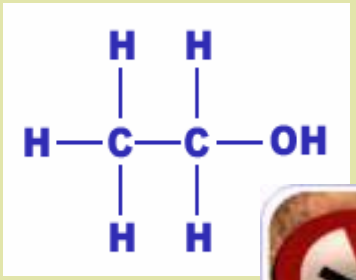
ผลของ

แอลกอฮอล์และบุหรี่

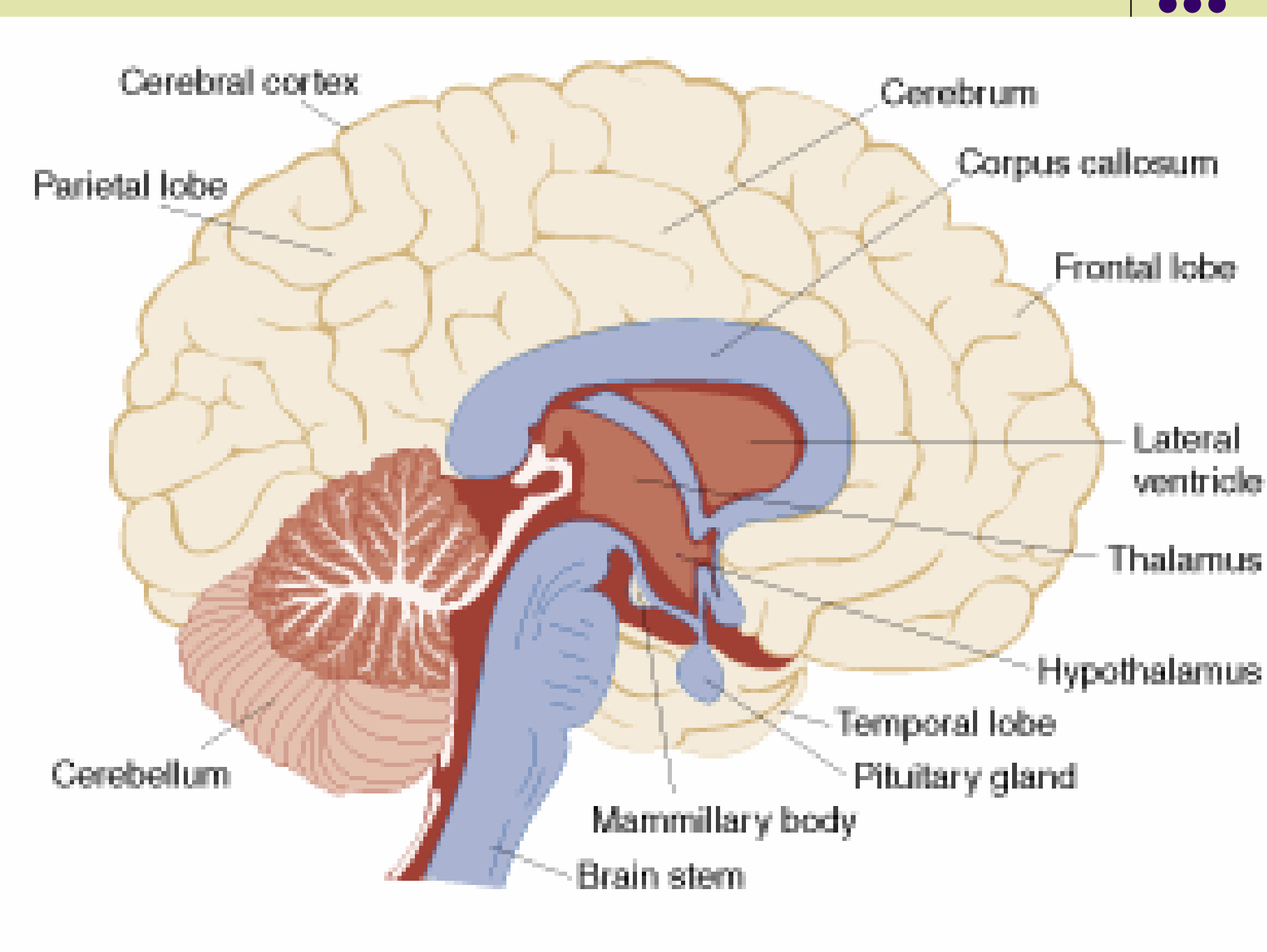
ต่อสมอง

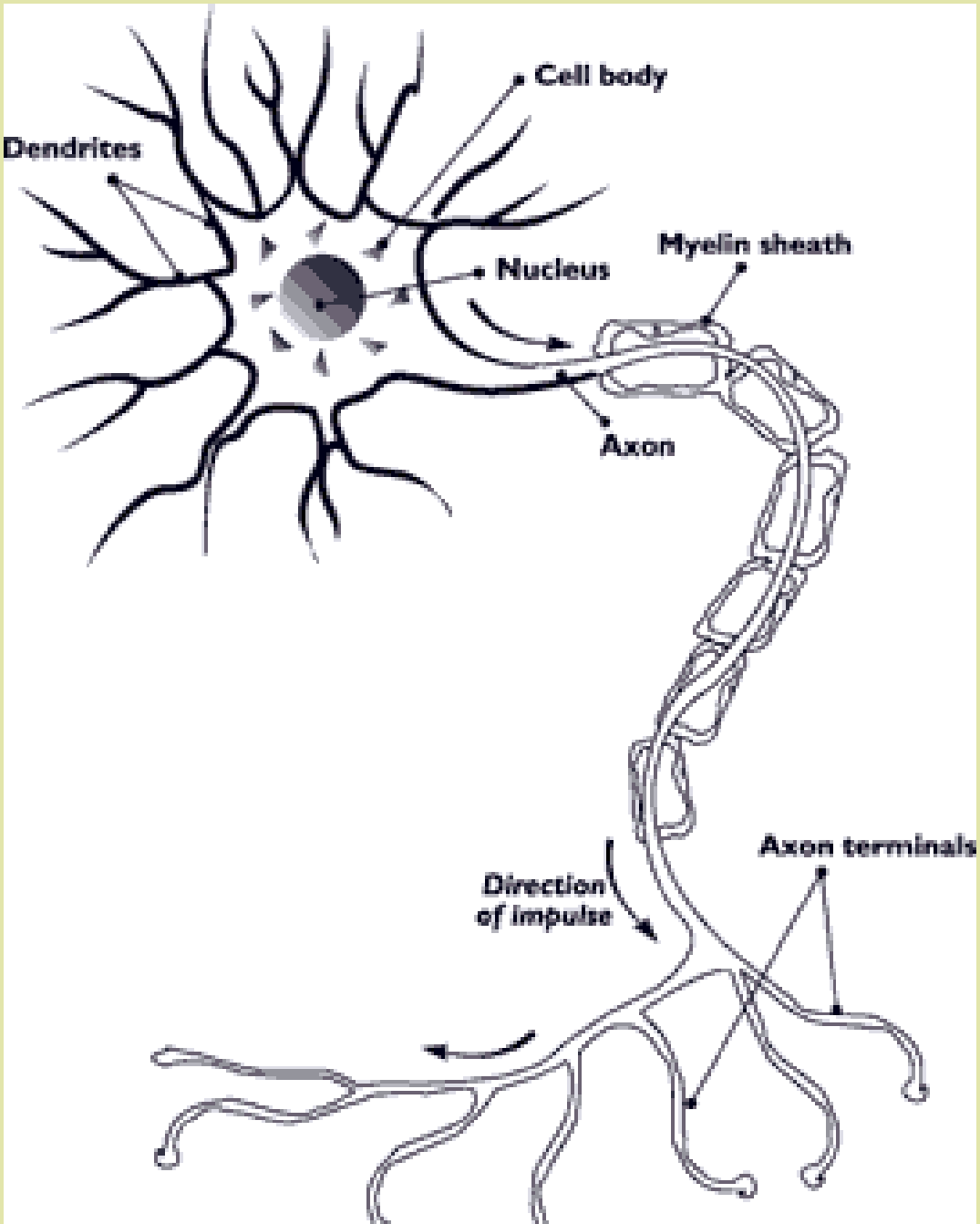


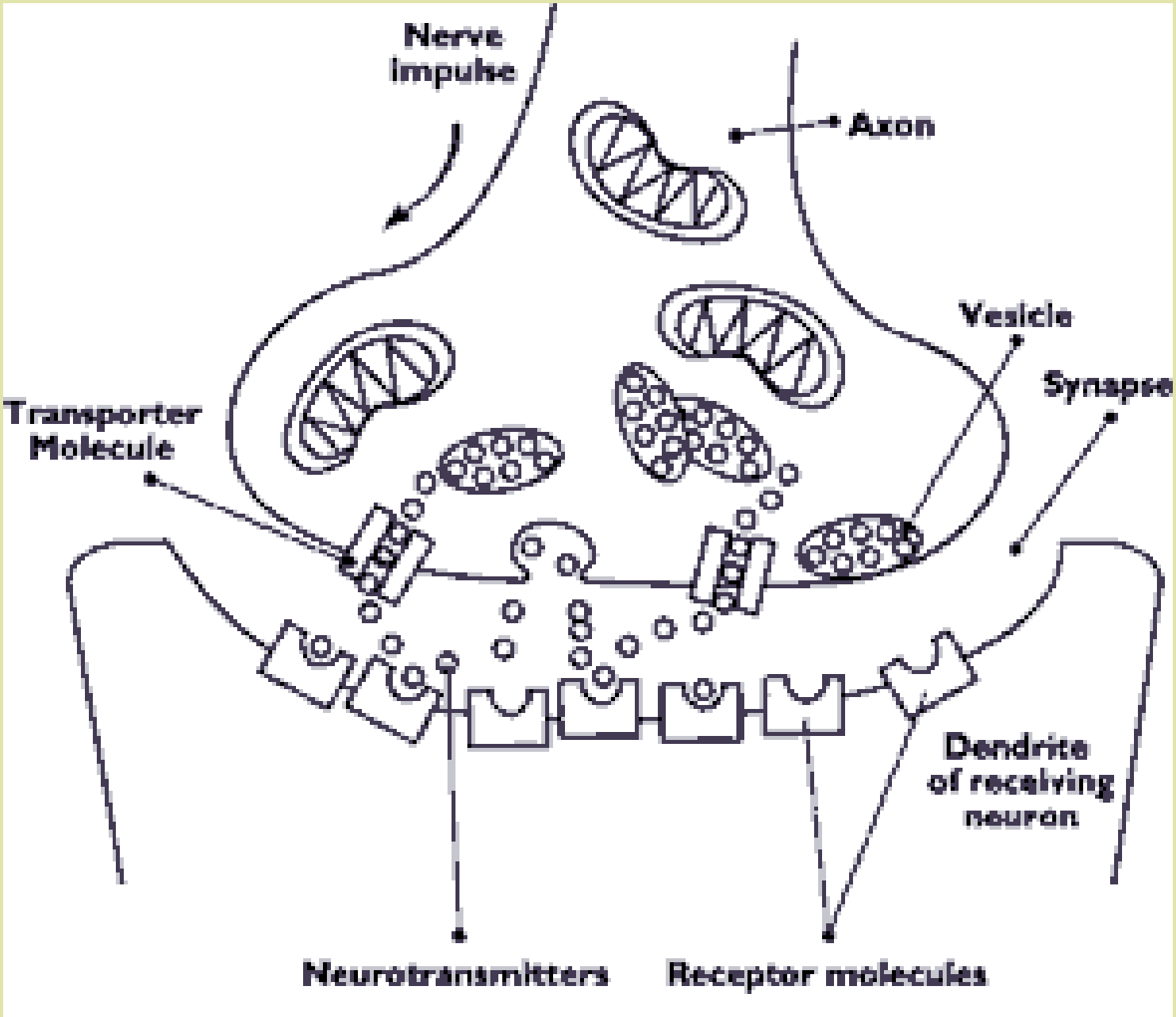
พ.ญ. สาวิตรี อัษณางค์กรชัย

ภาควิชาจิตเวชศาสตร์ คณะแพทยศาสตร์

มหาวิทยาลัยสงขลานครินทร์


Cerebral cortex
Cerebrum
Parietal lobe
Corpus callosum
Frontal lobe
Lateral ventricle
Thalamus
Hypothalamus
Temporal lobe
Pituitary gland
Cerebellum
Mammillary body
Brain stem


Cell body
Dendrites
Myelin sheath
Nucleus
Axon
Axon terminals
Direction of impulse


Nerve Impulse
Axon
Vesicle
Synapse
Transporter Molecule
Dendrite of receiving neuron
Neurotransmitters
Receptor molecules

