

# The Muscular System & Associated Structures

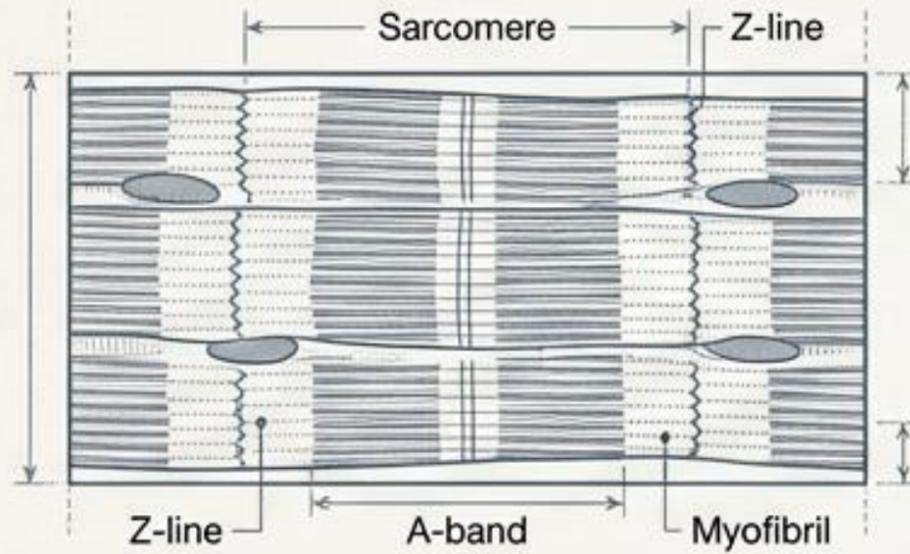
LECTURE 3: CLASSIFICATION, FUNCTION, AND ARCHITECTURE

Dr AMAL AQEEL ALBTOOSH

# The Three Engines of the Body



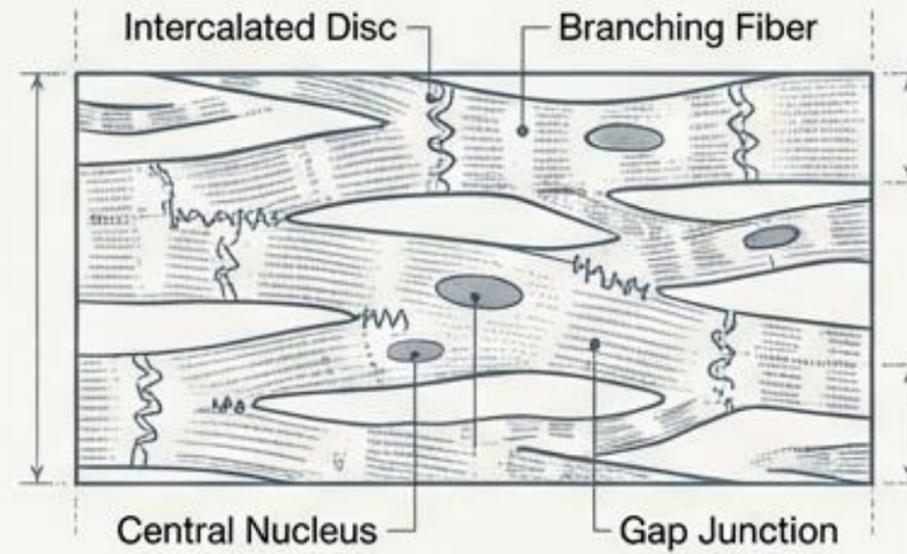
## SKELETAL



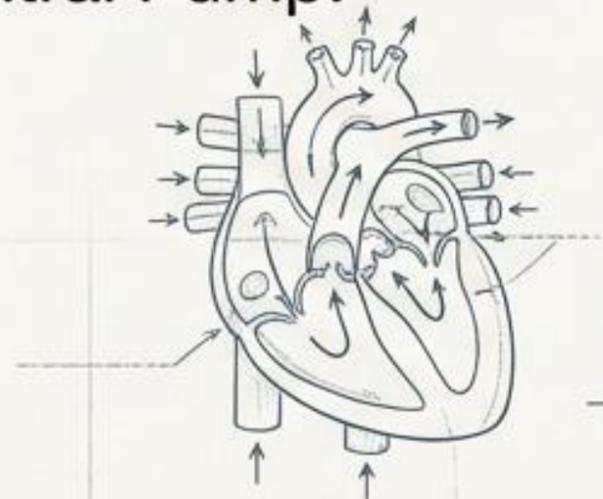
- Voluntary Control.
- Striated Structure.
- The Lever System.



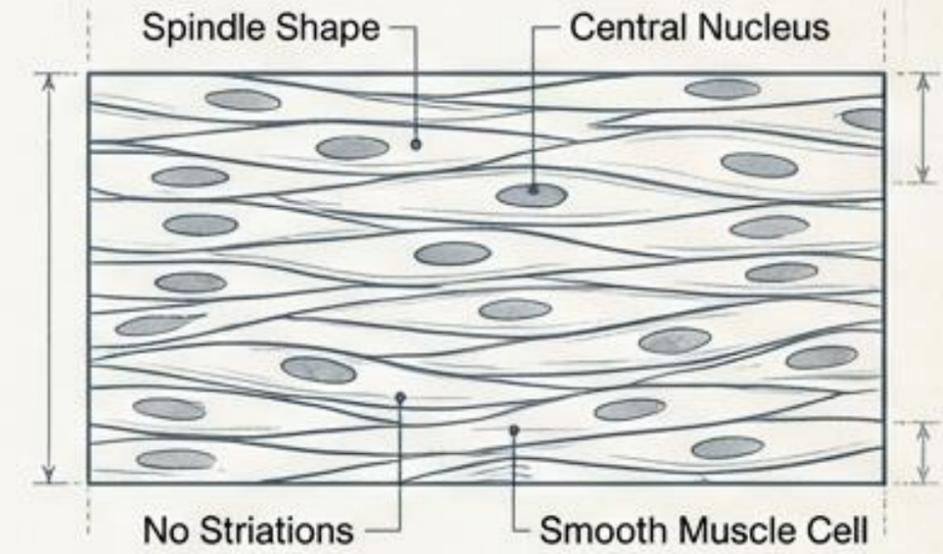
## CARDIAC



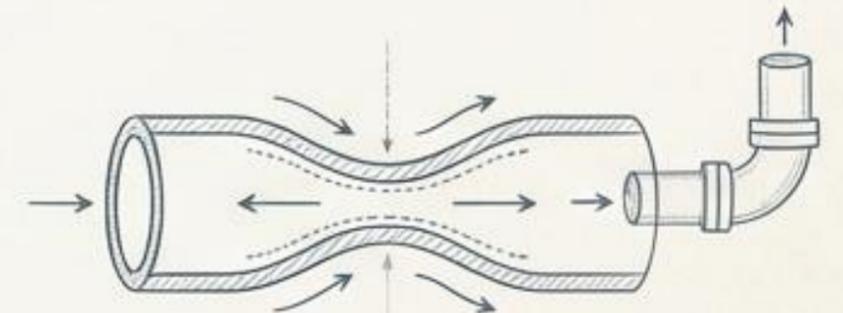
- Involuntary Control.
- Striated & Branching.
- The Central Pump.



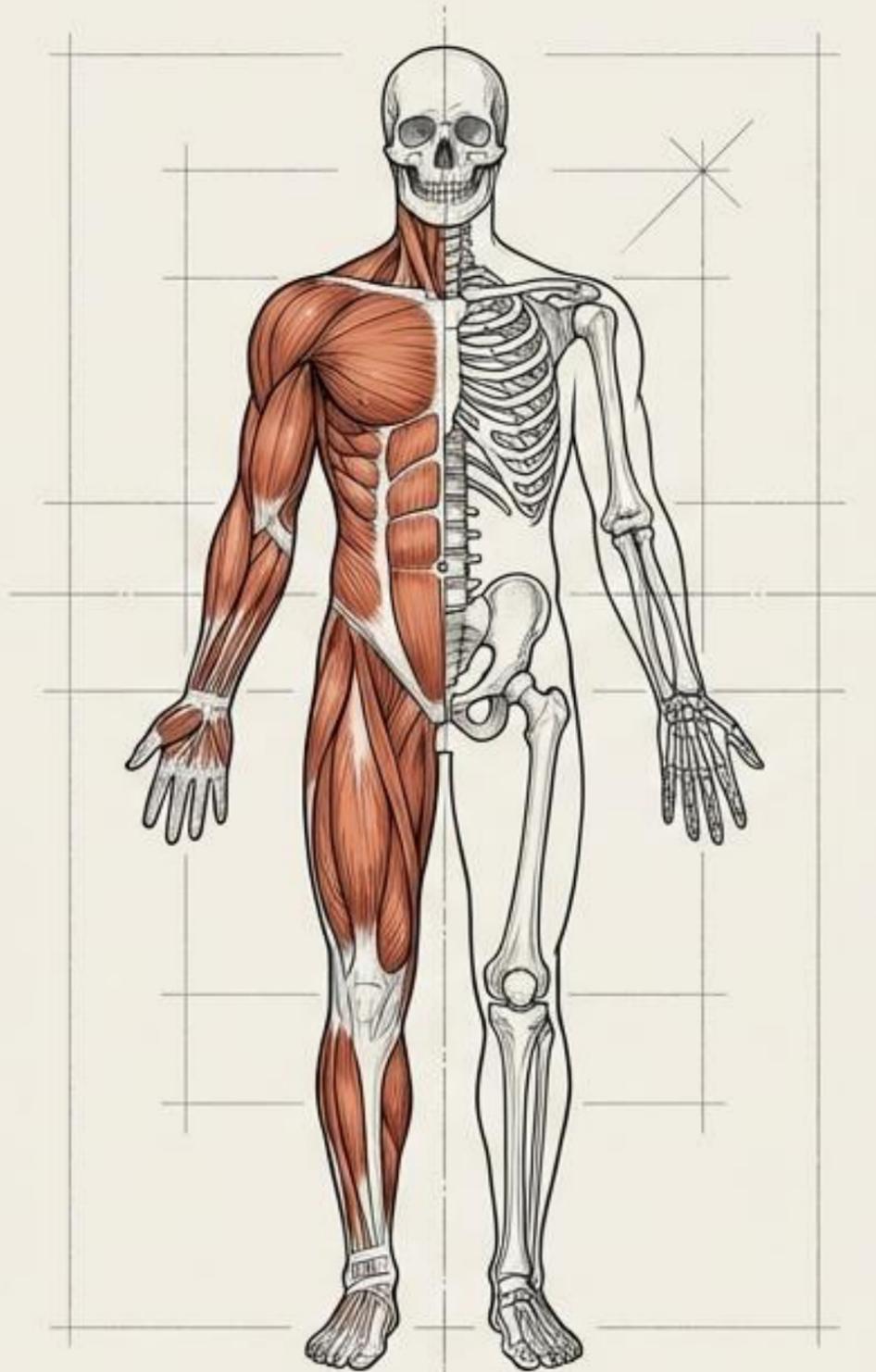
## SMOOTH



- Involuntary Control.
- Non-Striated (Smooth).
- The Internal Plumbing.

