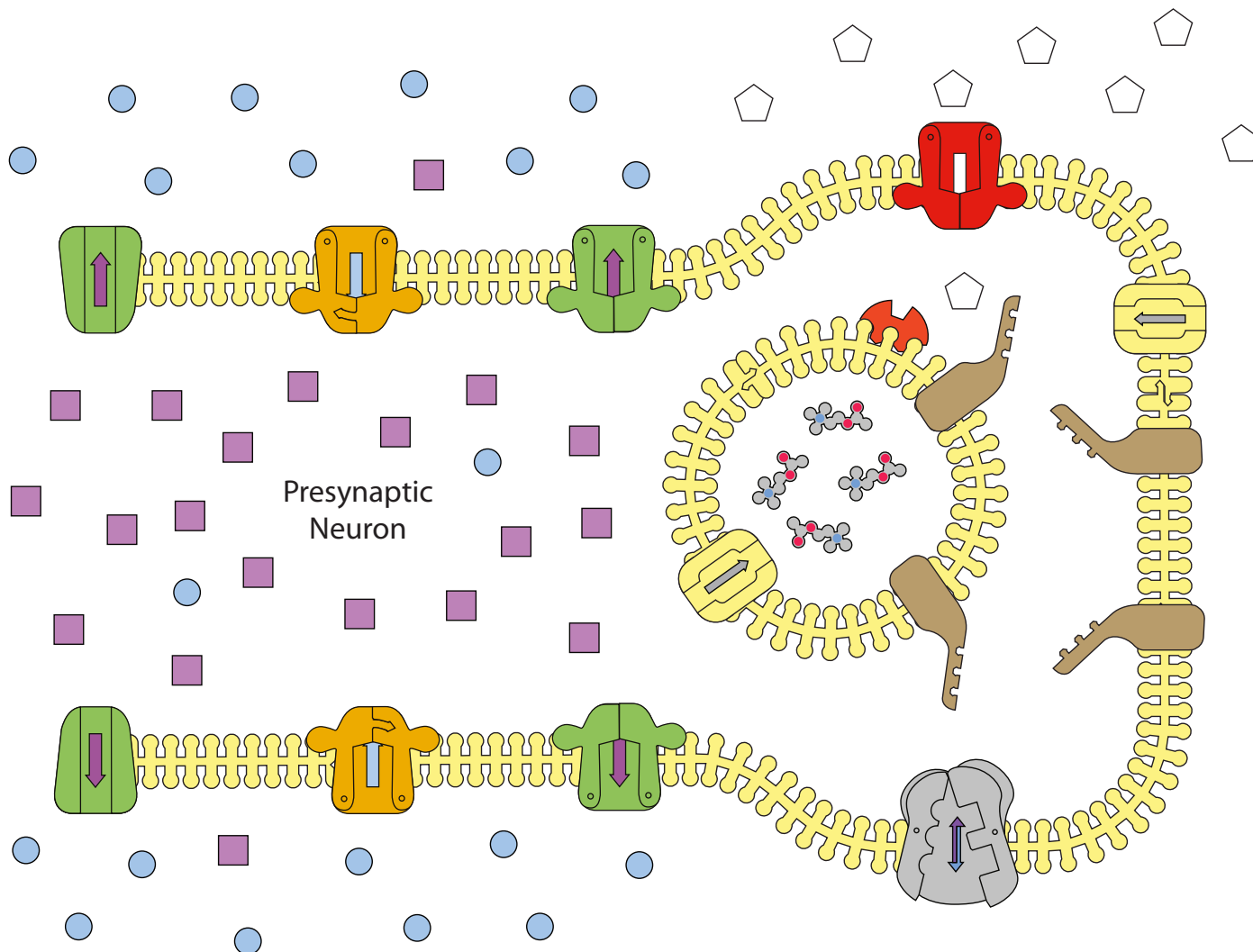
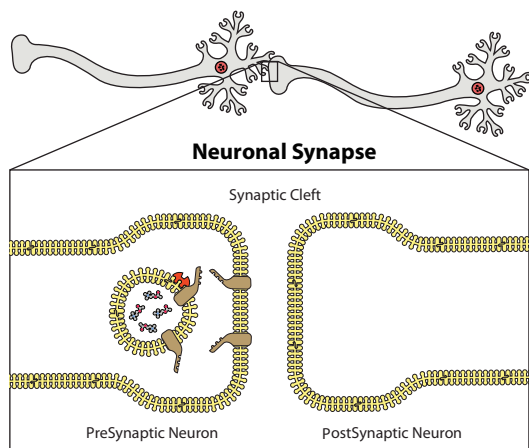
