Muscle Contraction : Role of Actin and Myosin

By

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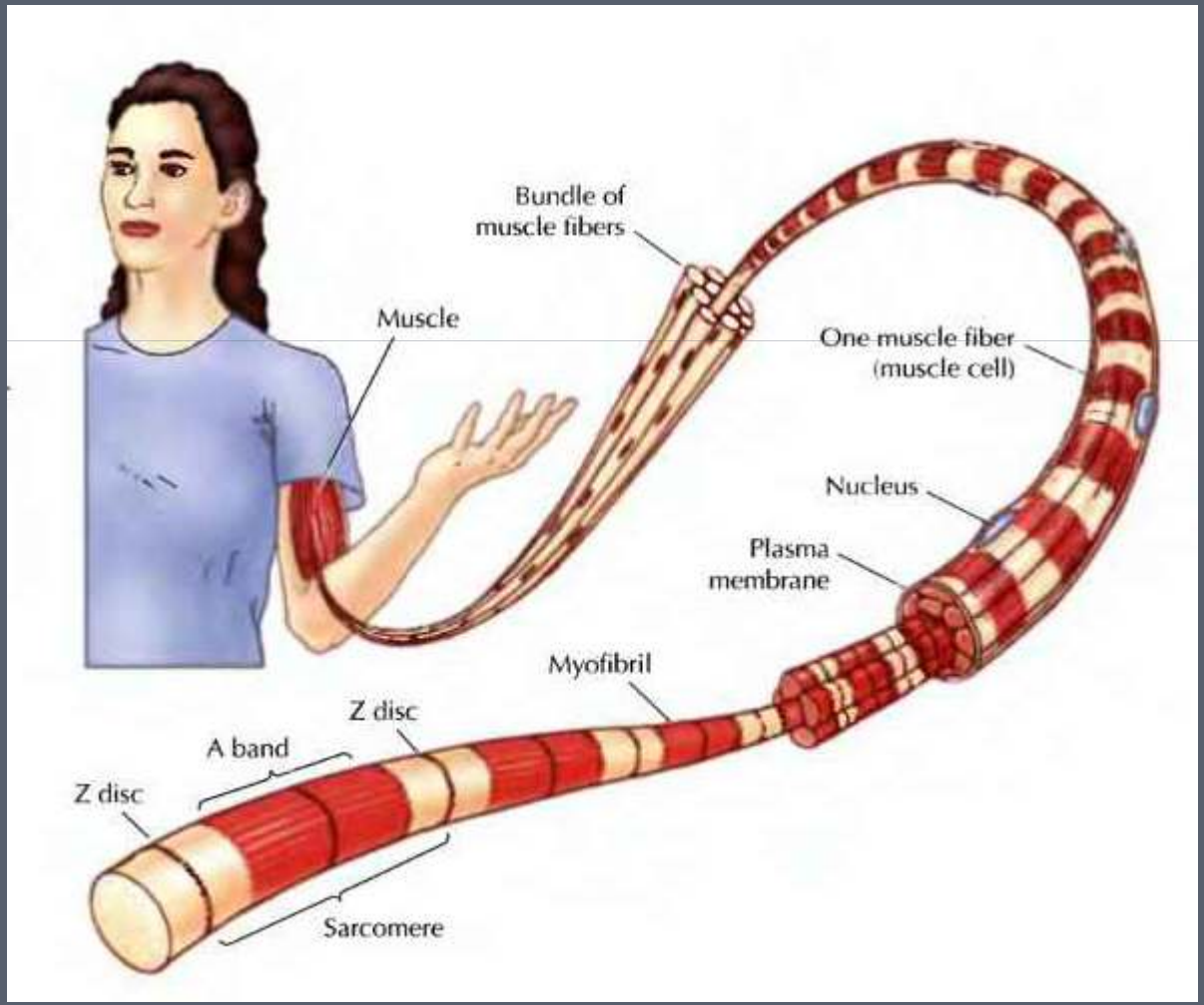