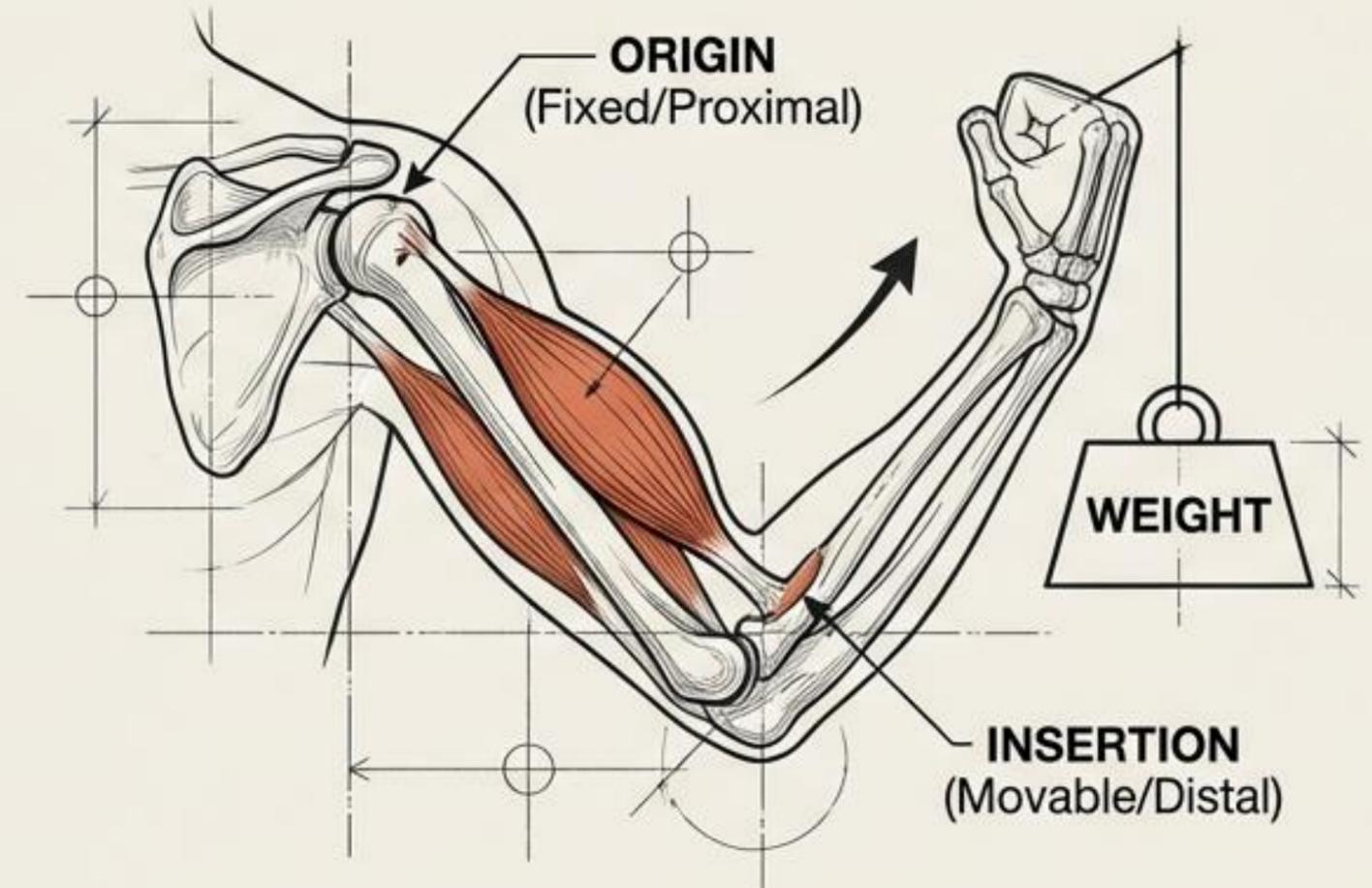


# Skeletal Muscle: The Voluntary Mover



## VITAL STATS

- **Mass:** ~40% of total body weight.
- **Primary Functions:** Skeletal Movement, Heat Generation, Posture Maintenance.

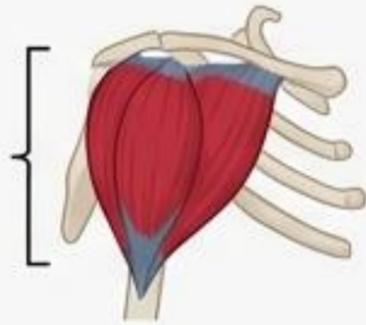


# Decoding Muscle Nomenclature

Muscles are named according to seven key characteristics

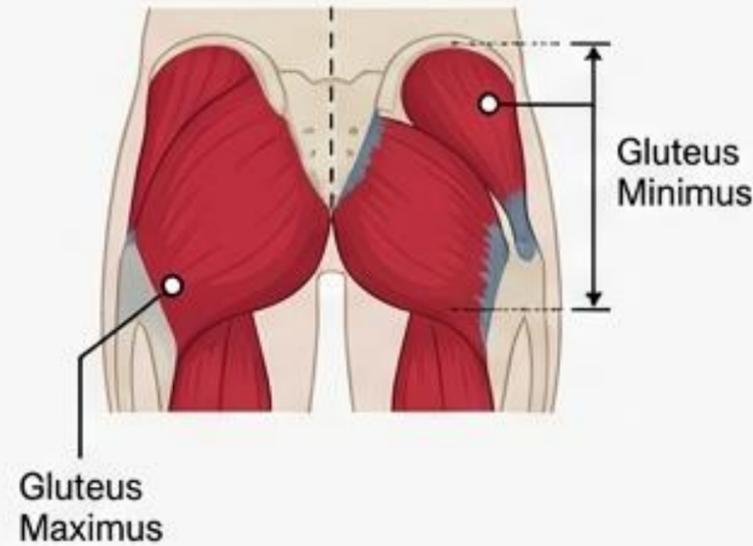
## Shape

e.g., Deltoid (Triangular)



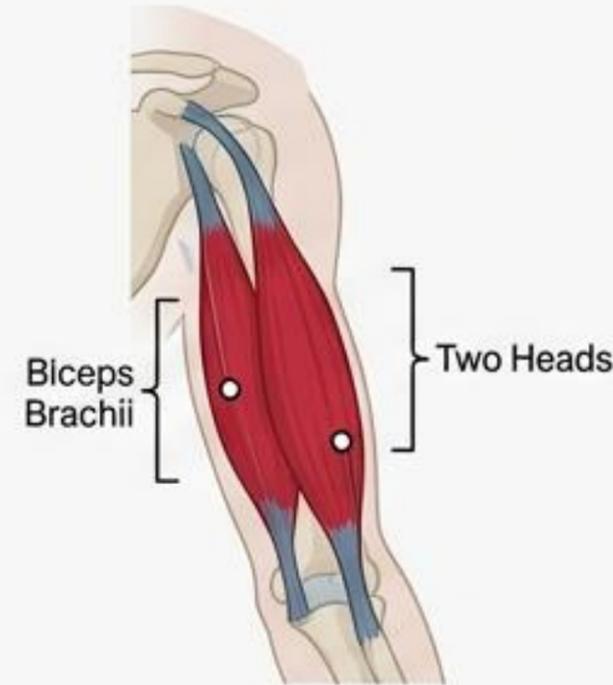
## Size

e.g., Gluteus Maximus vs. Minimius



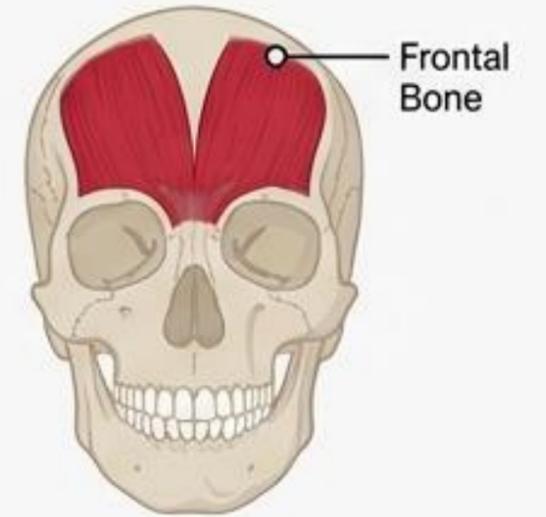
## Heads/Bellies

e.g., Biceps (Two Heads)



