

# VETERINARY ANATOMY, UNIT-1

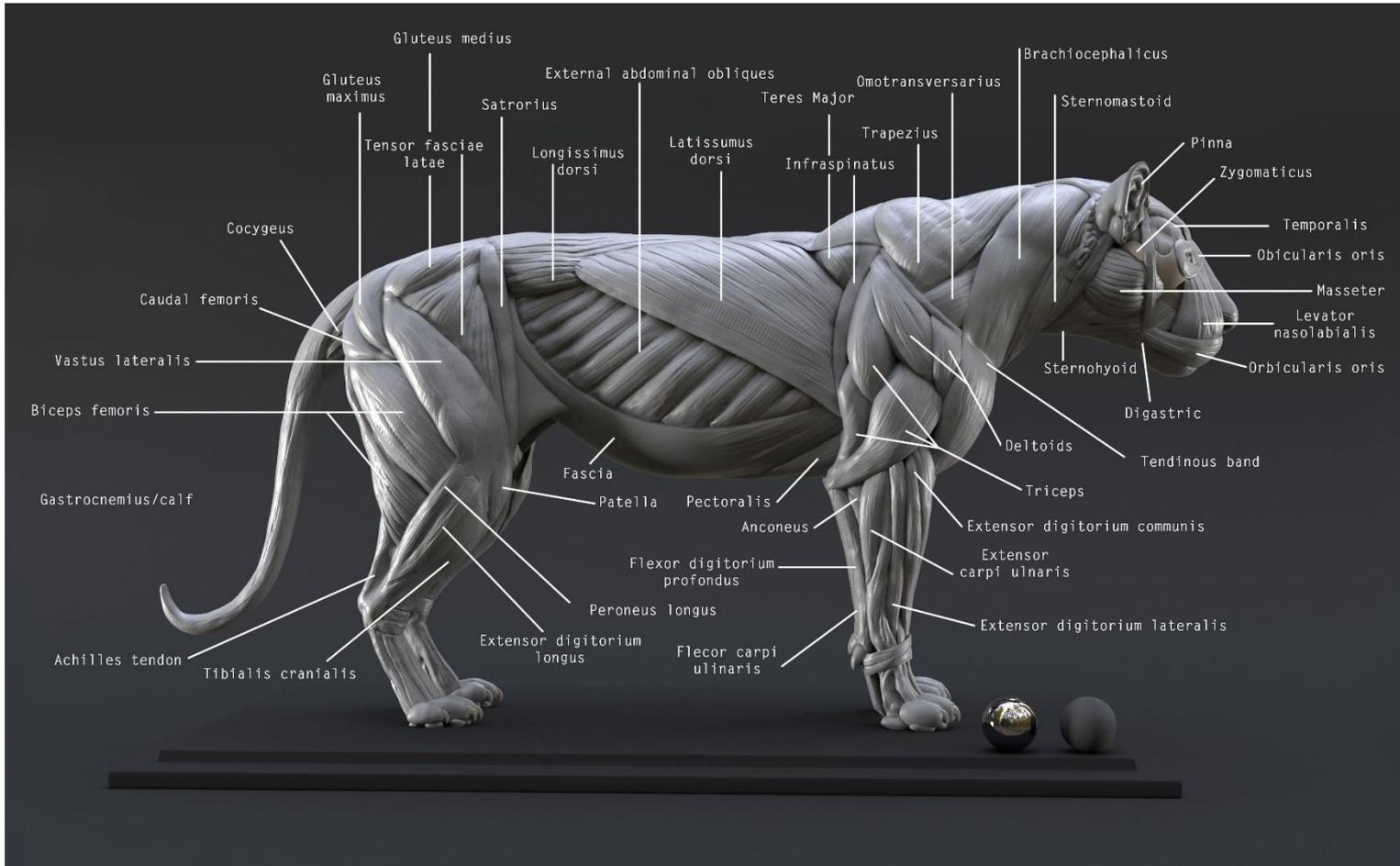
**TOPIC- A- INTRODUCTION TO MYOLOGY & CLASSIFICATION OF MUSCLES.**  
**B-ETYMOLOGY OF MUSCLES, DESCRIPTION OF TENDONS, LIGAMENTS**  
**C-DESCRIPTION OF APONEUROSIS, SYNOVIAL BURSA & SYNOVIAL SHEATH**

