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3-Muscular tissue

Without these muscles, nothing in the body would move and no body movement would occur .

Muscular tissue composed of cells called muscle fibers . Muscular fiber contain .The muscles are also important in the generation of actin filaments and myosin body heat .There are 3 types of muscle tissue. Each type differs in appearance ,physiology ,and function .

*Cardiac * skeletal* smooth

Classification of Muscle Cells

-Striated vs. Non striated. (striated have a banded appearance (stripes)

-Single nucleus or multinucleated cells

-Muscle cells can be controlled

(voluntarily (consciously) or involuntarily (automatically)

1- Skeletal muscle :- (voluntary muscle)

Skeletal muscle also called voluntary muscle is attached by tendons to the bones of skeleton ,and when it contracts ,body parts move contraction of skeletal muscle is under voluntary control and occurs faster than in the other muscle types they run the length of the muscle .

Skeletal Muscle Structures

Muscle tissue (muscle cells or fibers)

Connective tissues ,Nerves and Blood vessels

How is muscle tissue organized at the tissue level?
Organization of Connective Tissues

Muscles have 3 layers of connective tissues

1-Epimysium-Exterior collagen layer ,Connected to deep fascia Separates muscle from surrounding tissue

2-Perimysium- Surrounds muscle fiber bundles (fascicles**) .**

Contains blood vessel and nerve supply to fascicles

3-Endomysium – Surrounds individual cells (muscle fibers) .

Contains capillaries and nerve fibers contacting muscle cells ,Contains satellite cells (stem cells) that repair damage **.**

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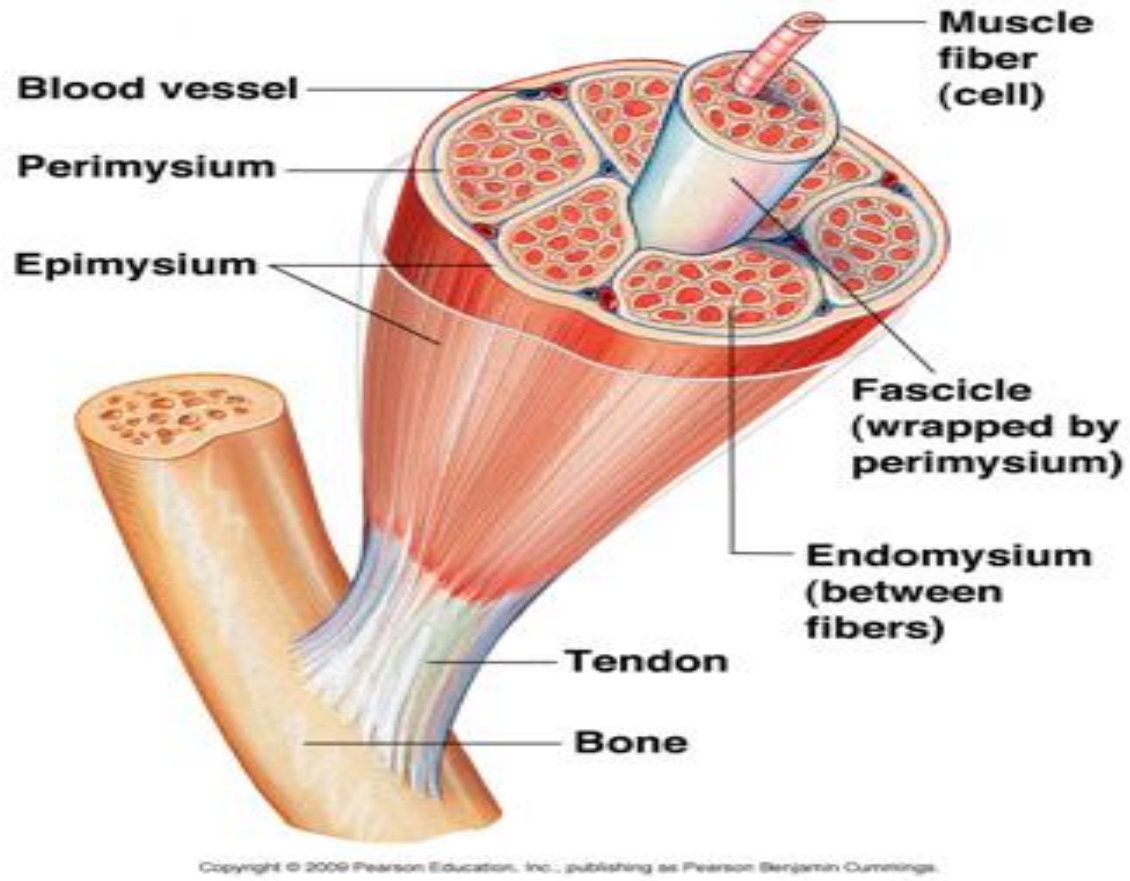


