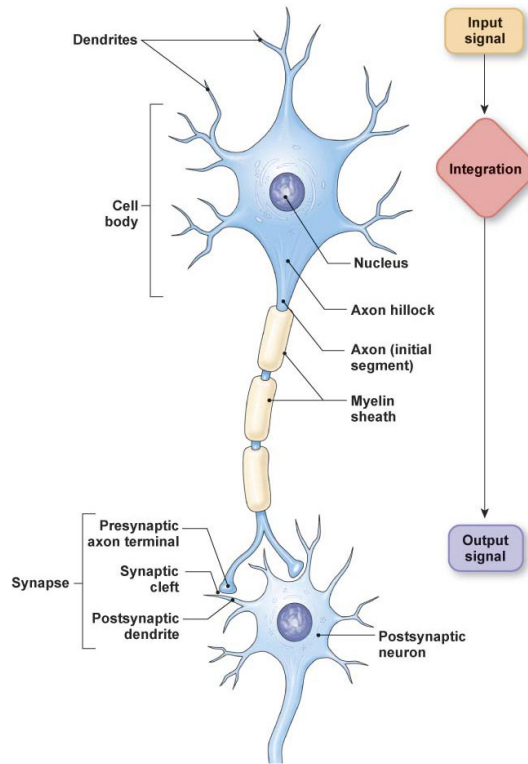


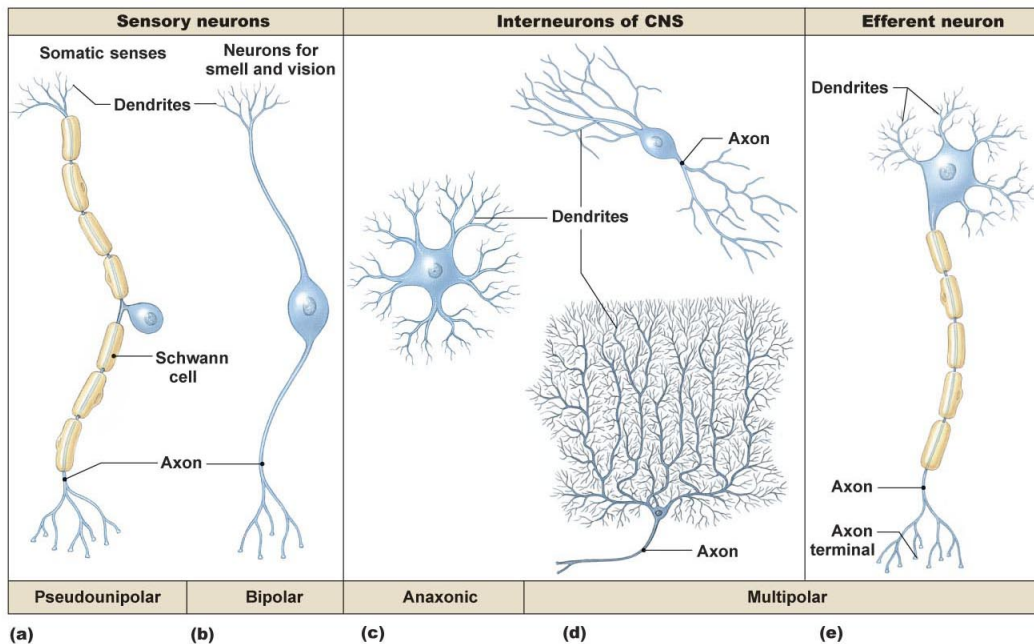
Figure 8-2



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Figure 8-3



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Figure 8-4

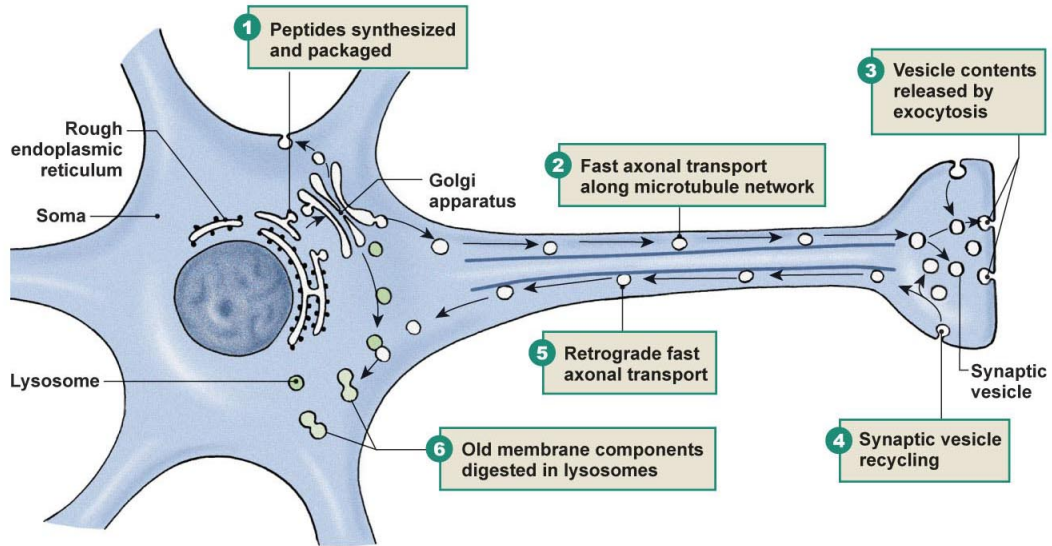


Figure 8-5a, overview

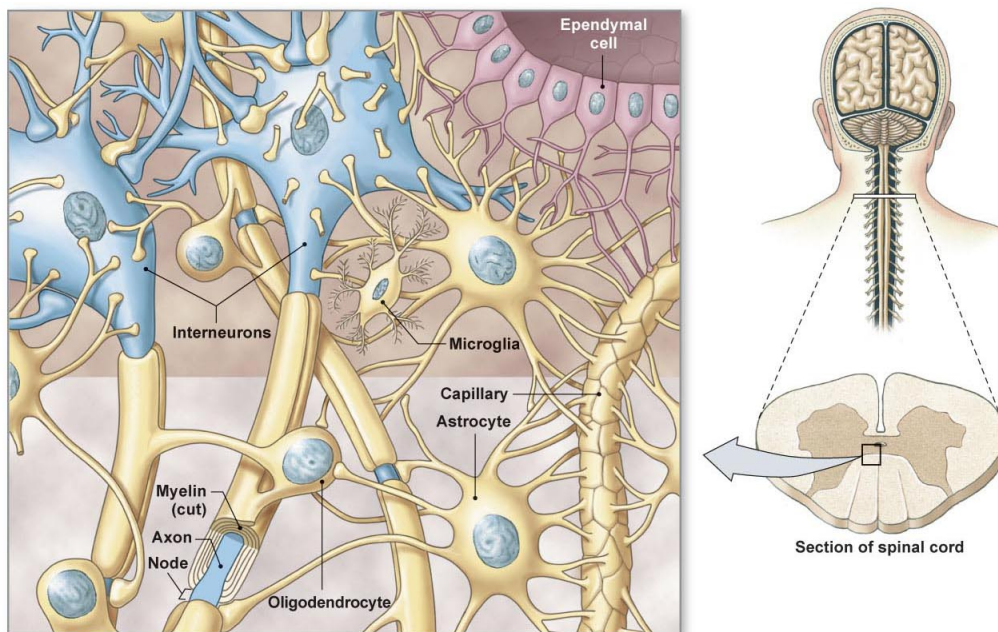


Figure 8-5b, overview

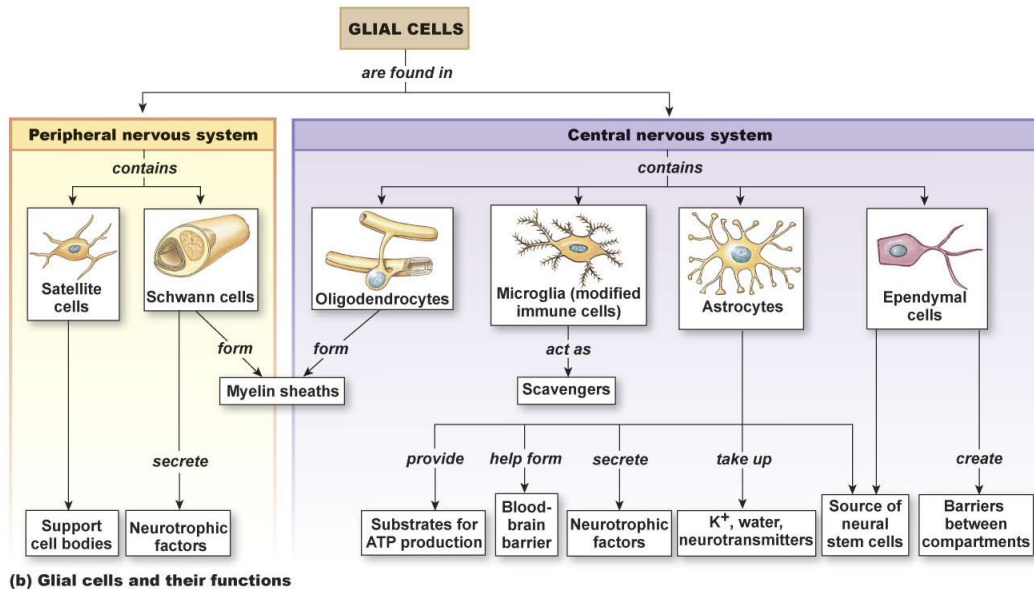


Figure 8-6

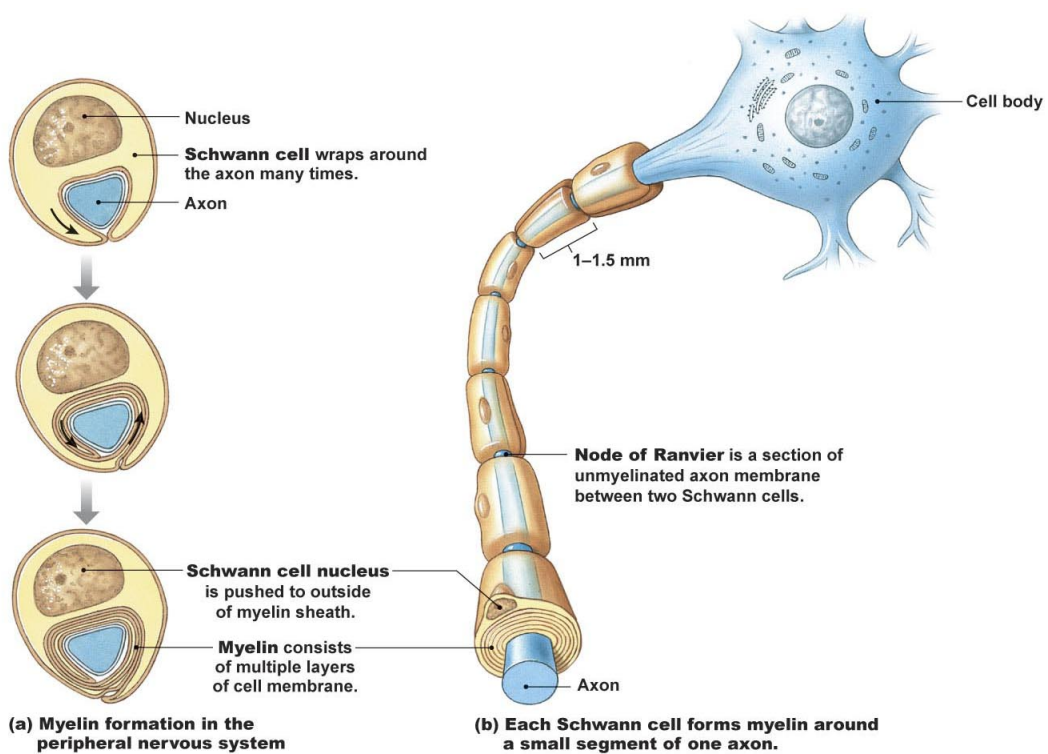


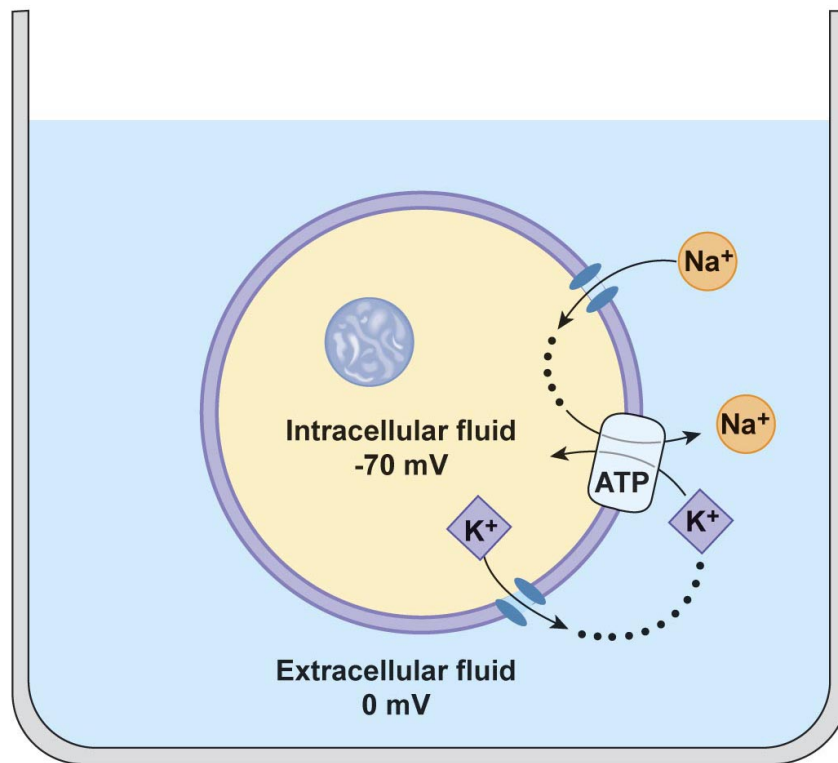
Table 8-2

TABLE 8-2 Ion Concentrations and Equilibrium Potentials			
ION	EXTRACELLULAR FLUID (mM)	INTRACELLULAR FLUID (mM)	E_{ion} AT 37° C
K ⁺	5 mM (normal range: 3.5–5)	150 mM	–90 mV
Na ⁺	145 mM (normal range: 135–145)	15 mM	+60 mV
Cl [–]	108 mM (normal range: 100–108)	10 mM (range: 5–15)	–63 mV
Ca ²⁺	1 mM	0.0001 mM	see Concept Check question 6

Table 8-3

TABLE 8-3 Comparison of Graded Potential and Action Potential in Neurons		
	GRADED POTENTIAL	ACTION POTENTIAL
Type of signal	Input signal	Regenerating conduction signal
Occurs where?	Usually dendrites and cell body	Trigger zone through axon
Types of gated ion channels involved	Mechanically, chemically, or voltage-gated channels	Voltage-gated channels
Ions involved	Usually Na ⁺ , Cl [–] , Ca ²⁺	Na ⁺ and K ⁺
Type of signal	Depolarizing (e.g., Na ⁺) or hyperpolarizing (e.g., Cl [–])	Depolarizing
Strength of signal	Depends on initial stimulus; can be summed	All-or-none phenomenon; cannot be summed
What initiates the signal?	Entry of ions through channels	Above-threshold graded potential at the trigger zone
Unique characteristics	No minimum level required to initiate	Threshold stimulus required to initiate
	Two signals coming close together in time will sum	Refractory period: two signals too close together in time cannot sum
	Initial stimulus strength is indicated by frequency of a series of action potentials	