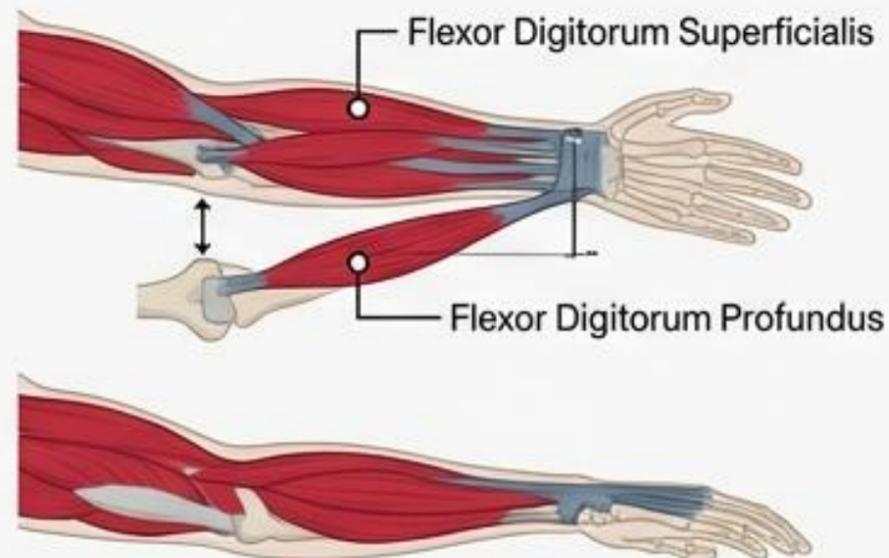
## Position

e.g., Frontalis (Frontal Bone)



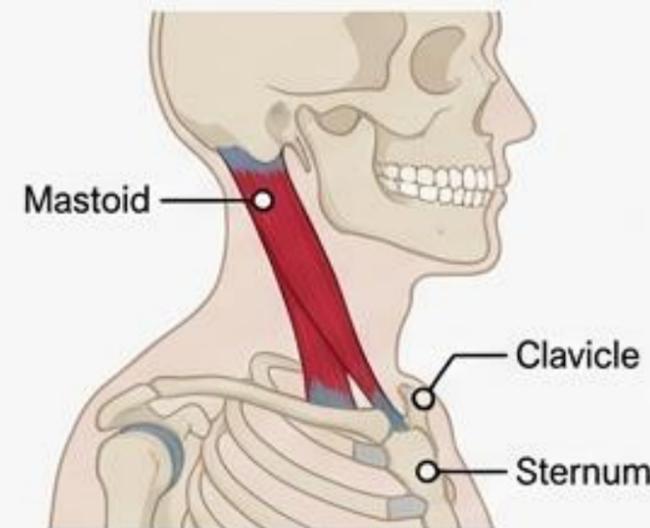
## Depth

e.g., Flexor Digitorum Superficialis vs. Profundus



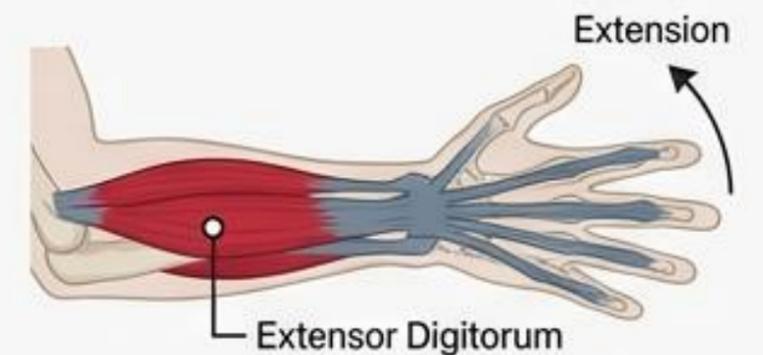
## Attachments

e.g., Sternocleidomastoid (Sternum/Clavicle/Mastoid)

