

Physiology 5 (Physiology 4 cancelled)

due to snow...

- send answer to iClicker Question 25A now.
- Neurons: output
- Neurons: input
 - stimulatory
 - inhibitory
- animations
- turnoff
 - drugs
- iClicker Question 25B

Action Potential (AP) review

Due in lab this week: nothing.

Action Potential revisited

(note reversed direction - now a time* axis)

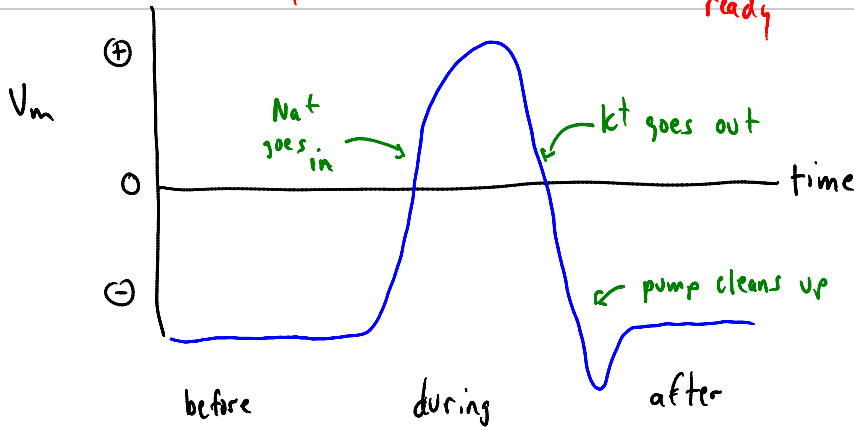
Na⁺ channel status

closed ready

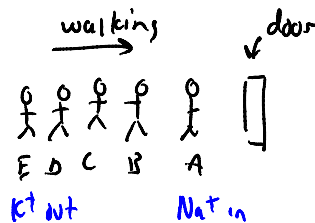
open

closed inactive

closed ready



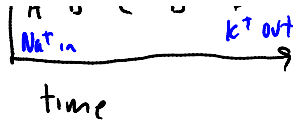
* "space" axis (friday's lecture)



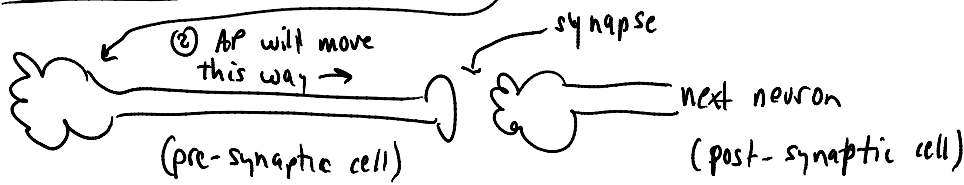
time axis (today)

- who passes through person | A R I N E

The door when?