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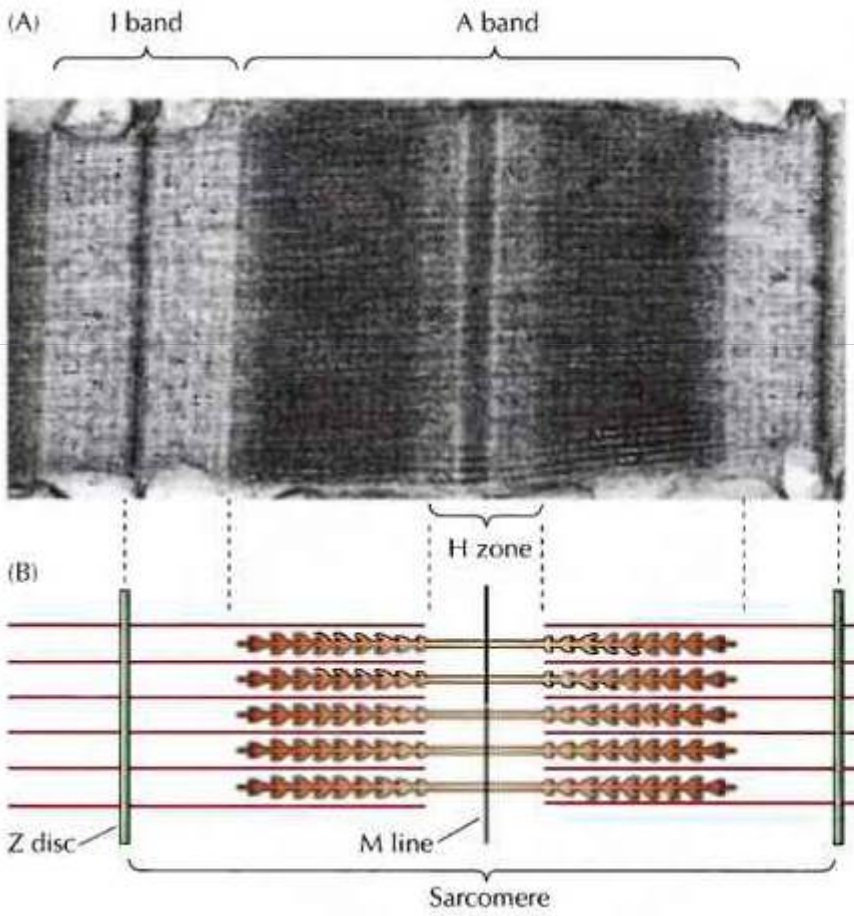

FIGURE 12.22 Structure of the sarcomere (A) Electron micrograph of a sarcomere. (B) Diagram showing the organization of actin (thin) and myosin (thick) filaments in the indicated regions. (A, Frank A. Pepe/Biological Photo Service.)

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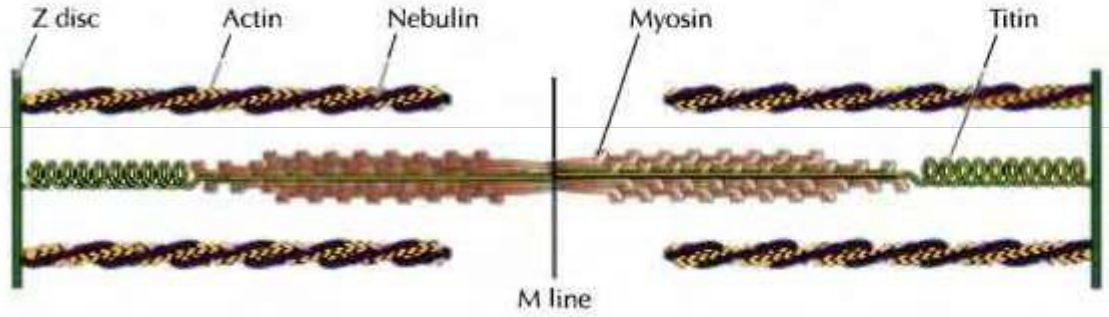

FIGURE 12.23 Titin and nebulin Molecules of titin extend from the Z disc to the M line and act as springs to keep myosin filaments centered in the sarcomere. Molecules of nebulin extend from the Z disc and are thought to determine the length of associated actin filaments.