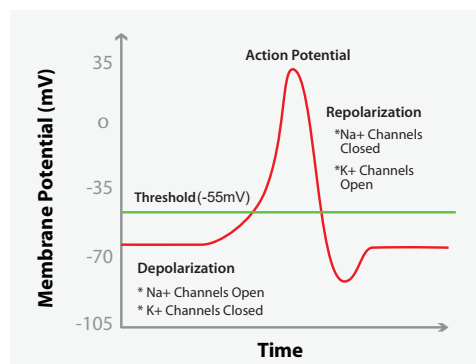
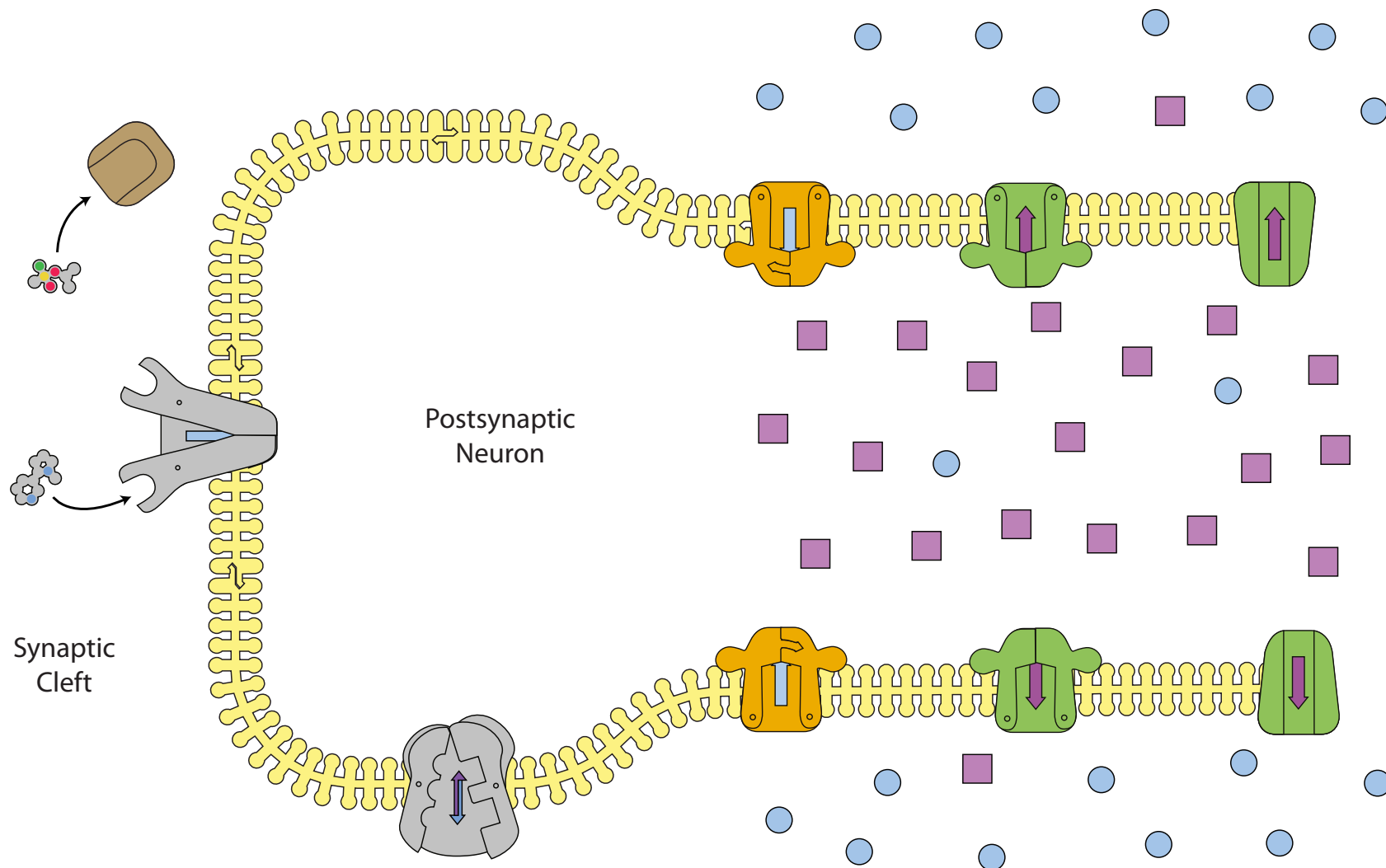


