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Lecture title: CNS Drugs

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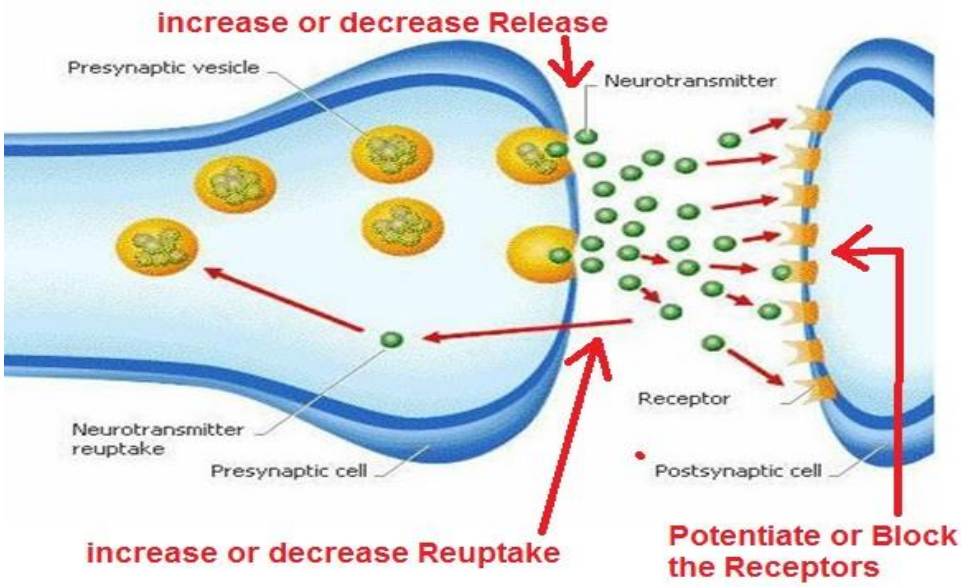
Drugs acting on the Central Nervous System (CNS)

The CNS is consisted of the brain and spinal cord. The brain composed of the cerebrum, cerebellum and medulla oblongata.

Neurotransmitters

Neurotransmitters are biological substances that transmit signals from a presynaptic neuron to a target receptor on the postsynaptic neuron.



(General Mechanisms of the Drugs that acting on the CNS)

Types of neurotransmitters in the CNS:

1. Acetylcholine (Ach).

2. Catecholamines that composed of Norepinephrine (NE), Epinephrine (Epi) and Dopamine (DA).

3. Serotonin (5-hydroxy tryptamine)(5-HT).

4. Aminoacids that divided into:

A. Inhibitory (GABA and Glycine).

B. Excitatory (Aspartate and Glutamate).

Sedatives and Hypnotics

Hypnotics are drugs that cause hypnosis by depressing the CNS so the animal is less responsive to external stimuli. Hypnotics that used in small doses will cause sedation.

Types

Barbiturates

Divided into:

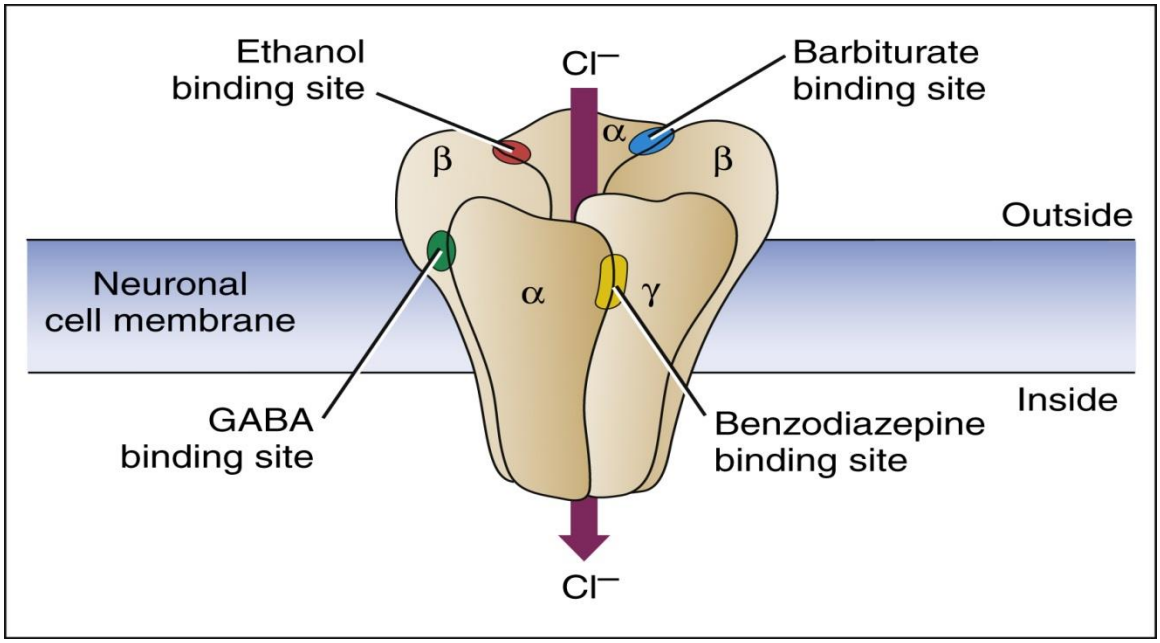
A. Long acting (Phenobarbital).