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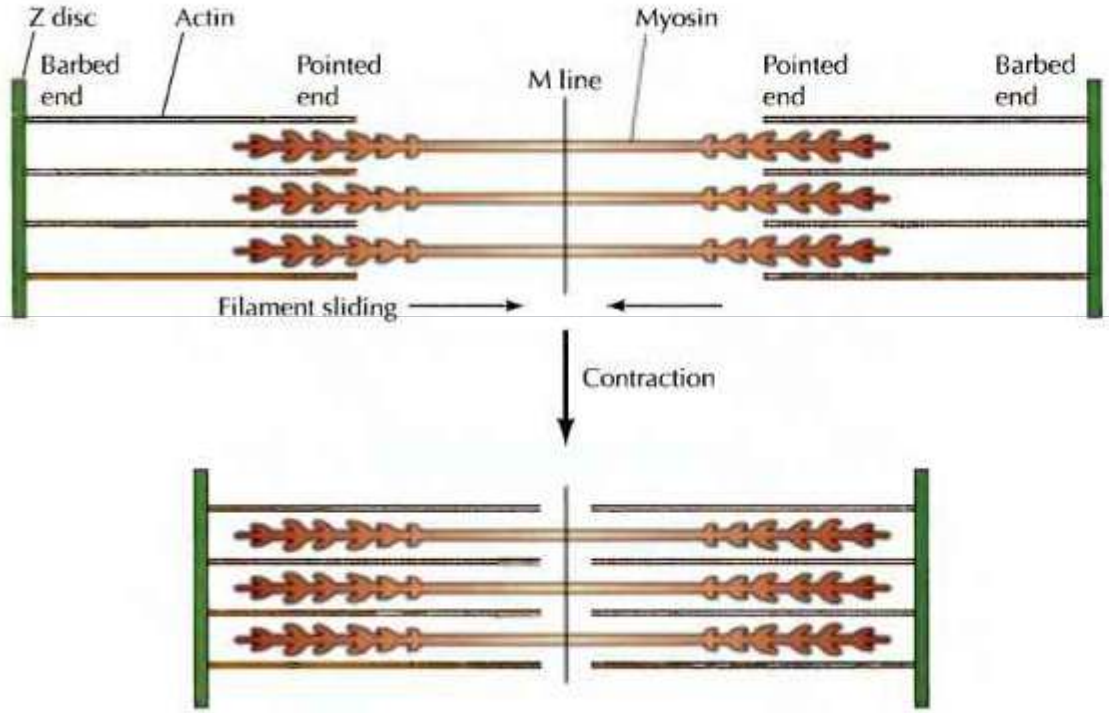

FIGURE 12.24 Sliding-filament model of muscle contraction The actin filaments slide past the myosin filaments toward the middle of the sarcomere. The result is shortening of the sarcomere without any change in filament length.

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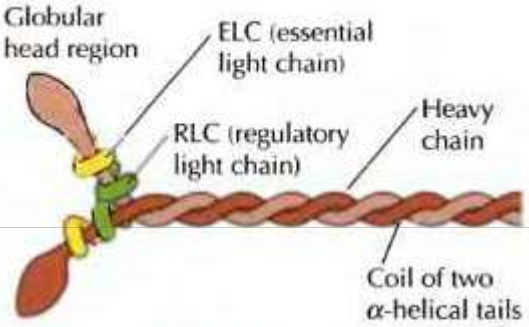

FIGURE 12.25 Myosin II The myosin II molecule consists of two heavy chains and two pairs of light chains (called the essential and regulatory light chains). The heavy chains have globular head regions and long α-helical tails, which coil around each other to form dimers.

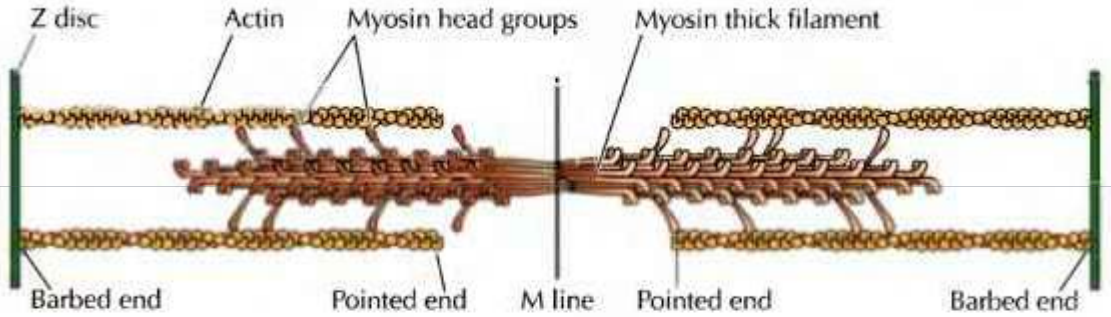

FIGURE 12.26 Organization of myosin thick filaments Thick filaments are formed by the association of several hundred myosin II molecules in a staggered array. The globular heads of myosin bind actin, forming cross-bridges between the myosin and actin filaments. The orientation of both actin and myosin filaments reverses at the M line, so their relative polarity is the same on both sides of the sarcomere.