**INSTRUCTOR- DR. SANJAY KUMAR BHARTI**  
**HOD, VETERINARY ANATOMY**

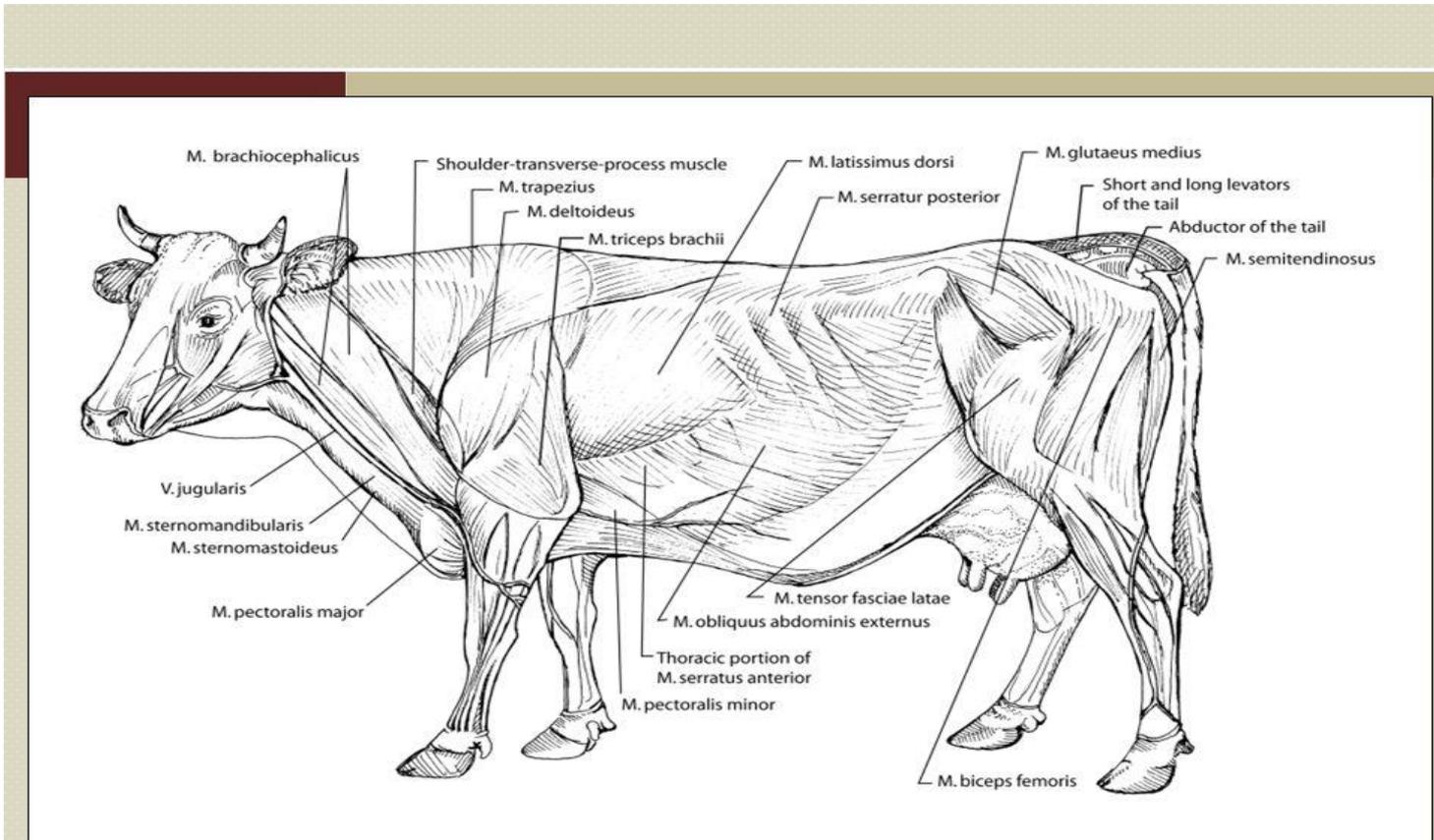
# A- INTRODUCTION TO MYOLOGY & CLASSIFICATION OF MUSCLES.