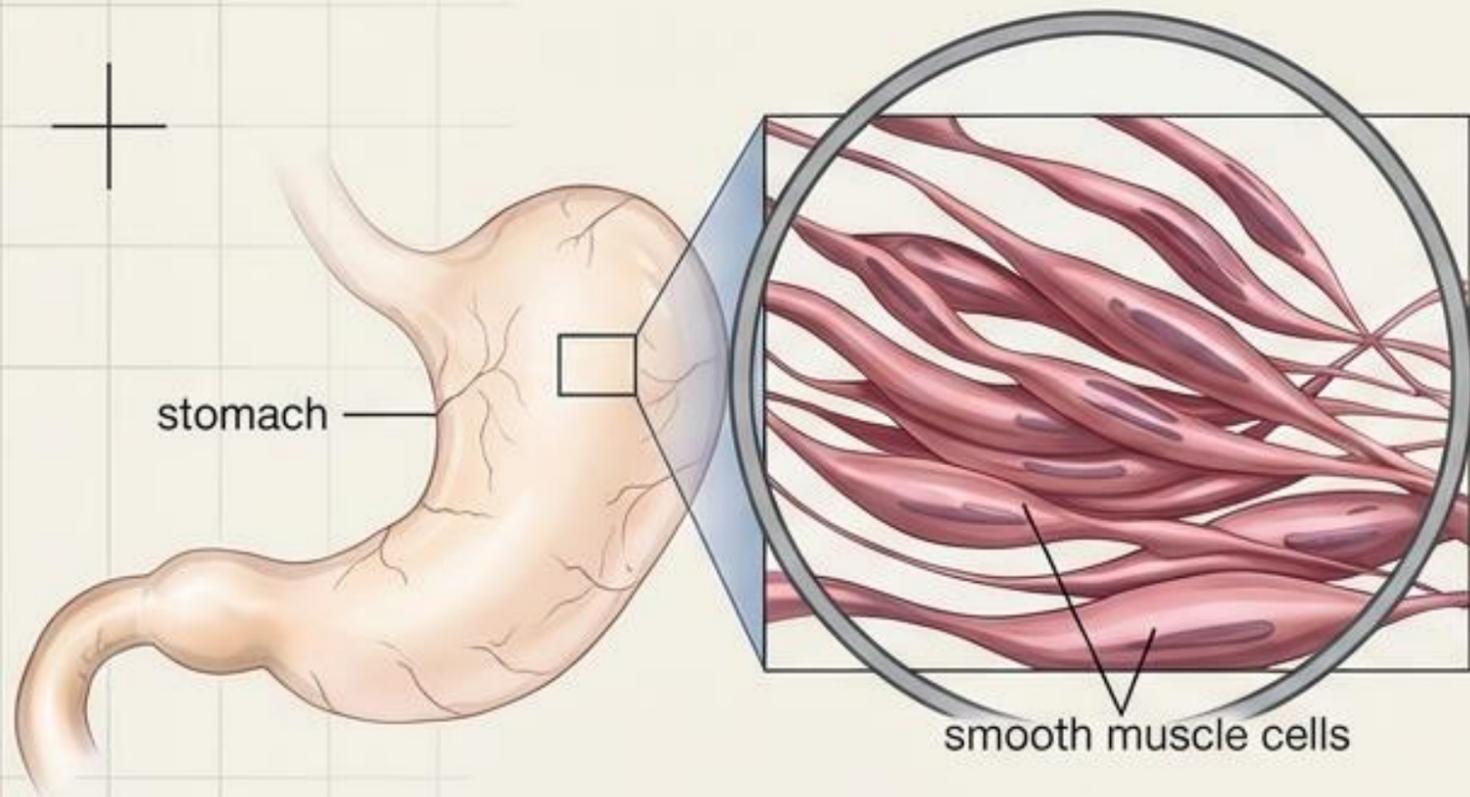


## Action

e.g., Extensor Digitorum



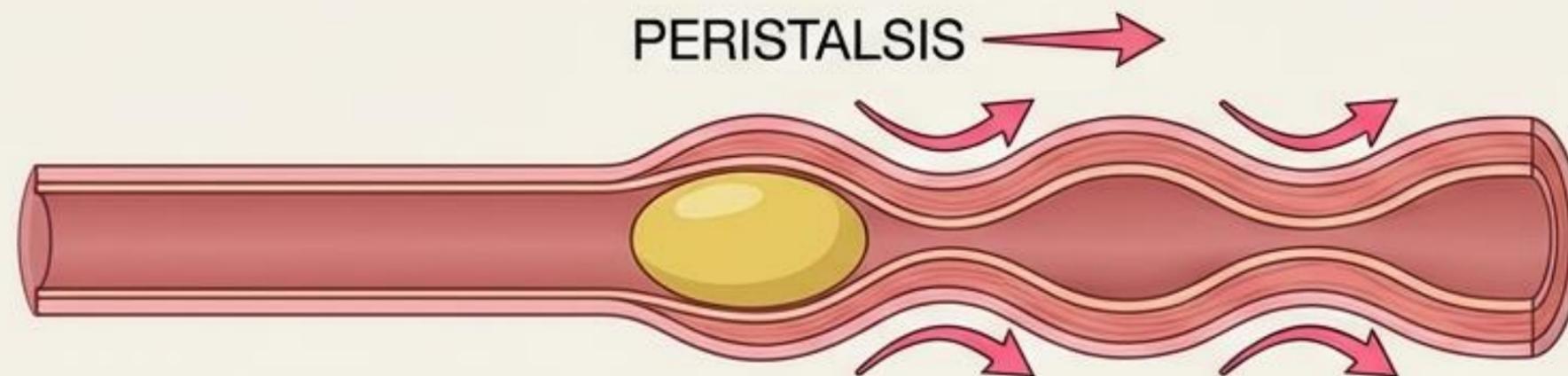
# Smooth Muscle: The Sustainer



**Location:** Walls of hollow organs (GI Tract, Ureters, Vessels).

**Structure:** Non-striated, spindle-shaped cells.

**Arrangement:** Two layers - Circular (inner) and Longitudinal (outer).



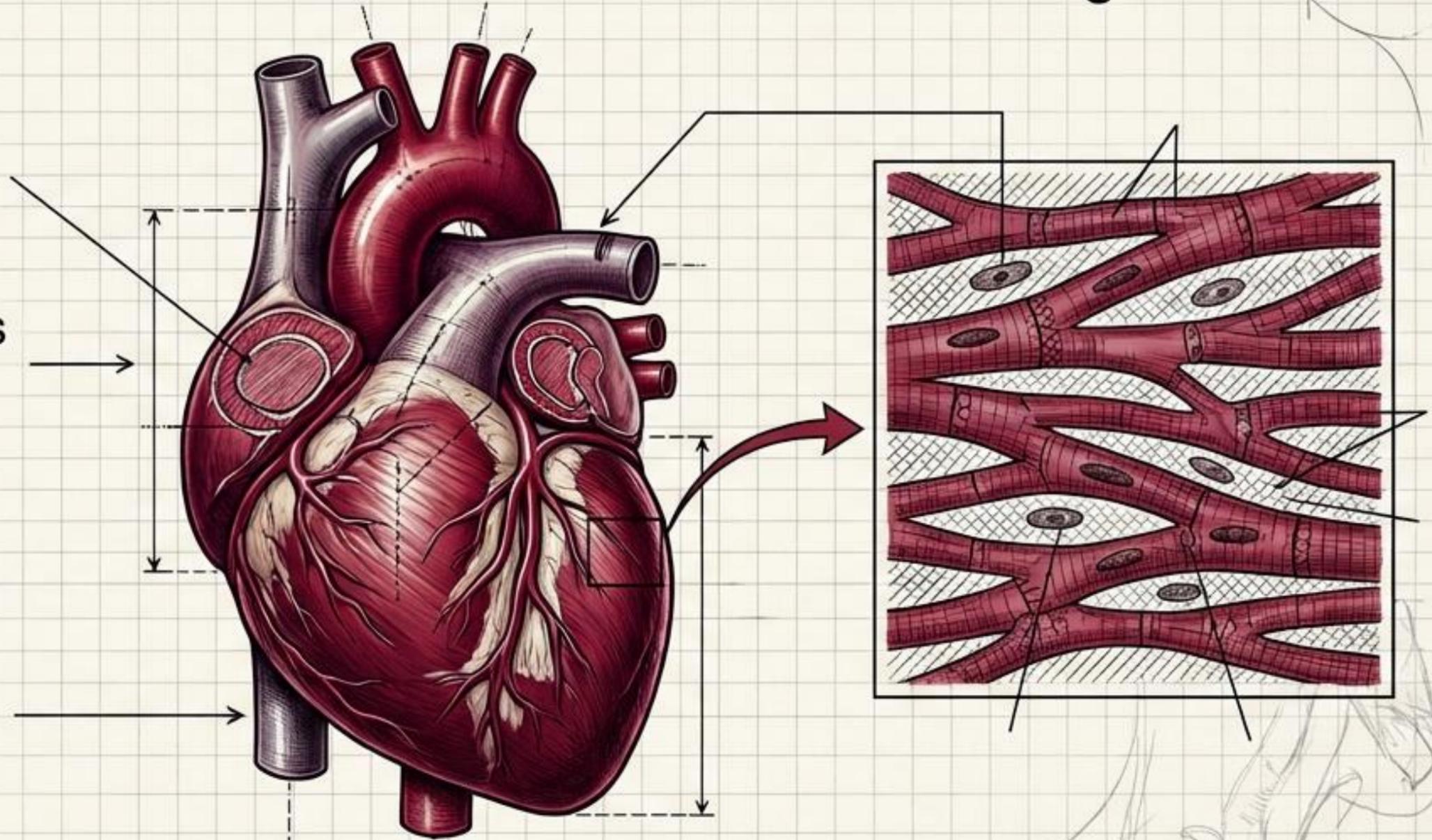
# Cardiac Muscle: The Rhythm

**Location:** Myocardium  
(Heart only).

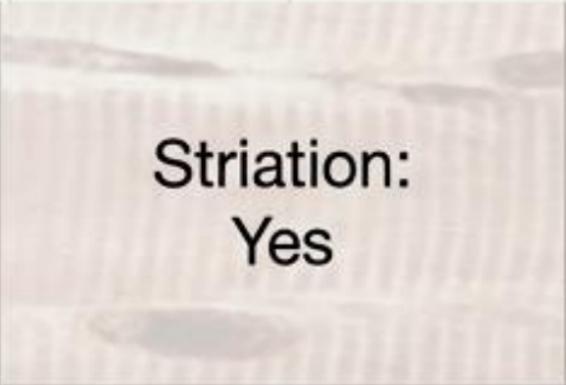
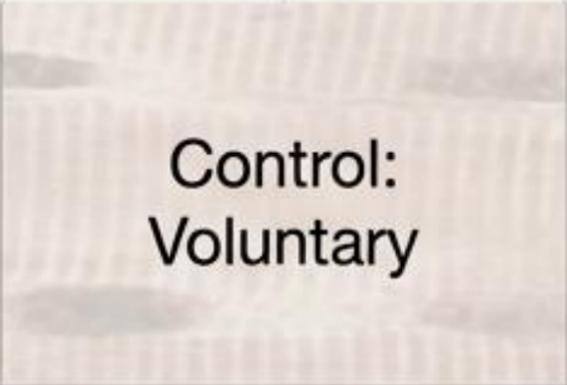
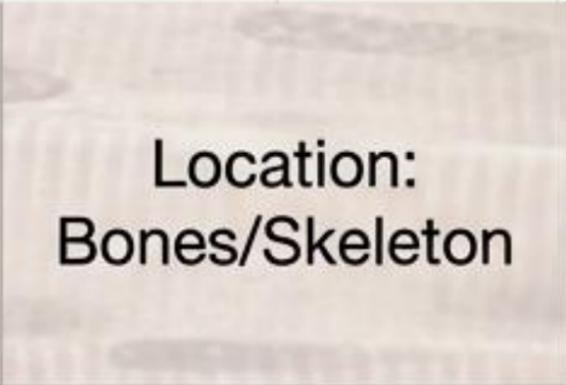
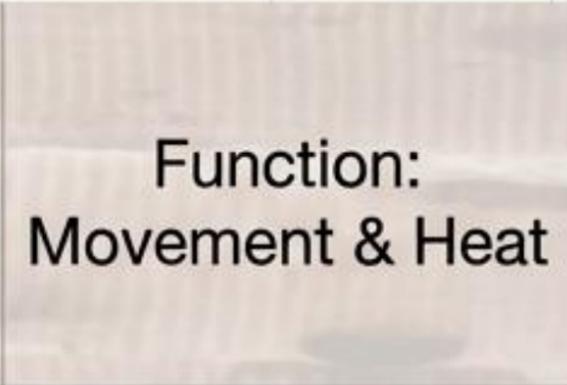
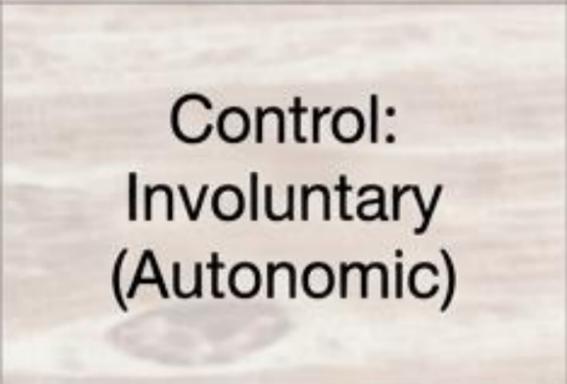
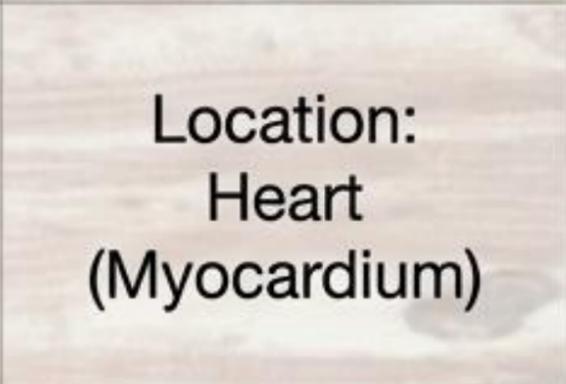
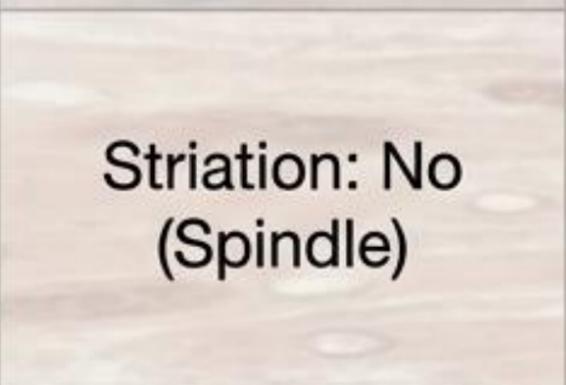
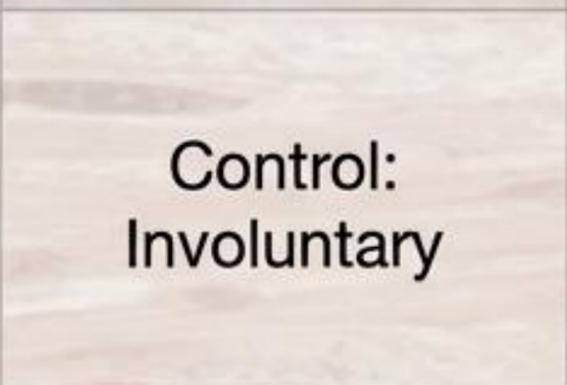
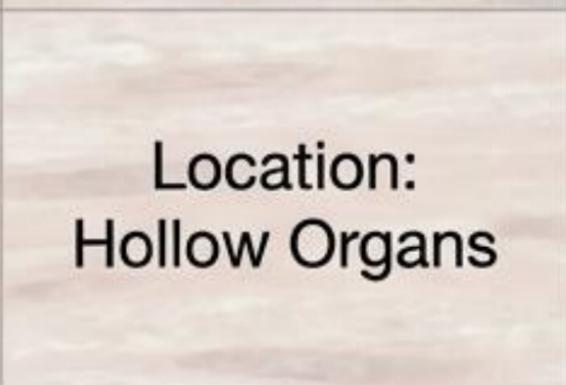
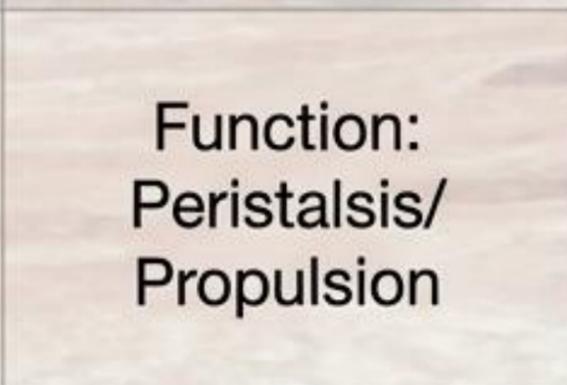
**Structure:** Striated fibers  
that branch and unite.

