.

Answers:

1. rectum 7. S
2. garbage 8. saliva
3. lymphoid 9. under the tongue
4. blood 10. false
5. fatty 11. chemical
6. ascending 12. 2
C. Now go back to the main page and click on “Nervous System.”

1. The brain is divided into 3 parts, the brain stem, the forebrain and the ________________.

2. What is the Latin meaning for cerebellum? ________________

3. Read about the eye and answer:
   a. The flexible membrane that seals off the eye is called the ________________.
   b. At the back of the eye is the r__________.
   c. The thin blood network of blood vessels under the retina are called the choroid ________.

4. Hover over the left lower abdomen; what is the nerve located there?

5. Where is the ulnar nerve?

6. Plantar means a. _________________. So, the plantar nerve enervates the ____________.

7. The peroneal nerve is in/near the _________.

8. The muscle’s name that is enervated by the peroneal nerve is ____________.

9. The tongue, like the heart, is a ________________.

10. Look at “sciatic nerve.” The sciatic nerves are branches of the (a.) ____________ nerves and descend into the buttock and (b.) _____________.

Answers:

1. cerebellum. 6. a. bottom of the foot. b. foot
2. little brain (cerebrum is the big brain) 7. knee
3. a. conjunctiva b. retina c. plexus 8. peroneus
4. femoral 9. muscle
5. just above the elbow 10. a. lumbar, b. thighs.
D. Now click on the Cardiovascular System. Explore some of the clickable options. As you note, there is quite a list of terms.

Answer True or False

1. The aortic arch or arch of the aorta is located below the heart. T/F
2. The axillary vein is located in the lower leg. T/F
3. Brachiocephalic is a combined word with a root of cephalic. T/F
4. The tributaries of the portal veins include the greater saphenous vein. T/F
5. The heart has 5 chambers. T/F
6. The upper chambers are called the ventricles. T/F
7. The smallest vessels are called the aortic. T/F
8. Venules are very large veins. T/F
9. Veins are rarely named the same as their parallel arteries. T/F
10. The two major veins of the body are the superior and inferior vena cava. T/F
11. The artery at the distal end of the left 4th finger is the plantar digital artery. T/F
12. The heart is simply a pump. T/F
13. Each lung has one main bronchus. T/F
14. Bronchioles are little bitty bronchi. T/F
15. Since ilium refers to the pelvis, the iliac artery and vein must originate there as well. T/F

Answer:

1. False
2. False
3. False (brachium)
4. False (gastric veins, superior mesenteric, splenic, inferior mesenteric)
5. False (4)
6. False (atria)
7. False (capillaries)
8. False (small)
9. False
10. True
11. False (palmar)
12. True
13. True
14. True
15. True
You may click at the end of the page(s) we reviewed to ‘NEXT’ and continue reading about the Cardiovascular System.

**E. Now move to the “Lymphatic System.”**

1. The lymphatic system and the ________________ system are closely related structures that are joined by a capillary system.

2. Lymph is a body fluid that contains a) ________ blood cells, called b)__________, along with protein and c)________.

3. The right lymphatic a) ___________ drains the lymph fluid from the upper right quadrant of the body above the b) ________________.

4. In the neck are the a) ___________ nodes which serve as a barrier to b) ________________.

5. The largest body of lymphoid tissue is in the ________________.

6. Along the distal abdomen near the leg are the ________________ nodes.

7. The lymph nodes in the neck are the ________________.

8. Cysterna (or cisterna) chyli is a dilated sac at the lower end of the thoracic ____________.

9. The subclavian trunk drains the ________.

10. After the lymph system is through collecting (through the ducts), it enters the ________ to become part of the blood plasma.

**Answers**

1. cardiovascular

2. a) white  b) lymphocytes, c) fats

3. a) duct, b) diaphragm

4. a) lymph, b) infection(s)

5. spleen

6. inguinal

7. cervical

8. duct (if you didn’t find it readily on the page, did you think to “google” the term?)

