Muscular System

Muscular System

- The muscular system, in conjunction with the skeletal system, allows the movement of internal structures, limbs, and the body as a whole.

Muscles

Muscles can be categorized by their:

- Function
  (skeletal, visceral, or cardiac)
- Activation method
  (voluntary or involuntary)
- Physiology
  (smooth, striated or unstrained)

Skeletal Muscles

- Skeletal muscles are striated, voluntary muscles that are involved in the movement of the skeleton.

- Skeletal muscles can be intentionally controlled by the animal.

Visceral Muscles

- Smooth or visceral muscles are involuntary, unstraited muscles found in the digestive organs and blood vessels of the body.

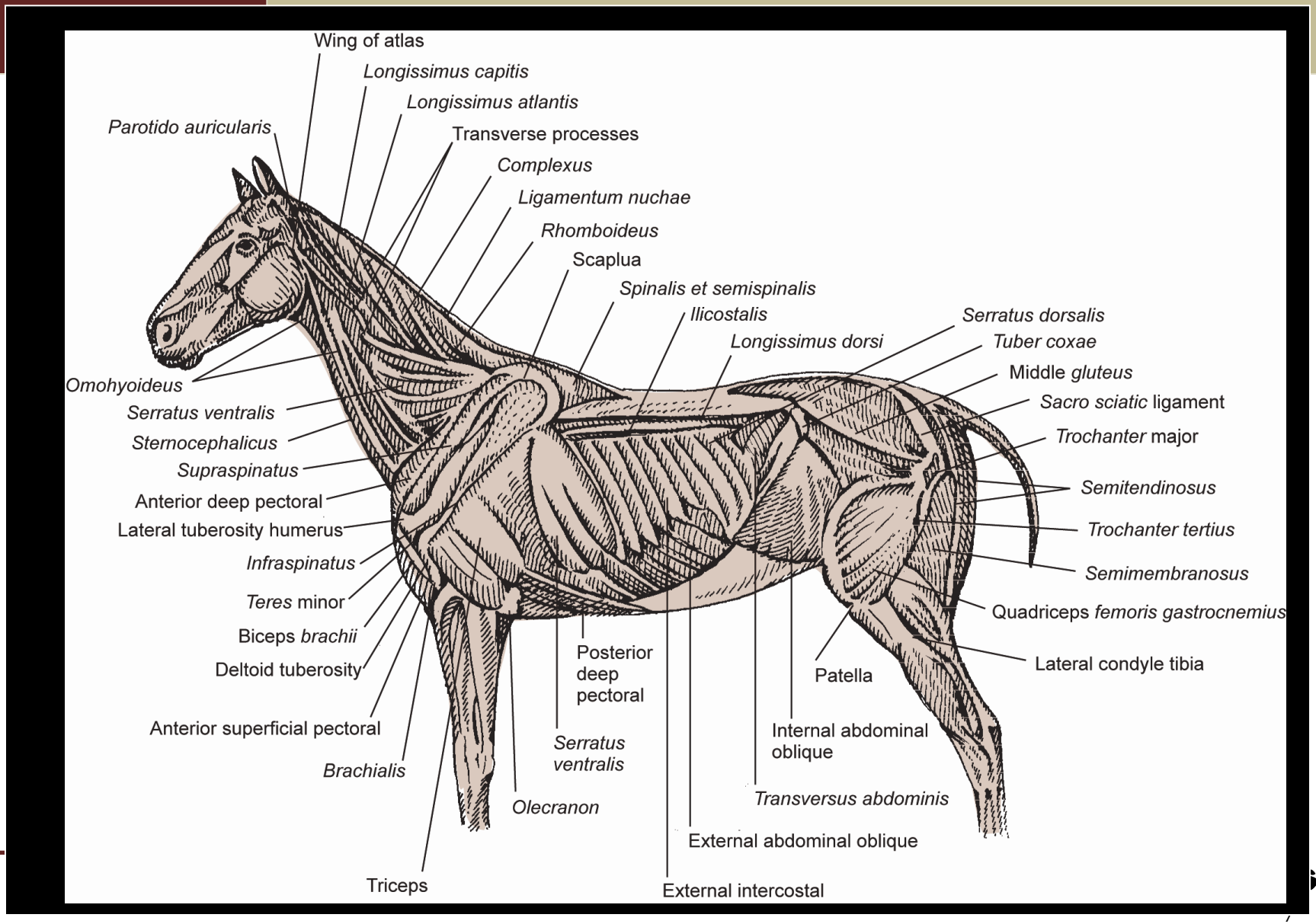
- Visceral muscles function automatically and can not be controlled by the animal.