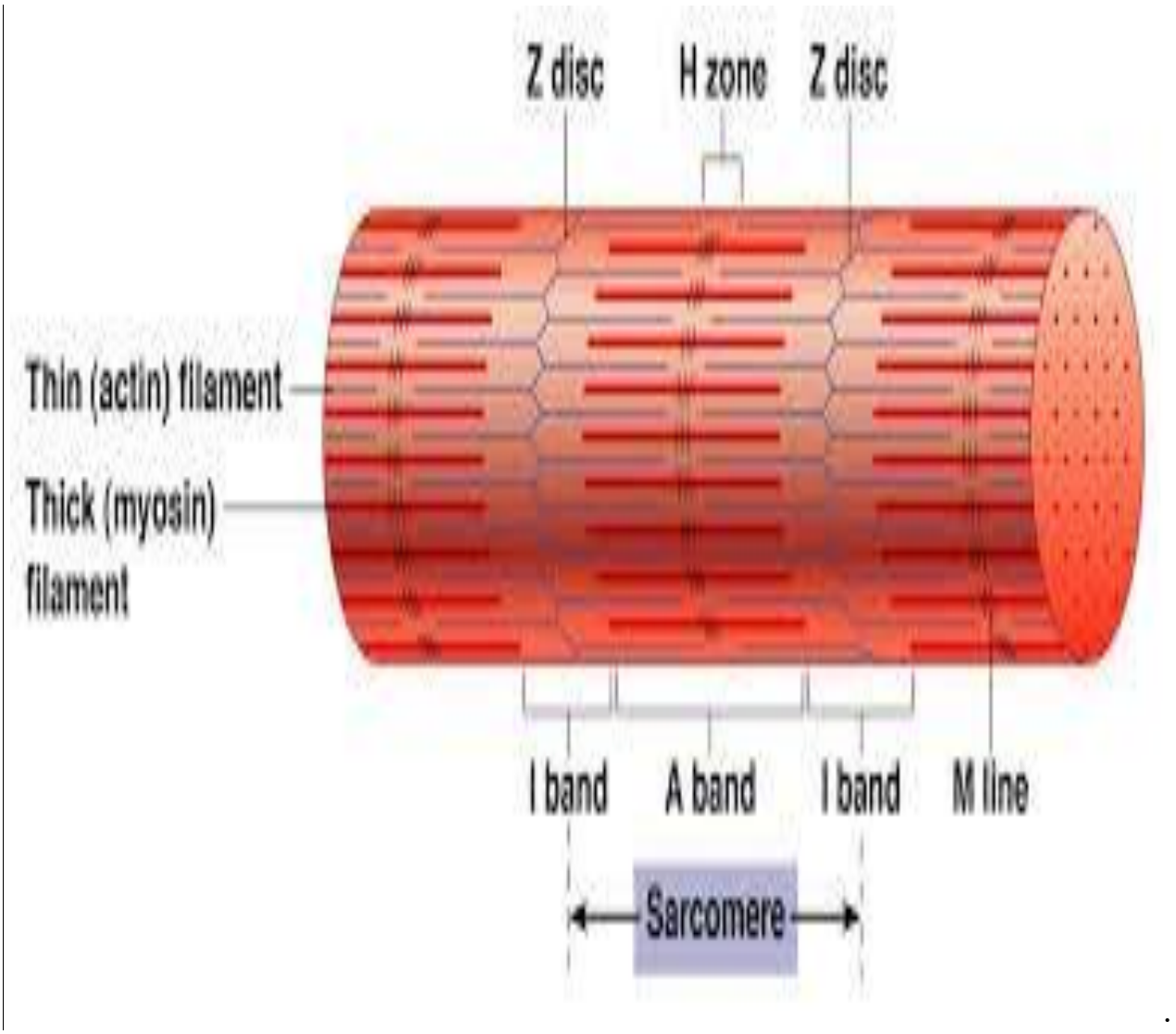
Nerves

Skeletal muscles are voluntary muscles, controlled by nerves of the central nervous system .