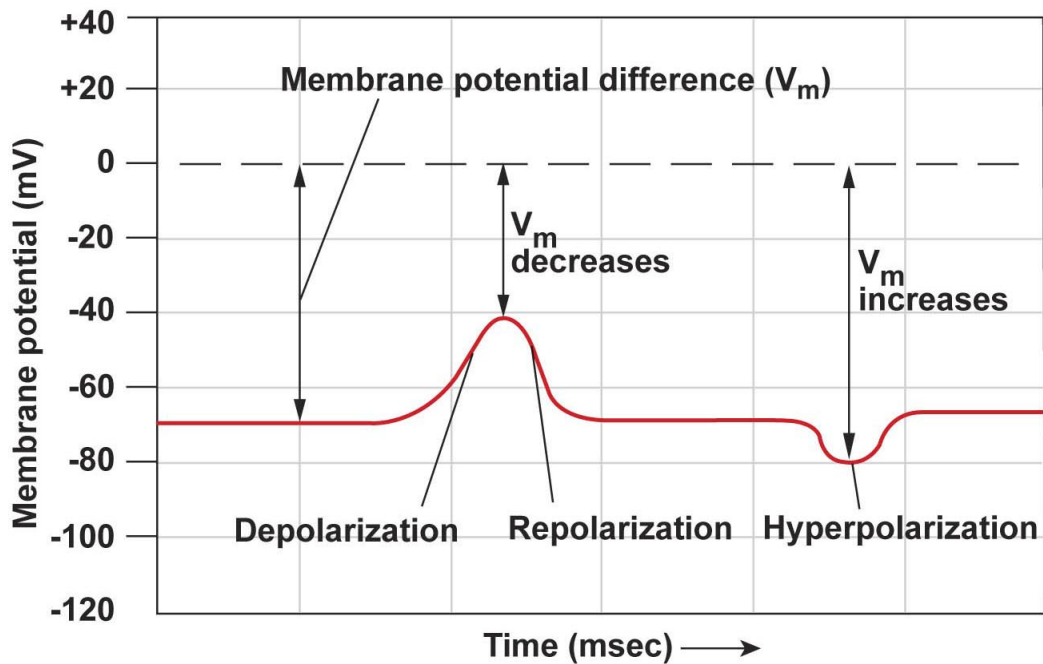
Figure 5-33



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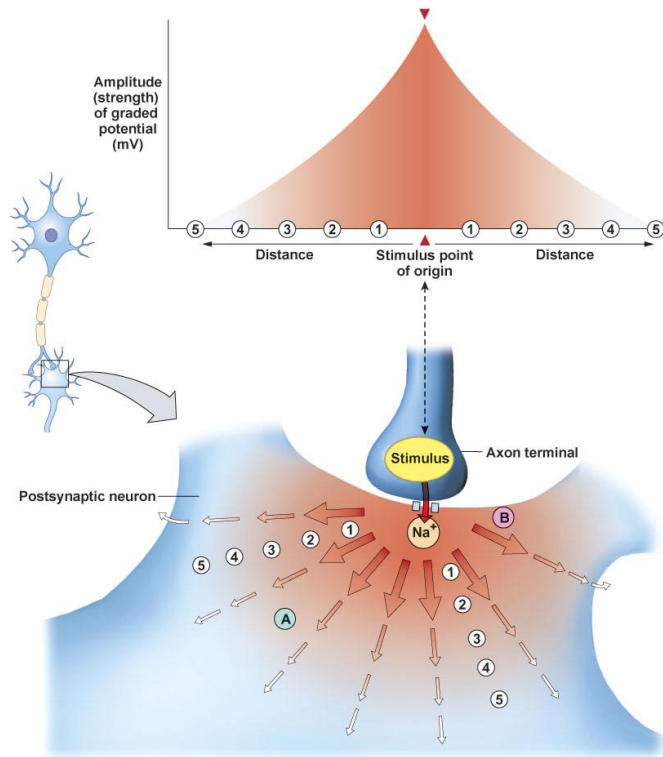
Figure 5-34



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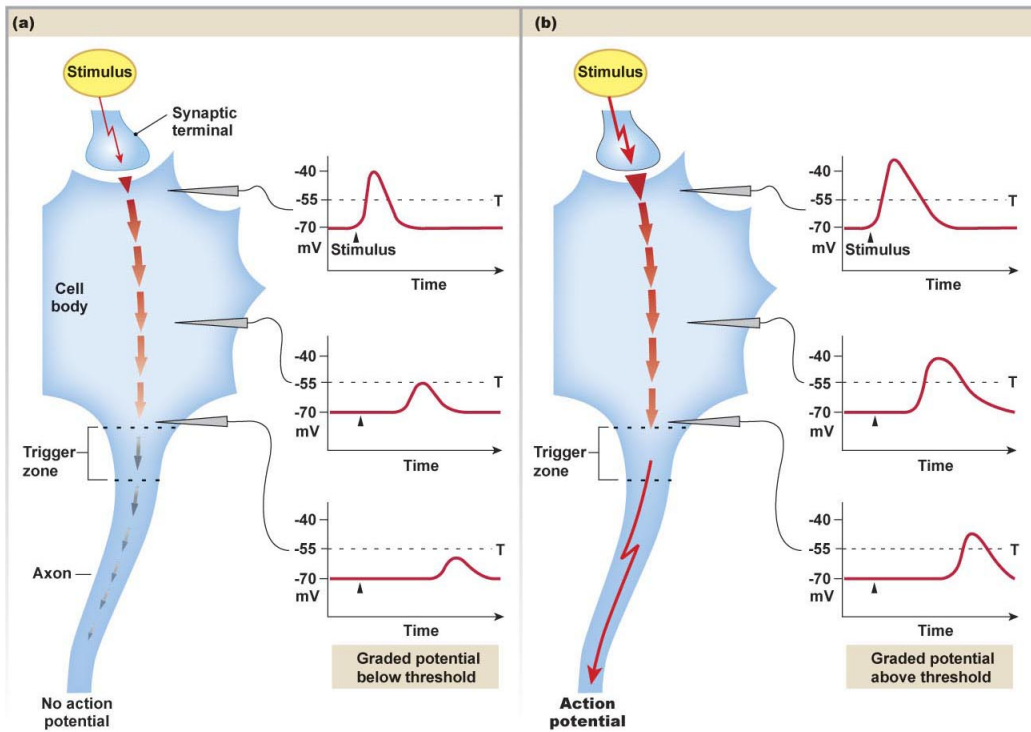
Figure 8-7



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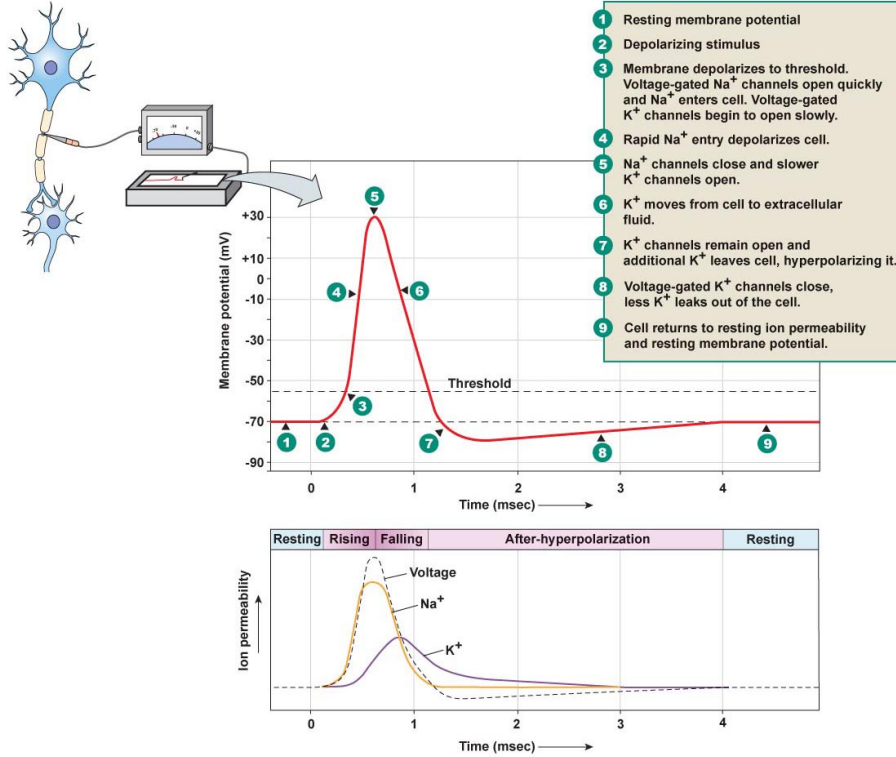
Figure 8-8



