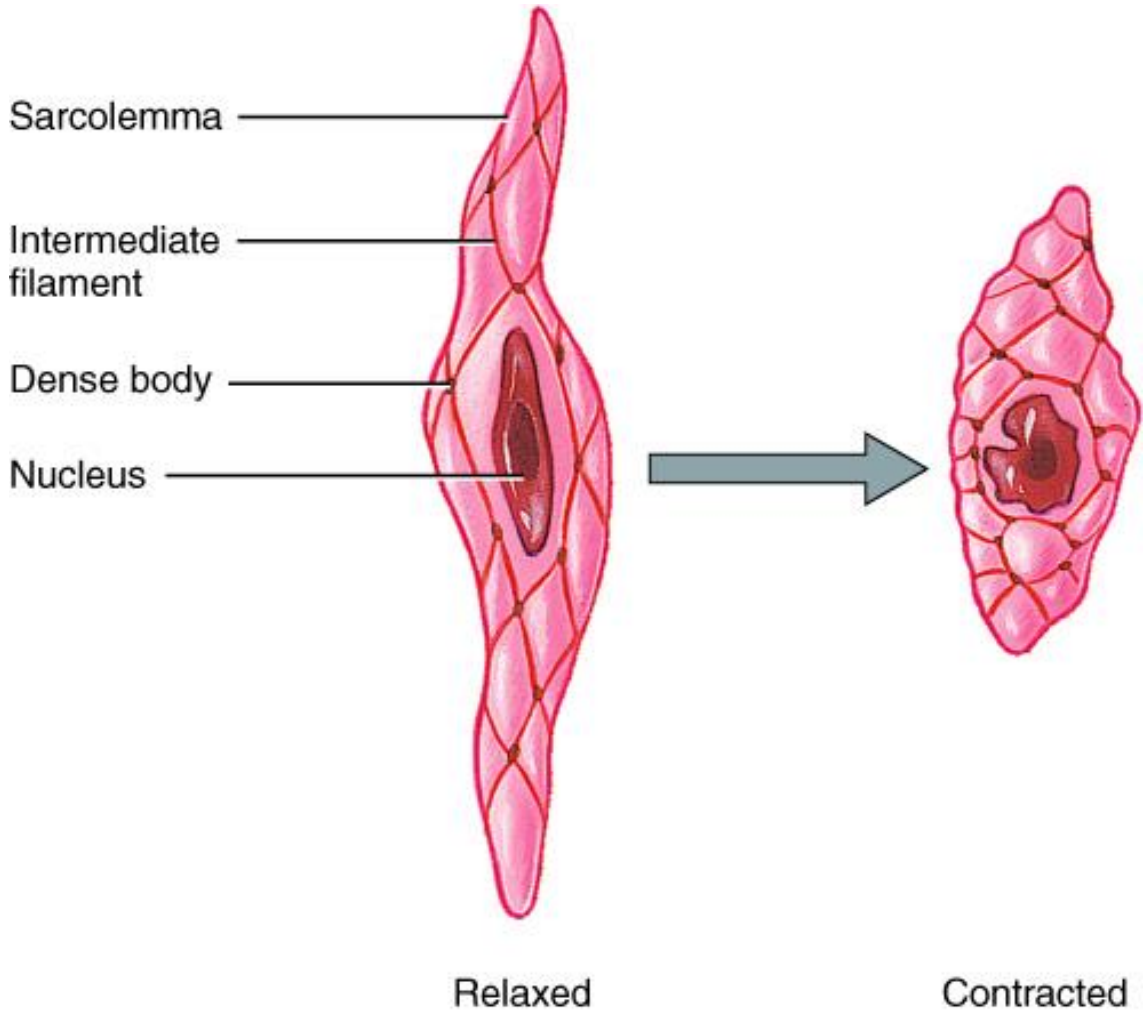
