DOWNLOAD PDF MUSCULAR SYSTEM PARTS AND FUNCTIONS

Chapter 1 : Muscular System - Definition, Functions and Organs | Biology Dictionary

Muscular System Physiology Function of Muscle Tissue. The main function of the muscular system is movement. Muscles are the only tissue in the body that has the ability to contract and therefore move the other parts of the body. Related to the function of movement is the muscular system's second function: the maintenance of posture and body position.

The muscular system plays an important role in providing proper posture and stability to the body and also brings about locomotion, digestion and heat generation. It is only when our body muscles begin to ache terribly that we realize body has so many muscles. The muscular system is a vast network of tissues, which are attached to the skeletal framework of the body, with the help of nonelastic cords called tendons. When these muscles stop contracting and relaxing, our body becomes immobile. This is why people with muscular disorders like muscular dystrophy, etc. Muscles of the Muscular System The human muscular system spread across the entire body is controlled by the nervous system of the body. The human body comprises over muscles, of which the largest gluteus maximus is found in the buttocks. The muscles can be categorized further. The muscular system comprises three different types of muscles: These muscles are also called voluntary muscles, because their movements can be controlled by us. Movements like chewing, blinking, typing, throwing, etc. Smooth or Involuntary Muscles Smooth muscles on the other hand, are involuntary muscles that are found lining the intestinal walls, stomach, lungs and other hollow organs. The movements of these muscles cannot be controlled by us, instead they are controlled by the autonomous nervous system. For example, we cannot control the peristaltic movement of food in the stomach, etc. Neither can we control the movement of the lung muscles and so on. Cardiac Muscles As the name implies, cardiac muscles are muscles lining the heart and are not found in any other part of the body. They are controlled by the sinus node, which is also influenced by the autonomous nervous system. Cardiac muscles are less striated as compared to striated muscles and house several mitochondria for energy production. They also feature an extensive network of blood vessels, which supply oxygen to the muscles. Functions of the Muscular System? Mobility The skeletal framework of our body is covered by muscles whose primary function is providing mobility to the body. Actions such as walking, climbing, running, lifting, dancing, jogging, etc. Communication We owe our ability to communicate to these skeletal muscles as well, which enable us to speak and write. Being voluntary, these muscles can be controlled by our brain and told what to say and write. So the next time you say something nasty or insensitive, remember you are in control of your tongue and every word spoken can be controlled by your brain. So get a grip of your tongue and think before you speak! Maintenance of Posture We rarely give a thought to how our bodies are able to remain in standing or sitting position. In fact, most of us think that our bodies are at a state of rest during these phases. However, even during these times, certain muscles in the body are constantly contracting and relaxing, making various tiny adjustments, so that your posture can be maintained. Thus, we are able to continue sitting or standing, due to the contraction of muscles. The muscles of the body also provide joint stability, by extending their tendons over the joints. Carries out Digestion The action of stuffing our mouth with food is voluntary and we also have control of the chewing motion. However, once the food is swallowed what happens to it? We do not have any control of it, once it passes down the food pipe or esophagus. The food travels via the esophagus to the stomach via an involuntary muscular movement called peristalsis. The smooth muscles contract and relax and allow the food ingested to be churned in the stomach and then the intestines. As the digestion process continues, the waste is sent to the rectal region from where it is discarded. Heat Generation Since we are warm blooded, a constant body temperature ought to be maintained in the body, via temperature regulation. In order to maintain a constant body temperature, the body needs to produce heat. When muscles contract to cause the bones to move, heat is generated. Thus, in situations wherein the body temperature plummets, the muscles involuntarily contract and generate heat. This is why when we are cold, we find our body shivering. Similarly, when the body temperature escalates after exercise or strenuous activity, the muscles redirect the heat to the skin to cool down the body. Blood Circulation The cardiac muscles in the heart are responsible for blood circulation within the heart and its

pumping to the rest of the body. The elaborate blood vessel network ensures adequate oxygen is made available to these muscles whose contraction and relaxation movements, are vital for the survival of a person. Respiration Respiration involves inhalation of oxygen-rich air and exhalation involves expulsion of carbon-dioxide-rich air. For this process to take place, the diaphragm muscle is required, which contracts and relaxes to bring about the required inhalation and exhalation. Shock Absorption The muscular network of the body forms a padding for the skeletal framework, thereby protecting the vital internal organs. Moreover, the agonist and antagonist muscles that work in pairs, help slow down the movements of joints in the opposite direction, by contracting. These muscles are seen to contract to absorb impact from forceful actions like that during sports activities or during a fall. The muscular system is a truly fascinating organ system of our body. The muscles keep working all the time, even when we are sleeping. It is only when an individual becomes unconscious, that the body is in a complete state of muscular rest. Otherwise, the muscles are always contracting and relaxing.

Chapter 2 : The Top 5 Muscular System Functions | Health Symptoms and Diseases

The muscular system is a complex network of muscles vital to the human body. Muscles play a part in everything you do. They control your heartbeat and breathing, help digestion, and allow movement.

