

# Muscles



# Muscle

- Motion is an essential body function
- Muscles (Contraction & Relaxation)
- Muscle tissue consists of Cells and intercellular substance
- Muscle fibers: significantly developed and highly specialized
- Myocyte: highly excitable, contractile elongated cells



# Functions of Muscles

- Production of movement: Locomotion
  - ✓ Generalized
  - ✓ Localized
- Maintenance of posture and Stability
- Heat production and conserve energy



# Classification

- 1- According to structure
- 2- According to Function
- 3- According to Development
- 4- According to Pylogenetic History



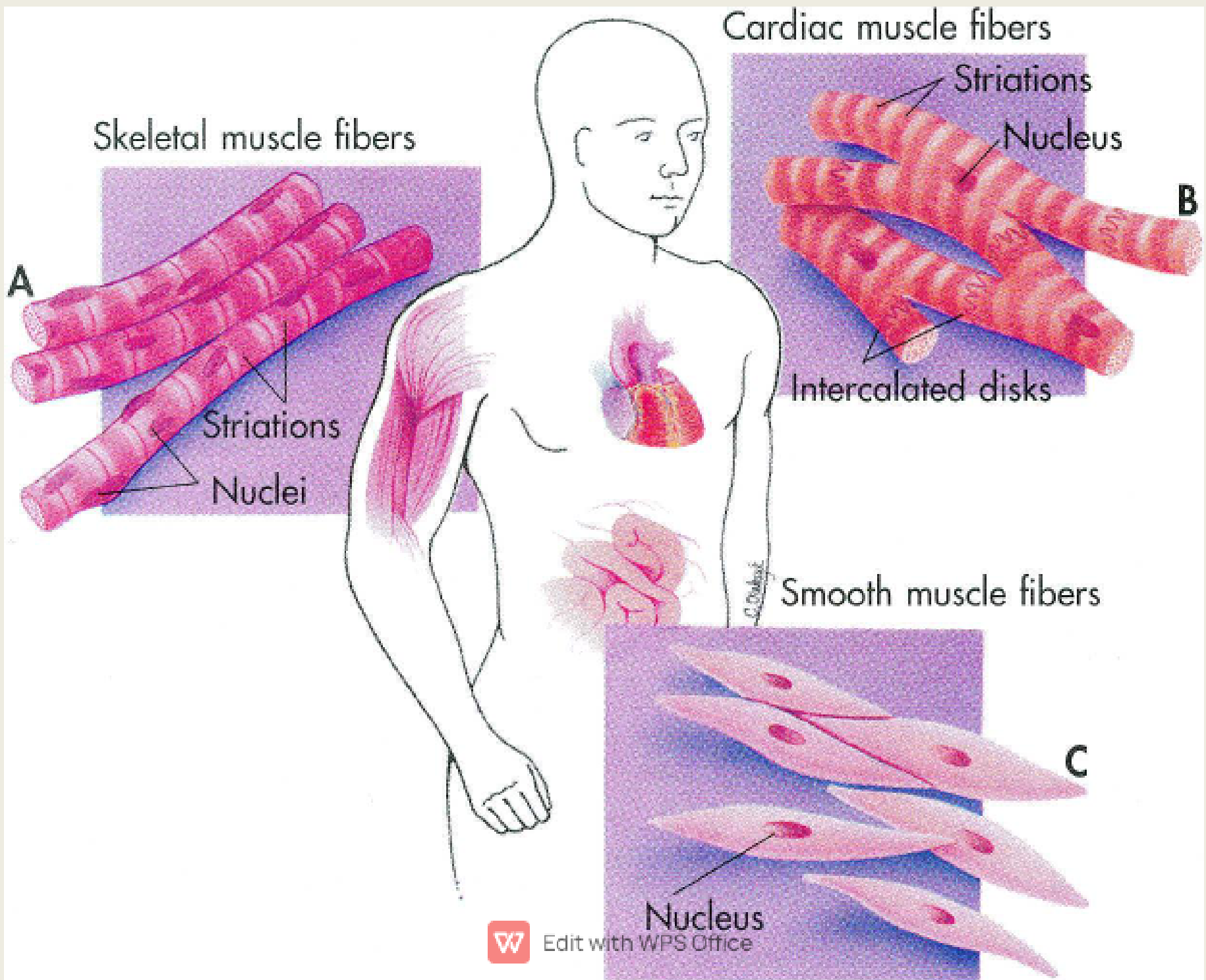
# **1-According to structure**

- 1. Skeletal muscle (Striated Muscle)**
- 2. Smooth muscle**
- 3. Cardiac muscle**

