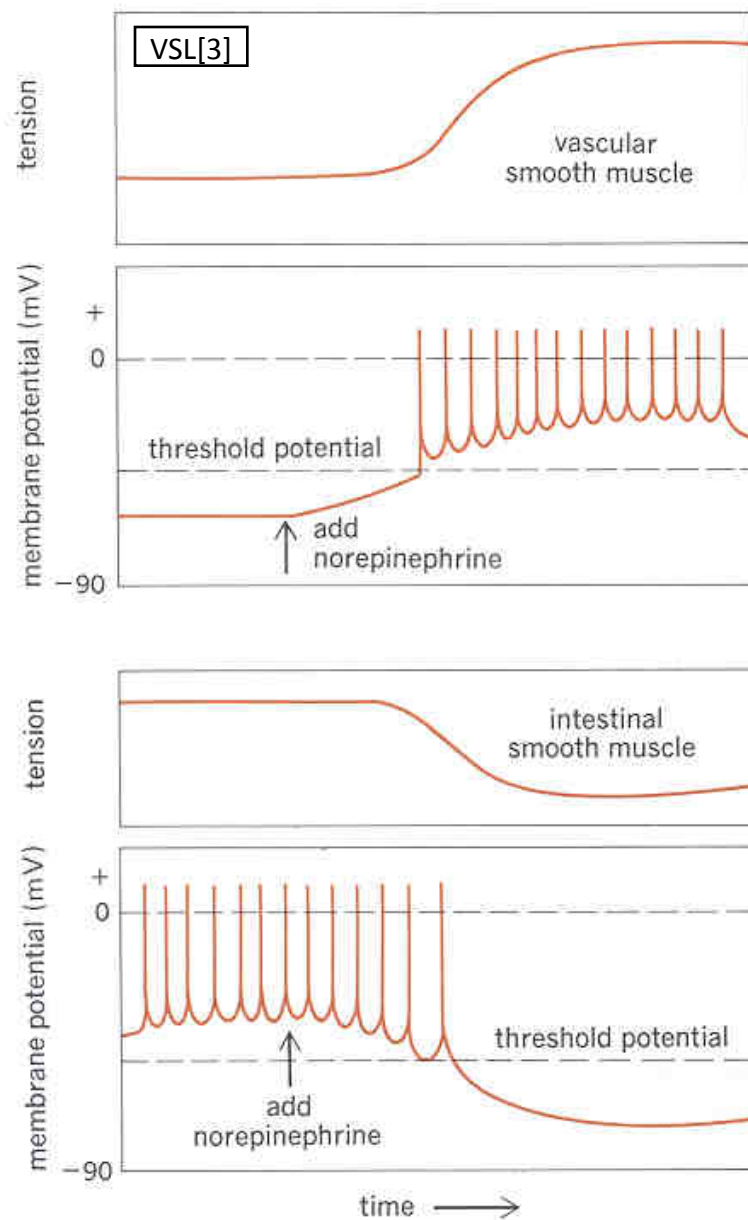


Koeppen & Stanton: Berne and Levy Physiology, 6th Edition.  
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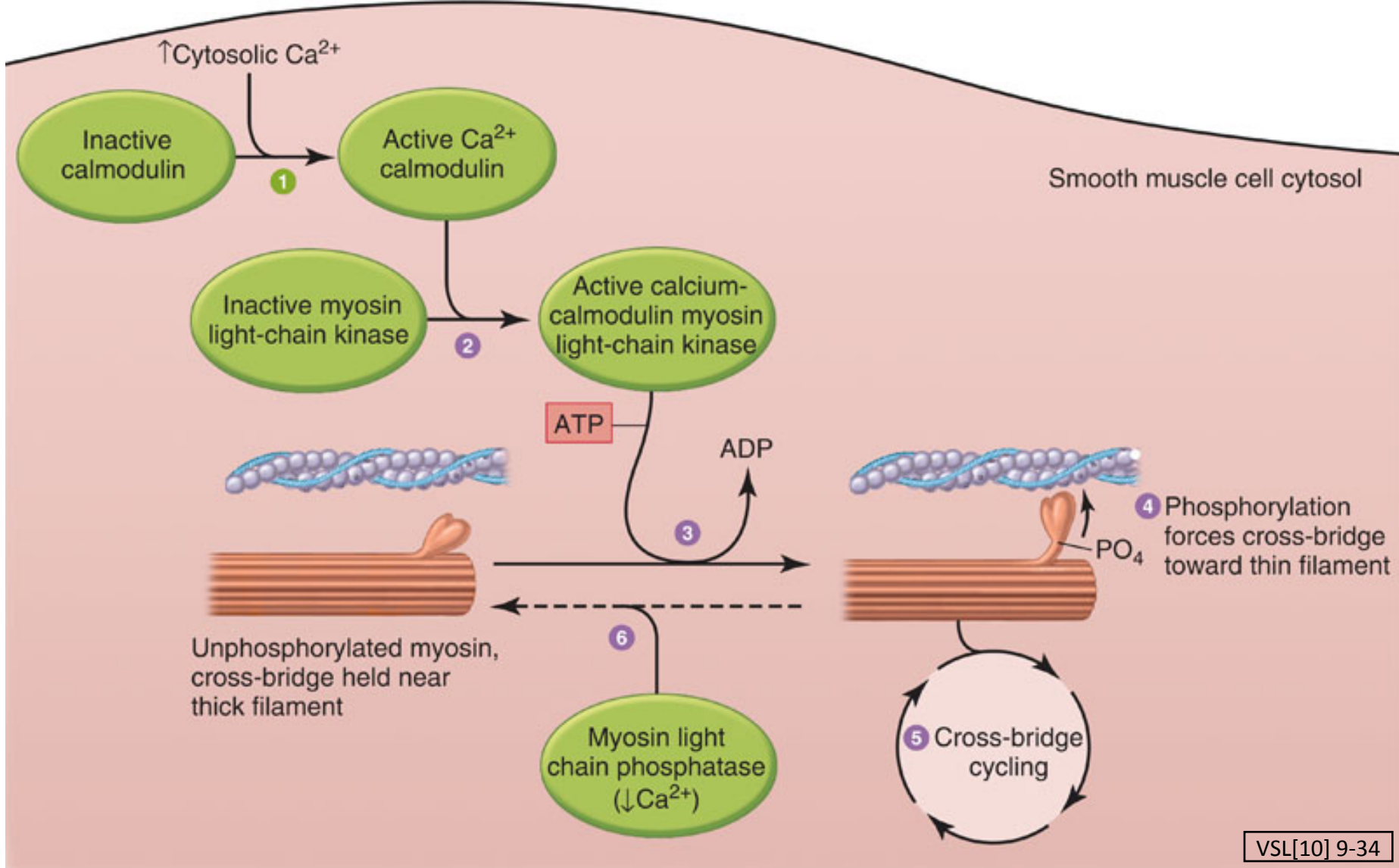
Figure 14-6 Relationships between membrane potential ( $E_m$ ) and generation of force ( $F$ ) in different types of smooth muscle. A, Action potentials may be generated and lead to a twitch or larger summed mechanical responses. Action potentials are characteristic of single-unit smooth muscles (many viscera). Gap junctions permit the spread of action potentials throughout the tissue. B, Rhythmic activity produced by slow waves that trigger action potentials. The contractions are generally associated with a burst of action potentials. Slow oscillations in membrane potential usually reflect the activity of electrogenic pumps in the cell membrane. C, Tonic contractile activity may be related to the value of the membrane potential in the absence of action potentials. Graded changes in  $E_m$  are common in multiunit smooth muscles (e.g., vascular), where action potentials are not generated and propagated from cell to cell. D, Pharmacomechanical coupling; changes in force produced by the addition or removal (arrows) of drugs or hormones that have no significant effect on membrane potential.