**Control:** Autonomic  
(Involuntary).

**Special Ability:**  
Spontaneous, rhythmic  
contraction.

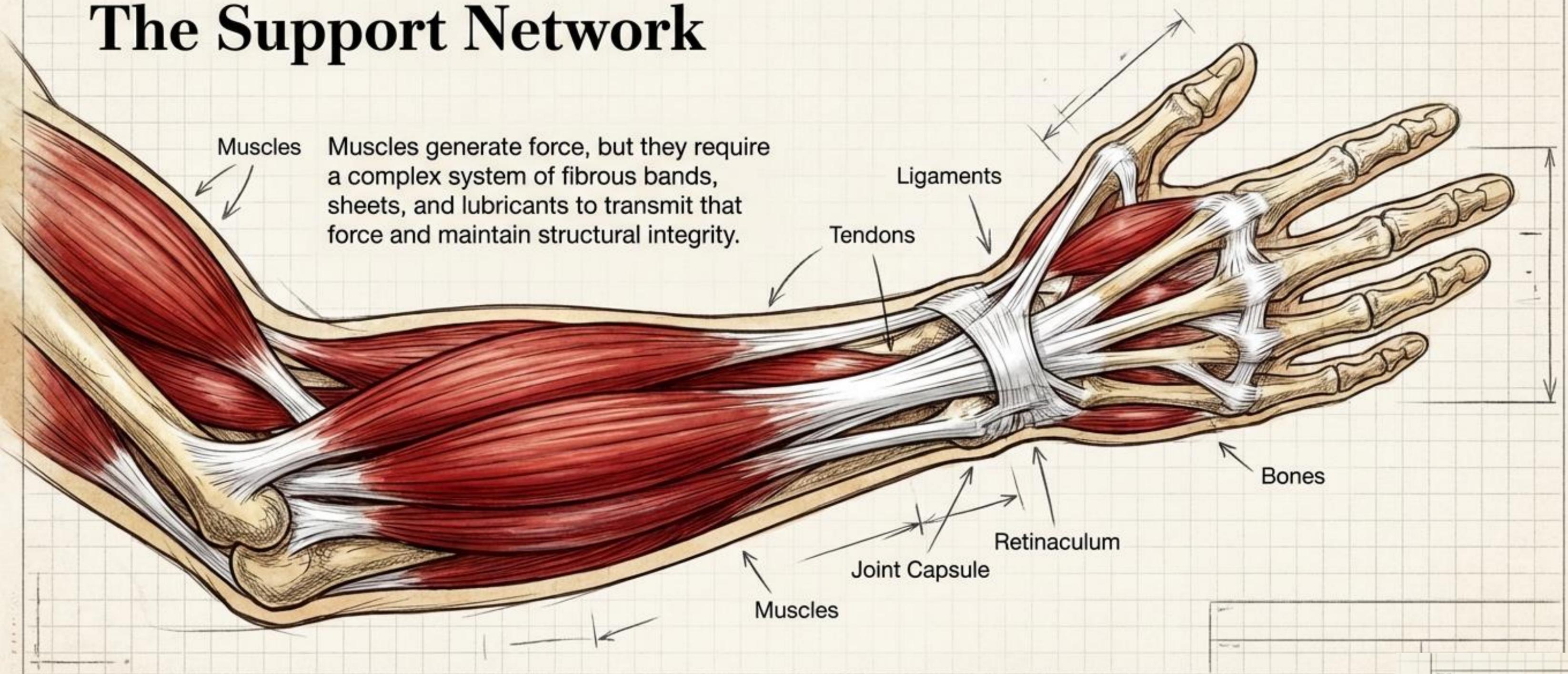


# Comparative Anatomy: The Three Types

<b>SKELETAL</b>	 <p>Striation: Yes</p>	 <p>Control: Voluntary</p>	 <p>Location: Bones/Skeleton</p>	 <p>Function: Movement &amp; Heat</p>
<b>CARDIAC</b>	 <p>Striation: Yes (Branching)</p>	 <p>Control: Involuntary (Autonomic)</p>	 <p>Location: Heart (Myocardium)</p>	 <p>Function: Pumping &amp; Rhythm</p>
<b>SMOOTH</b>	 <p>Striation: No (Spindle)</p>	 <p>Control: Involuntary</p>	 <p>Location: Hollow Organs</p>	 <p>Function: Peristalsis/ Propulsion</p>

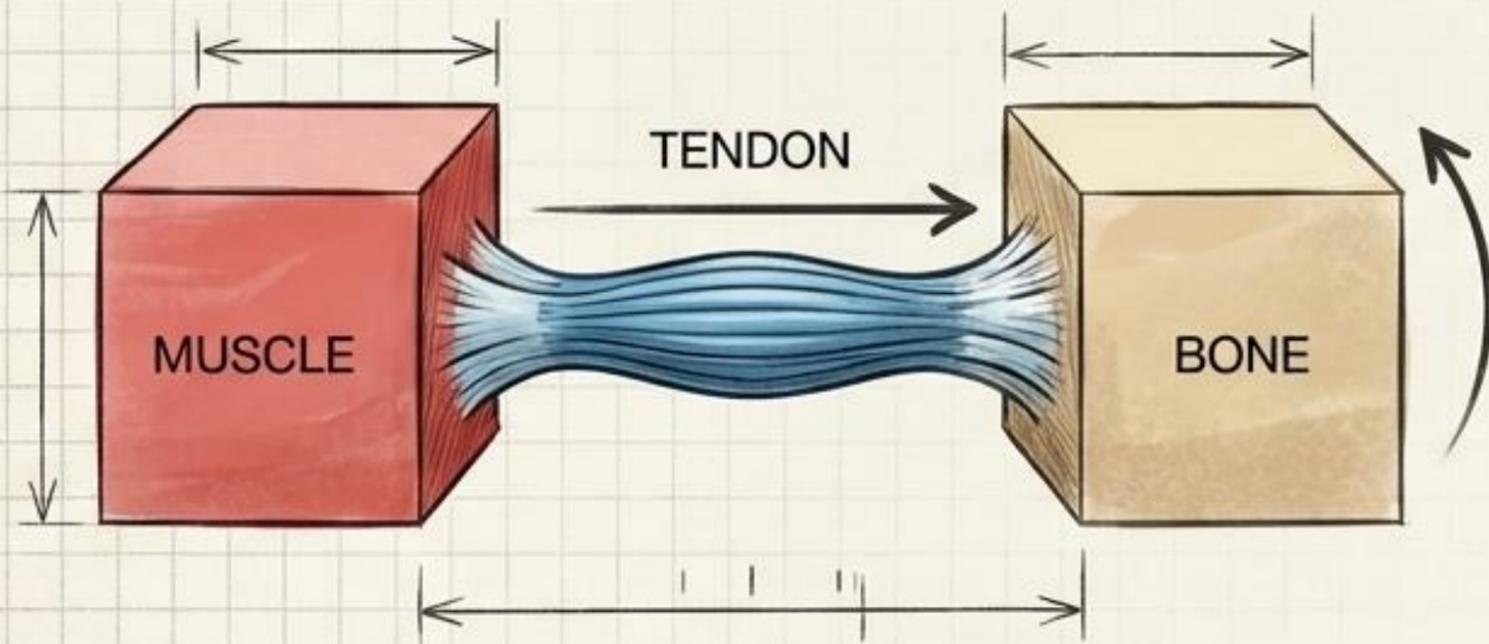
# Section II: Associated Structures

## The Support Network



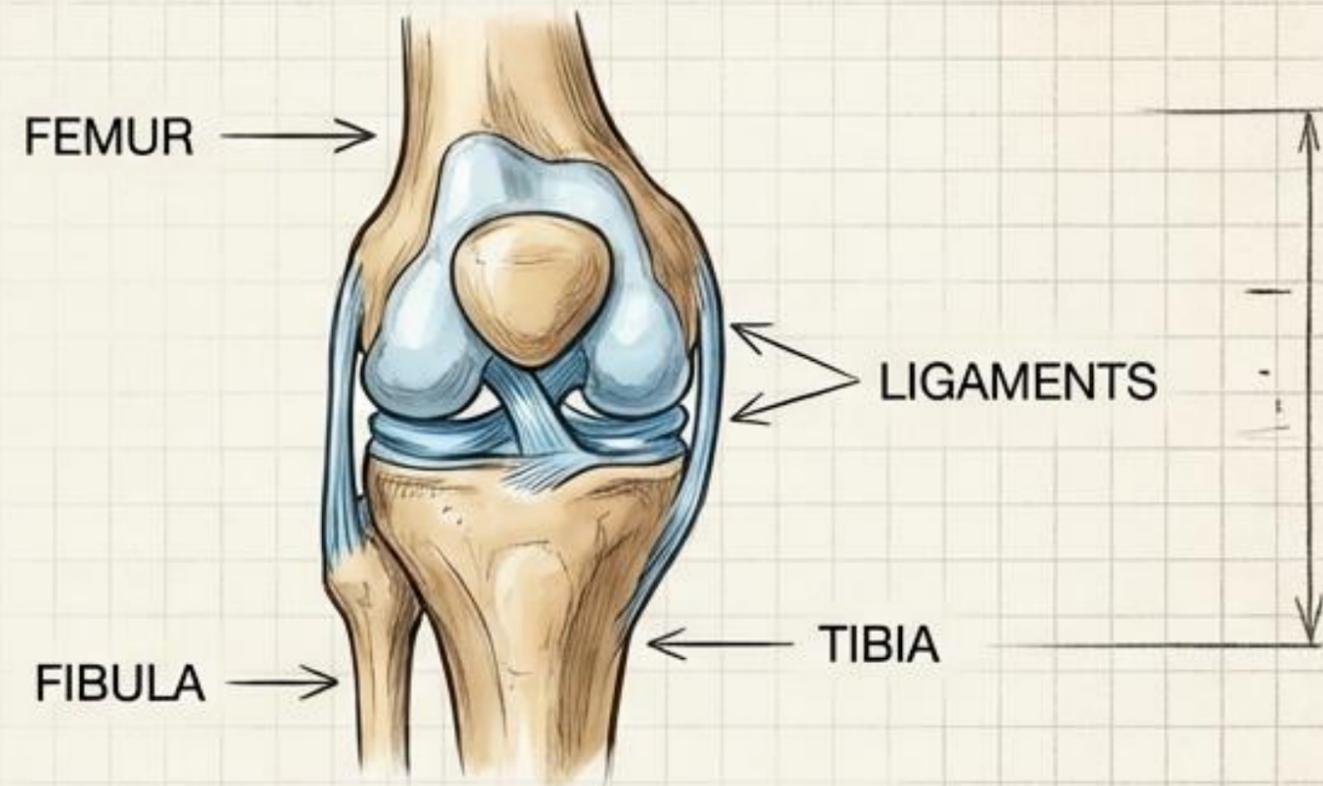
# The Cables: Tendons vs. Ligaments

## TENDON (The Transmitter)



Connects Muscle to Bone.  
Transmits force to create movement.

