

Hypocalcemic Tetany

Hypocalcemic tetany is the involuntary tetanic contraction of skeletal muscles that occurs when the extracellular Ca^{2+} concentration falls to about 40 percent of its normal value. This may seem surprising, because we have seen that Ca^{2+} is required for excitation-contraction coupling. However, recall that this Ca^{2+} is sarcoplasmic reticulum Ca^{2+} , not extracellular Ca^{2+} . The effect of changes in extracellular Ca^{2+} is exerted not on the sarcoplasmic reticulum Ca^{2+} but directly on the plasma membrane. Low extracellular Ca^{2+} (**hypocalcemia**) increases the opening of Na^+ channels in excitable membranes, leading to membrane depolarization and the spontaneous firing of action potentials. This causes the increased muscle contractions, which are similar to muscular cramping. Chapter 11 discusses the mechanisms controlling the extracellular concentration of calcium ions.