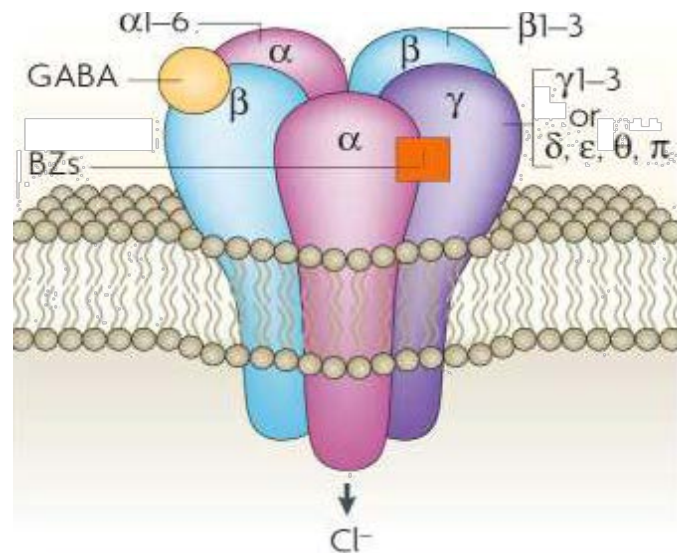


GABA-ERGIC SYSTEM



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OUTLINE

- INTRODUCTION
- GABA
- SYNTHESIS & METABOLISM
- MECHANISM OF ACTION
- RECEPTORS
- FUNCTION
- CONCLUSION



INTRODUCTION

- GABAergic means "pertaining to or affecting the neurotransmitter GABA". A synapse is GABAergic if it uses GABA as its neurotransmitter.
- A GABAergic or GABAergic agent is any chemical that modifies the effects of GABA in the body or brain. Some different classes of GABAergic drugs include the following:
- GABA receptor agonists, GABA receptor antagonists, and GABA reuptake inhibitors.

