

Actin and Myosin: The Anatomy of Contractile Proteins

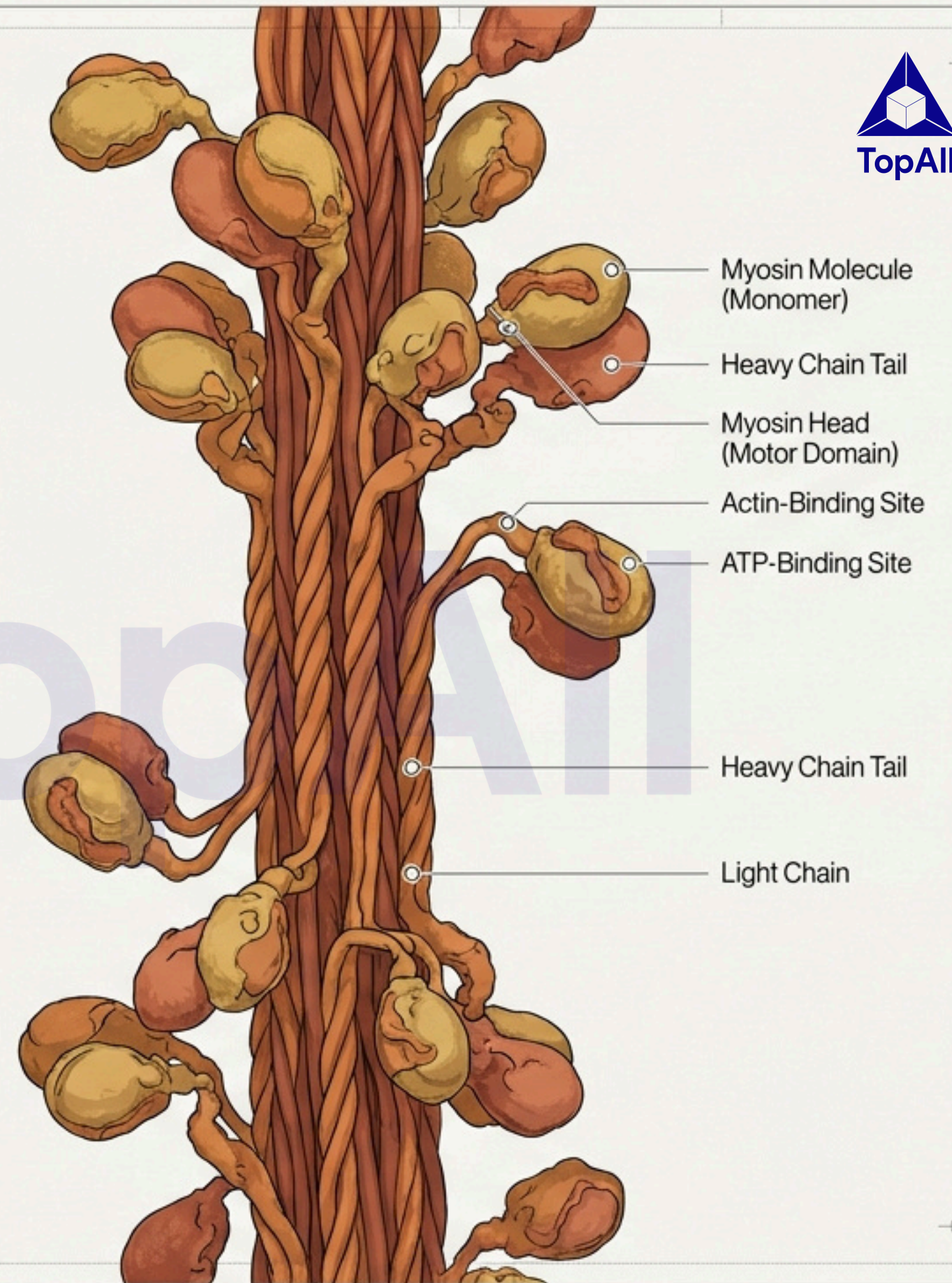
A structural blueprint of the molecular machinery driving skeletal muscle contraction.

Actin Monomer
(G-actin)