Cardiac Muscles

- Cardiac muscle is involuntary, striated muscle found only in the heart.

- No conscious control of cardiac muscle occurs in the animal, but it can be regulated by the autonomic nervous system.

Superficial Muscles of a Horse



Movement

Skeletal muscles can be divided into four functional groups:

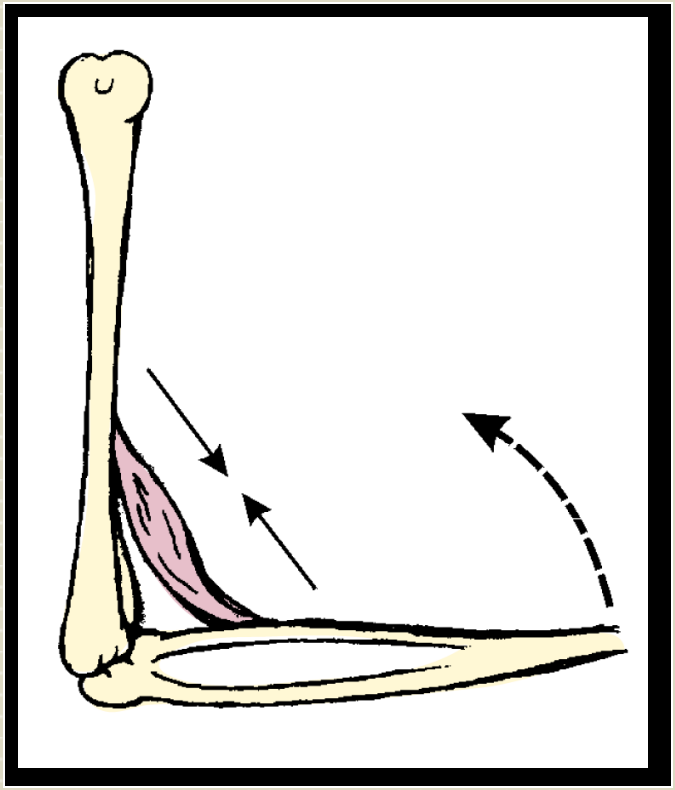
- Flexors
- Extensors
- Abductors
- Adductors

Movement

- Many muscles work in pairs so that when one contracts (flexes or shortens) the other one relaxes (extends or lengthens). This relationship is know as antagonism.

- Muscles that work together to perform a movement are referred to as synergists.

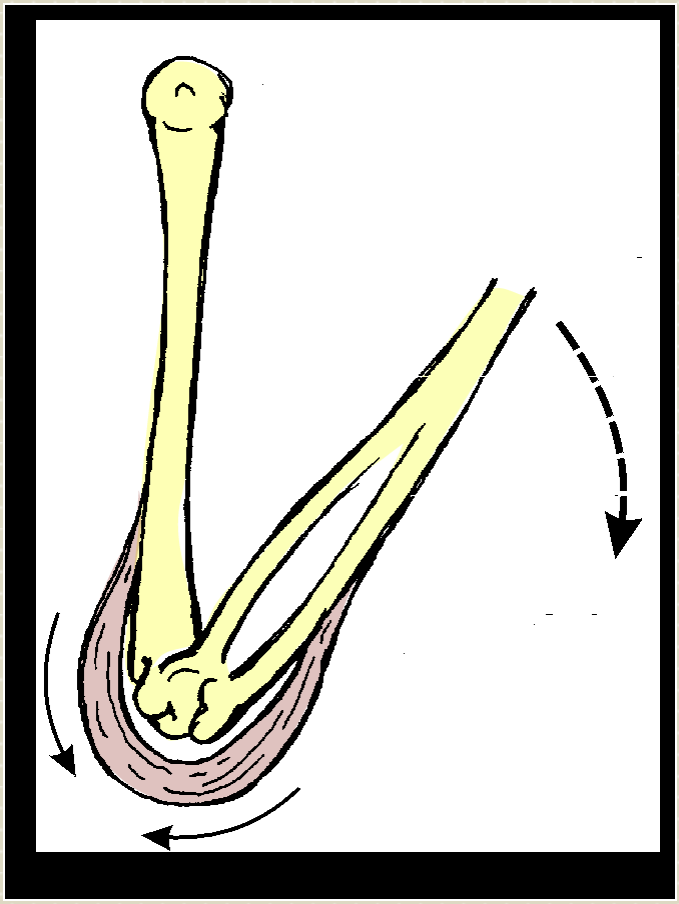
Movement



- Flexor muscles decrease the angle between two lever bones when they contract.