She has been an avid weight trainer and runner since She has worked in the fitness industry since Exercise proves essential in maintaining a healthy muscular system. Skeletal muscles attach to your bones, stabilizing the skeleton and enabling voluntary and reflexive movement. Smooth muscle tissue found in blood vessels and various body organs produces involuntary movement essential for normal function. Cardiac muscle occurs only in the wall of the heart, enabling its pumping action. In addition to structural and movement-related functions, the muscular system helps maintain normal body temperature. Video of the Day Voluntary and Reflexive Movement Skeletal muscles normally account for at least 40 percent of your body weight and are categorized as appendicular or axial based on body location. The large muscles of your arms and legs are appendicular skeletal muscles. The axial skeletal muscles include those of your trunk, head and neck. Contraction of skeletal muscle produces voluntary gross and fine movements, a primary function of the muscular system. Gross movement refers to large coordinated movements such as walking, running, jumping, sitting down, standing up, lifting large objects, swimming, and swinging a bat or racket. Gross movements rely primarily on large skeletal muscles. Fine motor skills refer to smaller, more intricate body movements. Examples include speaking, writing and playing a musical instrument. Fine motor skills typically involve small skeletal muscles of your hands, face or feet. Although most skeletal muscles are under voluntary control, they can also contract reflexively -- such as blinking when an insect flies toward your face or pulling your hand away from a hot surface. Skeletal Stability and Organ Protection Your bones provide the frame for your body. Your skeleton, however, lacks structural stability without the skeletal muscles and their associated tendons that hold your bones together and keep them in place. The axial skeletal muscles are particularly important for maintaining an upright position, and enabling you to twist your head and body. In conjunction with the rib and spinal bones of your trunk, the axial skeletal muscles also provide protection for your internal organs. For example, your rectus abdominus, transverse abdominus and oblique muscles protect your abdominal organs from the front and side. Your latissimus dorsi, quadratus lumborum and psoas muscles protect the organs of your abdominal cavity from the back. Blood Circulation Your heart is the hardest working muscle in your body, contracting at least 60 to times per minute from cradle to grave. The wall of your heart consists of highly specialized cardiac muscle tissue, which contracts involuntarily in response to electrical signals generated within the heart. With each contraction of your heart, blood is pumped through your circulatory system. This essential function provides life-sustaining oxygen and nutrients to your body organs and tissues. Smooth muscle cells in the walls of your arteries and veins also contribute to blood circulation by altering the diameter of these blood vessels in different situations. For example, arteries supplying exercising skeletal muscles relax to enable increased blood flow to meet the increased metabolic demand. Internal Organ Function Several internal organs contain smooth muscle tissue, which contracts automatically to support their normal function. For example, smooth muscle tissue in the walls of your esophagus, stomach, and small and large intestines produce rhythmic contractions that propel food through your digestive tract. Similarly, smooth muscle in the wall of your bladder enables you to expel urine. Uterine smooth muscle tissue, called the myometrium, proliferates during pregnancy and provides the strong propulsive force that enables a vaginal delivery. Other internal organs and structures that rely on smooth muscle to support some of their functions include the gallbladder, male reproductive ducts and glands, and the irises of the eyes. Body Temperature Regulation A normal body temperature of roughly Since body heat is lost to the environment in typical conditions, your body must generate heat to maintain a normal temperature. Most of this needed heat is generated by your skeletal muscles. When your body temperature decreases, skeletal muscle activity automatically increases to generate heat. Shivering is the most obvious manifestation of this response. Smooth muscle in the blood vessels supplying your skin also automatically constricts in cold conditions to conserve heat by limiting loss at your body surface. Reviewed and revised by:

Chapter 3 : Muscular System Functions You Did not Know About

When the nervous system signals the muscle to contract, groups of muscles work together to move the skeleton. These signals and movements are nearly involuntary, yet they do require conscious effort.