9. arm

10. veins
F. Now go to the “Urinary System.”

1. The renal pelvis is divided into tubes called the major __________.
2. The singular form of the word in #1 is ____________.
3. The hilum is the entrance to the _________ sinus.
4. The ___________ is used for storage of fluid waste until it can be eliminated.
5. The kidneys are shaped like ________.
6. The kidneys control fluctuations in __________, salt and glucose.
7. If you have a kidney infection, it will cause pain in the ____________.
8. The tubes that carry urine from the kidneys to the bladder ____________.
9. There are __________ (number) ureters.
10. ___________ are the functional units of the kidney.
11. The renal a) __________ is composed of conical masses of tissue called b) _______ pyramids.
12. The urethra is the tube that carries urine from the urinary bladder to the __________ of the body.
13. The mucous glands in the urethra are termed ___________ _____________ (2 words).
14. In the male, the urethra has 3 sections: the prostatic, the _________, and the penile.
15. What is the root word in membranous? ____________________

Answers:

1. calcyces
2. calyx
3. renal
4. bladder
5. beans
6. fluid
7. lower back
8. ureters
9. 2
10. nephrons
11. a) medulla, b) renal
12. outside
13. urethral glands
14. membranous
15. membrane
G. Now click on the “Male Reproductive System.”

1. The bulbourethral or ____________ (proper noun) glands are located below the prostate gland.

2. The vas deferens is also known as the ____________ deferens.

3. The singular form of testes is ____________.

4. The vas deferens passes upward along the side of the testis to become part of the ____________ cord.

5. The name of the “head” of the penis is the ____________.

6. The hood of the glans is often excised after birth in a procedure called a ____________.

7. The penis contains ______ (number) cylinder shaped bodies of spongy tissue.

8. The prostate gland surrounds the first part of the ____________.

9. The prostate produces ____________ called semen.

10. If the prostate degenerates significantly or becomes infected a ____________ (surgical procedure) may be performed.

Answers:

1. Cowper’s
2. ductus
3. testis
4. spermatic
5. glans
6. circumcision
7. 3
8. urethra
9. secretions
10. prostatectomy
**H. Now go to the “Female Reproductive System.”**

1. Areolae are located on the ____________.

2. The mammary glands consist of 15 to 20 irregularly shaped a) ____________, each of which includes b) _____________ glands, and a c) lactiferous _____________.

3. The root for lactiferous is a) ___________ and the Latin meaning for that root is b) ____________.

4. The suspensory ligaments help _____________ the weight of the breast(s).

5. The fallopian tube extends from the ___________ to the uterus.

6. It is in the fallopian tube that the _____________ of the ovum takes place.

7. The ovaries produce a hormone called _____________.

8. The fertilized egg is called a ________________.

9. Menstruation occurs to rid the body of _____________.

10. The a) __________ is the lower end of the uterus and the opening in this area is called the b) ____________ orifice (or os).

11. The ______ ligament helps hold the ovary in position.

12. The a) __________ ligament at the upper end of the ovary contains ovarian blood vessels and b) _____________.

13. The peritoneum is a ___ (number) layered membrane that holds in/supports the abdominal organs.

14. The vulva is made up of several organs from the pubis to the _____________.

15. The larger lips of the vulva protect the _____________.

16. The smaller lips enclose the _____________.

17. The labia minor are the ________________ located within the cleft between the lips of the labia major.

**Answers:**

1. breasts; 2. a) lobes, b) alveolar, c) ducts; 3. a) lact, b) milk; 4. lift or support; 5. ovary; 6. fertilization

7. estrogen and/or progesterone; 8. zygote; 9. waste; 10. a) cervix, b) cervical; 11. broad;

12. a) suspensory, b) nerves; 13. 2; 14. anus; 15. genitals; 16. urethra; 17. folds
PART II

The Bartleby.com edition of *Gray’s Anatomy of the Human Body* features 1,247 vibrant engravings—many in color—from the classic 1918 publication, as well as a subject index with 13,000 entries ranging from the Antrum of Highmore to the Zonule of Zinn. We are going to visit the Bartleby website now:

http://www.bartleby.com/

On the left of the page, click on *Gray’s Anatomy of the Human Body*. The next page will provide you with an index of the contents of the online version of the book. Please note the search window preceding the index where you may input any anatomic or physiologic word and be directed to various pages where the term is discussed. Also note that at the end of each page, you can click “next” to proceed to the next page without the need to return to the Anatomy Index Page.

