

Fundamentals of  
Anatomy & Physiology

SIXTH EDITION

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# Chapter 11, *part 1*

## The Muscular System

PowerPoint® Lecture Slide Presentation prepared by  
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# Learning Objectives

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- Describe the arrangement of fascicles in various muscle types and explain the resulting functional differences.
- Describe the classes of levers and how they relate to muscle function.
- Predict the actions of muscles based on their origins and insertions.

# Learning Objectives

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- Explain how muscles interact to produce or oppose movement.
- Explain how the name of a muscle can help identify its location, appearance or function.
- Identify the principle axial and appendicular muscles of the body, including origin, insertion, action, and innervation.

# **SECTION 11-1**

## **Muscle Organization and Function**

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# Muscular system

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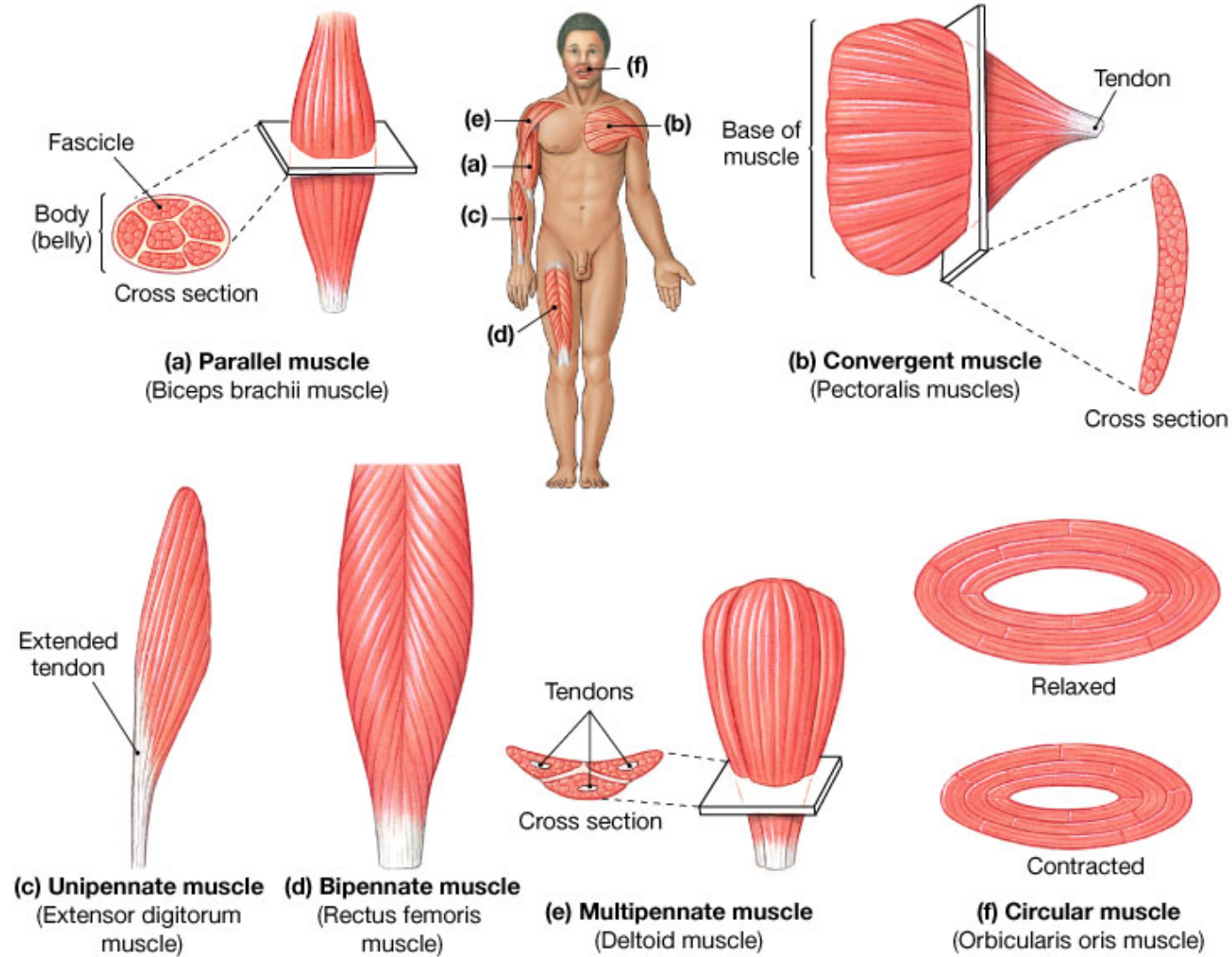
- Includes all skeletal muscle tissue that can be controlled voluntarily

