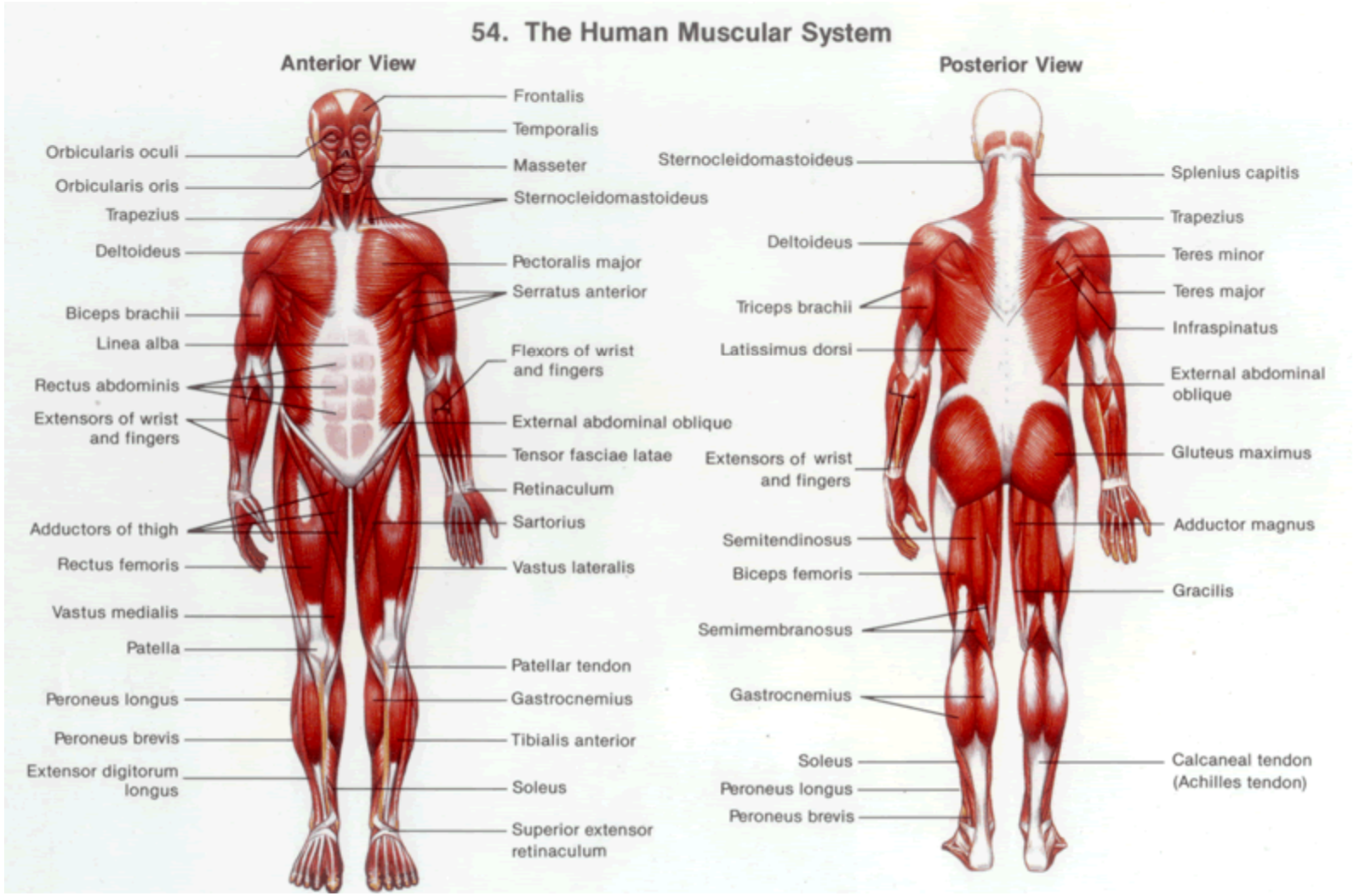
Chapter 17

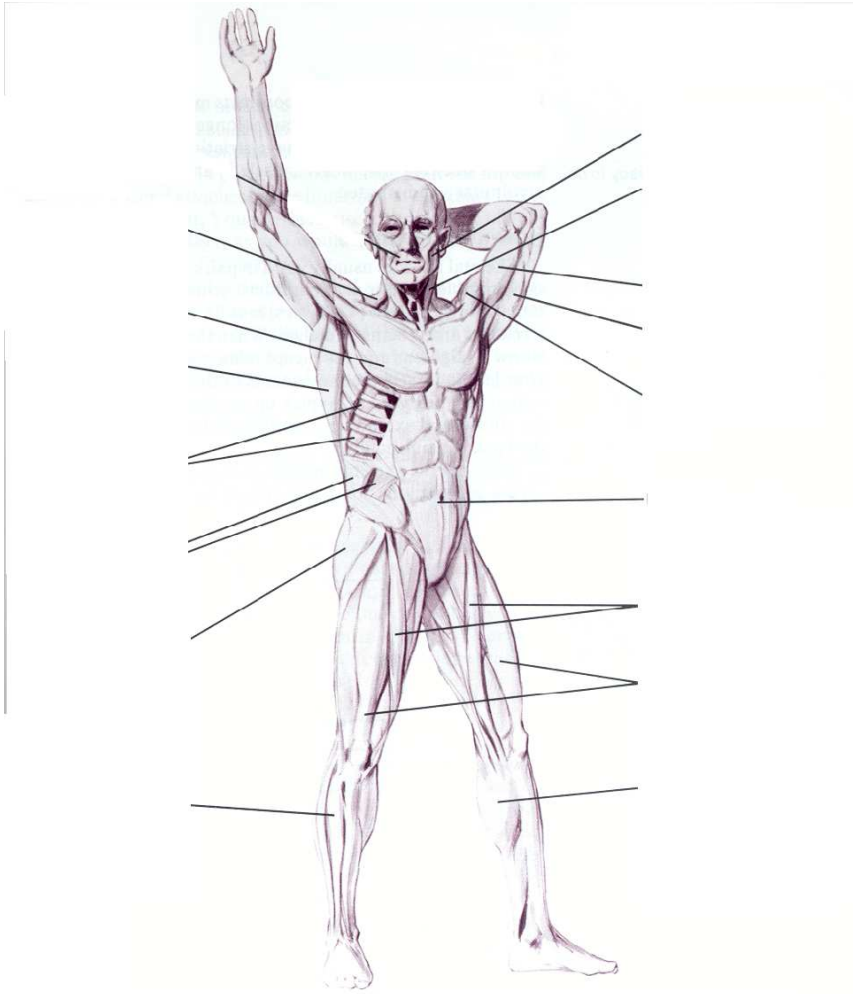