They do everything from pumping blood throughout your body to helping you lift your heavy backpack. You control some of your muscles, while others â€" like your heart â€" do their jobs without you thinking about them at all. Muscles are all made of the same material, a type of elastic tissue sort of like the material in a rubber band. Thousands, or even tens of thousands, of small fibers make up each muscle. You have three different types of muscles in your body: KAR-dee-ak muscle, and skeletal say: Smooth Muscles Smooth muscles â€" sometimes also called involuntary muscles â€" are usually in sheets, or layers, with one layer of muscle behind the other. Your brain and body tell these muscles what to do without you even thinking about it. But smooth muscles are at work all over your body. In your stomach and digestive system, they contract tighten up and relax to allow food to make its journey through the body. The muscles push the food back out of the stomach so it comes up through the esophagus say: Smooth muscles are also found in your bladder. Then they contract so that you can push the urine out. These muscles keep the eyes focused. A Hearty Muscle The muscle that makes up the heart is called cardiac muscle. It is also known as the myocardium say: The thick muscles of the heart contract to pump blood out and then relax to let blood back in after it has circulated through the body. Just like smooth muscle, cardiac muscle works all by itself with no help from you. A special group of cells within the heart are known as the pacemaker of the heart because it controls the heartbeat. These are your skeletal muscles â€" sometimes called striated say: STRY-ay-tud muscle because the light and dark parts of the muscle fibers make them look striped striated is a fancy word meaning striped. Skeletal muscles are voluntary muscles, which means you can control what they do. These muscles help to make up the musculoskeletal say: Together, the skeletal muscles work with your bones to give your body power and strength. In most cases, a skeletal muscle is attached to one end of a bone. It stretches all the way across a joint the place where two bones meet and then attaches again to another bone. Skeletal muscles are held to the bones with the help of tendons say: Tendons are cords made of tough tissue, and they work as special connector pieces between bone and muscle. The tendons are attached so well that when you contract one of your muscles, the tendon and bone move along with it. Skeletal muscles come in many different sizes and shapes to allow them to do many types of jobs. Some of your biggest and most powerful muscles are in your back, near your spine. These muscles help keep you upright and standing tall. They also give your body the power it needs to lift and push things. Try rotating your head around, back and forth, and up and down to feel the power of the muscles in your neck. These muscles also hold your head high. Face Muscles You may not think of it as a muscular body part, but your face has plenty of muscles. You can check them out next time you look in the mirror. Instead, many of them attach under the skin. This allows you to contract your facial muscles just a tiny bit and make dozens of different kinds of faces. Even the smallest movement can turn a smile into a frown. You can raise your eyebrow to look surprised or wiggle your nose. Your tongue is actually made of a group of muscles that work together to allow you to talk and help you chew food. Stick out your tongue and wiggle it around to see those muscles at work. But here are a few of the major ones: In each of your shoulders is a deltoid say: These are usually called pectorals say: PEK-tuh-rulz , or pecs, for short. When many boys hit puberty, their pectoral muscles become larger. Many athletes and bodybuilders have large pecs, too. Below these pectorals, down under your ribcage, are your rectus abdominus say: When you make a muscle in your arm, you tense your biceps say: When you contract your biceps muscle, you can actually see it push up under your skin. KWAD-ruh-seps , or quads, are the muscles on the front of your thighs. Many people who run, bike, or play sports develop large, strong quads.

Chapter 4 : Muscular System Parts And Functions - HUMAN ORGAN SYSTEM

Muscular system is composed of special tissue called muscular tissue. Muscles have the ability to contract actvely to provide the force for movements of body parts. Muscular system is an important system of human body because without it, life will completely stop.

Her work has appeared in health, medical and scientific publications such as Endocrinology and Journal of Cell Biology. She has also published in hobbyist offerings such as The Hobstarand The Bagpiper. Marie is a certified master gardener and has a Ph. Muscles are either voluntary or involuntary. These different muscle types have some features in common, but each is highly specialized for its function and responds to changes in your body in different ways. Video of the Day Skeletal Muscle Voluntary muscle tissue is also called skeletal muscle, because it makes up the muscles that attach to bones and help move parts of your skeleton, such as your arms and legs. Skeletal muscle is voluntary, because it responds to your conscious thoughts and intentions. When viewed microscopically, skeletal muscle cells have regular patterns, called striations, made up of specialized proteins that facilitate strong muscle contraction. These muscle cells are rectangular and tightly attached to one another end to end. Groups of these joined cells, called fibers, bundle together in larger and larger groups attached to one another by connective tissue. The largest groups of fibers eventually end in tendons, which attach your muscles to your bones. Smooth Muscle The muscular system contains two types of involuntary muscle that function automatically without conscious thought. One kind, called smooth muscle, is mostly found in the walls of hollow organs, such as the stomach, intestines and bladder. Under a microscope, smooth muscle lacks the striations of skeletal muscles, although its contractile proteins are similar to those in skeletal muscle. These proteins produce slower, more rhythmic contractions than those in skeletal muscle. This type of contraction helps smooth muscle carry out its functions, such as moving food through your gastrointestinal tract and emptying your bladder. Smooth muscle also contracts or relaxes to adjust the diameter of arteries in response to changes in your circulatory system. Cardiac Muscle The third type of muscle in your body is cardiac muscle, which is highly specialized and found only in the walls of your heart. Microscopically, cardiac muscle fibers are rectangular and have striations like those in skeletal muscle. But cardiac cells branch and join with neighboring cells and have specialized connections with one another that allow for both tight attachment and rapid cell-to-cell communication. Cardiac muscle fibers also contain exceptionally high numbers of mitochondria, which are energy-producing components. These and other adaptations help cardiac muscle cells contract constantly and steadily, keeping the heart pumping blood without interruption. Regulation Your body regulates contraction of the three types of muscle in different ways. Skeletal muscles contract in response to impulses from nerves, called motor nerves, whose endings contact muscle cells and release neurotransmitters. Smooth muscle cells are stimulated to contract in response to activity of nearby nerve cells or hormones and other molecules in their vicinity. Smooth muscle also contracts as a natural response to stretching. Contraction of cardiac muscle and the rate of your heartbeat are controlled by nerve endings in the heart wall and by hormones, such as epinephrine and norepinephrine, that circulate in the blood. Repair Both skeletal and smooth muscle tissue can repair themselves after injury and can increase the number of cells they contain when needed, such as when you exercise and build your muscle mass. Smooth muscle cells divide when new cells are needed. This mechanism remains functional throughout life. Many research studies, such as one published in the June issue of "Journal of Clinical Investigation," suggest that undifferentiated cells called adult stem cells might help replace damaged cardiac muscle. But additional work is needed to determine whether this strategy will eventually be used to treat people with heart disease.