- ▶ **MYOLOGY** - It is the branch of systemic anatomy which deals with the study of **muscles**.
- ▶ (from latin myos "**muscle**" and logia, "**logy**") is the **science** that **studies** muscles, their physical structure, type of fibres, specific function, and the connections between different muscle groups.
- ▶ **Muscle**: a tissue that can **undergo repeated contraction and relaxation**, so that it is able to produce **movement** of body parts, maintain **tension**, or **pump** fluids within the body.

# INTRODUCTION TO MYOLOGY

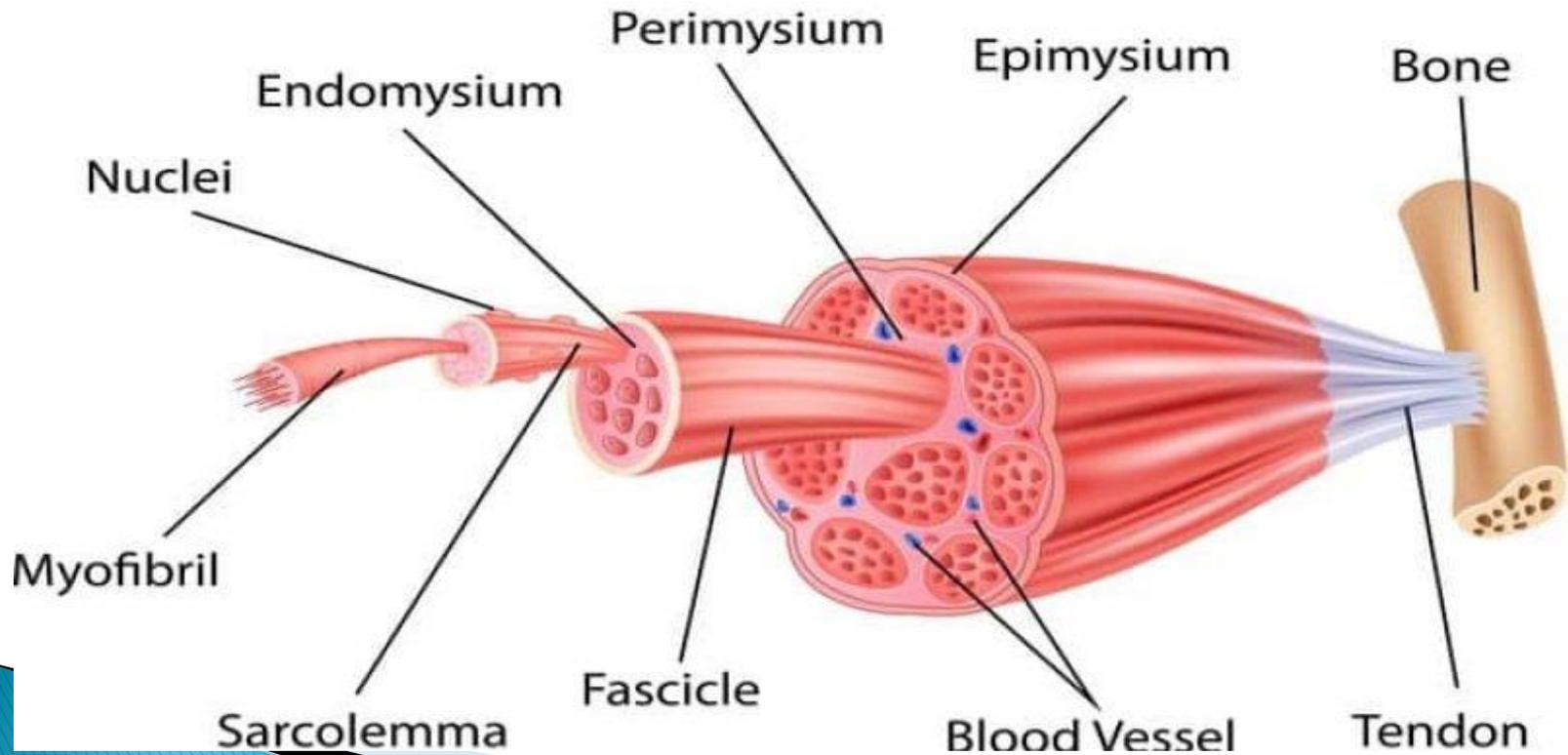


# INTRODUCTION TO MYOLOGY, CONTD..



# STRUCTURES OF MUSCLES

## Structure of Skeletal Muscle



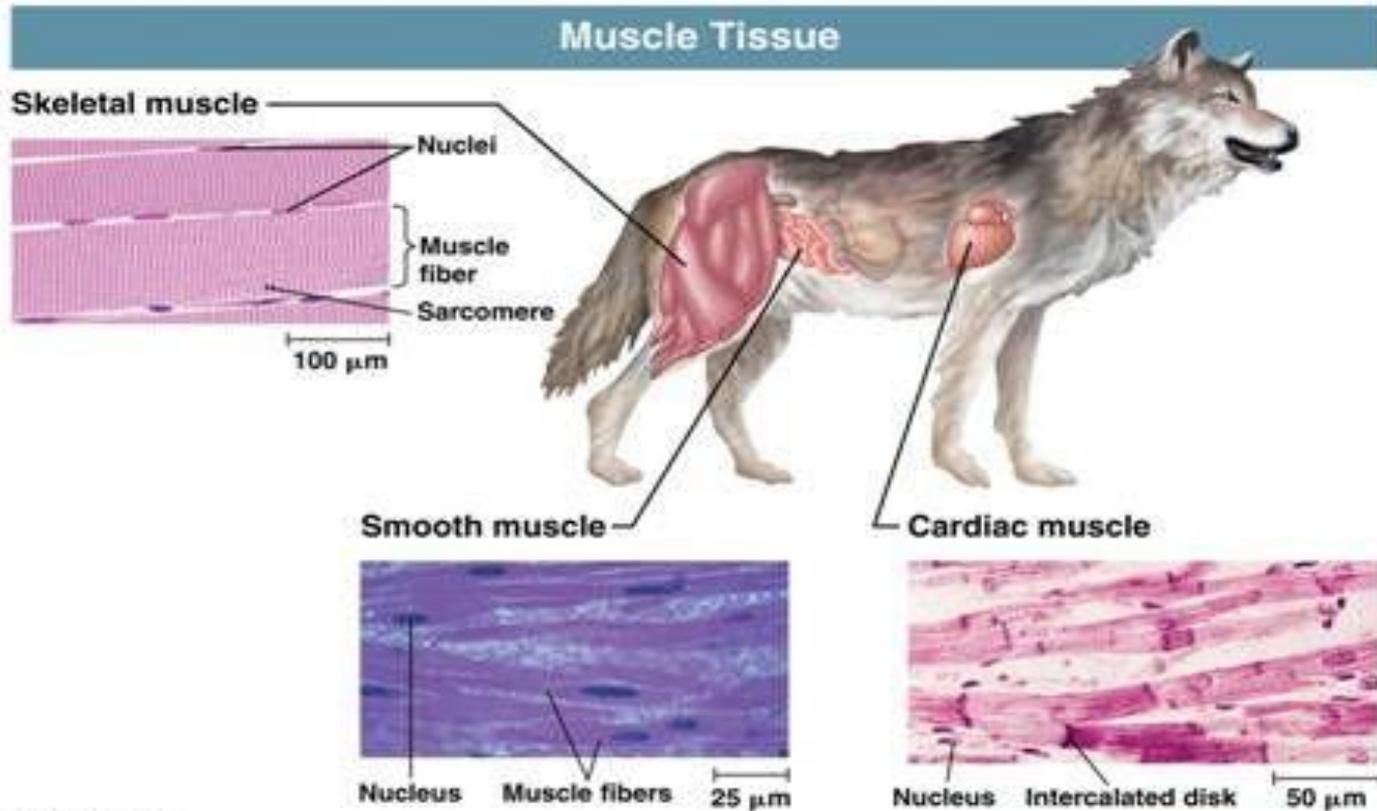
# STRUCTURE OF MUSCLE

- ▶ **Epimysium**- The covering of whole muscle is called epimysium
- ▶ **Perimysium**-Below the epimysium, each bundle of muscles fibre is covered by a layer of connective tissue fibres is called perimysium.
- ▶ **Endomysium**- Covering of muscle fibre which is made up of areolar tissue is called endomysium
- ▶ **Fascicle**-A muscle **fascicle (connective tissue)** is a bundle of skeletal muscle fibers surrounded by perimysium
- ▶ **Sarcolemma**-Cell membrane, **Sarcoplasm**-Cytoplasm
- ▶ **Myofibriles**-**Myofibril**, very fine contractile fibers, groups of which extend in parallel columns along the length of striated muscle fibres. The **myofibrils** are made up of thick and thin myofilaments, which help give the muscle its striped appearance

