The Muscular System

10

Interactions of Skeletal Muscles

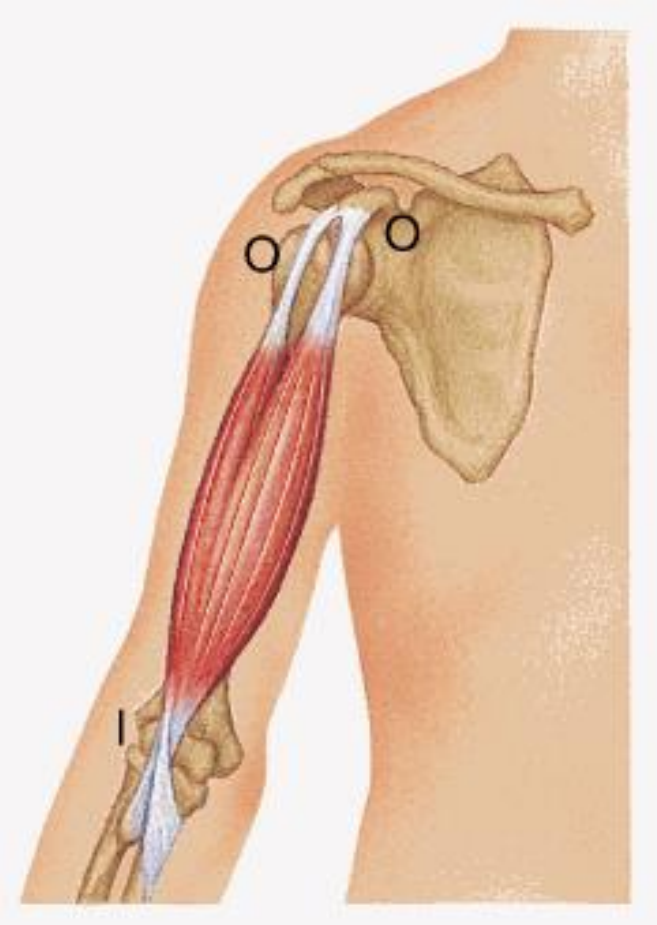
- Muscle tissue includes all contractile tissue → skeletal muscles take center stage!

Interactions of Skeletal Muscles in the Body

- The arrangement of muscles permits them to work together or in opposition to achieve a variety of movements.
- Muscles can only **pull** then can ***never*** push!!!

Interactions of Skeletal Muscles in the Body

- **<u>Origin</u>** – muscle attached to the immovable (or less) movable bone.
- **<u>Insertion</u>** – muscle attached to the movable bone.
- Ex. Spring on a screen door.



Interactions of Skeletal Muscles in the Body

- As a muscle shortens:
  - The **<u>insertion</u>** moves towards its **<u>origin</u>**.
- Whatever one muscle or group of muscles does → another muscle or group muscles must "undo" the action
  - Flex the elbow → extend the elbow

