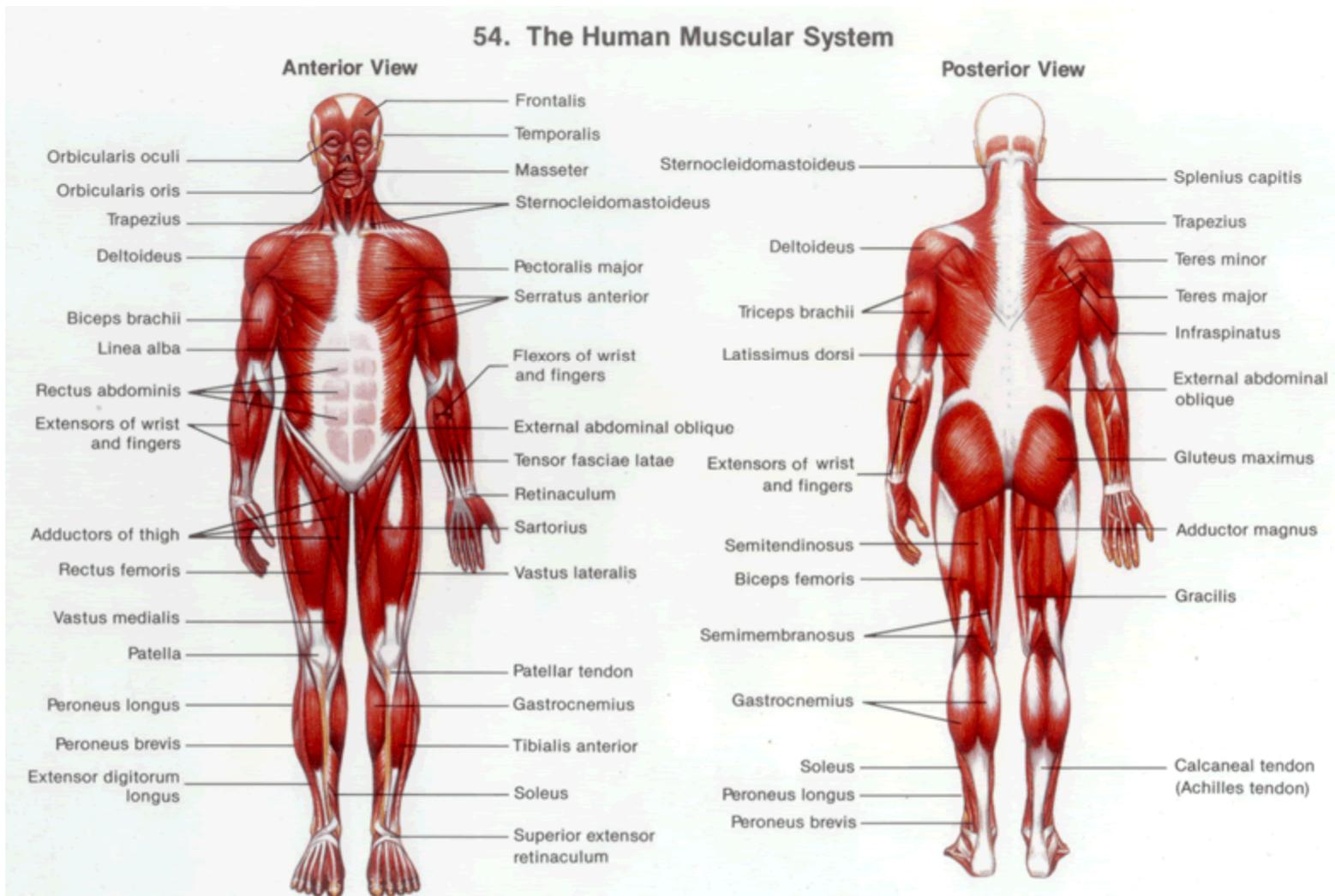


Chapter 17

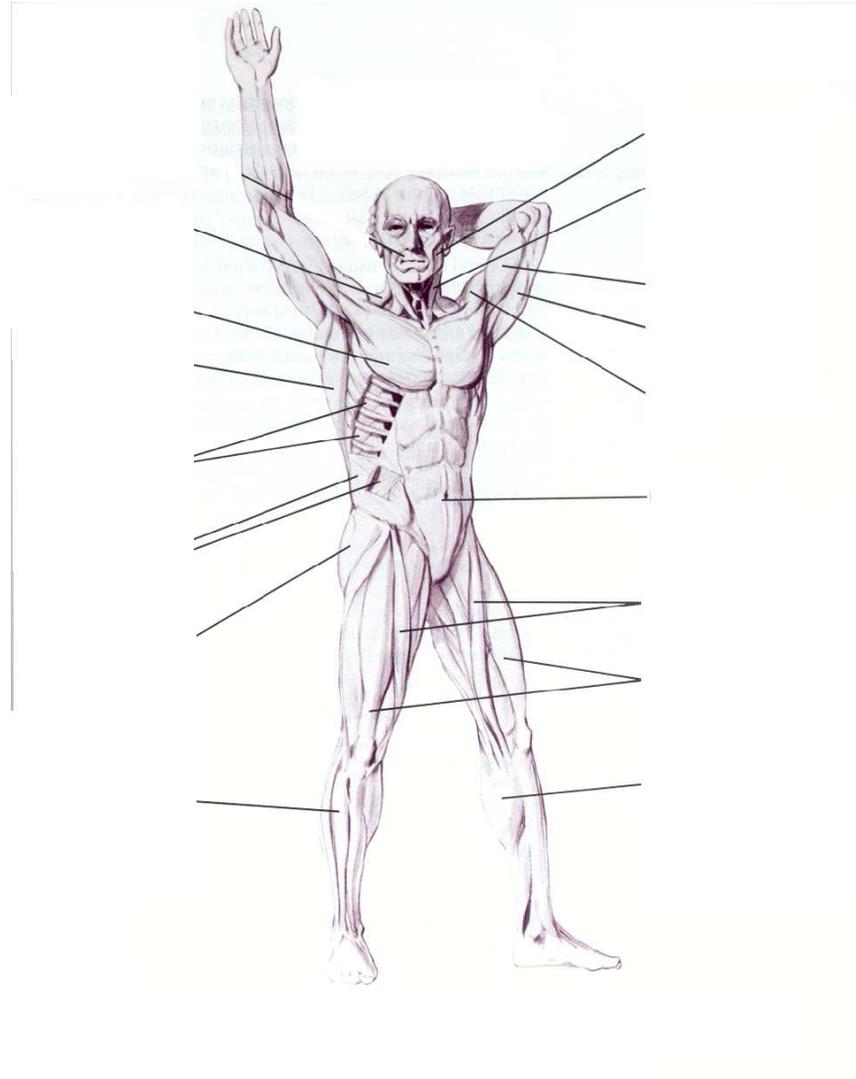
Musculature System

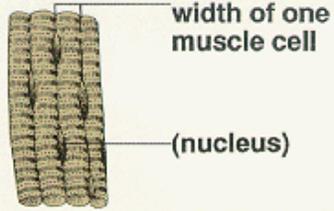
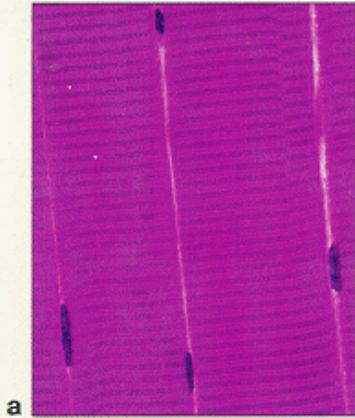
The Musculature System