# Organization of skeletal muscle fibers

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- Parallel muscle
- Convergent muscle
- Pennate muscle
  - Unipennate
  - Bipennate
  - Multipennate
- Circular muscle (sphincter)

# Figure 11.1 Different Arrangements of Skeletal Muscle Fibers



# Levers

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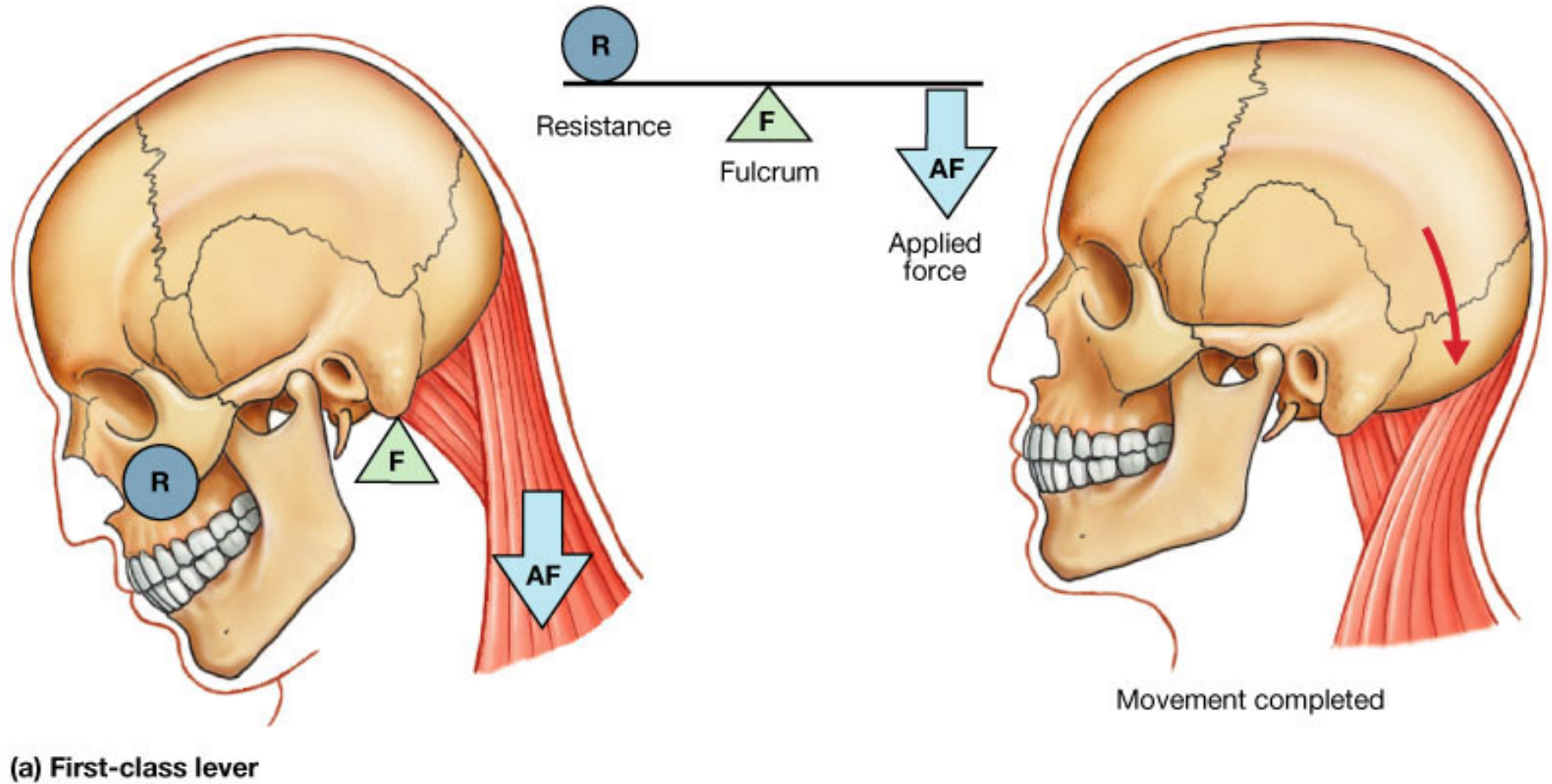
- Rigid structure that moves on a fixed point, the fulcrum
- Changes direction and strength of applied force
- Changes distance and speed of movement
- Three classes
  - First class
  - Second class
  - Third class
  - Most common in the body

