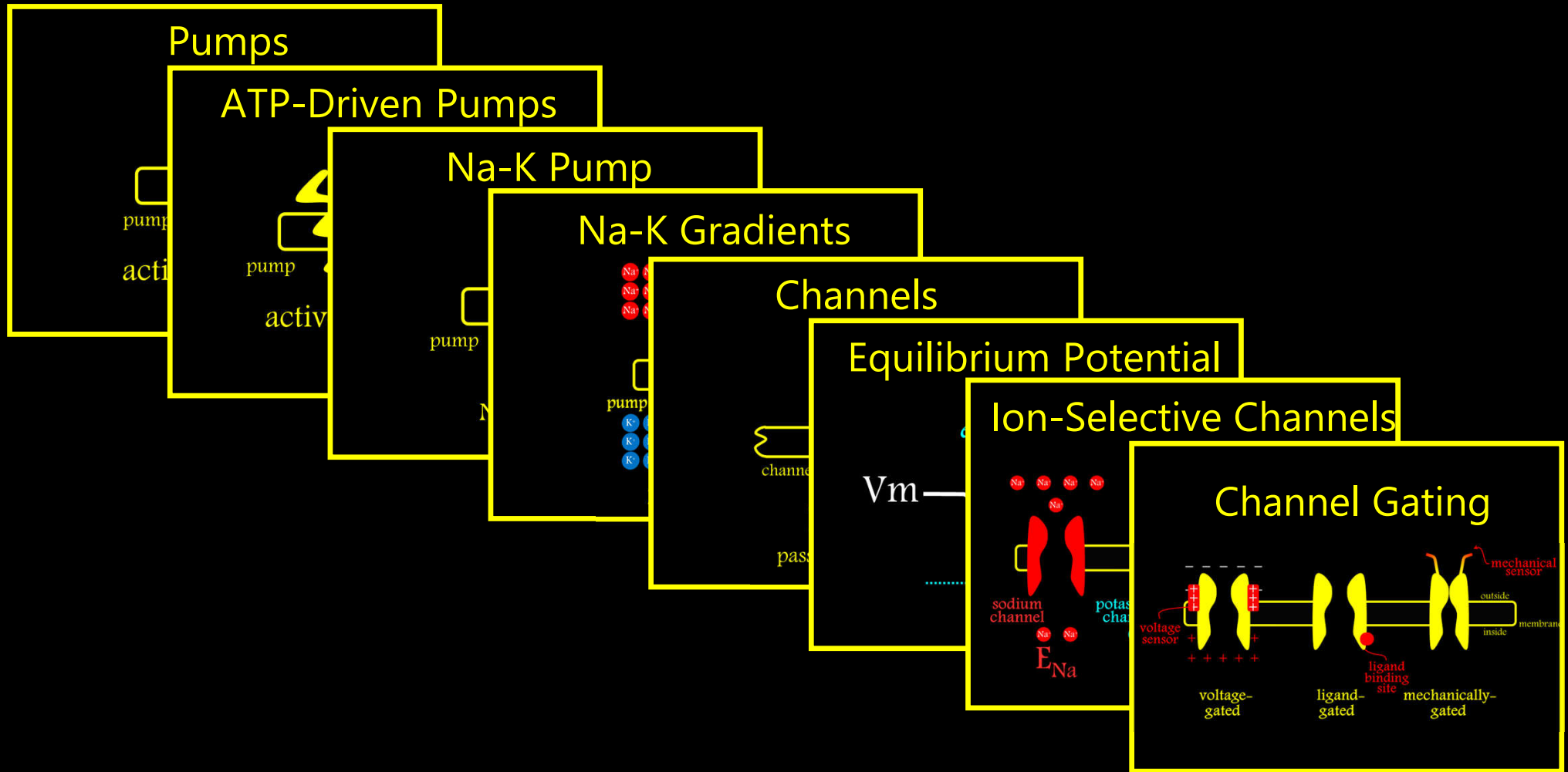


Hiring:
I need a
room

Cleaver
Knock for details!

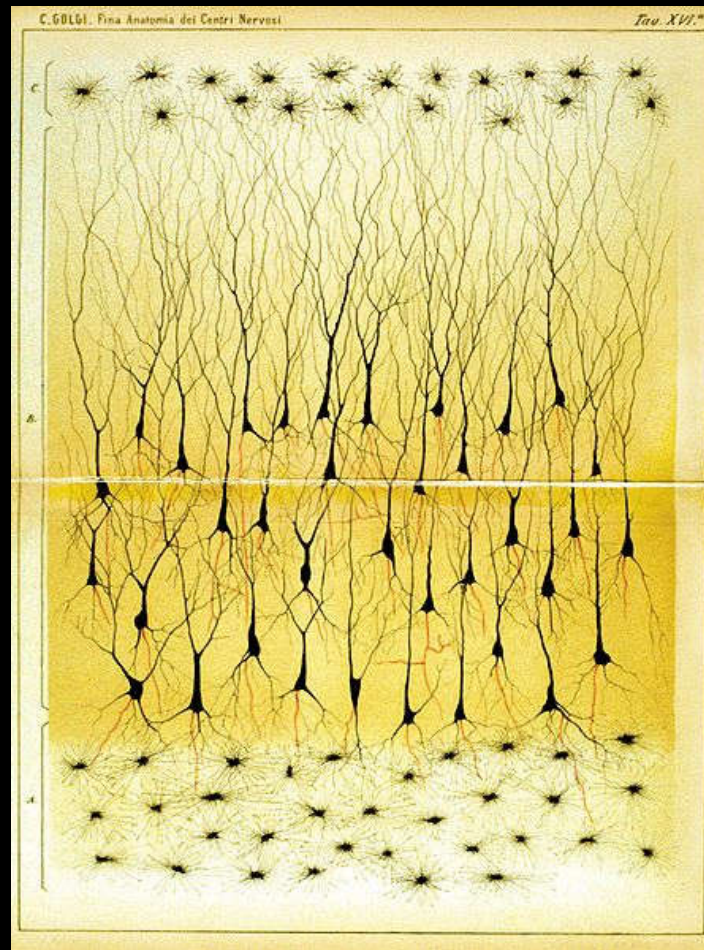
Ion Channels & Cellular Electrophysiology



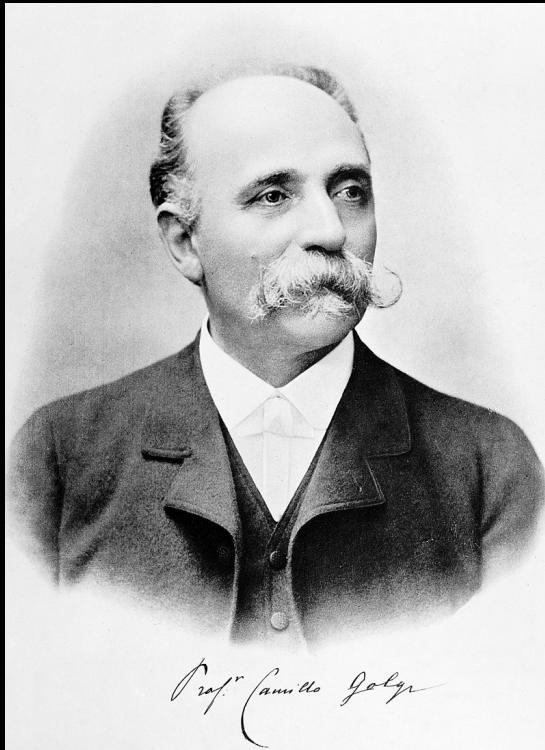
Synaptic Transmission & Neurotransmitter Receptors