B. Short acting (Pentobarbital).

C. Ultra-short acting (Thiopental).

Mechanism of action

Potentiate the effect of GABA neurotransmitter leading to depression of the brain and inhibits excessive motor discharge.



Pharmacological effects

1. Depresses all functions of the brain.

2. Selectively depresses the motor cortex.

3. Depresses the respiratory center in medulla.

4. Produce good muscle relaxation.

5. Decreases blood pressure and heart rate.

6. Induce microsomal enzymes and increase the metabolic rate of the animal.

Clinical uses

1. Sedative.

2. Hypnotic.

3. Anticonvulsant.

4. Anesthetics.

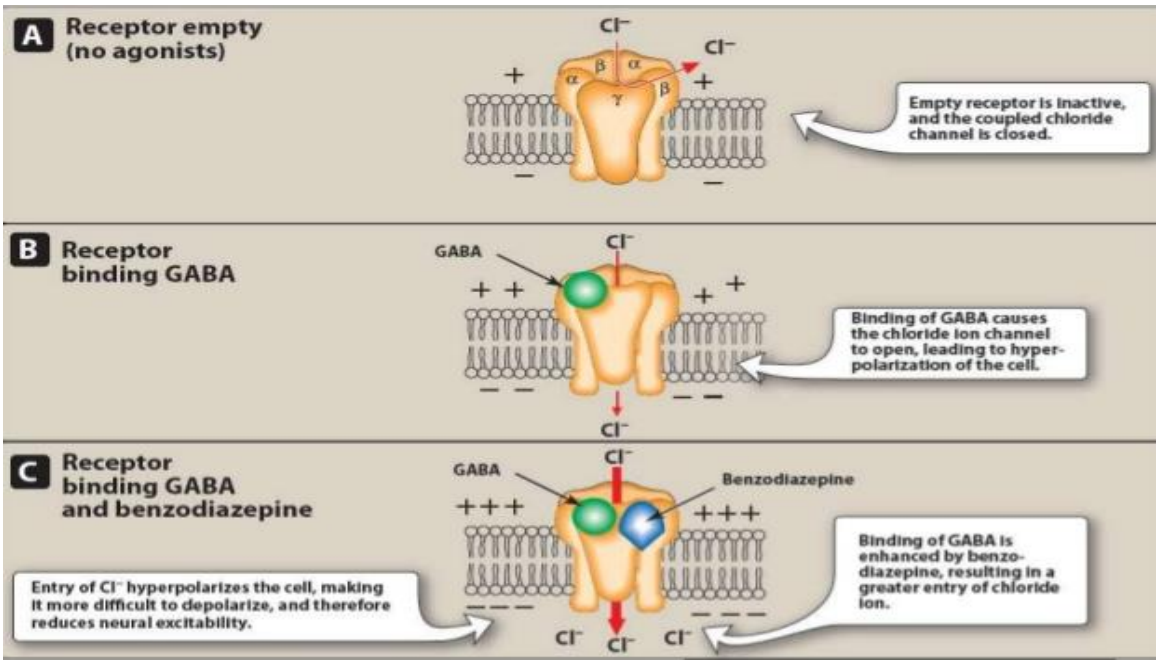
5. In case of pruritus to control itching.

Benzodiazepines

Which include diazepam, chlordiazepoxide and alprazolam.

Mechanism of action

Increasing the action of GABA neurotransmitter on its receptor which causes influx of chloride ion into the neuronal cells leading to depression of the CNS.



Clinical uses

1. Sedative.

2. Hypnotic.

3. Muscle relaxant.

4. Anticonvulsant.

5. Preanesthetic.

6. Antianxiety.

Chloralhydrate

It is hypnotic given I.V. in large animals (7%). It depresses the respiratory and vasomotor centers. It is metabolized in the body by reduction into Trichloroethanol which is the active metabolite responsible of hypnotic effect of chloral hydrate. It is used as anesthetic in equine species with weak analgesic effect and can be mixed with Magnesium sulfate (MgSO4) (6%) to produce muscle relaxation. Chloral hydrate decreases blood pressure and decreases heart rate and sudden death may occur in horses which are highly excited.

Ethanol

It has sedative effect, depresses respiration and causes vasodilation. It has diuretic effect because it inhibits antidiuretic hormone (ADH). It metabolized into CO_2 and H_2O and small amount expired by the lungs.