**\*(650 Skeletal muscles in human body)**

**\*\* (75 pairs of muscles involves in maintenance of posture and body movements)**



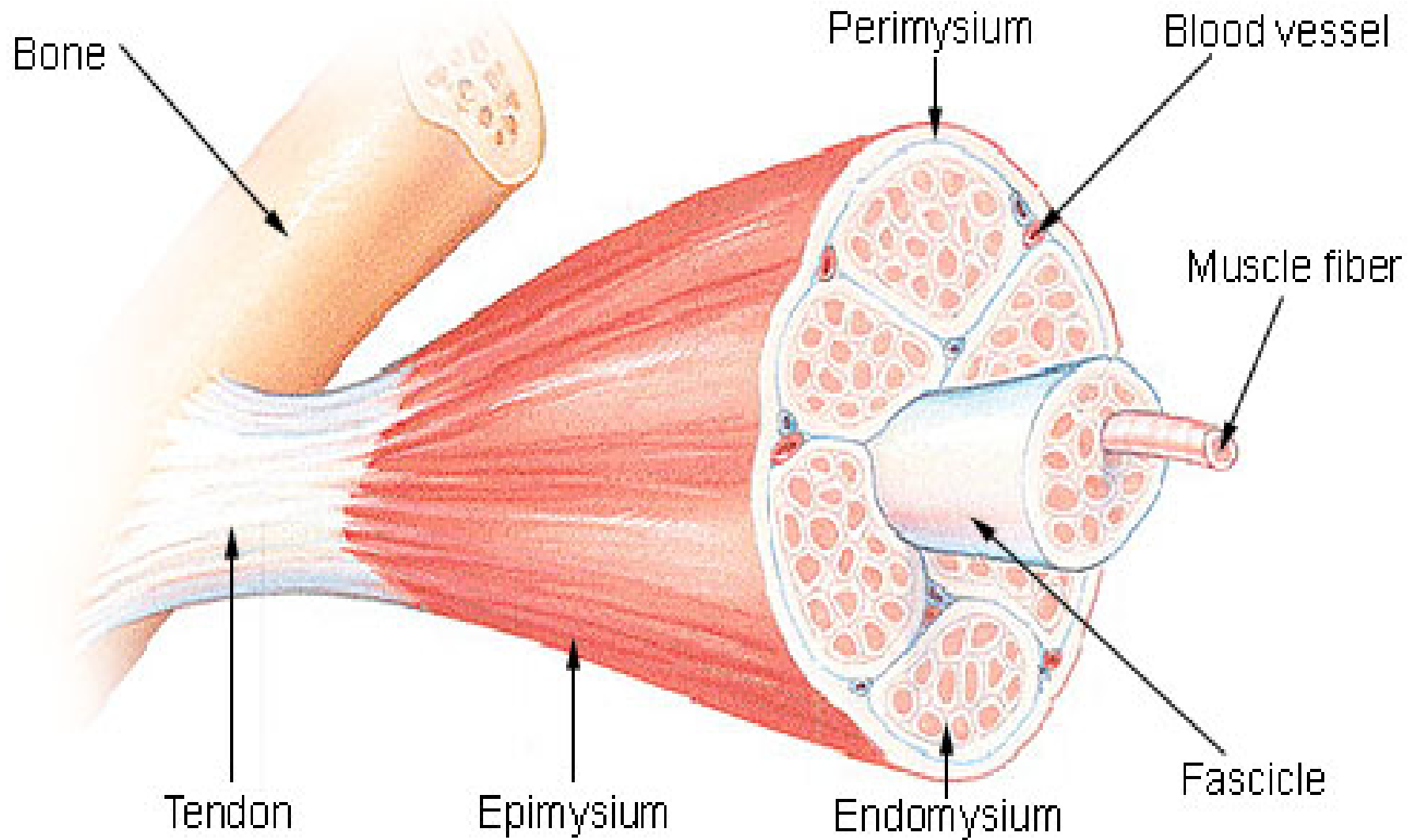


# 1-Skeletal muscle

- **Most abundant**
- **40% to total weight**
- **Elongated, no branching, multinucleated**
- **Light and dark bands under microscope**
- **Striated**
- **Voluntary**
- **Breathing, blinking, swallowing**
- **Somatic Nervous system controls them**
- **Attached to skeleton**