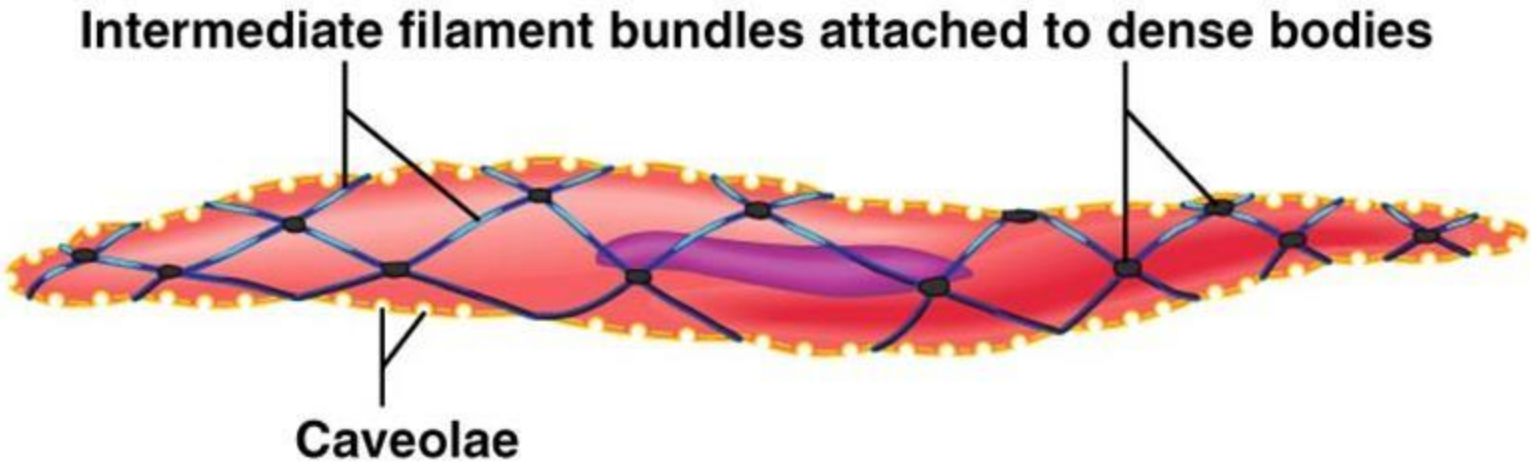
SMOOTH MUSCLE CELLS