F-actin Filament

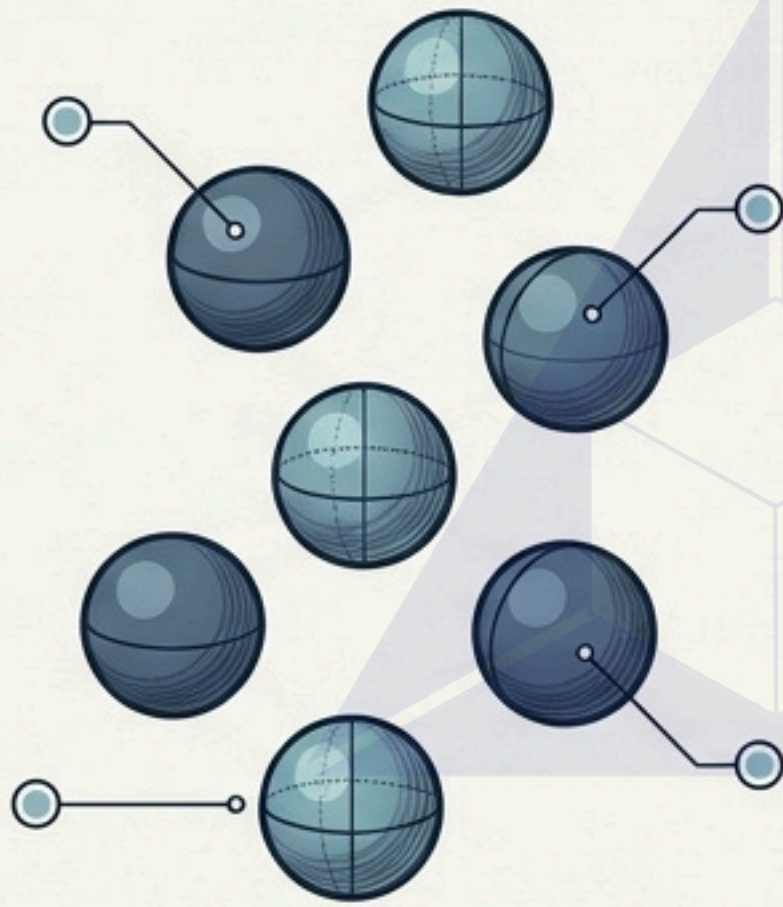
Tropomyosin

Troponin
Complex



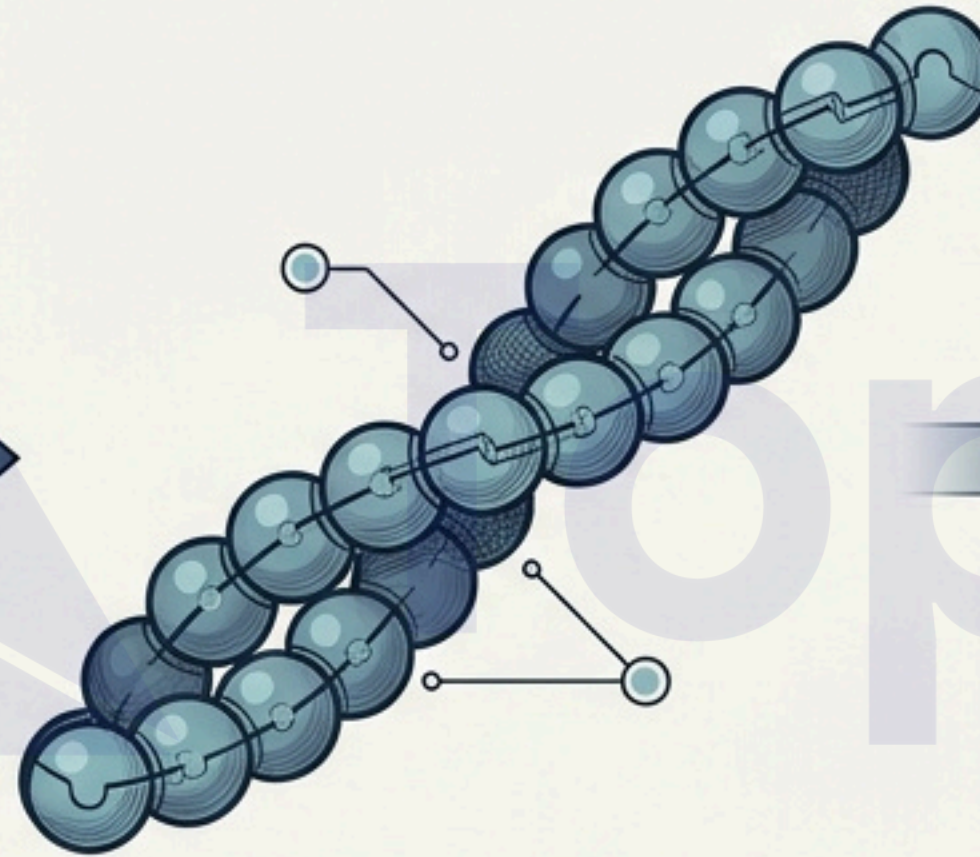
The Thin Filament: Building the F-Actin Backbone