**PLAY**

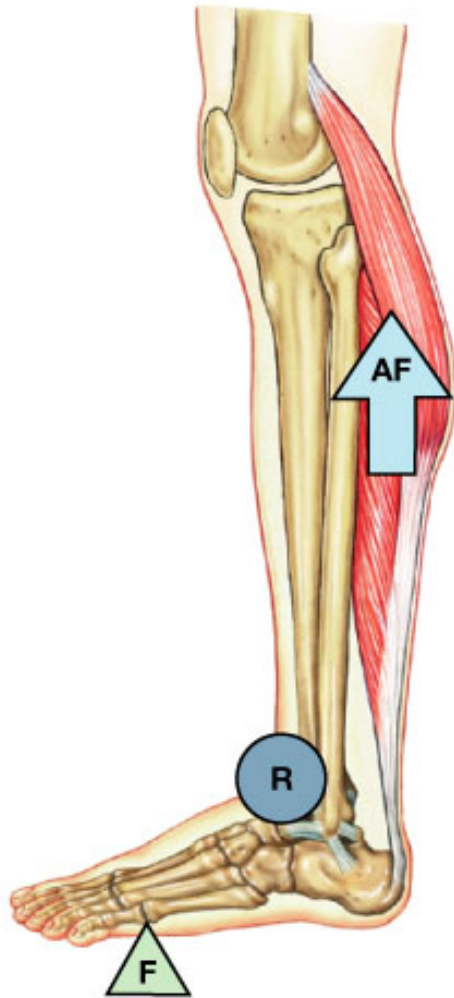
Animation: First, Second and Third-Class Levers



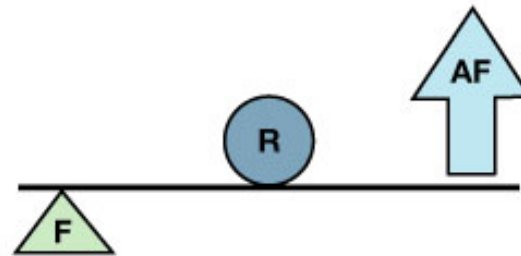
# Figure 11.2 The Three Classes of Levers



