CNS Stimulant

Content

CNS Stimulants

- CNS Stimulants
- Drugs act as an CNS stimulant
- Pharmacology of CNS Stimulants
- Adverse effects

Intended Learning Outcomes

At the end of this lecture, student will be able to

- Describe CNS Stimulants

Nervous System

- Nervous system can be classified into
- **Central Nervous System (CNS)** Brain and spinal cord
- **Peripheral Nervous System (PNS)**The nervous system outside of the brain and spinal cord

Peripheral Nervous System (PNS)

Divided in to

1- Sensory division (afferent)

- Conducts impulses from receptors to the CNS and Informs the CNS of the state of the body

2- Motor **division (efferent)**

- Conducts impulses from CNS to effectors organs

Motor Neurons

- The motor division is also divided into

1- S**omatic nervous system:**

- VOLUNTARY (generally) Somatic nerve fibers that conduct impulses from the CNS to skeletal muscles

2 - Autonomic nervous system:

- INVOLUNTARY (generally) Conducts impulses from the CNS to smooth muscle, cardiac muscle, and glands

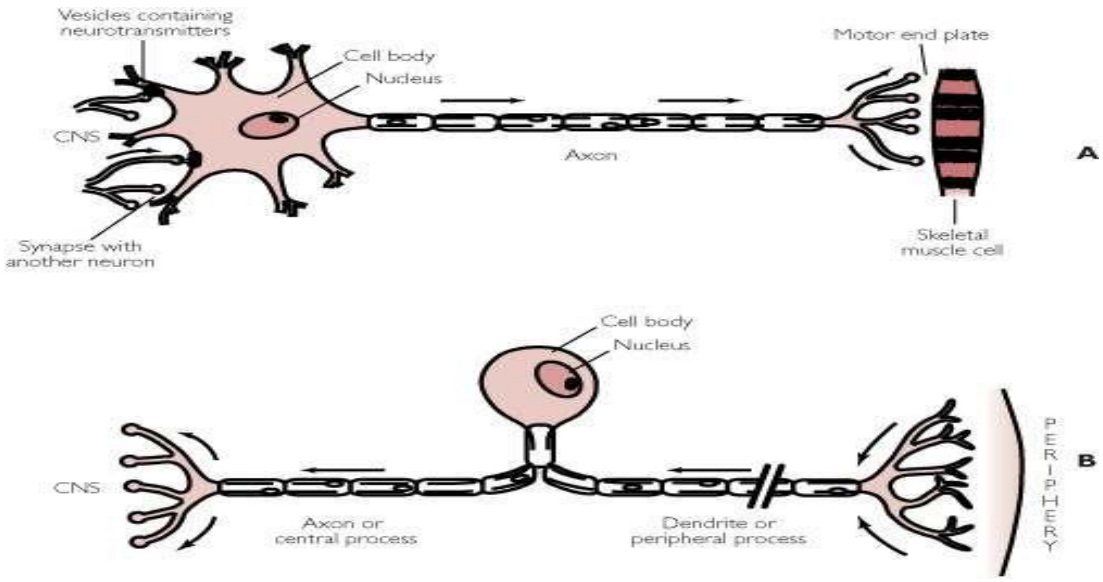
Neurons

- They are the basic functional unit of the nervous system.
- They contain three major parts:

  1. Cell body

2. Dendrites

3. Axon



Neurotransmitters CNS

They can be classified into:

1. Excitatory:

- Ach, glutamate, aspartate, serotonin and NE.

2. Inhibitory:-

- GABA , glycin

CNS Stimulants

Definition

- "Stimulants are a substance which tends to increase behavioral activity when administered"

They can be divided based on their site of action:

- Cerebral stimulants (Amphetamines)
- Medullary stimulants (Picrotoxin)
- Spinal stimulants (Strychnine)

Signs and symptoms

- Elevate Mood
- Increase Motor Activity
- Increase Alertness
- Decrease need for Sleep

In case of overdose lead to convulsion and death

MOA of CNS Stimulants

- Block neurotransmitters reuptake (Most reuptake inhibitors affect either NE or 5-HT(Serotonin): Cocaine
- Promote neurotransmitters release : Amphetamine
- Block Metabolism - MAO inhibitors (monoamine oxidase): ex. Phenelzine
- Antagonize the effect of inhibitory neurotransmitter: Picrotoxin & Strychnine

Amphetamine

MOAs:

- Block the reuptake of norepinephrine and dopamine into the presynaptic neuron and increase the release of these monoamines into the extra neuronal space.

Clinical use:

- Narcolepsy
- Attention-deficit hyperactivity disorder

Adverse effects:

- **Cardiovascular:** Hypertension
- **Endocrine metabolic:** Weight loss
- **Gastrointestinal:** Abdominal pain, Loss of appetite, Xerostomia.
- **Neurologic:** Headache, Insomnia.
- **Psychiatric:** Feeling nervous.

After injecting, the mice with amphetamine you will notice:

- Hair erection
- Licking
- Stereotype
- Sniffing

Picrotoxin

MOA:

- Non-competitive antagonist of GABA receptors.
- After injecting the mice with picrotoxin you will notice:

- **Clonic convulsion** characterized by:

- Asymmetric
- Intermittent
- Spontaneous

- Coordinated

Strychinine (Nux vomica)

MOA:

- Competitive antagonist of the glycin receptors

After injecting the mice with Strychinine you will notice:

Tonic convulsion characterized by:

- Symmetric
- Reflex in origin
- Continuous
- Uncoordinated

Summary

- CNS Stimulants are different from antidepressants
- Act through excitatory neurotransmitters
- Caffeine and amphetamine are the main drugs in this category