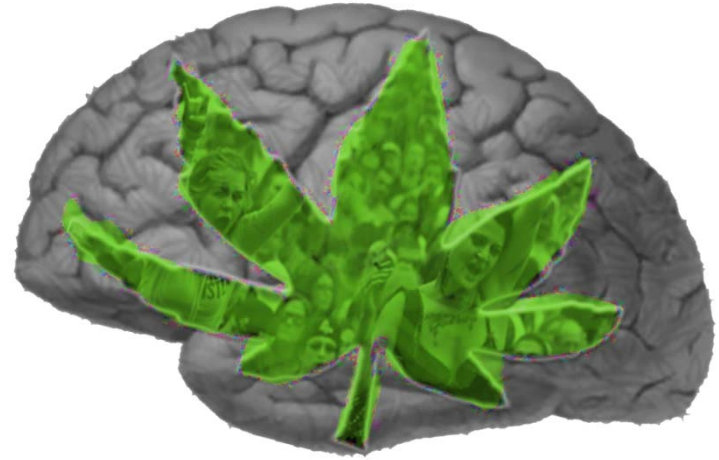


consequences?



marijuana and the teen brain

MARY ET BOYLE, PH. D.

DEPARTMENT OF COGNITIVE SCIENCE

UCSD

in this talk

what is marijuana?

the brain on
marijuana

is the teen brain
special?

current research



what is marijuana?



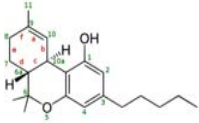
cannabis sativa plant

leaves, stems flowers

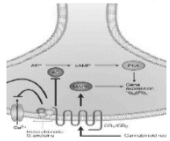
delta-9-
tetrahydrocannabinol
= Δ^9 -THC

main psychoactive
ingredient

Δ^9 -THC is the main psychoactive ingredient

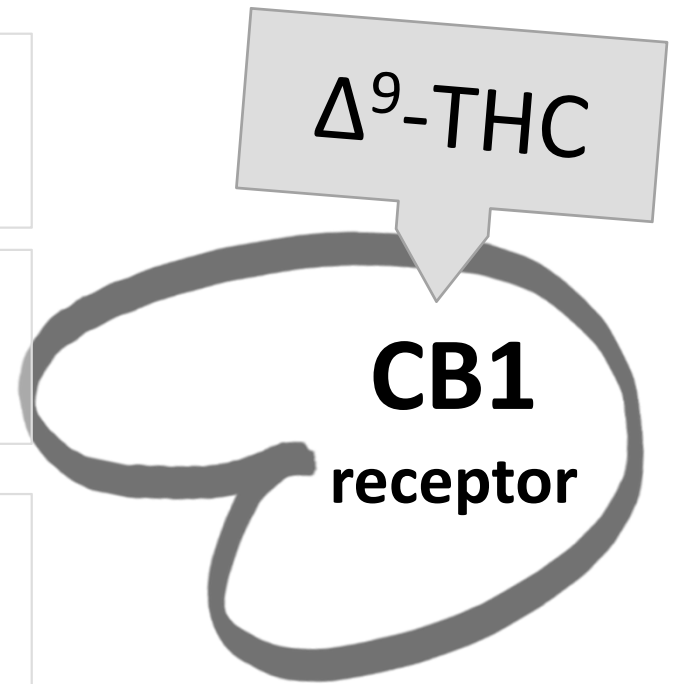


Δ^9 -THC activates cannabinoid1 (CB1) receptor in the brain.