# Figure 11.2 The Three Classes of Levers

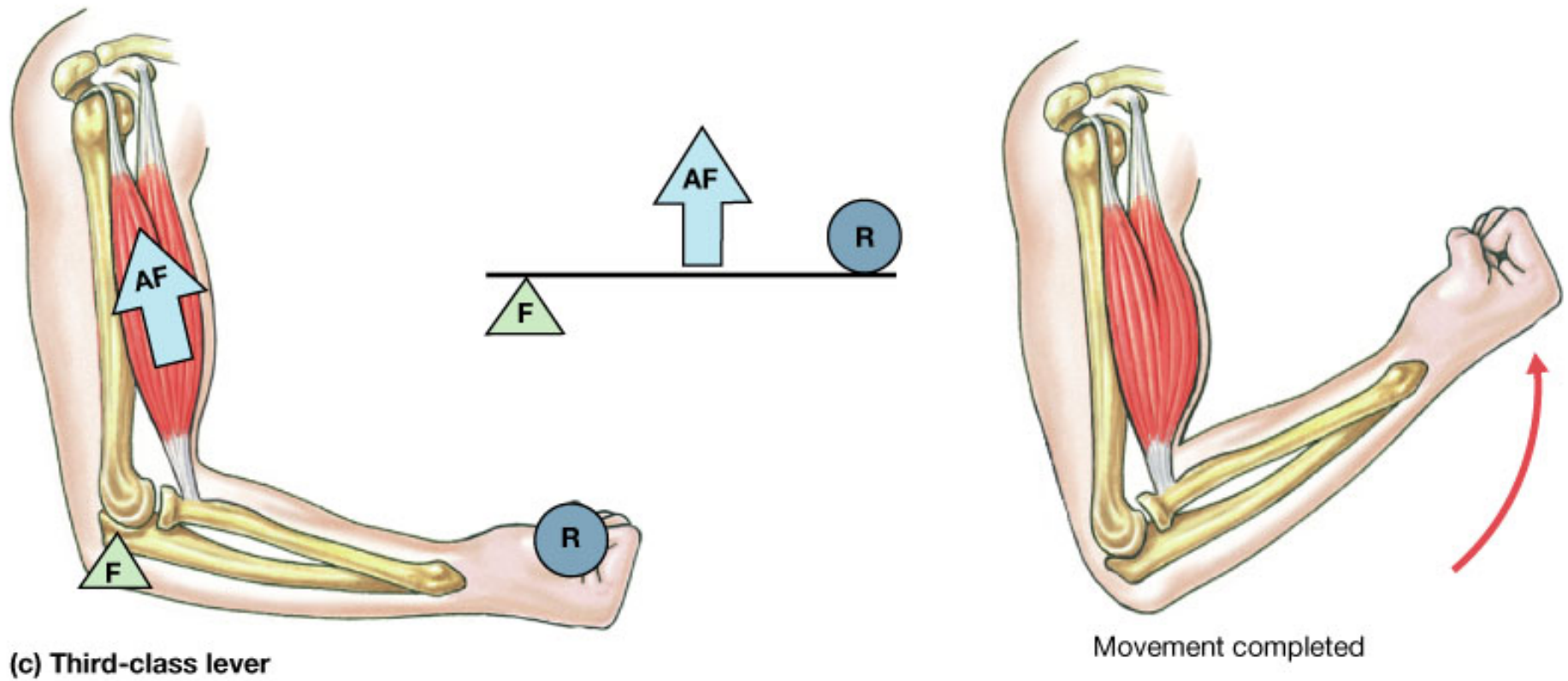


(b) Second-class lever



Movement completed

# Figure 11.2 The Three Classes of Levers



# **SECTION 11-2**

## **Muscle Terminology**

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# Origins and Insertions

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- Muscles can be identified by origin, insertion and action
  - Origin = stationary end
  - Insertion = movable end

# **Actions**

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- **Muscles can be classified by action**
  - **Agonist (prime mover)**
  - **Antagonist**
  - **Synergist**
  - **Fixator**

# Names of skeletal muscles

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- Names give clues to muscle characteristics
  - Location
  - Fascicle organization
  - Relative position
  - Structure
  - Size
  - Shape
  - Origin and insertion
  - Action

