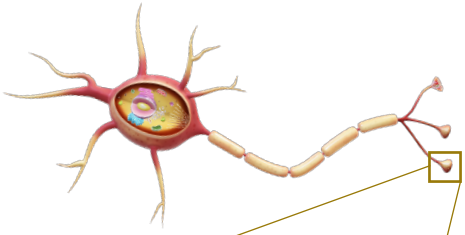
CONCEPT: NEUROTRANSMITTER RELEASE

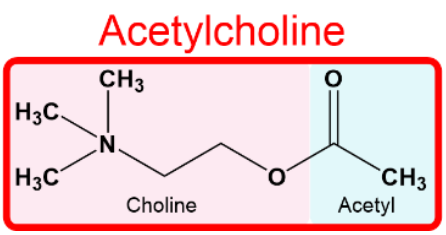
Neurotransmitters

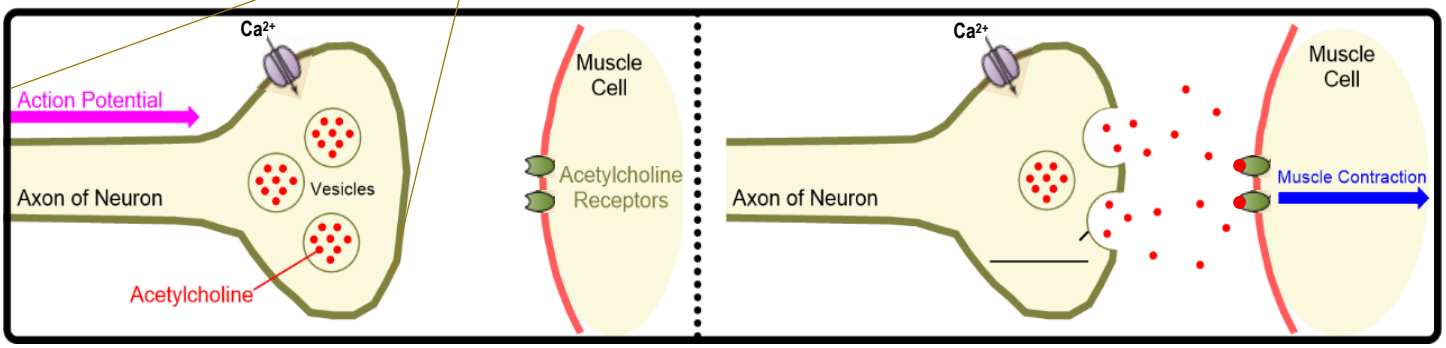
●A well-studied example of exocytosis is *release* of _____ in the final step of a neuron's signal.

□ *Neurotransmitter*: chemical released by end of *neuron* to _____ a signal (ex. _____).

□ *Acetylcholine* is stored in *vesicles* & released by *neurons* (via *exocytosis*) to trigger *muscle* _____.







SNARE Fusion Proteins

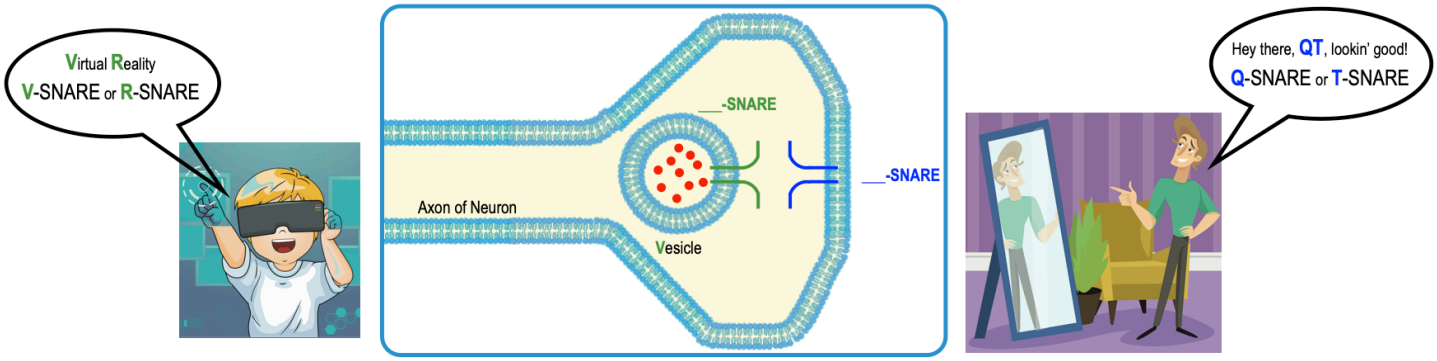
●Vesicles & plasma membranes naturally _____ each other.