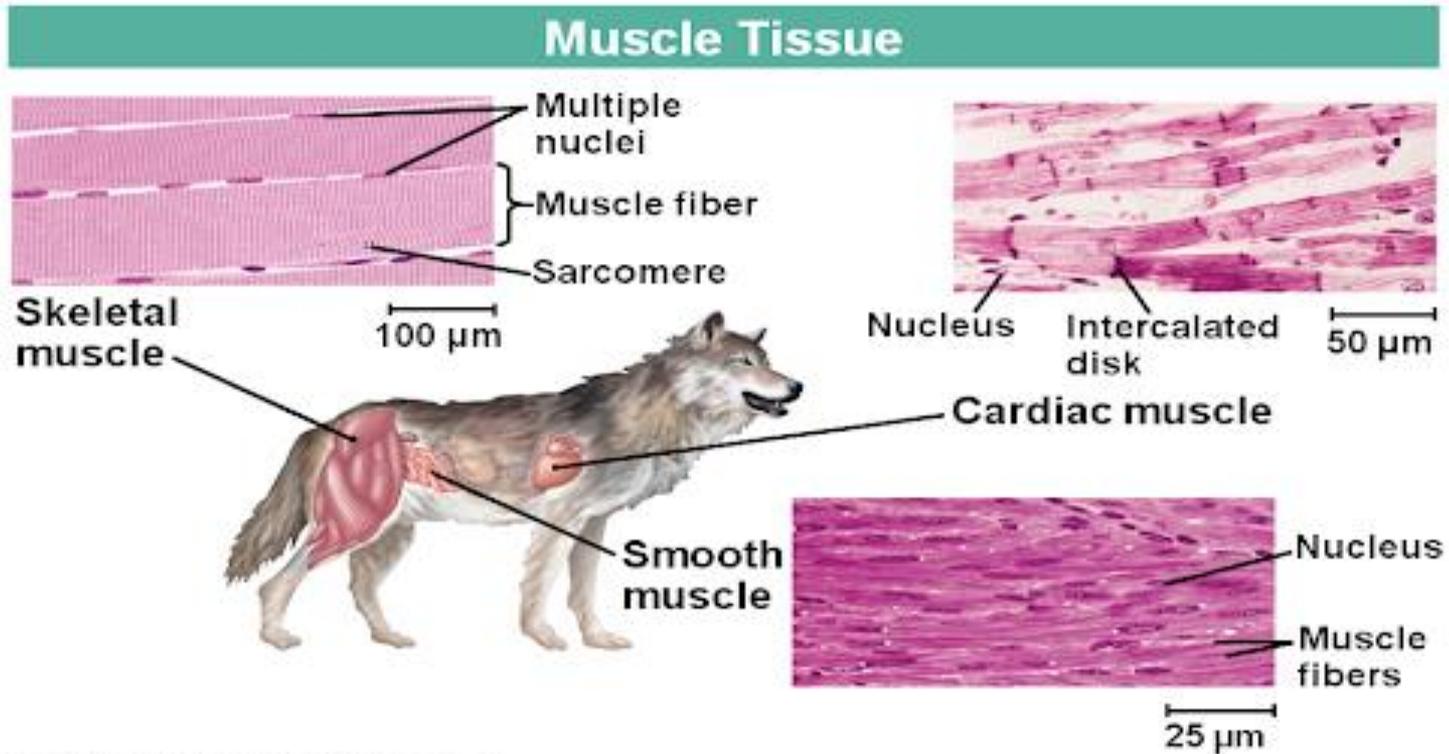
# CLASSIFICATION OF MUSCLES

- ▶ There are **three** categories of muscle tissue:
- ▶ 1] Skeletal muscle = **striated**; generally attached to bone; usually under voluntary control
- ▶ 2] Cardiac muscle = **striated**; musculature of the heart, usually under involuntary control
- ▶ 3] Smooth muscle = **not striated**; associated with viscera (gut, vessels, glands, etc.) usually under involuntary control

