Structure of Muscle Fibers

Because of their long, thread-like appearance, muscle cells are called muscle fibers. Unlike other cells, muscle fibers have multiple nuclei pressed against the side of the plasma membrane. Furthermore, even though muscle fibers are extremely thin, they contain a complex interior—just like other human cells.

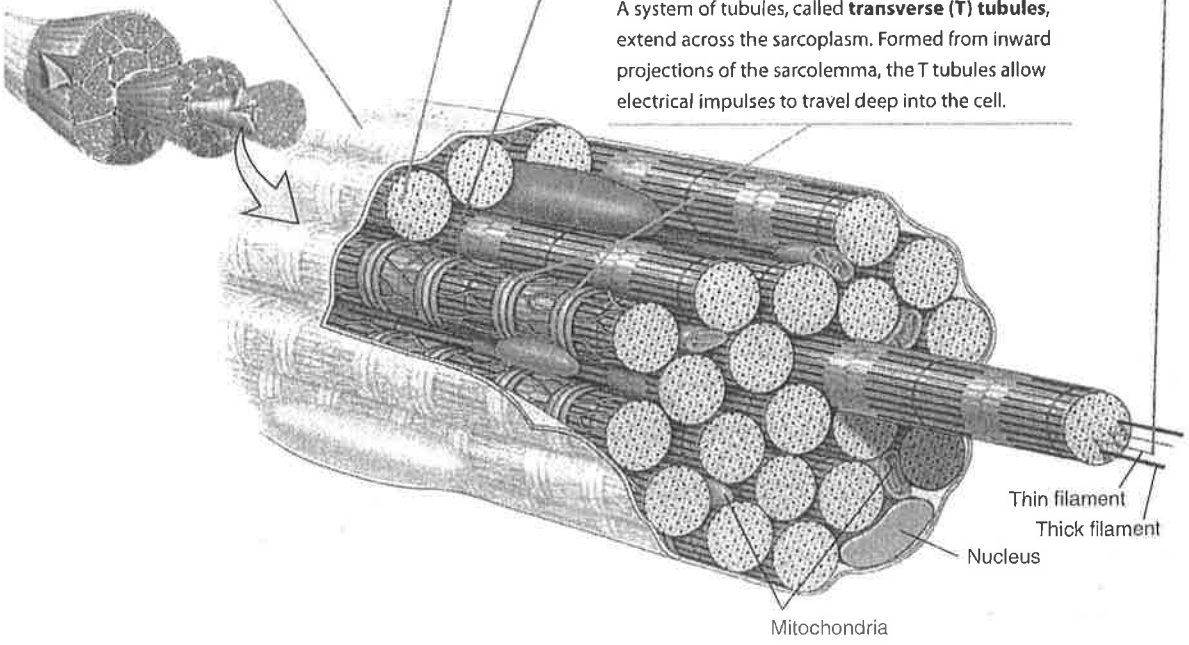
The plasma membrane surrounding each fiber is called a **sarcolemma**, while the cytoplasm of the cell is called **sarcoplasm**.

Long protein bundles called **myofibrils** fill the sarcoplasm. Myofibrils store glycogen (which is used for energy) as well as oxygen.

Sarcoplasmic reticulum (SR)—the smooth endoplasmic reticulum of a muscle fiber—surrounds each myofibril. This is where calcium ions are stored.

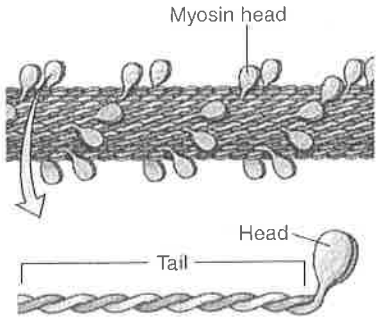
Myofibrils consist of even finer fibers, called **myofilaments**. There are two types of myofilaments: thick and thin. Thick myofilaments are made of a protein called **myosin**, while thin myofilaments consist of a protein called **actin**. The arrangement of actin and myosin gives skeletal muscle its striated appearance.

A system of tubules, called **transverse (T) tubules**, extend across the sarcoplasm. Formed from inward projections of the sarcolemma, the T tubules allow electrical impulses to travel deep into the cell.



Thick Filaments

Each thick myofilament consists of hundreds of myosin molecules stacked together, with the myosin heads facing outward.



The myosin molecule, which makes up thick myofilaments, is shaped like a golf club with a globular head and shaft-like tail.

Thin Filaments

Consisting of two chains of the contractile protein **actin**, thin myofilaments look like a string of beads. Entwined with the actin are two other proteins: **tropomyosin** and **troponin**.