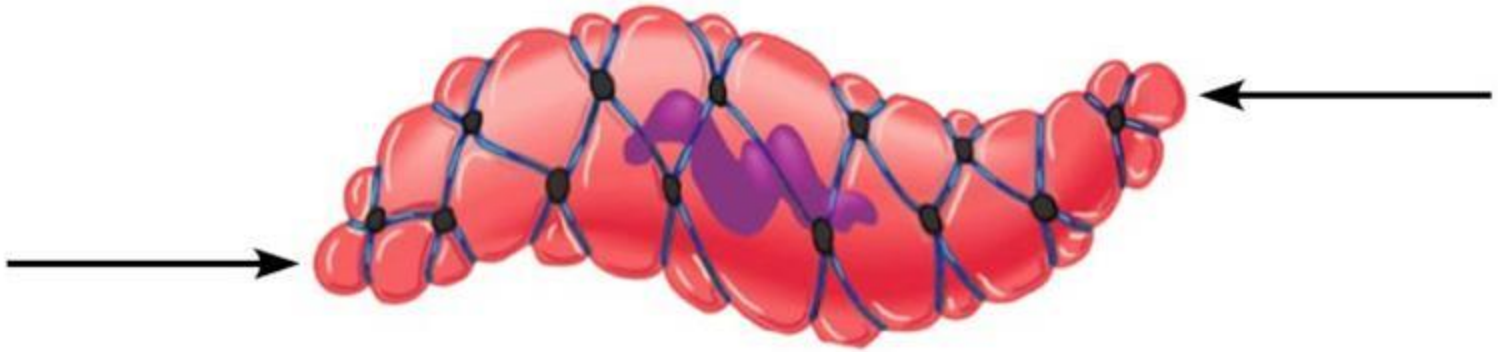
Fig. 10.19



10.19

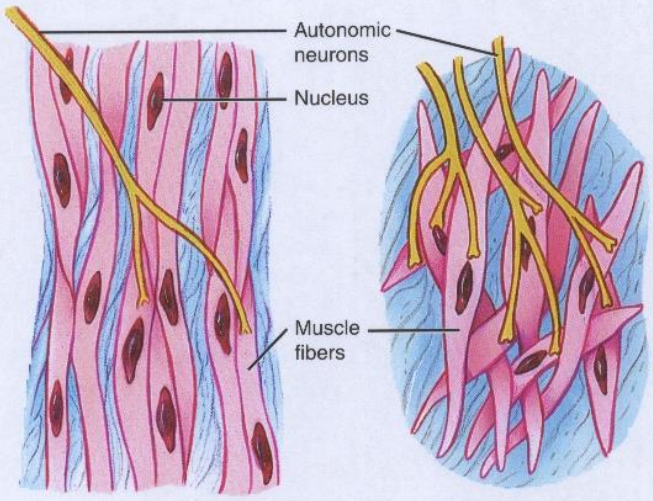


(a) Relaxed smooth muscle cell