Visual Equation



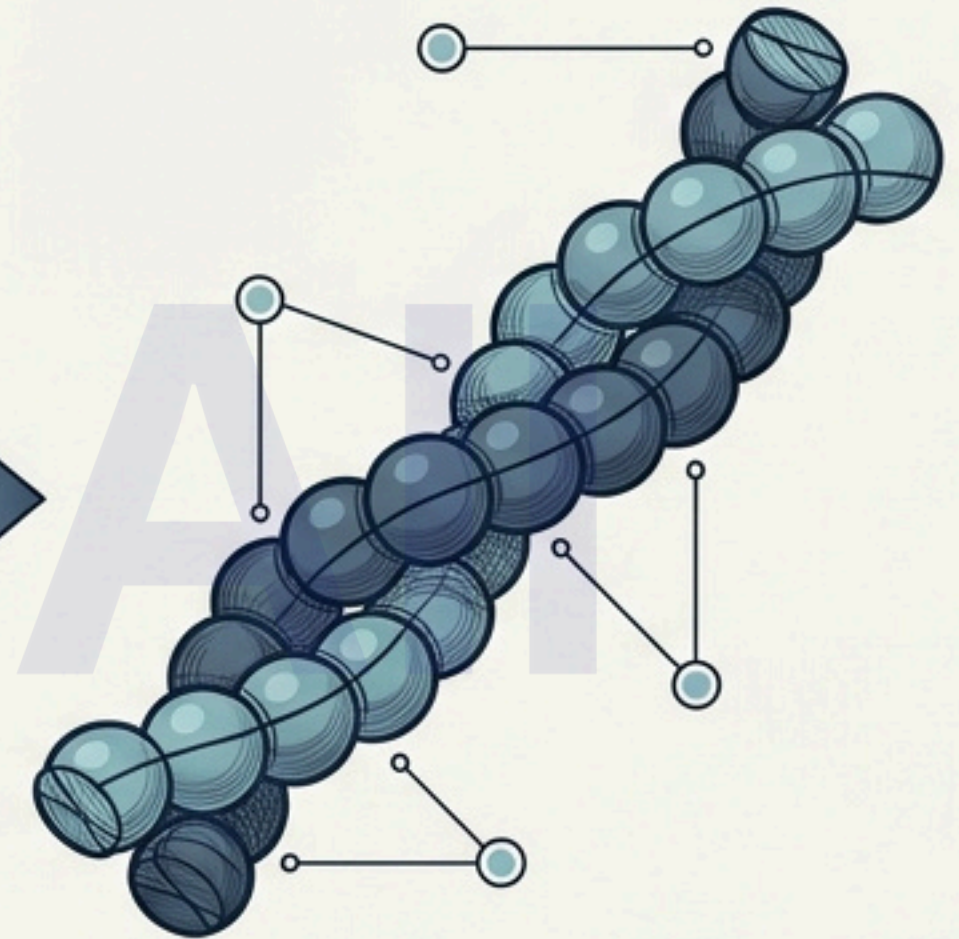
The Monomer

"G" (Globular) actins act as the individual building blocks.



The Polymer

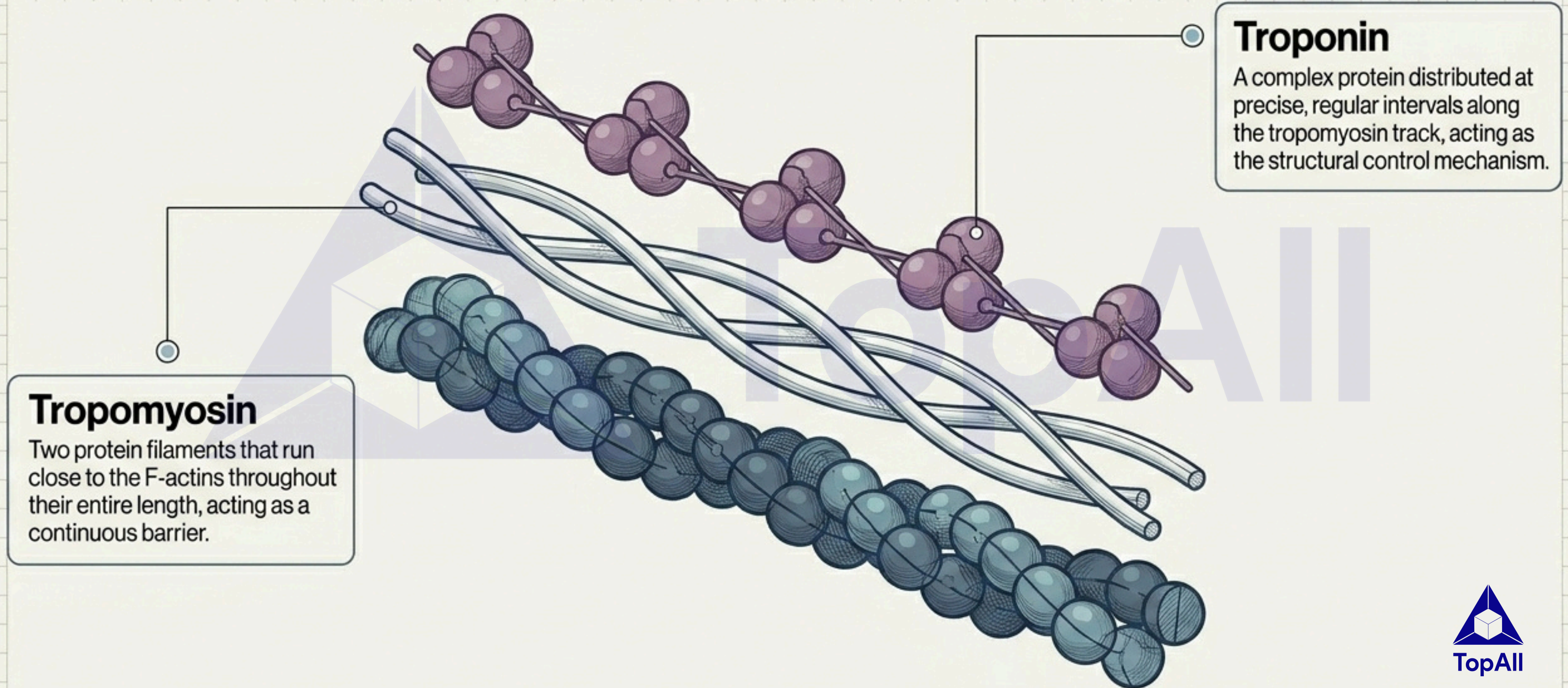
"F" (Filamentous) actin is formed by polymerizing G-actin.



