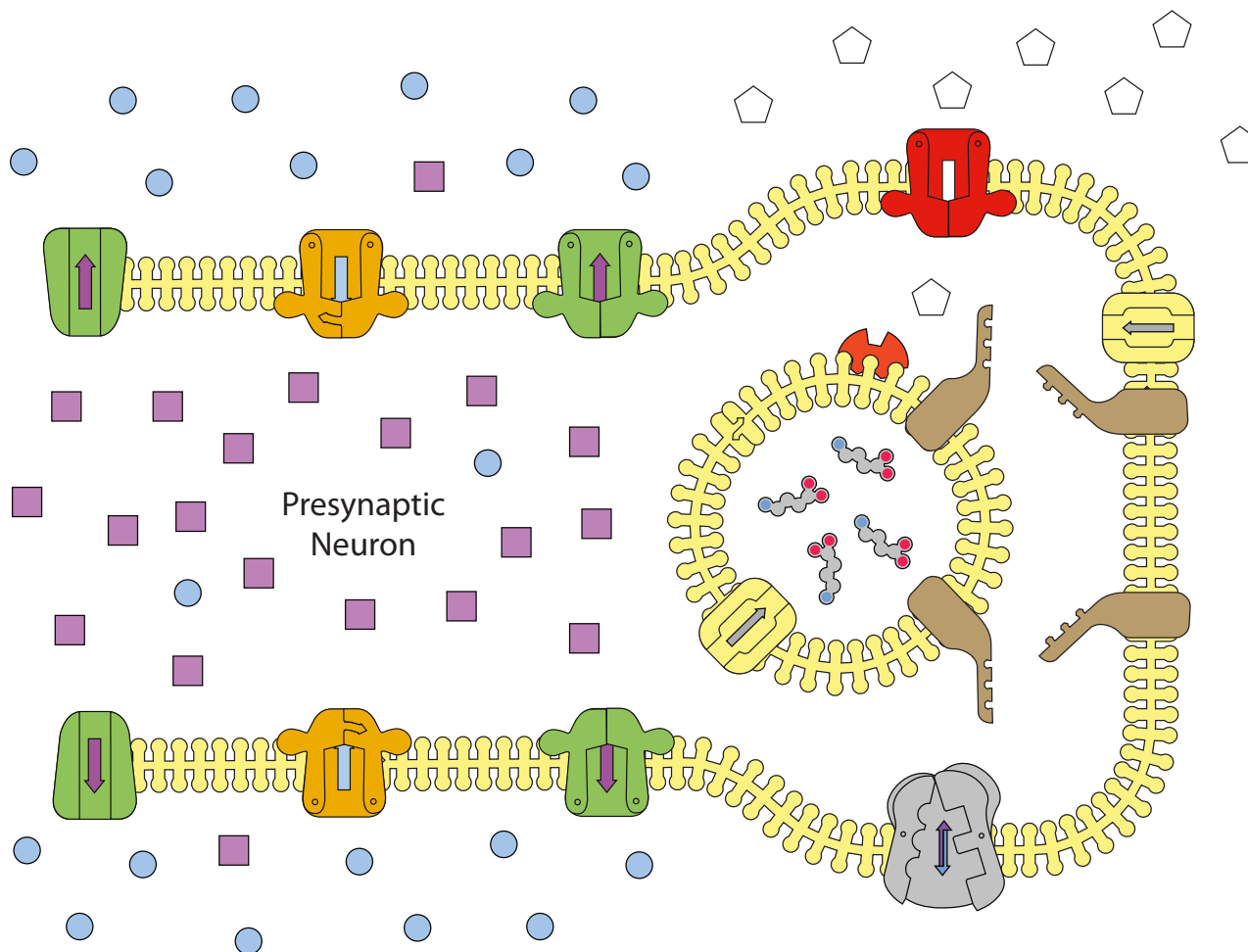
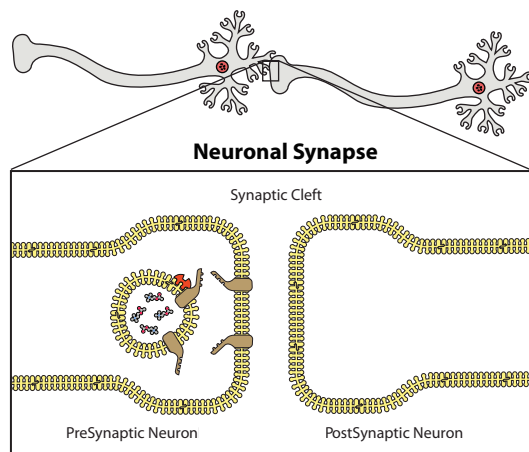