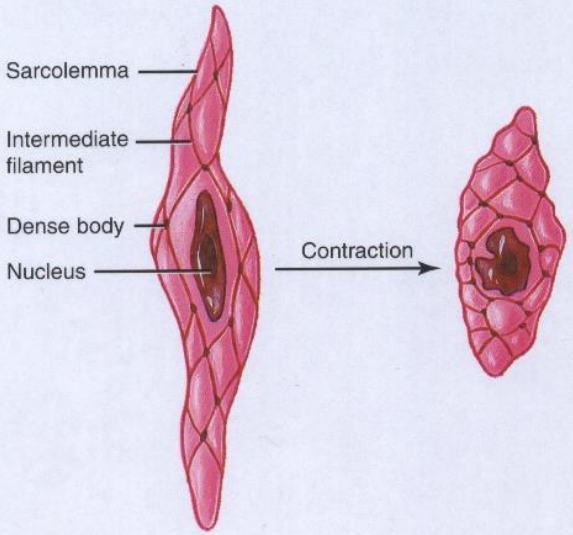
(b) Contracted smooth muscle cell

Figure 9.26



(a) Visceral (single-unit) smooth muscle tissue

(b) Multiunit smooth muscle tissue



(c) Details of a smooth muscle fiber

Histology of Smooth Muscle Tissue, Fig# 10.18a-c