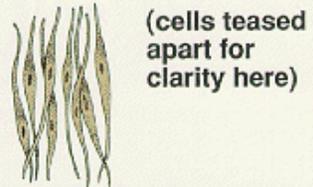
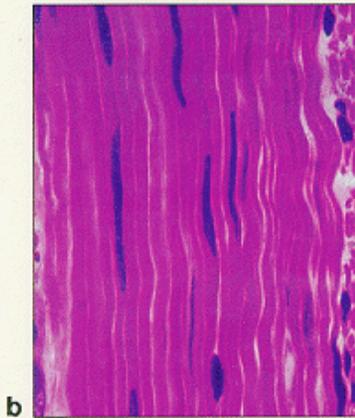
The Musculature System

- Includes 3 types of Muscle:
 - Striated, Smooth & Cardiac
- Function of the Muscles:
 - Provide means of Movement
 - Keeps blood pumping
 - Moves food thru Digestive System
- Skeletal Muscle usually in **Antagonistic Pairs**
 - Flexor (bicep)
 - Extensor (tricep)



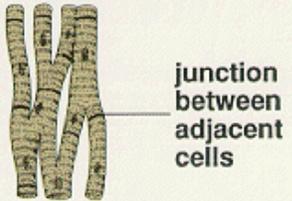
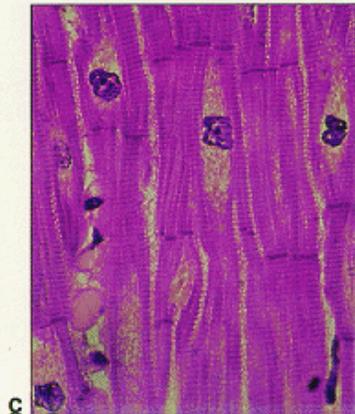


TYPE: Skeletal muscle
DESCRIPTION: Long, striated cells with multiple nuclei
COMMON LOCATIONS: In skeletal muscles
FUNCTION: Contraction for voluntary movements



TYPE: Smooth muscle
DESCRIPTION: Long, spindle-shaped cells, each with a single nucleus
COMMON LOCATIONS: In hollow organs (e.g., stomach)
FUNCTION: Propulsion of substances along internal passageways

- Organ
- Smooth
- Involuntary



TYPE: Cardiac muscle
DESCRIPTION: Branching, striated cells fused at plasma membranes
COMMON LOCATIONS: Wall of heart
FUNCTION: Pumping of blood in the circulatory system

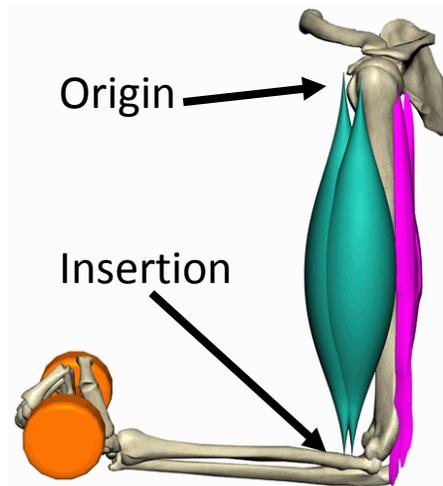
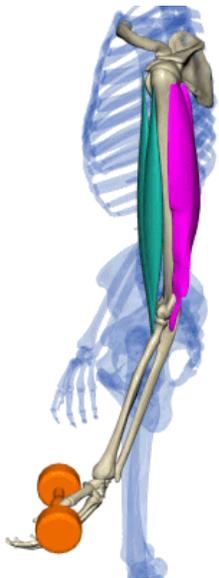
- Heart
- Cardiac
- Involuntary