Two Ways Neurons Can Communicate



Two Ways Neurons Can Communicate

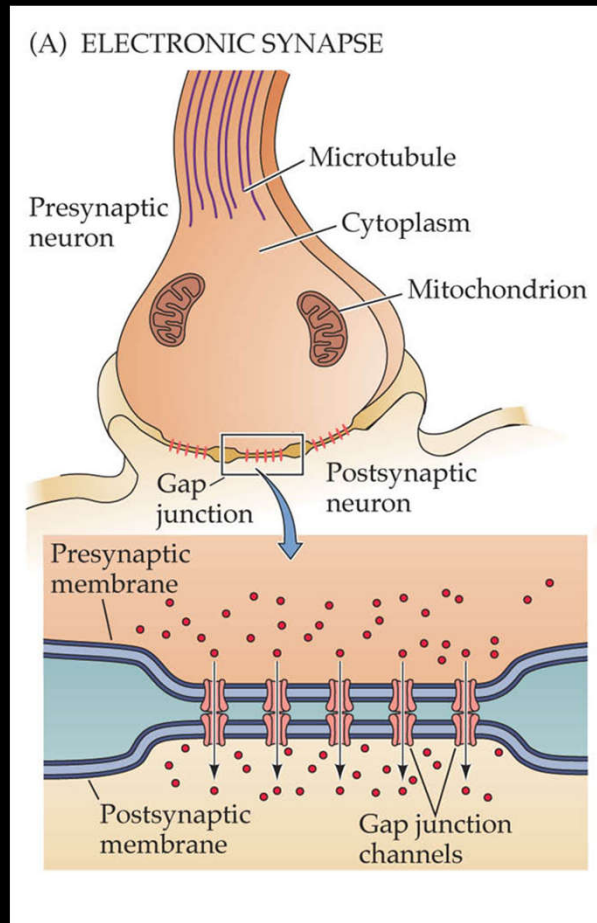


Camillo Golgi

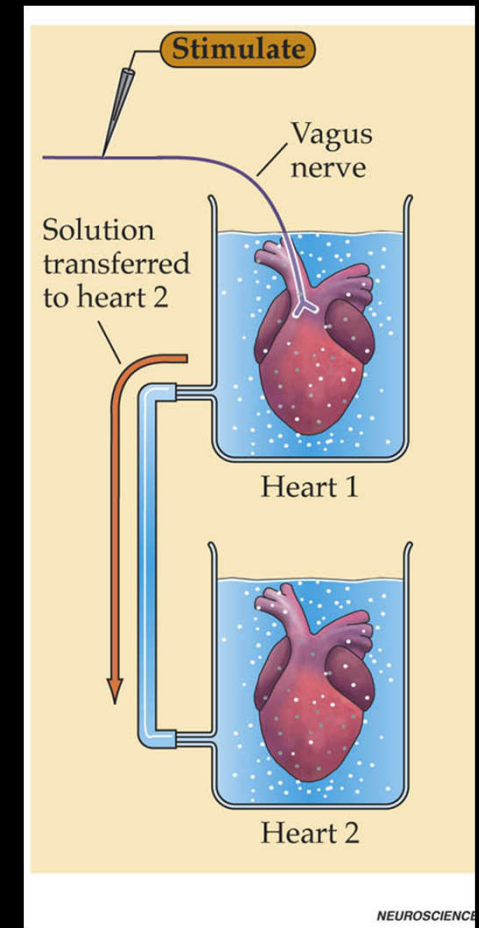
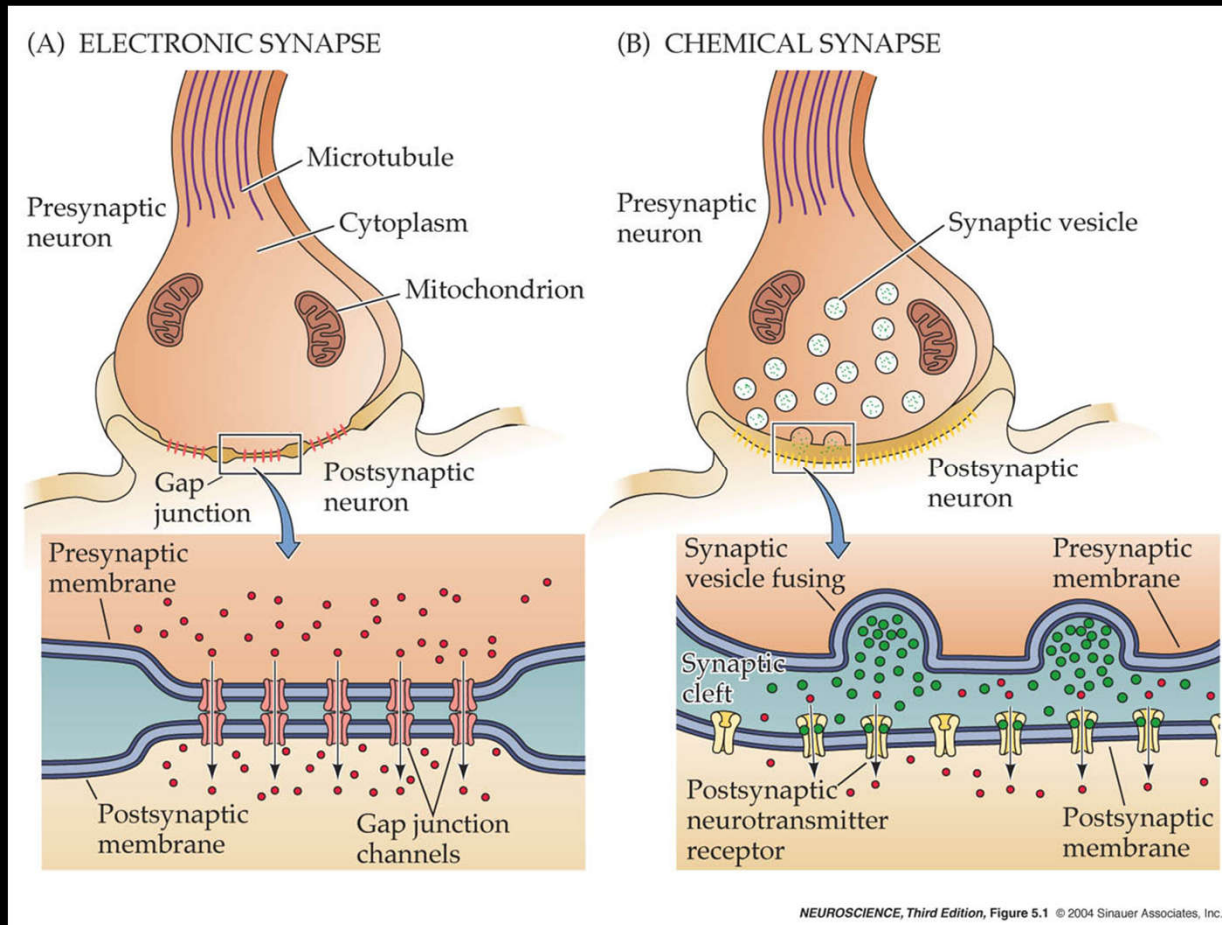