  Example: Biceps

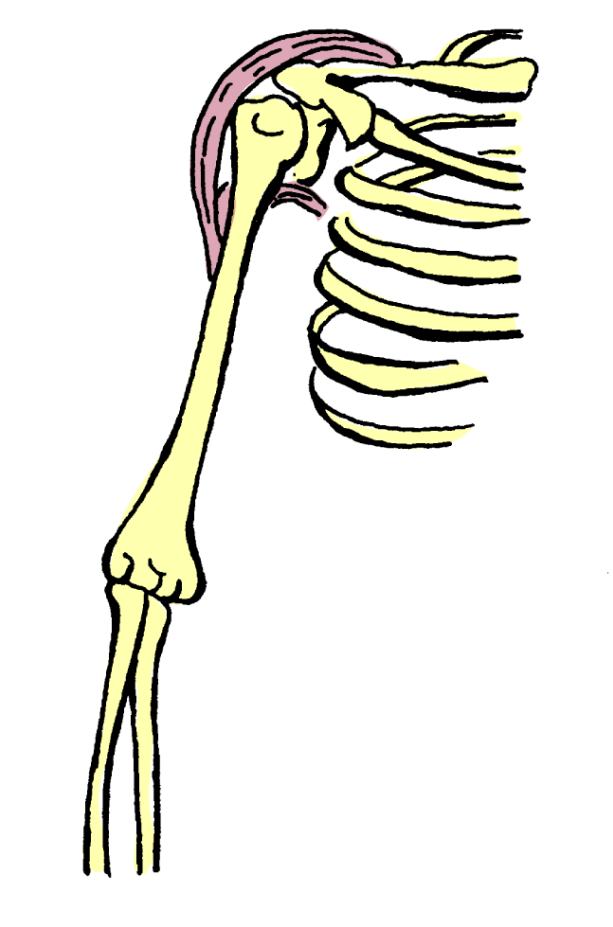
Movement



- Extensor muscles increase the angle between two lever (bones) when they contract.

  Example: Triceps

Movement

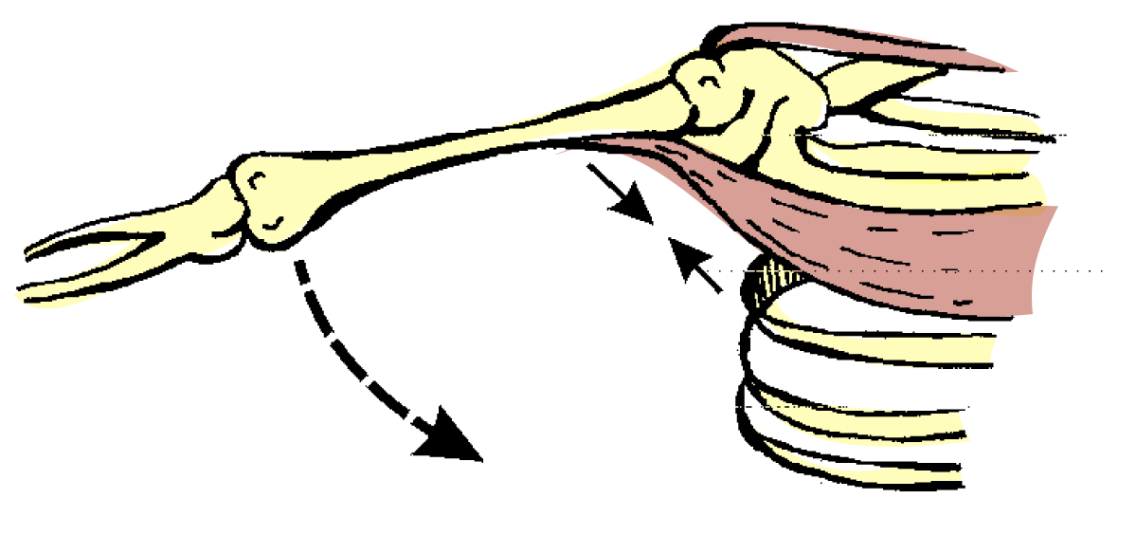


- Abductor muscles move limbs away from the median plane (the middle
or main part of the body).

Example: Deltoids

Movement

- Adductor muscles pull limbs toward the median plane (middle or main part of the body).
  Example: Pectoralis Major



Attachment

- Most skeletal muscles attach to two different bones.

- The point of origin is on the most stable or least movable bone while the insertion point is on the more movable bone.

Structure of Skeletal Muscle

- Skeletal muscle is made up of bundles of fibers or cells that stretch from one tendon, or connective tissue, to the other tendon.