Let’s start with Section II. Osteology. You know by now that oste- or osti- are prefices related to bone. Let’s look at “bones” generally. Read and answer:

A. **OSTEOLOGY (I)**

**QUESTIONS:**

1. Long bones are found in the _________.
2. The body or a)_______ of a long bone is cylindrical, meaning b)_____________.
3. The central portion of the bone is termed the _____________ canal.
4. Long bones are usually developed from separate centers of ossification called _____________.
5. The tissue related to the epiphyses is termed _________________.
6. The medullary canal and space in the cancellous tissue are filled with _____________.
7. Two of the long bones are: (list 2) _______________ ________________
8. Short bones are needed for a)_______________ and b) _______________ and have limited movement.
9. Flat bones are located in the a) _______________ and b) _________________.
10. The patella is a flat bone. T/F
11. The skeleton itself is divided into the trunk or the a) _________ skeleton, and the limbs or the b) ____________ skeleton.

12. The intersegmental septa are arranged on either side of the ____________.

13. The singular word for septa is ____________.

14. Cartilaginous is spelled correctly. T/F

15. Costal refers to the ________.

16. In the discussion of the skull, the word chondrification is employed. It means the same thing as chondrogenesis which means ____________.

Answers:

1. limbs or extremities
2. a) diaphysis, b) round
3. medullary
4. epiphyses (singular is epiphysis)
5. cancellous
6. marrow
7. any of clavicle, humerus, radius, ulna, femur, fibula, metacarpals, metatarsals, phalanges
8. a) strength, b) compactness
9. a) skull, b) scapula
10. true
11. a) axial, b) appendicular
12. spine
13. septum
14. true
15. ribs
16. to change a tissue into cartilage
Return to the Index (or Next). Click on “Syndesmology.”

B. SYNDESMOLOGY (II)

Questions:

1. In reading the introduction, it appears that syndesmology is a study of the ___________.

2. Cartilage may change into ____________ which occurs in infants.

3. There are ______ types of cartilage.

4. Hyaline cartilage is a mass of gristle. T/F

5. Chondrin is similar to gelatin. T/F

6. Yellow elastic ligamentous material is called ligamentum flava. T/F

7. The singular term for ligamentum flava is ligamentum flavium. T/F

8. Synovial fluid helps ______________ the joints.

9. Find the articulations of the lower extremity and hip joint. The articular capsule is also known as the ___________ _____________ (2 words)

10. Zona orbicula are ________ fibers.

11. The iliofemoral ligament would involve the a) ___________ and b)__________.

12. The ligament of Bigelow is sometimes called the ____________________.

13. Read the information under “Movements.” The physiology is fascinating.

Answers:

1. joints

2. bone

3. 3

4. true

5. true

6. true

7. false (flavum)

8. lubricate

9. capsula articularis

10. circular

11. a) ilium, b) femur

12. iliotrochanteric ligament

13. You read it?
C. MYOLOGY (IV)

Questions

1. Myo- means ___________

2. Muscle descriptions might include: long, broad and ___________.

3. A sphincter is not a muscle. T/F

4. Muscle names are derived from their location. The tibialis muscles would be located near the a) ______ bone, the radialis near the b) ___________, the ulnaris near the c) ___________,

5. Muscles names may derive from their use, such as flexors, extensors and ___________.

6. The term *insertion* describes the movable point on which the force of the muscle is applied. T/F

7. Go to #6, “Articulations of the Upper Extremity,” and choose I, Intermetacarpal Articulations. The ____________ ligaments connect the contiguous surfaces just distal to their collateral articular facets.