Santiago Ramon y Cajal

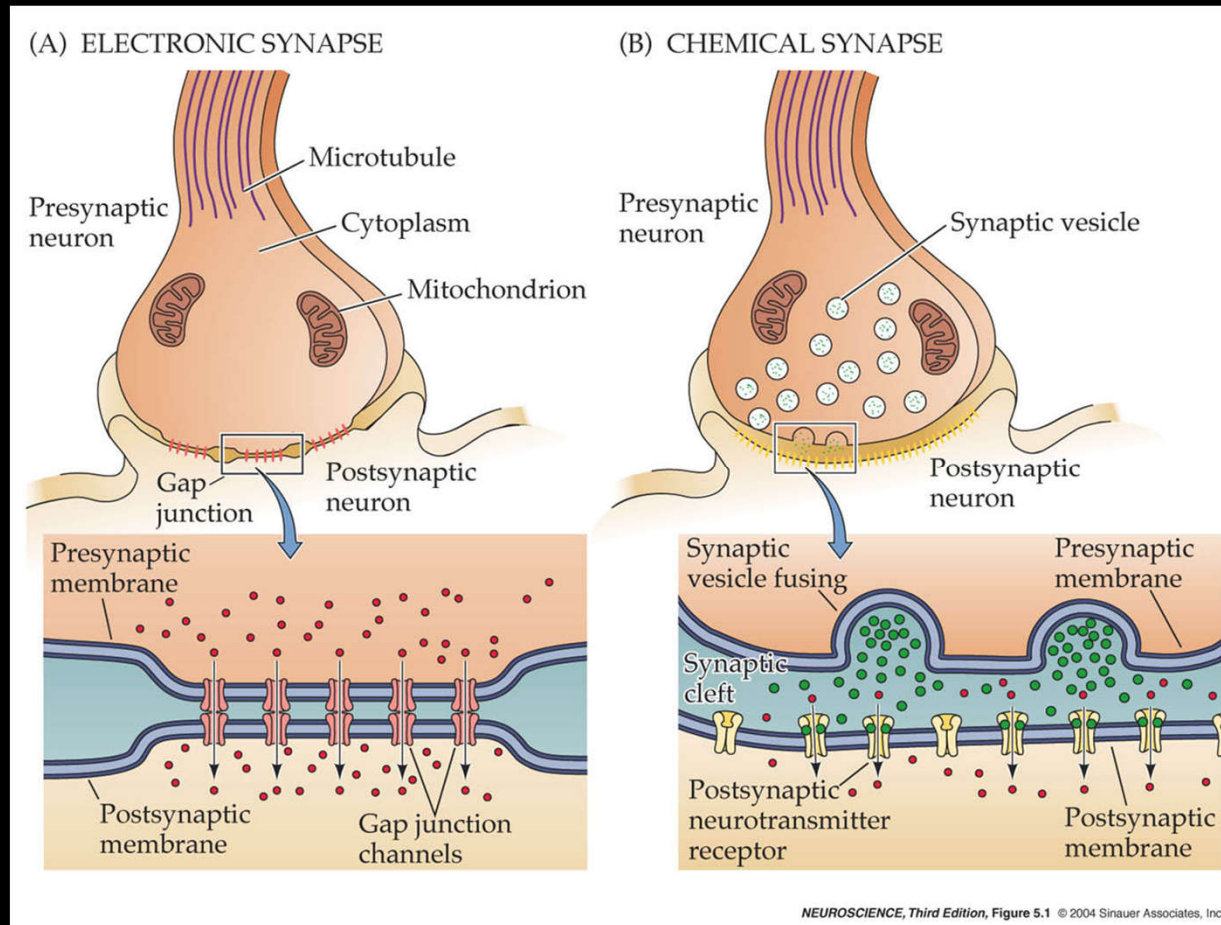
Two Ways Neurons Can Communicate



Two Ways Neurons Can Communicate

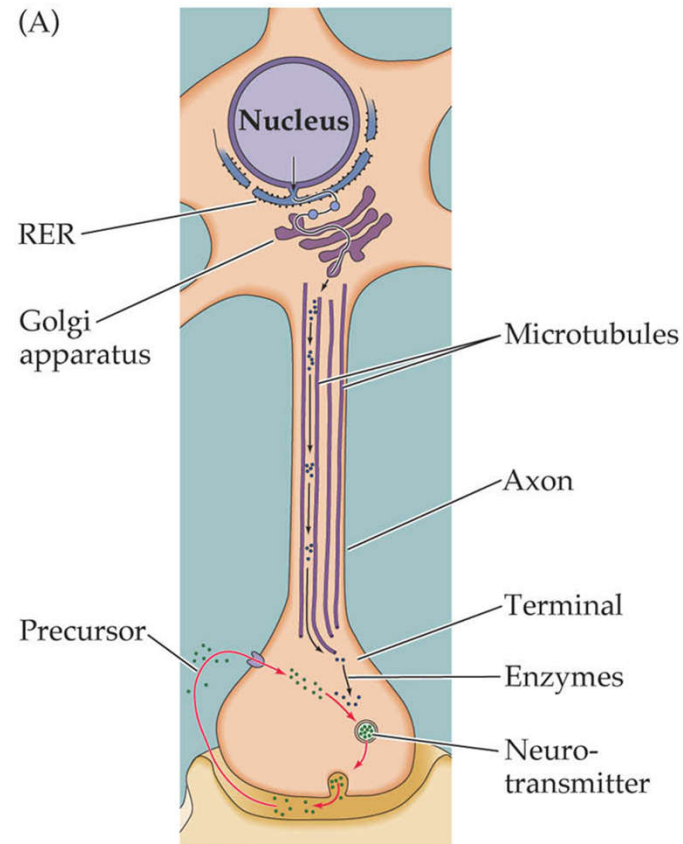


Two Ways Neurons Can Communicate

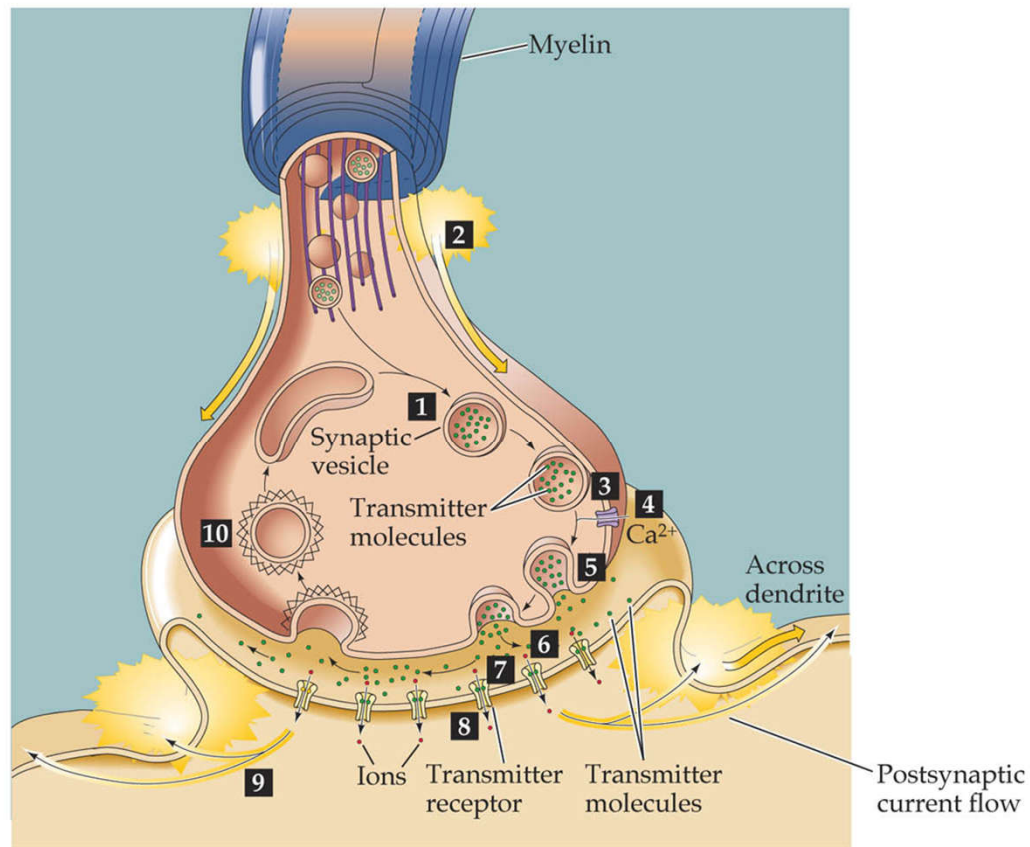


Otto Loewi

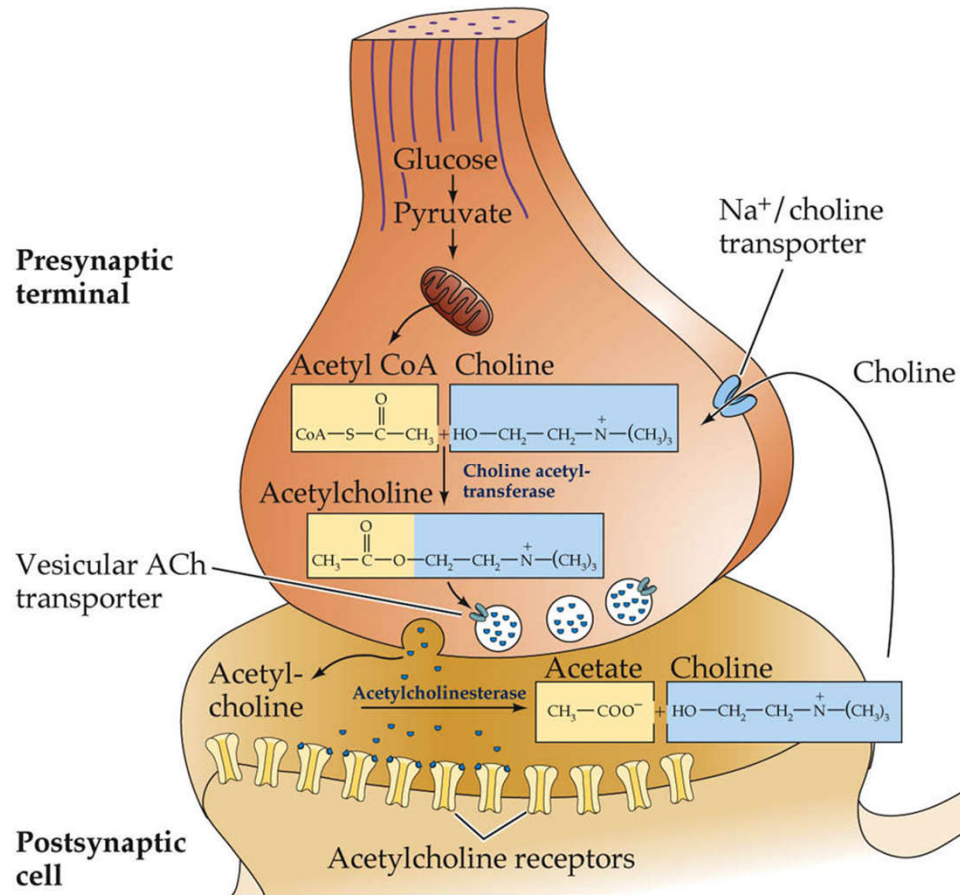
Special Structures For Neurotransmission