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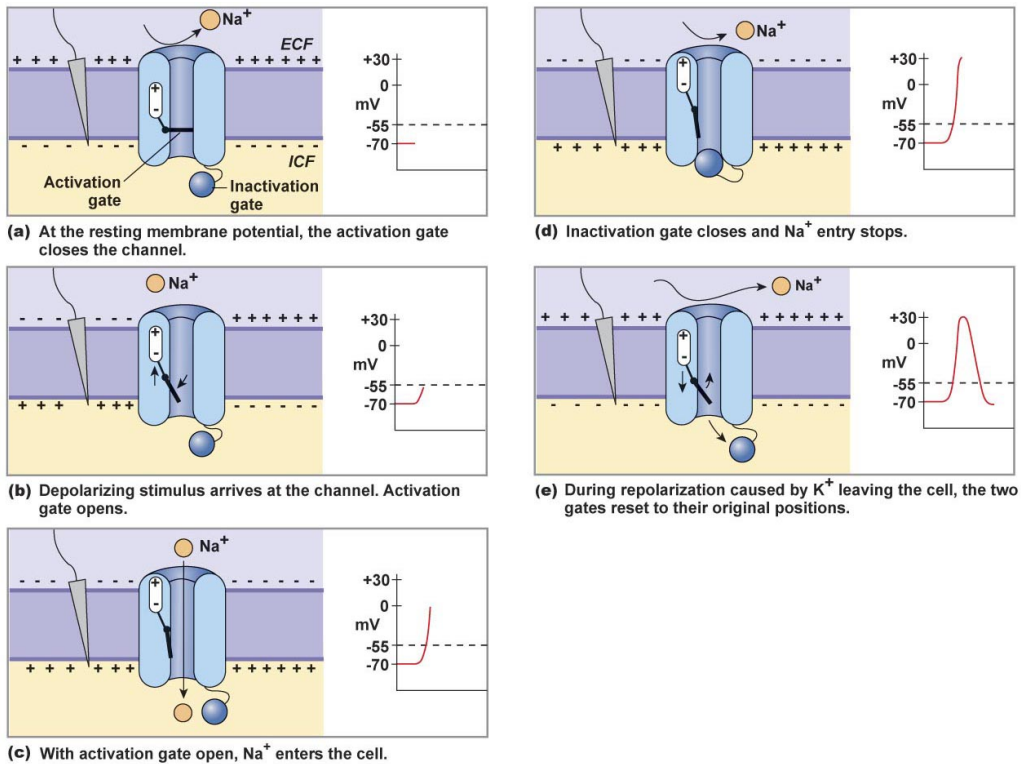
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Figure 8-9, overview



