

# DOPAMINE

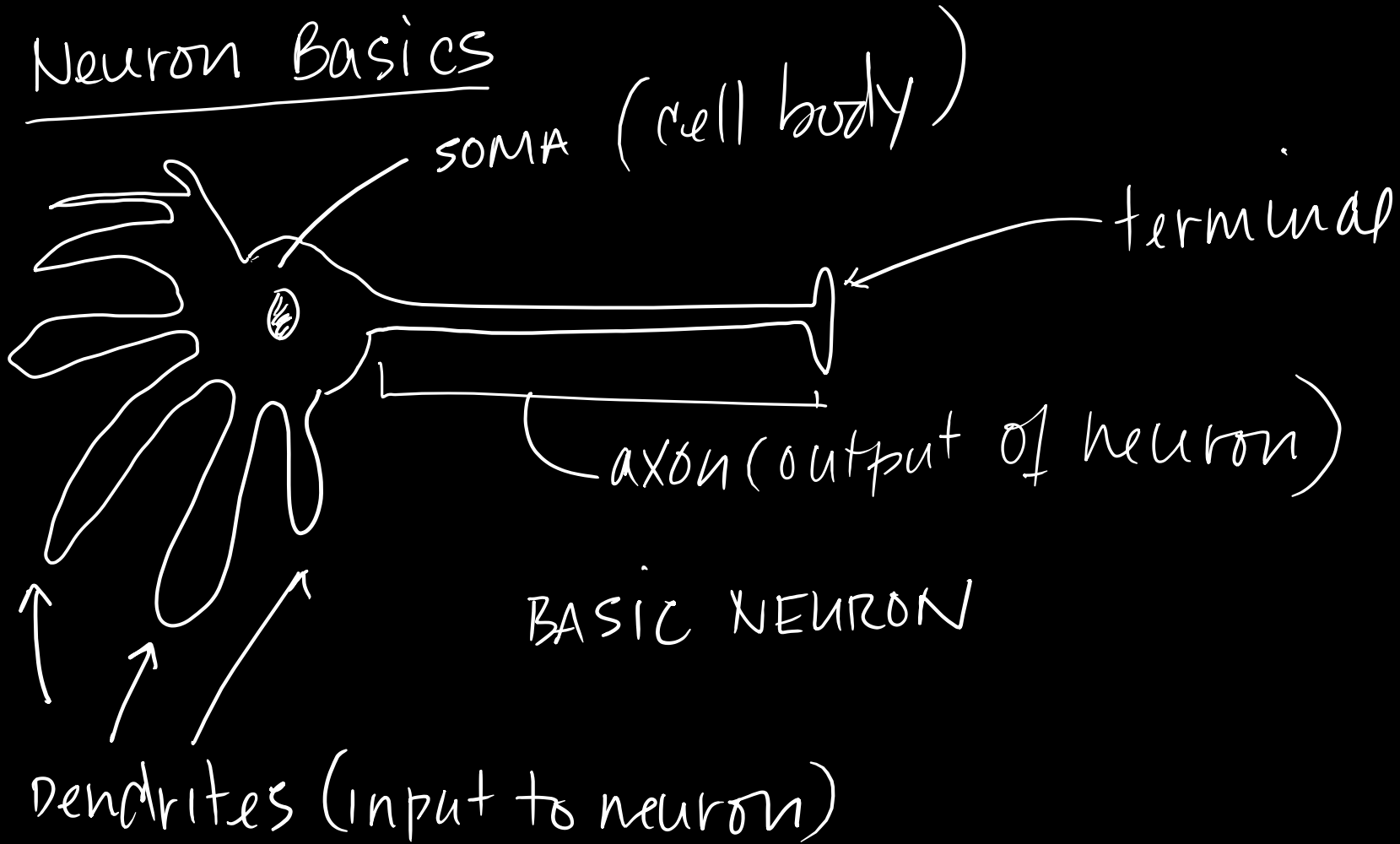
The neurotransmitter that  
determines value!

SOME BASIC NEUROSCIENCE...