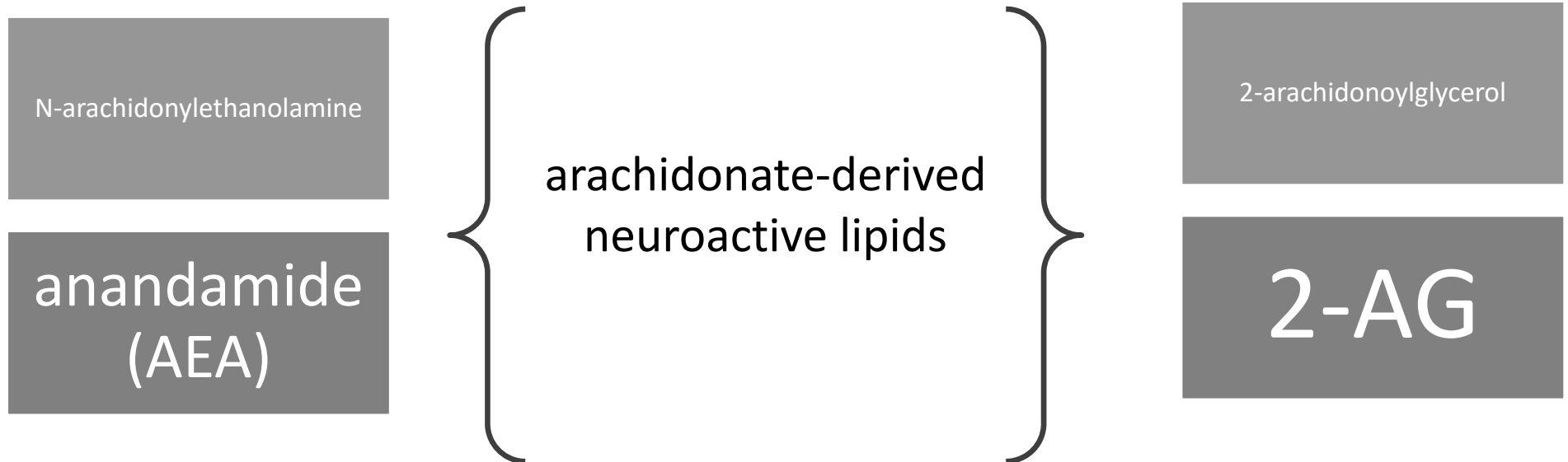


CB1 is expressed at high levels in many brain areas

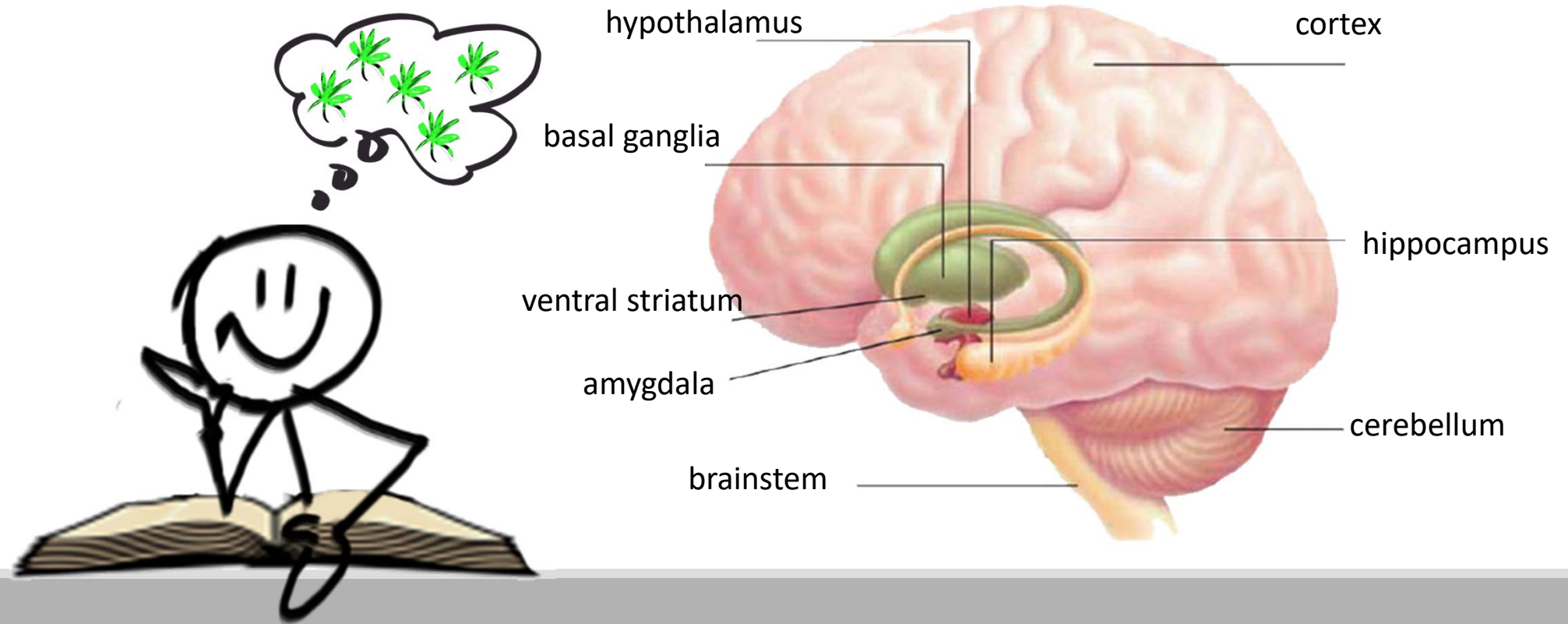
Two endogenous brain lipids have been identified as CB1 ligands