Chapter 5 : Nervous System Functions and Parts | Ask A Biologist

Diseases of the muscular system. There is no single type of doctor that treats muscular diseases and disorders.

The cerebrum is the thinking part of the brain and it controls your voluntary muscles â€" the ones that move when you want them to. You need it to solve math problems, figure out a video game, and draw a picture. Your memory lives in the cerebrum â€" both short-term memory what you ate for dinner last night and long-term memory the name of that roller-coaster you rode on two summers ago. The cerebrum has two halves, with one on either side of the head. Scientists think that the right half helps you think about abstract things like music, colors, and shapes. The left half is said to be more analytical, helping you with math, logic, and speech. Scientists do know for sure that the right half of the cerebrum controls the left side of your body, and the left half controls the right side. The cerebellum is at the back of the brain, below the cerebrum. It controls balance, movement, and coordination how your muscles work together. Because of your cerebellum, you can stand upright, keep your balance, and move around. Think about a surfer riding the waves on his board. What does he need most to stay balanced? Nope â€" he needs his cerebellum! The brain stem sits beneath the cerebrum and in front of the cerebellum. It connects the rest of the brain to the spinal cord, which runs down your neck and back. The brain stem is in charge of all the functions your body needs to stay alive, like breathing air, digesting food, and circulating blood. The brain stem also sorts through the millions of messages that the brain and the rest of the body send back and forth. Pituitary Gland Controls Growth The pituitary gland is very small â€" only about the size of a pea! Its job is to produce and release hormones into your body. This gland is a big player in puberty too. This little gland also plays a role with lots of other hormones, like ones that control the amount of sugars and water in your body. And it helps keep your metabolism say: Your metabolism is everything that goes on in your body to keep it alive and growing and supplied with energy, like breathing, digesting food, and moving your blood around. The hypothalamus knows what temperature your body should be about If your body is too hot, the hypothalamus tells it to sweat. You Have Some Nerve! It needs some nerves â€" actually a lot of them. And it needs the spinal cord, which is a long bundle of nerves inside your spinal column, the vertebrae that protect it. If a spiky cactus falls off a shelf headed right for your best friend, your nerves and brain communicate so that you jump up and yell for your friend to get out of the way. What are they anyway? The nervous system is made up of millions and millions of neurons say: NUR-onz , which are microscopic cells. Each neuron has tiny branches coming off it that let it connect to many other neurons. When you were born, your brain came with all the neurons it will ever have, but many of them were not connected to each other. When you learn things, the messages travel from one neuron to another, over and over. Eventually, the brain starts to create connections or pathways between the neurons, so things become easier and you can do them better and better. Think back to the first time you rode a bike. Your brain had to think about pedaling, staying balanced, steering with the handlebars, watching the road, and maybe even hitting the brakes â€" all at once. But eventually, as you got more practice, the neurons sent messages back and forth until a pathway was created in your brain. Now you can ride your bike without thinking about it because the neurons have successfully created a "bike riding" pathway. Emotion Location With all the other things it does, is it any surprise that the brain runs your emotions? Maybe you got the exact toy you wanted for your birthday and you were really happy. Or your friend is sick and you feel sad. Where do those feelings come from? Your brain, of course. Your brain has a little bunch of cells on each side called the amygdala say: Scientists believe that the amygdala is responsible for emotion. Sometimes you might feel a little sad, and other times you might feel scared, or silly, or glad. Be Good to Your Brain So what can you do for your brain? They contain potassium and calcium, two minerals that are important for the nervous system. Get a lot of playtime exercise. Wear a helmet when you ride your bike or play other sports that require head protection. Use your brain by doing challenging activities, such as puzzles, reading, playing music, making art, or anything else that gives your brain a workout!

Chapter 6 : Muscular system - Wikipedia

The muscular system parts refer to the types, locations and the number of muscular organs in the human body, as you can see in the muscular system diagram.