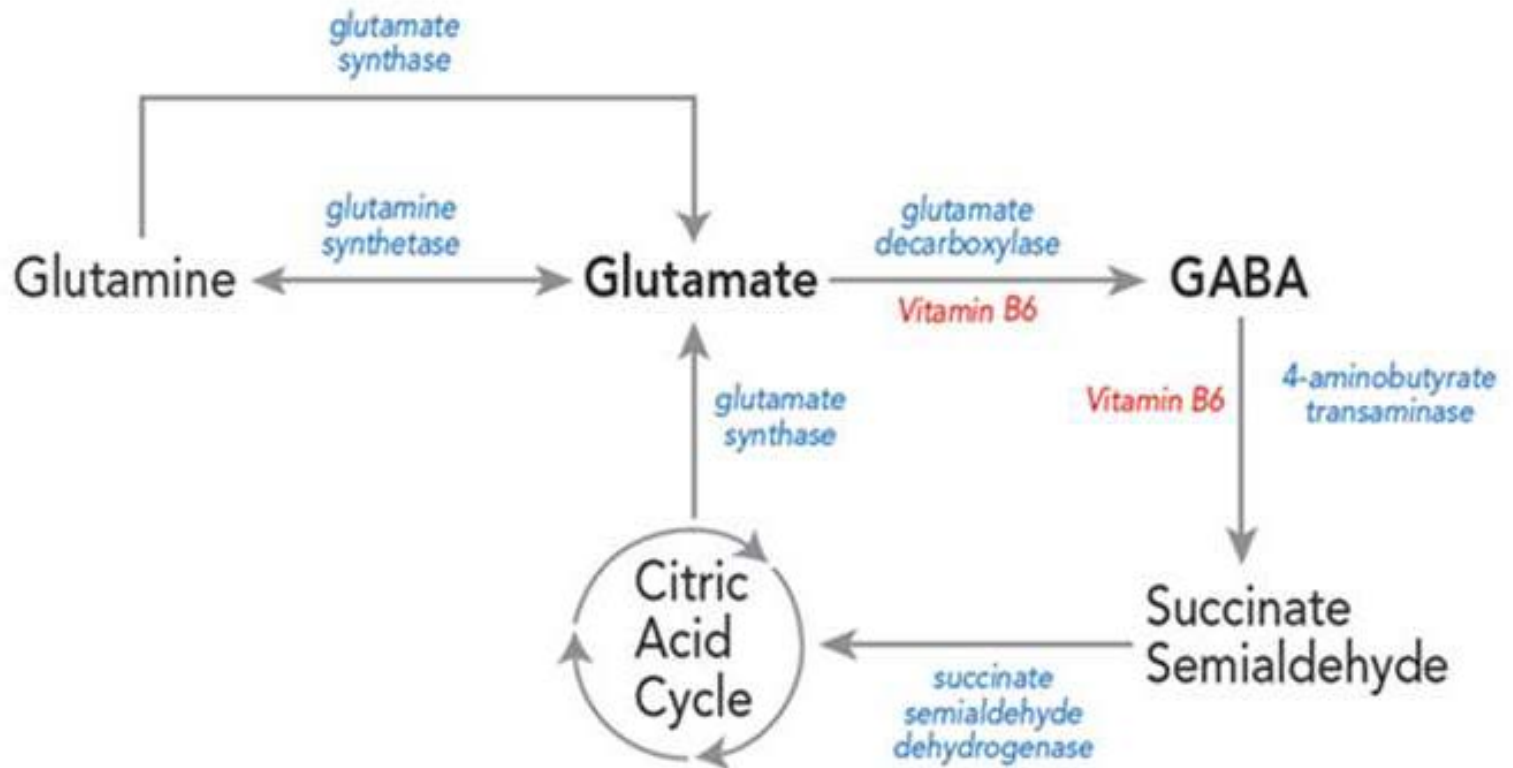


GABA

- GABA stands for gamma amino butyric acid which is a zwitter ion with deprotonated carboxyl group and protonated amino group.
- GABA acts at inhibitory synapses in the brain by binding to specific transmembrane receptors in the plasma membrane of both pre and postsynaptic neuronal processes.
- It is most highly concentrated in the substantia nigra and globus pallidus nuclei of the basal ganglia, followed by the hypothalamus, the periaqueductal grey matter.
- There are two types of GABA receptors: GABA-A & GABA-B