The Musculature System

3 Types of Muscle Tissue

Skeletal, Smooth and Cardiac

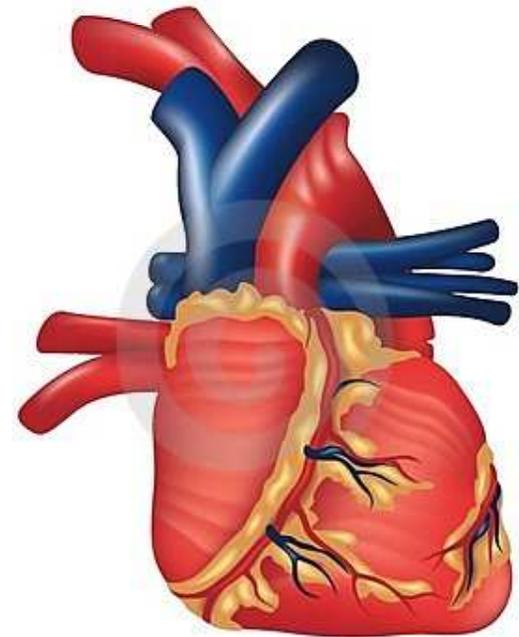
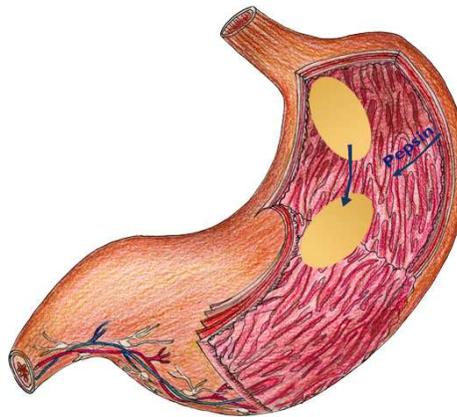
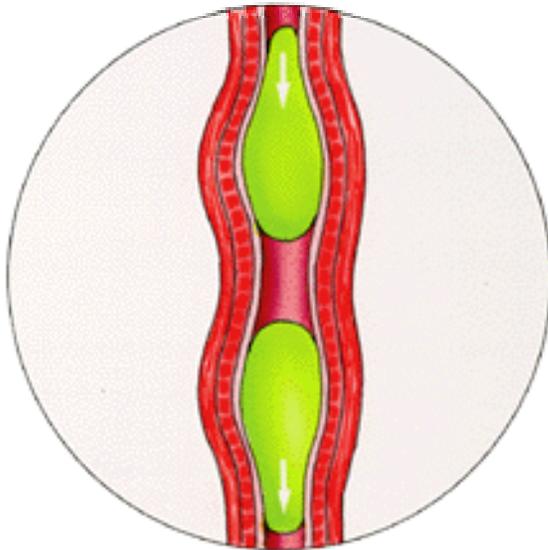
How Muscles Work



- Muscles can only **contract** & get shorter
- They cannot push things, they only pull.
- They are attached to two different bones and cause them to bend at the joint
 - **Origin** – place the muscle attaches or begins (proximal)
 - **Insertion** – place on the other side of joint muscle attaches (distal side)
- They work in Antagonistic Pairs
 - **Flexors** – cause the joint to bend – bicep
 - **Extensor** – causes the joint to extend (straighten out) - tricep
- Muscles are attached to bones w/ **tendons**

Smooth & Cardiac Muscle

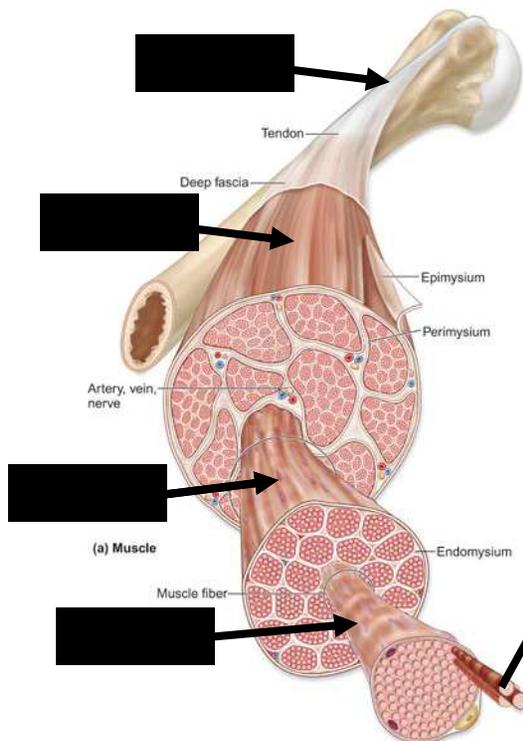
- **Smooth Muscle** – usually are not voluntarily controlled. Found in the walls of hollow organs of the digestive tract & blood vessels.
 - They assist in the movement of food thru the digestive system (**peristalsis**) and movement of blood thru the circulatory system.
- **Cardiac Muscle** – found only in the heart. Similar to both Striated & Smooth Muscle tissue. Involuntarily controlled by brain.