Neurotransmitters

Gamma-aminobutyric acid - GABA

inhibitory neurotransmitter

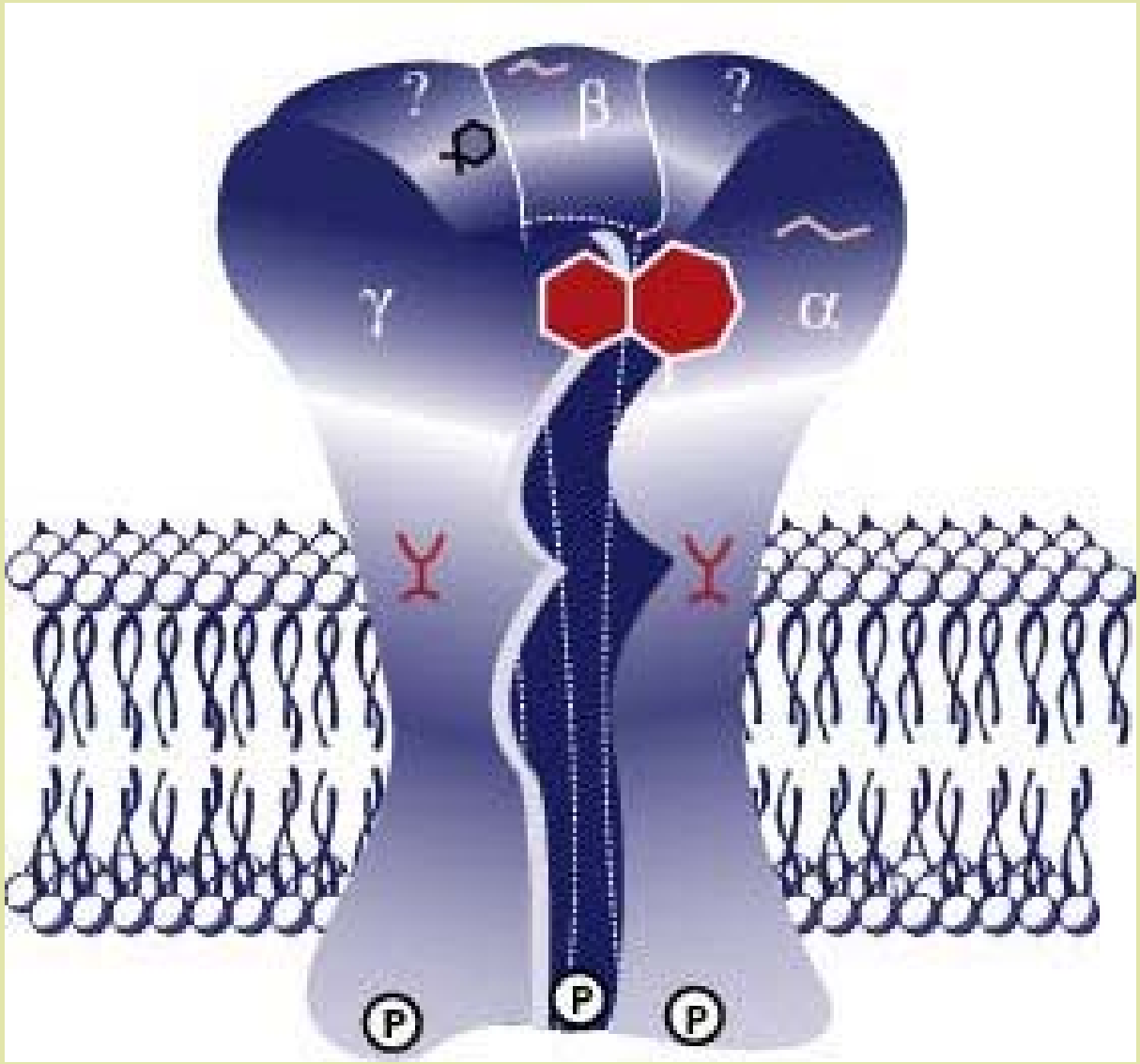
Activating GABA receptors

-Hyperpolarize postsynaptic membrane.

⇨ Decreased brain and body activity

⇨⇨ general anesthesia

GABA receptors : $GABA_A$, $GABA_B$, $GABA_C$



Schematic representation of the gamma aminobutyric acid ($GABA_A$) receptor.