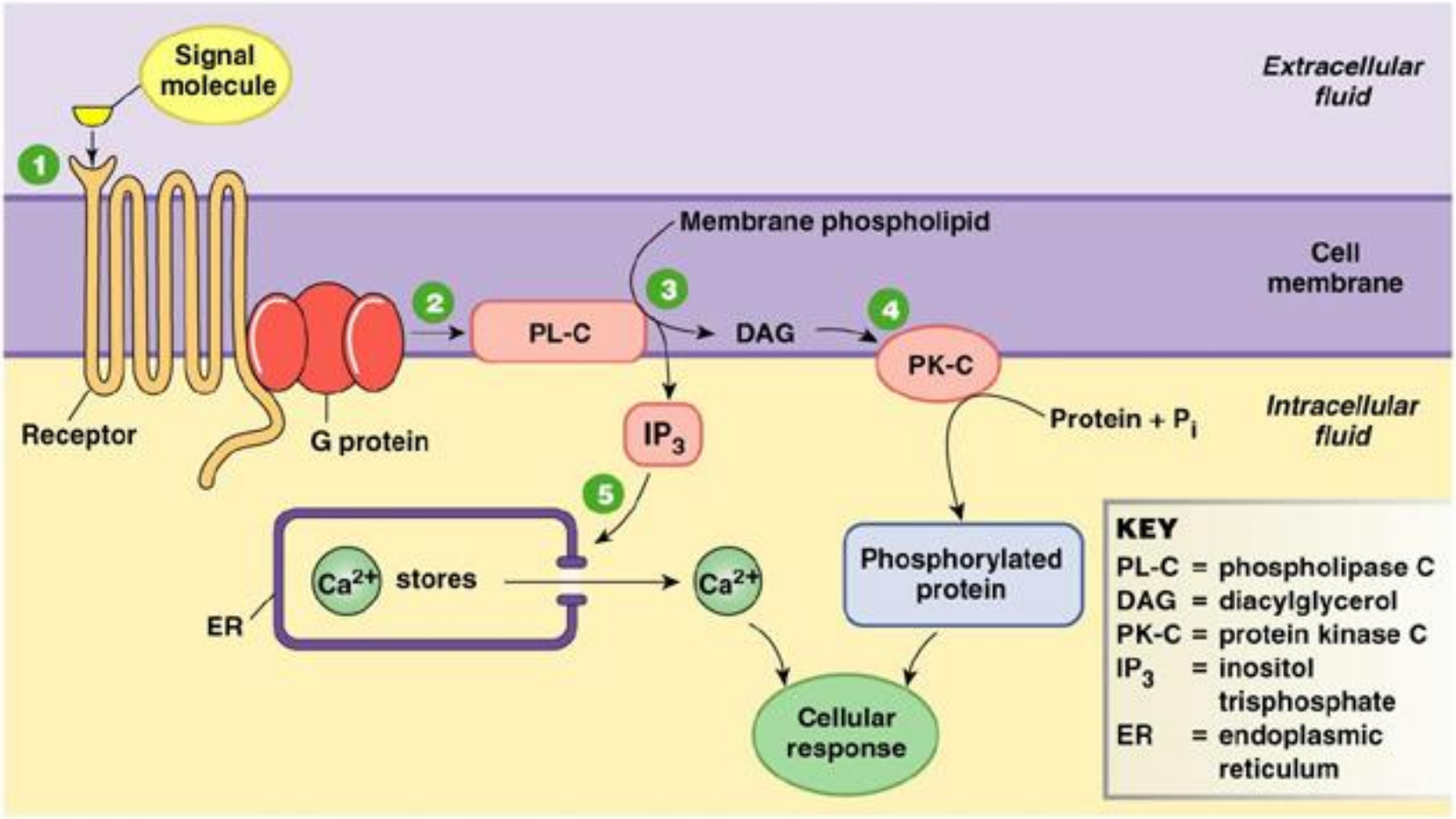


Fig. 6-12

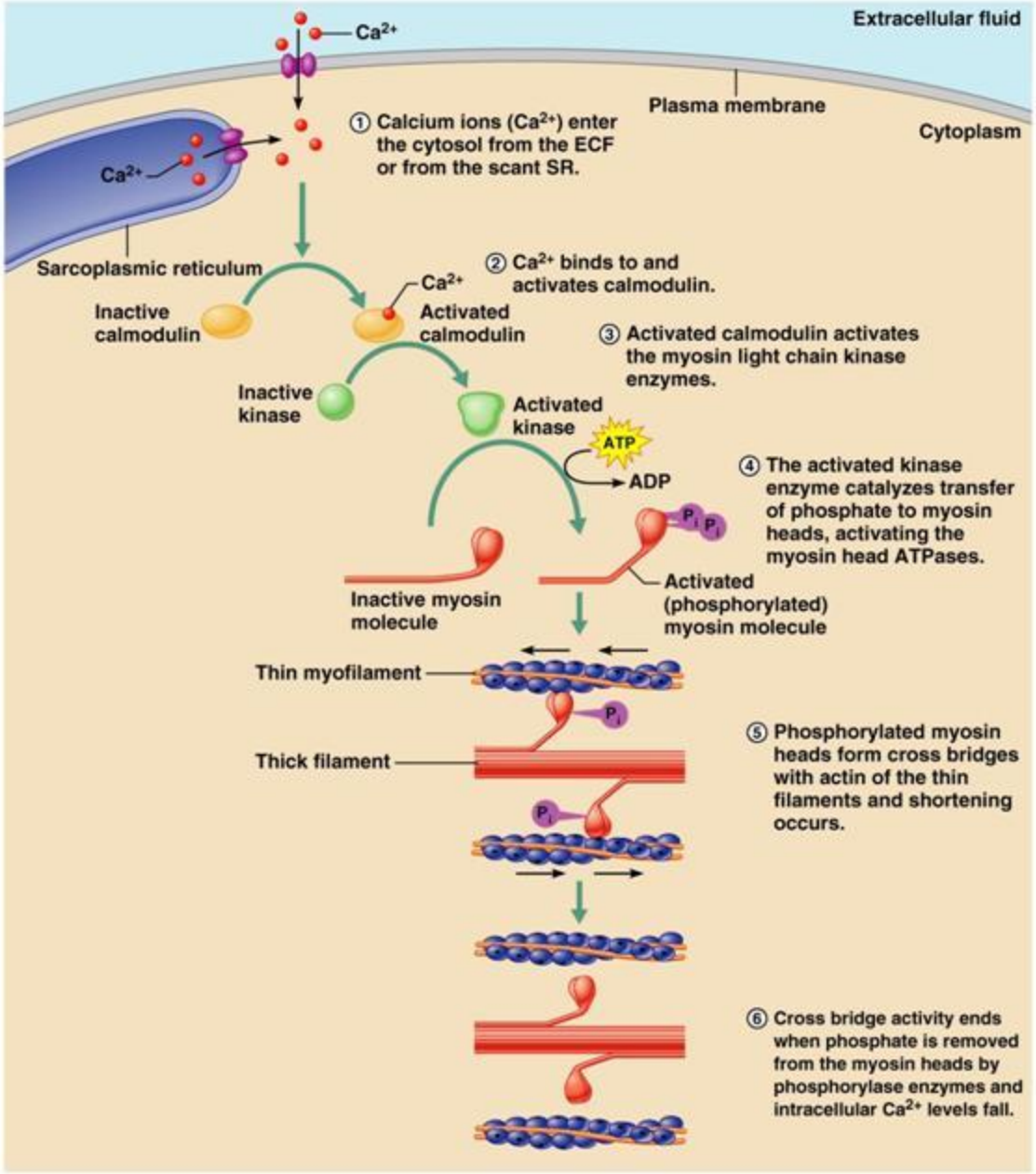
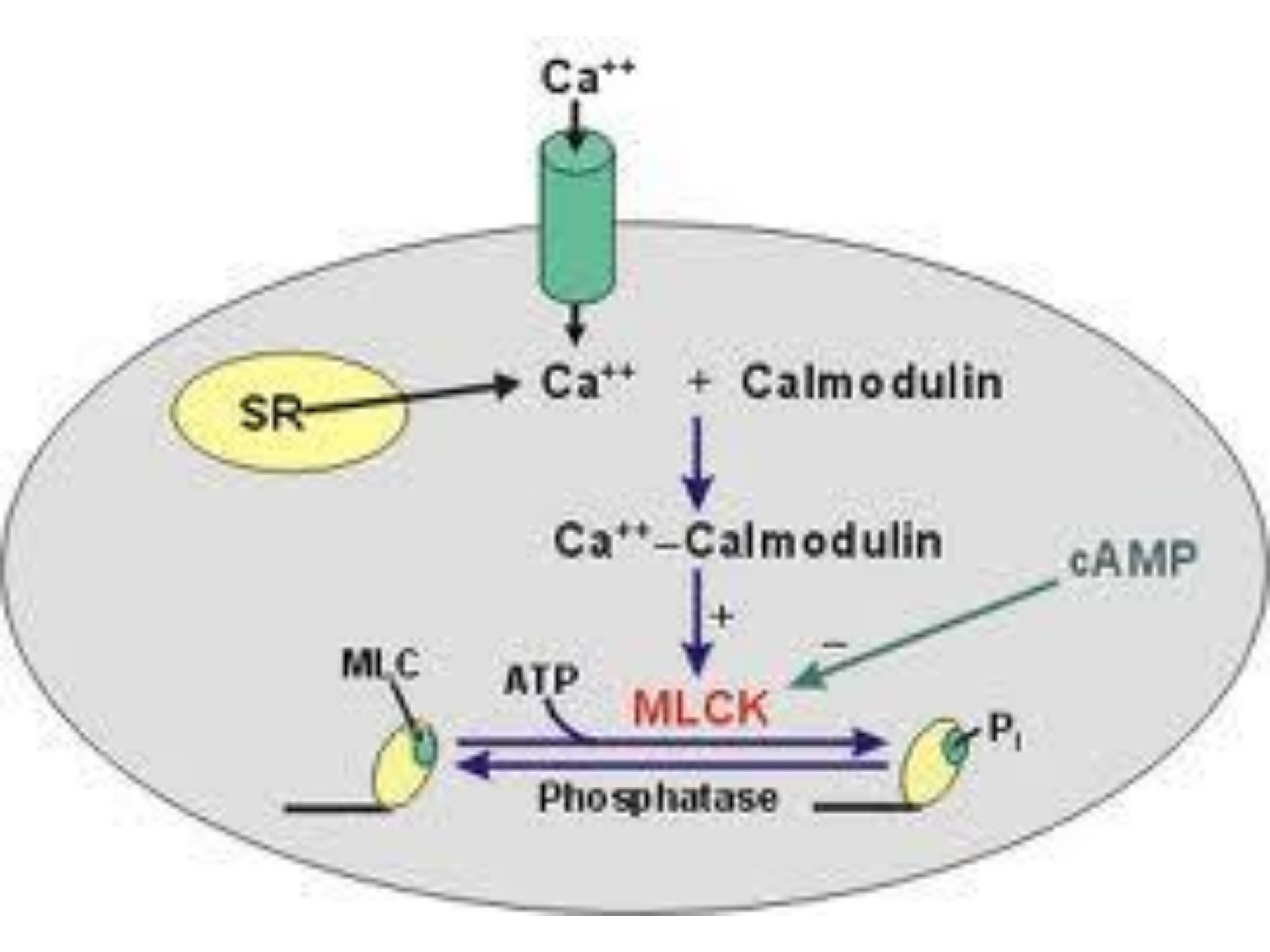