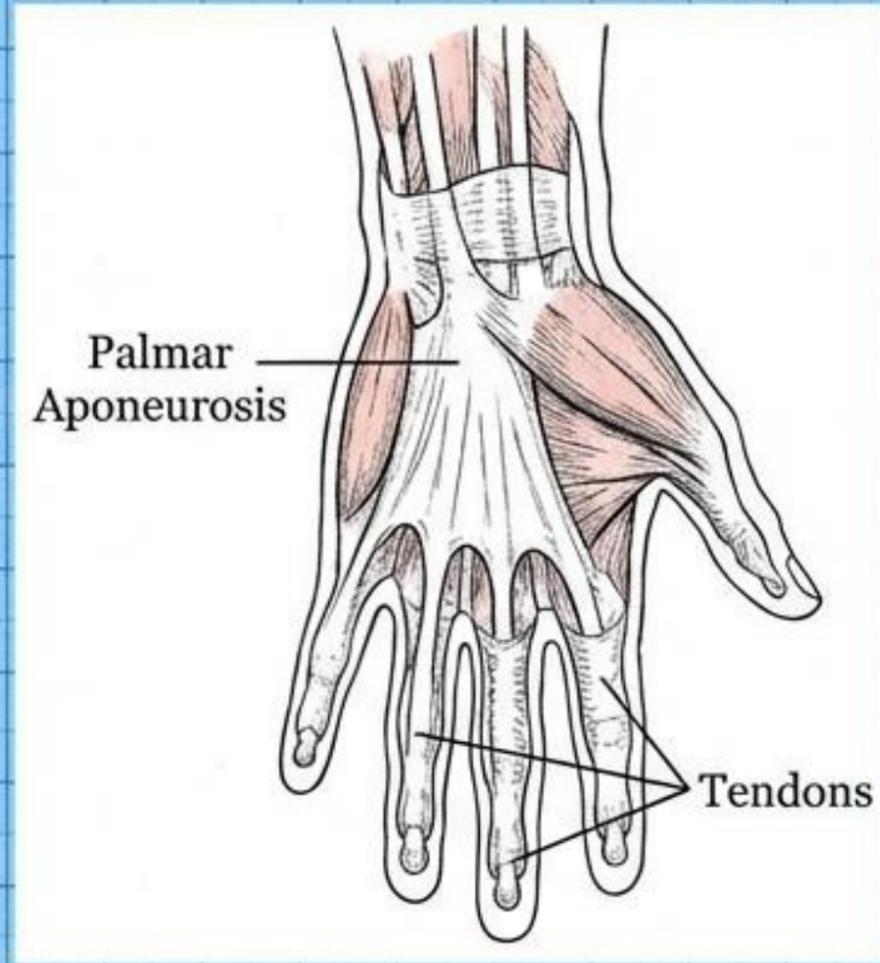
## LIGAMENT (The Stabilizer)



Connects Bone to Bone.  
Provides joint stability.  
(Also refers to peritoneal folds supporting viscera).

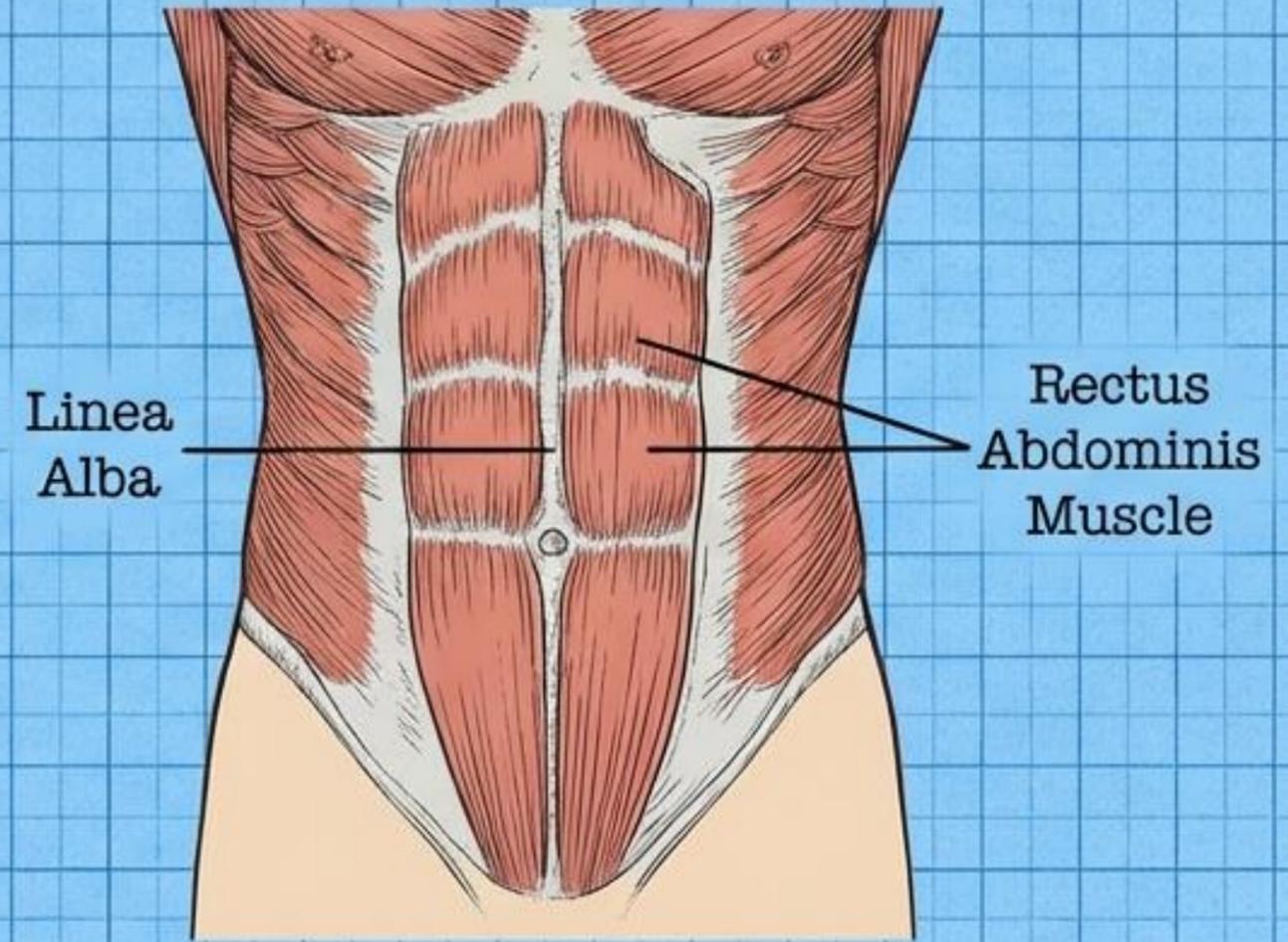
# Sheets & Seams: Aponeuroses & Raphe

## APONEUROSIS



A flat, fibrous tendon acting as a wide sheet of attachment.

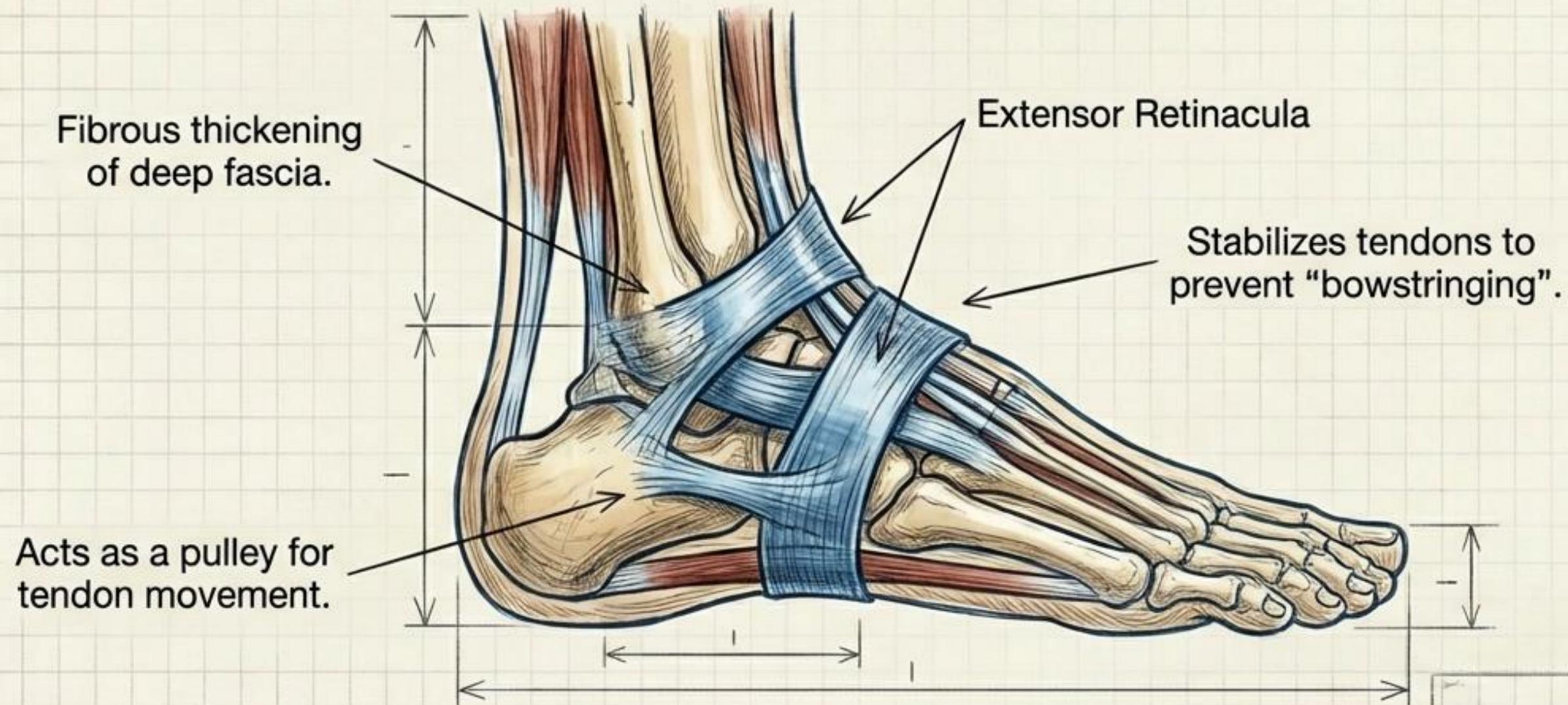
## RAPHE



A "Seam." The union of two symmetrical halves by a fibrous band, e.g., the Linea Alba down the center of the abdomen.