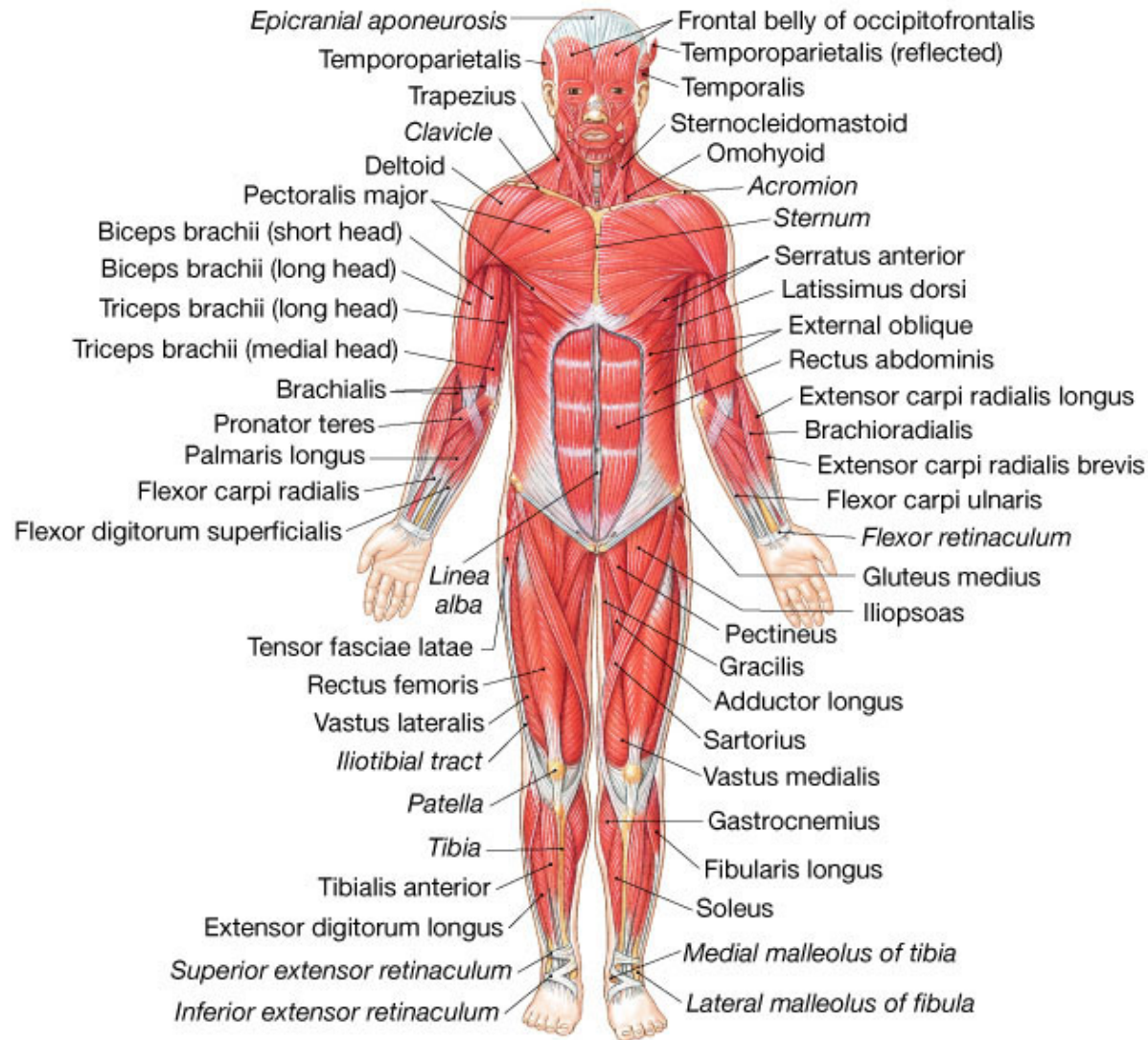
# Axial and Appendicular Muscles

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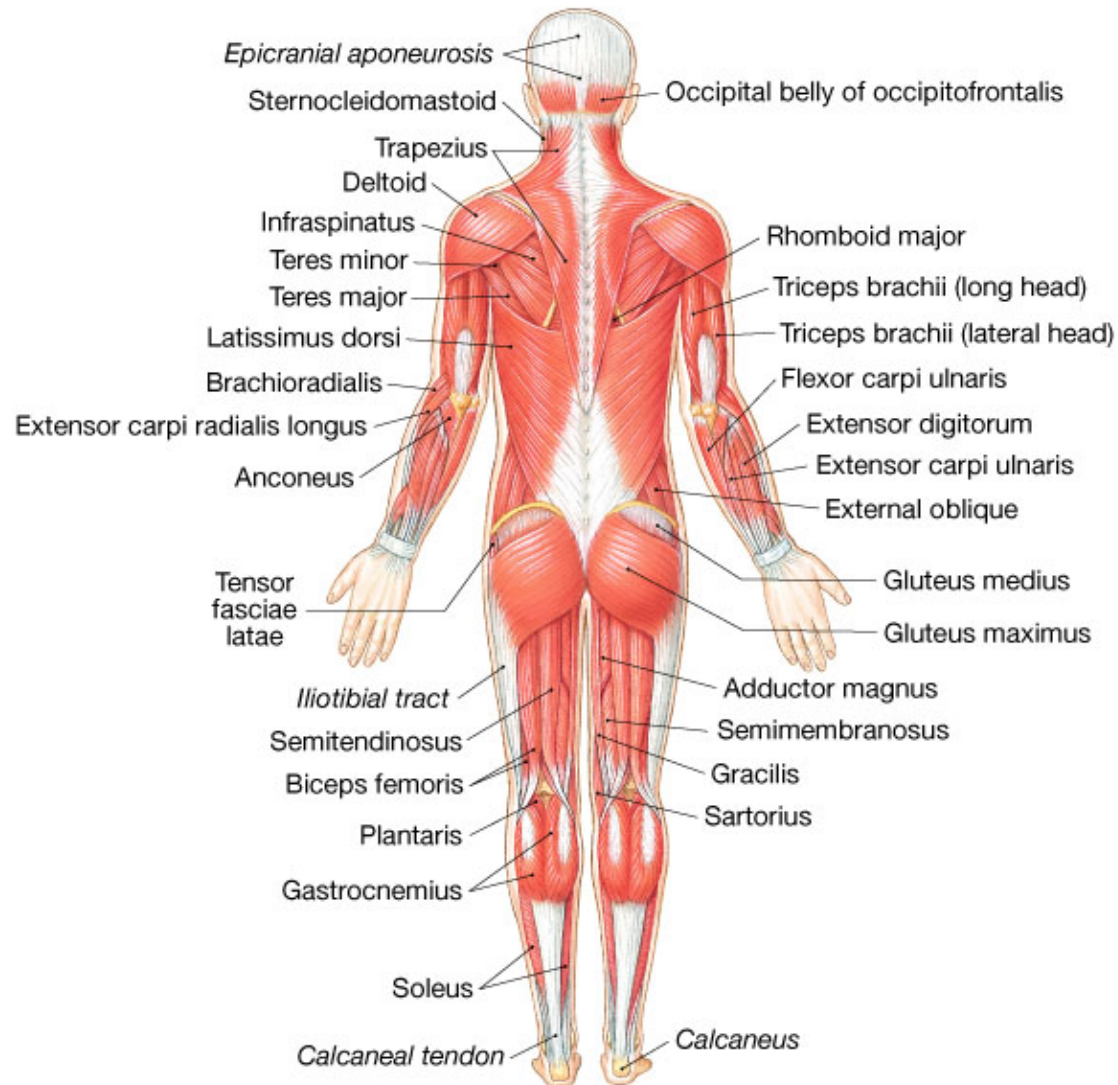
- Axial musculature arises on axial skeleton
  - Positions head and spinal column and moves the rib cage
- Appendicular musculature moves and stabilizes components of the appendicular skeleton