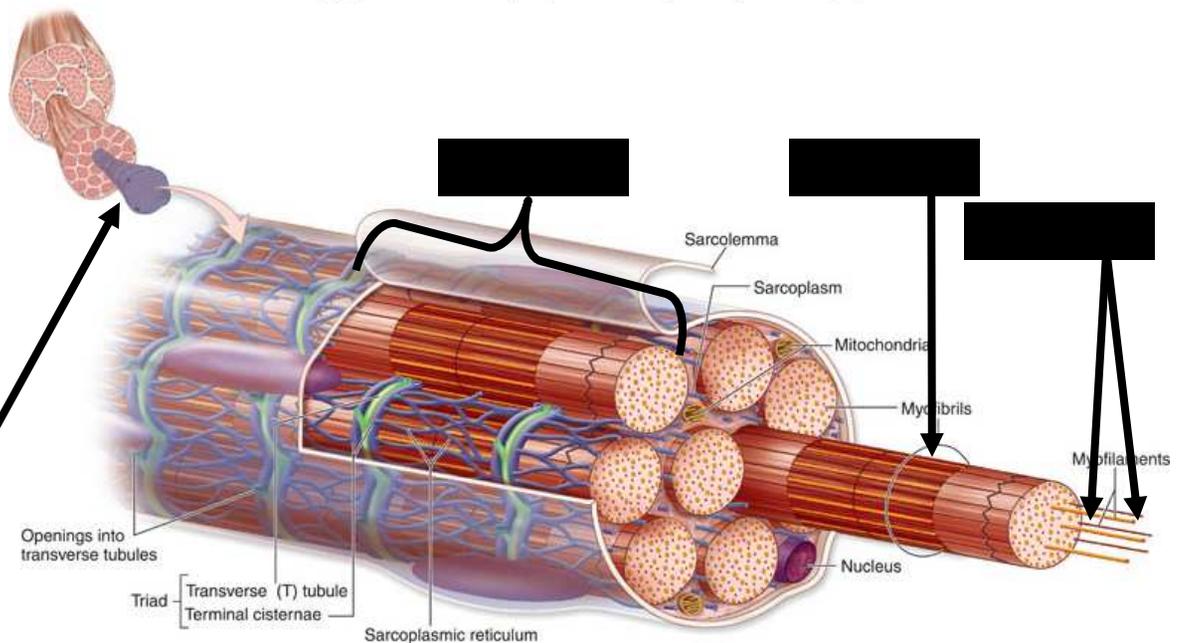
Skeletal Muscle Structure

- Skeletal **muscles** are made up of **bundles** of **muscle fibers** which in turn are made of **myofibrils** (multi-nucleated muscle cells).
- Each myofibril is made of
 - thin **filaments** called **Actin** and thick filaments called **Myosin**.
- **Muscle → Bundle → Fibers → Myofibrils → Filaments → Actin & Myosin**
- Each fiber is divided into functional units called sarcomeres