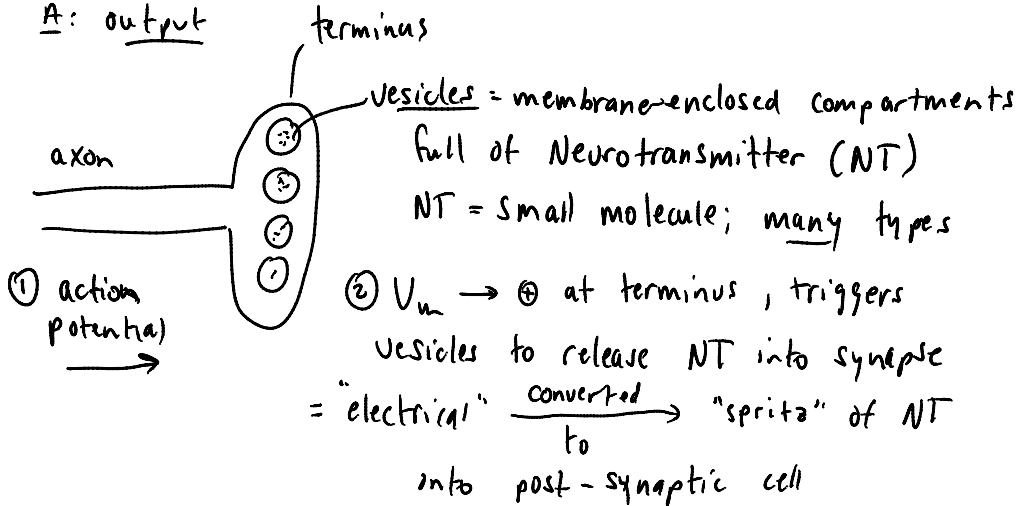


From last time : ① start AP here



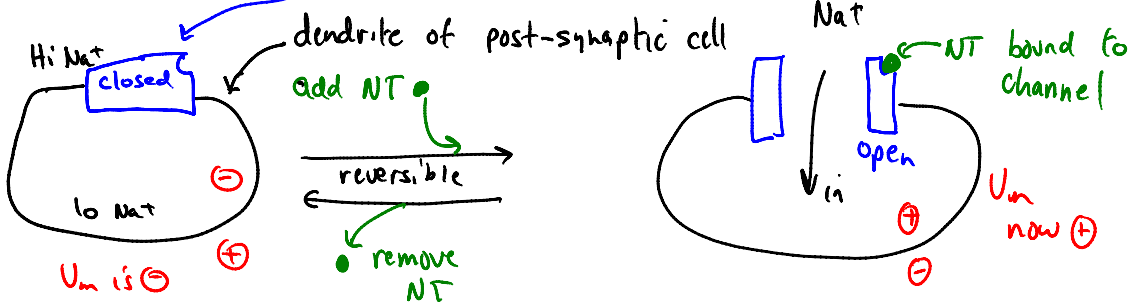
Q: how does signal cross synapse to next neuron?

A: output



How does this trigger next cell? INPUT

New player: Neurotransmitter-gated Na^+ channel



Ⓐ excitatory synapse: increases chance of AP in post-synaptic cell via NT-gated Na^+ channels in dendrites

Steps ① pre synaptic cell releases NT

② NT crosses synapse, binds to NT-gated Na^+ channels

③ channels open; Na^+ goes in

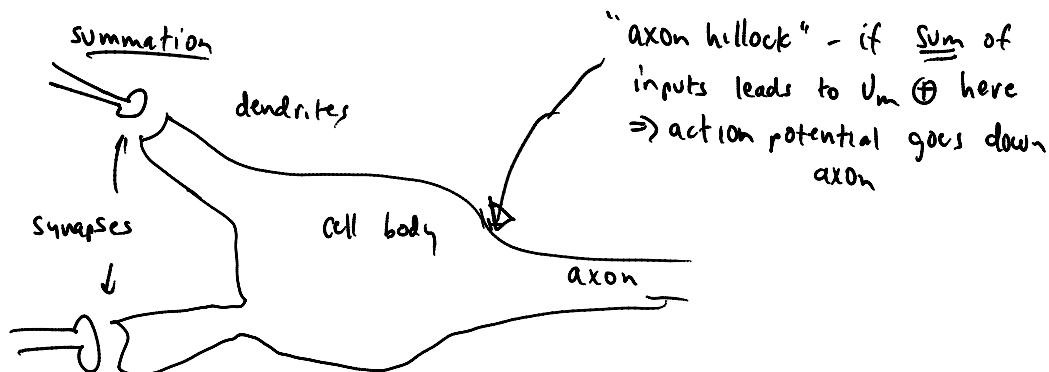
④ $V_m \rightarrow +$

⑤ action potential (probably) triggered in post synaptic cell

③ inhibitory synapse : decrease chance of AP in post-synaptic cell

NT opens K^+ channel \Rightarrow more K^+ goes out \Rightarrow V_m more \ominus

\Rightarrow harder to fire AP in post-synaptic cell



* a given synapse can be either stimulatory or inhibitory but not both

* synapses can be weak or strong (different amounts of NT released, different #s of channels, etc.)

-this can change (learning)

Problem - need to remove NT from synapse after pulse is over

- otherwise post synaptic cell will be constantly triggered

Q: how? A: turnoff

2 main ways [influenced by some drugs]

① NT is destroyed by enzyme in synapse
(nerve gases inhibits one of these enzymes)

② NT is pumped back into pre-synaptic cell for re-use
 \Rightarrow re-uptake

(prozac, zoloft inhibit re-uptake of NT serotonin)

(LSD binds to serotonin's receptor & activates it)