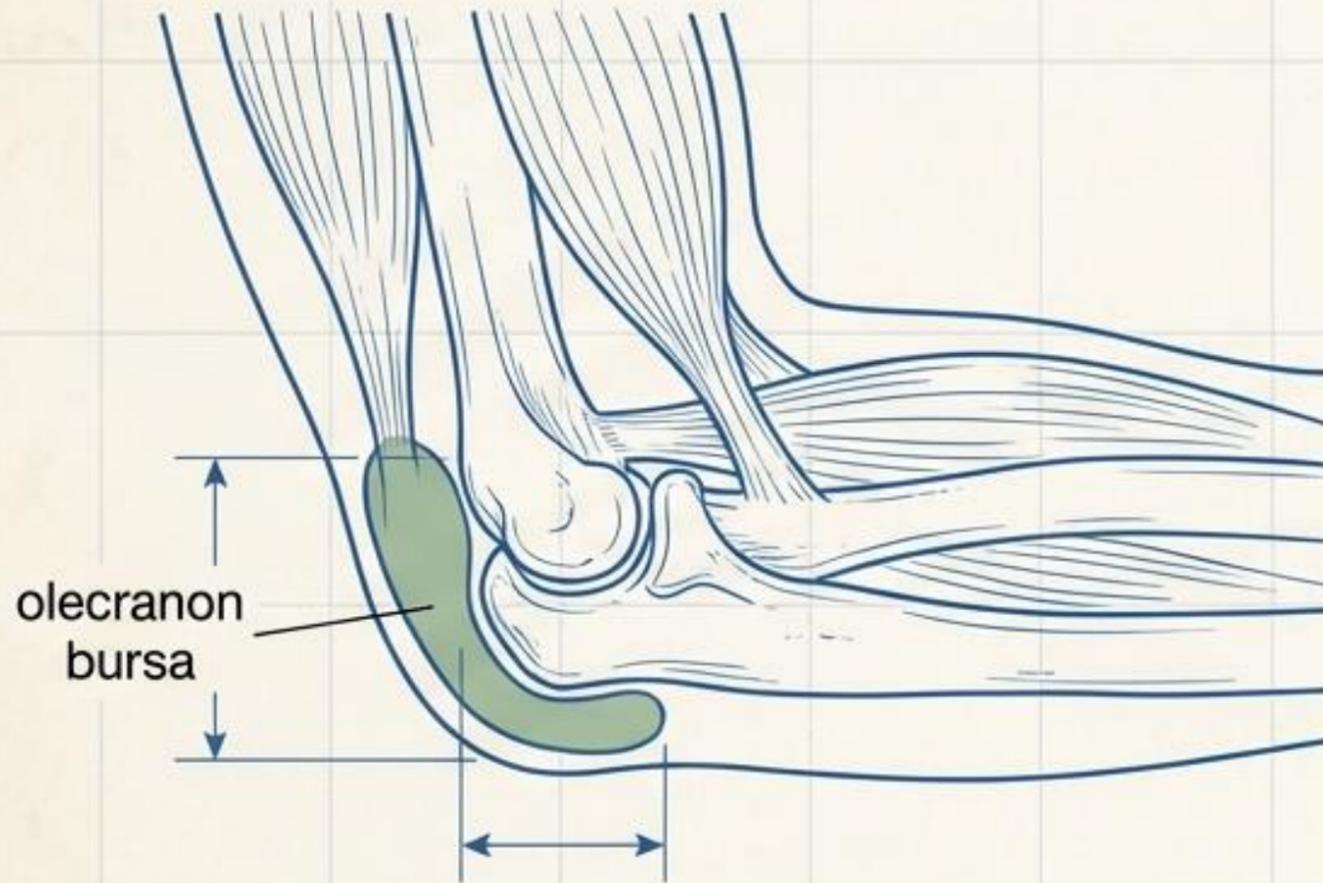
# The Retinaculum

## The Body's Cable Ties



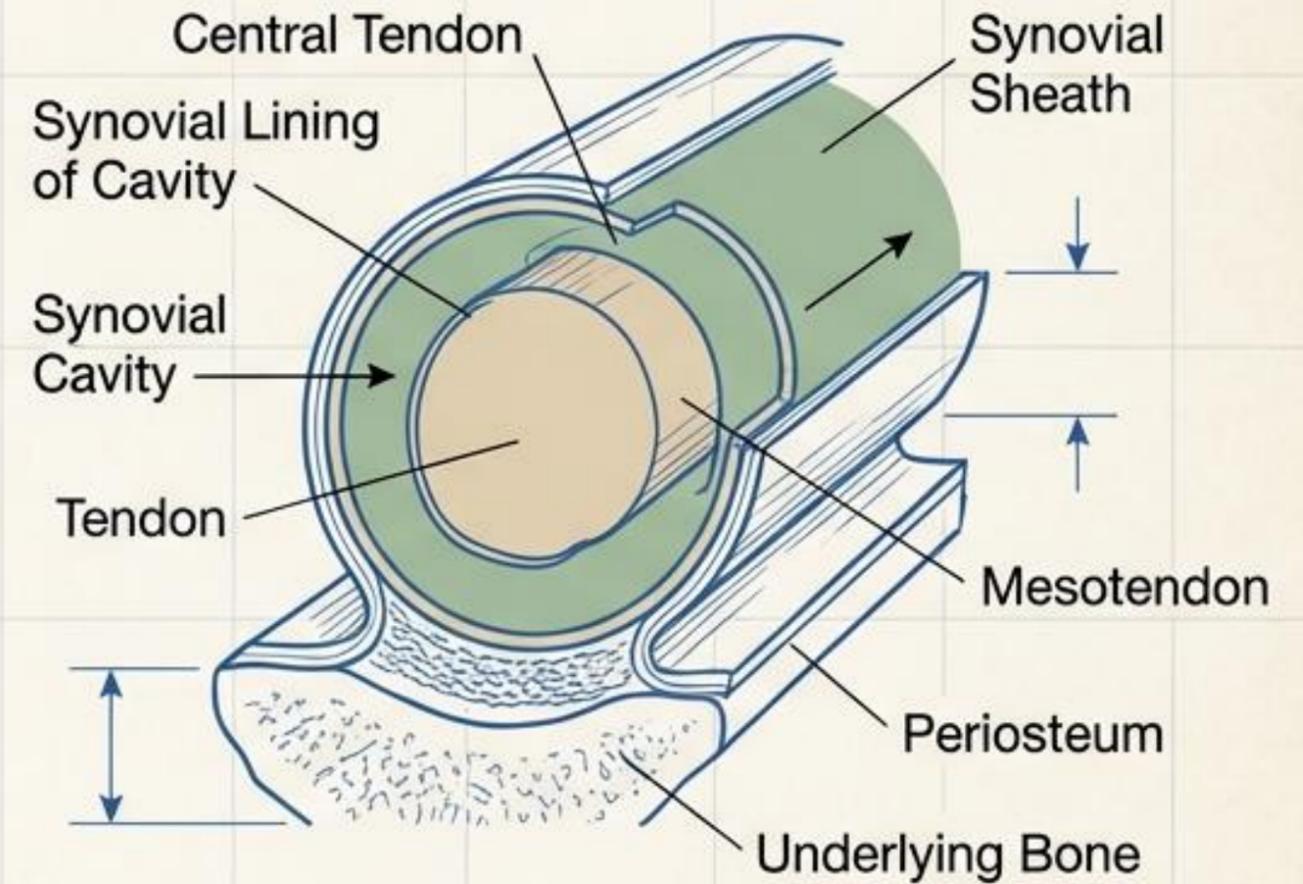
# Friction Control: Bursae & Synovial Sheaths

