Resting state: ion concentration gradients
FIGURE 6.2 Differential distribution of ions inside and outside plasma membrane of neurons and neuronal processes, showing ionic channels for Na⁺, K⁺, Cl⁻, and Ca²⁺, as well as an electrogenic Na⁺-K⁺ ionic pump (also known as Na⁺, K⁺-ATPase). Concentrations (in millimoles except that for intracellular Ca²⁺) of the ions are given in parentheses; their equilibrium potentials (E) for a typical mammalian neuron are indicated.
FIGURE 6.3 The equilibrium potential is influenced by the concentration gradient and the voltage difference across the membrane. Neurons actively concentrate $K^+$ inside the cell. These $K^+$ ions tend to flow down their concentration gradient from inside to outside the cell. However, the negative membrane potential inside the cell provides an attraction for $K^+$ ions to enter or remain within the cell. These two factors balance one another at the equilibrium potential, which in a typical mammalian neuron is $-102$ mV for $K^+$. 
Why does $\text{Na}^+$ not pass through $\text{K}^+$ channel?

Hydration shell stripped and $\text{K}^+$ stabilized by electronegative lining of pore. Smaller $\text{Na}^+$ retains hydration shell and not stabilized.
Derivation of Nernst potential for single ionic species
Nernst (reversal) potential for different ions
Multiple ionic species: GHK equation
Forces on ions near resting potential

\[ \Delta V \]

\[ \text{Na}^+ \]

outside

\[ \text{Na}^+ \]

\[ \text{Na}^+ \]

\[ \text{Na}^+ \]

\[ \Delta V \]

\[ \text{Na}^+ \]

\[ \Delta V \]

\[ \text{Na}^+ \]

inside

\[ \text{K}^+ \]

\[ \text{K}^+ \]

\[ \text{K}^+ \]

\[ \text{K}^+ \]

\[ \text{K}^+ \]