Muscle Types

There are three types of muscle in the body: skeletal, cardiac and smooth. Skeletal muscle is innervated by the somatic nervous system, so it is under voluntary control. It is also striated and multinucleated. More nuclei per cell allow uniform contraction of the entire muscle fiber. Cardiac muscle is similar structurally, except that it is under control of the autonomic nervous system. It also has myogenic activity, as some heart tissue can generate action potentials without nervous system stimulation. Cardiac muscle cells use gap junctions to transmit the electrical signal from one cell to the next. This occurs through channels that connect the cytoplasm of two cells. The final type of muscle is smooth muscle, which is uninucleate like cardiac muscle. Smooth muscle is typically found in the digestive tract and also exhibits myogenic activity. However, smooth muscle is non-striated and can maintain contractions after stimulation has ended.

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Characteristics

Skeletal Muscle

Muscular Skeleton

Skeletal muscles connect one bone to another. Usually they attach to bone in antagonistic pairs such as tricep and bicep muscles. The attachment occurs via bundles of collagen fibers called tendons.

Somatic Nervous System

Sumo-tick

Skeletal muscles can only generate action potentials if stimulated by the somatic nervous system. They are non-myogenic and are under voluntary control.

Striated

Striped-ribbon

Skeletal Muscles have a striated appearance due to their many sarcomeres.

Multinucleate

Juggling Multiple-nuclear-balls

Skeletal muscles have more than one nucleus per cell, which permits the simultaneous contraction of all the actin-myosin contractile units along the length of a muscle fiber.

Cardiac Muscle

Heart Muscle

The heart is composed of cardiac muscle, which has certain features allowing for automatic pumping of blood and timed contractions of various sections of the heart.

Autonomic Nervous System

Atomic-automobile

The autonomic nervous system regulates the rate of contraction of cardiac muscles.

Myogenic

Mayo-genie

Cardiac muscle has myogenic activity much like smooth muscle. Cardiac muscle can automatically generate action potentials without nervous stimulation.

Gap Junctions

Gap in Teeth

When an action potential is initiated in one cardiac muscle cell, it is passed along to its neighbors through gap junctions. This is why the heart contracts in unison. Gap junctions are channels to connect one cytoplasm to the next, allowing flow of ions and transmission of electrical signal. Both cardiac muscle and smooth muscle have gap junctions.

Uninucleate

Unicorn-nuclear-balls

Cardiac muscle cells and smooth muscle cells have only one nucleus per cell, unlike skeletal muscle cells which are multi-nucleated. Muscle fiber cells have multiple nuclei because each muscle fiber arises from the fusion of many myoblasts.

Smooth Muscle

Smooth Muscle Smoothie

Smooth muscle is found in organs and vessels such as the digestive tract, bladder, uterus and blood vessel walls. Smooth muscle cells exhibit myogenic activity, are non-striated, and form a complicated contraction mechanism with intermediate filaments and dense bodies. Some smooth muscle cells have gap junctions and can maintain contractions after stimulation.