**3 Types of Muscle Tissue**:

1.

2.

3.

O2 Mitochondria Glucose/Monosaccharide Ca+ Protein

Acetylcholine Action Potentials Na+ K+ Motor neuron

Twitch fibers Tendons Fascia ATP Muscle fibers

Myofilaments Nodes of Ranvier Synaptic knobs Receptors

Synaptic cleft Motor end plate Neuromuscular junction Enzyme

CNS ANS Motivation to move Effectors

**Structure of a Skeletal Muscle**

 Connective Tissues

1. Fascia -
2. Tendons –
3. Aponeuroses -

**Anatomy of a Skeletal Muscle**





**Skeletal muscle fiber = muscle cell**

* Multinucleated

* Sarcolemma
* Sarcoplasm
* Myofibrils consisting of:

 -thin actin filaments

 -thick myosin filaments

* Sarcomeres
* Sarcoplasmic reticulum (SR)
* Transverse (‘T’) tubule



* **I Band:** Light band, composed of thin actin filaments
* **A Band:** Dark band, composed of thick myosin filaments overlapping with thin actin filaments

**H Zone:** Center of A band; composed of thick myosin filaments

* **Z Line:** Anchors filaments in place; sarcomere boundary; center of I band
* **M Line:** Anchors thick filaments; center of A band

**Contractile Proteins**:

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Neurology:**

 Neuron –

 Local potential changes –

 Action Potential –

 Neurotransmitter –

**Neuromuscular Junction**

* + Motor neuron -
	+ Motor end plate -
	+ Synaptic cleft -
	+ Synaptic vesicles -
	+ Neurotransmitters -

**Stimulus for Contraction**

**Steps of Muscle Contraction**

**Muscle Relaxation**

 Acetylcholinesterase –

 Calcium pump –

 Troponin-tropomyosin complex –

**Muscular Responses**

 Threshold Stimulus –

 Twitch –

1. Fast twitch
2. Slow twitch

Hypertrophy vs. Atrophy –

**Recruitment of Motor Units**

 Gross motor -

 Fine motor -

**Muscle Diseases:**

**Muscle contraction terminology**

1. Origin
2. Insertion
3. Prime mover
4. Agonist
5. Antagonist
6. Synergist
7. Isotonic
	1. Concentric
	2. Eccentric
8. Isometric

**Length-Tension relationship**

**Energy Sources**

1. ATP reserves
2. Creatine phosphate
3. Cellular respiration
	1. Anaerobic phase
	2. Aerobic phase

**Skeletal Muscle Actions**

 Articulation/Joints -

 Synovial Joints

1. Ball & Socket –
2. Plane –
3. Hinge –
4. Pivot –
5. Saddle –
6. Condylar –

**Muscle Fatigue & Cramping**