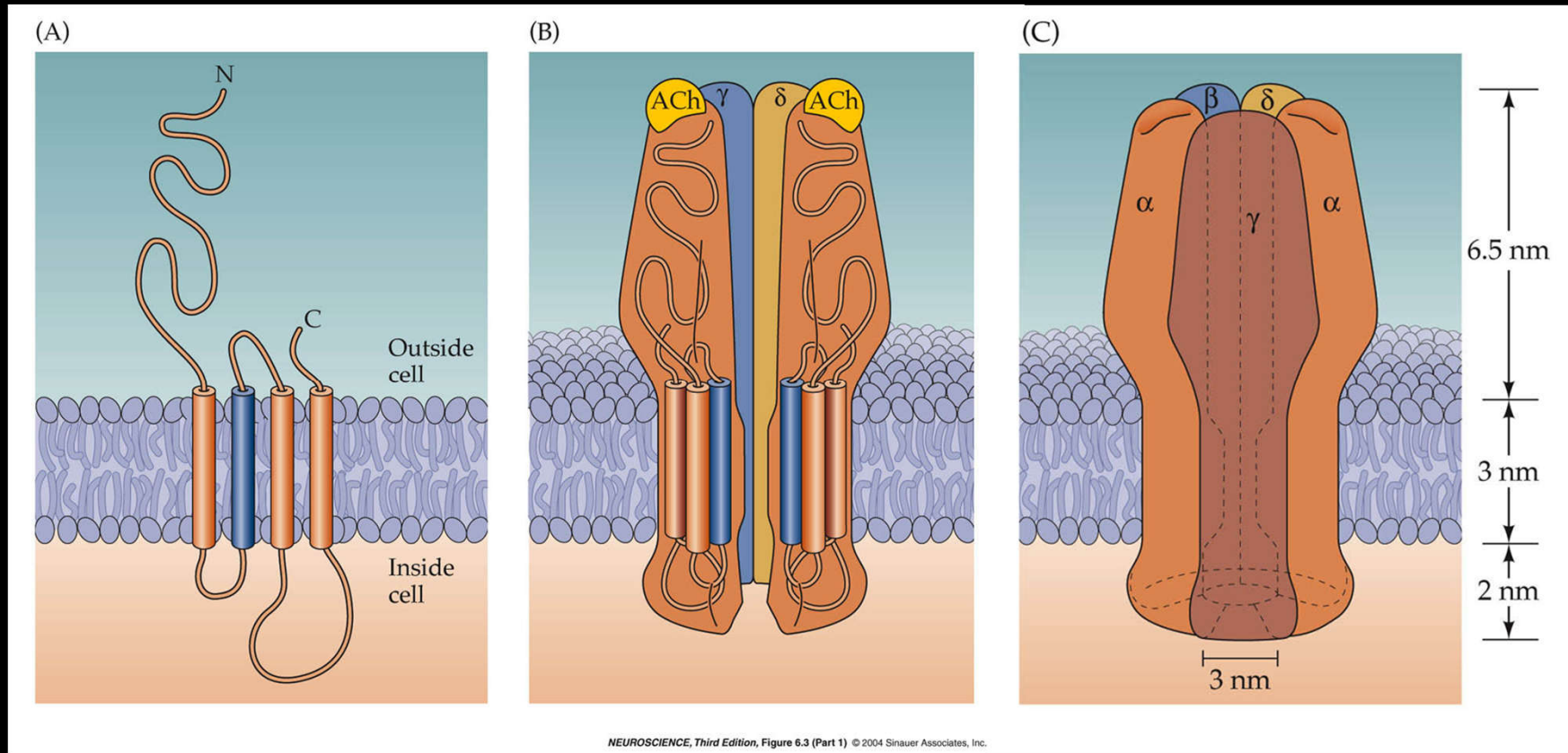
Steps of Neurotransmission



Cholinergic Synapse

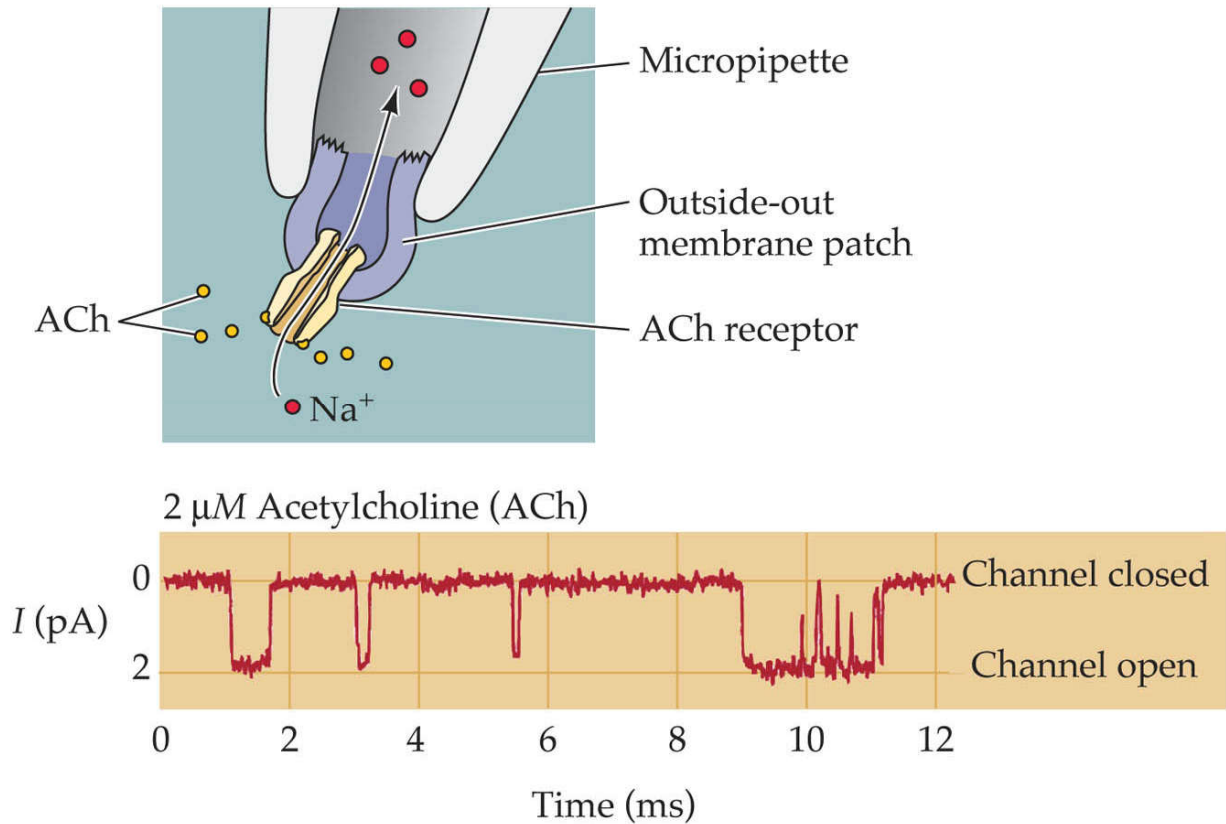


Acetylcholine Receptor



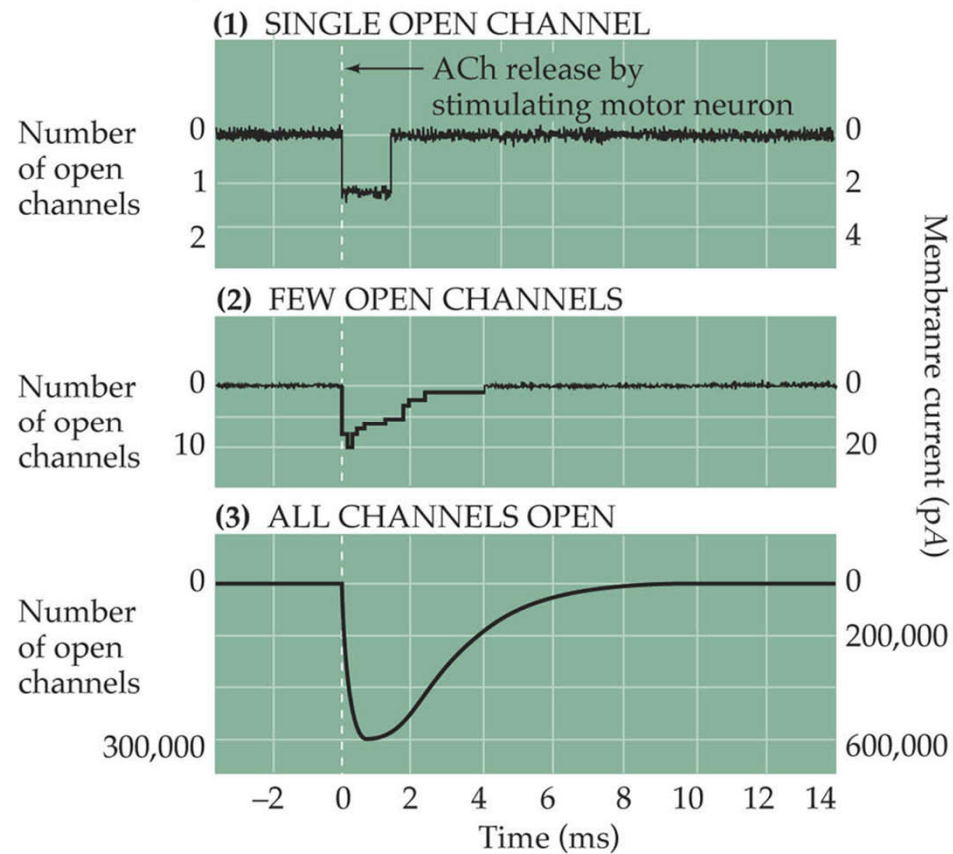
Cholinergic Currents

(A) Patch clamp measurement of single ACh receptor current

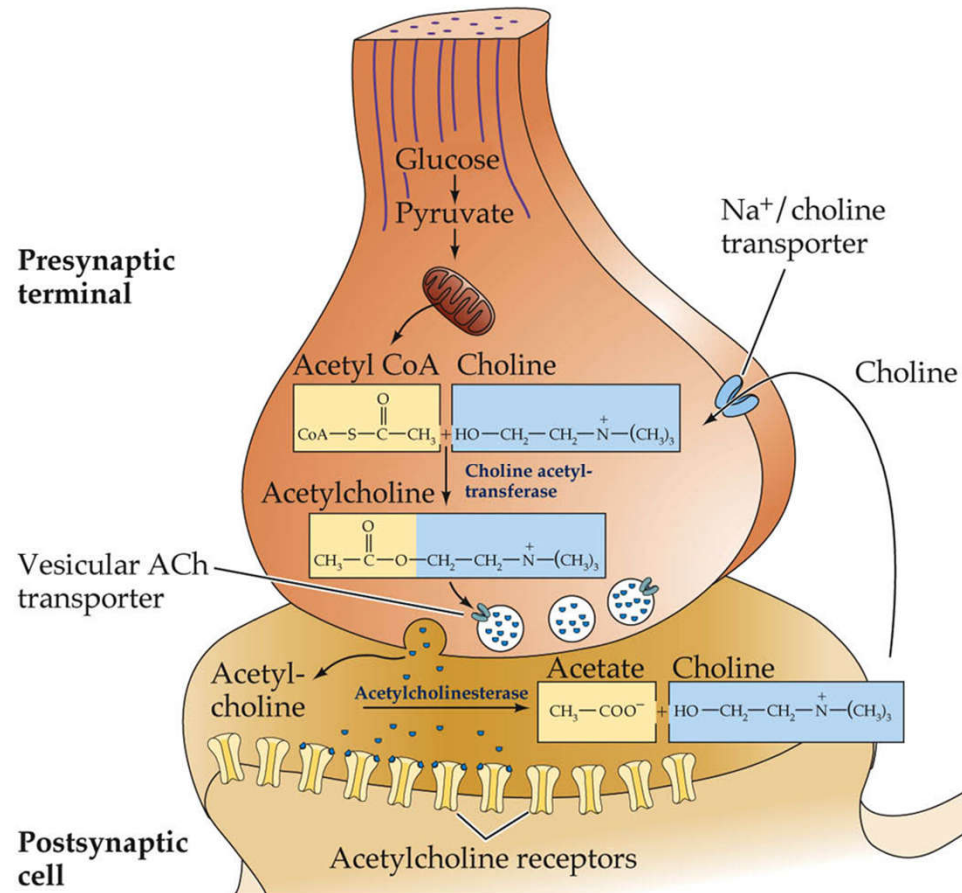


Cholinergic Currents

(B) Currents produced by:



Cholinergic Currents



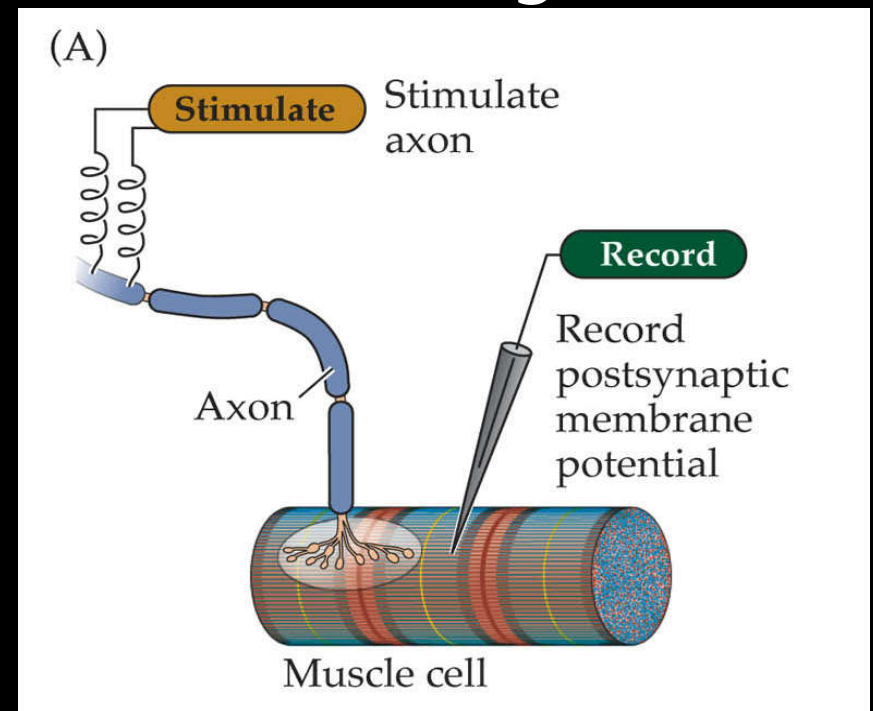
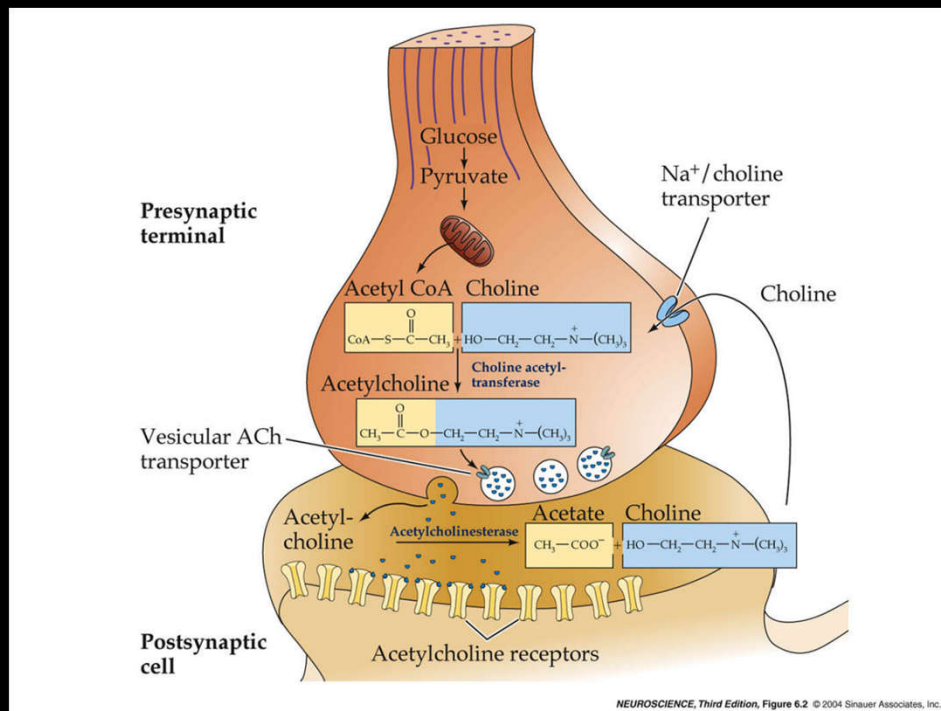
Recording Synapses

Presynaptic & Postsynaptic

Recording Synapses

Presynaptic & Postsynaptic

Voltage

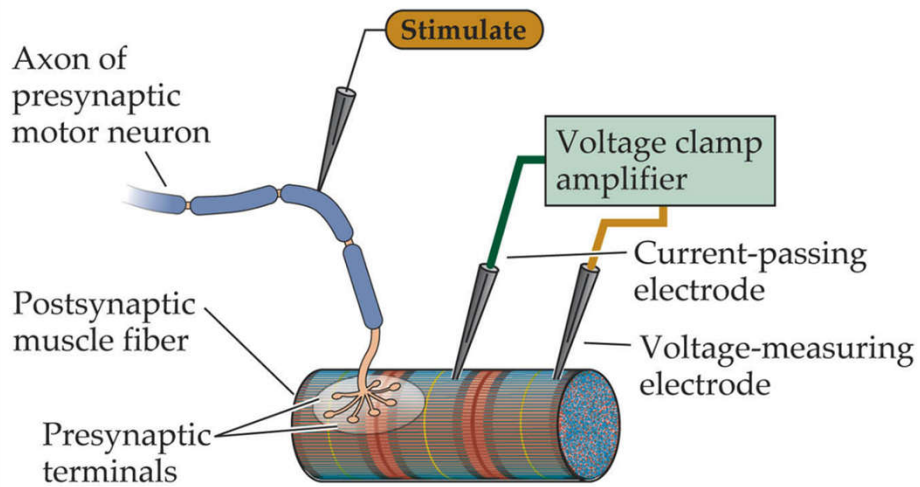


Recording Synapses

Presynaptic & Postsynaptic

Current

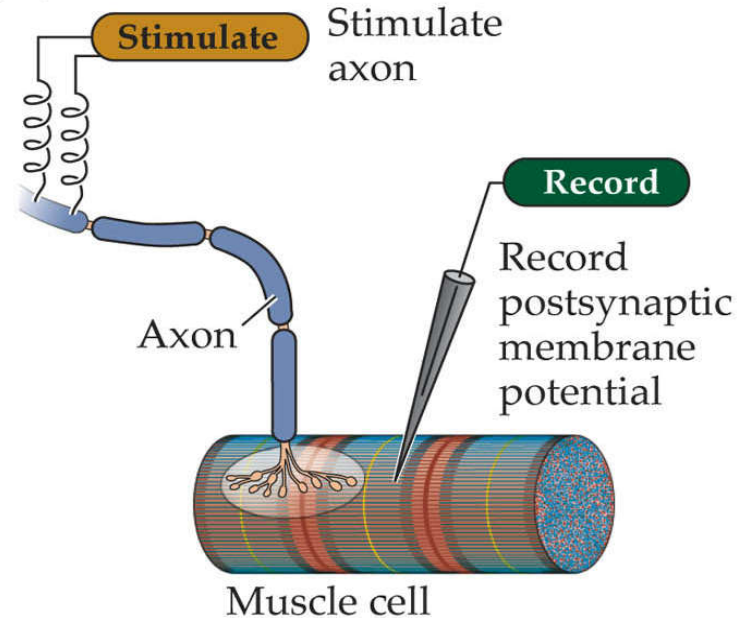
(A) Scheme for voltage clamping postsynaptic muscle fiber