●Neurotransmitter exocytosis involves many proteins, including integral-membrane *fusion proteins* called _____.

1) ____-SNAREs: on an intracellular **V**esicle's *cytoplasmic* surface (outside of **V**esicle); also called ____-SNARE.

2) ____-SNAREs: on the **T**arget membrane's *cytoplasmic* surface; also called ____-SNARE.

EXAMPLE: V/R-SNARE vs. T/Q-SNARE.



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PRACTICE: V-SNARE proteins deliver _____ to T-SNARE receptor sites.

a) Ribosomes. b) mRNA. c) Transport vesicles. d) Lysozymes.

PRACTICE: True or False: All transport vesicles in the cell have T-SNARE proteins in their membrane.

a) True. b) False.

Neurotransmitter Exocytosis

●Neurotransmitter release via exocytosis occurs in a _____-step process:

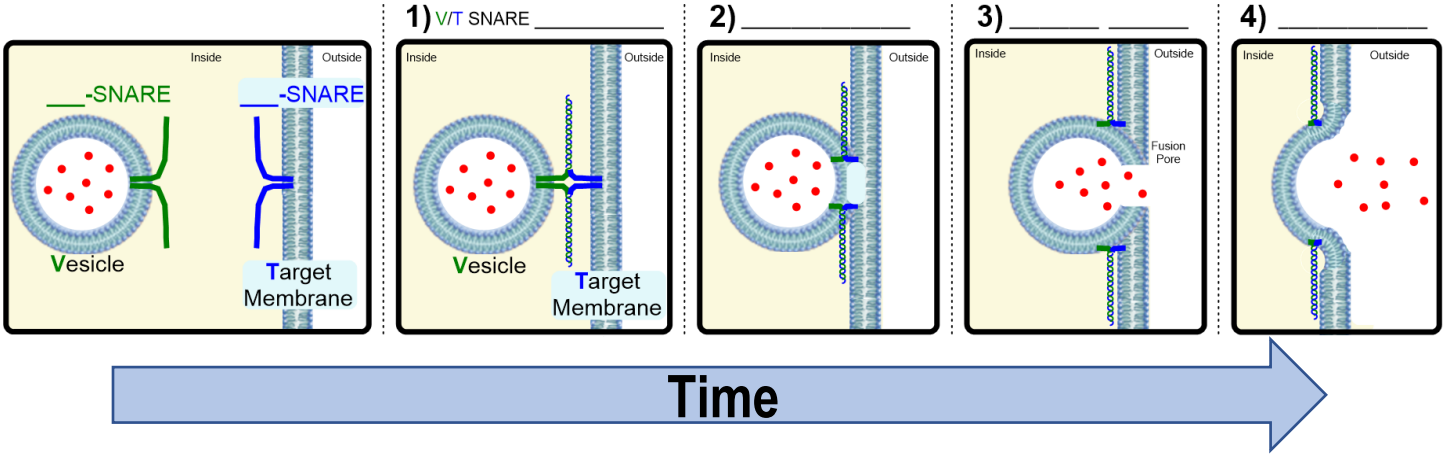
1) *SNARE Binding*: V & T SNARE _____, inducing _____ *changes*, drawing membranes together.

2) *Hemifusion*: changes in *curvature* & *lateral tension* induce _____ *sheets* of membranes to *fuse*.

3) *Fusion Pore*: *continued* changes in curvature & lateral tension *fuse* both membrane sheets, creating a _____.

4) *Release*: Fusion pore *expands* to _____ neurotransmitter & fused membrane relaxes.

EXAMPLE: Neurotransmitter Release via Exocytosis.



EXAMPLE: The toxin produced by *Clostridium tetani* (which causes tetanus) is a protease that cleaves/destroys SNAREs. Explain why this would lead to muscle paralysis.

PRACTICE: The R-SNARE and Q-SNARE proteins are involved in what process?

a) Formation of vesicles.

b) Fusion of transport vesicles with the target membrane.

c) Targeting of transport vesicle to intracellular destinations.

d) Packaging of neurotransmitters into transport vesicles.

e) Ligand-gated channel opening.