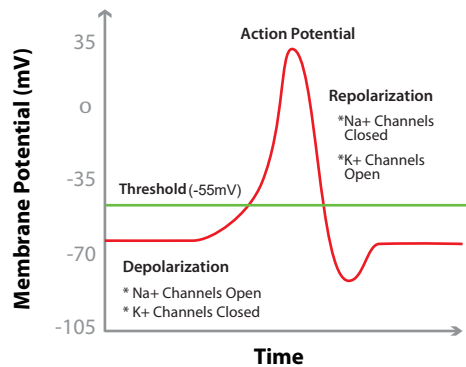
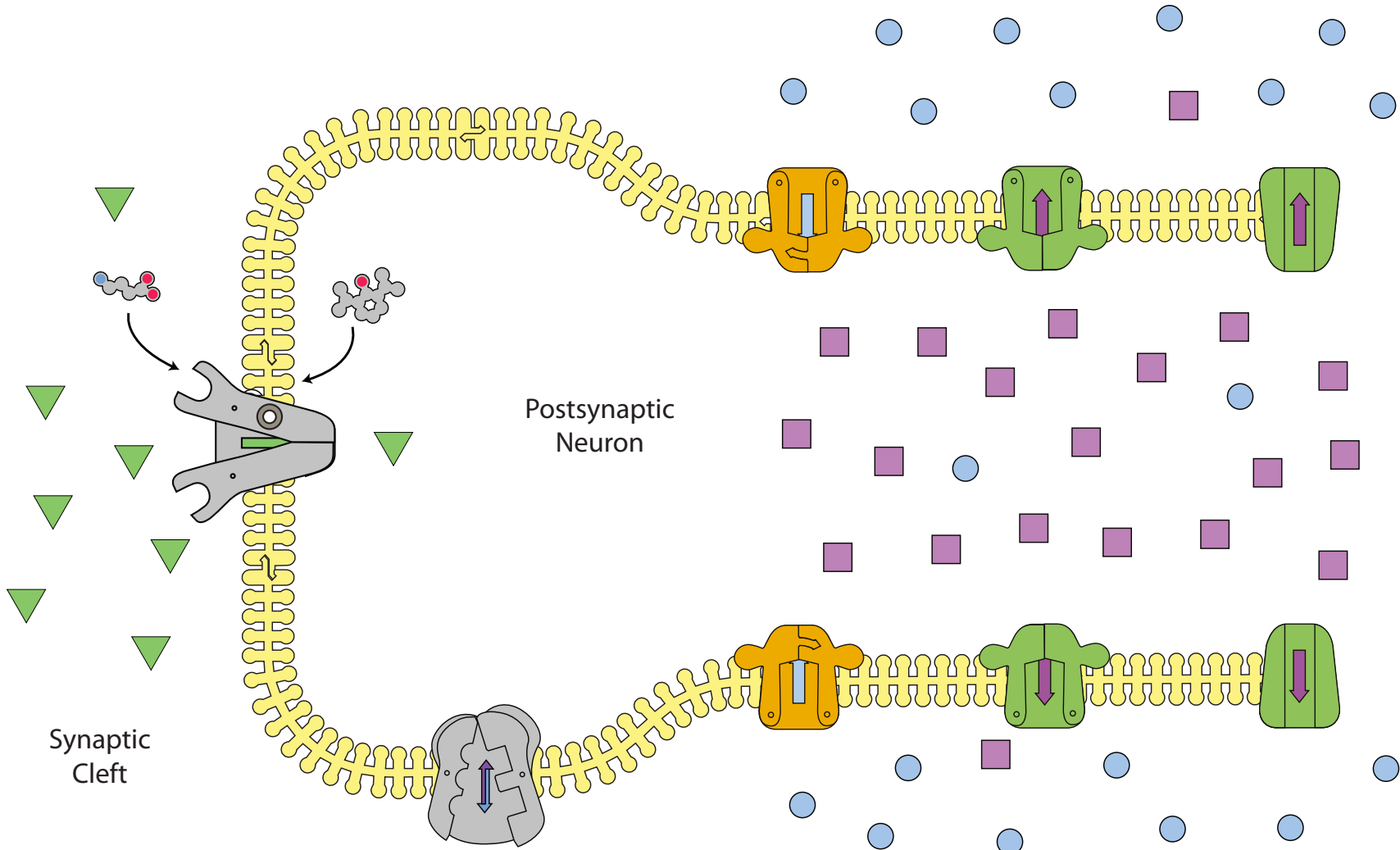