8. More than one interosseus is _________________.

Answers:

1. muscle

2. short

3. false

4. a) tibial, b) radial, c) ulnar

5. adductors

6. true

7. interosseous

8. interossei
Go back to the main menu Index and Select “Angiology.”

D. ANGIOLOGY (V)

Questions

1. The arteries end in minute vessels called ________________.

2. The upper part of the heart is the a) ______________ and the lower, the (b) ________________.

3. The portal vein goes to the ________________.

4. The external coat of an artery is the tunica ________________.

5. Combine the roots atrium and ventricle to make one word. __________________________

6. Aortic arches relate to the feet. T/F

7. The heart is enclosed within a fibrous bag called the peri______________.

8. The sternopericardiac ligaments have 2 anatomic references in the roots, a) ______________ and b) ________________

NOW READ THIS PARAGRAPH OUT LOUD (some hints for pronunciation by the word(s)).

The ligament of the left vena (VEENA) cava (cave-uh). Between the left pulmonary artery and subjacent pulmonary vein is a triangular fold of the serous (seer-us) pericardium; it is known as the ligament of the left vena cava (vestigial fold of Marshall). It is formed by the duplicature of the serous layer over the remnant of the lower part of the left superior vena cava (duct of Cuvier – coo-vee-ay), which becomes obliterated during fetal life, and remains as a fibrous band stretching from the highest left intercostal vein to the left atrium, where it is continuous with a small vein, the vein of the left atrium (oblique vein of Marshall), which opens into the coronary sinus.

Sounds almost like poetry, doesn’t it?

Click “Next” and it will take you to 4b. The heart.

9. The Latin word for heart is ____________.

10. In the component parts, we find a notch called the incisura (in-sice-ure-uh) ________________.
11. Behind the crest, the internal surface of the atrium is smooth, while in front of it the muscular fibers of the wall are raised into parallel ridges resembling the teeth of a comb, and hence named the *musculi _____________.

12. In this sentence: The atroventricular opening (tricuspid orifice) was observed. The words are all spelled correctly. **T/F**

13. You can use *ventriculus dexter* to describe the right ventricle. **T/F**

14. *Chordae tendineae* is the Latin plural form for more than one of those. **T/F**

15. The word, *cusp*, may relate to heart anatomy. **T/F**

16. Since there is a Valsalva sinus in heart anatomy, then it is likely the Valsalva maneuver was named after the same guy. **T/F**

17. Pouches are not the same as sinuses. **T/F**

---

Interesting that from this famous book used so widely for so many years, we see this paragraph:

**Structure.**—The heart consists of muscular fibers, and of fibrous rings which serve for their attachment. It is covered by the visceral layer of the serous pericardium (*epicardium*), and lined by the *endocardium*. Between these two membranes is the muscular wall or *myocardium*.

---

18. Proofread the sentence above and see if you can find the error missed in the editing (hopefully not in the textbook itself but maybe making the transition to the web?).

19. Between the endocardium and the cardiac muscle imbedded in a small amount of connective tissues, peculiar fibers known as ___________ fibers are found.

20. Systole refers to a heart _____________.

21. There are both atrial and ventricular _________________.

22. The ____________ arteriosus is a short tube.
Answers:

1. arterioles
2. a) atrium, b) ventricle
3. liver
4. adventitia
5. atrioventricular
6. false (see the paragraph on Aortic Arches)
7. (peri) cardium
8. a) sternum and b) heart (cardium)
9. cardium
10. cor
11. apicis (ay-piss-eece)
12. pectinati
13. true
14. true
15. true
16. true
17. true
18. false
19. structure
20. Purkinje (purr-kin-gee)
21. contraction or beat
22. systole
23. ductus
E. ARTERIES (VI)