Organs of Skeletal System and Their Functions The skeletal system in human is a major connective tissue system that is made up of organs, such as bones, ligaments, tendons and cartilages. The entire framework of body is made up of bones, which serves as a guarding system to protect the viscera and allows locomotion. Two bones are connected by fibrous tissues that are called ligaments; whereas the muscles are connected to the bones by tendons. These connections provide the system with greater range of motion and strength. Soft parts such as nose and ear are made up of flexible connective tissues called cartilages which further protect the bones. These different parts make up organs of human skeletal system. The skeletal systems in male and female are a bit different in a few aspects, such as female pelvis is more flat and round so as to support the childbirth. Similarly the pelvic angles and inlets are also different, such as angle in males is 90 degrees while that in females is degrees. Bones The most important organ of the skeletal system is the bones. Human skeleton is made up of bones that in coordination not only provides support and protection to the viscera with the help of muscles attached to them but also produces blood cells for the body from the bone-marrow. Ligaments and Joints Another important component, i. This attachment forms into joints and allows the bone to move in a particular direction and hence enhances the movement of body parts in desired direction, such as hips, elbow, knees ad wrist etc. If the stretching of ligament occurs more than the normal levels, the person is referred to as double-jointed. Tendons Similar to ligaments, tendons are important skeletal system organs which join the muscles to the bones, hence they are more flexible so as to provide greater range of movement. The contraction of tendon pulls the end of bone to which it is attached and makes that bone to move during walking and running. But this excessive flexibility of tendons make them more prone to injuries and infections. One such inflammatory conditions is known as tendonitis, in which the tendons get red, swollen and painful to move. Cartilage not only plays a role in maintaining and forming the shape of human ear and nose as well as other organs, but also protects the bones against friction forces which would otherwise corrode the bones easily. The cartilages can also get damaged or infected, causing the joint to be swollen and tender. In advanced cases, you may require repair or replacement such as knee replacement surgery. Divisions of Human Skeletal System Human skeleton organsare divided into two types, the appendicular skeleton and the axial skeleton. The axial skeleton runs in the midline i. The axial skeleton forms the central axis and provides protection to vital viscera, such as brain protected by skull, heart and lungs protected by the ribs cage and spinal cord protected by vertebrae. On the other side, the appendicular skeleton forms the body limbs, and is made up of bones in total. The most important function of appendicular skeleton is to provide movement and locomotion. Axial Skeleton It contains the following from top to bottom respectively: Skull- it includes the cranium, face and auditory ossicles. Hyoid- bone of neck for muscles attachment of chin and larynx. Vertebral column- consist of all spinal vertebrae. Thoracic cage- it contains ribs and sternum. Appendicular Skeleton It contains the following from top to bottom respectively: Shoulder girdle- it includes clavicle and scapula. Hip girdle- it includes hip bone. Classification of Bones Based on Shape and Size The bones of human skeletal system are classified in to four distinct groups on the basis of size and shape. They are long bones, short bones, flat bones and irregular bones. The bones of arms and legs are long in length as compared to their width. Thus these are categorized under long bones. Similarly the bones of ankle and wrist are short and cuboidal with almost same length as compared to their width. The bones of ribs and cranium are thin, broad and curved. They are called flat bones. All those bones which do not have a particular shape, and cannot be classified as long, short and flat are called irregular bones, such as hip bones and vertebrae. Skeletal System Diseases Following are some major diseases of the skeletal system which affect the above mentioned skeletal system organs: Diseases Description Osteoporosis This occurs in elderly population due to loss of calcium from the bones, making them thin and easy to get fractured. Osteomalacia Deficiency of vitamin D in adults causes osteomalacia. The condition is characterized by softening of bones and easy vulnerability to fractures.

Vitamin D deficiency also interferes with the bone remodeling processes. Arthritis It is the inflammation of joints, mostly the mobile joints such as neck, shoulder, knees, wrist and lower back. It affects not only the joint spaces, but also destroys the capsule surrounding tissues and even bones. Scoliosis Occurs in adolescence. It is a condition in which there is C or S shaped bending of vertebral spine and can be seen on the x-ray. It occurs due to multiple factors such as vitamin D deficiency and causes painful spinal movements that can be relieved by anti-steroidal drugs or topical application. Bone Cancer Primary cancers of bone are very rare. In other words, most cases of bone cancers are secondary and are a result of metastasis from a primary cancer to the bones. Leukemia is a blood cancer that occurs typically in the marrow of bones and is characterized by uncontrolled growth of abnormal looking white blood cells. Bursitis Inflammation of fluid filled sacs around joint space, called bursae. It usually affects the hips and shoulders. How to Keep Skeleton System Organs Healthy Take Calcium rich diet, containing mg calcium per day in the form of milk, cheese, broccoli, orange and salmon etc. Take vitamin D rich diet, containing 15mcg vitamin D per day for an adult in the form of eggs, fish, orange and cereals etc. Do weight bearing exercisesdaily or at least 30 minutes twice a week so as to make your bones strong in the form of pushups, sit-ups and squats etc.

Chapter 7 : Physiology Info > Parts of the Muscular System

The human muscular system includes skeletal, smooth and cardiac muscle tissue. Skeletal muscles attach to your bones, stabilizing the skeleton and enabling voluntary and reflexive movement. Smooth muscle tissue found in blood vessels and various body organs produces involuntary movement essential for normal function.