Neurotransmitters

Glutamate

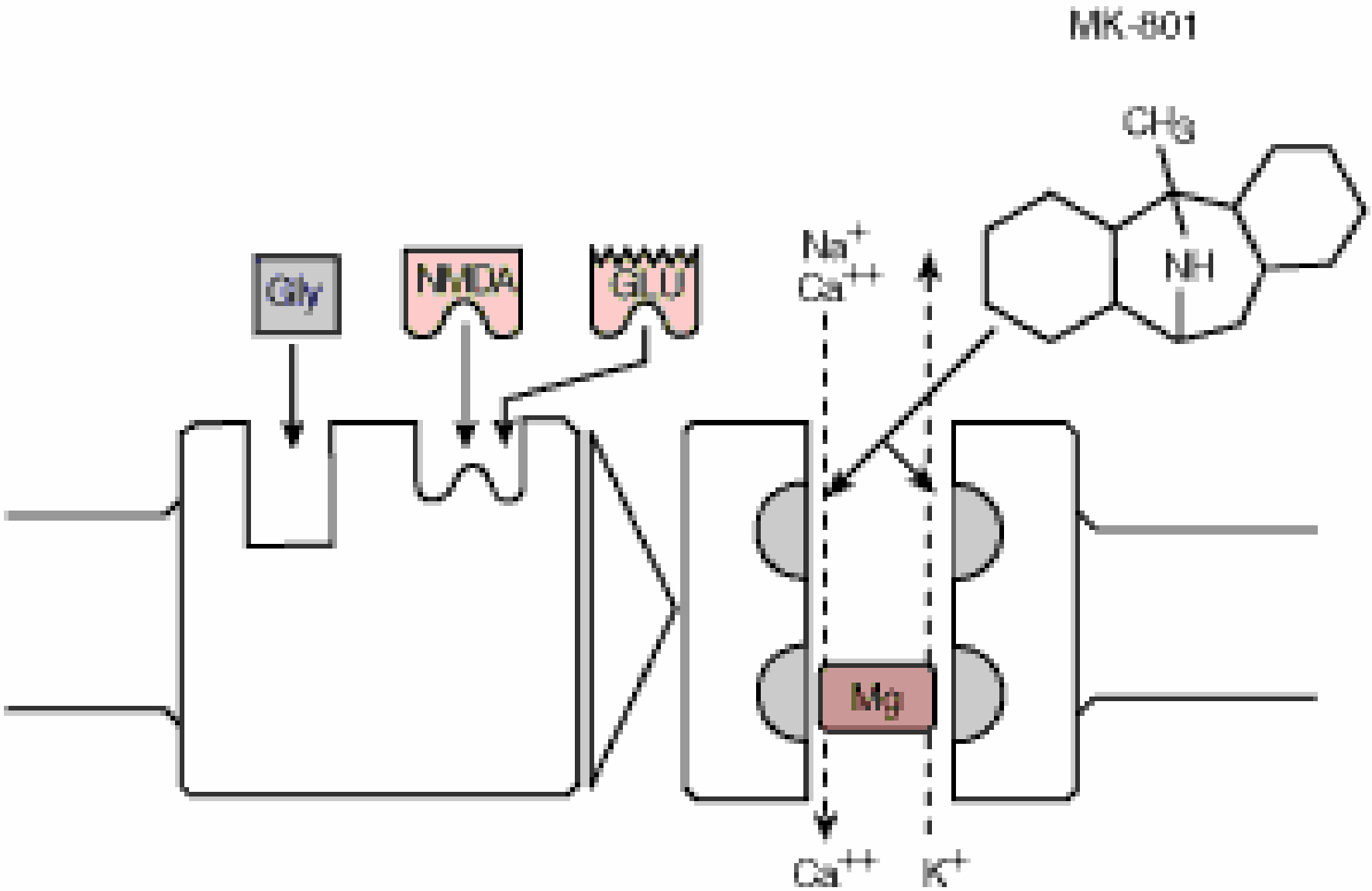
excitatory neurotransmitter

Activating Glutamate receptors

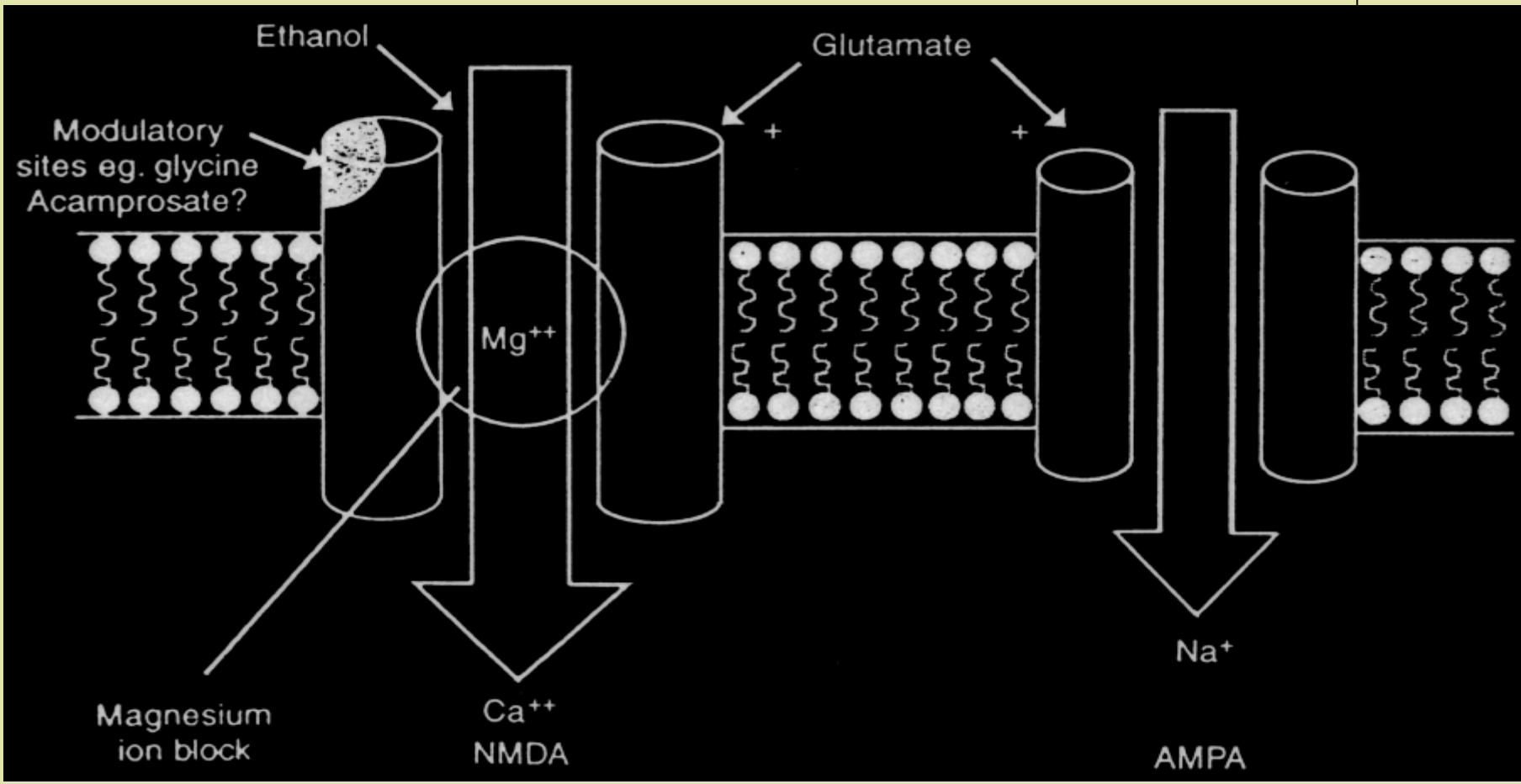
-Depolarize postsynaptic membrane.