Musculature System

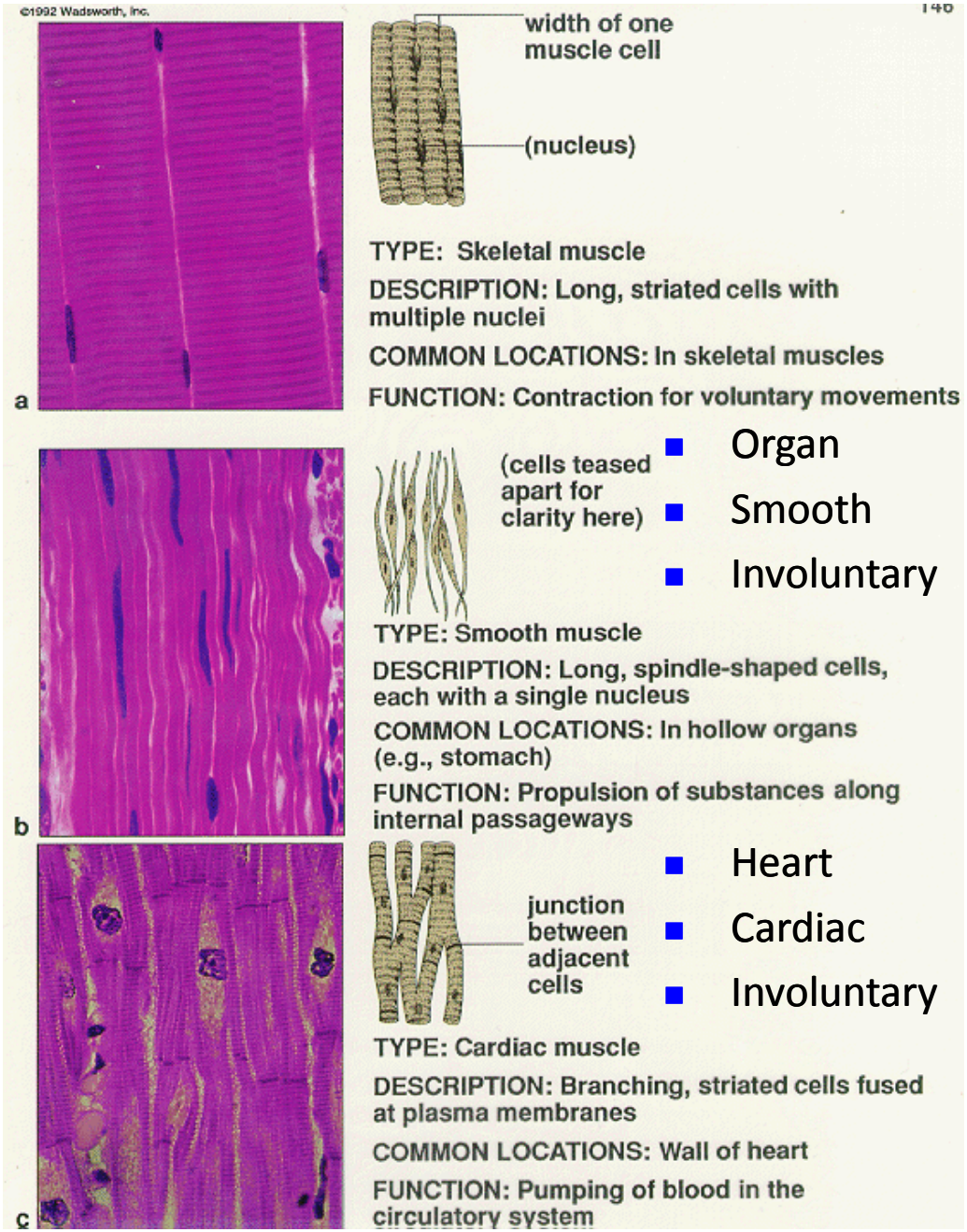
The Musculature System



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)