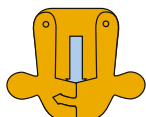
Cholinergic Synapse Guide



Cholinergic Synapse Guide

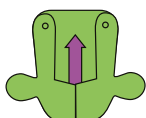


Cholinergic Synapse Guide



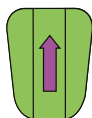
Gated Na⁺ Channel

- A channel protein embedded in neuronal membranes
- Opening triggered by changes in voltage across the membrane
- Permeability is specific to sodium ions with a net influx during depolarization



Gated K⁺ Channel

- A channel protein embedded in neuronal membranes
- Opening triggered by changes in voltage across the membrane
- Permeability is specific to potassium ions with a net efflux during repolarization



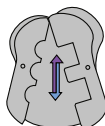
K⁺ Leak Channel

- A transmembrane protein embedded in the membranes of presynaptic and postsynaptic cells
- An open channel allowing potassium ions to follow their concentration gradient
- Important in establishing the resting potential of the neuron



Gated Ca²⁺ Channel

- A channel protein embedded in neuronal membranes
- Triggered by an action potential
- Permeable primarily to Ca²⁺ and some Na⁺



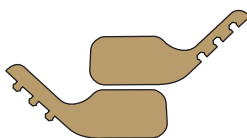
Sodium/Potassium Pump

- An active transport protein located in the neuronal cell membrane
- Establishes the resting potential ion concentrations in neurons



Synaptotagmin

- A protein localized to synaptic vesicular membranes
- Calcium ions bind to induce an interaction with SNAP/SNARE proteins resulting in vesicular membrane fusion



SNAP/SNARE Proteins

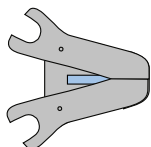
- A complex of proteins located in the vesicular and neuronal membranes
- Enables vesicular fusion with the neuronal membrane



Acetylcholine

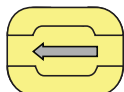
- A mainly excitatory neurotransmitter, chemical messenger, stored in synaptic vesicles of the presynaptic cell
- When released into the synaptic cleft, binds to and results in the opening of the acetylcholine receptor in the postsynaptic neuronal membrane

Cholinergic Synapse Guide



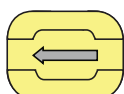
Acetylcholine Receptor

- A ligand-gated ion channel protein located in the postsynaptic cell membrane
- Opens to allow the influx of sodium ions when two acetylcholine molecules are bound to the receptor



Reuptake Transporter Protein

- A protein embedded in the membrane of the presynaptic cell
- Carries choline from synaptic cleft into acetylcholine synthesizing neurons



Vesicular Transport Protein

- A channel protein embedded in the vesicular membranes of the presynaptic cell
- Facilitates the movement of newly synthesized acetylcholine into the vesicles



Acetylcholinesterase

- An enzyme located in the synaptic cleft
- Terminates neural transmission by removing acetylcholine from the synaptic cleft
- Catalyzes the breakdown of acetylcholine into acetate and choline



Toxins

- Tetrodotoxin from puffer fish blocks the transport of Na^+ through the voltage-gated sodium channels
- Charybdotoxin from scorpions blocks the transport of K^+ through the voltage-gated potassium channels
- Omega-conotoxin from cone snails blocks the transport of Ca^{2+} through the voltage-gated calcium channels



Nicotine

- An alkaloid chemical compound that acts as a stimulant
- An agonist that imitates the action of acetylcholine on the acetylcholine receptor



Sarin

- An organophosphorus chemical compound
- Competitively inhibits acetylcholinesterase binding in the active site