# Microsymposium

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Rocking, rolling, sliding: structural transitions in actin:tropomyosin

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Tropomyosin is a key factor in the molecular mechanisms that regulate the binding of myosin motors to actin filaments in most eukaryotic cells. This regulation is achieved by the azimuthal repositioning of tropomyosin along the actin:tropomyosin:troponin thin filament to block or expose myosin binding sites on actin. In striated muscle, including involuntary cardiac muscle, tropomyosin regulates muscle contraction by coupling Ca2+ binding to troponin with myosin binding to the thin filament. In smooth muscle, the switch is the post-translational modification of the myosin. Depending on the activation state of troponin and the binding state of myosin, tropomyosin can occupy the blocked, closed, or open position on actin. Using native cryogenic 3DEM, we have directly resolved and visualized cardiac and gizzard muscle tropomyosin on filamentous actin in the position that corresponds to the closed state. From the 8-Å resolution structure of the reconstituted Ac:Tm filament formed with gizzard-derived Tm we discuss two possible mechanisms for the transition from closed to open state and describe the role Tm plays in blocking myosin tight binding in the closed state position.

[1] Sousa, Stagg, and Stroupe JMB 2013
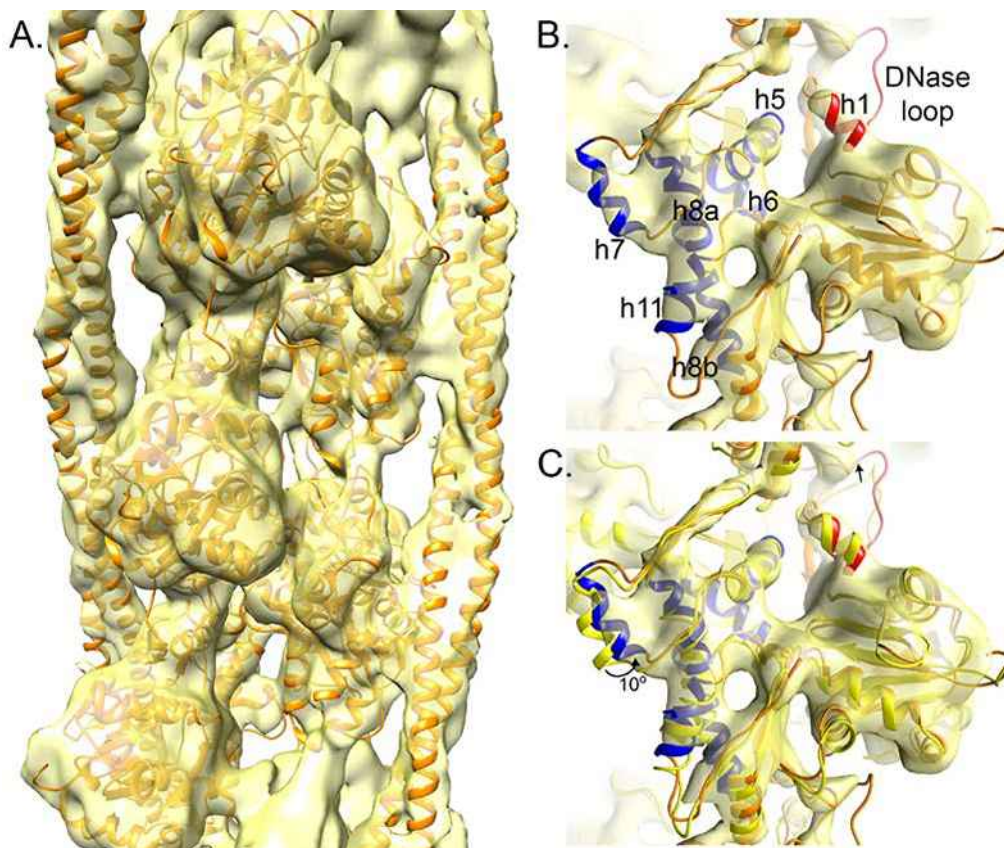
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