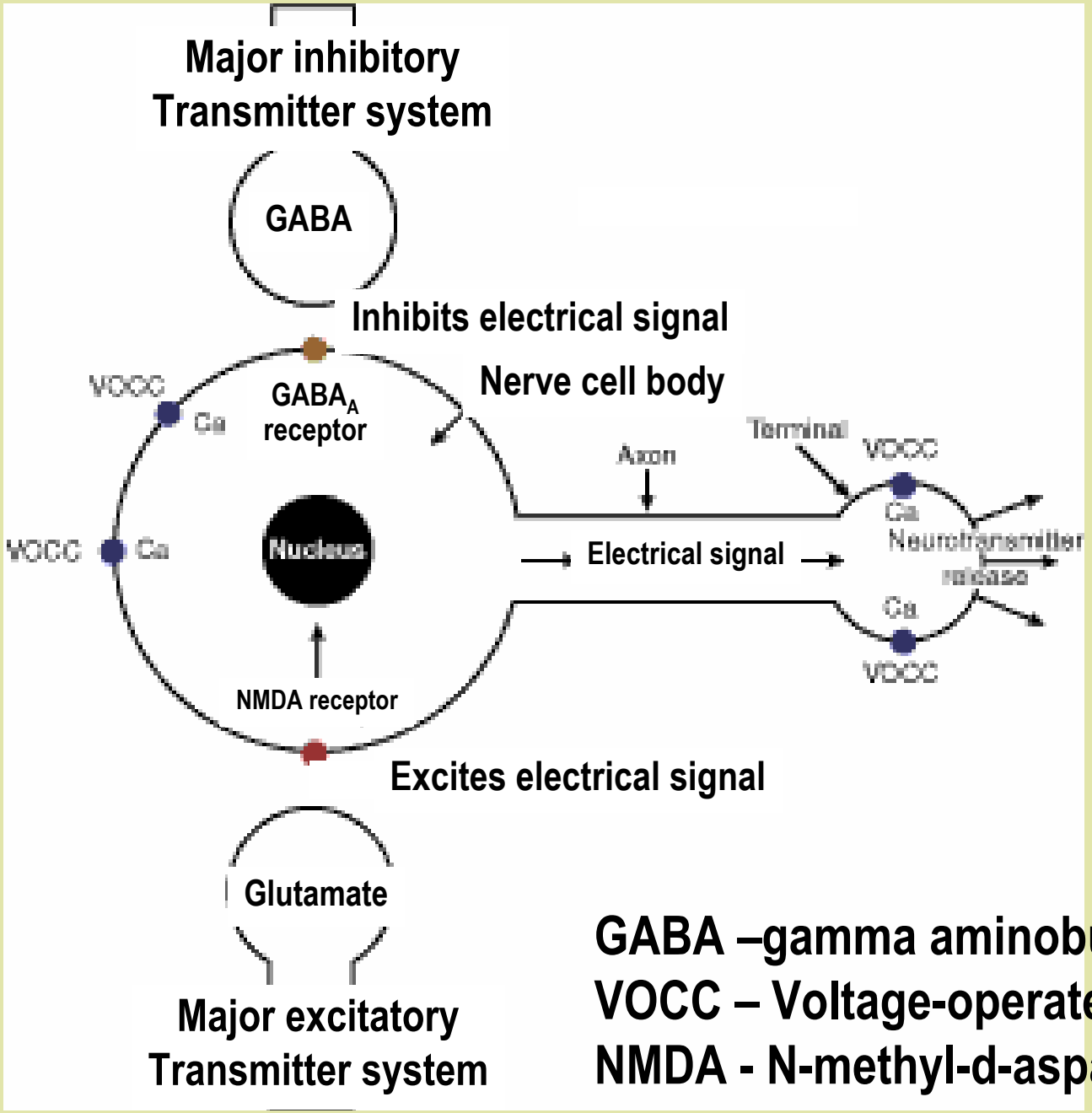
⇨ Hyperexcitability of the brain and body