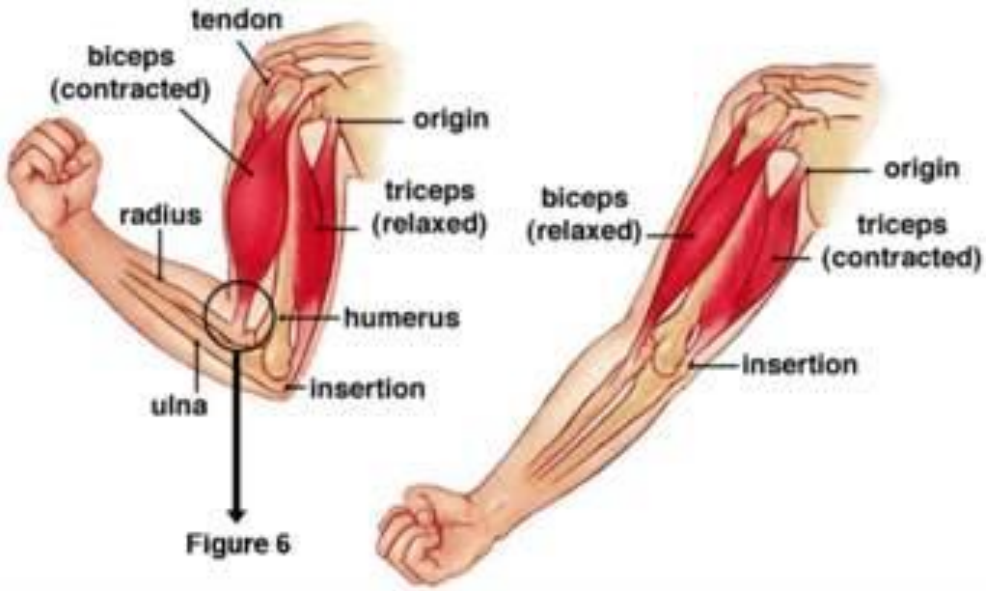


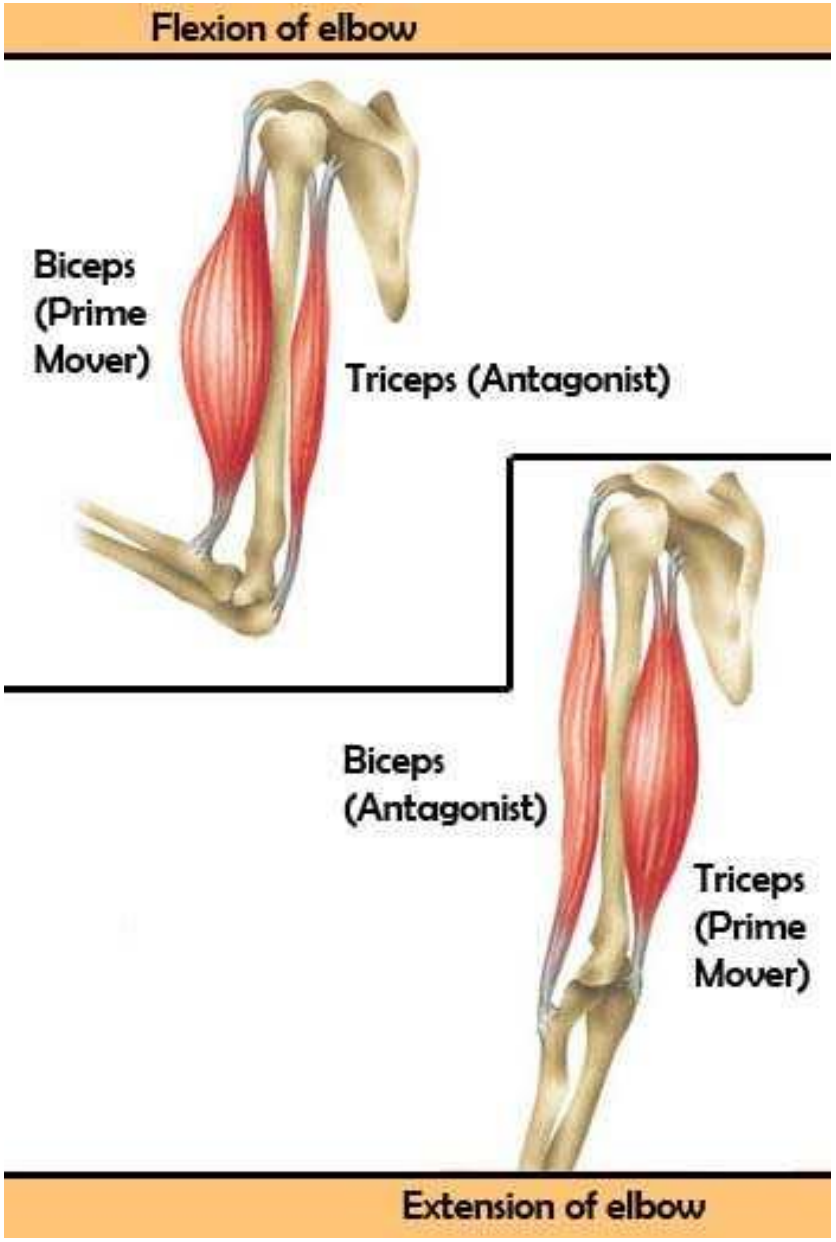
Figure 6

Interactions of Skeletal Muscles in the Body

- **Skeletal muscles work together or in opposition**
  - A muscle cannot reverse the movement it produces
  - Another muscle must undo the action
  - Muscles with opposite actions lie on opposite sides of a joint