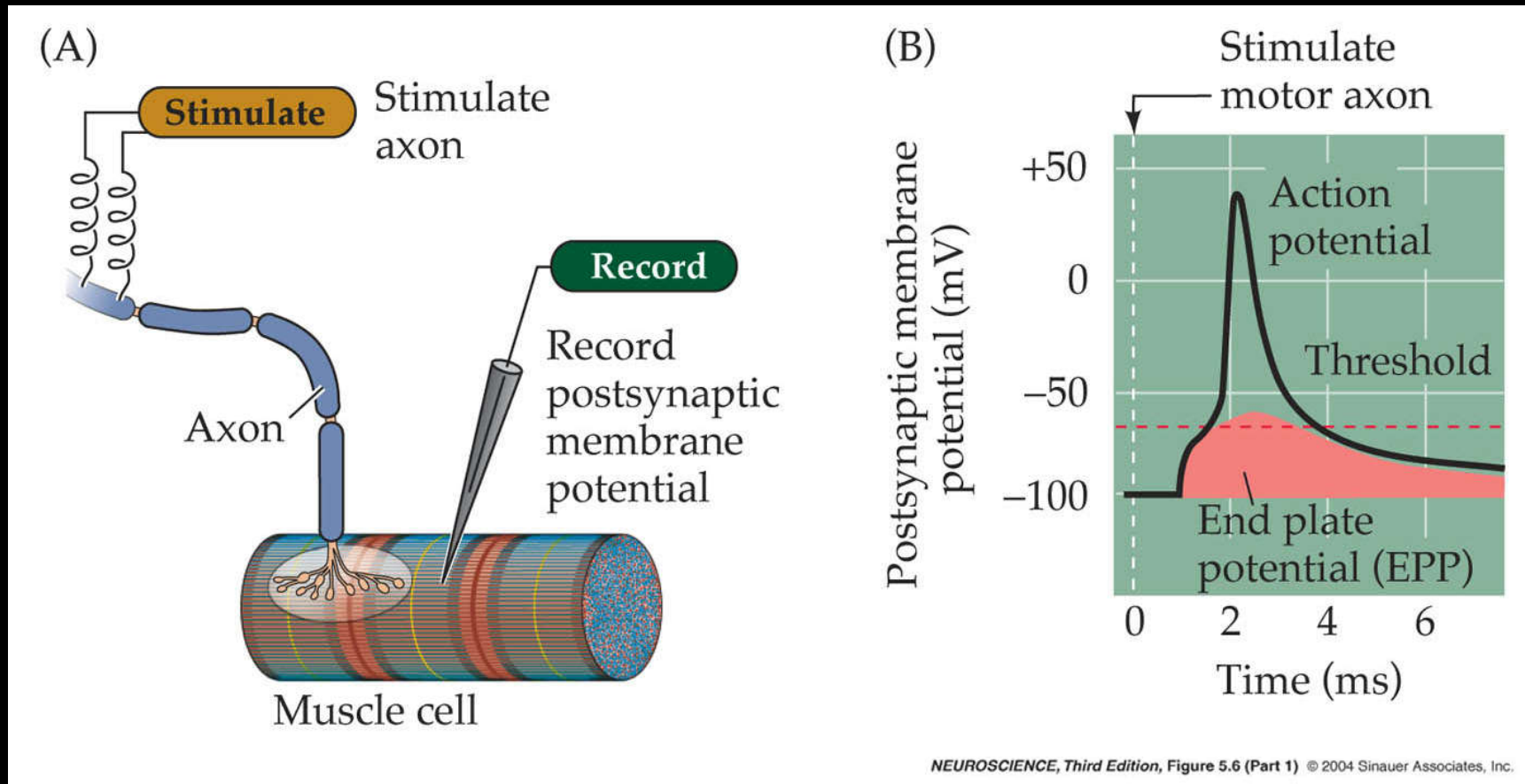
NEUROSCIENCE, Third Edition, Figure 5.16 (Part 1) © 2004 Sinauer Associates, Inc.

Voltage

(A)

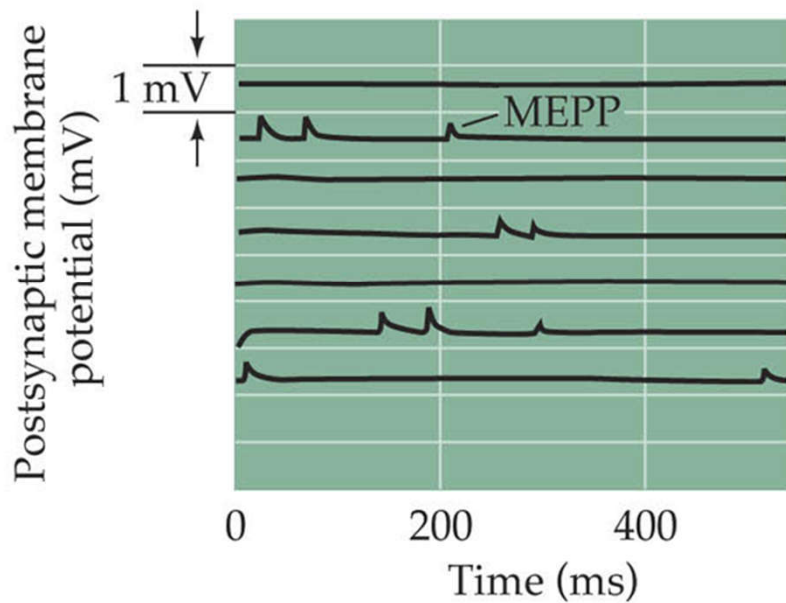


Neuromuscular Junction: Model for Synaptic Function

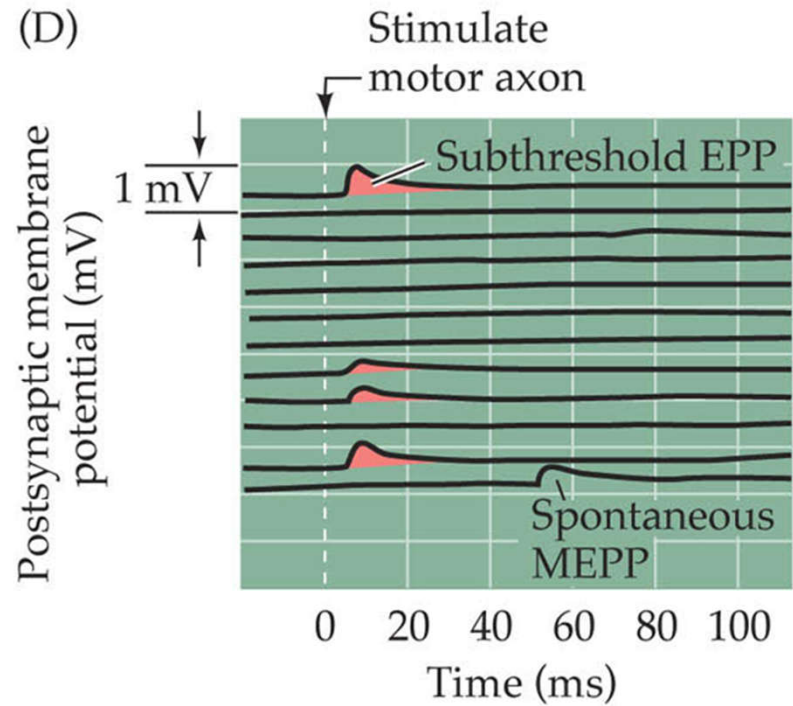


Muscle Recordings

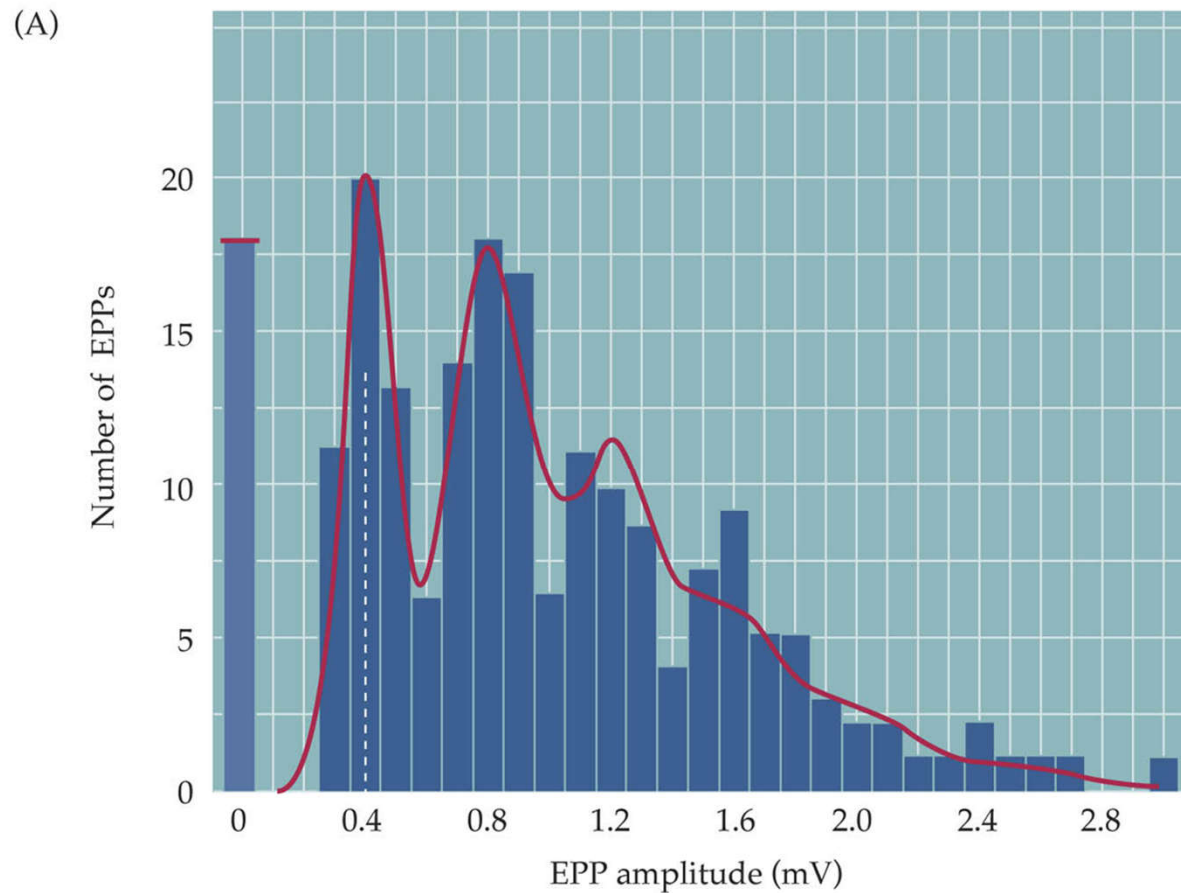
(C)



(D)