The Musculature System

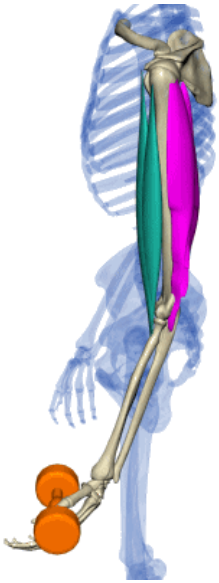
- Organ
- Smooth
- Involuntary

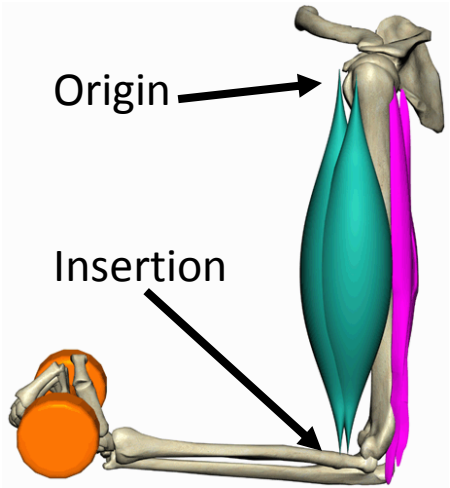
3 Types of Muscle Tissue

- Heart
- Cardiac
- Involuntary

Skeletal, Smooth and Cardiac

How Muscles Work

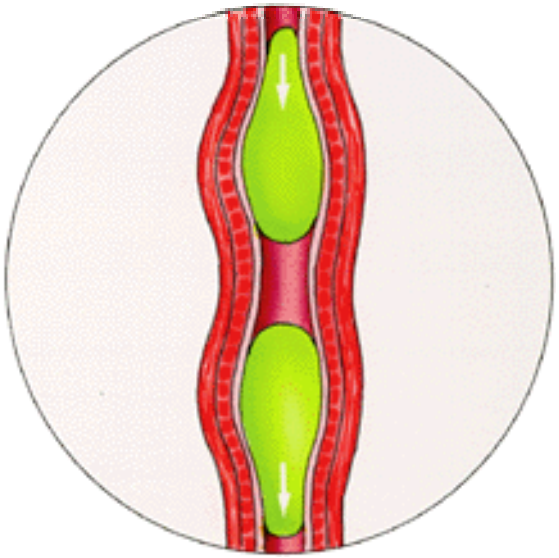


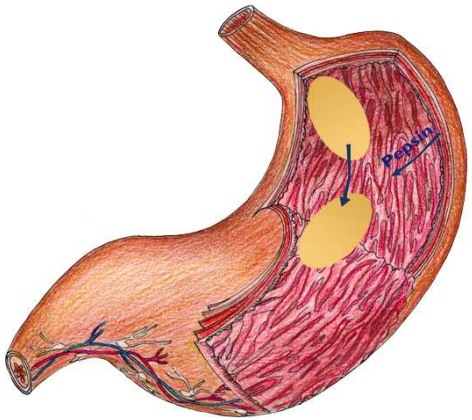


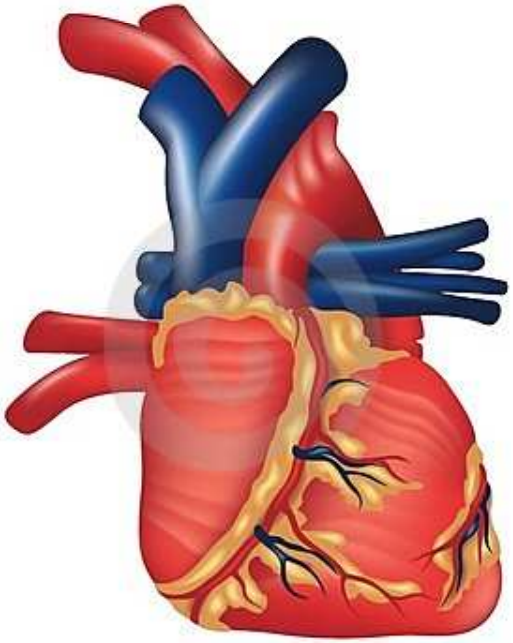
- Muscles can only contract & get shorter
- They cannot push things, they only pull.
- They are attached to two different bones and cause them to bend at the joint
  - Origin – place the muscle attaches or begins (proximal)
  - Insertion – place on the other side of joint muscle attaches (distal side)
- 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.