Questions:

1. The trunk of the artery tree is the ______________.

2. There are arteries everywhere in the body including the nails. T/F

3. A branch of an artery is smaller than the trunk where it arises. T/F

4. Arteries cannot communicate with one another. T/F

5. By anastomoses, arteries do communicate. T/F

6. The pulmonary artery moves the venous blood from the left ventricle of the heart to the lungs. T/F

7. The branches off the arch of the aorta are the left common carotid, the left subclavian and the inanimate artery. T/F

8. The brachiocephalic artery relates to the arm and the shoulder. T/F

9. Look at Figure 507 (enlarge it). There is a superior belly of the omohyoides. T/F

10. The carotid artery divides into the superficial temporal and internal maxillary arteries. T/F

11. The Pterygoideus internus artery is pronounced puh-terry-goyd-ee-us in-turn-us. T/F

Scroll on down through the remaining dissertation on the arteries and if you don’t read it all word for word, pay attention to the bolded names. They tend to stick in your head that way. Note how often the directional description is used, superior, inferior lateral, triangle, ascending, descending, first part, second part, bellies, etc. The Latin roots also often describe where the artery is located. Migrate through the subheadings: Head and Neck, Upper Extremity, Axilla, Trunk, Iliac, Lower Extremities.

Answers:

1. aorta
2. false
3. true
4. false
5. true
6. false (right ventricle)
7. false (innominate)
8. false (arm and head)
9. true
10. true
11. false (terry-goyd-ee-us – the –p- is silent)
The next series is VII, The Veins. Go there.

**F. VEINS (VII)**

**Questions:**

1. Veins convey blood from the capillaries to the heart and have two distinct sets, the pulmonary and the ______________.

2. The pulmonary veins actually contain arterial blood which they get from the ______________.

3. The system venous channels have three sets: superficial, deep veins, and ________ sinuses.

4. Venous sinuses are found only in the a) __________, formed by a separation of two layers of the b) dura __________.

5. The semilunar valve is termed *the valve of* the ______________ sinus.

6. The frontal vein begins on the ______________.

7. The various jugulars are in the ______________.

8. The diploic veins (venae diploicae) are located in the ______________.

9. Cerebral veins, superior, middle and inferior are located in the ______________.

10. The ophthalmic vein must relate to the ______________.

11. The upper extremity veins are termed superficial and __________.

12. The plantar cutaneous venous arch must be in the ______________.

13. The great saphenous vein is the longest vein in the body and goes from the foot and ends up in the thigh. T/F

14. Did you know that the saphenous vein is often used in open heart surgery to repair veins and arteries?

15. The pampiniform plexus is located in the testis and epididymis. T/F

**Answers:**

1. systemic 6. forehead 11. deep
2. lungs 7. neck 12. foot
3. venous 8. cranium/head 13. true
4. a) skull, b) mater 9. brain 14. You do now
5. coronary 10. eye 15. true
G. LYMPHATIC SYSTEM (see VIII)

Questions:

1. The milk-white fluid found in the intestine is called, ___________.

2. Lymphatic capillaries are abundant in the dermis, particularly rich over the a) ___________ surface of the hands and fingers and b) ___________ surface of the feet and toes.

3. The periosteum of bone does not have lymphatic capillaries. T/F

4. Lymphatic vessels are tough and resilient. T/F

5. Endothelium means inside closed spaces. T/F

6. So epithelium must mean outside the body so skin would be epithelium. T/F

7. Lymphadenopathy refers to both the lymph and a gland and indicates there is something pathological with those items. T/F

8. Afferent and efferent vessels communicate through the lymph paths. T/F

9. Lymph, a water substance, has a specific gravity of 1.020. T/F

Answers:

1. chyle

2. a) palmar, b) plantar

3. false

4. false (delicate)

5. true (Greek endon−within and thele−nipple)

6. true

7. true

8. true (you will see and hear those 2 terms in many ways and note how much they look [and sound] alike, so you have to pay attention since their meanings are different)

9. false (1.015)
H. NEUROLOGY (IX)

Neurology contains tons of words and you could study the anatomy and physiology for years, like neurologists and neurosurgeons do. Our intent here is to make sure you know how to find the words and tune into their logical names and expressions of singular and plural versions.