⇨⇨ seizures


MK-801
CH3
NH
Gly
NMDA
GLU
Na+
Ca++
Mg
Ca++
K+

Alcohol's Actions on Glutamate Neurotransmission

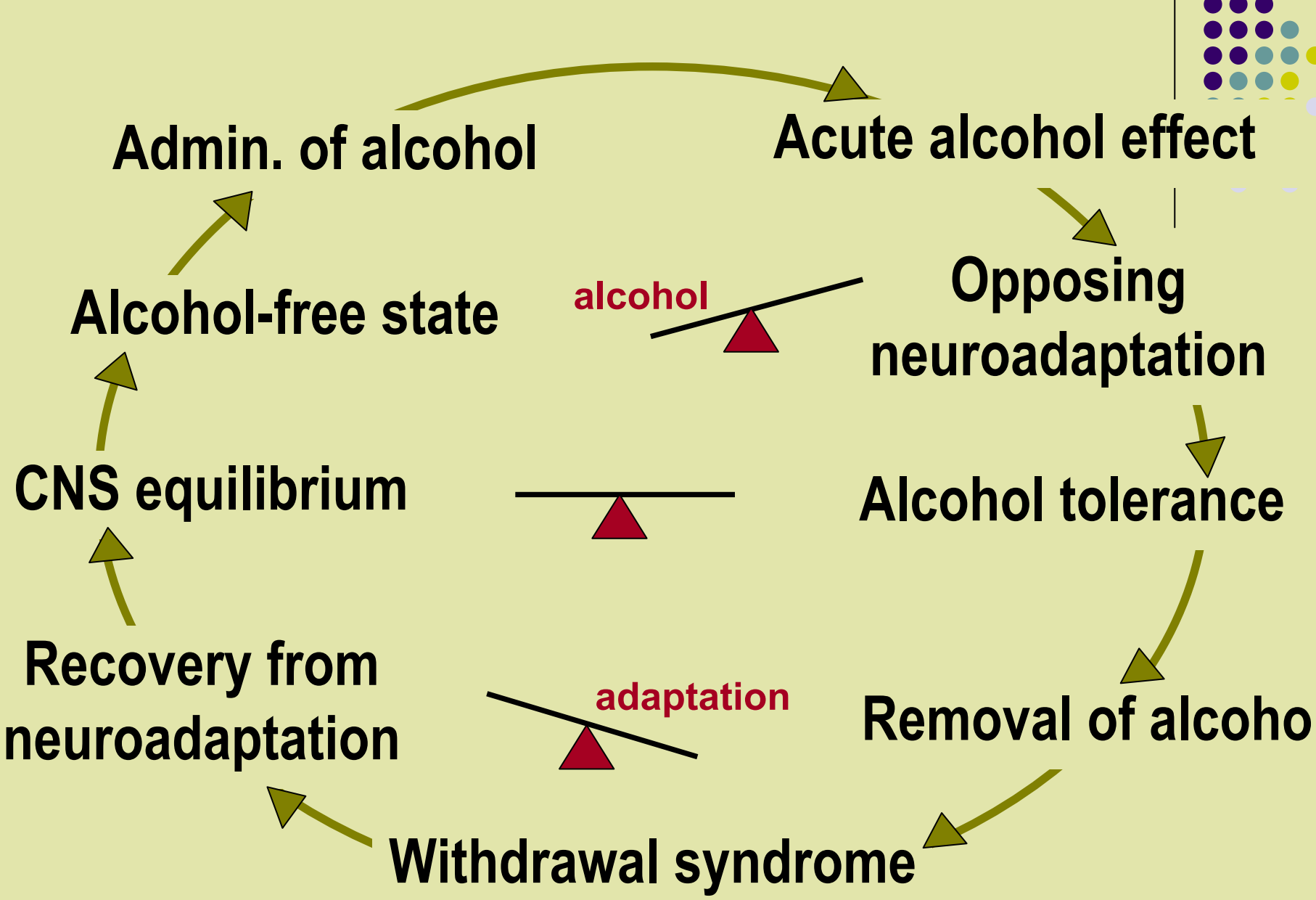




GABA –gamma aminobutyric acid

VOCC – Voltage-operated calcium channels

NMDA - N-methyl-d-aspartate



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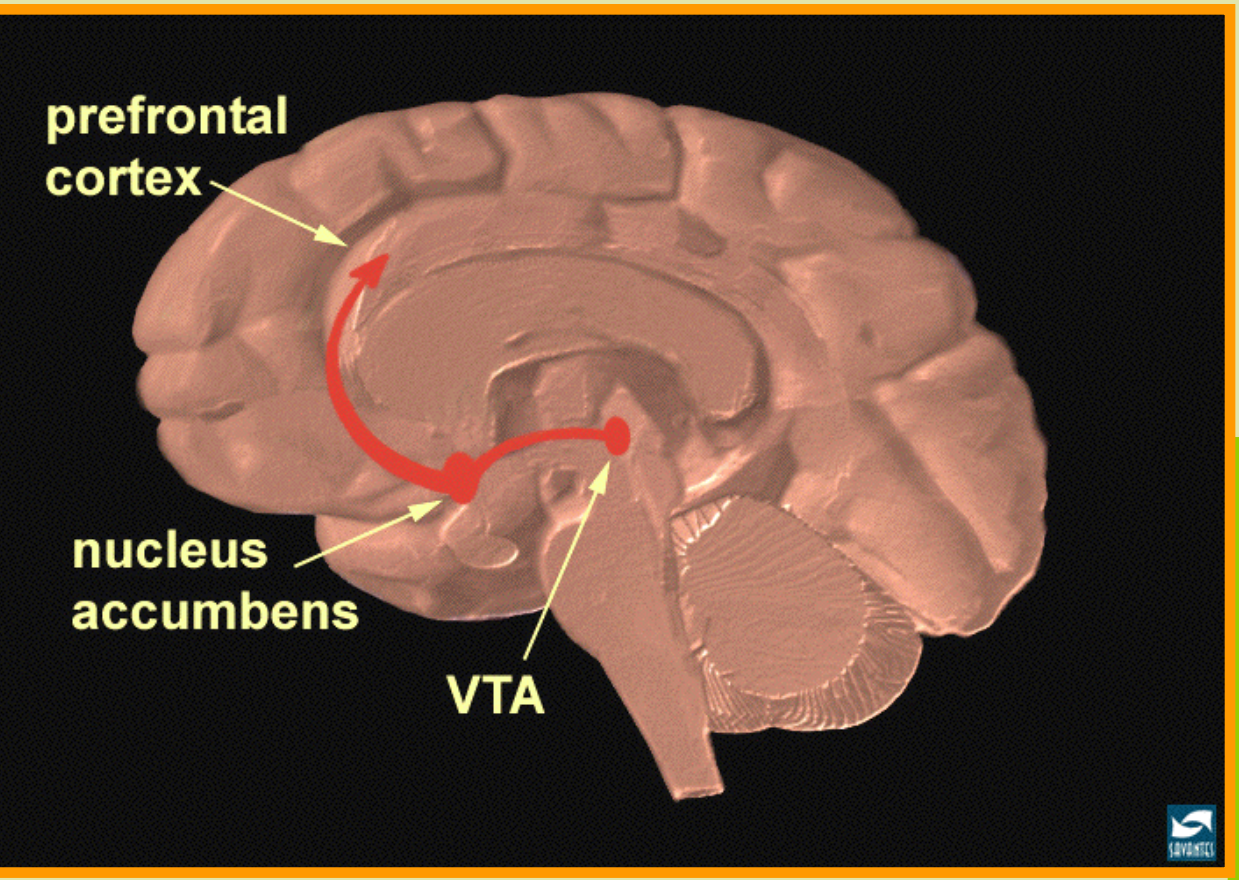
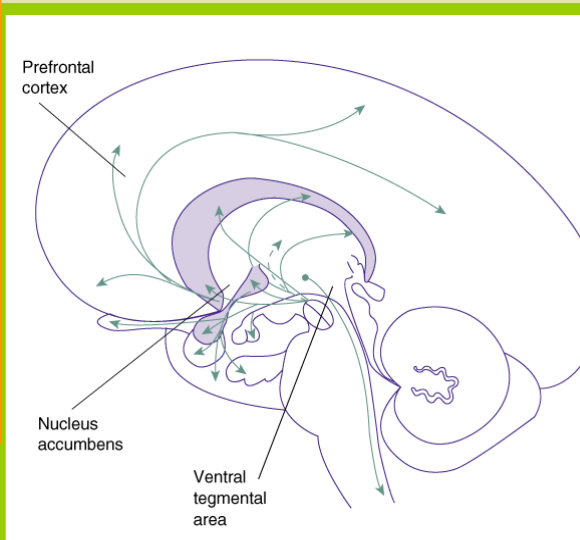
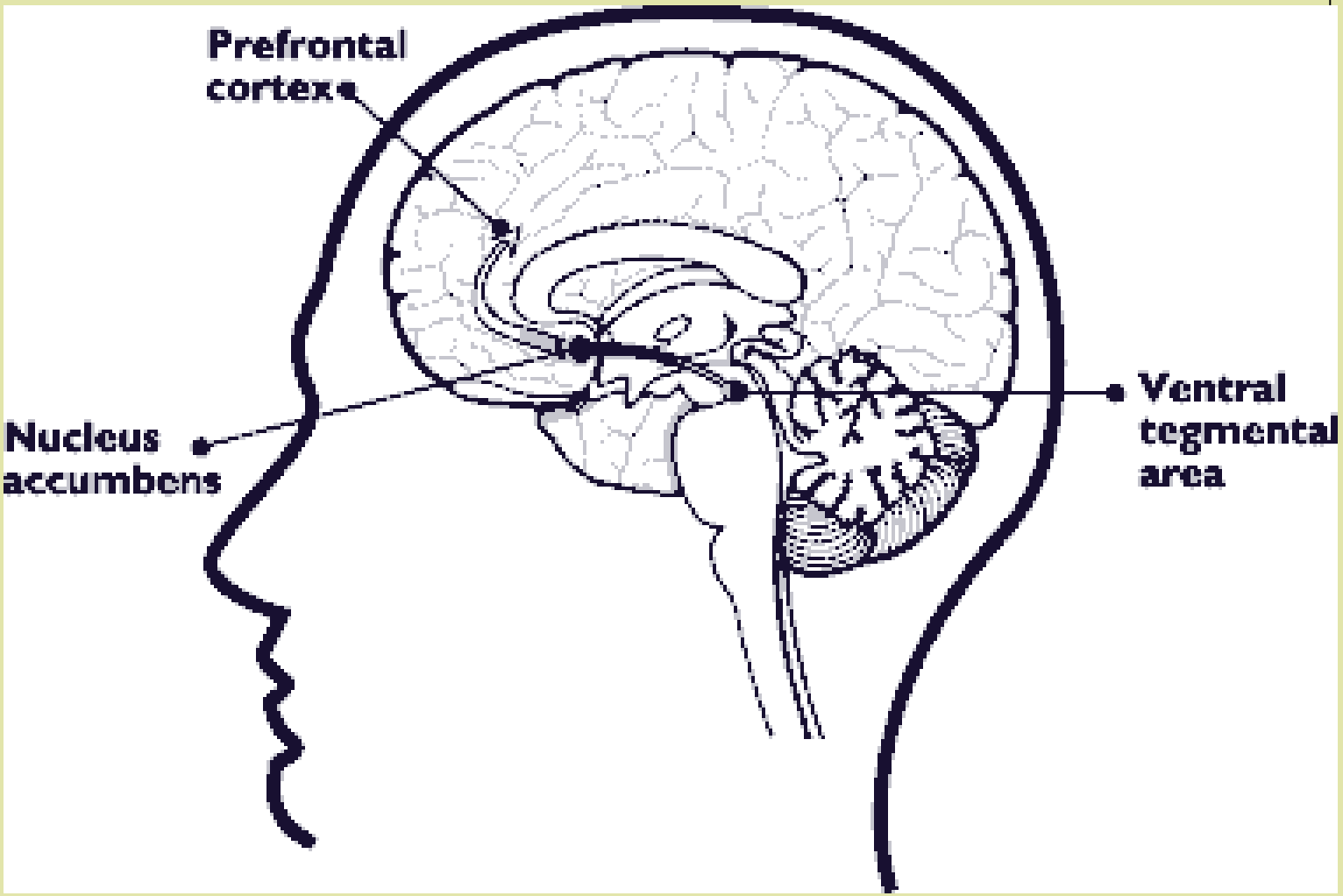
Brain reward pathway

