Muscle Functions

1. Produces movement
2. Maintains posture
3. Stabilizes joints
4. Generates heat

Comparison of Muscle Types

Differ by:

- Body location
  - Attached to bones
  - Heart
  - Walls visceral organs

- Cell shape and appearance
  - Single cell
  - Cylindrical
  - Striated
  - Multinucleate
  - Branched cells
  - Fusiform
  - No striations
  - One nucleus

- Regulation of contraction
  - Voluntary
  - Involuntary
  - Involuntary
Common Characteristics of All Muscle types

- elongated
- shorten/contract
- terminology

Skeletal Muscle

- striated and voluntary
- fragile
- powerful
  - epimysium
    - becomes tendon
  - perimysium
    - around fascicle
  - endomysium
    - around single muscle fiber/cell
A myofibril is an organelle

Muscle Contractions — Stages 1 & 2

1. Nerve impulses travel down a motor neuron, which branches.

2. A motor neuron branch terminates at a neuromuscular junction.

Inside Skeletal Muscle

**Innermost**

1. Actin/myosin
2. Sarcomere
3. Myofibril
4. Sarcoplasmic reticulum
5. Sarcoplasm

6. Sarcolemma
7. Endomysium
8. Fascicle
9. Perimysium
10. Epimysium

**Outermost**
Neuromuscular Junction

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Muscle Contraction—Stage 3

1. A muscle fiber has a T (for transverse) system that conducts impulses to calcium storage sacs.

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Muscle Contraction—Stage 4

2. Calcium is released, and muscle contraction occurs as actin filaments slide past myosin filaments.

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Why Warm Up?

- Stretching
  - lengthens muscle & tendon
  - less prone to trauma/tears
- raise body temperature
- decrease chances of muscle & CT injury
- increase blood flow to area
  - better delivery of fuels
- increase speed of neural transmission to muscles
  - faster reaction times

Skeletal Muscle Fiber Types

- Slow-twitch Fibers
- Fast-twitch Fibers
Slow-twitch Fibers

- Is aerobic
- Has steady power
- Has endurance

Fast-twitch Fibers

- Is anaerobic
- Has explosive power
- Fatigues easily

Energy for Muscle Contraction

- Blood delivers glucose and O₂ to muscle
- Glycogen in muscle produces glucose

Aerobic Respiration
- O₂ available
- ATP, H₂O, CO₂
- Lactate, creatine, creatine phosphate

Fermentation
- No O₂ available
- Lactate, creatine, creatine phosphate

In resting muscle, ATP is used to build up creatine phosphate.
Energy for Muscle Contraction

1. Coupled reaction of creatine phosphate and ADP
2. Anaerobic glycolysis and lactic acid formation
3. Aerobic respiration

Origin and Insertion

Every skeletal muscle attaches to bone or cartilage at two or more points via tendons

- Origin
  - Immovable or less movable
- Insertion
  - More movable bone
Muscles of Head and Neck

- Frontalis
- Orbicularis oculi
- Zygomaticus
- Orbicularis oris
- Buccinator
- Temporalis
- Masseter
- Sternocleidomastoid

Anterior Trunk Muscles

- Trapezius
- Deltoid
- Pectoralis major
- Rectus abdominis
Posterior Trunk Muscles

- Trapezius
- Deltoid
- Sternocleidomastoid
- Latissimus dorsi

Deltoids - raise the arm to the front, side and back
Latissimus dorsi - large muscle which lowers the arms to the side
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Arm Muscles

- Deltoid
- Biceps brachii
- Triceps brachii

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Leg Muscles

- Gluteus maximus
- Hamstring group
- Gastrocnemius
- Achilles tendon
- Adductor longus
- Sartorius
- Rectus femoris
- Vastus lateralis
- Vastus medialis

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"Boyfriend's Arm Pillow" Kameo Corporation, Tokyo 9-04
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“Lap Pillow”

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The End