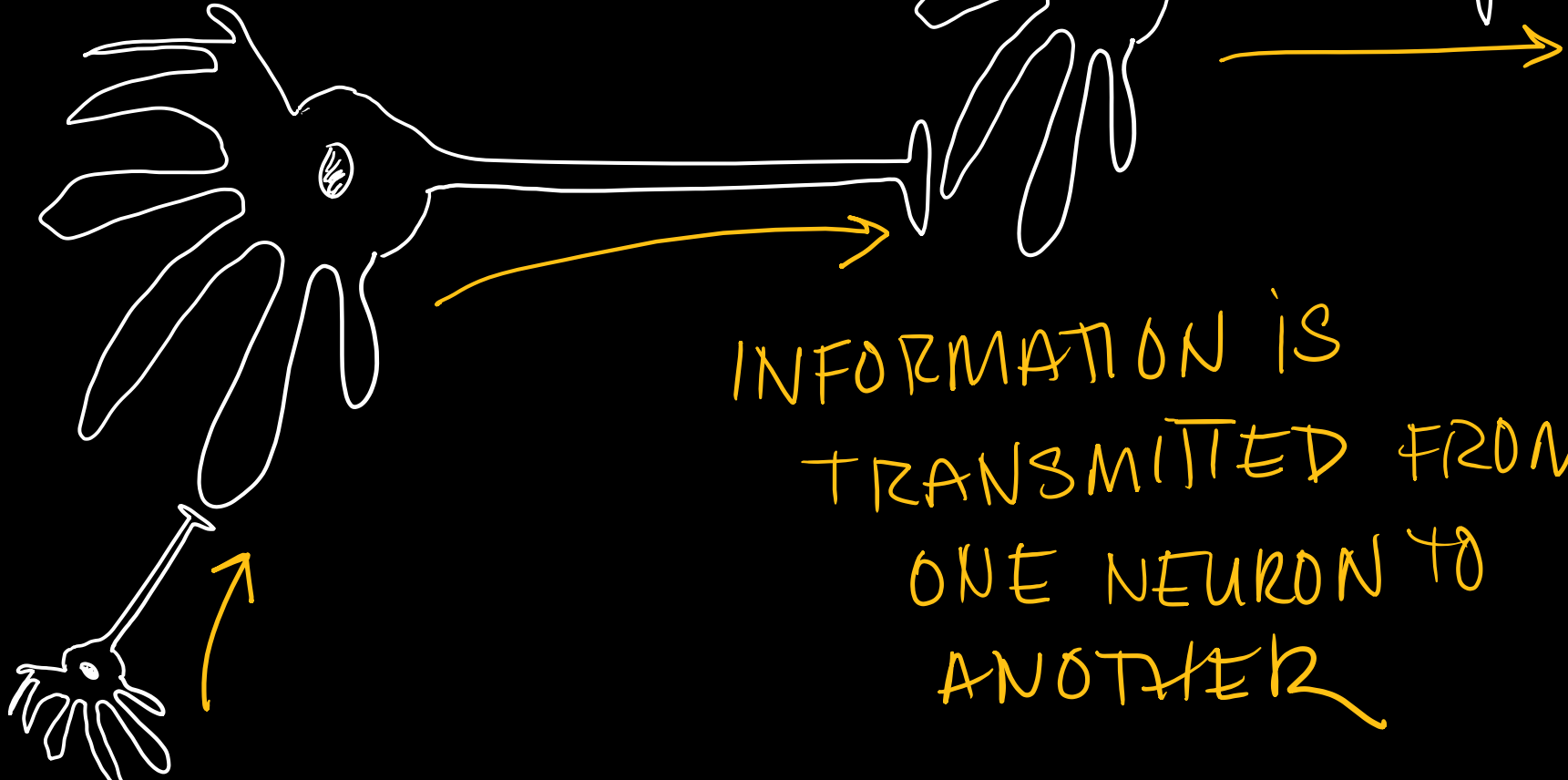


the human brain 😊

# Neuron Basics



NEURONS COMMUNICATE  
WITH EACH OTHER



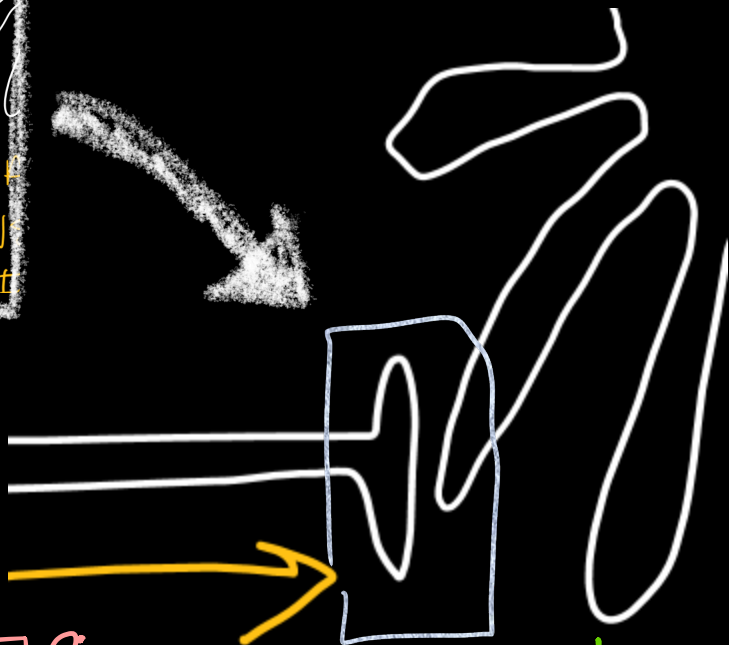
INFORMATION IS  
TRANSMITTED FROM  
ONE NEURON TO  
ANOTHER

NEURONS COMMUNICATE WITH EACH OTHER



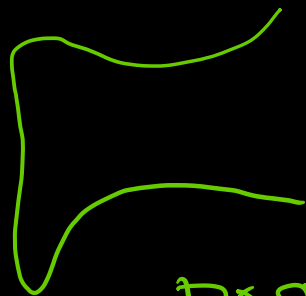
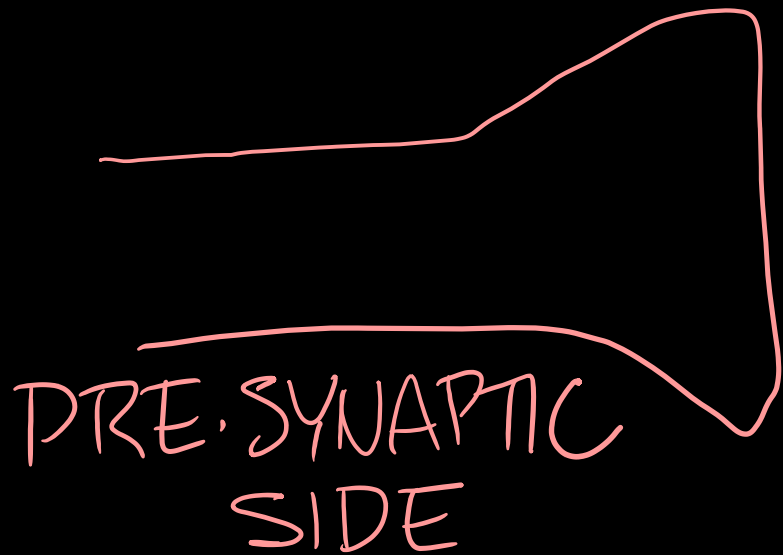
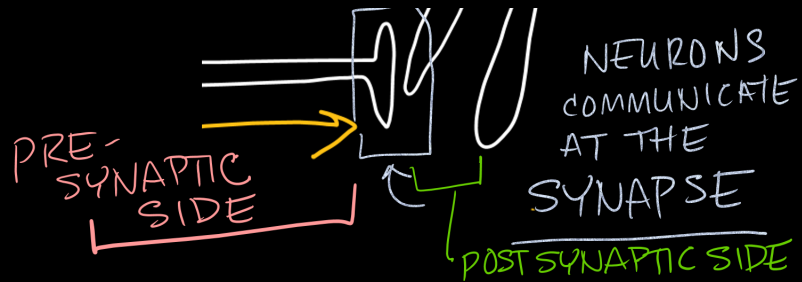
INFORMATION TRANSMISSION

PRE-SYNAPTIC SIDE

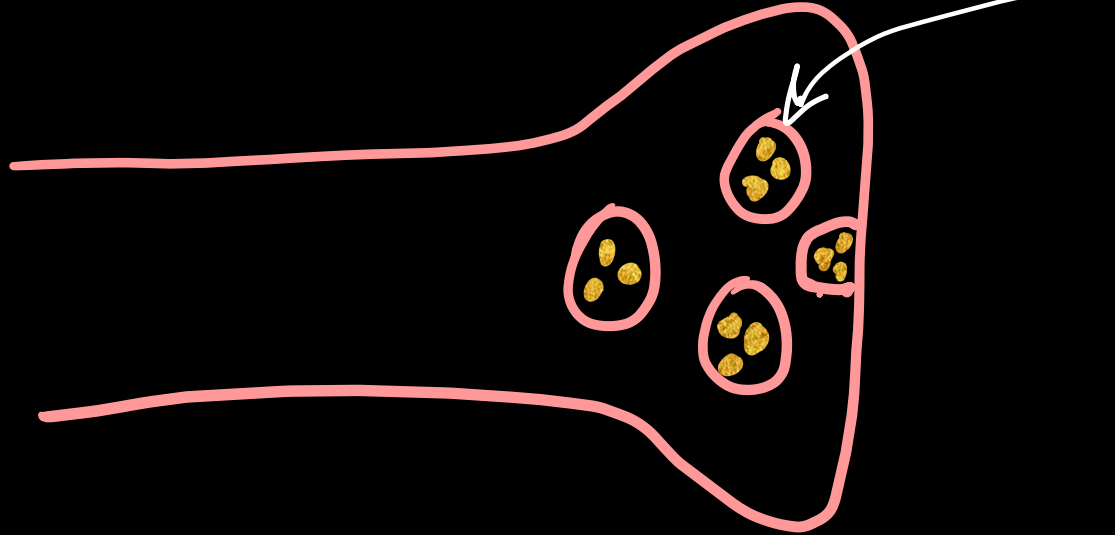
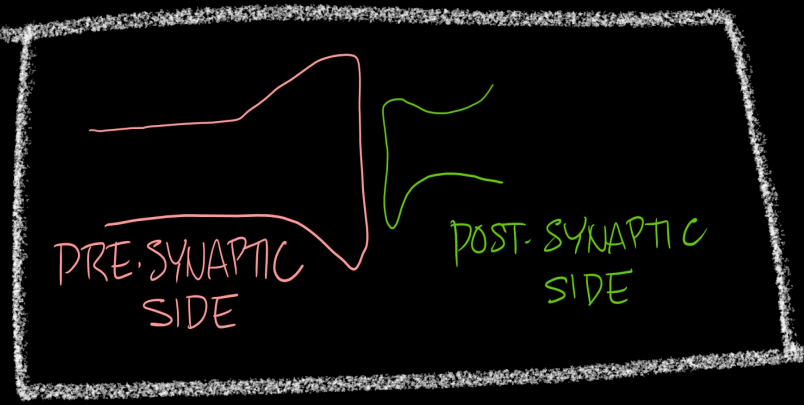