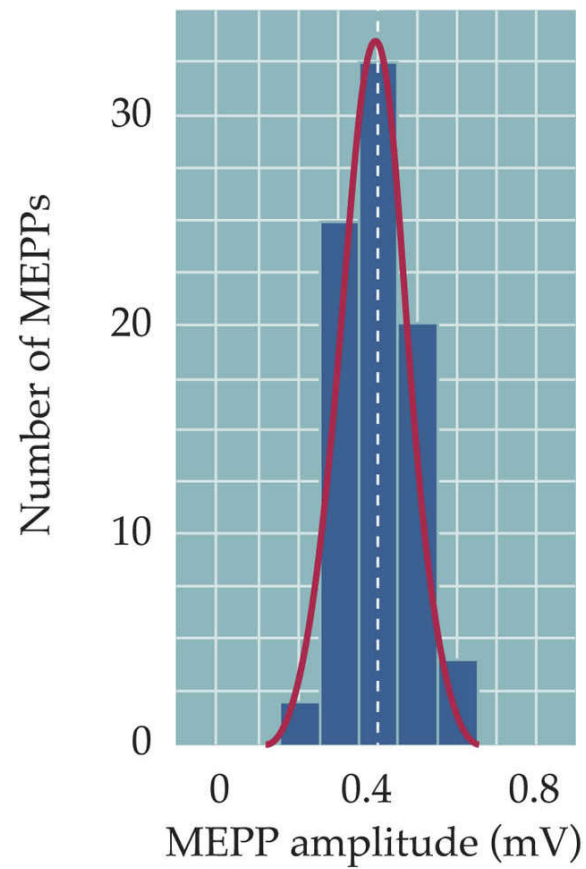


Distribution of EPP Amplitudes

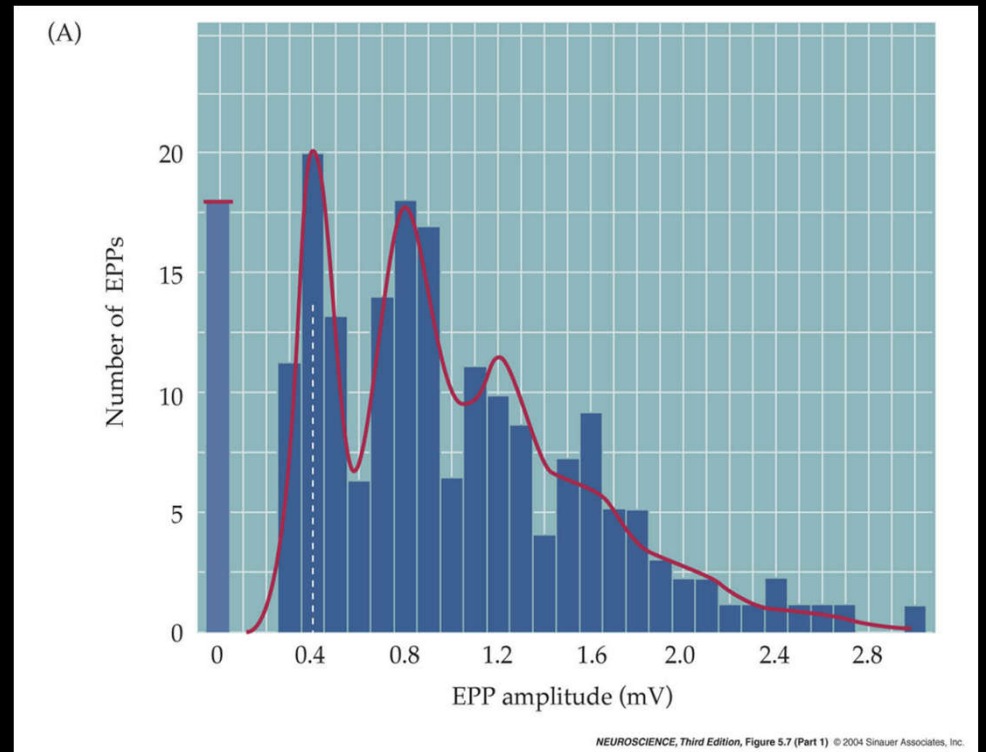
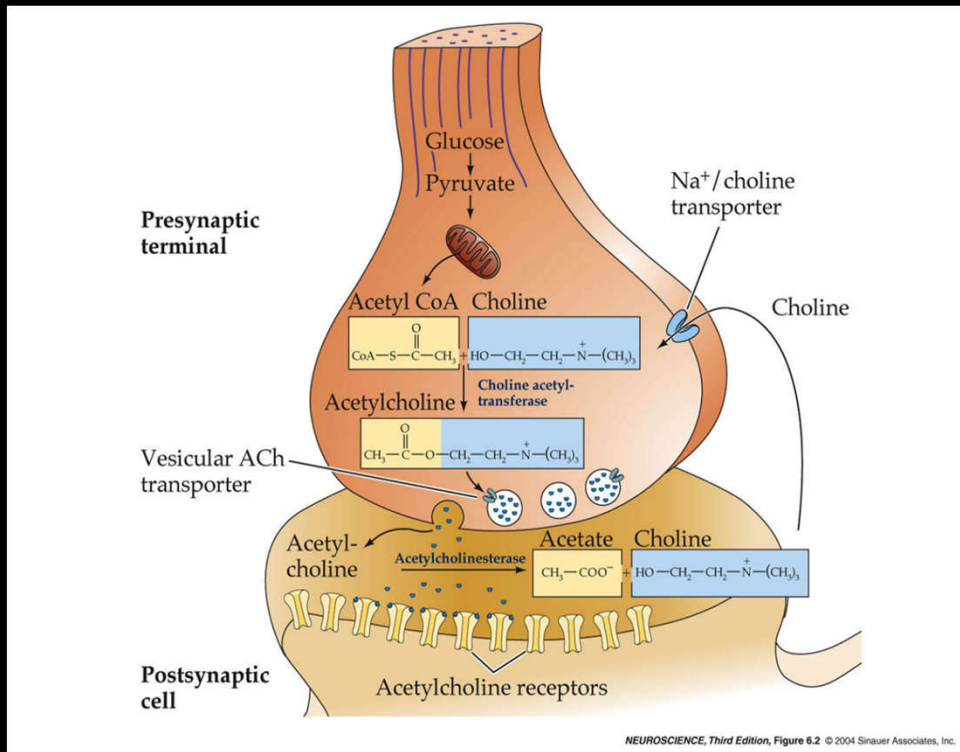


Quantal Transmission

(B)



Quanta Represent Single Vesicles

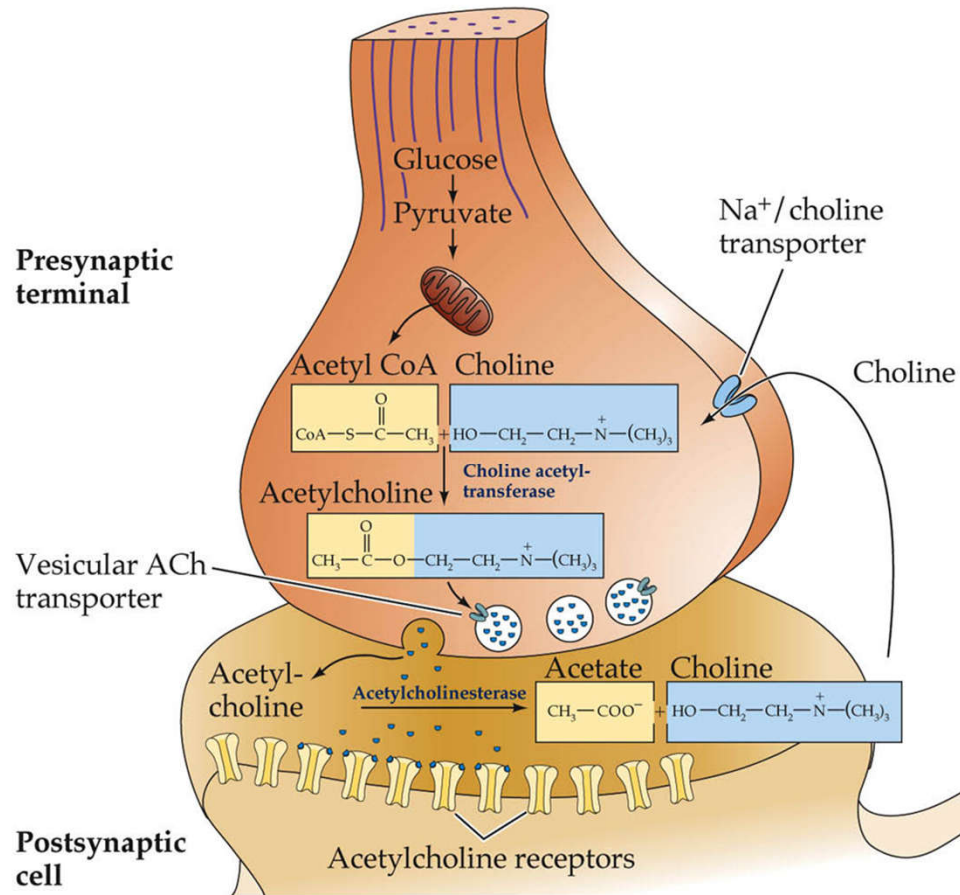


Vesicles at a Real Synapse

(B)

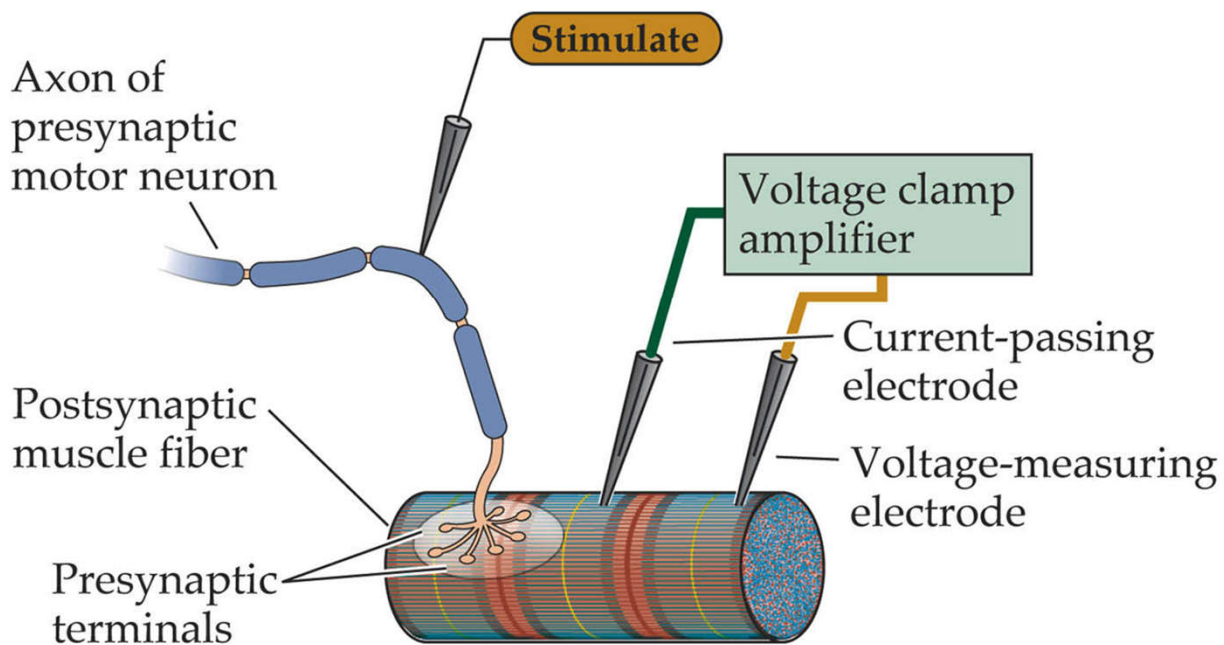


Cholinergic Synapse



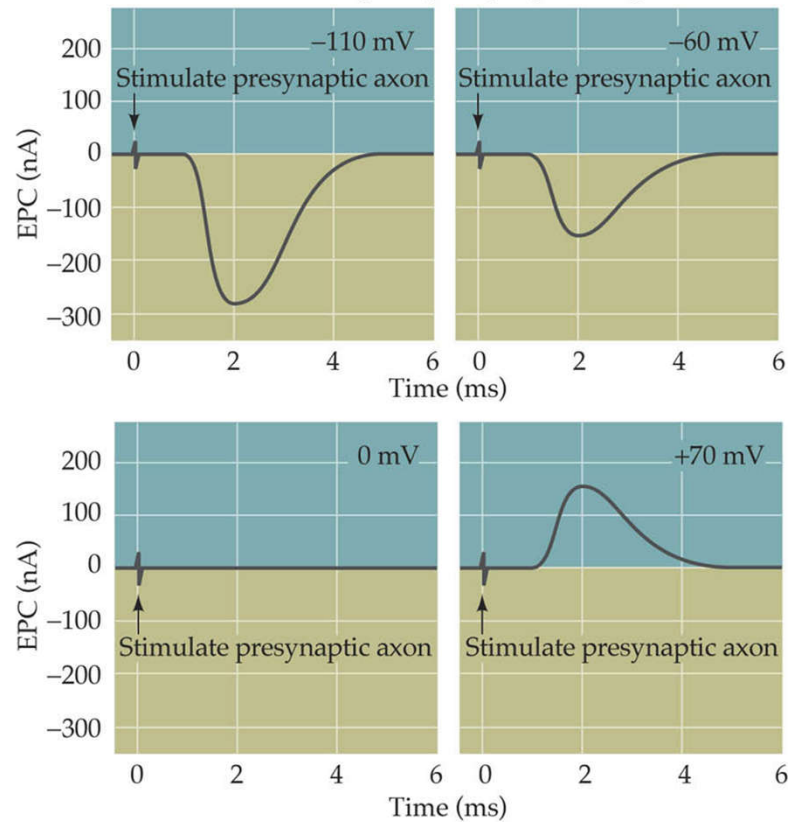
Recording Synaptic Currents

(A) Scheme for voltage clamping postsynaptic muscle fiber

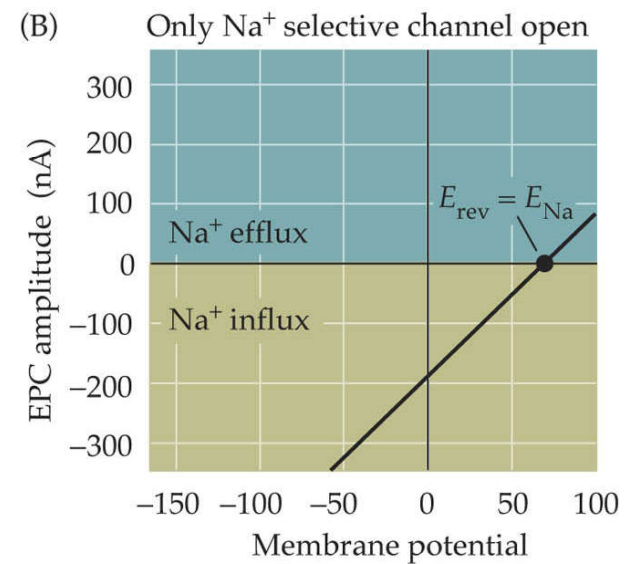
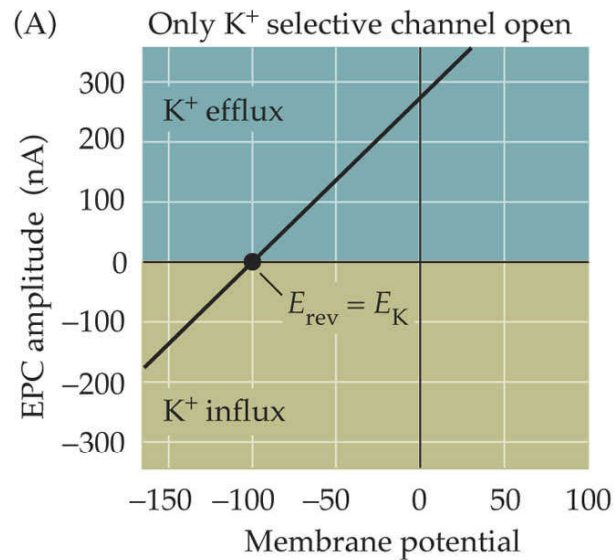