endocannabinoids – ligands for CB₁



what areas of the brain process marijuana?



hormones

appetite

circadian
rhythms

sexual
behavior

hypothalamus

basal ganglia

ventral striatum

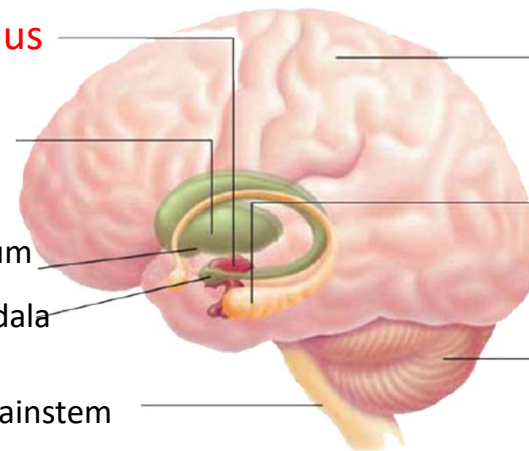
amygdala

brainstem

cortex

hippocampus

cerebellum

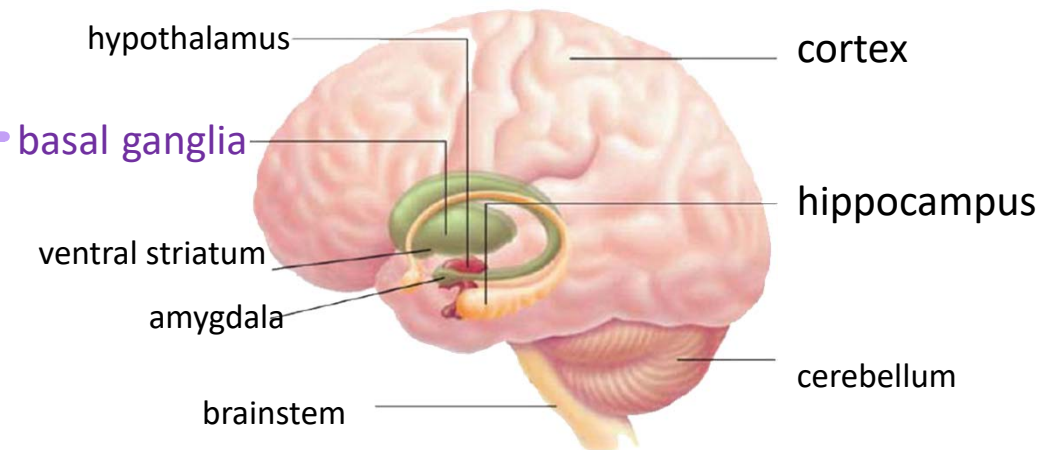


motor
controlled
planning

initiation of
actions

termination of
actions

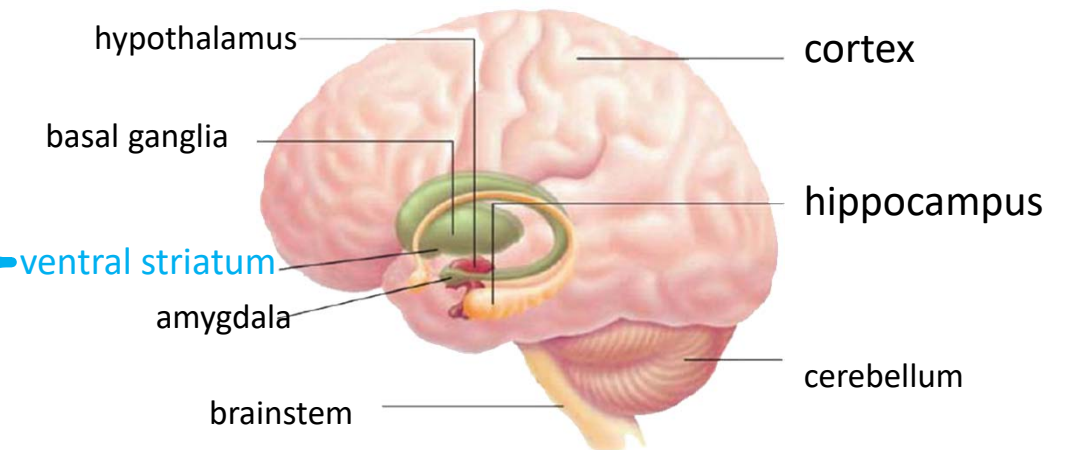
habit pathway



prediction

reward

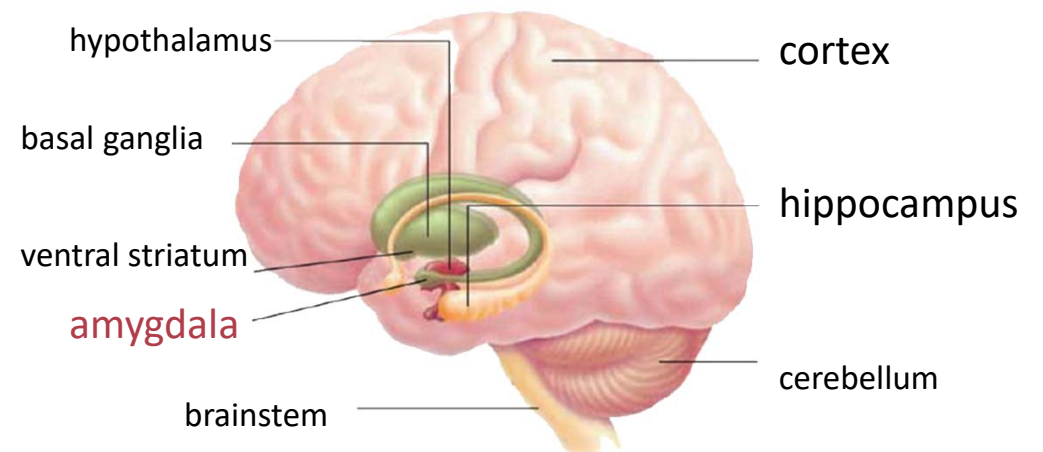
addiction?