NEURONS COMMUNICATE AT THE SYNAPSE

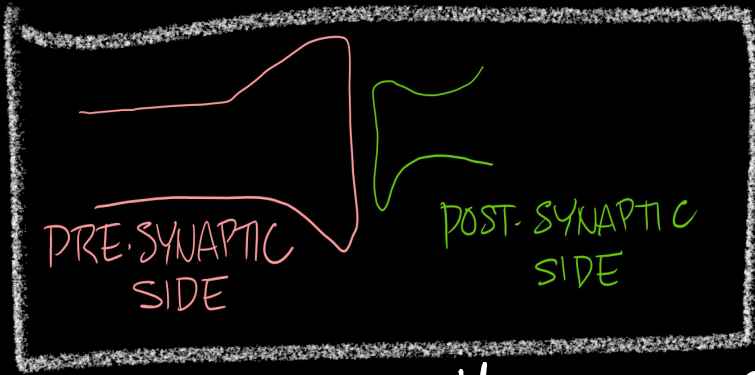
POST SYNAPTIC SIDE



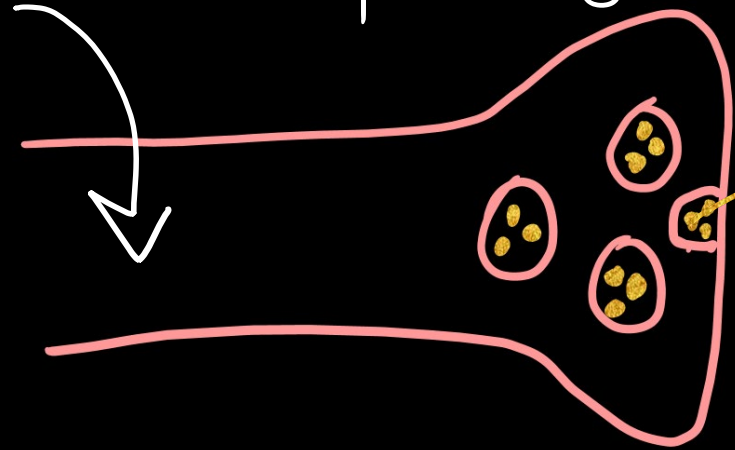
POST-SYNAPTIC SIDE



neurotransmitter  
is stored  
in the  
pre-synaptic  
terminal in  
vesicles

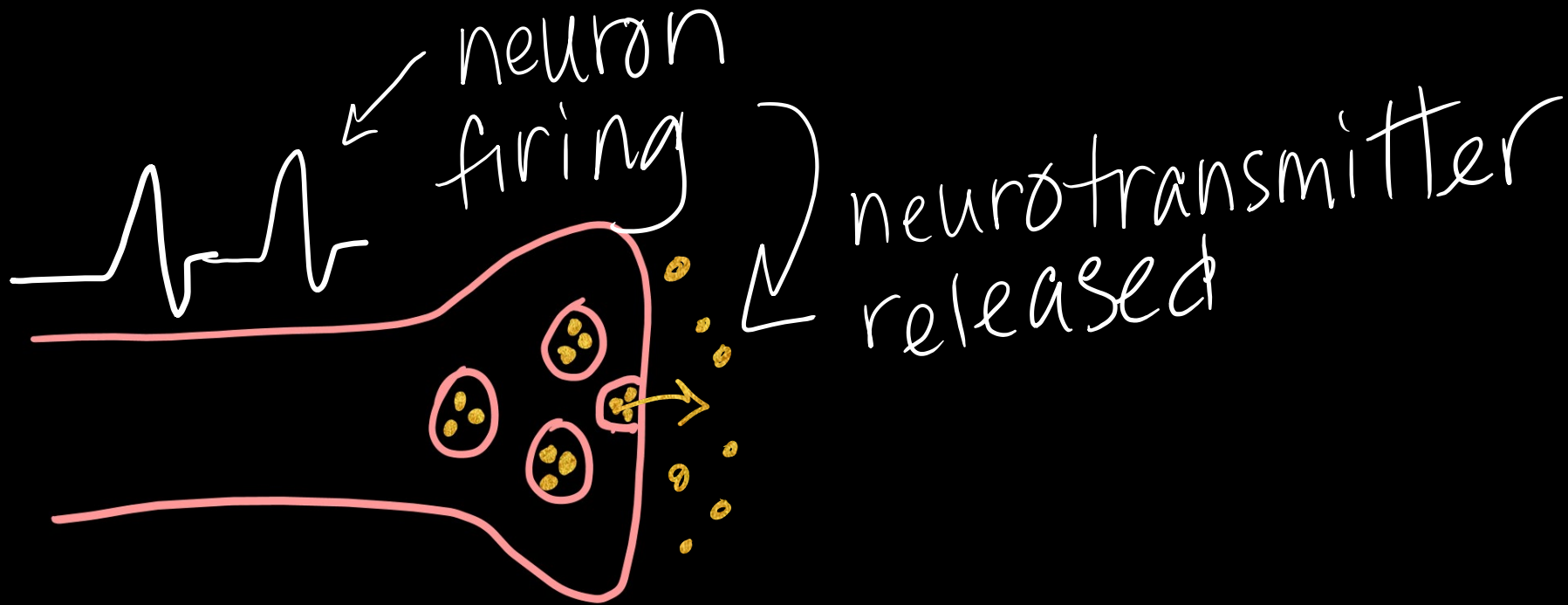


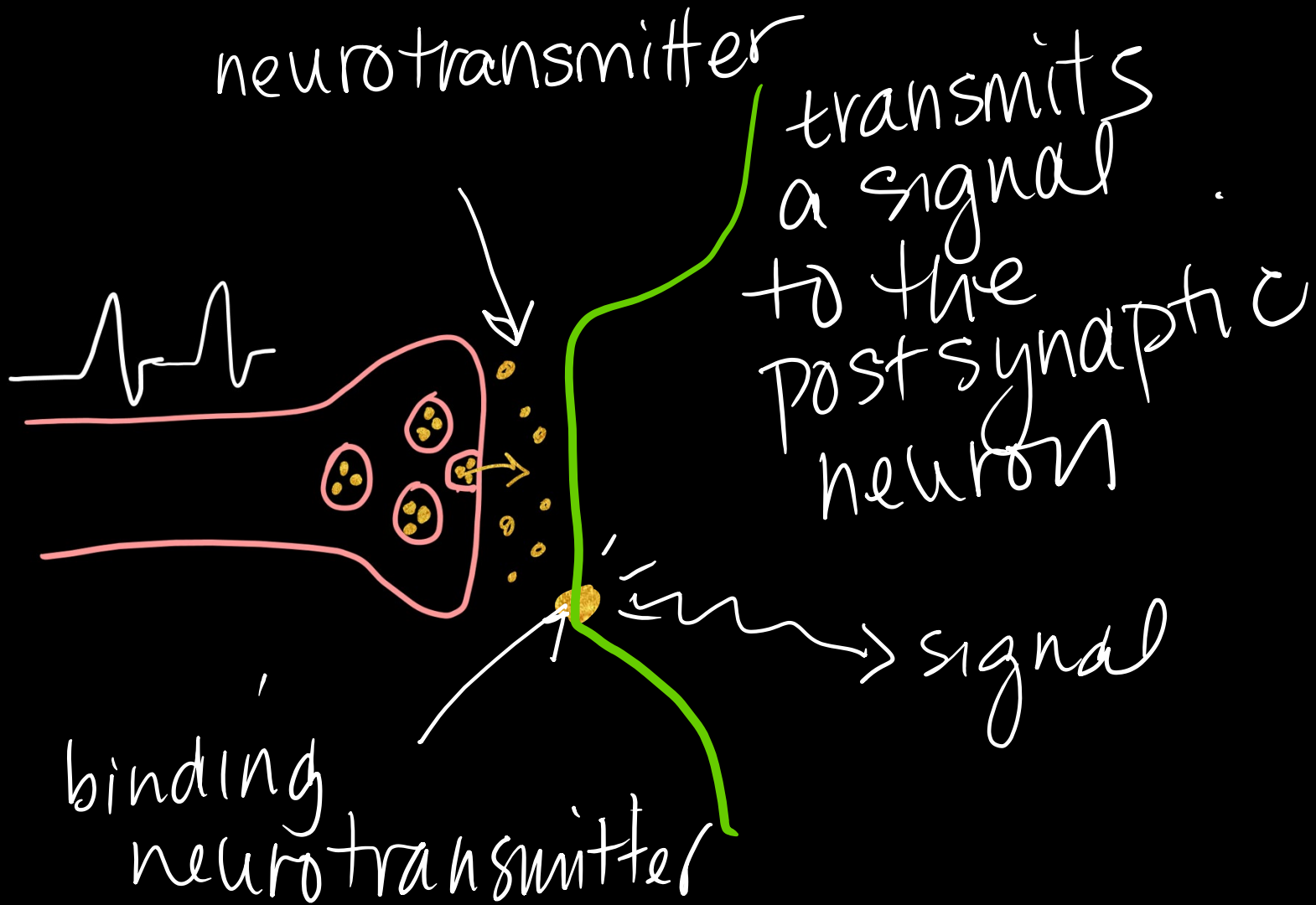
When the presynaptic neuron "fires"



the neurotransmitter is released.