Membrane Potential Determines Current Flow

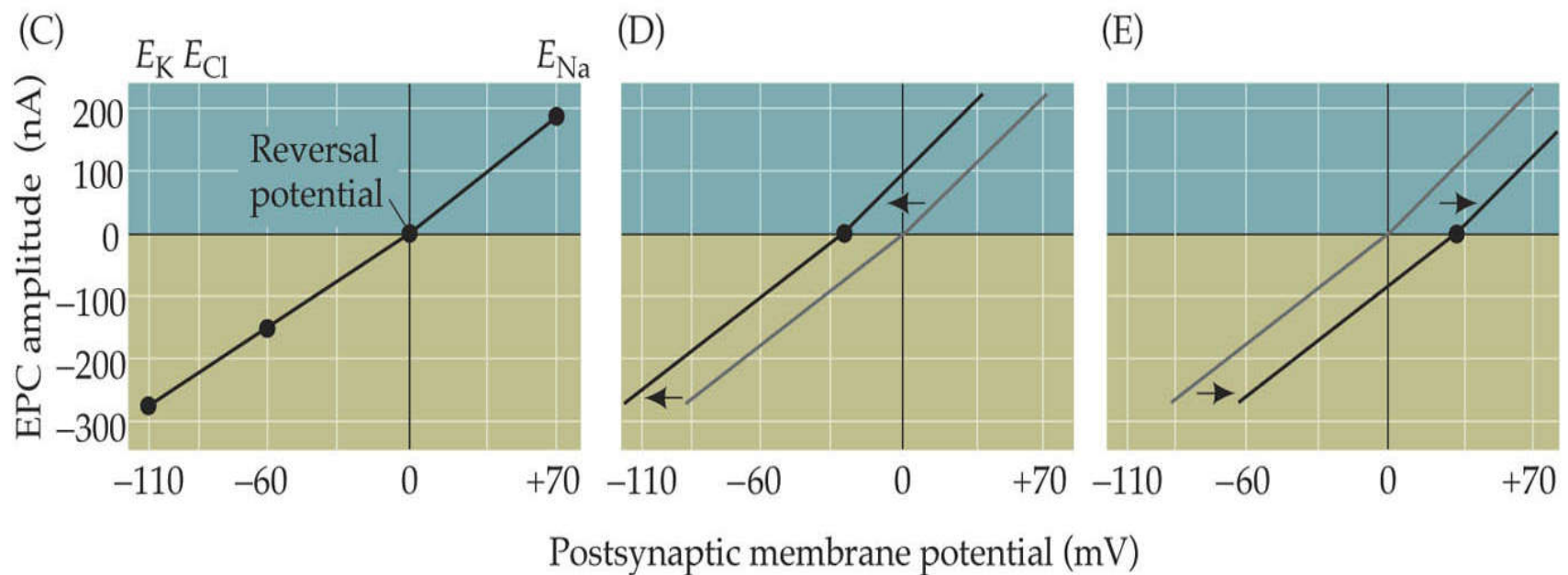
(B) Effect of membrane voltage on postsynaptic end plate currents



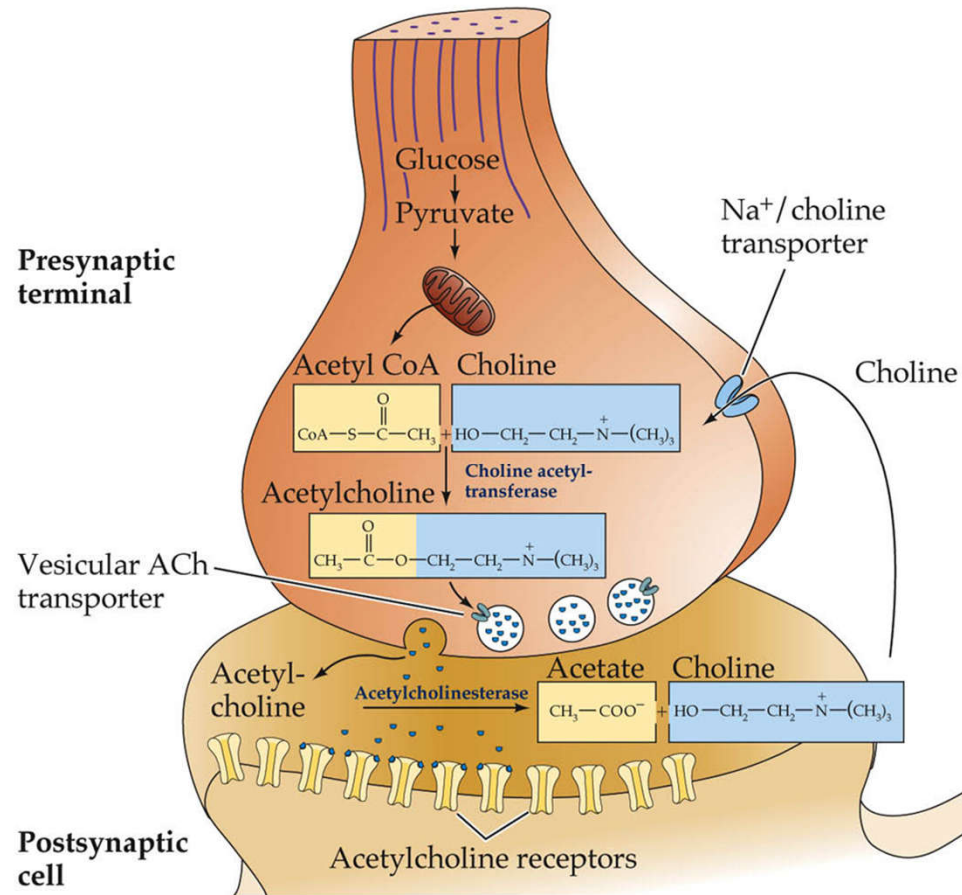
Equilibrium Potentials



Test Your Hypothesis

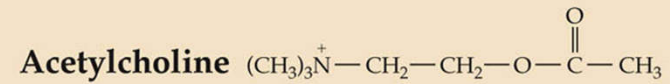


Cholinergic Synapse

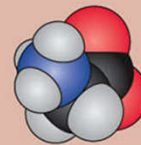
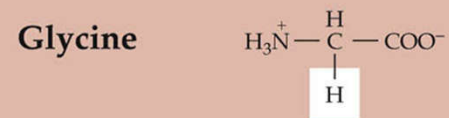
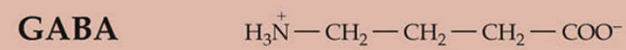
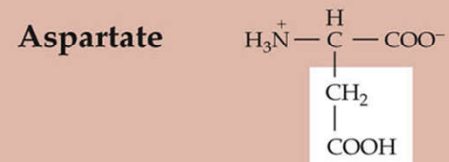
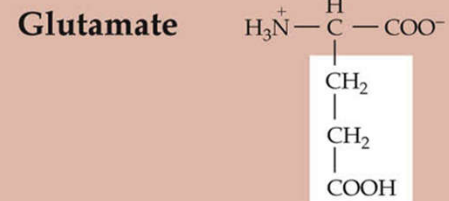