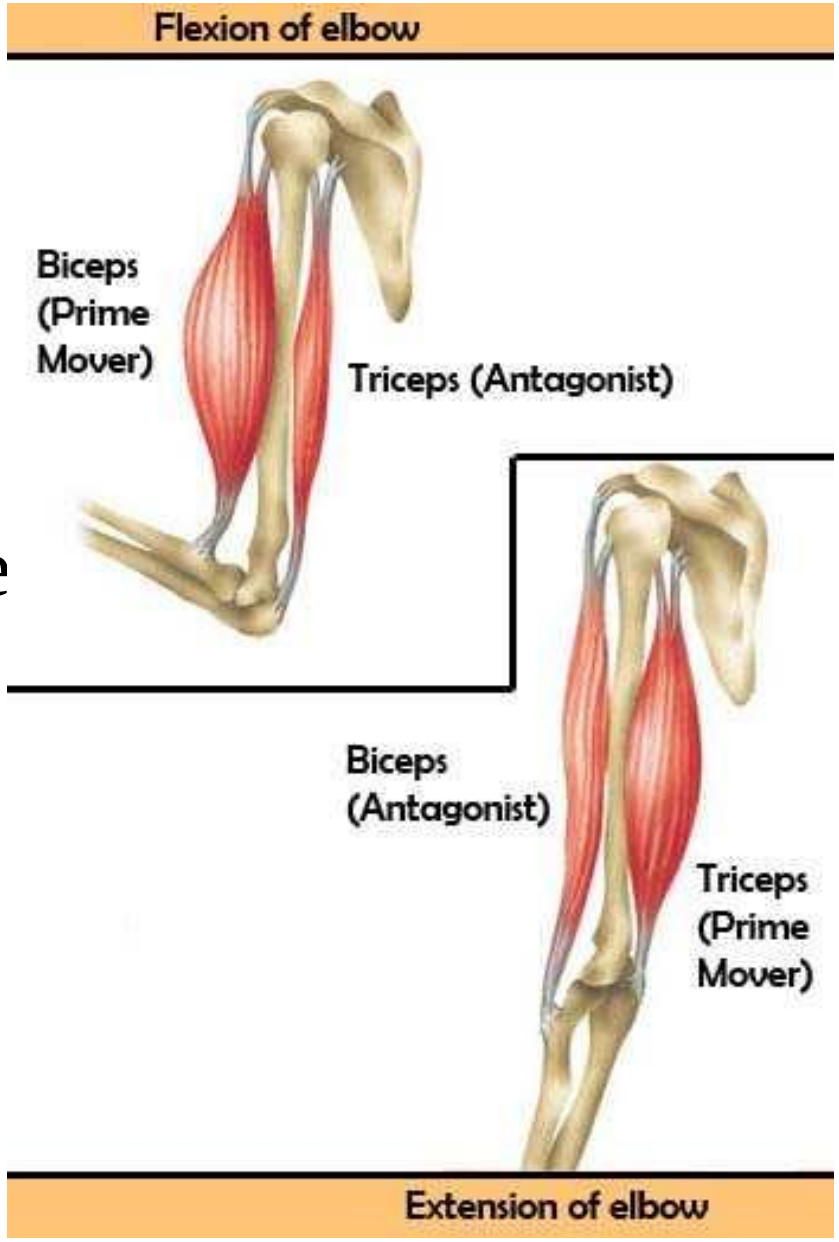
Interactions of Skeletal Muscles in the Body