anxiety

emotion

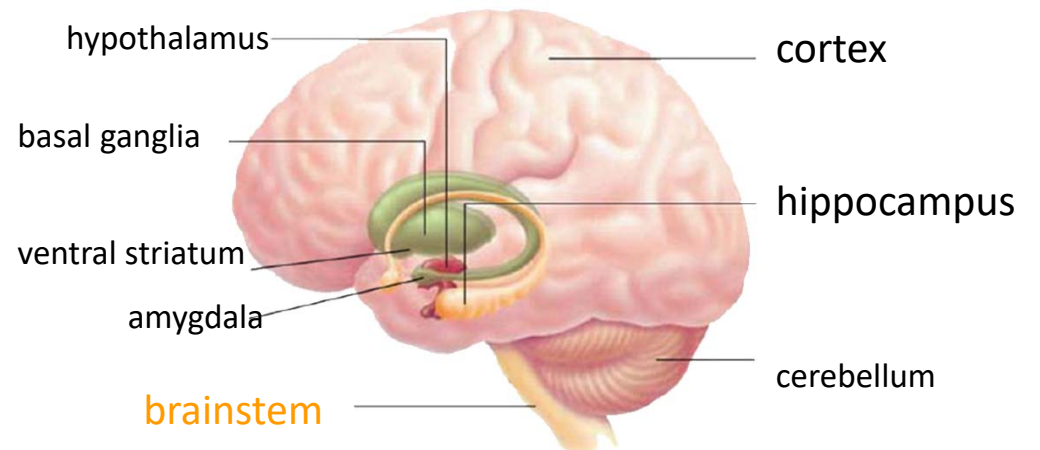
fear

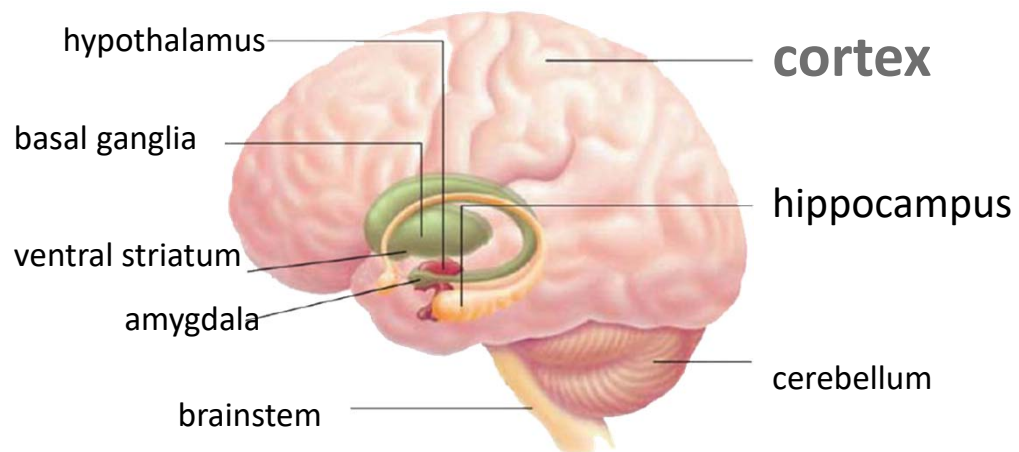


vomiting reflex

pain sensation

sympathetic
nervous system
reactions

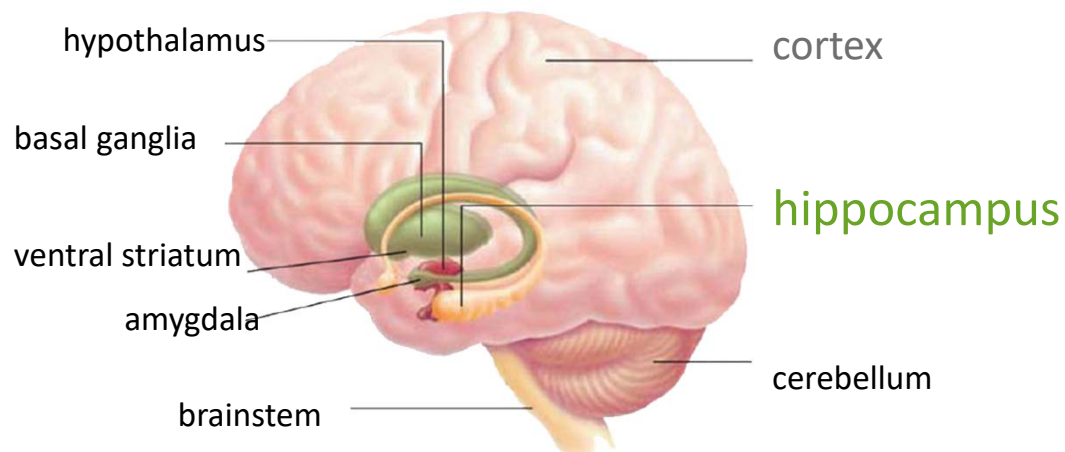




higher
cognitive
functions

sensation
perception

judgment and
pleasure

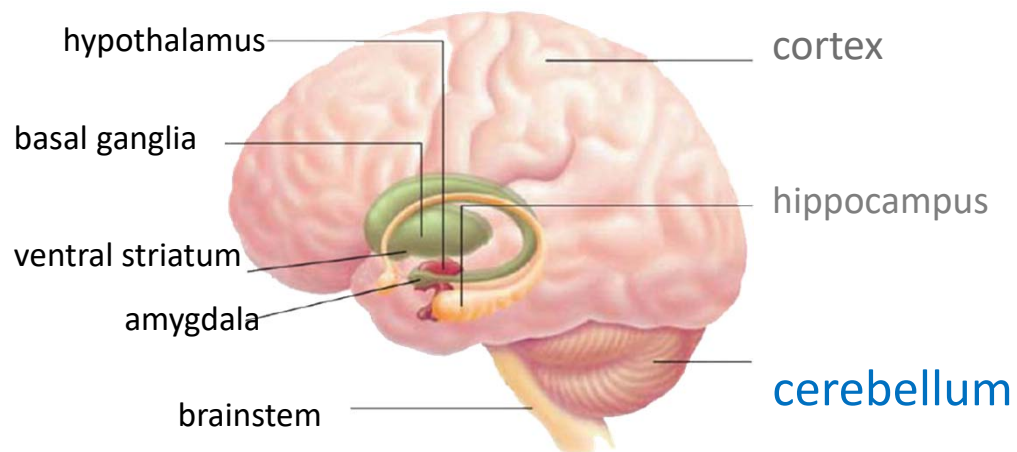


memory
formation

learning:
facts

sequences

places



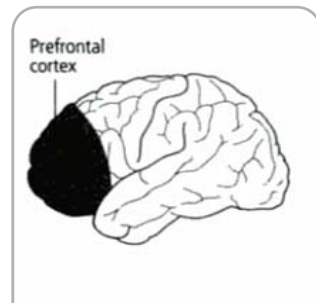
motor control

coordination

motor learning

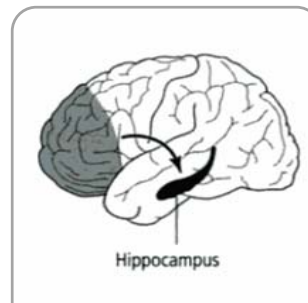
doubles risk of
car accident -
DUI

Explicit memory or declarative memory: objects, places, facts, people, and events.