Neurotransmitters

SMALL-MOLECULE NEUROTRANSMITTERS



AMINO ACIDS

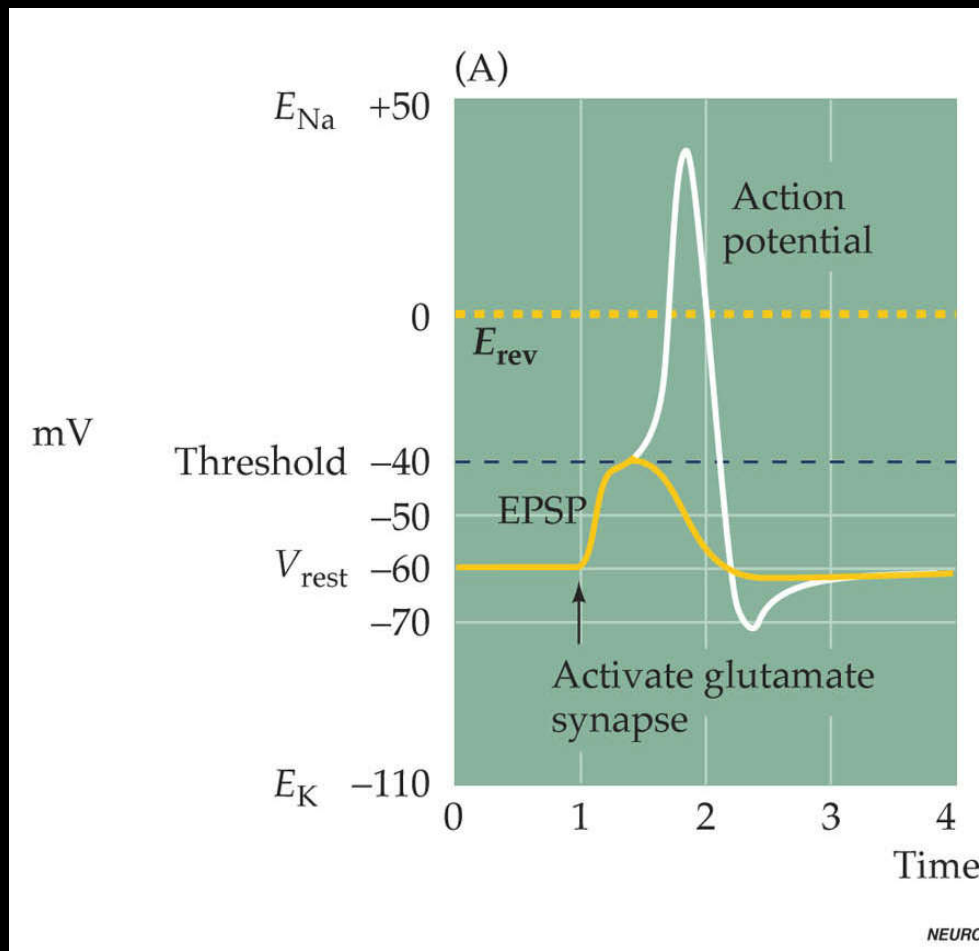


Neurotransmitters

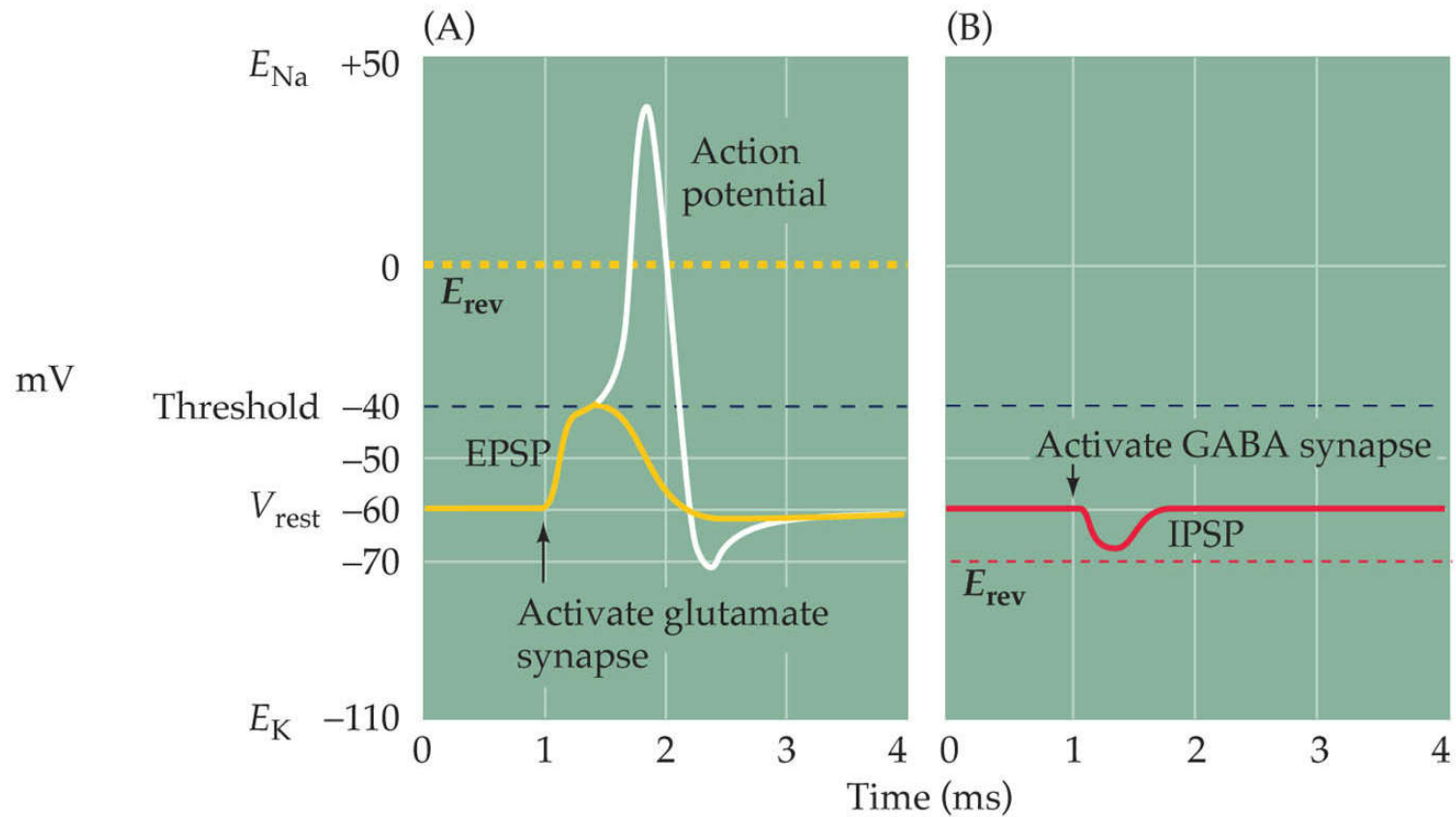
(C)

Receptor	AMPA	NMDA	Kainate	GABA	Glycine	nACh	Serotonin	Purines
Subunits	Glu R1	NR1	Glu R5	α_{1-7}	$\alpha 1$	α_{2-9}	5-HT ₃	P _{2X1}
	Glu R2	NR2A	Glu R6	β_{1-4}	$\alpha 2$	β_{1-4}		P _{2X2}
	Glu R3	NR2B	Glu R7	γ_{1-4}	$\alpha 3$	γ		P _{2X3}
	Glu R4	NR2C	KA1	δ	$\alpha 4$	δ		P _{2X4}
		NR2D	KA2	ϵ	β			P _{2X5}
				ρ_{1-3}				P _{2X6}
								P _{2X7}

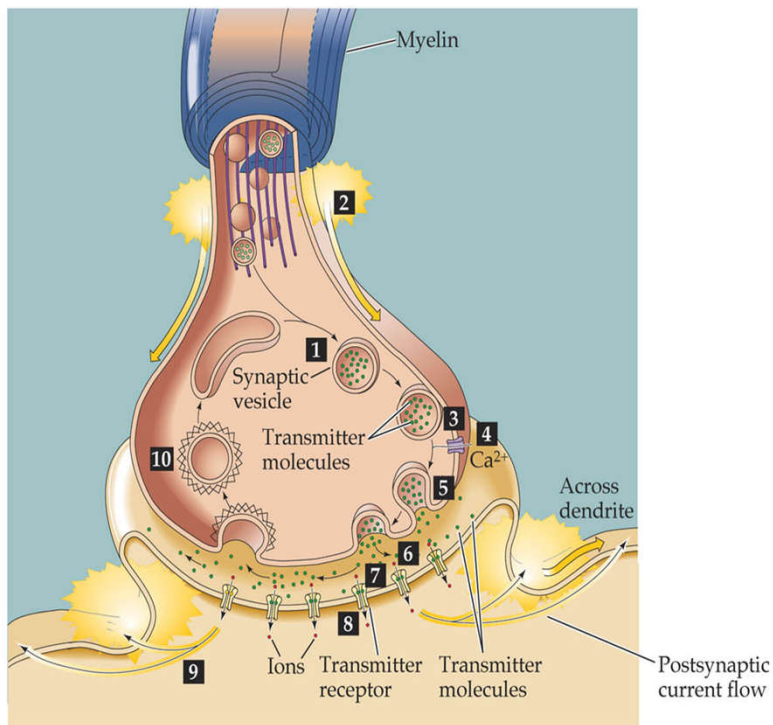
Excitatory & Inhibitory Currents



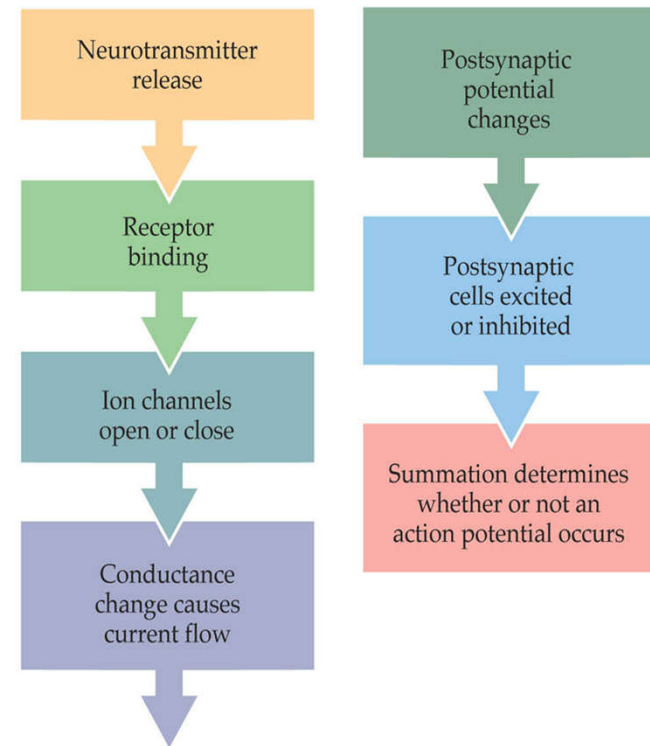
Excitatory & Inhibitory Currents



Excitatory & Inhibitory Currents

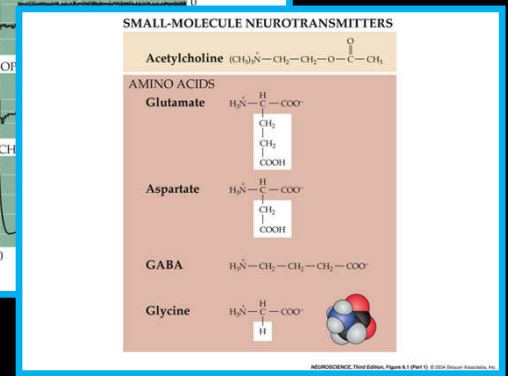
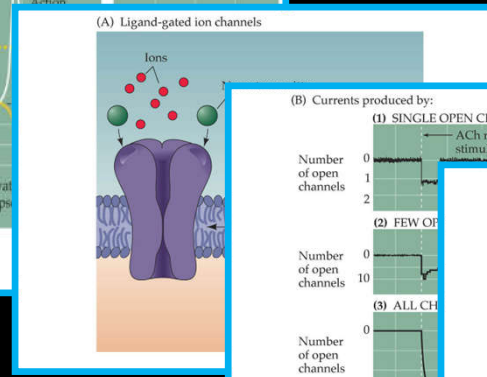
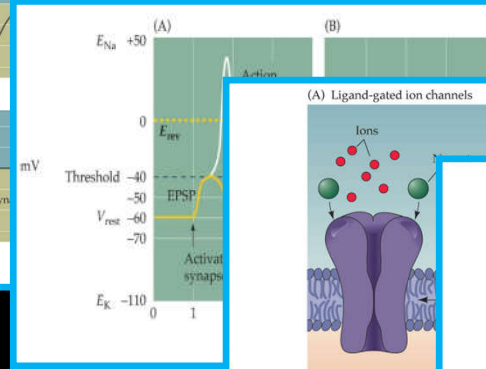
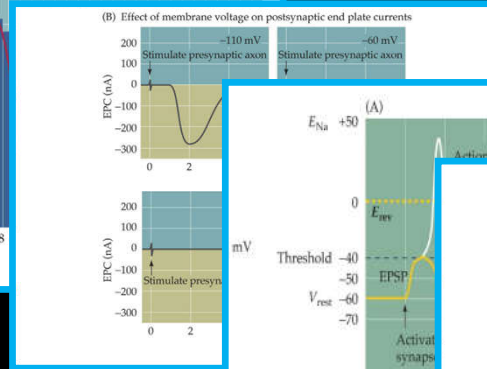
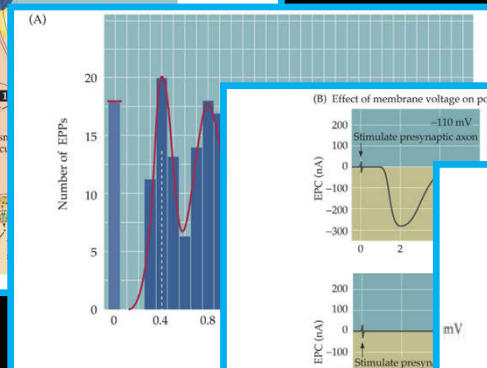
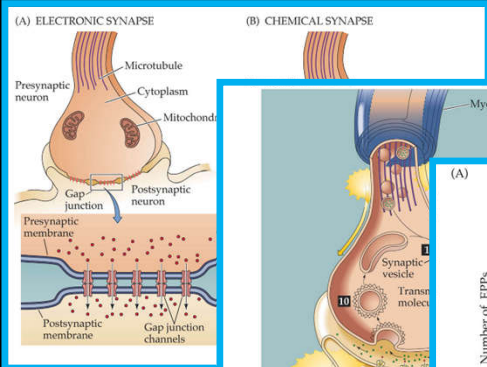


NEUROSCIENCE, Third Edition, Figure 5.3 © 2004 Sinauer Associates, Inc.



NEUROSCIENCE, Third Edition, Figure 5.21 © 2004 Sinauer Associates, Inc.

Summary



Ion Channels & Cellular Electrophysiology