- **Prime mover**
  - Agonist
  - Provides major force for certain movement



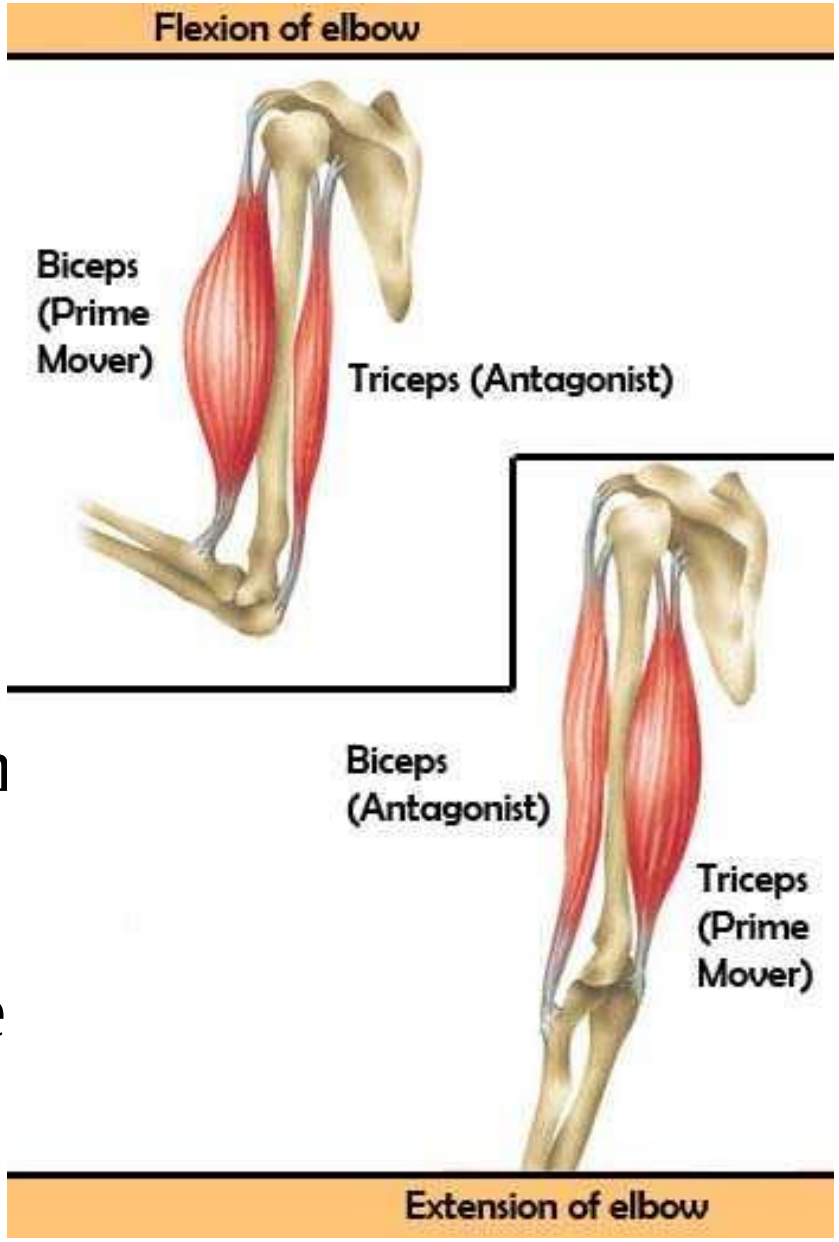
Interactions of Skeletal Muscles in the Body

- **Antagonist**
  - Muscles that oppose, or reverse, a particular movement.
  - Can also help to regulate the action of the prime mover by contracting to provide some resistance
  - When prime mover is active → relaxed and stretched



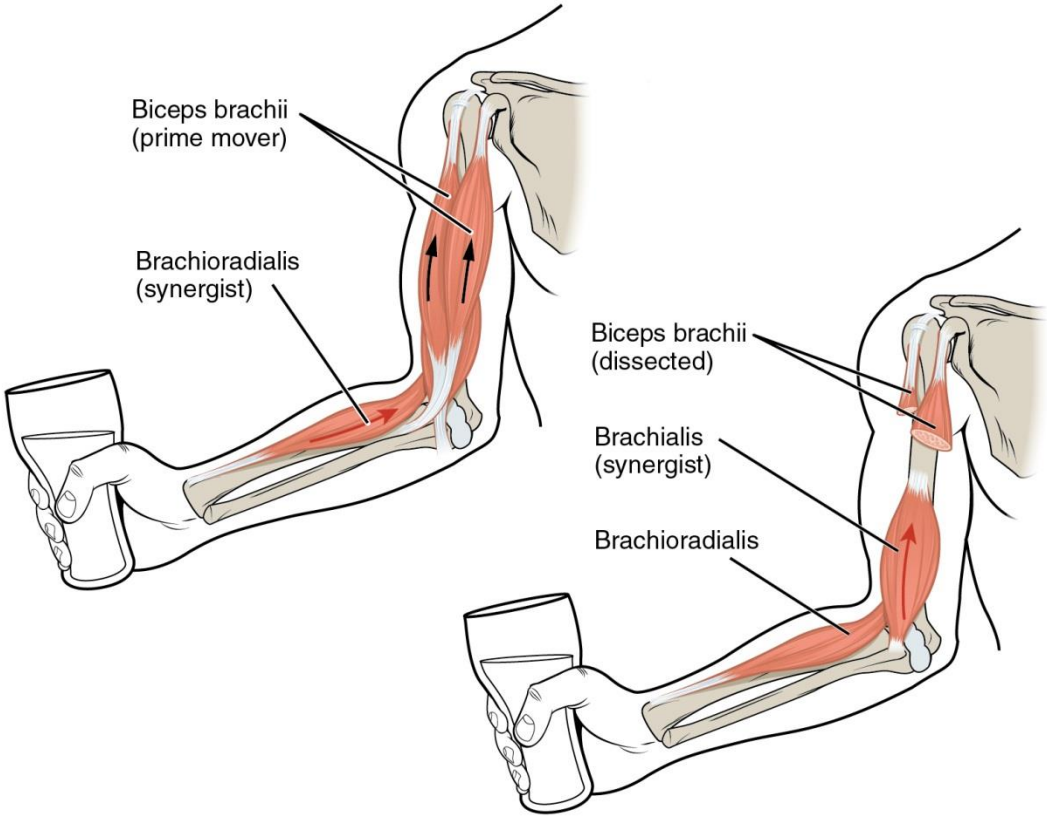
Interactions of Skeletal Muscles in the Body