The Structure

Two F-actin chains helically wound around each other form the structural core of the thin filament.

Tropomyosin and Troponin: The Regulatory Locks





**You've Learned the Theory.
Let's Test Them Now.**

$$E=mc^2$$



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Practice Now



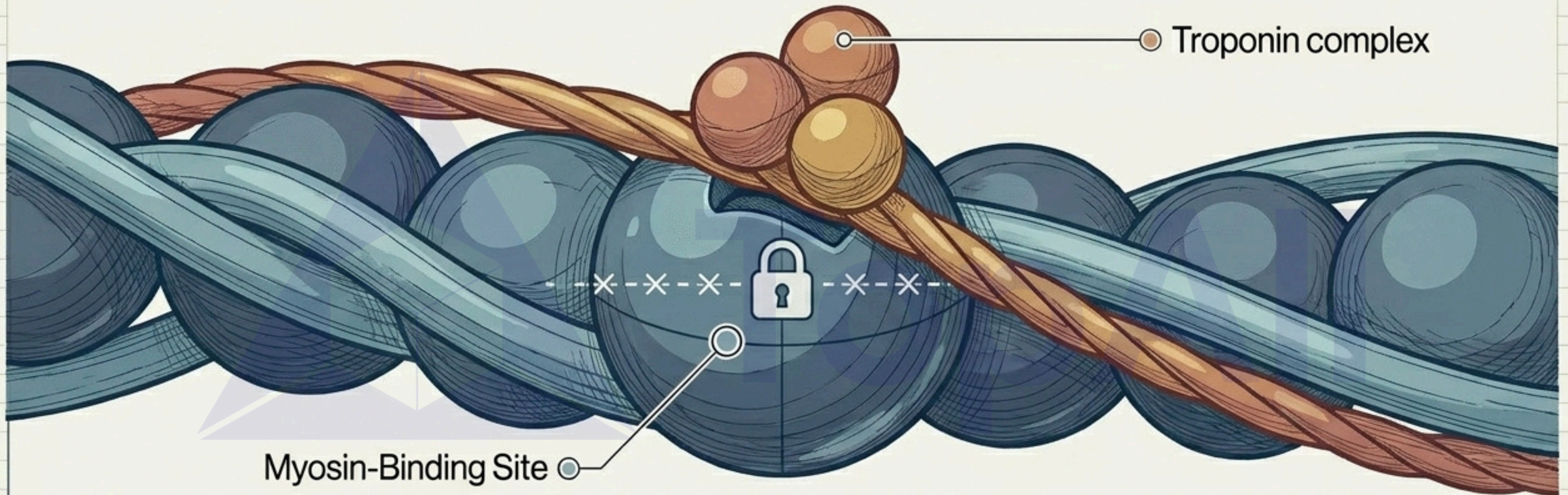
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- » Get Clear Explanations, Not Just Marks
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The Resting State: Masking the Active Sites



The Lock

In a resting state, a specific subunit of the Troponin complex anchors the Tropomyosin over the actin molecule.