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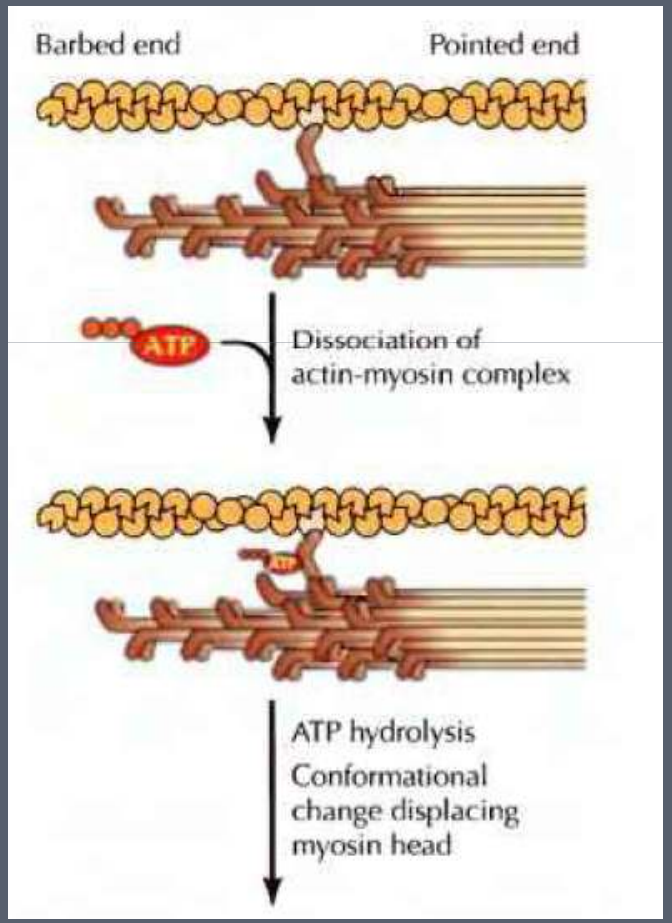