Blood Vessels

Muscles have extensive vascular systems that supply large amounts of oxygen supply nutrients carry away wastes

Skeletal muscle fiber:- Skeletal muscle fibers (cells) are actually a multinucleated syncytium formed by the fusion of individual small muscle cells or myoblasts, during development**.,** They are filled with longitudinally arrayed subunits called myofibrils. The myofibrils are made up of the myofilaments myosin (thick filaments) and actin (thin filaments). The striations reflect the arrangement of actin and myosin filaments and support structures. The individual contractile units are called sarcomeres. A myofibril consists of many sarcomeres arranged end to end. The most obvious feature in longitudinal sections of skeletal muscle is the alternating pattern of dark and light bands, called respectively the A (anisotropic) and I (isotropic) band. The I band is bisected by a dense zone called the Z line, to which the thin filaments of the I band are attached



The nuclei are located peripherally, immediately under the plasma membrane (sarcolemma). The thickness of individual muscle fibers varies (depending for example on location in the body and exercise) but each fiber is of uniform thickness throughout its length. Skeletal muscle fibers do not branch.

Skeletal Muscle Cells

-Striated, voluntary, and multinucleated

- long, thin and cylindrical; they are attached to bones and move our skeleton

-called “muscle fibers , do not divide to create new cells

new fibers are produced by stem cells

Striations -- cross stripes (bands) run perpendicular to the cells

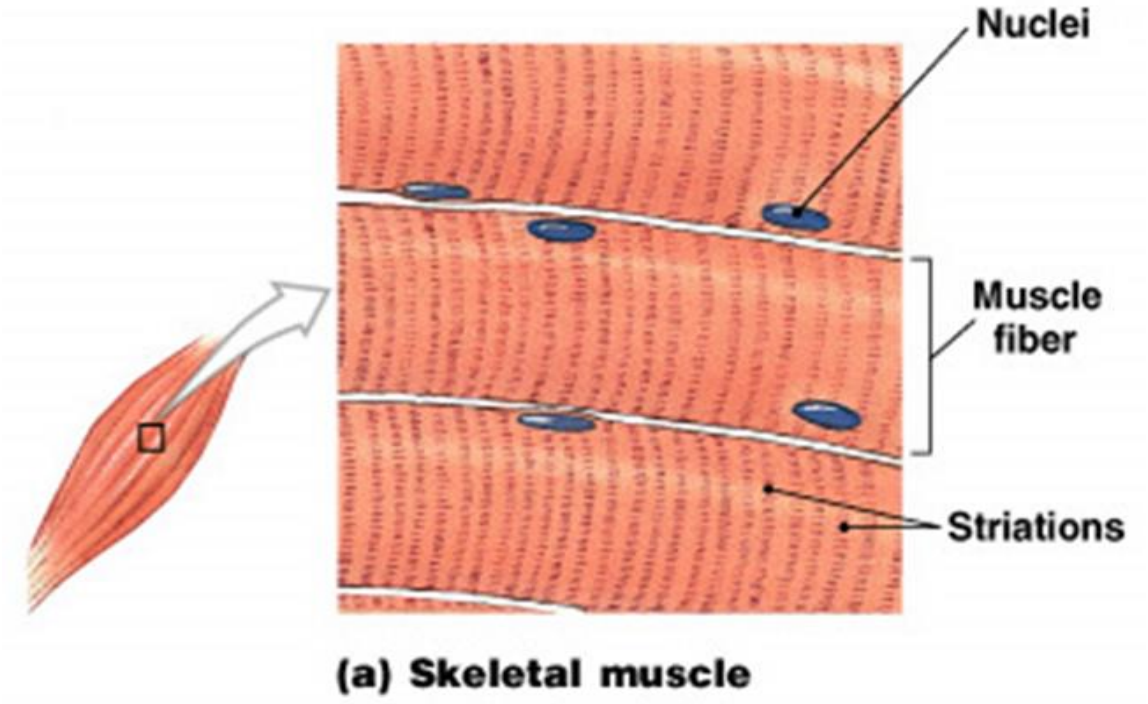
Function of skeletal muscle

1-Maintain body position and posture

2-Support soft tissues

3-Maintain body temperature

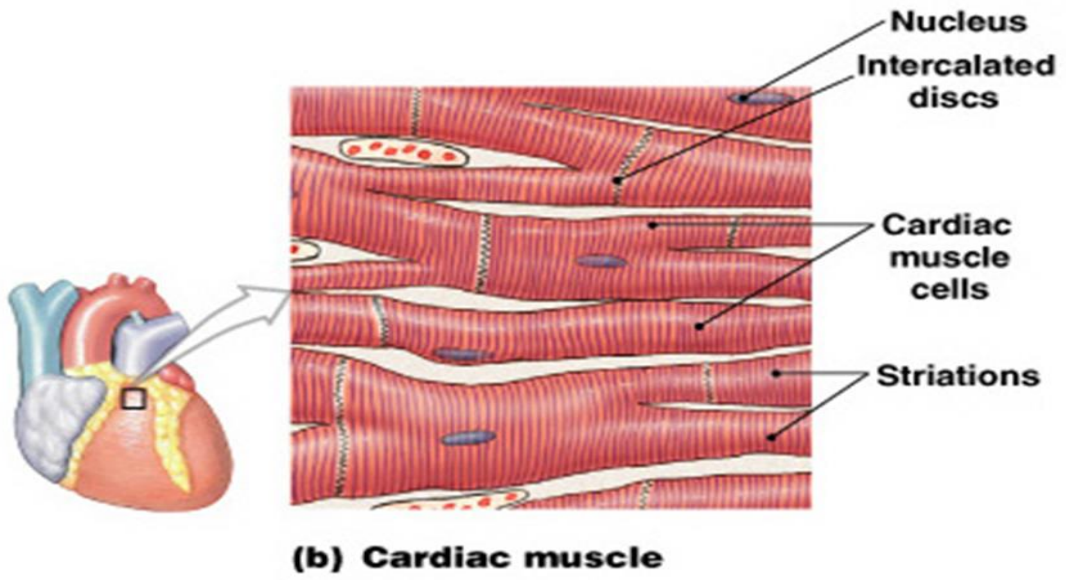
4-Store Nutrient reserves



(a) Skeletal muscle

2-Cardiac Muscle Cells:-is found only in the walls of the heart and at the base of the venae cavae as they enter into the heart. Cardiac muscle is intrinsically contractile but is regulated by autonomic and hormonal stimuli. . Its contraction pumps blood and accounts for the heart beat .Cardiac muscle combines features of both smooth muscle and skeletal muscle. It has striations but the contraction of the heart is involuntary for the most part .Have a single ,centrally placed nucleus .The cells (cardiocytes) are branched and seemingly fused one with