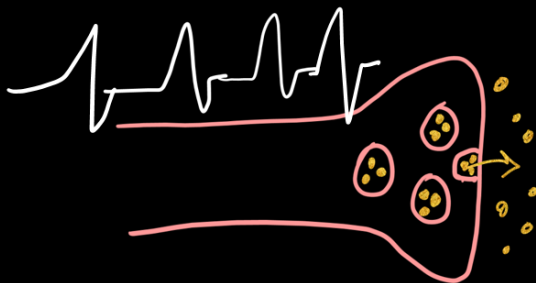


# SIGNAL FREQUENCY MATTERS



low freq  $\Rightarrow$  [XMT<sub>2</sub>]

SMALL



med freq  $\Rightarrow$  [XMT<sub>2</sub>]

MEDIUM



high freq  $\Rightarrow$  [XMT<sub>2</sub>]

LARGE

EFFECT ON POST SYN. SIDE:

# SOUNDS OF SPIKING NEURONS



low  
freq  $\Rightarrow$  [XMT<sub>12</sub>]



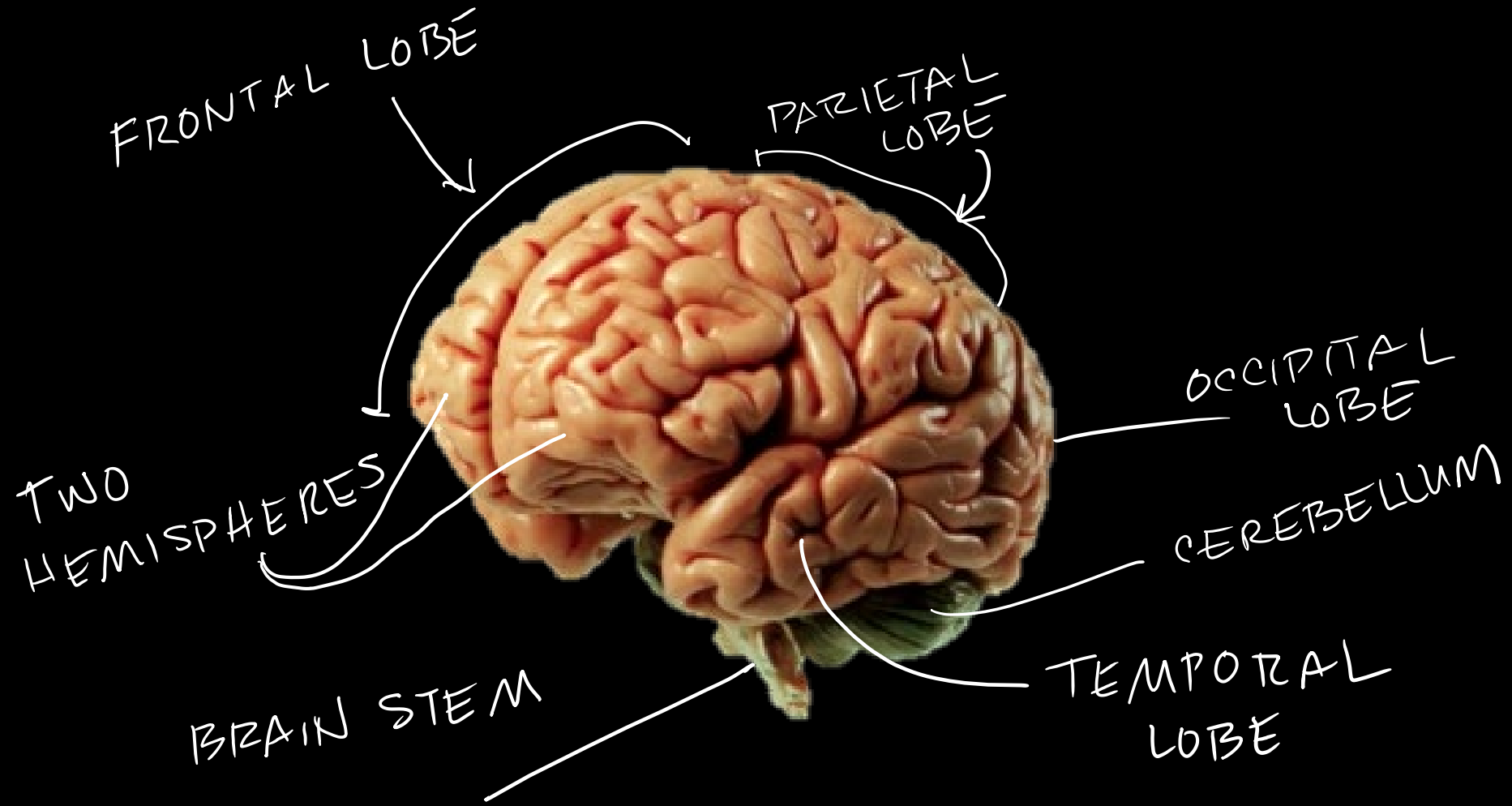
med  
freq  $\Rightarrow$  [XMT<sub>12</sub>]



high  
freq  $\Rightarrow$  [XMT<sub>12</sub>]