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Figure 8-10



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Figure 8-11

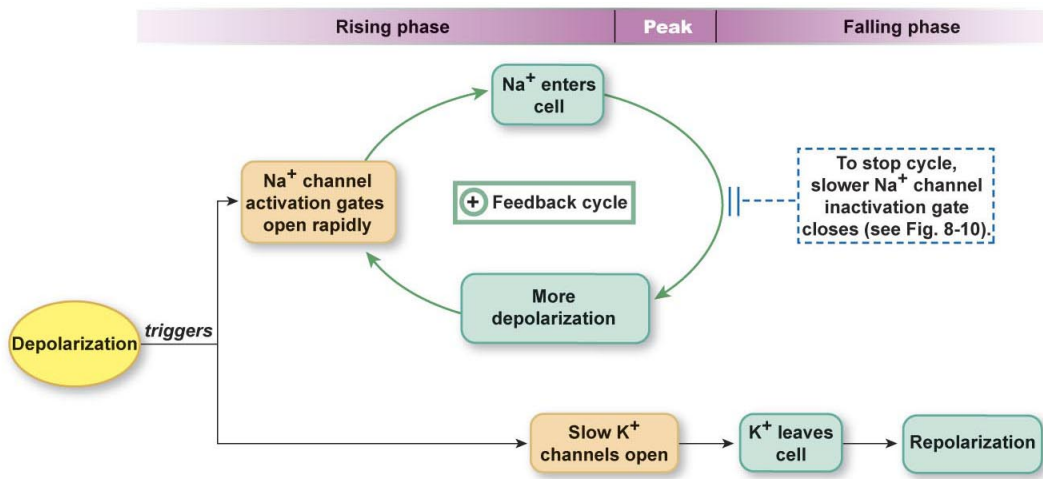


Figure 8-12

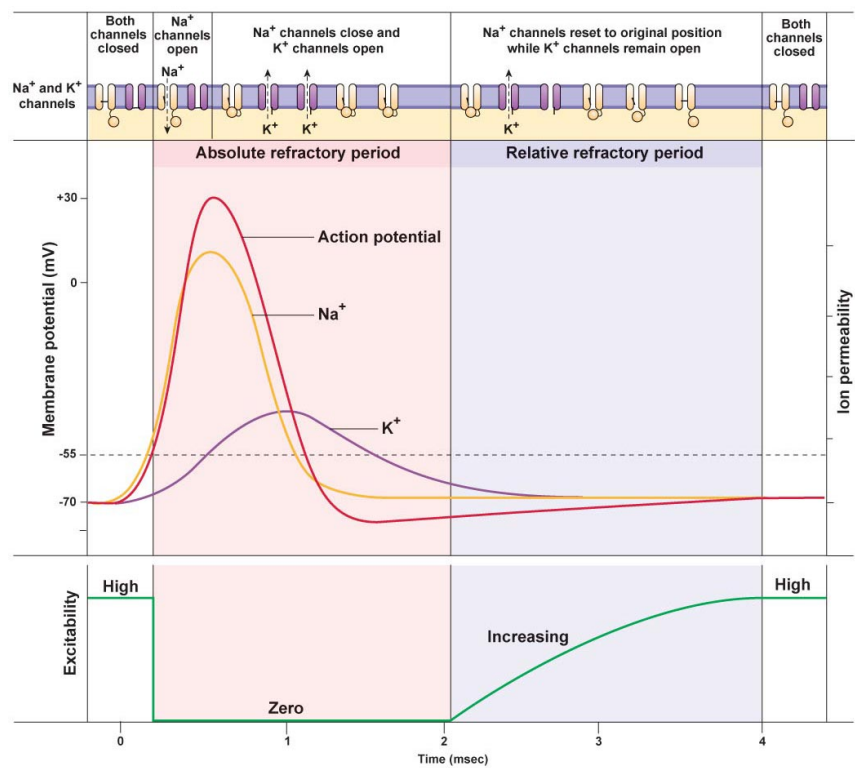


Figure 8-13

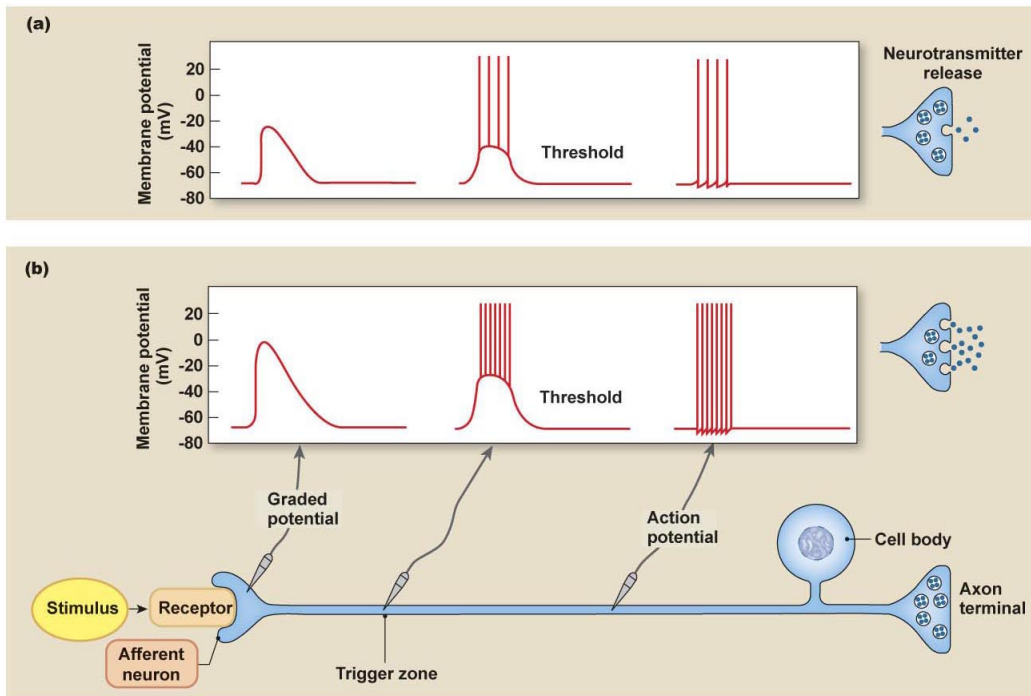


Figure 8-14

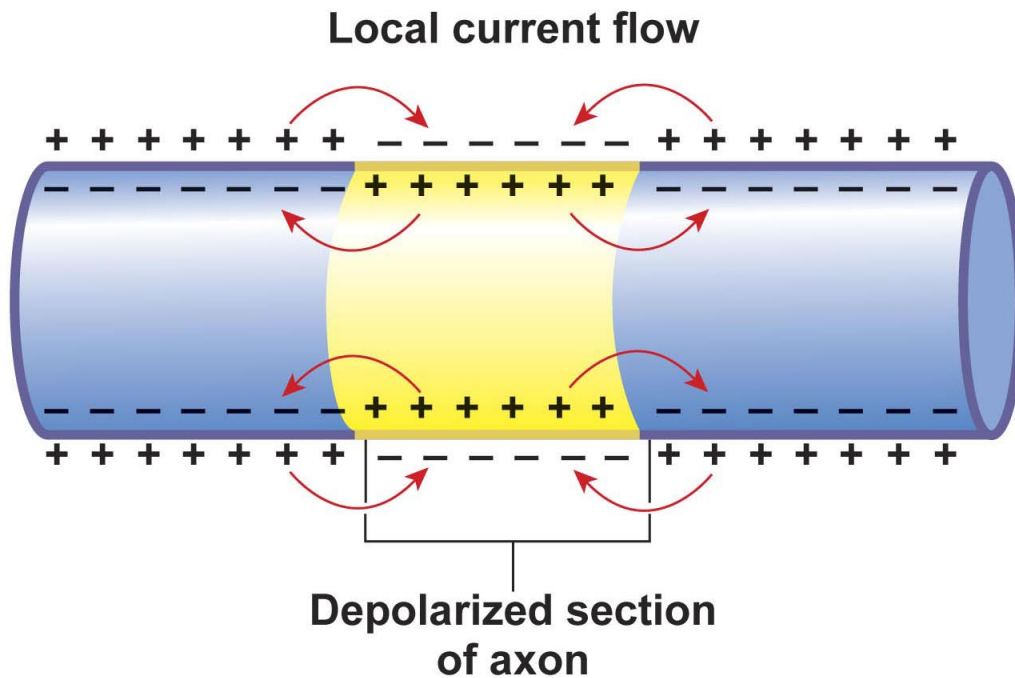
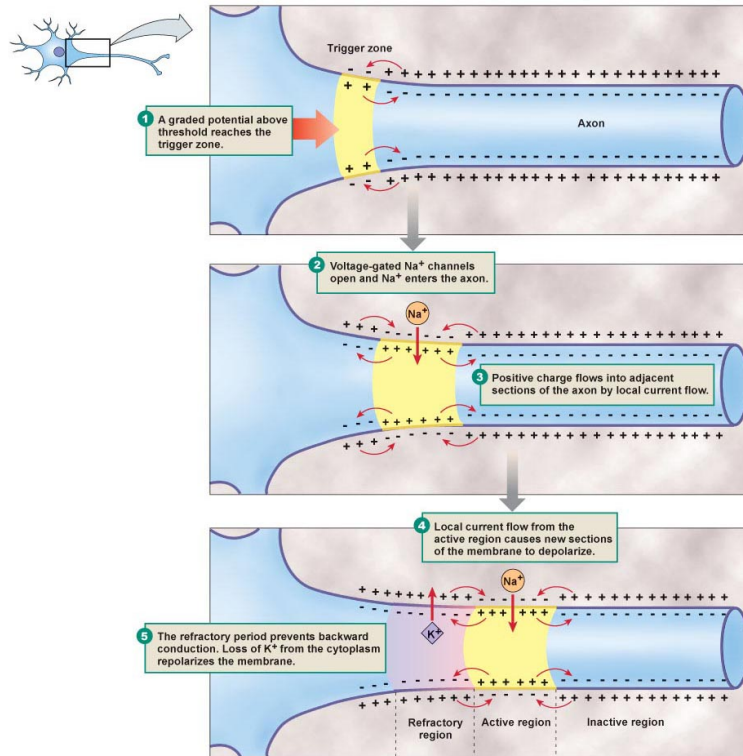