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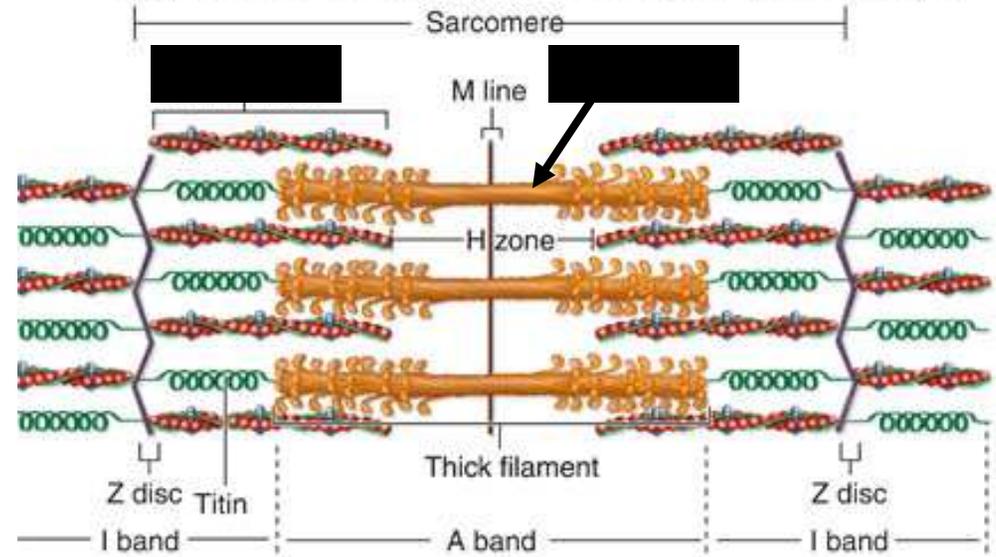
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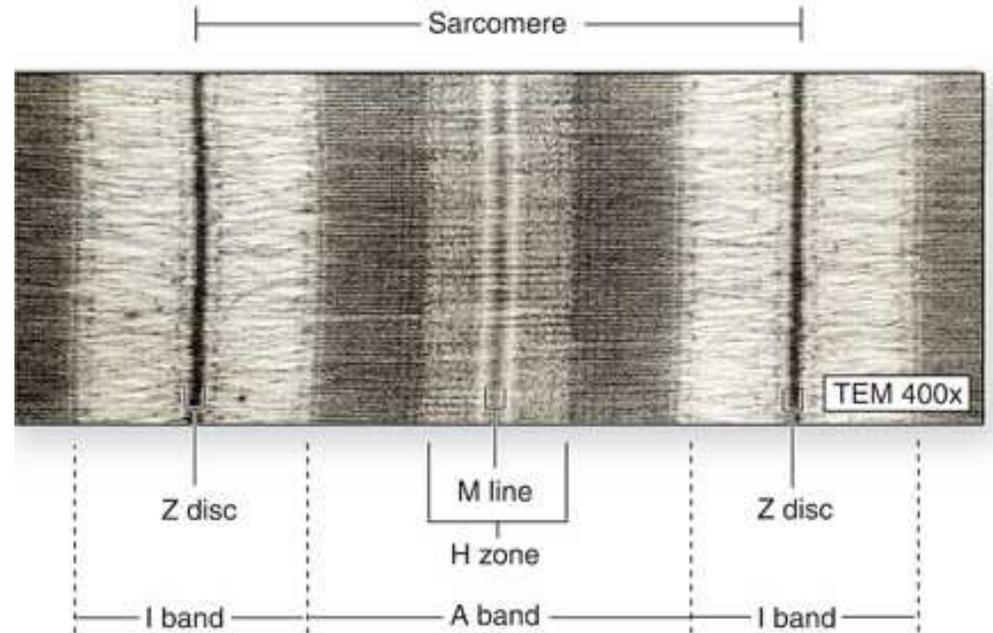
Skeletal Muscle Sarcomere

- Sarcomere is divided into various zones.
 - Each Sarcomere is separated by Z discs
 - Light colored bands are I bands
 - Dark colored bands are A bands
 - Middle of the dark A band is H zone
 - Middle of H zone is the M line
- Muscle contraction begins after a nerve stimulates the muscle fiber.