SPIKE  
FREQUENCY  
HISTOGRAM





FRONTAL LOBE

PARIETAL LOBE

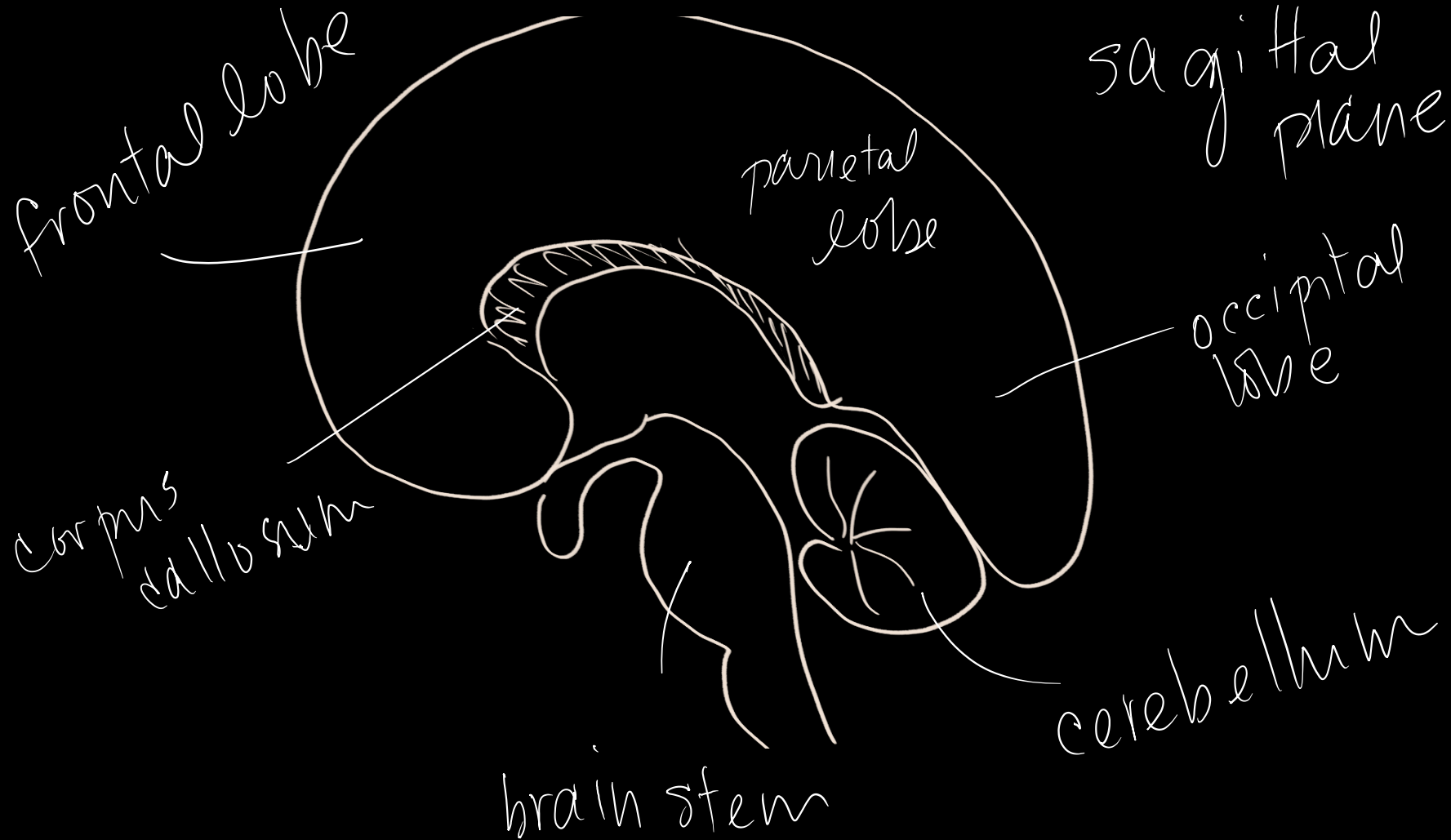
OCCIPITAL LOBE

CEREBELLUM

TEMPORAL LOBE

BRAIN STEM

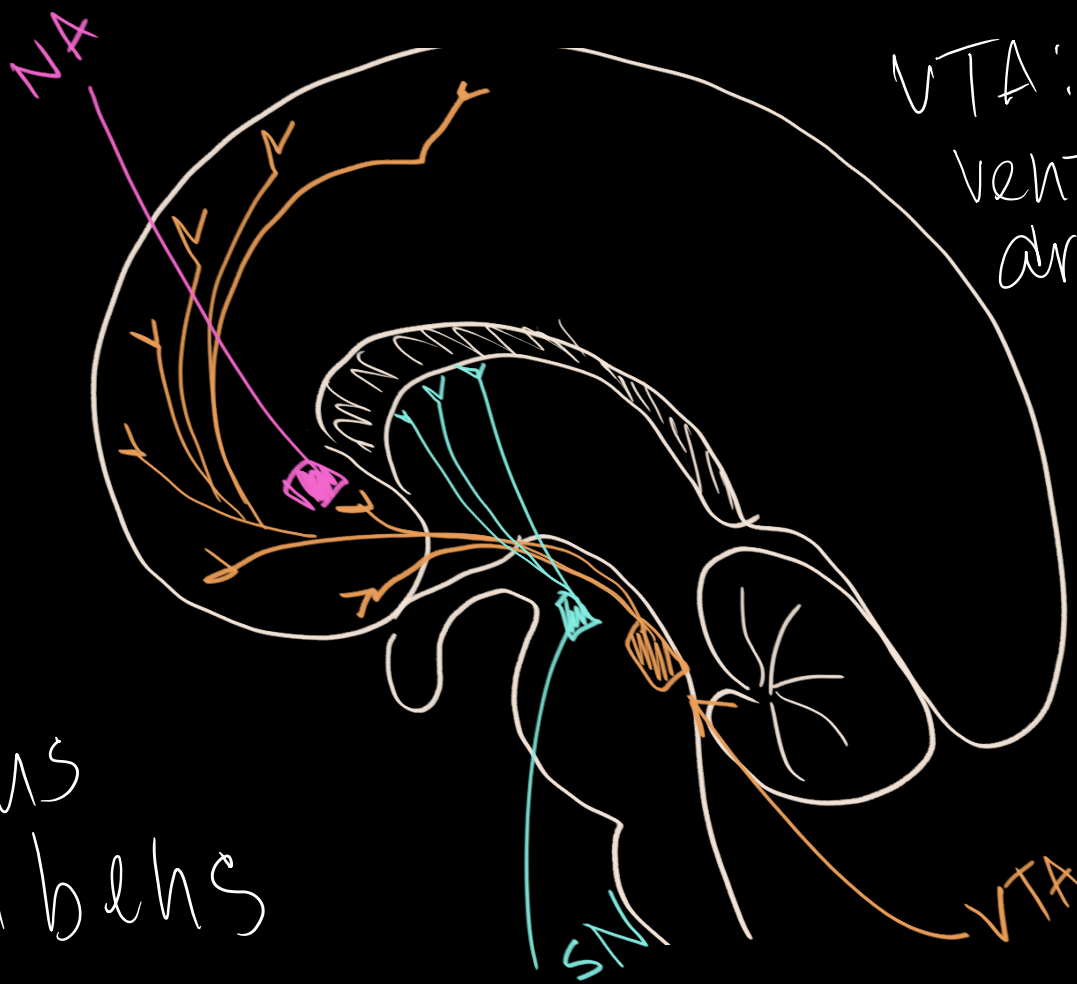
TWO HEMISPHERES





DOPAMINERGIC SYSTEM

NA  
Nucleus  
Accumbens



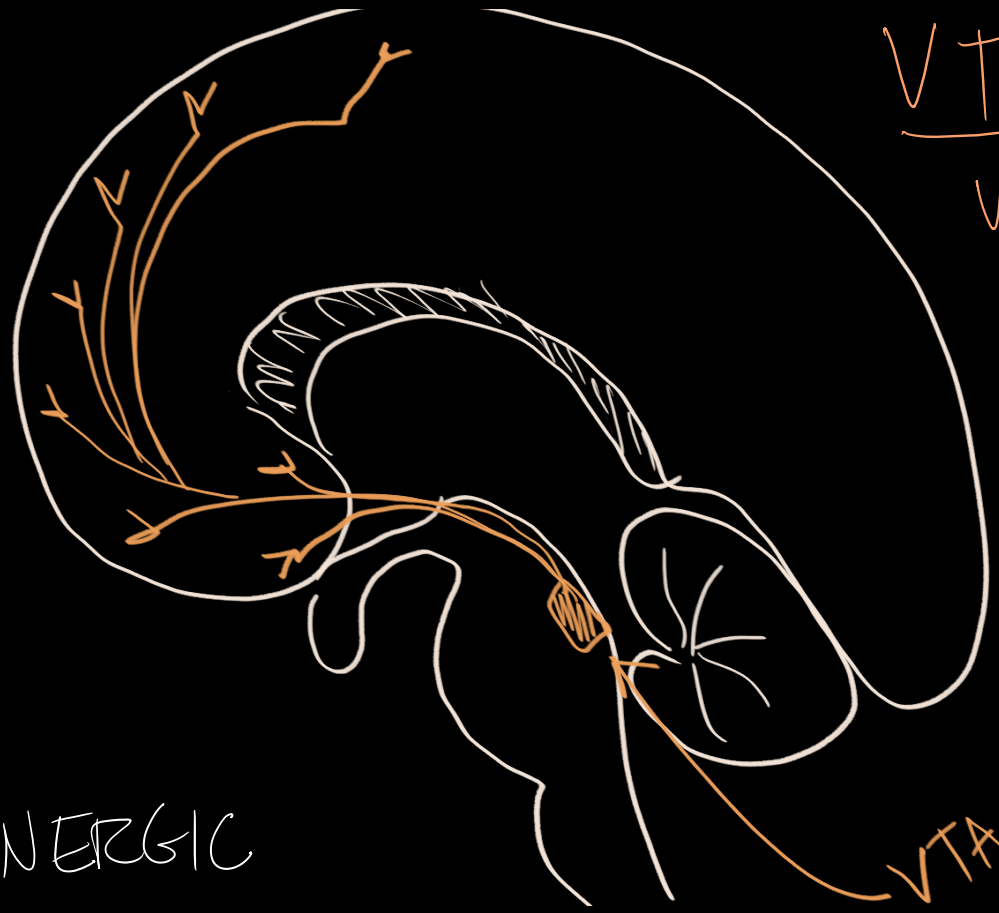
VTA:  