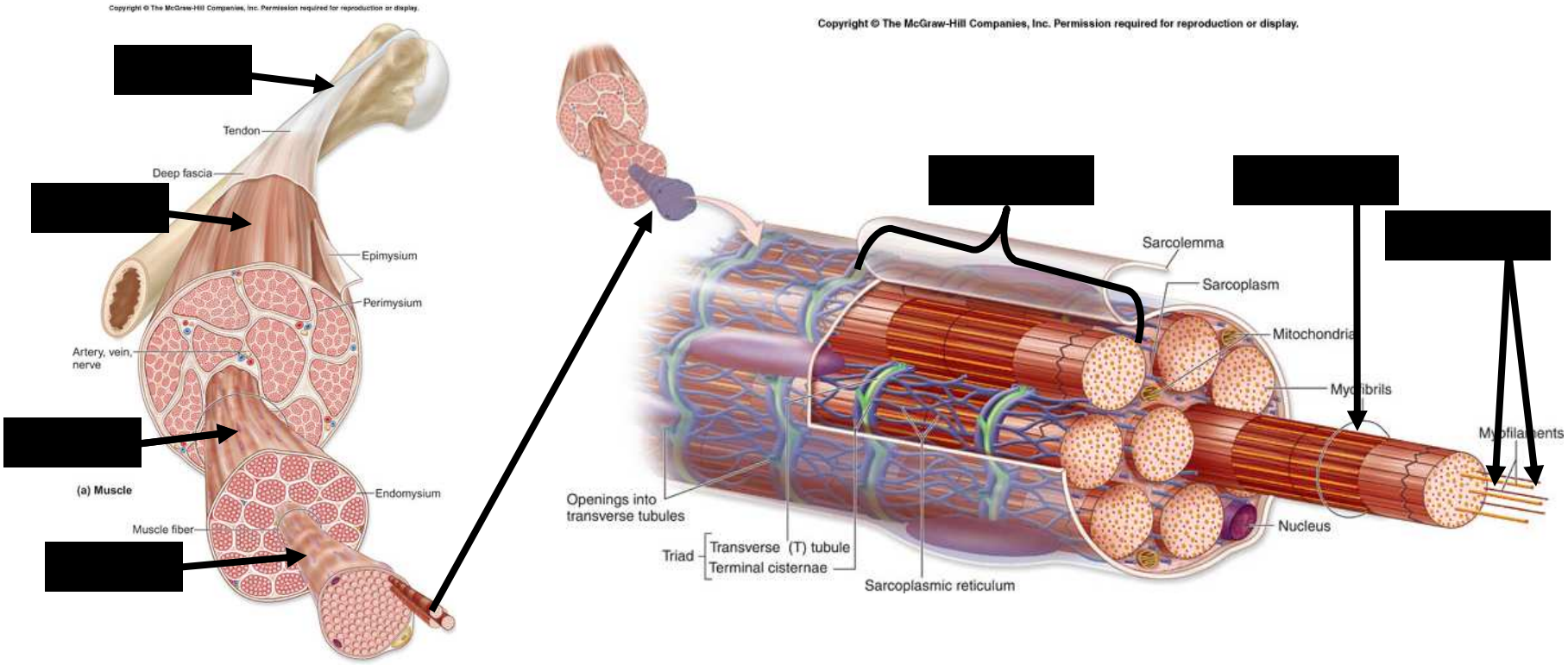






Skeletal Muscle Structure

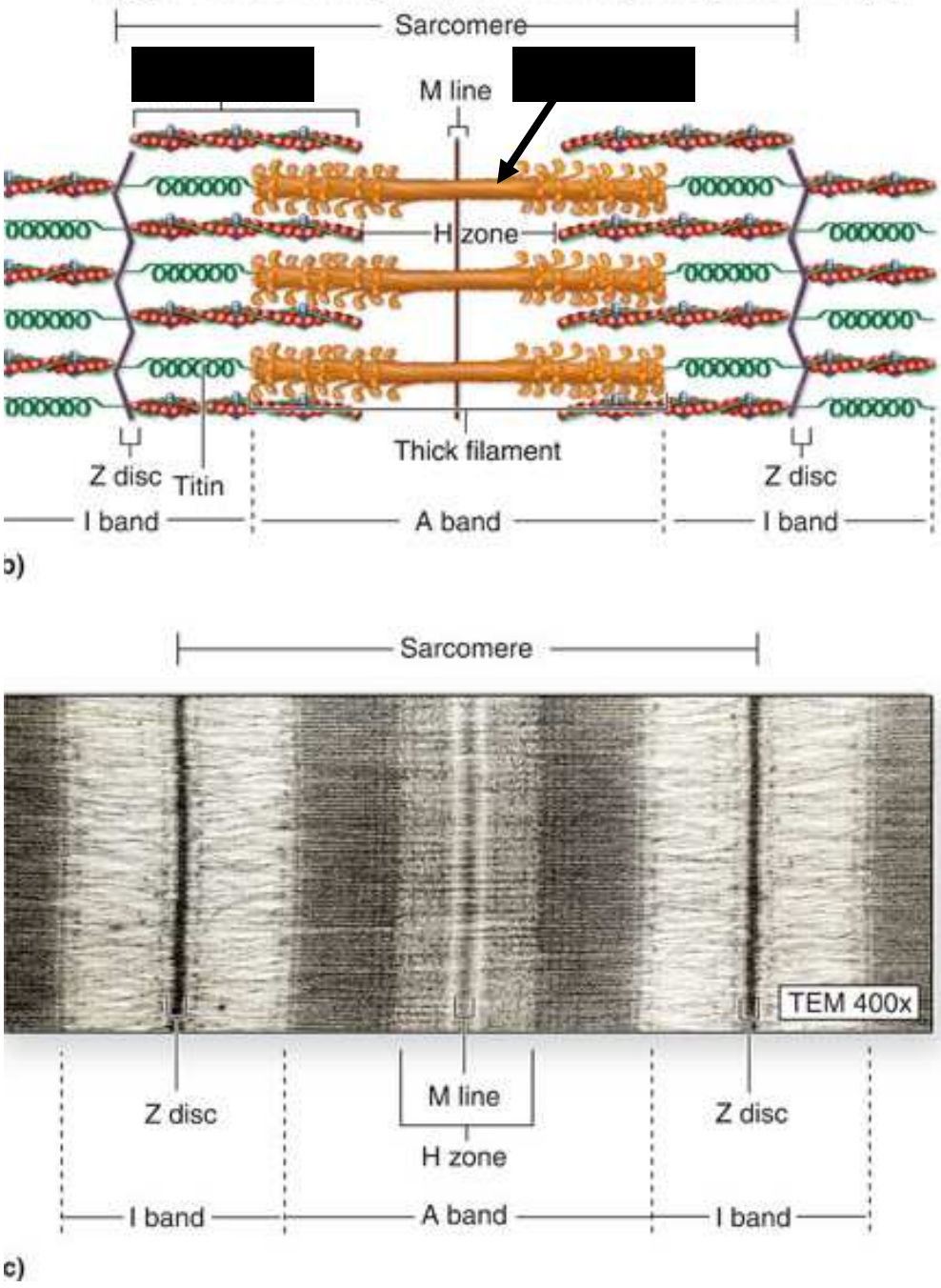
- Skeletal muscles are made up of bundles of muscle fibers which in turn are made of myofibrals (multi-nucleated muscle cells).
- Each myofibral is made of
  - thin filaments called Actin and thick filaments called Myosin.
- Muscle → Bundle → Fibers → Myofibrils → Filaments → Actin & Myosin
- Each fiber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