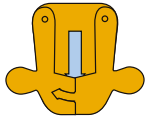
## GABAergic Synapse Guide



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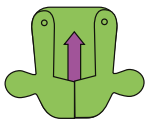


## GABAergic Synapse Guide



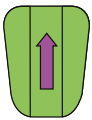
### Gated Na<sup>+</sup> Channel

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



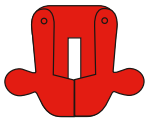
### Gated K<sup>+</sup> Channel

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



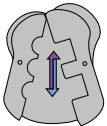
### K<sup>+</sup> Leak Channel

- 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 Ca<sup>2+</sup> Channel

- A channel protein embedded in neuronal membranes
- Triggered by an action potential
- Permeable primarily to Ca<sup>2+</sup> and some Na<sup>+</sup>



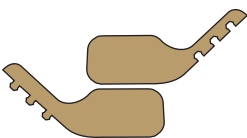
### Sodium/Potassium Pump

- 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

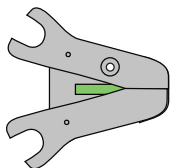
- A complex of proteins located in the vesicular and neuronal membranes
- Enables vesicular fusion with the neuronal membrane



### GABA (gamma-aminobutyric acid)

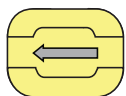
- An inhibitory neurotransmitter, chemical messenger, stored in synaptic vesicles of the presynaptic cell
- When released into the synaptic cleft, binds to the GABA receptor reducing activity of the postsynaptic neuron

## GABAergic Synapse Guide



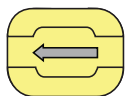
### GABA Receptor

- An ionotropic ligand-gated receptor located in the postsynaptic cell membrane
- Activation occurs by the binding of two GABA molecules resulting in a selective influx of Cl<sup>-</sup> into the postsynaptic cell leading to hyperpolarization



### Reuptake Transporter Protein

- A protein embedded in the membrane of the presynaptic cell
- Facilitates removal of GABA from synaptic cleft into the presynaptic cell



### Vesicular Transport Protein

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



### Toxins

- Tetrodotoxin from puffer fish blocks the transport of Na<sup>+</sup> through the voltage-gated sodium channels
- Charybdotoxin from scorpions blocks the transport of K<sup>+</sup> through the voltage-gated potassium channels
- Omega-conotoxin from cone snails blocks the transport of Ca<sup>2+</sup> through the voltage-gated calcium channels



### Propofol

- A chemical compound medically used as a general anesthetic
- Allosterically binds to the GABA receptor increasing the duration of the GABA activated opening of the chloride channel resulting in hyperpolarization