ventral tegmental  
area

SN:  
Substantia  
Nigra

VTA

SN

# THE DOPAMINERGIC SYSTEM

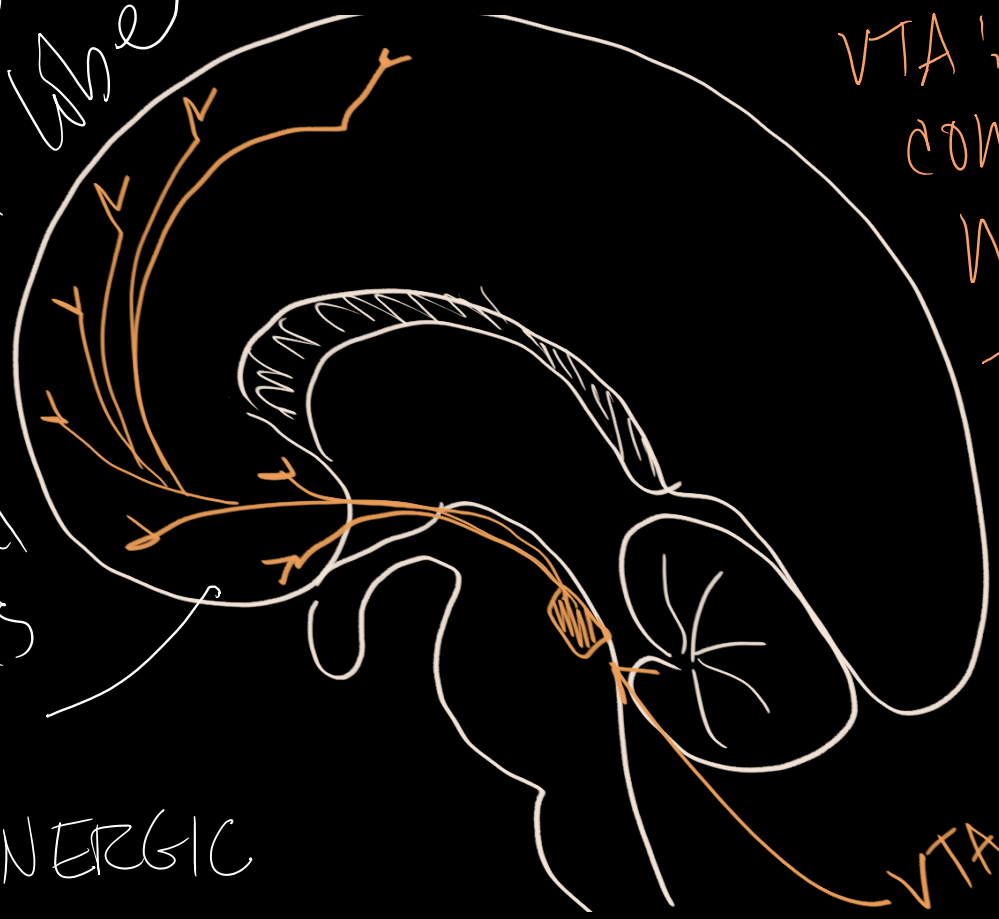


VTA  
ventral  
tegmental  
area

VTA

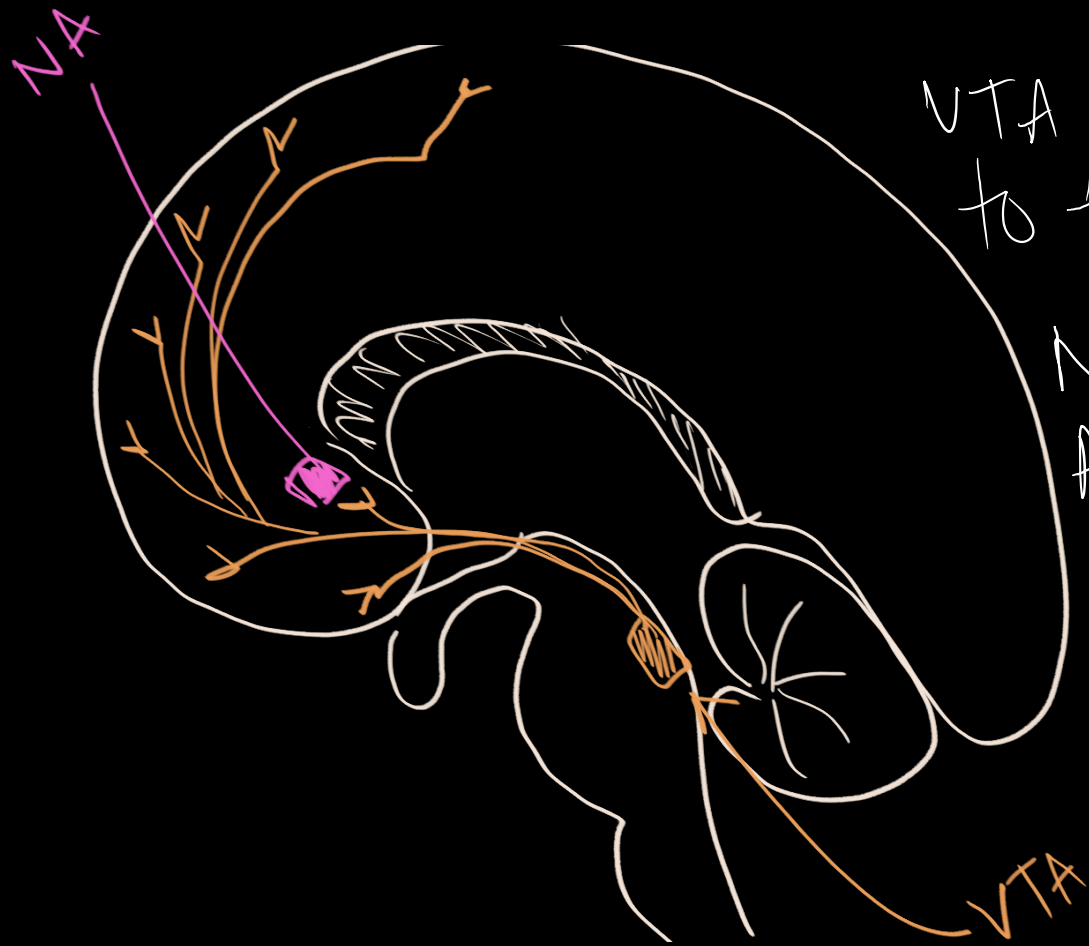


notice -  
VTA neurons  
project to  
the frontal lobe  
&  
emotional  
areas

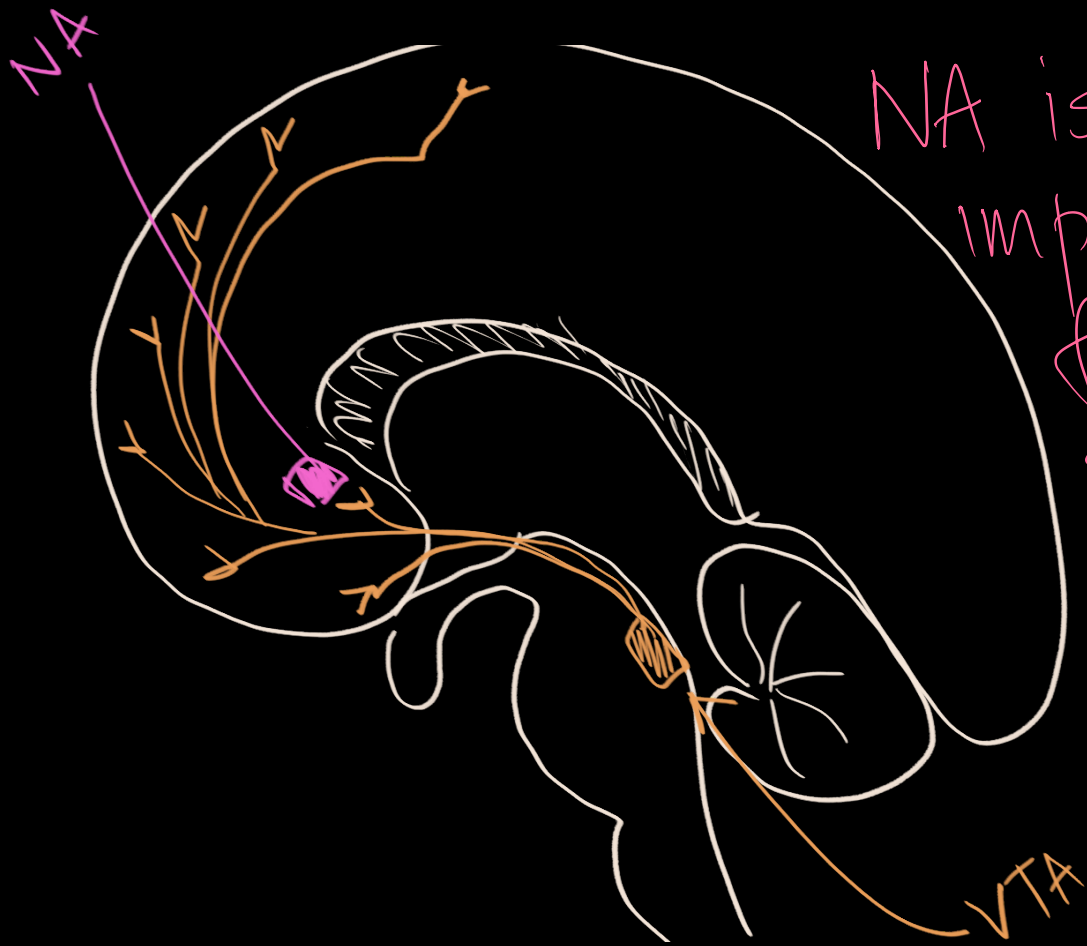