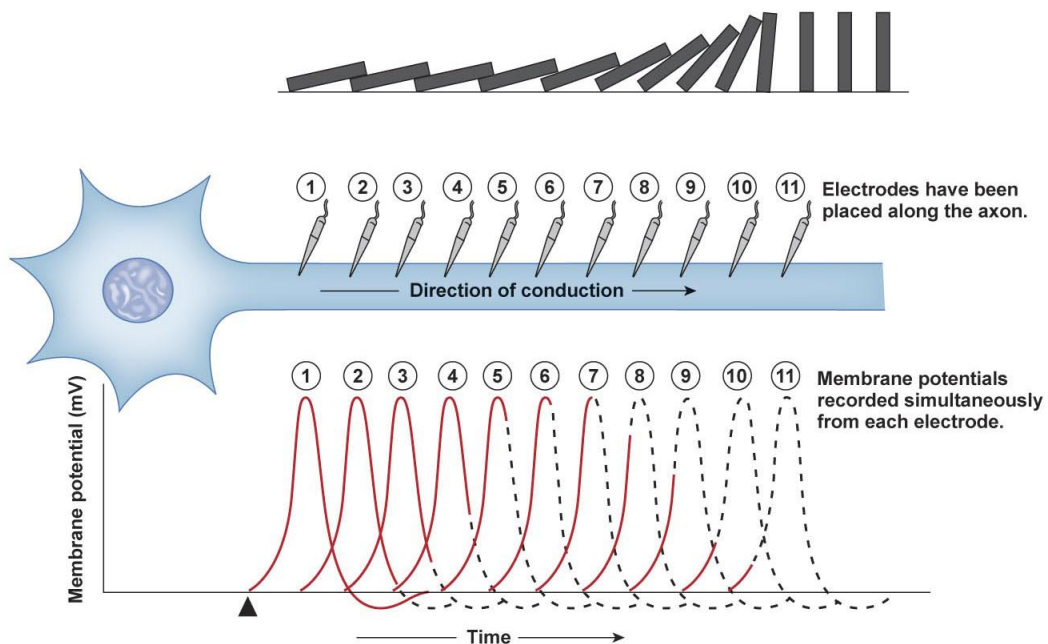
Figure 8-15, overview



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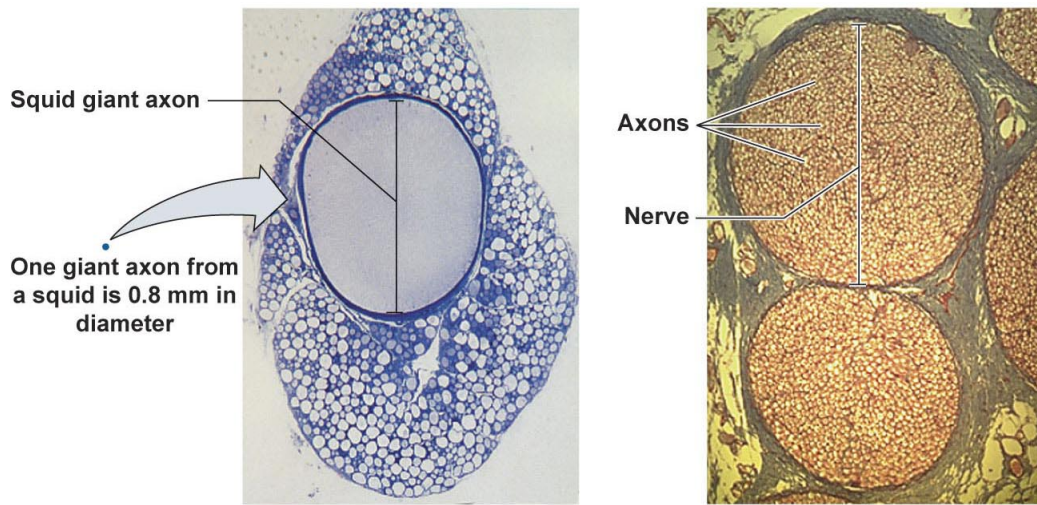
Figure 8-16a-b



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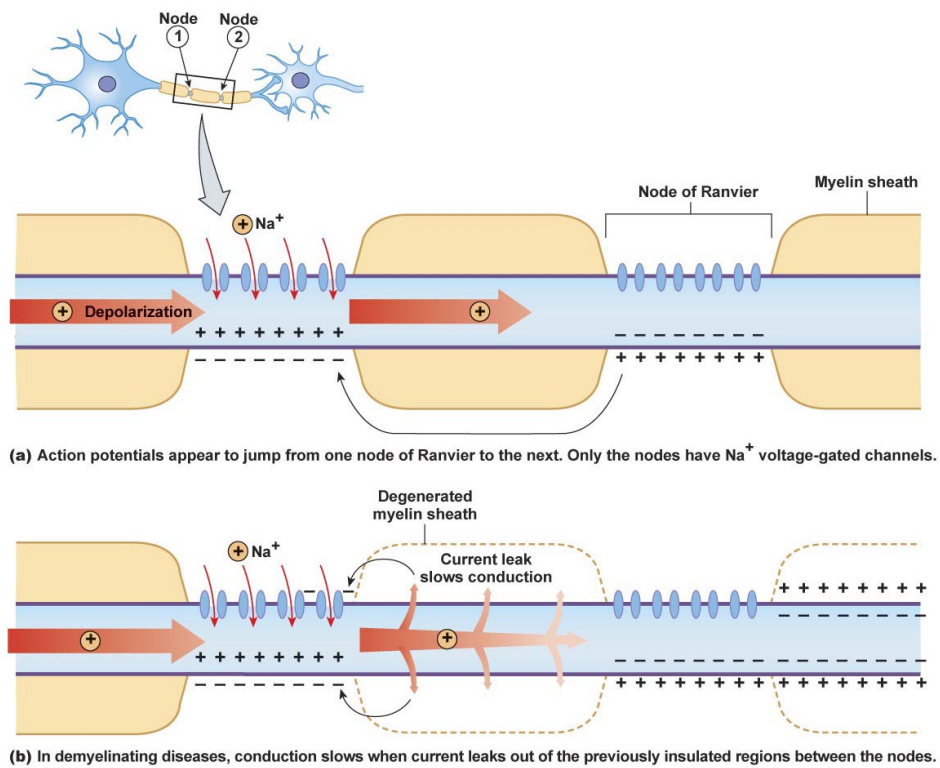
Figure 8-17



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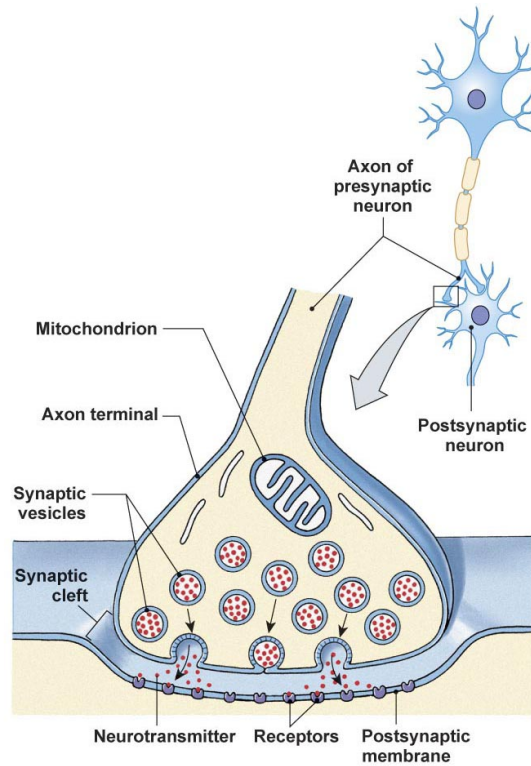
Figure 8-18



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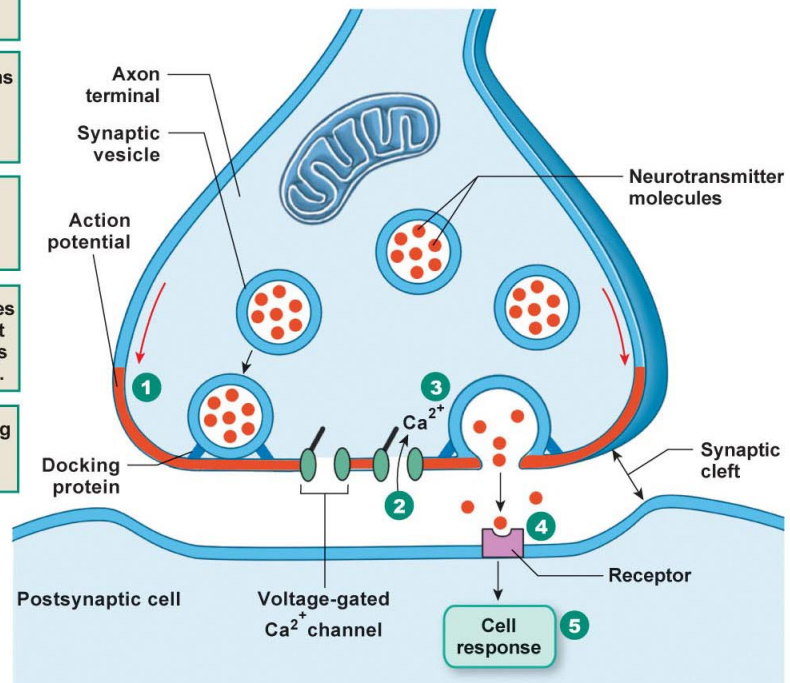
Figure 8-20



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Figure 8-21, overview

- 1 An action potential depolarizes the axon terminal.
- 2 The depolarization opens voltage-gated Ca^{2+} channels and Ca^{2+} enters the cell.
- 3 Calcium entry triggers exocytosis of synaptic vesicle contents.
- 4 Neurotransmitter diffuses across the synaptic cleft and binds with receptors on the postsynaptic cell.
- 5 Neurotransmitter binding initiates a response in the postsynaptic cell.