SYNTHESIS & METABOLISM OF GABA



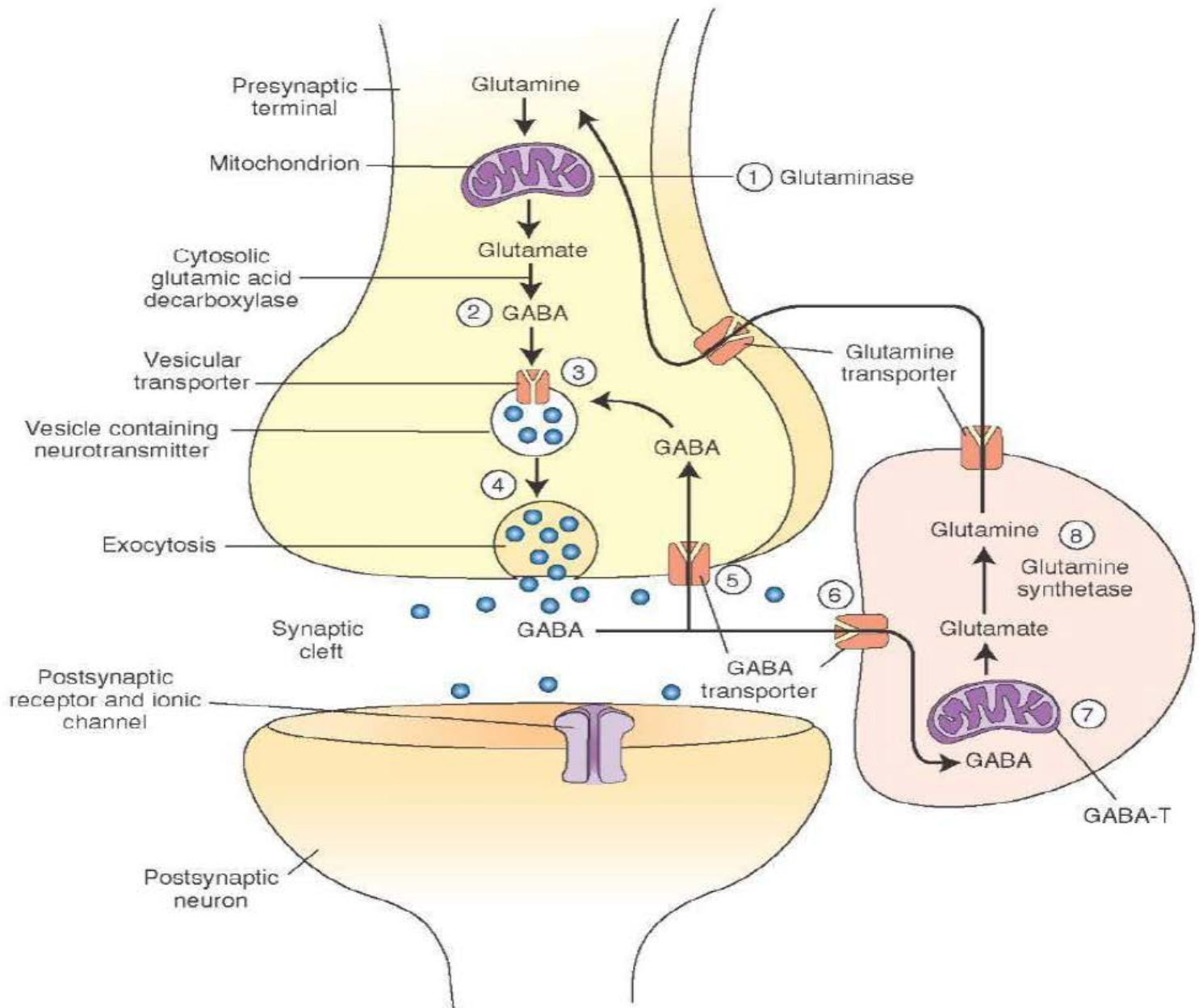
STORAGE

- Newly synthesized GABA is stored in synaptic vesicle by means of vesicular transporter.
- These are stored at postsynaptic terminal until action potential release.

RELEASE

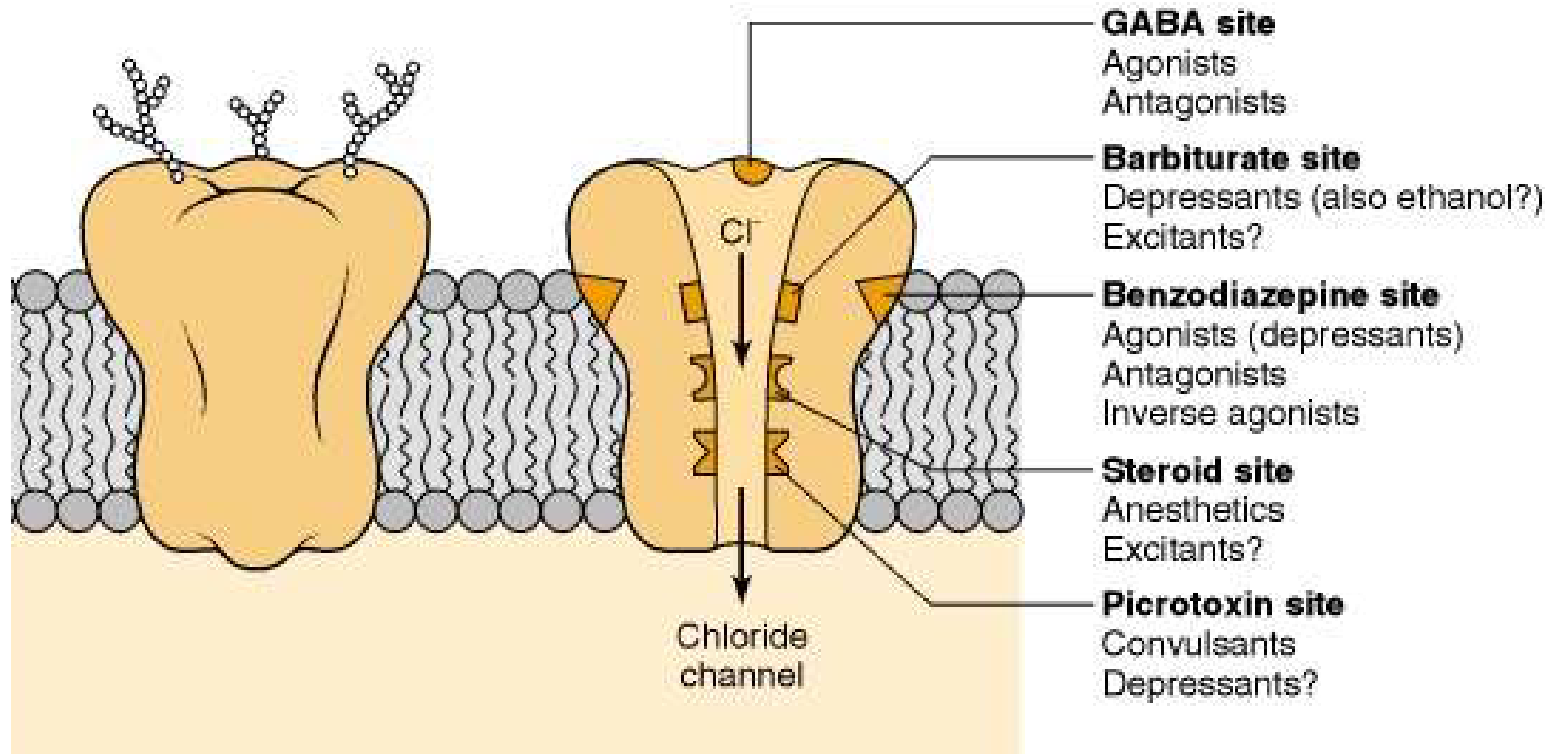
- Stored GABA releases into synaptic cleft stimulated by depolarisation of presynaptic neurons.
- GABA diffuses across the cleft to target receptors on postsynaptic surface.
- The action of GABA is terminated by reuptake of GABA by presynaptic nerve terminals & glial cells