## BURSAE (The Pads)



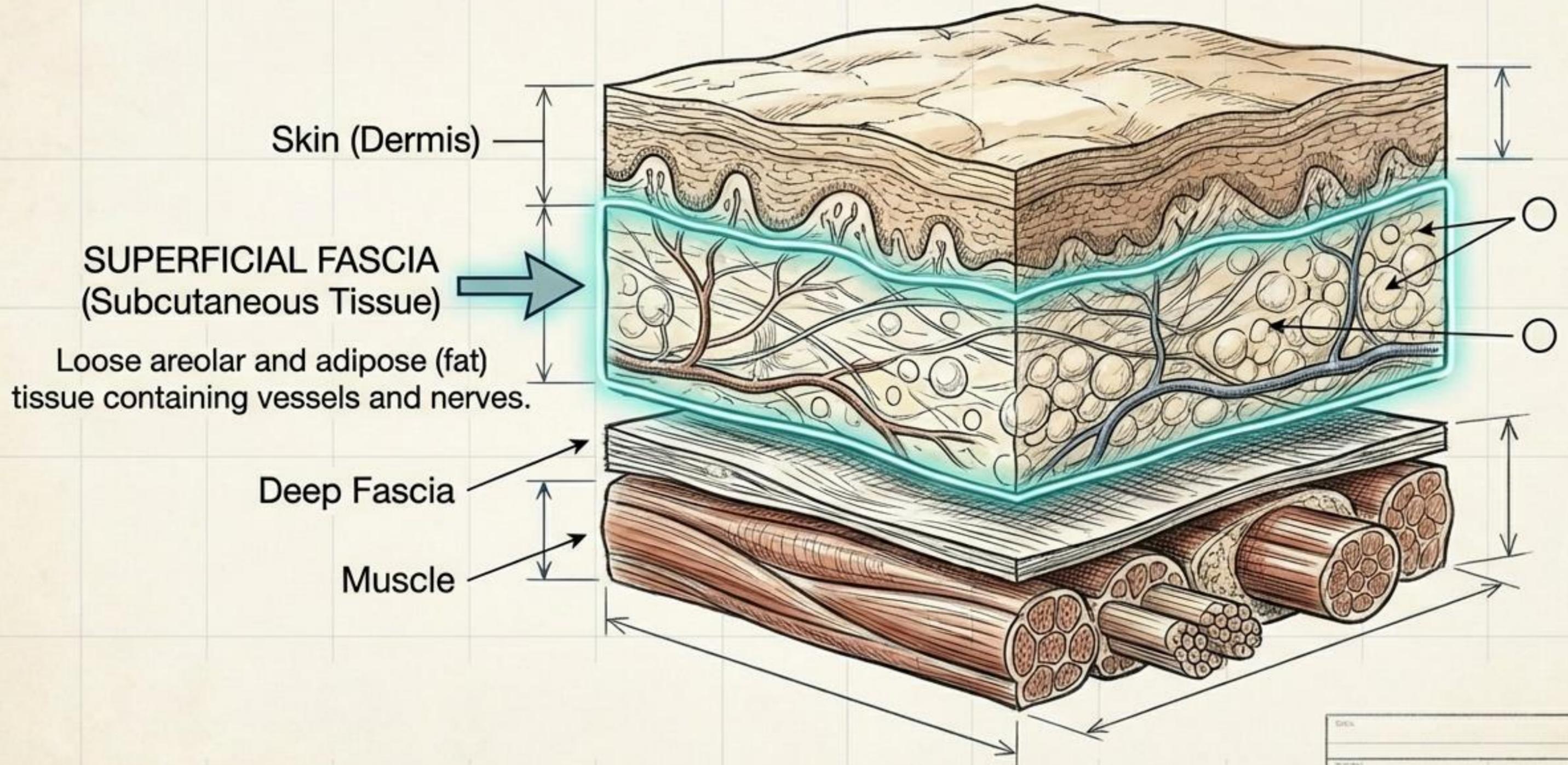
Fluid-filled sacs reducing friction between bone and soft tissue

## SYNOVIAL SHEATHS (The Sleeves)



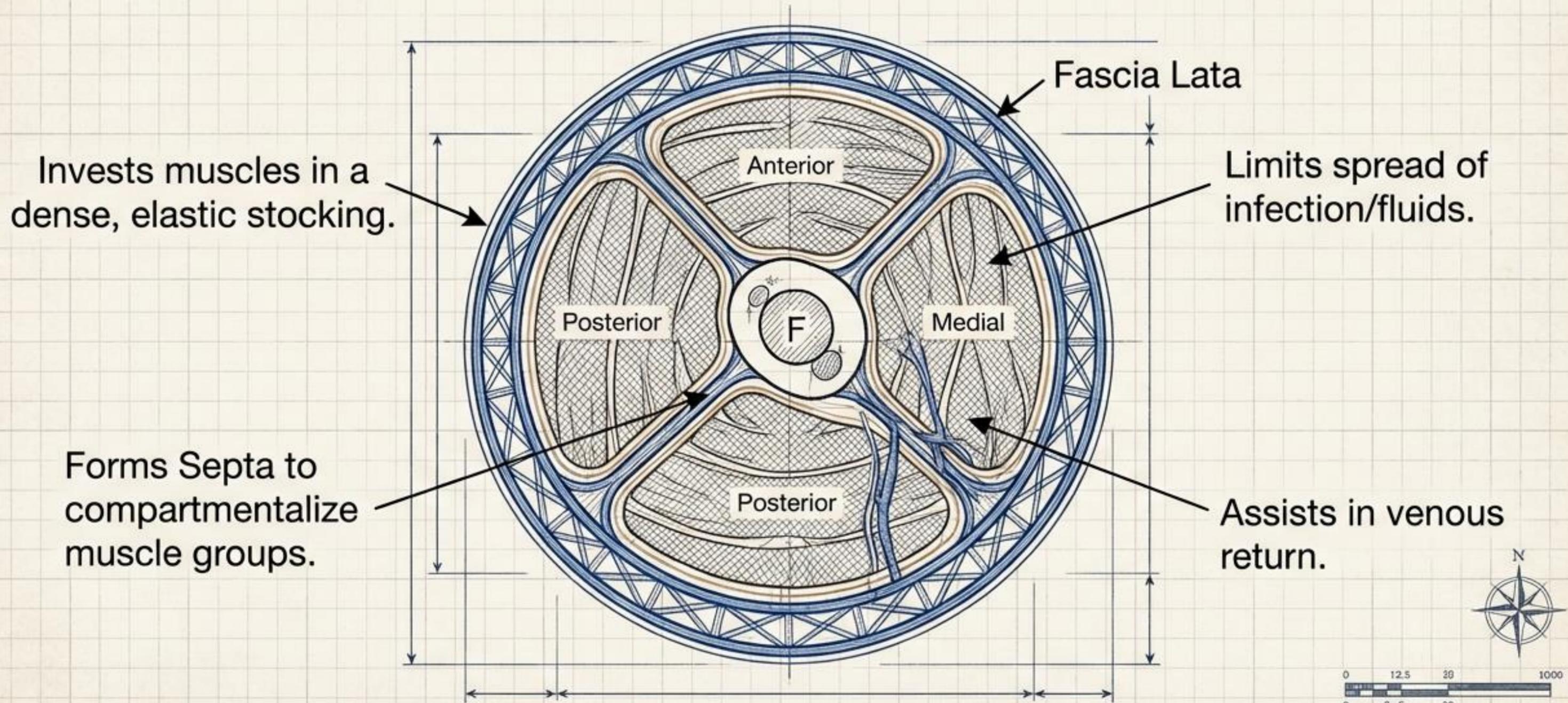
Tubular sacs wrapped around tendons to lubricate passage through limbs

# Fascia: The Universal Wrapper

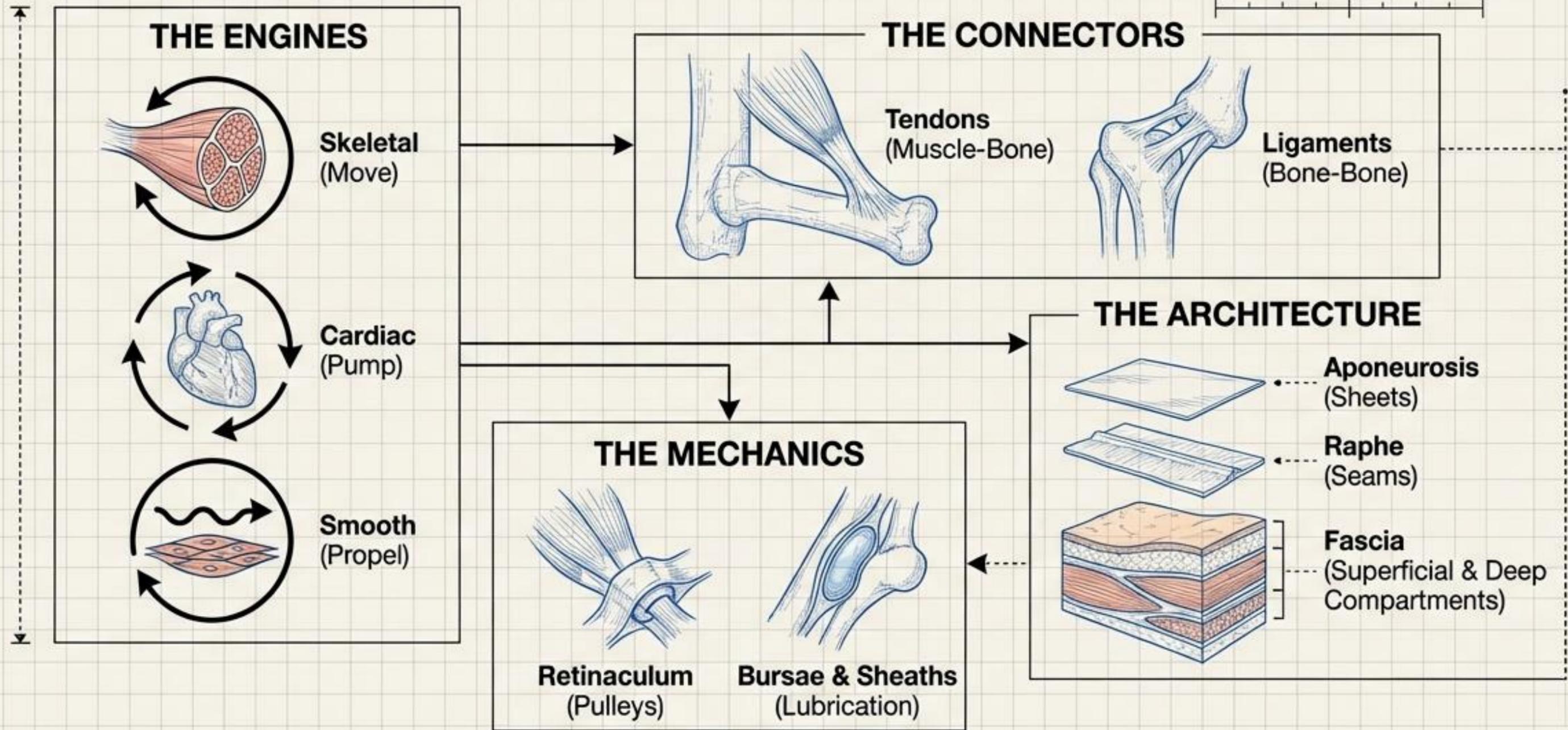



# Deep Fascia: The Structural Stocking

## Structural Integrity and Compartmentalization



# System Architecture Summary



Understanding anatomy requires knowing both the engine (Muscle) and the chassis (Connective Tissue).