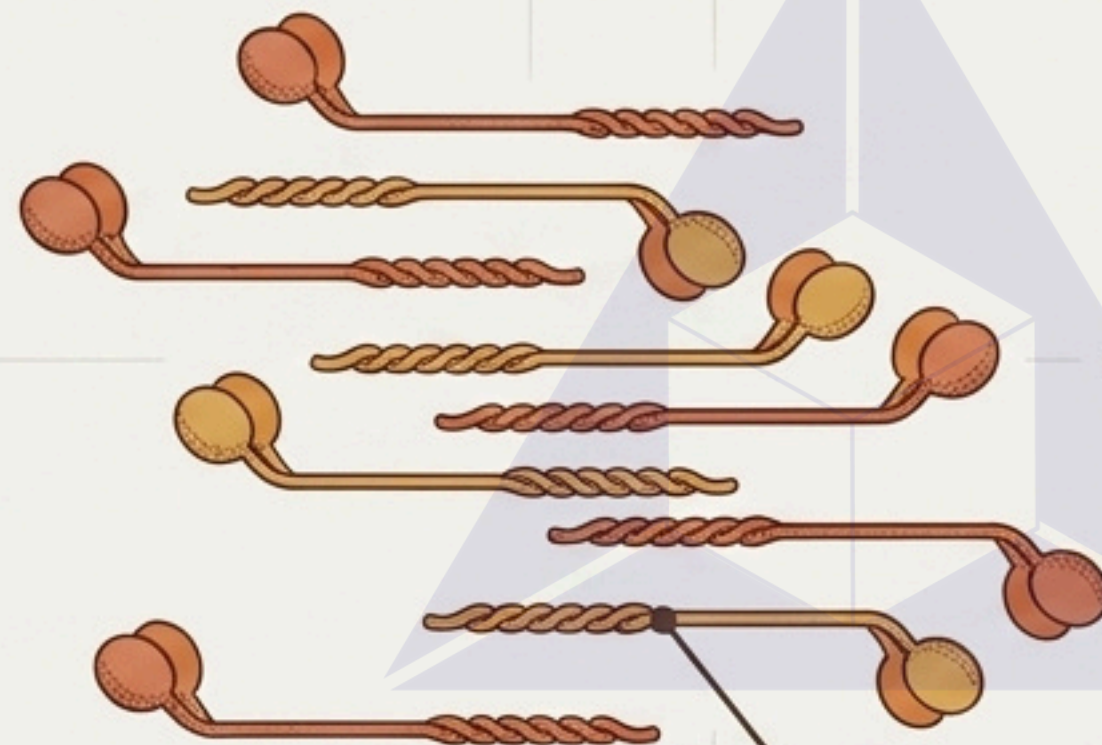
The Consequence

The active binding sites for myosin on the actin filaments are completely masked. Contraction cannot occur until this physical barrier is moved.

The Thick Filament: Polymerizing Myosin

The Polymer

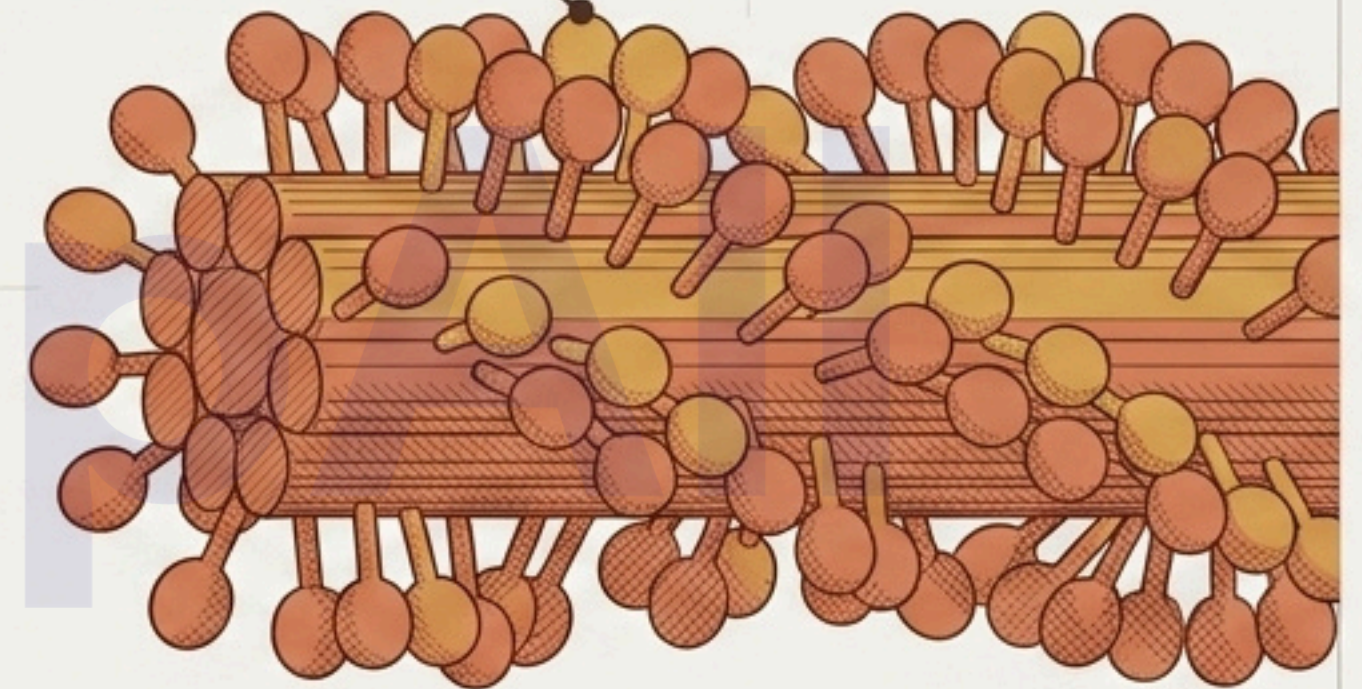
Each thick filament is a highly organized polymerized protein.