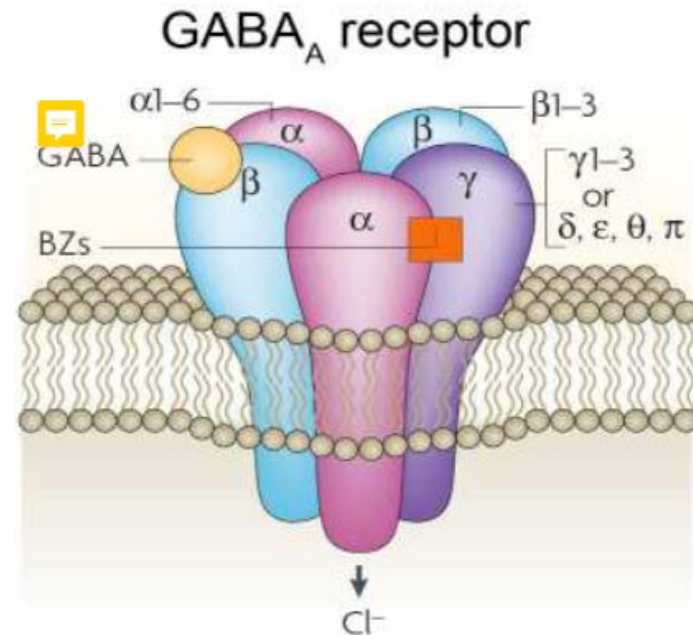
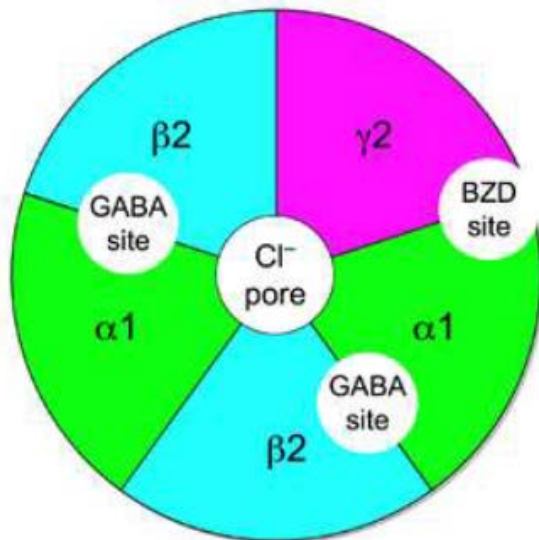
MECHANISM OF ACTION

- GABA opens chloride receptor channels and induces cellular hyperpolarization by increasing intracellular concentration of chloride ions.