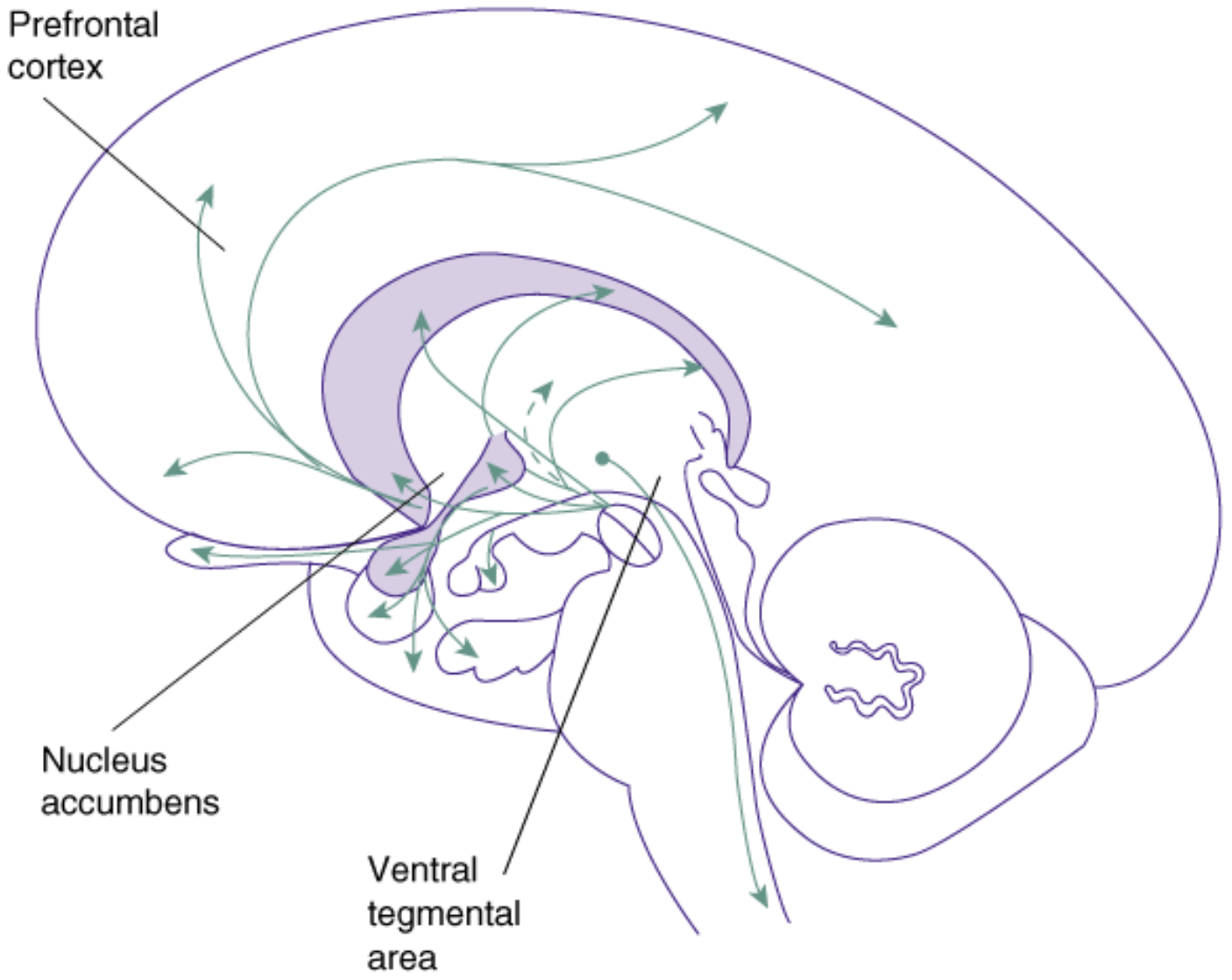
- Mesolimbic dopamine pathway
- Mesocorticol dopamine pathway