## Structure of a Skeletal Muscle





# Examples

- **Muscles of mastication**
- **Muscles of facial expression**
- **Muscles of larynx**
- **Muscles of Diaphragm, eyeball, Middle ear.**

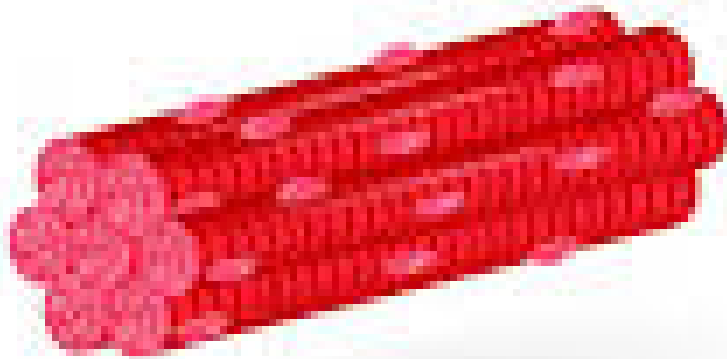


## 2-Smooth muscle

- Smooth
- Not striated
- Long, spindle shaped cells
- Visceral muscles
- Single nucleus
- No cross striations
- Involuntary
- Autonomic Nervous system
- Blood vessels, Respiratory tract, GIT, urogenital