# Figure 11.3 An Overview of the Major Skeletal Muscles



# Figure 11.3 An Overview of the Major Skeletal Muscles



# **SECTION 11-3**

## **The Axial Muscles**

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# Axial muscles

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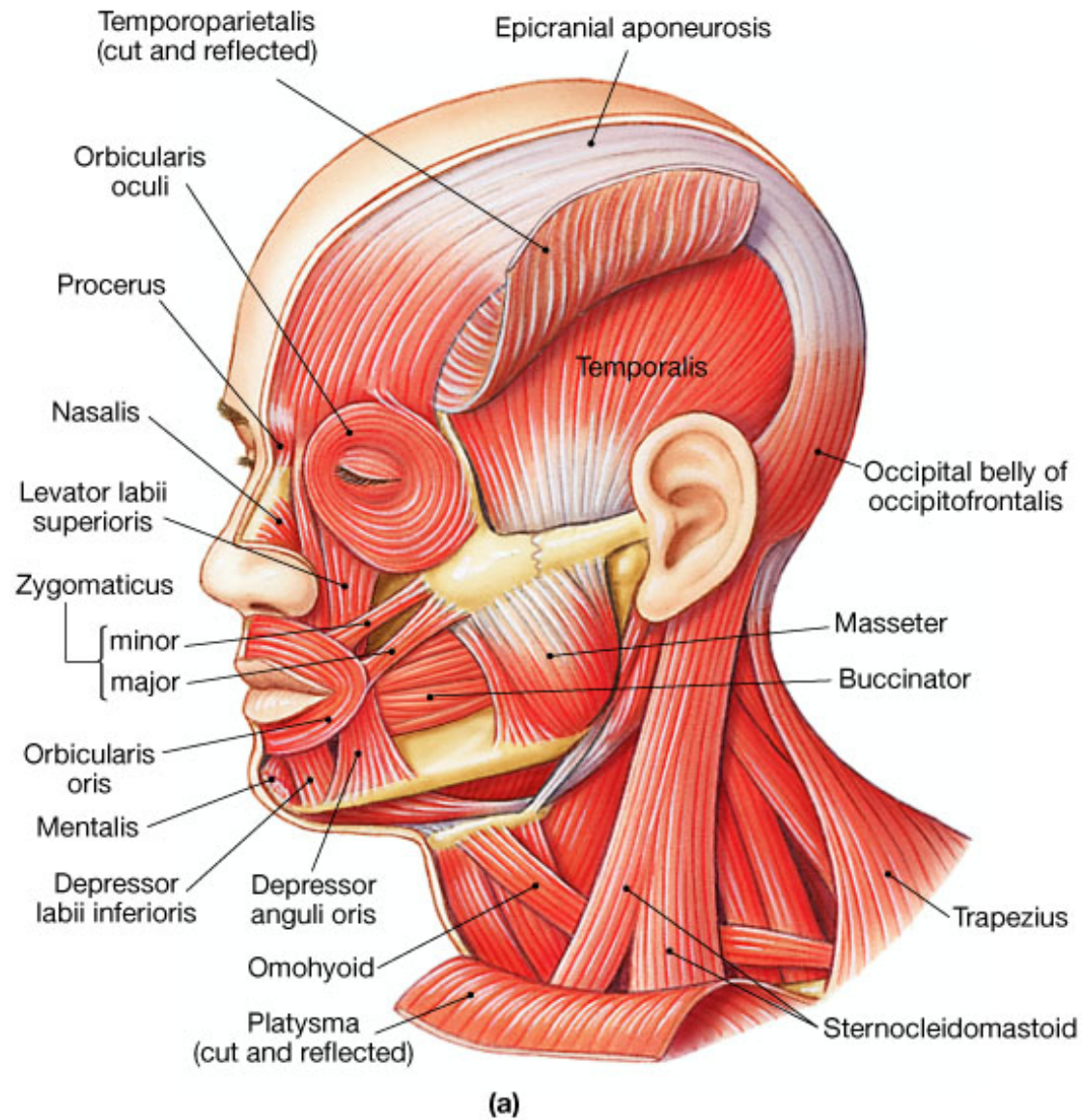
- Logical groupings based on location and/or function
  - Head and neck
  - Vertebral column
  - Oblique and rectus muscles
  - Pelvic floor

# Muscles of the head and neck

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- Facial expression muscles
  - Orbicularis oris
  - Buccinator
  - Occipitofrontalis muscles
  - Platysma

# Figure 11.4 Muscles of Facial Expression



# Figure 11.4 Muscles of Facial Expression