# CLASSIFICATION OF MUSCLES, CONTD



# CLASSIFICATION OF MUSCLES, CONTD.



# SKELETAL MUSCLE.

- ▶ They are both directly or indirectly attached to the skeleton and hence often named as skeletal muscles
- ▶ Each muscle consists of a central portion called *belly* and *two ends*.
- ▶ The fixed attachment is called **origin**; the movable one is called **insertion**. Each end of the muscle is attached to bone or cartilage or to skin by means of either *tendon* or *ligament*

# SMOOTH MUSCLE

- ▶ Smooth muscle is also called as **non-striated** or **involuntary muscle**, because the contraction of the muscle is not controlled by the will of the animal
- ▶ The muscle fibres **don't show cross striations** under microscope. Hence, they get the name smooth muscle
- ▶ They make the bulk of the walls of the **visceral organs** and are also named as **visceral muscles**
- ▶ It is composed of **fusiform or spindle shaped cells** with a **single nucleus** at the centre
- ▶ The muscle fibres are generally arranged **parallel** to each other

# CARDIAC MUSCLES

- ▶ Cardiac muscle is found only in the heart, the immediate proximal ends of aorta, pulmonary artery and pulmonary veins
- ▶ It is also known as **involuntary and striated muscle**. Since the contraction is not under the control of the animal and the muscle fibres also shows the cross striations under microscope as the skeletal muscle fibres, they can be called as ***involuntary and striated***
- ▶ Unlike the skeletal muscle fibres they are single nucleated, smaller in size and often have multiple branches
- ▶ They are attached to the adjacent cells to form a **branching network**
- ▶ The firm end-to-end attachments between cardiac muscle cells are visible under the microscope as dark, transverse lines between the cells. These attachment sites are called ***intercalated discs***