Figure 9.27


Ca++
SR
Ca++ + Calmodulin
Ca++–Calmodulin
cAMP
+
–
MLC
ATP
MLCK
Pi
Phosphatase

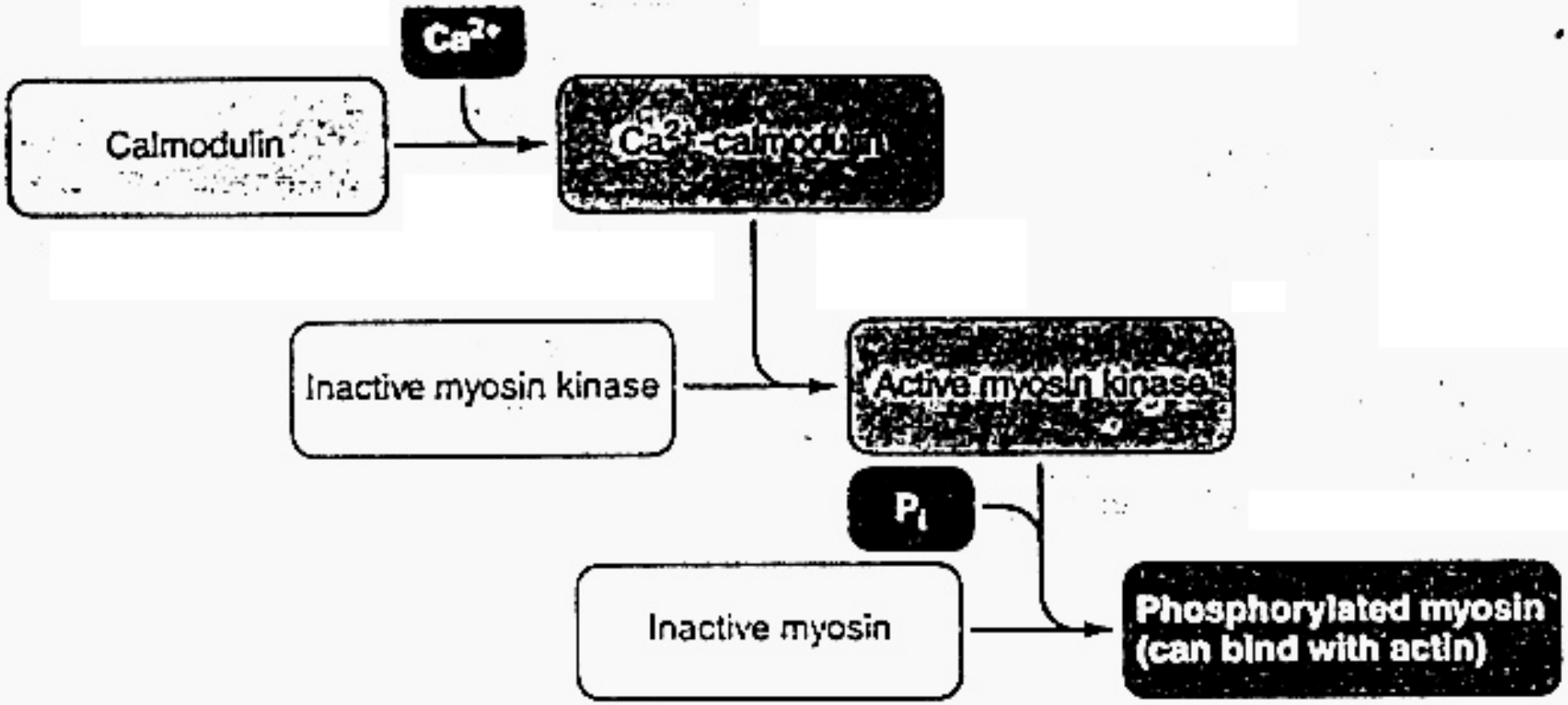

Ca^{2+}
Calmodulin
Ca^{2+}-calmodulin
Inactive myosin kinase
Active myosin kinase
P_i
Inactive myosin
Phosphorylated myosin (can bind with actin)

Table 12.8 | Comparison of Skeletal, Cardiac, and Smooth Muscle

Skeletal Muscle	Cardiac Muscle	Smooth Muscle
Striated; actin and myosin arranged in sarcomeres	Striated; actin and myosin arranged in sarcomeres	Not striated; more actin than myosin; actin inserts into dense bodies and cell membrane
Well-developed sarcoplasmic reticulum and transverse tubules	Moderately developed sarcoplasmic reticulum and transverse tubules	Poorly developed sarcoplasmic reticulum; no transverse tubules
Contains troponin in the thin filaments	Contains troponin in the thin filaments	Contains calmodulin, a protein that, when bound to Ca^{2+}, activates the enzyme myosin light-chain kinase
Ca^{2+} released into cytoplasm from sarcoplasmic reticulum	Ca^{2+} enters cytoplasm from sarcoplasmic reticulum and extracellular fluid	Ca^{2+} enters cytoplasm from extracellular fluid, sarcoplasmic reticulum, and perhaps mitochondria
Cannot contract without nerve stimulation; denervation results in muscle atrophy	Can contract without nerve stimulation; action potentials originate in pacemaker cells of heart	Maintains tone in absence of nerve stimulation; visceral smooth muscle produces pacemaker potentials; denervation results in hypersensitivity to stimulation
Muscle fibers stimulated independently; no gap junctions	Gap junctions present as intercalated discs	Gap junctions generally present