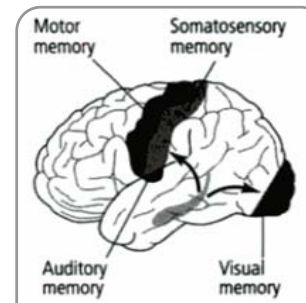
Short term
explicit
memory

1



Converted
to long
term
memories

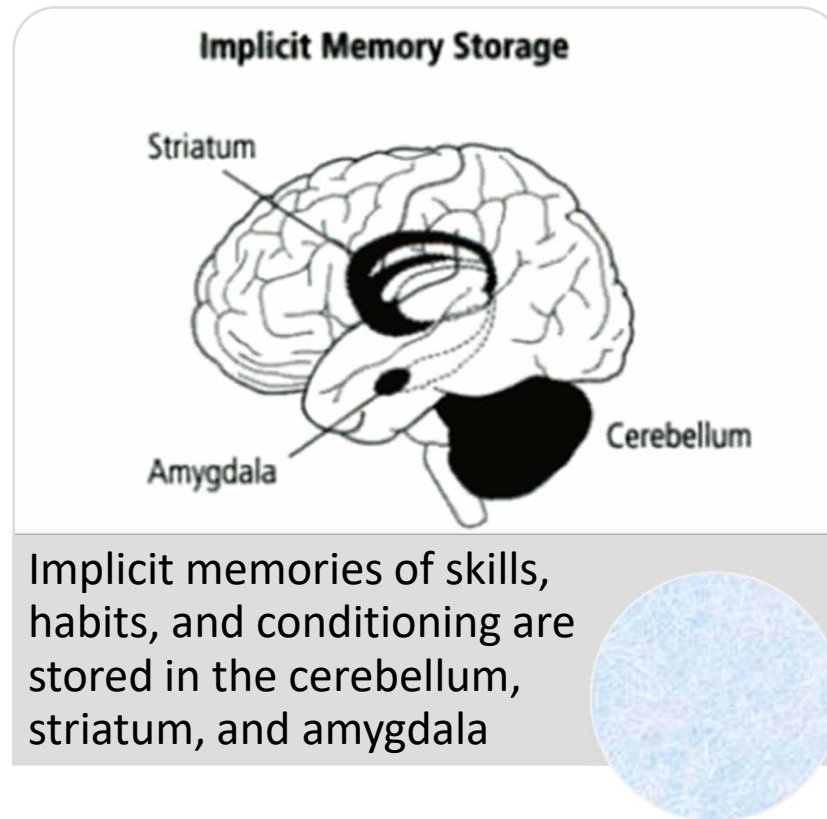
2

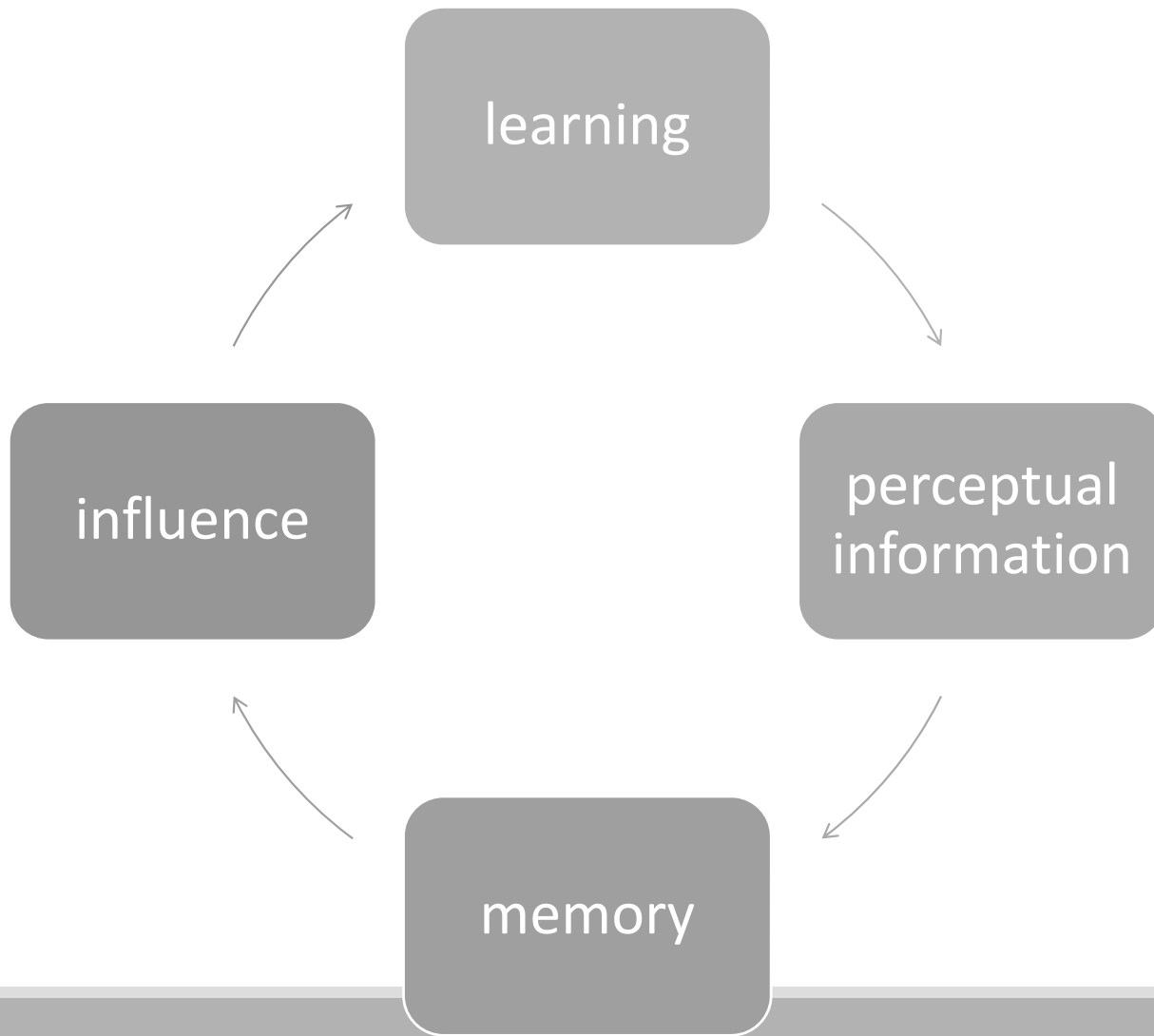


Stored in parts of
the cortex that
correspond to the
senses involved –
the same areas
that originally
processed the
information.

3

**Implicit memory or procedural memory:
skills, habits, and conditioning.**





How do endocannabinoids affect synaptic transmission?