- Prime movers and antagonists lie on **opposite** sides of the bone!
- Depending on the movement:
  - A prime mover can becom an antagonist
  - An antagonist can become a prime mover



Interactions of Skeletal Muscles in the Body

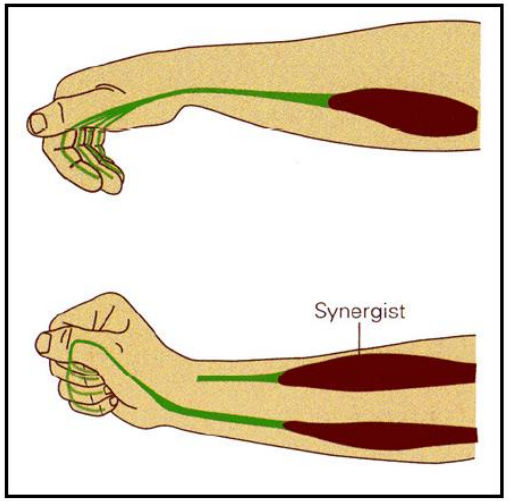
- **Synergist**
  - Syn = together; erg = work
  - Help prime mover:
    - Add extra force to same movement
    - Reduce undesirable or unnecessary movements that might occurs at prime mover contracts.



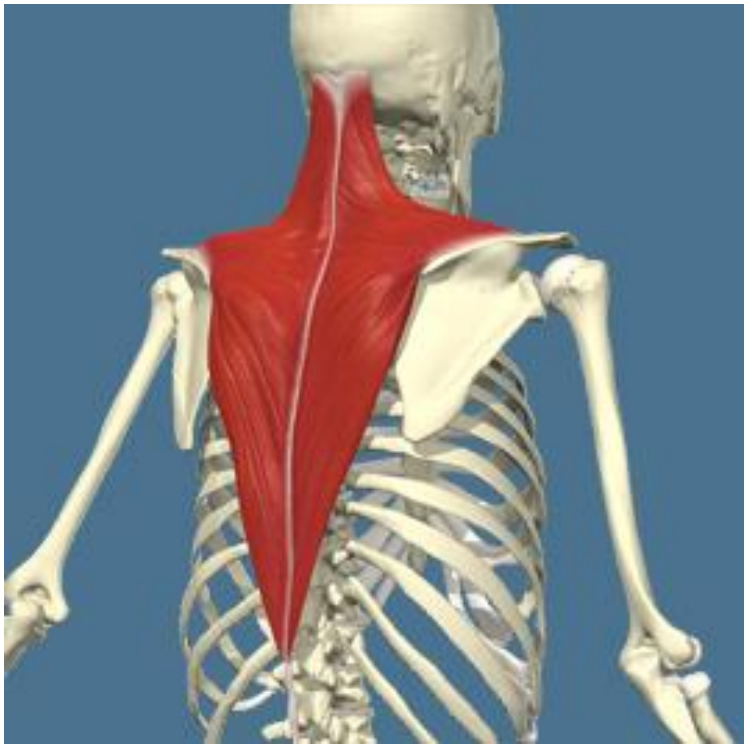
Interactions of Skeletal Muscles in the Body

- **Synergist**
  - Example – if a muscle crosses two or more joints → movement occurs at all the joints → stabilize so movement doesn't occur.
  - Example – Muscles that cause finger flexion → found in forearm

Muscles that directly assist or complement a prime mover are referred to as **synergists**.



Interactions of Skeletal Muscles in the Body



- **Fixator**
  - A synergist that immobilizes a bone or a muscle's origin
  - Example – scapula
    - Held to the axial skeleton only by muscles, but is also freely movable.
    - Fixators immobilize the scapula so that only the desired movements occur at the shoulder joint.

Interactions of Skeletal Muscles in the Body

- Prime movers, antagonists, and synergists work together to produce smooth coordinated, and precise movements
- A muscle can switch roles depending on the movement!