**Skeletal muscle**



**Smooth muscle**



**Cardiac muscle**



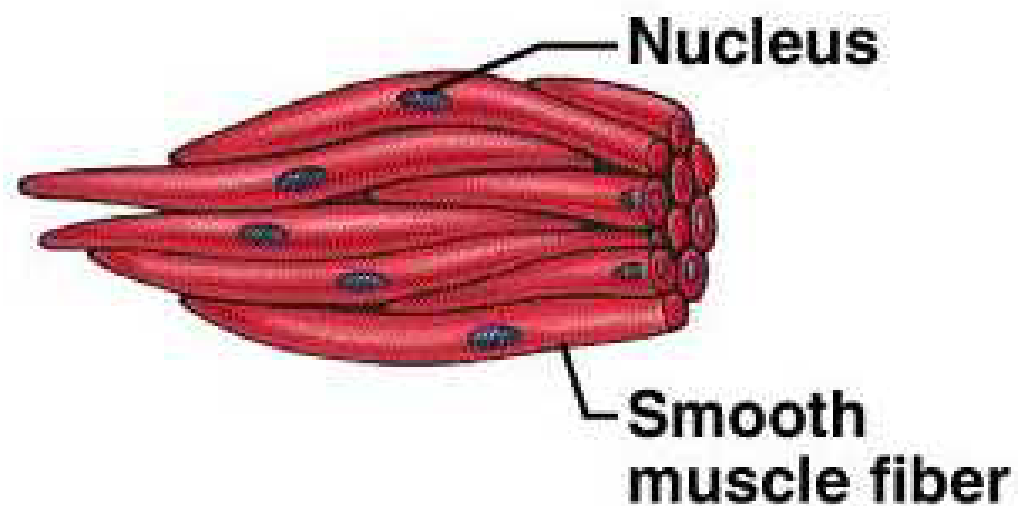
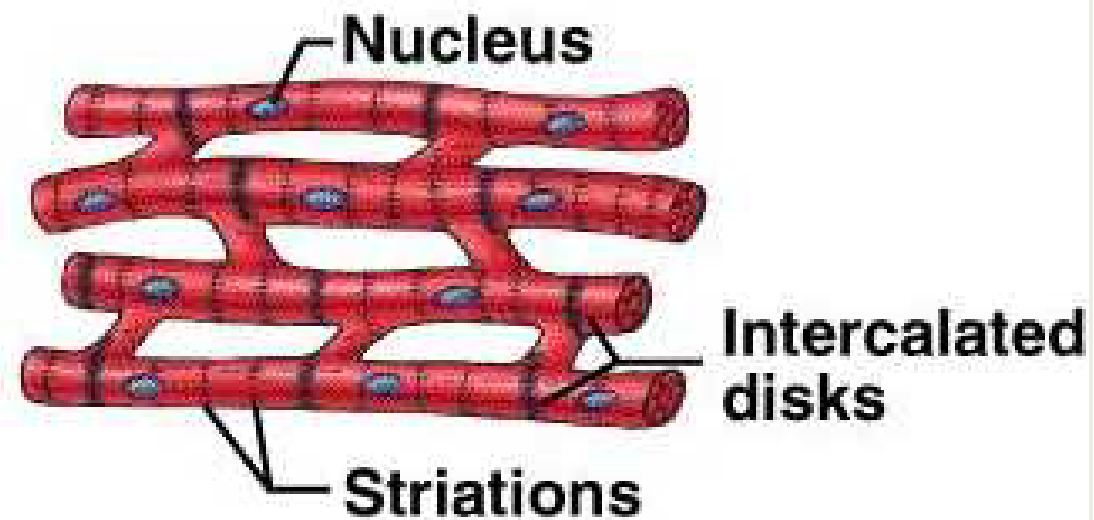
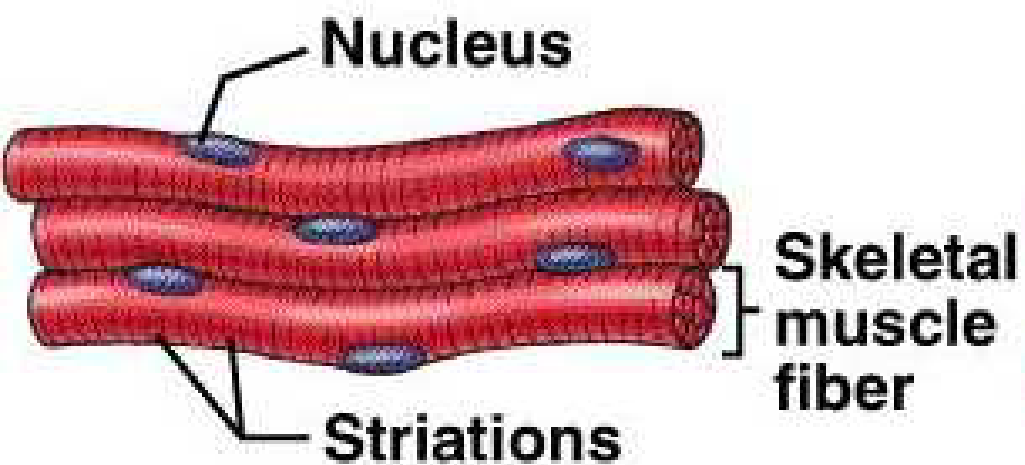
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# 3-Cardiac muscle

- Wall of heart
- Myocardium
- Short cylindrical segments (cells), branching, anastomosing contractile cells and intercellular junctions
- **Microscopically:** One nucleus in the centre of cell, Cross striations.
- Involuntary
- Autonomic nervous system





## ➤ According to Function:

1-Voluntary

2- Involuntary

### 1-Voluntary:

- Contract under our will
- 43% of body weight
- Example: All muscles of body except (pharynx, larynx)



## **2-Involuntary:**

- **Contract automatically, not under our will**
- **Autonomic nervous system**
- **Example: All muscles pharynx, larynx**

## **3-Cardiac Muscle:**

**Myocardium**

**ANS not controls control- But involved in modification of activity**

**Example: Myocardium of heart**



# **3- According to Development**

**1- Mesodermal Muscles**

**2-Ectodermal Muscles**

**1- Mesodermal Muscles:**

- Derived from mesodermal tissue in embryo
- E.g.: All skeletal, smooth and cardiac muscles

**2-Ectodermal Muscles:**

- Derived from ectodermal tissue in embryo
- E.g.: smooth muscles of iris





“Believe in yourself  
and all that you are.  
Know that there is  
something inside  
you that is greater  
than any obstacle.”  
—Christian D. Larson