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Figure 8-22, overview

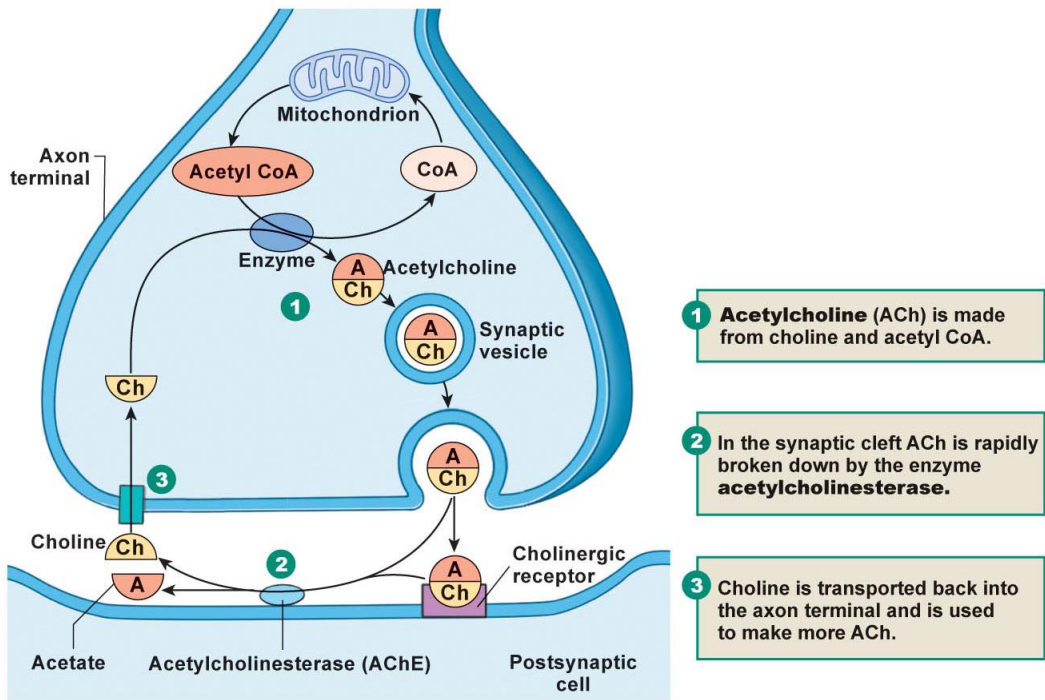


Figure 8-23

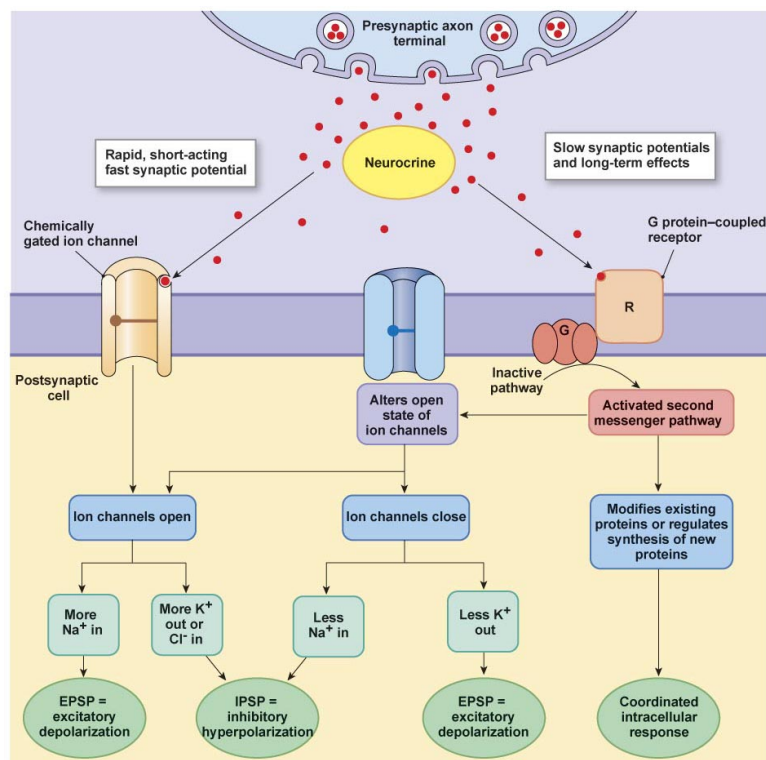
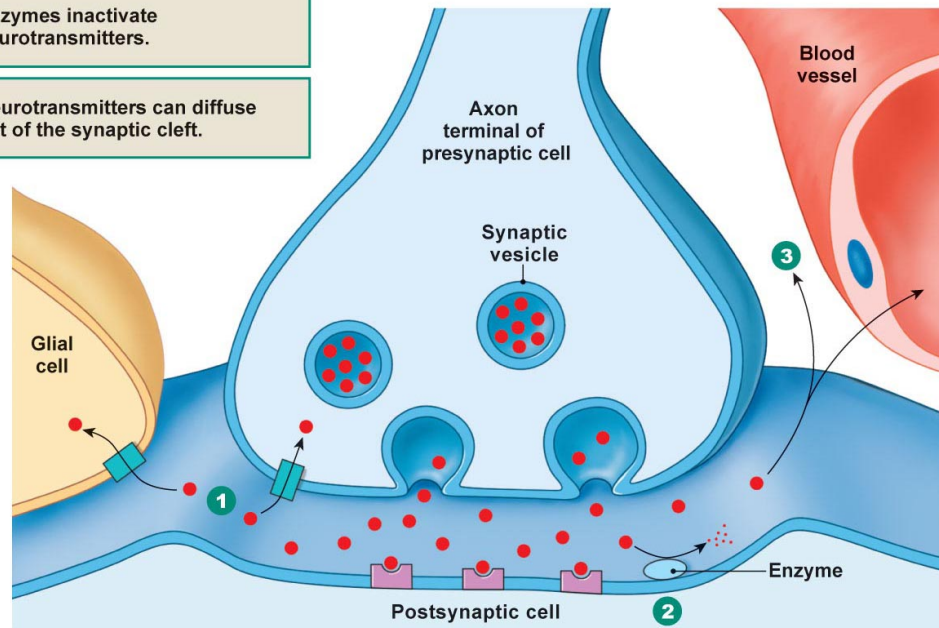


Figure 8-24, overview

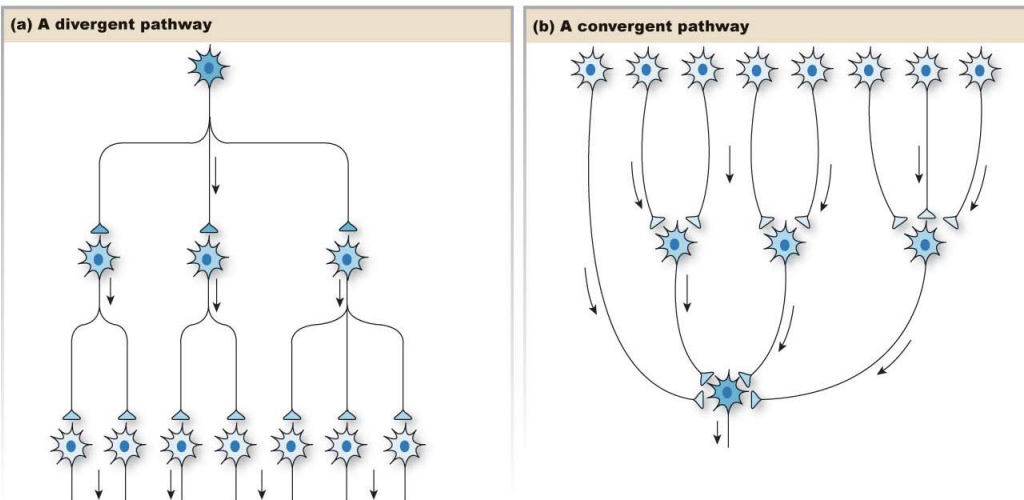
- 1 Neurotransmitters can be returned to axon terminals for reuse or transported into glial cells.
- 2 Enzymes inactivate neurotransmitters.
- 3 Neurotransmitters can diffuse out of the synaptic cleft.