Questions:

1. The supporting tissue of a nerve cell is called ________________.
2. Some of the nerve cells are stellate in shape which means ___________-shaped.
3. Unipolar cells have only one pole while bipolar cells have two. T/F
4. Protoplasmic processes are also known as dendrous. T/F
5. A small fiber would be a fibril. T/F
6. The central part of a nerve fiber is an axis cylinder and surrounding it is a medullary sheath. T/F
7. So a sheath must be something that surrounds or protects. T/F
8. An intermodal segment is the portion of nerve fibers between two ________.
9. A small bundle of nerve fibers enclosed in a tubular sheath is called a funiculus. T/F
10. The plural of funiculus is ________________.
11. If a nerve is large, the funiculi are collected into bigger bundles called fasciculi. T/F
12. Reading about peripheral nerves and ganglia, there are a) epi__________, b) peri __________, c) endo__________.
13. A plexus is a ________________.
14. The connections transmitted between nerve cells are synapses. T/F
15. Review the brain nervous system descriptions and words and answer this question. Is singulate spelled correctly. Y/N
16. Hipocampus is spelled correctly. Y/N
17. The Sylvian fossa is located in the brain. T/F
18. Midbrain is also called the mesencephalon. T/F
19. The medulla oblongata is located in the thorax. T/F
20. The pars optica retina is a nerve in the eye. T/F
21. Aracknoid is spelled correctly. T/F
22. Pia mater is a membrane in the brain. T/F
23. If I want to change the word fasciculus to an adjective, it would be fasciculous. T/F
24. The brain is contained in the cranium. T/F
25. The hind brain is called the rhomboencephalon. T/F
26. The proencephalon is the midbrain. T/F
27. The diencephalon is part of the third ventricle. T/F
28. The medulla oblongata is also known as the spinal bulb. T/F
29. Nodules and lobules are descriptive terms of the brain. T/F
30. The olfactory nerve probably has something to do with the sense of smell. T/F

Answers:

1. neuroglia
2. star
3. true
4. true
5. true
6. true
7. true
8. nodes
9. true
10. funiculi
11. true
12. a, b and c all end with neurium
13. network
14. true
15. no (cingulate)
16. no (hippocampus)
17. true
18. true
19. false (brain)
20. true
21. false (arachnoid)
22. true
23. true
24. true
25. true
26. false (fore – in front of = pro)
27. true
28. true
29. true
30. true

Read on through the remaining pages of the section on nerves and pay attention to the bolded words. Most of the time you will be able to locate the names of the nerves in your reference material without too much difficulty. Also remember that you may narrow searches down to the anatomy you might be working on so if a neurosurgeon is discussing the spine versus enervation of a muscle in the leg, illustrations of the anatomy involved will help you find the nerve itself.
Fortunately, the next session in anatomy deals with the Organs of the Senses and Common Integument, a much shorter topic. Go to X. Session