VTA!  
contains  
neurons  
that  
make  
dopamine!

# THE DOPAMINERGIC SYSTEM

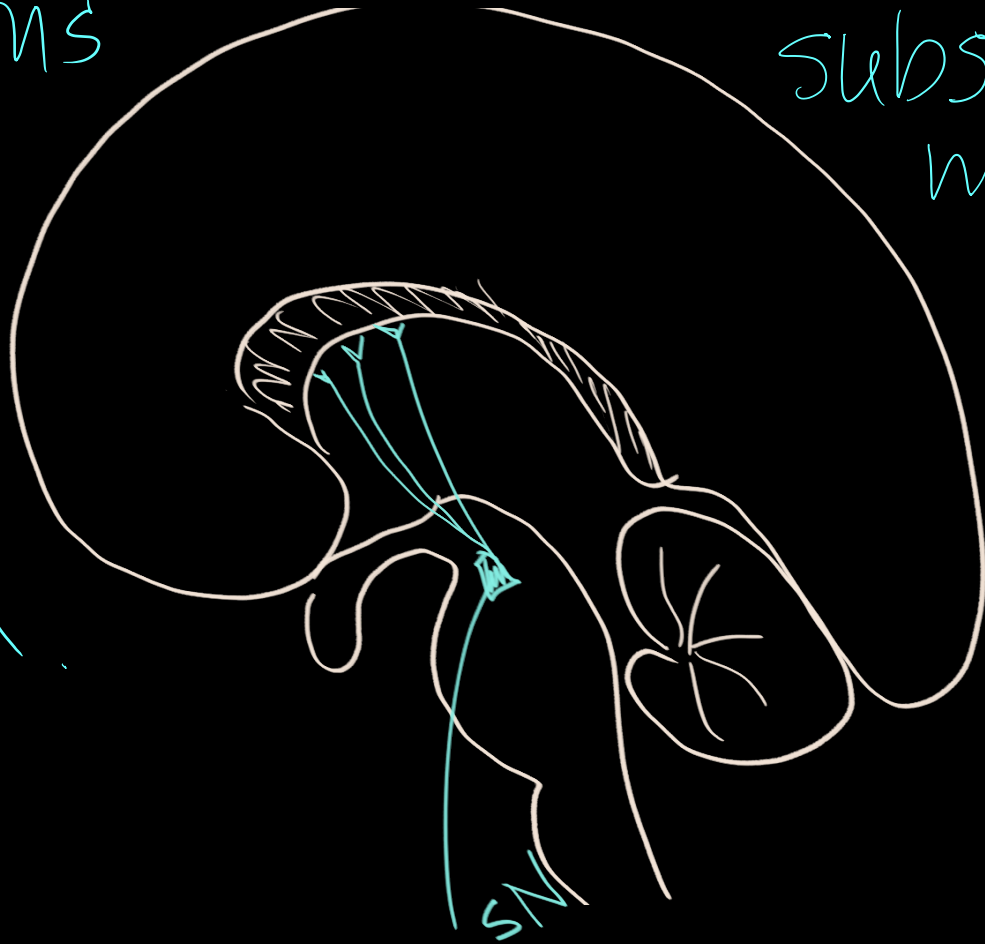


VTA also projects  
to the  
Nucleus  
Accumbens  
(NA)



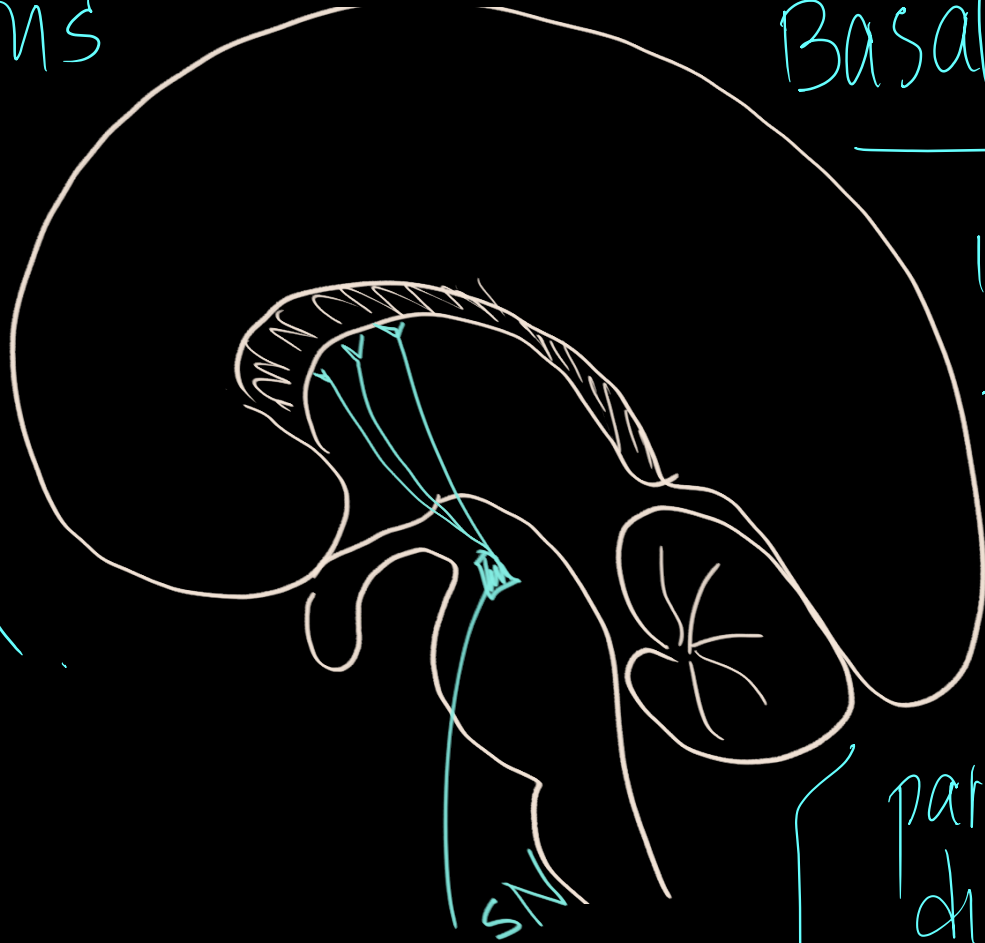
NA is very important for reward system

SN neurons  
project  
to the  
Basal  
ganglia.



