

extracellular matrix of connective tissue insulates the SA node from the hyperpolarizing influence of the larger atrium. In addition, the alignment of this complex matrix is associated with nearly unidirectional electrical propagation to the atrium (**Fig. 244-1**).

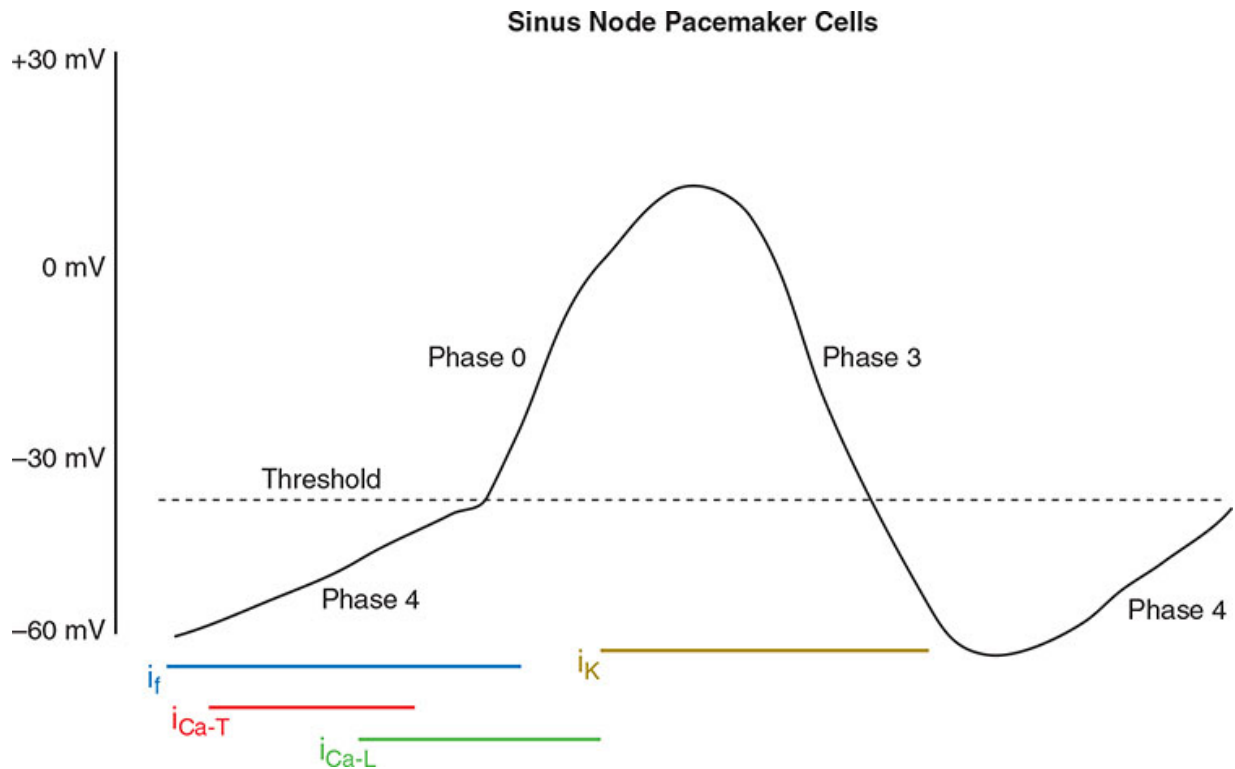


FIGURE 244-1 Cellular ion currents involved in depolarization and automaticity of SA nodal pacemaker cells. Phase 4 spontaneous depolarization results from i_f (funny) current, along with T- and L-type calcium channels. Phase 0 is the depolarization phase of the action potential. This is followed by phase 3 repolarization, which results from the outward directed hyperpolarizing K⁺ currents. i_f , funny current; i_{Ca-T} , T-type calcium current; i_{Ca-L} , L-type calcium current; i_K , potassium current.

Pacemaker cells spontaneously depolarize in a continuous manner setting the natural rate of depolarization and myocardial contraction. Action potential depolarization in the SA node is normally at a resting rate of 60–100 beats/min. The autonomic nervous system exhibits control over the sinus node, with a preponderance of parasympathetic innervation at baseline. Removal of parasympathetic tone or an increase in sympathetic innervation leads to an increase in rate of depolarization. In denervated hearts,