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Figure 8-25



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Figure 8-26

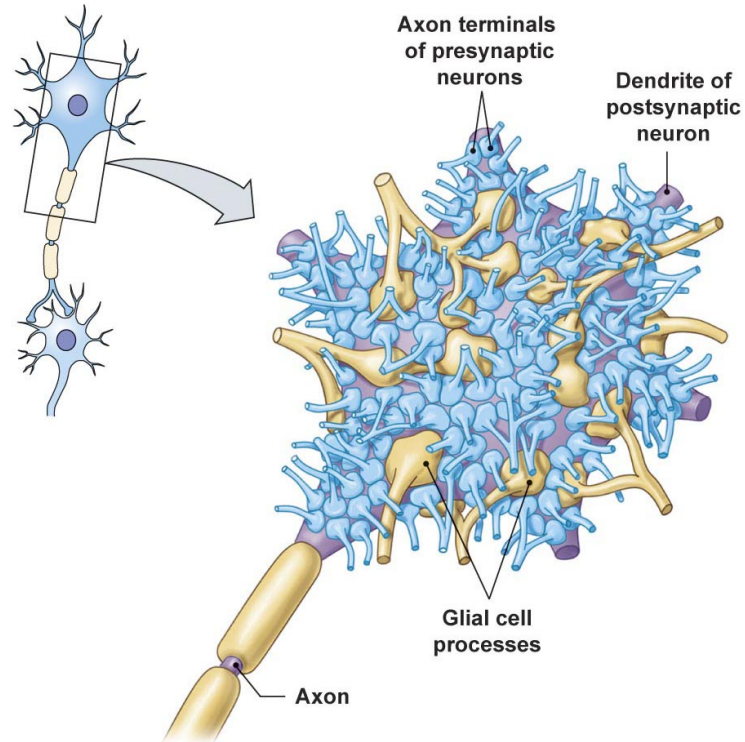


Figure 8-28a, overview

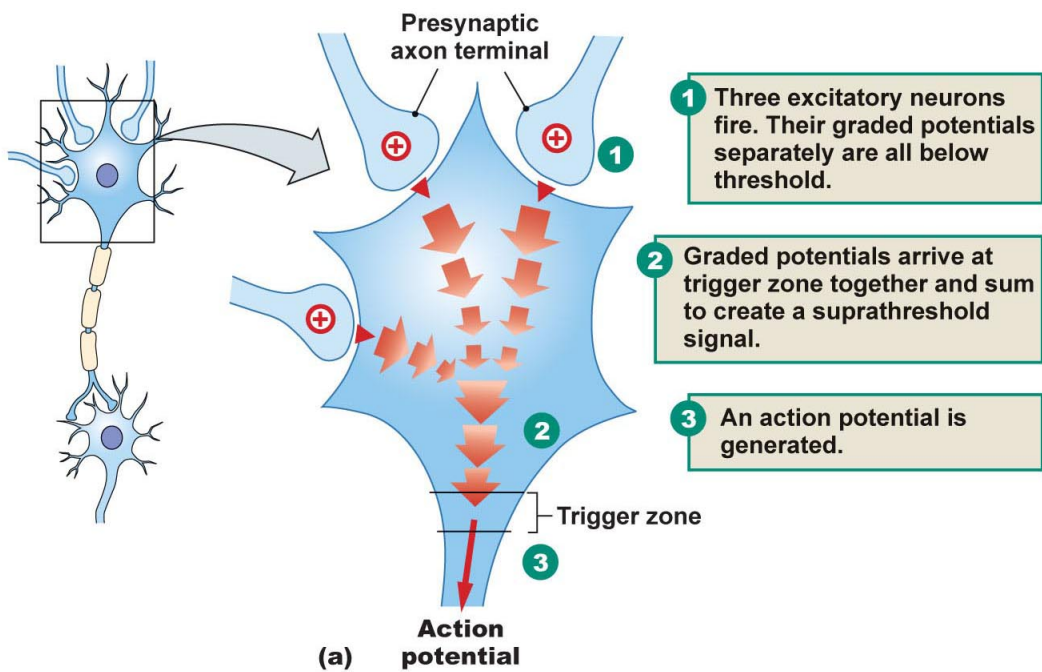


Figure 8-28b, overview

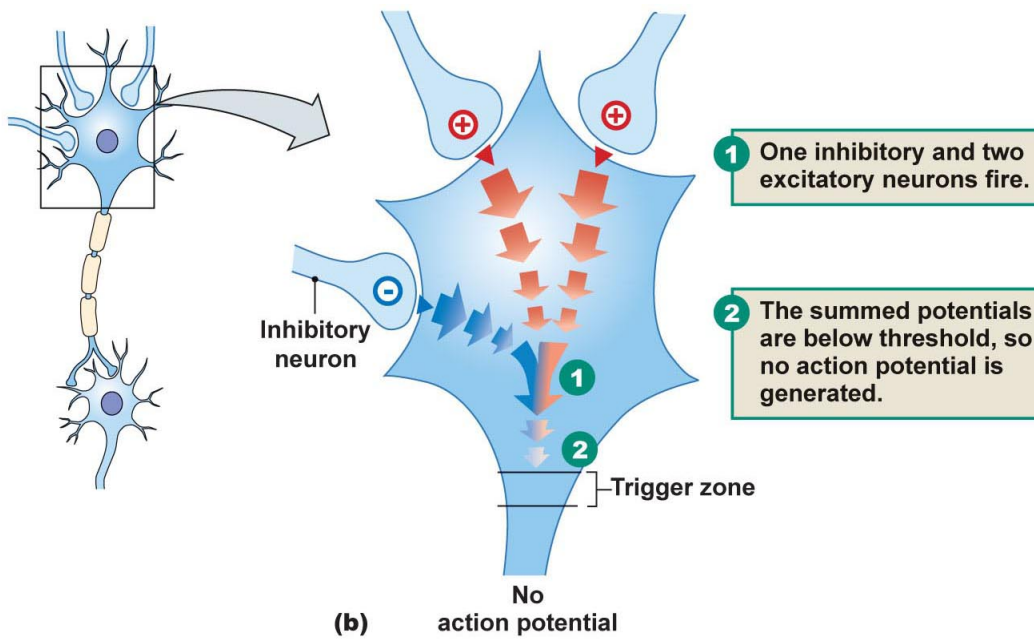


Figure 8-29

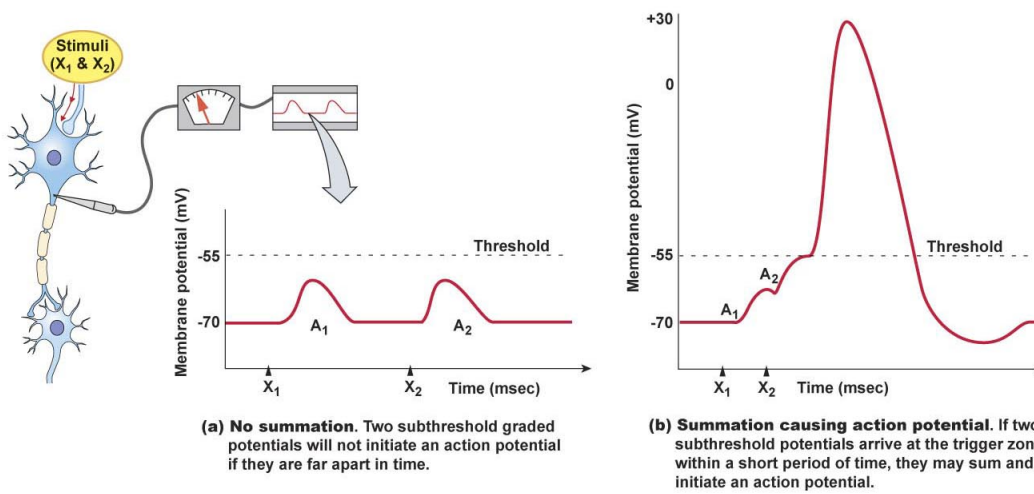


Figure 8-31, overview