There are three types of muscle tissue: Visceral, cardiac, and skeletal. Visceral Muscle Visceral muscle is found inside of organs like the stomach , intestines, and blood vessels. The weakest of all muscle tissues, visceral muscle makes organs contract to move substances through the organ. Because visceral muscle is controlled by the unconscious part of the brain, it is known as involuntary muscleâ€"it cannot be directly controlled by the conscious mind. This smooth appearance starkly contrasts with the banded appearance of cardiac and skeletal muscles. Cardiac Muscle Found only in the heart , cardiac muscle is responsible for pumping blood throughout the body. Cardiac muscle tissue cannot be controlled consciously, so it is an involuntary muscle. While hormones and signals from the brain adjust the rate of contraction, cardiac muscle stimulates itself to contract. The natural pacemaker of the heart is made of cardiac muscle tissue that stimulates other cardiac muscle cells to contract. Because of its self-stimulation, cardiac muscle is considered to be autorhythmic or intrinsically controlled. The cells of cardiac muscle tissue are striatedâ€"that is, they appear to have light and dark stripes when viewed under a light microscope. The arrangement of protein fibers inside of the cells causes these light and dark bands. Striations indicate that a muscle cell is very strong, unlike visceral muscles. The cells of cardiac muscle are branched X or Y shaped cells tightly connected together by special junctions called intercalated disks. Intercalated disks are made up of fingerlike projections from two neighboring cells that interlock and provide a strong bond between the cells. The branched structure and intercalated disks allow the muscle cells to resist high blood pressures and the strain of pumping blood throughout a lifetime. These features also help to spread electrochemical signals quickly from cell to cell so that the heart can beat as a unit. Skeletal Muscle Skeletal muscle is the only voluntary muscle tissue in the human bodyâ€"it is controlled consciously. Every physical action that a person consciously performs e. The function of skeletal muscle is to contract to move parts of the body closer to the bone that the muscle is attached to. Most skeletal muscles are attached to two bones across a joint, so the muscle serves to move parts of those bones closer to each other. Skeletal muscle cells form when many smaller progenitor cells lump themselves together to form long, straight, multinucleated fibers. Striated just like cardiac muscle, these skeletal muscle fibers are very strong. Skeletal muscle derives its name from the fact that these muscles always connect to the skeleton in at least one place. Gross Anatomy of a Skeletal Muscle Most skeletal muscles are attached to two bones through tendons. Tendons are tough bands of dense regular connective tissue whose strong collagen fibers firmly attach muscles to bones. Tendons are under extreme stress when muscles pull on them, so they are very strong and are woven into the coverings of both muscles and bones. Muscles move by shortening their length, pulling on tendons, and moving bones closer to each other. One of the bones is pulled towards the other bone, which remains stationary. The place on the stationary bone that is connected via tendons to the muscle is called the origin. The place on the moving bone that is connected to the muscle via tendons is called the insertion. The belly of the muscle is the fleshy part of the muscle in between the tendons that does the actual contraction. Names of Skeletal Muscles Skeletal muscles are named based on many different factors, including their location, origin and insertion, number of origins, shape, size, direction, and function. Many muscles derive their names from their anatomical region. The rectus abdominis and transverse abdominis, for example, are found in the abdominal region. Some muscles, like the tibialis anterior , are named after the part of the bone the anterior portion of the tibia that they are attached to. Other muscles use a hybrid of these two, like the brachioradialis, which is named after a region brachial and a bone radius. Some muscles are named based upon their connection to a stationary bone origin and a moving bone insertion. These muscles become very easy to identify once you know the names of the bones that they are attached to. Examples of this type of muscle include the sternocleidomastoid connecting the sternum and clavicle to the mastoid process of the skull and the occipitofrontalis connecting the occipital bone to the frontal bone. Some

muscles connect to more than one bone or to more than one place on a bone, and therefore have more than one origin. A muscle with two origins is called a biceps. A muscle with three origins is a triceps muscle. Finally, a muscle with four origins is a quadriceps muscle. Shape, Size, and Direction. We also classify muscles by their shapes. For example, the deltoids have a delta or triangular shape. The serratus muscles feature a serrated or saw-like shape. The rhomboid major is a rhombus or diamond shape. The size of the muscle can be used to distinguish between two muscles found in the same region. The gluteal region contains three muscles differentiated by sizeâ€"the gluteus maximus large , gluteus medius medium , and gluteus minimus smallest. Finally, the direction in which the muscle fibers run can be used to identify a muscle. In the abdominal region, there are several sets of wide, flat muscles. The muscles whose fibers run straight up and down are the rectus abdominis , the ones running transversely left to right are the transverse abdominis, and the ones running at an angle are the obliques. Muscles are sometimes classified by the type of function that they perform. Most of the muscles of the forearms are named based on their function because they are located in the same region and have similar shapes and sizes. For example, the flexor group of the forearm flexes the wrist and the fingers. The supinator is a muscle that supinates the wrist by rolling it over to face palm up. In the leg, there are muscles called adductors whose role is to adduct pull together the legs. Groups Action in Skeletal Muscle Skeletal muscles rarely work by themselves to achieve movements in the body. More often they work in groups to produce precise movements. The muscle that produces any particular movement of the body is known as an agonist or prime mover. The agonist always pairs with an antagonist muscle that produces the opposite effect on the same bones. For example, the biceps brachii muscle flexes the arm at the elbow. As the antagonist for this motion, the triceps brachii muscle extends the arm at the elbow. When the triceps is extending the arm, the biceps would be considered the antagonist. Synergists are muscles that help to stabilize a movement and reduce extraneous movements. They are usually found in regions near the agonist and often connect to the same bones. Because skeletal muscles move the insertion closer to the immobile origin, fixator muscles assist in movement by holding the origin stable. If you lift something heavy with your arms, fixators in the trunk region hold your body upright and immobile so that you maintain your balance while lifting. Skeletal Muscle Histology Skeletal muscle fibers differ dramatically from other tissues of the body due to their highly specialized functions. Many of the organelles that make up muscle fibers are unique to this type of cell. The sarcolemma is the cell membrane of muscle fibers. The sarcolemma acts as a conductor for electrochemical signals that stimulate muscle cells. Connected to the sarcolemma are transverse tubules T-tubules that help carry these electrochemical signals into the middle of the muscle fiber. Myofibrils are made up of many proteins fibers arranged into repeating subunits called sarcomeres. The sarcomere is the functional unit of muscle fibers. See Macronutrients for more information about the roles of sugars and proteins. Sarcomere Structure Sarcomeres are made of two types of protein fibers: Thick filaments are made of many bonded units of the protein myosin. Myosin is the protein that causes muscles to contract. Thin filaments are made of three proteins: Actin forms a helical structure that makes up the bulk of the thin filament mass. Actin contains myosin-binding sites that allow myosin to connect to and move actin during muscle contraction. Tropomyosin is a long protein fiber that wraps around actin and covers the myosin binding sites on actin. Bound very tightly to tropomyosin, troponin moves tropomyosin away from myosin binding sites during muscle contraction. Muscles are the only tissue in the body that has the ability to contract and therefore move the other parts of the body. Muscles often contract to hold the body still or in a particular position rather than to cause movement. Another function related to movement is the movement of substances inside the body. The cardiac and visceral muscles are primarily responsible for transporting substances like blood or food from one part of the body to another. The final function of muscle tissue is the generation of body heat. As a result of the high metabolic rate of contracting muscle, our muscular system produces a great deal of waste heat. Many small muscle contractions within the body produce our natural body heat. When we exert ourselves more than normal, the extra muscle contractions lead to a rise in body temperature and eventually to sweating. Skeletal Muscles as Levers Skeletal muscles work together with bones and joints to form lever systems. The muscle acts as the effort force; the joint acts as the fulcrum; the bone that the muscle moves acts as the lever; and the object being moved acts as the load. There are three classes of levers, but the vast

