Types of Muscle Tissue

Skeletal	Cardiac	Smooth
multinucleate striated	one nucleus striated	one nucleus nonstriated
voluntary	involu-ntary	involuntary
attached to bones to cause movement	heart (myoca-rdium)	GI, Uterus, Blood vessels

Skeletal Muscle Cells

long cells (fibers) that contain repeating striations called bands

bands composed of filaments of actin and myosin

voluntarily controlled by motor neurons:

1. descending motor tracts

2. ventral root

3. spinal nerve

4. neuromuscular junction synapses with muscle fiber

Innervation of Muscle Celll

motor neurons	stimulate muscle cells
excitable cells	can change membrane potential
acetylcholine	released from neuron and tells muscles to contract
Neuromuscular junction(syn-apse)	axon terminal of motor neuron interacts with muscle

Smooth Muscle Cells

contain filaments of actin and myosin

gap junctions allow movement between neighboring cells

displays rhythmicity (peristalsis and segmentation)

tetanic contraction

multi-unit: more varicosities

single unit: more gap junctions

Gross Anatomy of Skeletal Muscle

A muscle is a bundle of fascicles

Fascicles are bundles are muscle fibers-(cells)

muscle fiber(cell) serves as the unit of contraction

Epimysium covers entire muscle

Perimysium wrap around fascicle

Endomysium encloses a single muscle fiber (cell)

one nerve and one artery generally serve each muscle

Sliding Filament Theory

Action potential in neuron	motor neuron is activated an AP passes down axon	AP arrives at axon terminal

Sliding Filament Theory (cont)

Calcium channels in neuron	voltage change induces opening of Ca channles	calcium induces docking of neurotran-smitter-filled vesicles at plasma membrane
Acetyl-choline released	ach diffuses across cleft	Ach binds to its receptors
Muscle cell response	GP induces depolarization and MANY Ca channles open	T-tubules carry impulse deep into muscle fiber
power stroke and contra-ction	Calcium binds to troponin--myosin binds to actin and uses ATP to generate a powerstroke	Muscle fibers shift at each sarcomere

Cardiac Muscle Cells

connected by desmosomes and gap junctions

contain filaments of actin and myosin that shorten to contract

functional syncytium: all-or-none

does not undergo tetanic contraction

Microscopic Anatomy of Skeletal Muscle	
Sarcoplasm: cytoplasm of muscle cell	contains glycosomes and myoglobin
Sarcolemma: specialized plasma membrane	deep to endomysium
T-tubules	extensions of plasma membrane(sarcolemma), permut action potentials to penetrate,
Sarcoplasmic reticulum-(modified ER)	calcium storage and release site
Myofibrils	Fibers that aid in muscle contraction they are made of lots of sarcomeres(contractile units)
sarcomere	contain thick(myosin) and thin(actin) filaments. the reason skeletal muscles are striated. slide along one another
Troponin and Tropomyosin	proteins that prevent actin from binding myosin by blocking myosin binding sites

Myofibril structure	
Dark A band	actin and myosin filaments
Light I band	actin filaments
H-zone	area of A band with only myosin. shortens when muscle contraction occurs
M-line	attachment point for myosin
Z-line	attachment point for actin
Sliding Filament Theory	Filaments in sarcomere do not shorten, they slide past one another