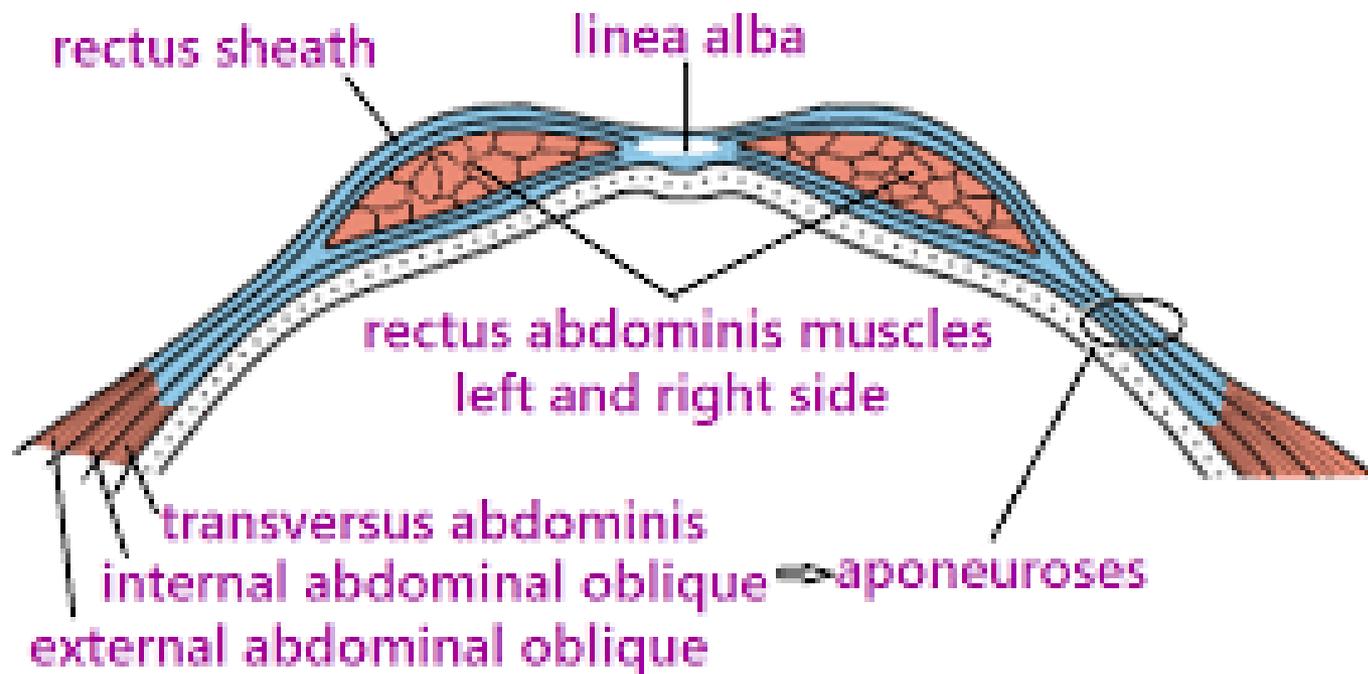
# B-ETYMOLOGY OF MUSCLES, DESCRIPTION OF TENDONS, LIGAMENTS

- ▶ **Etymology** of muscles – means its origin and development throughout body.
- ▶ fixed attachment is called **origin**; the movable one is called **insertion**. Each end of the muscle is attached to bone or cartilage or to skin by means of either *tendon* or *ligament*
- ▶ **Tendon-** A narrow band of white fibrous cord like structure that attaches **muscle to bone** or cartilage or other tissues is known as tendon

# DESCRIPTION OF TENDONS, LIGAMENTS

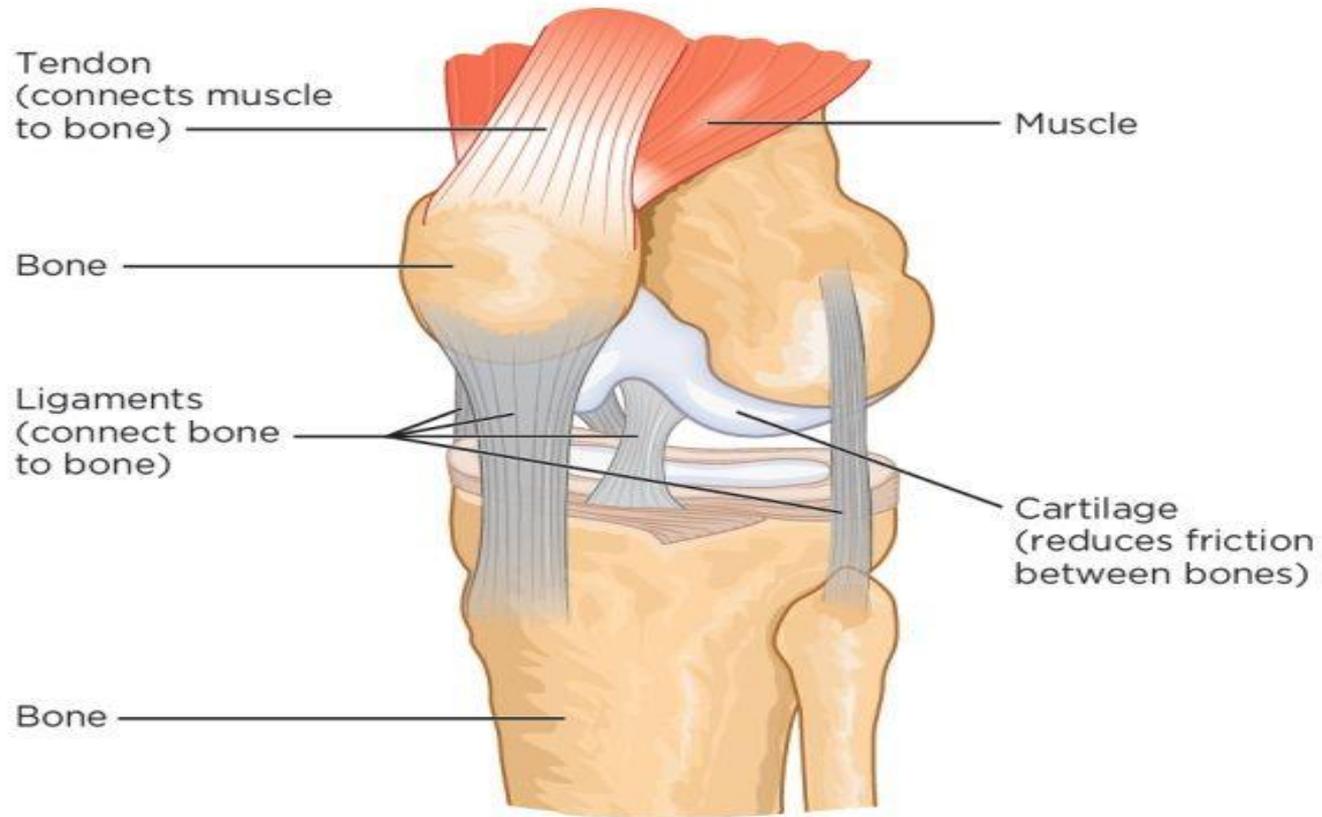
- ▶ **Aponeurosis** - Instead, some muscles are connected to bone or other muscles by a broad thin sheet of fibrous connective tissue called aponeurosis,
- ▶ **Linea alba**- which is often glistening is called linea alba.
- ▶ **Ligament**- are bands of tough elastic tissue around your joints. They **connect bone to bone**, give your joints support, and limit their movement.
- ▶ **Ligament** present around your knees, ankles, elbows, shoulders, and other joints.