majority of the levers in the body are third class levers. A third class lever is a system in which the fulcrum is at the end of the lever and the effort is between the fulcrum and the load at the other end of the lever.

Chapter 8 : Five Functions of the Muscular System | www.nxgvision.com

Parts of the Muscular System. There are three types of muscular tissues: skeletal (or striated) muscle, cardiac muscle, and smooth muscle. Skeletal Muscle. Skeletal muscle is found throughout your body.

By Editors Muscular System Definition The muscular system is a set of tissues in the body with the ability to change shape. Muscle cells contain a variety of proteins which help them contract in size. The proteins form fibers, which connect various parts of the cells. The main proteins used are actin and myosin. As seen in the graphic below, the muscular system contracts when energy from ATP is applied to the myosin heads of the myosin protein filament. The head releases the actin, reaches forward, and reattaches to the actin. This moves the protein filaments and contracts the fiber. Depending on the muscle cell, different formation of actin and myosin can be used, and in some organisms completely different proteins are used. Functions of the Muscular System Movement The most obvious function of the muscular system is movement. Organisms have adopted a variety of methods to use the contractile function of the muscular system to move themselves through the environment. The most basic movements of fish include contracting muscles on opposite sides of the body in succession to propel themselves through the water. In organisms with limbs, tendons and other connective tissues are used to secure muscles to the joints and skeleton, which may be internal like human skeletons, or external like the exoskeleton of crabs. The nervous system coordinates the contraction of the muscular system to synchronize the movement of the limbs. Animals like the cheetah, swordfish, and bat have obtained speeds above 60 miles per hour through the power of their muscles alone. Circulation The second and less obvious function of the muscular system is to assist with circulation. Visceral and cardiac muscle tissues surround the blood vessels and lymph vessels that carry crucial nutrients to the cells of the body. Cardiac muscle makes up the heart, and supplies the main force for blood traveling through the body. Large arteries and veins have associated muscles which can contract or relax to control the pressure of the blood. The actions of large skeletal muscles also help pump the blood and lymph through the body. While you exercise and contract large and small muscles, they push vessels aside, which works like a pump to move fluids around your body. Digestion Much like its ability to move fluids through vessels in the circulatory system , the muscular system also aids in moving food through the digestive system. Most digestive organs are surrounded by visceral, or smooth muscle tissue. Although the tissue cannot be voluntarily contracted like skeletal muscles, it is controlled subconsciously. When food needs to be moved through the gut, the muscles contract in a synchronized fashion in a wave through the digestive system. Muscular System Organs Unlike other organ systems, the muscular system is divided into different types of tissues, which are incorporated into various organs in the body. Skeletal muscle is the tissue most commonly associate with the muscular system. Skeletal muscle attaches to the skeleton, and moves the limbs and body of an organism. Skeletal muscle systems are composed of striated muscle which has distinct bands of proteins called actin and myosin in each myofibril. When these proteins are given energy, they slide past each other, pulling the ends of each muscle cell together. The sarcomeres, or function units of actin and myosin, produce the banding that can be seen in striated muscle. This can be seen in the image below. Visceral muscle cells do not contain these stark bands of protein, and the actin and myosin fibers work differently. Instead of think fibers than run through the cell, visceral muscle is surrounded by a net of actin and myosin fibers, which squeezes the cell when contracted. Visceral muscle is also known as smooth muscle for this reason. Cardiac muscle, which surround the chambers of the heart, is striated like skeletal muscle, but the cells are connected to adjacent cells, which creates more of a contractile motion to pump the blood. Skeletal muscle is connected mostly to the somatic nervous system which is controlled by voluntary impulses from the brain. The cardiac and visceral muscles, on the other hand, are controlled largely by the autonomic nervous system , which controls the subconscious actions of an organism. The separation of these nerve systems ensures that the autonomic functions like breathing and digestion continue to take place as an animal moves about and searches for more food. The difference in muscular system tissues is due to their very different uses. Skeletal muscles must be able to do large amount of work quickly, therefore they consist of striated muscle cells, which can contract voluntarily. The smooth muscle