Substantia  
nigra (SN)  
also  
contain  
dopaminergic  
neurons

SN neurons project to the Basal ganglia.



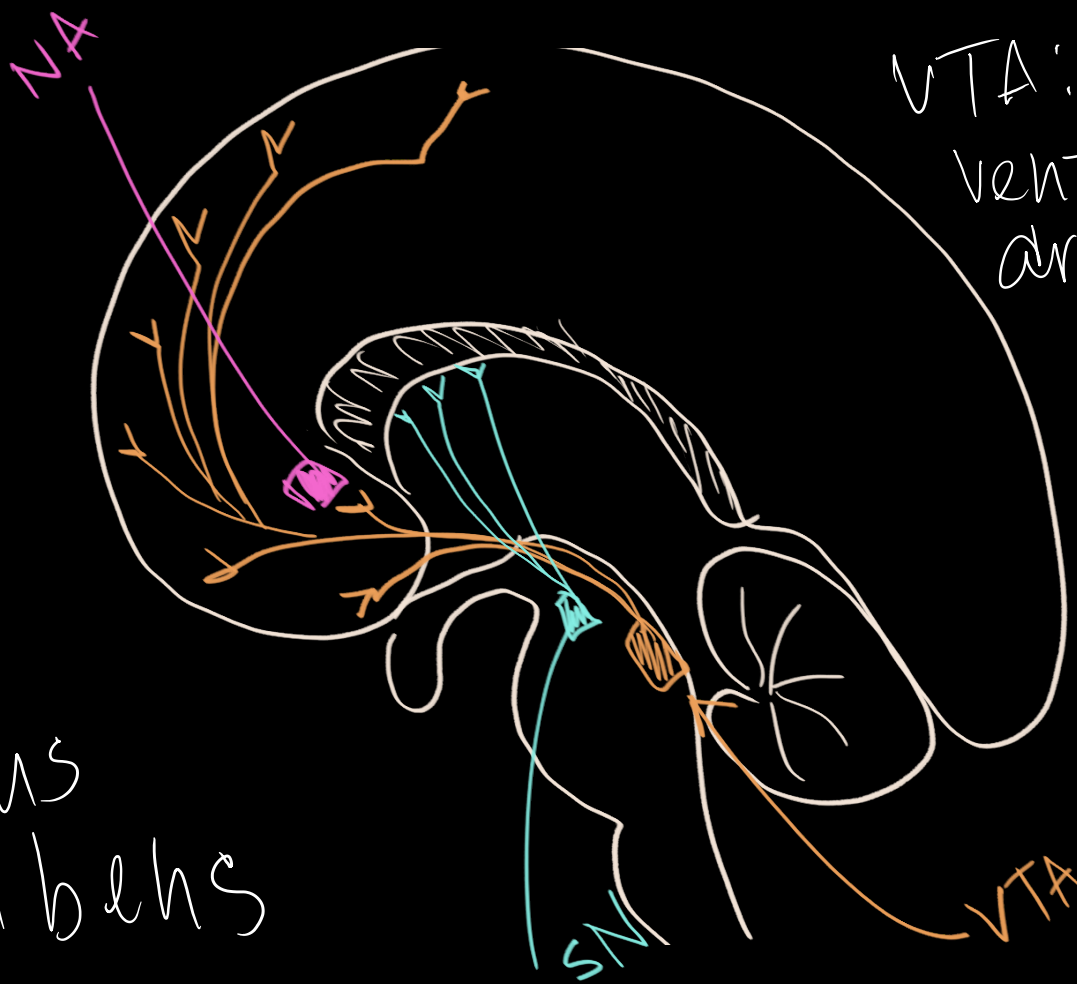
Basal Ganglia  
important for movement

parkinson's disease



DOPAMINERGIC SYSTEM

NA  
Nucleus  
Accumbens

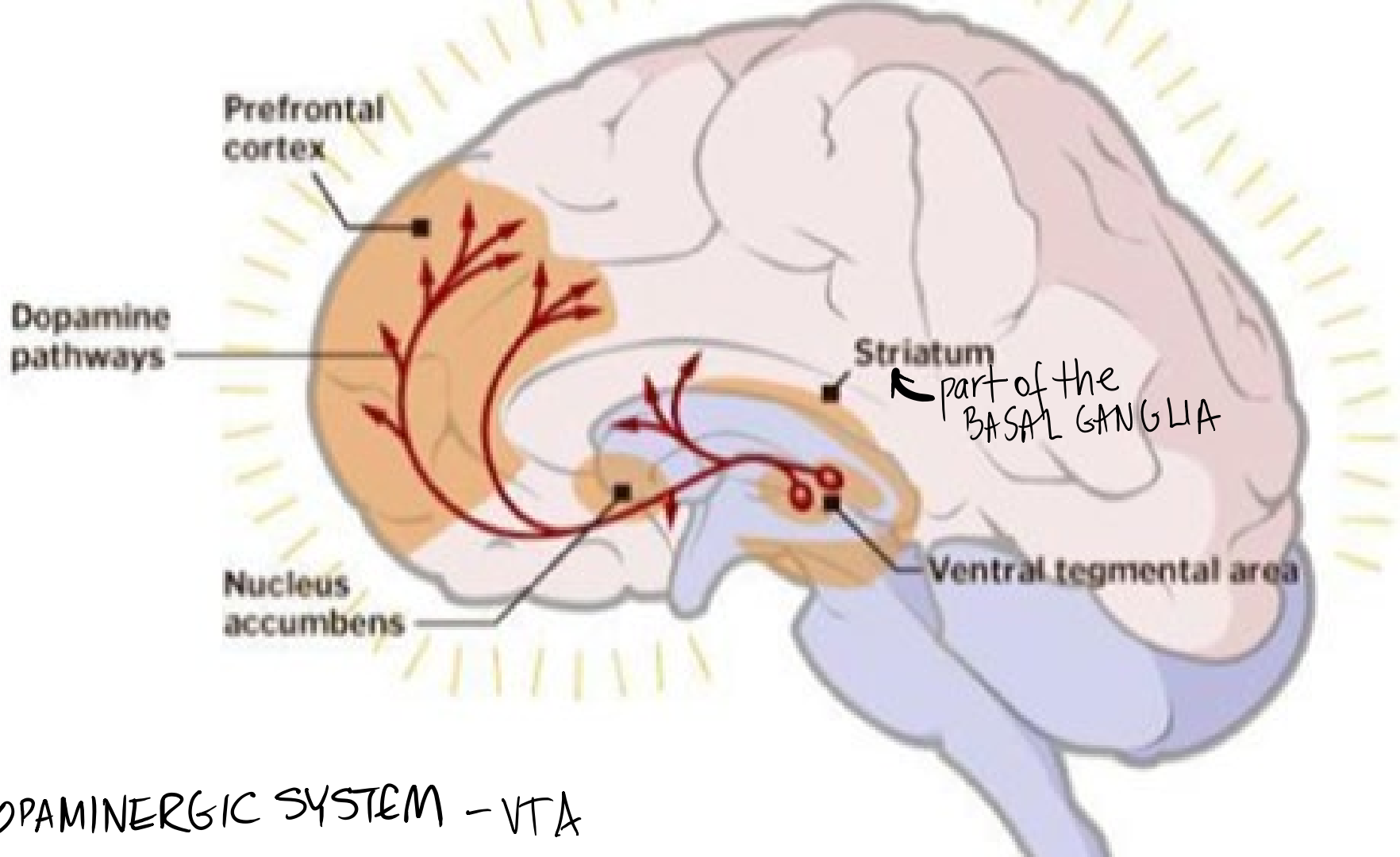


VTA:  
ventral temental  
area

SN:  
Substantia  
nigra

VTA

SN



DOPAMINERGIC SYSTEM - VTA