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b)

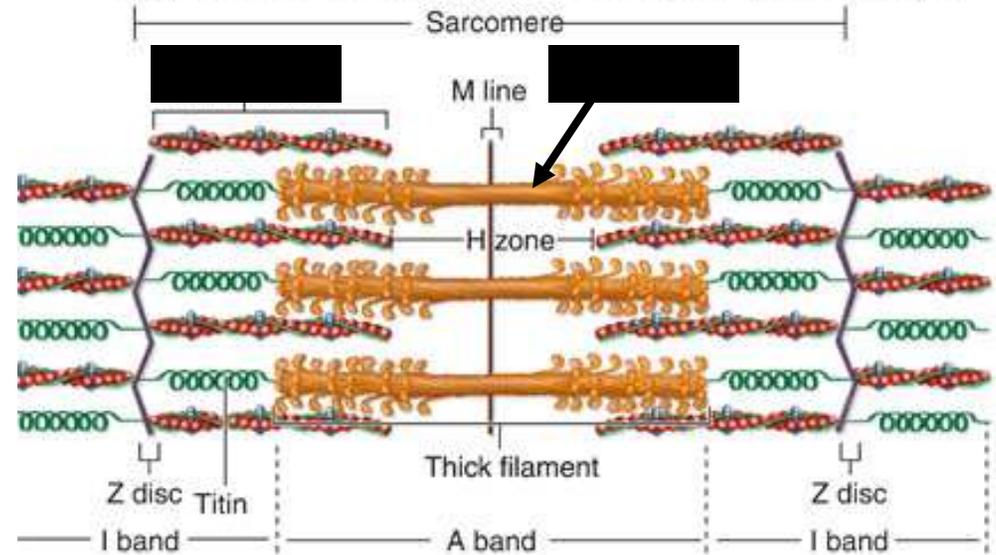


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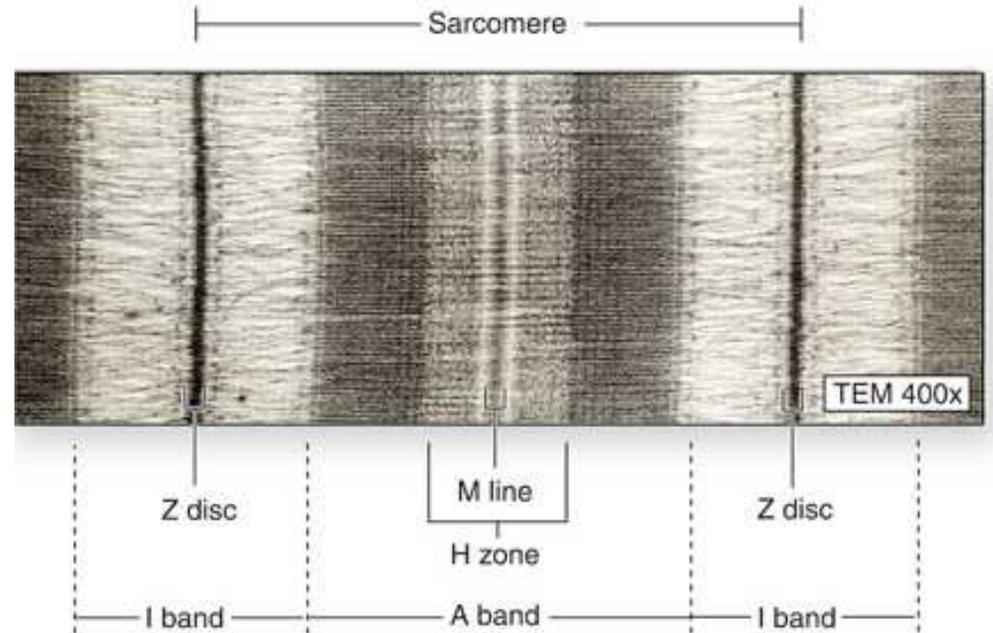
Skeletal Muscle Contraction

- Muscle contraction begins after a nerve stimulates the muscle fiber.
- Impulse causes **Actin** filaments to slide over (like a ratchet) the **Myosin** filaments.
- This shortens the length of the **sarcomere**.
- Once contracted, the H zone closes up.
- This shortening isn't much until you add up the thousands of sarcomeres in each muscle bundle.

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b)



c)

Need-to-Know Skeletal Muscles

Know these muscles: **Masseter, Trapezius, Deltoid, Pectoralis, Latissimus dorsi, intercostals, Rectus abdominis, External obliques, Biceps brachii, Triceps, Gluteus, Rectus femoris, Biceps femoris, gastrocnemius**