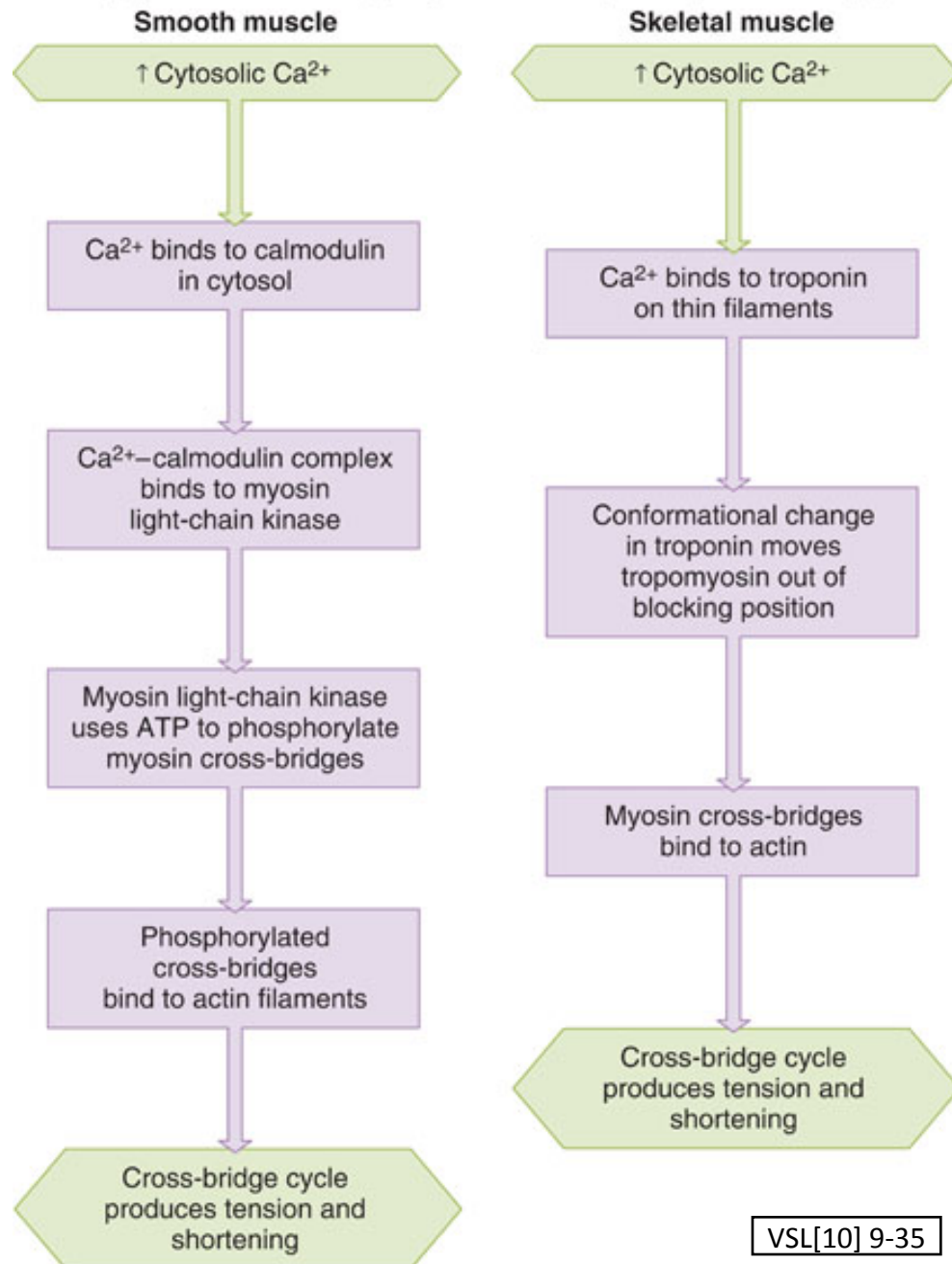
**Figure 10-39. Different responses of vascular smooth muscle and intestinal smooth muscle to norepinephrine released from a sympathetic nerve ending.**

Characteristic	Skeletal	Smooth	
		Single Unit	Multi Unit
Thick and thin filaments	Yes	Yes	Yes
Sarcomeres	Yes	No	No
T – tubular system	Yes	No	No
SR	Abundant	Sparse	Sparse
Gap junctions	No	Yes	Minimal
Source of activating $\text{Ca}^{2+}$	SR	SR and extra cellular	SR and extra cellular
Regulation site	Troponin	Myosin XB	Myosin XB
Speed	Fast to slow	Very slow	Very slow
Spontaneous APs	No	Yes	No
Tone (without external stimuli)	No	Yes	No
Effect of nerve input	Excitation	Excitation or inhibition	Excitation or inhibition
Effect of hormones on excitability and contraction	No	Yes	Yes
Effect of stretch	No	Yes	No

Adapted from  
VSL[6], Table 11-6



VSL[10] 9-34



VSL[10] 9-35

**END**

**Video 5, Module 4**