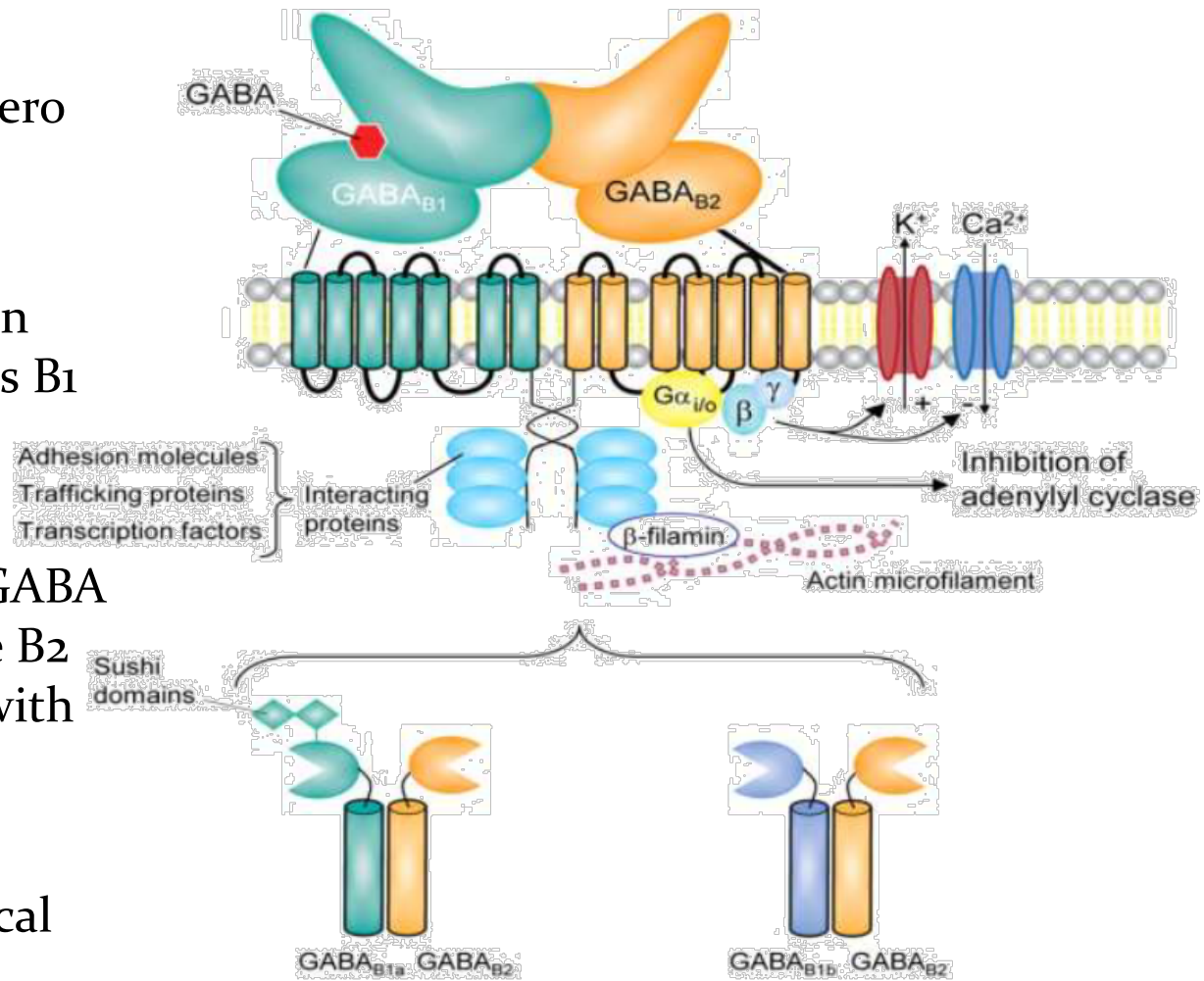
GABA receptors:

- It has pentameric structure.
- Each GABA-A receptor contains two alpha, two beta and one gamma subunits.
- It has structural and functional similarity with ligand gated ion channel.



GABA-B

- There are two hetero dimers.
- GABA-B have been cloned to subunits B1 and B2.
- B1 subunit has a GABA binding site while B2 subunit interact with G protein.
- It has two biological actions:
 - increase K⁺ conductance
 - decrease Ca²⁺ conductance



FUNCTIONS OF GABA

- Relieving from anxiety
- Improving mood
- Regulating the release of sex hormone
- Promoting lean muscle growth
- Burning fat
- Lowering elevated blood sugar levels in diabetes
- Stabilizing the blood pressure



DRUGS ACTING ON GABA RECEPTOR

	GABA A	GABA B
TYPE	Ionotropic	Metabotropic
LOCATION	Widespread, mainly GABAergic interneurons	Widespread, presynaptic and post synaptic
SUBCELLULAR EVENT	Post synaptic inhibition by increase in chloride ion influx	Presynaptic inhibition by decrease in calcium entry Postsynaptic inhibition by increase in potassium ion influx
AGONIST	GABA, Mucimol, Gabaxadol, Barbiturates, Benzodiazepines, Steroid anesthetics	GABA, Baclofen
ANTAGONIST	Flumazenil, Gabazine, Bicuculline	Saclofen
CHANNEL BLOCKER	Picrotoxin	NA



CONCLUSION

- GABA is an amino acid made in brain cells from glutamate. It functions as an inhibitory neurotransmitter, meaning it blocks nerve impulses.
- Without GABA, nerve cells fire too often and too easily.



THANK YOU