**H. ORGANS OF THE SENSES AND COMMON INTEGUMENT (X)**

**I. The Senses**

**Questions:**

1. The taste organs are termed peripheral _______________.
2. The gustatory calyculi are the _______________.
3. The little bumps on the tongue are called ____________ (plural please).
4. The nasus externus is the ___________ nose.
5. Vibrissa is a ____________.
6. The rounded eminence of the nose is the ala ________.
7. The septal cartilage is the movable part of the nose. T/F
8. The sphenoidal process is between the vomer and the perpendicular ethmoidal plate. T/F
9. Nares are the hair follicles in the nose. T/F
10. A depression called the *nasopalatine recess* is over the incisive canal at the lower edge of the cartilage of the septum. T/F
11. Mucous membranes have a covering called *epithelium*. T/F
12. The sinuses of the nose are frontal, ethmoidal, sphenoidal and _______________.
13. The bulbous oculi is commonly called the _______________.
14. Two poles are present in the eye, the anterior and the _______________.
15. Optic vesicles are diverticula after closure of the tube. T/F
16. The retina is developed from the optic cup. T/F
17. Eyelids are cutaneous folds of skin. T/F
18. The sclera received that name from *density and hardness* and is a membrane that covers the bulb (eyeball). T/F
19. The cornea is the projecting part of the external tunic and is circular in shape. T/F
20. The rounded aperture of the eye located in the middle of the iris is the ________.

21. Stroma is made up of fibers and cells. T/F

22. Aqueous humor is essentially _________ filling the anterior and posterior chambers of the eyeball.

23. In Figure 889, you can see the ___________ of the right orbit.

24. Palpebral commissures or canthi are part of the ________________.

25. Lacrimales help make ____________.

26. The ear is divided into a) ________ parts, the external, middle (tympanic) and the internal or b) ________________.

27. The malleus, incus and _________ are all located inside the ear.

28. A nerve in the ear is called the cokelear nerve. Is it spelled correctly? Y/N

29. The pinna or auricular are commonly referred to as the ____________.

30. The helix of the auricular is the rim of the outer ear. T/F

31. In Figure 907, the ear canal is called the external ___________ ___________. (2 words)

32. The tympanic membrane is like the covering on a drum. T/F

33. Remember the zonule of Zinn mentioned earlier? Please tell us where it is located. ______________

Answers:

1. gustatory
2. taste buds
3. papillae
4. outer
5. hair
6. nasi
7. true
8. true
9. false (nostrils)
10. true
11. true
12. maxillary
13. eyeball
14. posterior
15. true
16. true
17. true
18. true
19. true
20. pupil
21. true
22. water
23. muscles
24. eyelids
25. tears
26. a) 3, b) labyrinth
27. stapes
28. no (cochlear, but pronounced coke-lee-uhr)
29. ear lobe(s)
30. true
31. acoustic meatus
32. true
33. the eye – just wanted you to know there really is a zonule of Zinn. Zinn is a proper noun and zonule is not capitalized.

Now we are going to discover the intricacies of the largest organ of the body, the skin.
II. Integumentum (Skin) – (X-2)

Questions:

1. The skin covers and protects the deeper tissues of the body as well as providing insulation and thereby regulates the body _____________.
2. Epidermis or cuticle is the __________ covering of the skin.
3. The glands beneath the skin are the sebaceous and ________________.
4. The strata of the epidermis are mucosum, granulosum, lucidum, and _____________.
5. Pigment in the skin is called _____________.
6. The nail matrix is the part of the nail that is exposed on the outside of the nail. T/F
7. The white portion of the nail is the _________________.
8. The eponychia are the thin cuticular folds of the nail. T/F
9. The hair shaft is composed of the medulla, the cortex, and the _____________.

Answers:

1. temperature  
2. external  
3. sudoriferous  
4. corneum  
5. melanin  
6. false (beneath the nail)  
7. lanula  
8. true  
9. cuticle
I. SPLANCHNOLOGY (XI)

What is splanchnology? [splank-nol-ogy] It is the study of the visceral organs, including the digestive, respiratory, urogenital and ductless glands. We have already reviewed much of this anatomy, so this section will just focus on words you may not have encountered and of course give you the opportunity to learn more.

Questions:

1. The respiratory apparatus includes the larynx, trachea, ____________, lungs and pleura.

2. The furcula of His is a transverse ridge lying between the ventral end of the branchial arches. T/F

3. The voice organ is the ________.

4. The cartilages of the larynx are ________ in number.

5. The Adam’s apple is the laryngeal prominence. T/R

6. The vocal folds (plicoe vocales) actually produce sound. T/F

7. The windpipe’s Latin name is ________________.

8. The trachea is cartilaginous tubing that divides into two ____________, one for each lung.

9. Different portions of the pleura have names that indicate their position; the portion that lines the inner surfaces of the ribs is the a)___________ pleura, and the one that clothes the convex surface of the diaphragm is the b) _________________ pleura.