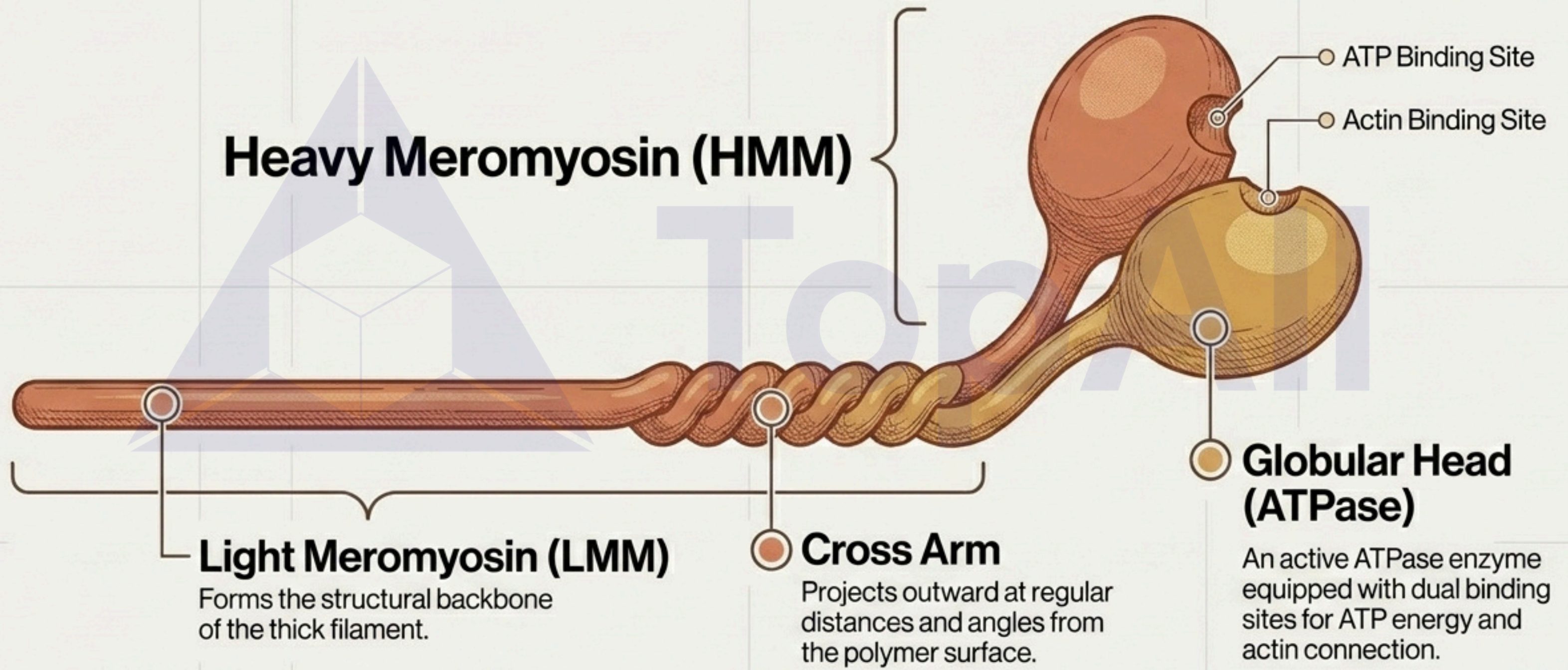
The Monomer

The filament is constructed from many individual monomeric proteins called **Meromyosins**, arranged parallel to the longitudinal axis.