Skeletal Muscle Sarcomere

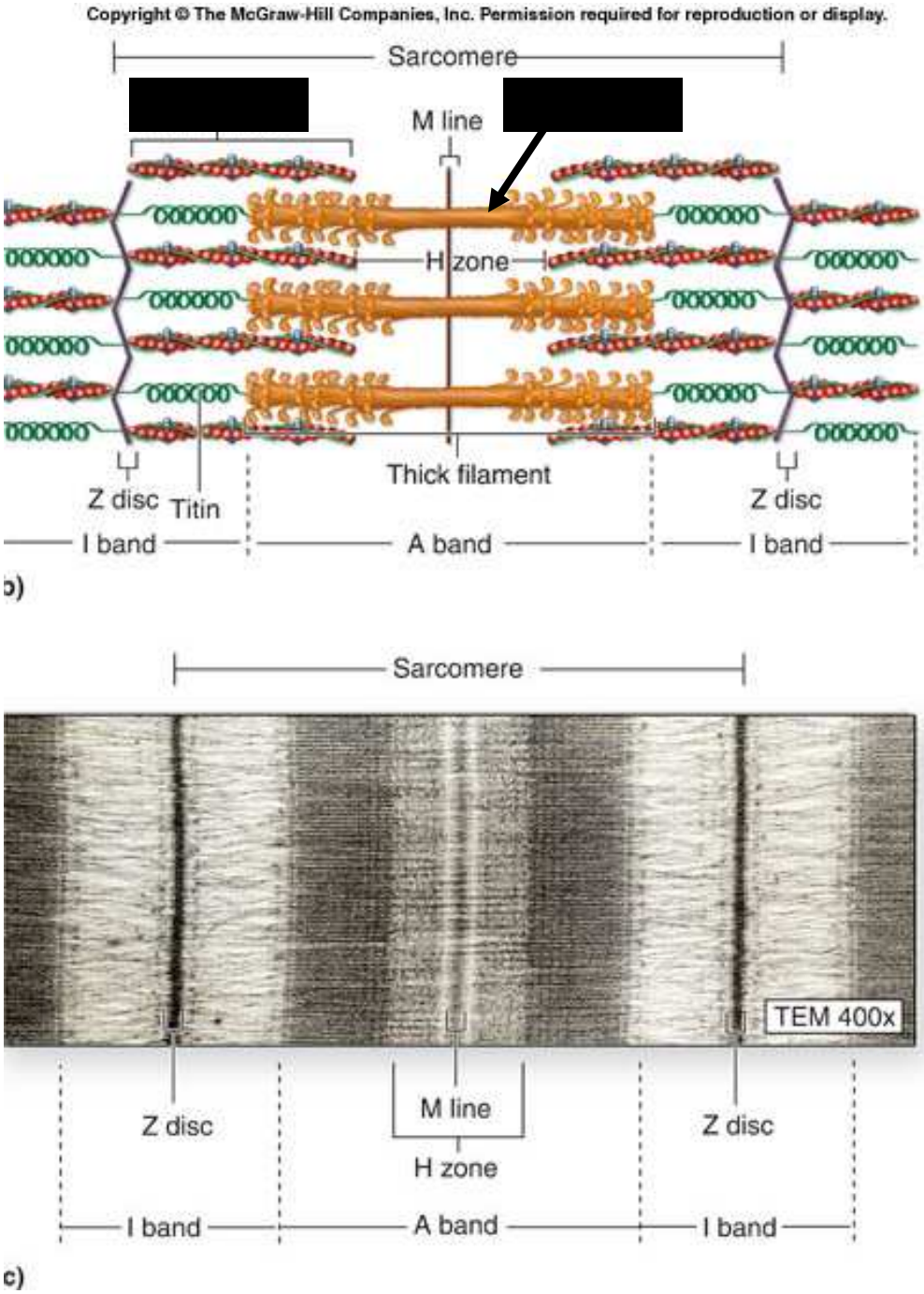
- Sarcomere is divided into various zones.
- Each Sarcomere is separated by Z discs
- Light colored bands are I bands
- Dark colored bands are A bands
- Middle of the dark A band is H zone
- Middle of H zone is the M line

■ Muscle contraction begins after a nerve stimulates the muscle fiber.



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.



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, gastronemius