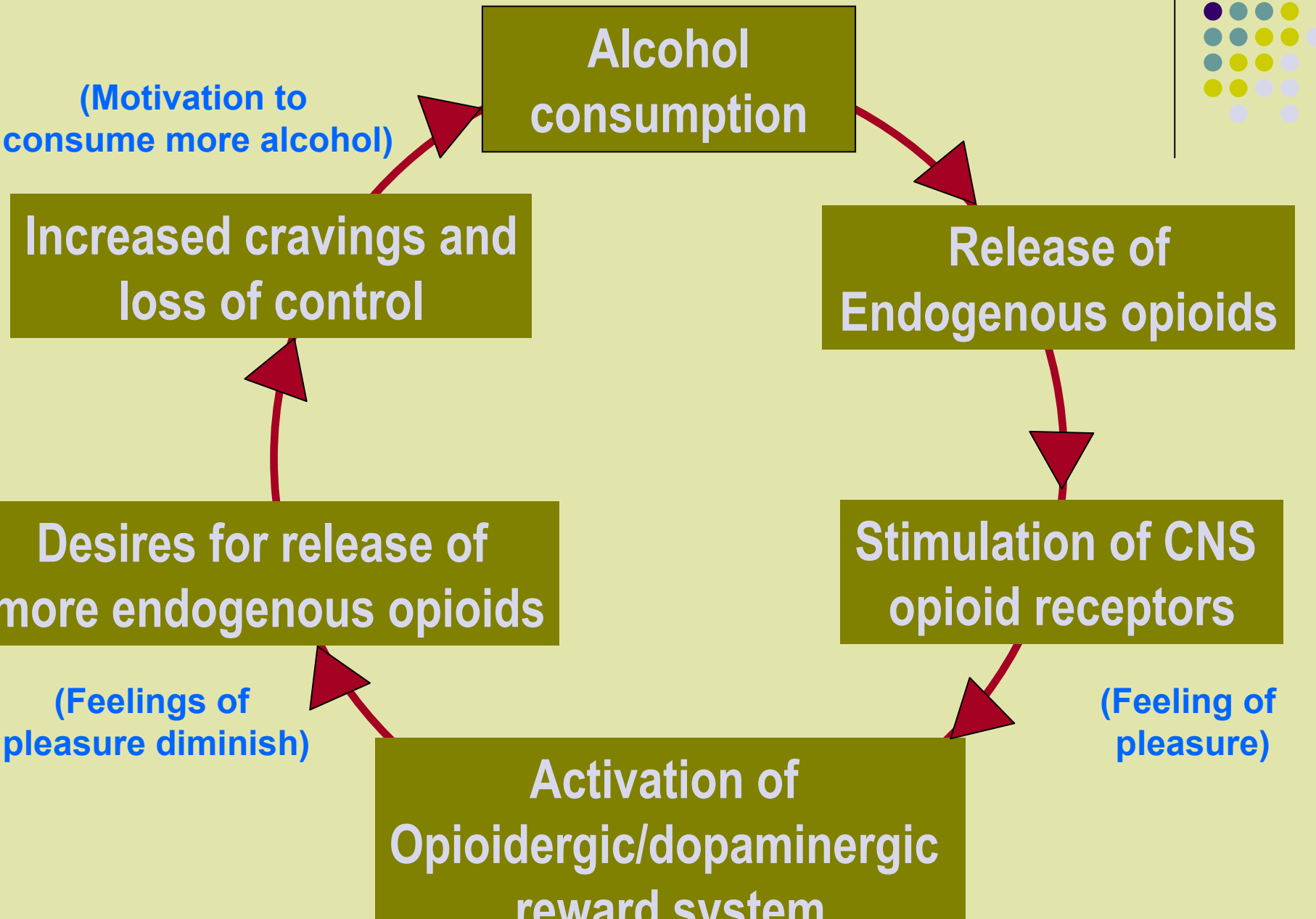
Pleasure circuit (mesolimbic dopamine system)


Prefrontal
cortex
Nucleus
accumbens
Ventral
tegmental
area

Dopamine release in NA

Reward	Acute	Repeat	Withdraw
Natural	+	-	-
Opioids	+	++	reduced
Stimulant	+	++	reduced
Alcohol	+	+	reduced
Nicotine	+	+	reduced

The vicious circle of alcohol dependence



Serotonin

Regulates physiologic functions;

body rhythms, sleep, mood, appetite, consumatory behaviours

Alcohol

- **given acutely** ⇧ **release of serotonin**
- **chronic** ⇩ **amount of serotonin stored in the CNS**

$5HT_1$

- General consummatory behaviours,

  ⇨ alcohol intoxication, alcoholism

$5HT_2$

- Alcohol's rewarding effects

  ⇨ acute physical withdrawal symptoms

$5HT_3$

- Alcohol's rewarding effects

  ⇨ Increased release of dopamine in NA

Lovinger 1997

Effects of nicotine

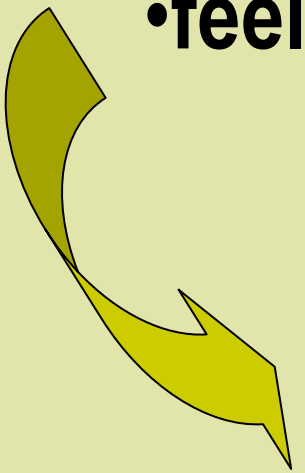
Nicotinic receptors
on dopaminergic cell bodies of the VTA.

Other neurotransmitters

- Acetylcholine
- Glutamate
- Norepinephrine
- Serotonine

Nicotine - Psychostimulant
Dose-dependent biphasic effects

- activating nicotinic acetylcholine receptors
- increasing neuronal firing rate
- feeling of alertness



- Desensitization to nicotinic acetylcholine receptors
- reducing the firing rate
- sense of relaxation

Nicotine effects on CNS

Electrocortical activation

Increases brain serotonin

endogenous opioid peptides

pituitary hormone, catecholamines, vasopressin

- **Enhancement of**
  pleasure, task performance, memory,
- **Reduction of anxiety, tension, pain**
- **Avoidance of weight gain**
- **Improvement of**
  attention-processing capacity