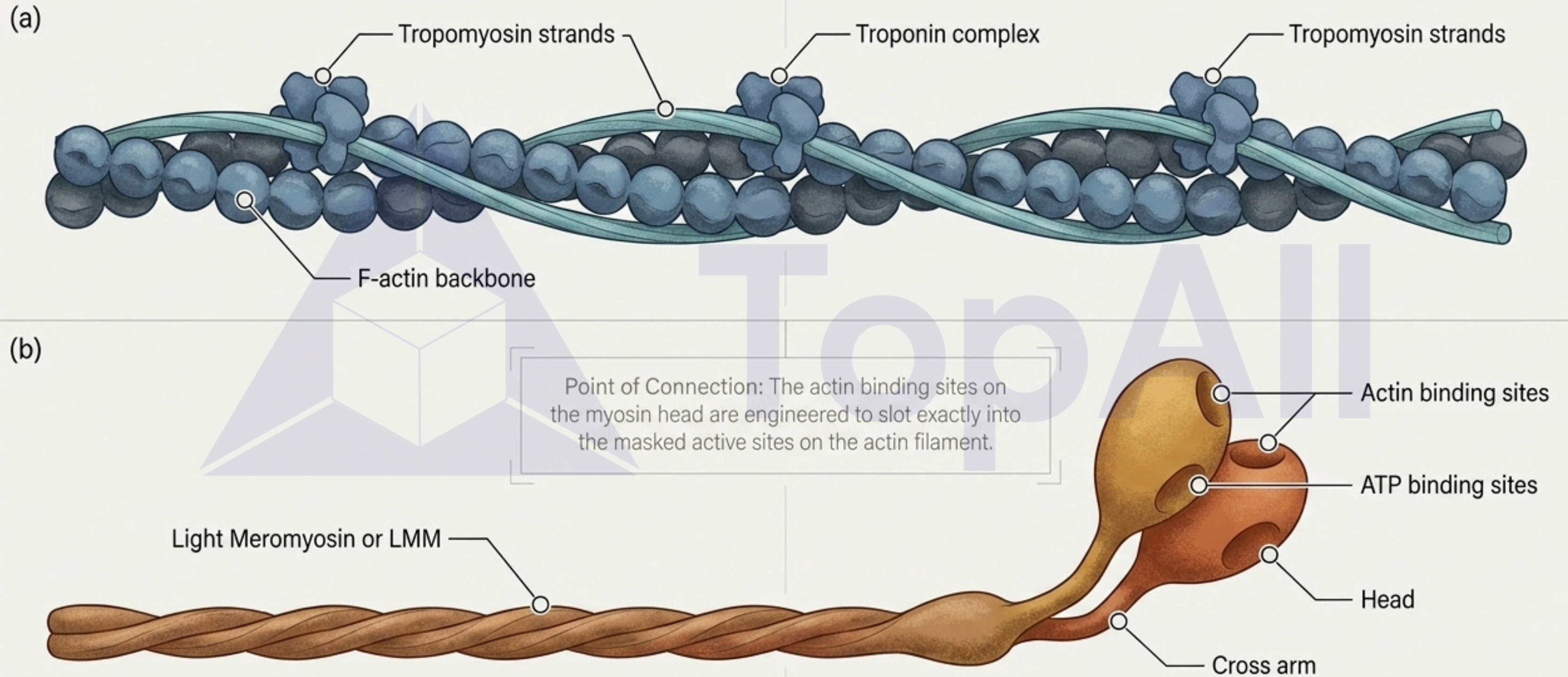
Deconstruction



Anatomy of Meromyosin: The Engine of Contraction

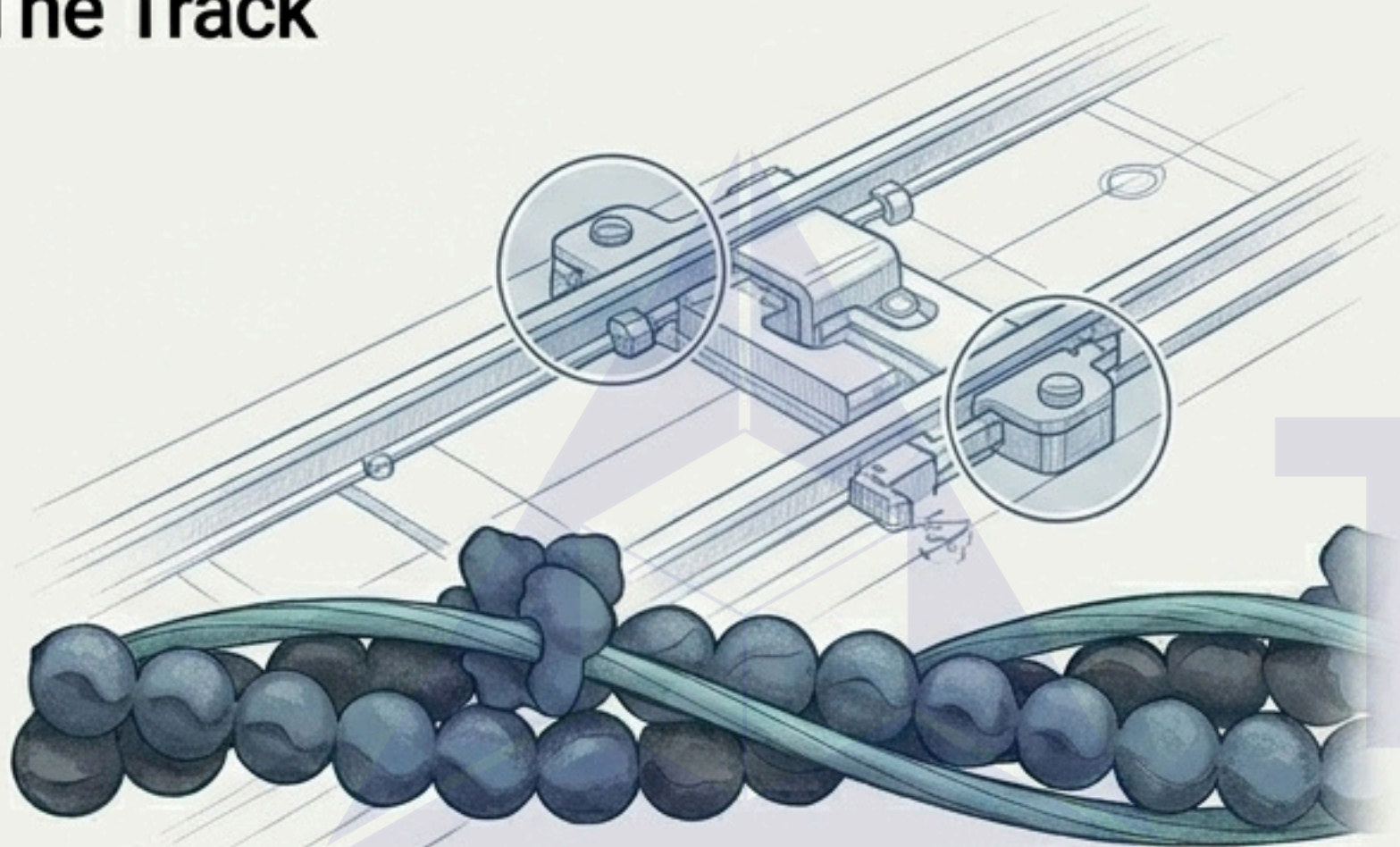


The Molecular Blueprint of Contractile Proteins



Key Takeaway: Engineered for the Sliding Filament

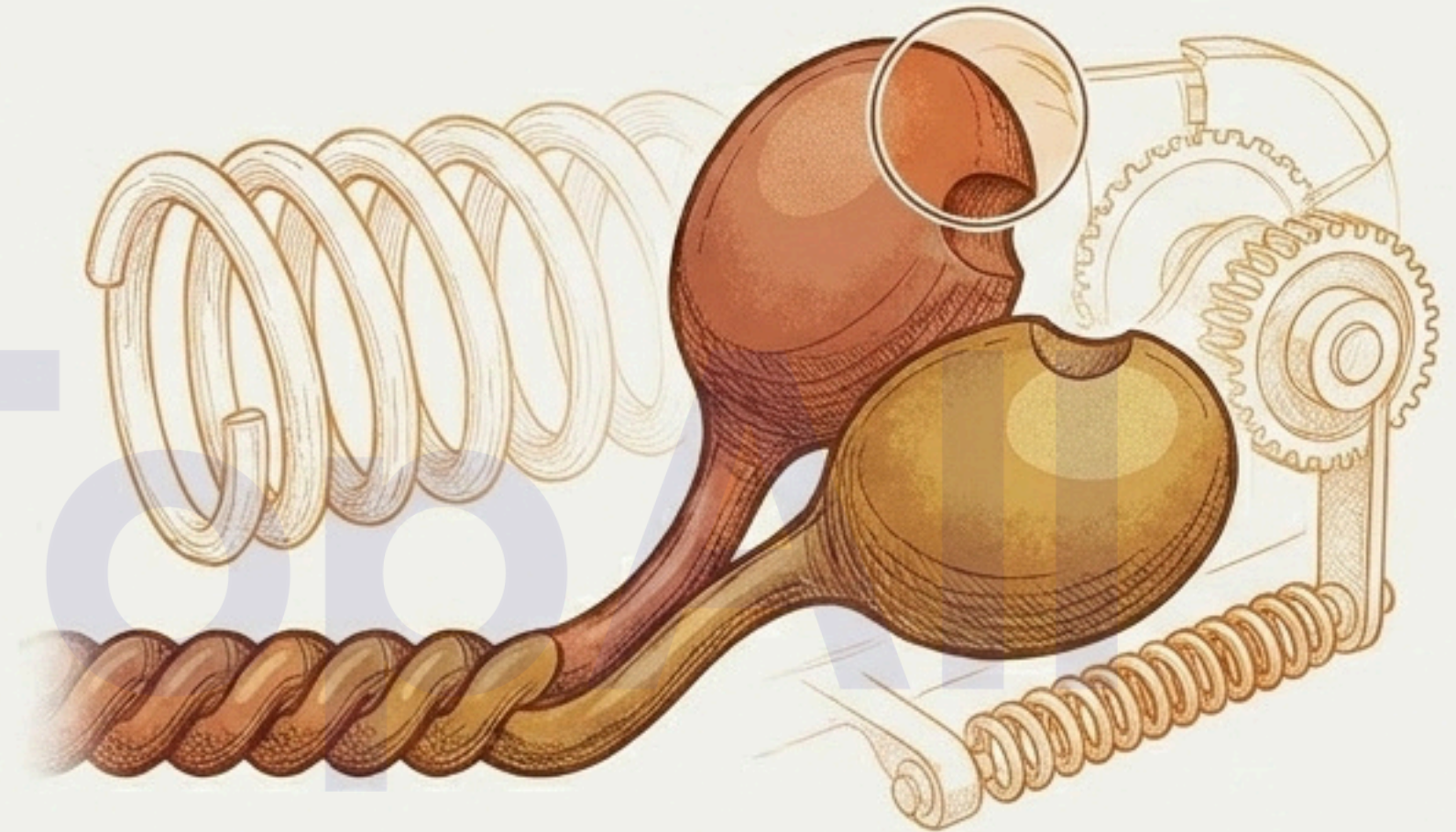
The Track



The Locked Track

- Actin serves as the structural track.
- Kept safely locked and regulated by troponin and tropomyosin in the resting state.

The Motor



The Loaded Spring

- Myosin acts as the chemical motor.
- Possesses an ATPase head that acts as a loaded spring, seeking active sites to initiate sliding.

Complementary Architecture: Muscle contraction relies on the perfect structural interdependence of these two proteins.



You've Learned the Theory.

Now Let's Test It.

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