the other, and the heart appears to be composed of one large interconnecting mass of muscle cells .Actually ,cardiac muscle cells are separate and individual ,but they are bound end to end at intercalated disks areas where folded plasma membranes between two cells contain adhesion junctions and gap junctions. Intercalated discs consist of several types of cells junctions whose purpose is to facilitate the passage of an electrical impulse from cell to cell and to keep the cells bound together during constant contractile activity. Cardiocytes are regulated by pacemaker cells which control contraction of the heart muscles . Cardiac muscle also has a much greater number of mitochondria in its cytoplasm. No satellite cells .

Specialized fibres, called Purkinje fibres, Purkinje fibres are of larger diameter than ordinary cardiac fibres, with fewer myofibrils and an extensive, well-defined clear area around the nucleus. They conduct impulses at a rate about four times faster than that of ordinary cardiac fibres and serve to coordinate the contraction of the atria and ventricles.



(b) Cardiac muscle

3-Smooth(visceral) Muscle tissue :- is so named because the cells lack striations . smooth muscle fibers are intrinsically contractile but responsive to autonomic and hormonal stimuli. They are specialized for slow, prolonged contraction. The spindle – shaped cells each with a single nucleus, form layers in which the thick middle portion of one cell is opposite the thin ends of adjacent cells . cells can divide and regenerate new cells .Consequently ,the nuclei form an irregular pattern in the tissue .Smooth muscle is not under voluntary control and therefore is said to be involuntary .Smooth muscle found in the walls of viscera (intestine ,stomach and other internal organs) .and blood vessels ,contracts more slowly than skeletal muscle but can remain contracts for a longer time .When the smooth muscle of the intestine contracts ,food moves along its lumen .When the smooth muscle of the blood vessels contracts blood vessels constrict ,helping to raise blood pressure .Small amounts of smooth muscle are also found in the iris of the eye and in the skin . One distinguishing physiological feature of smooth muscle is its ability to secrete connective tissue matrix. In the walls of blood vessels and the uterus in particular, smooth muscle fibers secrete large amounts of collagen and elastin.