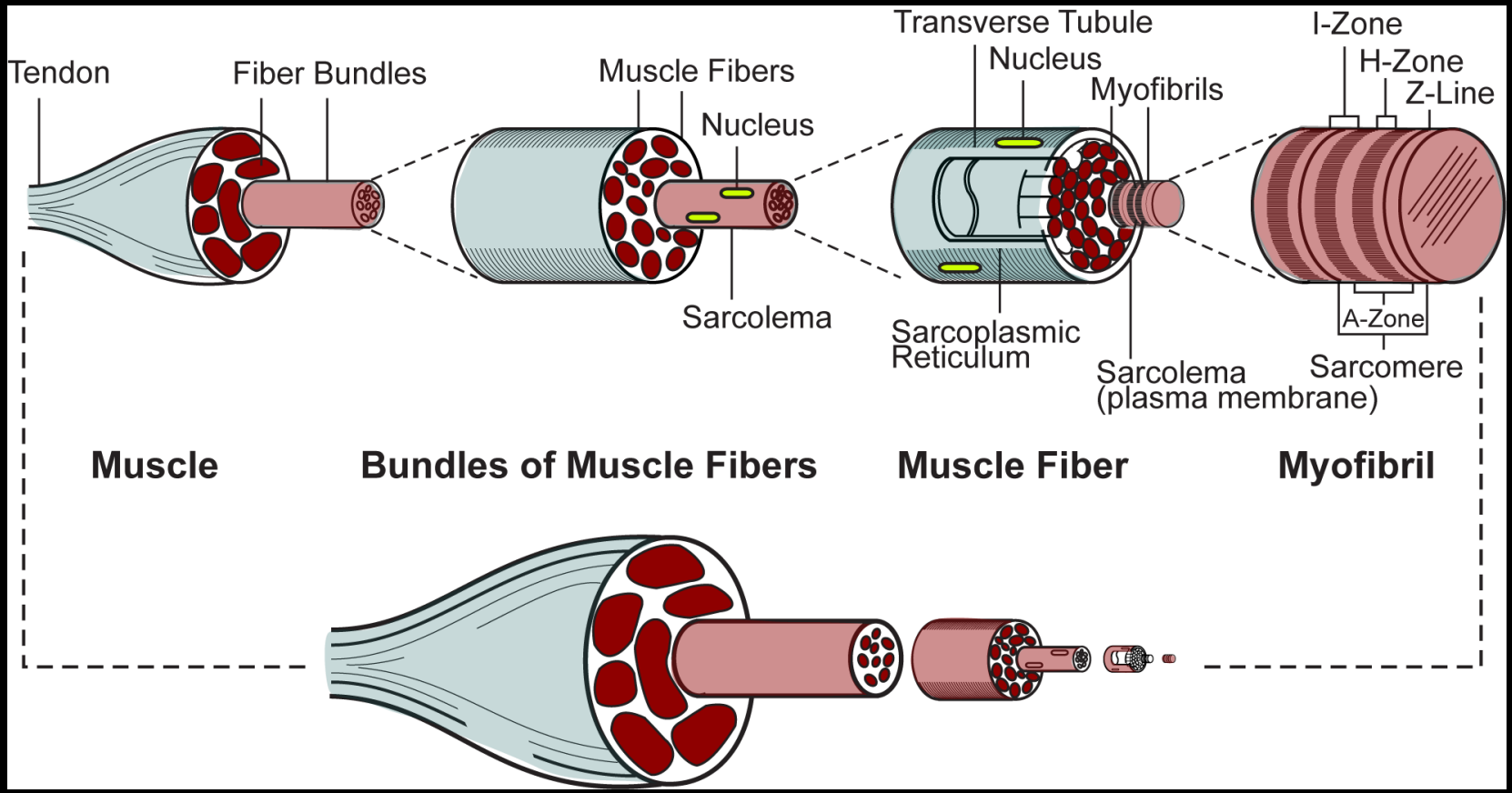
- These bundles of fibers lie parallel to each other within the muscle sheath making the muscle appear striped, or striated.

Structure of Skeletal Muscle

- Each bundle consists of fibers, which are individual cells with multiple nuclei.

- Individual muscle fibers are made up of bundles of myofibrils enclosed in a series of sarcomeres. They are made up of thick filaments of myosin and thin filaments of actin.

Structure of Skeletal Muscles



Contraction

- Muscle contraction occurs as a result of a process known as sliding-filament action.

- Each individual sarcomere contracts as a result of the actin and myosin filaments sliding over each other.

Muscle Contraction

- Energy utilized for muscle contraction comes primarily from non-protein sources such as adenosine triphosphate (ATP), glycogen and body fats.