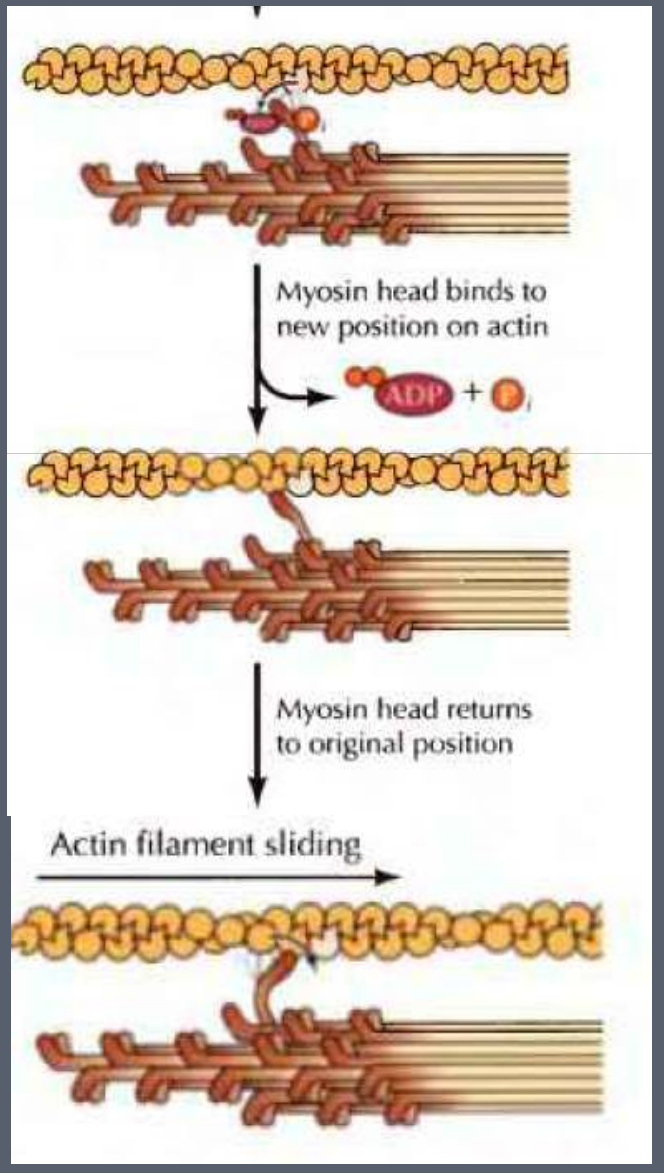

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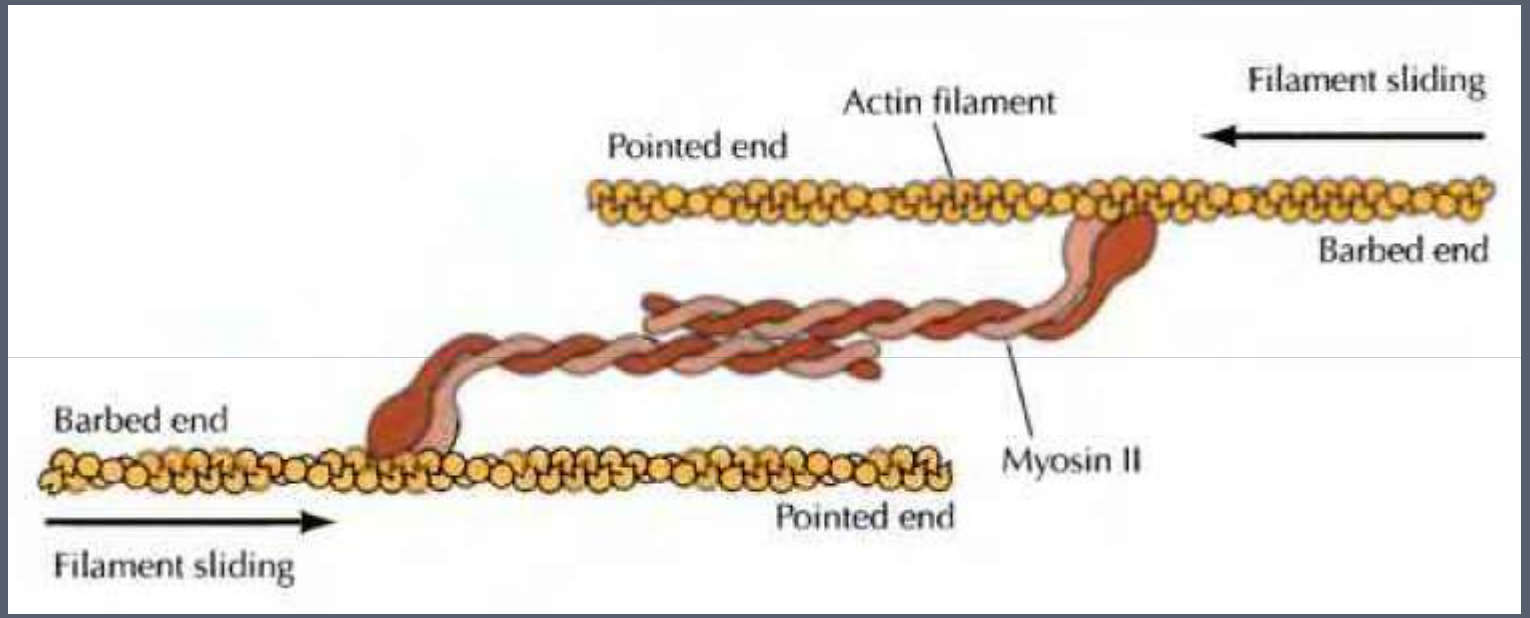

FIGURE 12.29 Contractile assemblies in nonmuscle cells Bipolar filaments of myosin II produce contraction by sliding actin filaments in opposite directions.

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