Role of Smooth Muscle in Body Systems

Forms around other tissues

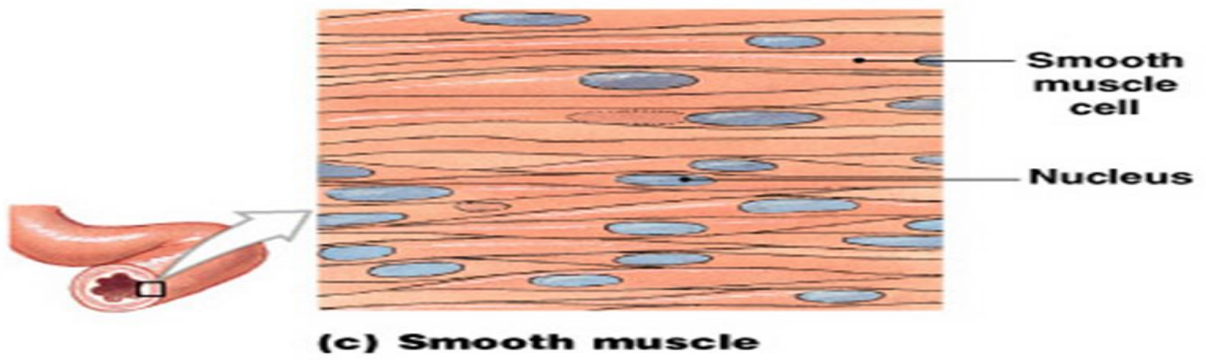
-In blood vessels:-regulates blood pressure and flow

In reproductive and glandular systems:-produces movements

-In digestive and urinary systems:-forms sphincters

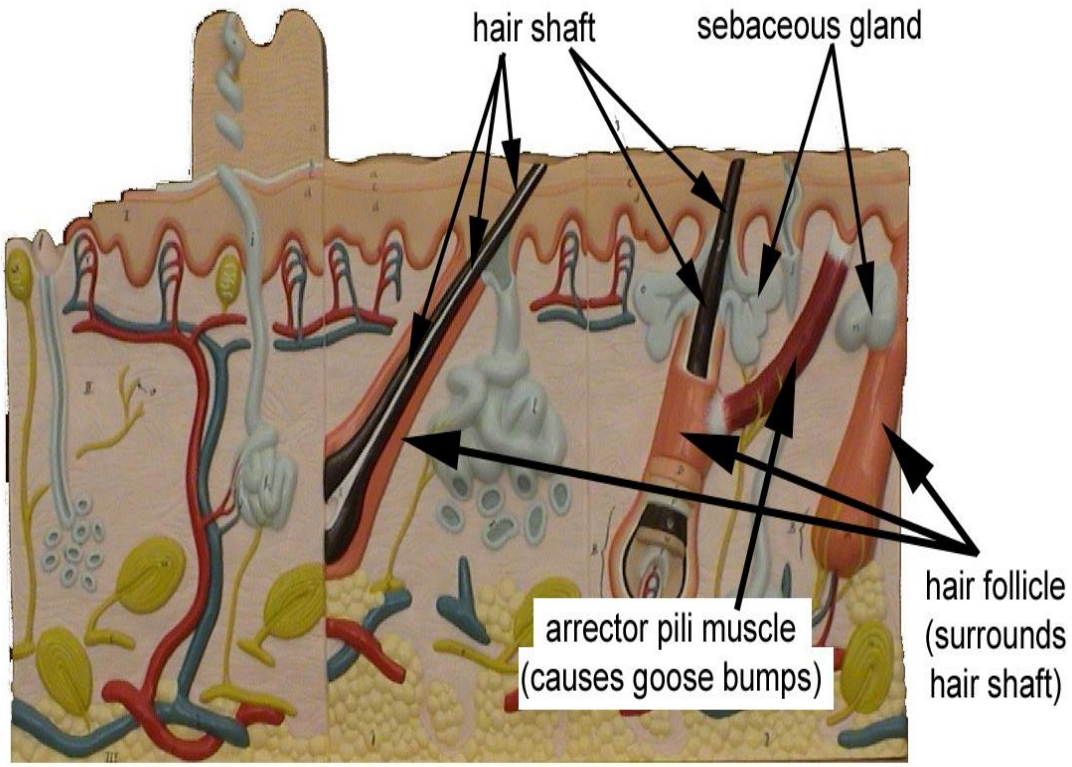
produces contractions

-In integumentary system :-arrector pili muscles cause goose bumps :-



(c) Smooth muscle

Muscle Type	Striated	nuclei	Voluntary or Involuntary
Skeletal	Yes	Multi-nucleated	Voluntary
Cardiac	Yes	Single Nucleus	Involuntary
Smooth	No	Single Nucleus	Involuntary



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