# STRUCTURE OF APONEUROSIS & LINEA ALBA



# STRUCTURE OF TENDONS, LIGAMENTS

Fig 1. **Accessory structures of the musculoskeletal system**

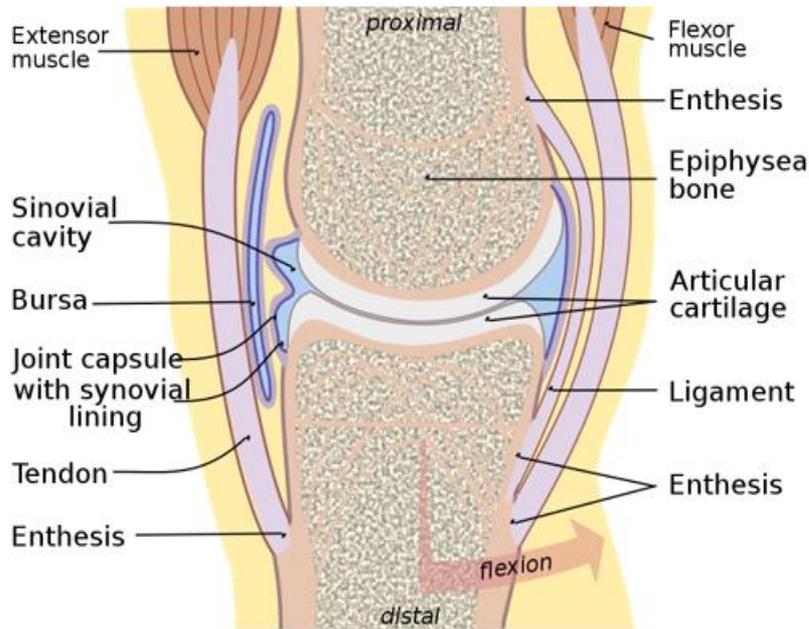


# SYNOVIAL BURSA & SYNOVIAL SHEATH

- ▶ **SYNOVIAL BURSA**- Is a thin walled bag, contains a small amount of synovial fluid, present between muscles and tendon or between muscles to reduce friction between these two structures
- ▶ **SYNOVIAL SHEATH**- A tubular synovial bag encircles a tendon is known as synovial sheath.

# SYNOVIAL BURSA & SYNOVIAL SHEATH

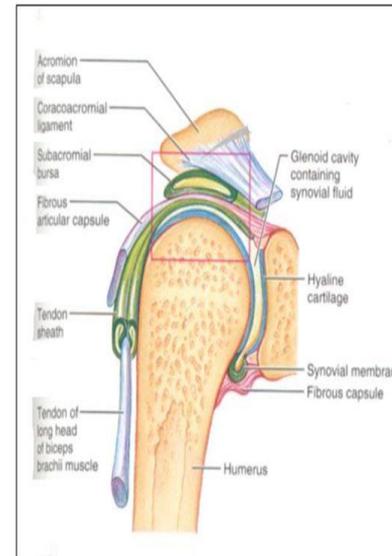
## BURSA



By Madhero88 - Own work, CC BY-SA 3.0

<https://commons.wikimedia.org/w/index.php?curid=10158699>

## Bursae & Tendon Sheaths



- **Bursae:** flat, fibrous sac w/synovial membrane lining
- **Tendon Sheaths:** elongated bursae that wraps around tendons
- **3 Factors in Joint Stability:**
  - Muscle Tone
  - Ligaments
  - Fit of Articular Surface