tissue found in visceral tissues have fewer energy producing mitochondria and are simply used to contract hollow organs and move the fluid inside. The stomach, intestines, and blood vessels are lined with visceral muscles. Cardiac muscle is striated, because it needs to produce lots of force, although it is not controlled voluntarily. Related Biology Terms Visceral Muscle â€" Muscle surrounding or attached to the circulatory and digestive systems, which helps circulate fluid and food through the body. Striated Muscle â€" Muscles with distinct stripped cause by bands of actin and myosin, which are often part of the voluntary, or somatic nervous system. Cardiac Muscle â€" Specialized muscle tissue of the heart, which is striated and connected to adjacent cells. Lymph is fluid in your body that helps circulate important immune cells which help protect you from bacteria and viruses. A common remedy to the common cold is to get up and exercise a little. Why can this be helpful? It will help you breath more, clearing out your lungs B. Running in the cold is really good for your sickness C. It helps circulate white blood cells, which fight disease Answer to Question 1 C is correct. When you exercise your muscular system circulates the fluid in your lymph system. This helps move white blood cells from where they are to where they are needed. A sit-ups or jumping jacks can help flex all your muscles and get the white blood cells to the infection. The muscle that controls your lungs is called the diaphragm. The diaphragm is a thin sheet of muscle that extends across the bottom of the chest cavity. While you can hold your breath for a while, once you pass out your body will resume breathing for you. Is the diaphragm connected to the autonomic or somatic nervous systems? Both Answer to Question 2 C is correct. This is one example of a muscle that is controlled by both systems. While you can actively control this muscle, it will also work on its own subconsciously. This is not true of most skeletal muscles. It is said that some people are able to control their heart rate in a similar way, however the heart will quickly resume its normal pattern when the body becomes stressed. Why are there no distinct organs in the muscular system? The muscular tissues span most of the other organ systems B. Muscle tissues are basically all the same C. The heart is a distinct organ Answer to Question 3 A is correct. Did you say C? The heart belongs to the circulatory system, because the lining of the heart is derived from the endoderm, the same embryonic tissue the created the digestive tract. The muscle tissue is derived from mesoderm, a different embryonic tissue which develops all of the muscle. Like the digestive system, the heart is just an organ surrounded by the muscular system.

Chapter 9 : Muscular System - Muscles of the Human Body

The two major functions of the muscular system are the ability to make the body move and the posture of the body. The muscles enable the arms, legs and other parts of the body to move while keeping the body in an upright or sitting position without falling over. Muscles are attached to nearly every.

Muscles are special type of tissues of human body that posess the ability of contraction and relaxation. They can contract actively thus producing force for different body movements. Types of Muscle Striated, under voluntary control, found attached to skeleton, produce major movements of body parts Smooth Muscle Non striated, not under voluntary control, found in soft organs of body, responsible for processes like digestion of food etc. Cardiac Muscle Striated, involuntary, present exclusively in heart, responsible for pumping activit of heart, very strong and tough Functions Movements of body parts, Stability and Posture, Heat production, Circulation, Help in Digestion Introduction to Muscular System: Muscular System Muscular system is the system of Human Body that provides motor power for all movements of body parts. Muscular system is composed of special tissue called muscular tissue. Muscles have the ability to contract actvely to provide the force for movements of body parts. Muscular system is an important system of human body because without it, life will completely stop. Muscles produce not only those movements that are under the control of our will and that we can see and feel, but also those movements that are responsible for activities like breathing, digestion of food, pumping of blood etc. Muscles are body tissues that provide the force for all body movements. They are made of special types of cells. Skeletal muscles form most of the human body weight. They are under the control of human will and all body movements occurring by our will are produced by skeletal muscles. They are called skeletal muscles because they are almost always found attached to the skeleton and produce movements in different parts of the skeleton. Smooth muscles form the soft body organs like stomach, intestine, blood vessels etc. They are not under the will of human beings and are responsible for unconscious body activities like digestion of food. They are called smooth muscles because when seen under the microscope, they do not have any striation in contrast to the other two types of muscles. Cardiac muscles are exclusively found in human heart and no where else. They are extremely strong and powerful muscles. They are not under the control of human will and are involuntary. The pumping of blood by human heart is because of the force provided by the contraction of cardiac muscles.