10. Sinuses are in the pleura as well as other areas of the body. Two of them are the phrenicocostal sinus and the costomediastinal sinus. The root word for the first one is a) ________ and it means b) ____________________, and the suffix is c) ____________, which refers to the d) ________________.

11. The lungs crepitate when handled because of a) _______ in the alveoli, so crepitations must be (b)______________________ (kind of sounds).

12. The ________ is the top of the lung.

13. Lung borders are described as inferior, posterior and ________________.

14. The mouth and teeth begin the digestive process. T/F

15. The foramen epiploicum is commonly known as the foramen of ____________.

16. The cloaca is the common passageway for feces. T/F
17. Procto refers to the a)_________ and b)____________.

18. Fauces is a passageway between the pharynx and the throat. T/F

19. In the fauces are the glossopalatine arch and the a) ___________ palatine arch, and the palatine b) ___________ are located here as well.

20. The circular band of tonsils and adenoid tissue form a ring for adenoid collections called the ___________ tonsil.

21. The pharynx is part of the digestive tube. T/F

22. If the pharynx becomes infected, the condition is termed ______________.

23. A torus is a ___________.

24. The serous membrane of the abdomen is the __________._

25. The linea alba is the tendinous median line on the anterior abdominal wall between the two rectus muscles. T/F

26. The text refers to a lesser omentum. May you infer from that term that there is a greater omentum? Y/N

27. The hepatoduodenal ligament relates to which two organs, a)______________ and b)______________.

28. The stomach’s Greek name is gaster. Is that why gastro- refers to the stomach? Y/N

29. The small intestine is divided into three portions, the duodenum, the jejunum and the ___________.

30. In the large intestine, there are “flexures”; they are the right colic, left colic and ______________.

31. The vermiform process or appendix is named because it is a long, cylindrical shape and looks like a ___________.

32. The excretory apparatus of the liver consists of ducts; they are the a) ____________, b) ____________, c) ____________, and the common bile duct.

33. The ampulla of Vater is located in the common bile ___________.

34. The pancreas is involved with sugar metabolism. T/F

35. The pancreas has a head, neck, body and ___________. 
Answers:

1. bronchi
2. true
3. larynx
4. 9
5. true
6. true
7. trachea
8. bronchi
9. a) costal, b) diaphragmatic
10. a) phrenic, b) relating to the diaphragm or mind, c) costal, d) rib
11. a) air  b) sounds --- sibilant or whistling, dry and crackling, or wet and sloshy
12. apex
13. anterior
14. true
15. Winslow
16. true
17. a) anus, b) rectum
18. true
19. a) pharyngo b) tonsils
20. lingual
21. true
22. pharyngitis
23. cushion
24. peritoneum (tunica serosa)
25. true
26. yes
27. a) liver and b) duodenum
28. yes
29. ileum
30. sigmoid
31. worm
32. any order: a) hepatic duct, b) gallbladder, c) cystic duct (duct of the gallbladder)
33. duct
34. true
35. tail

The remainder of the Gray’s sections we have covered in previous material, though you are of course free to read and study all the rest. You hopefully have discovered how logical the words are related to what they were designed to describe. Some of them sound even poetic (maybe that’s a stretch). In the study of the human body, combinations of words should now make more sense to you based on what you learned about names of things, roots, prefixes, suffixes and combining words. Now you can see why no medical dictionary could possibly list the endless ability to combine words to form new words. It would weigh a ton and you would not be able to turn the pages.

You have been through a pretty intense learning process. The primary purpose is to teach you how the body works, the names of some of its component parts, the logic in the naming, and the ability to find words you are not sure how to spell in your future career in health care.