

**D.PHARM 2<sup>nd</sup> YEAR**

**Pharmacology**

**CHAPTER-2**

**Drugs acting on the Peripheral Nervous  
System**

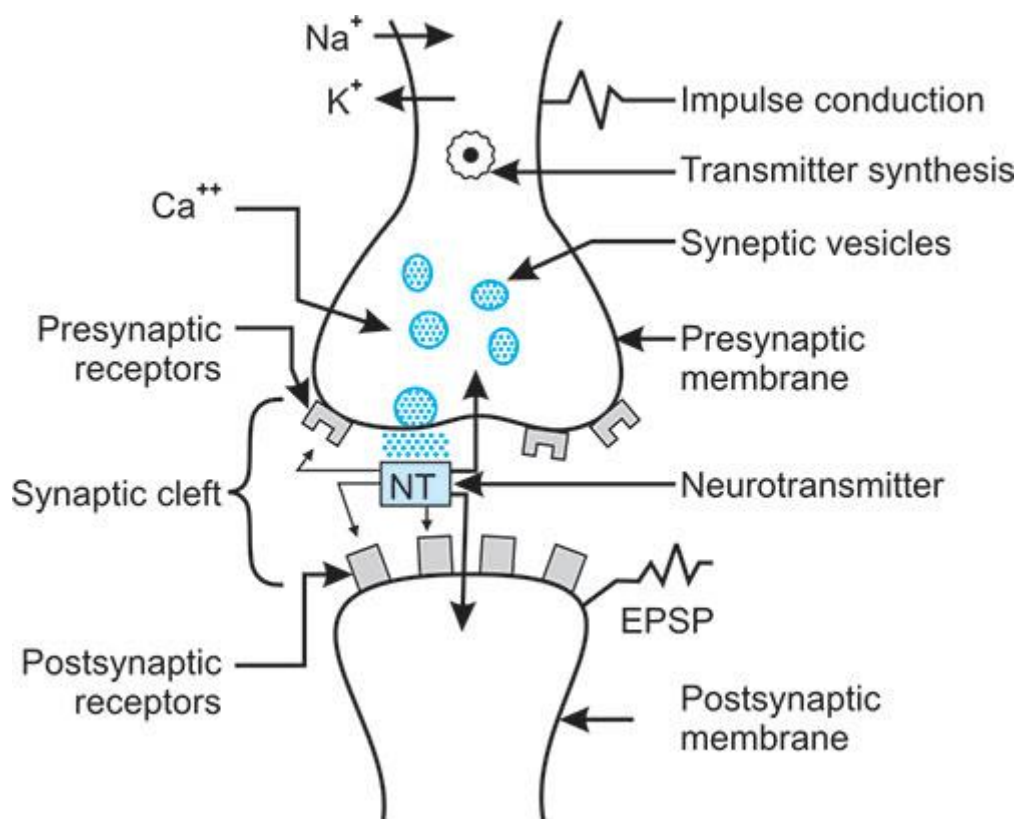


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## NEUROHUMORAL TRANSMISSION

- Transmission of nervous impulse either from one neuron to another or from a neuron to effector organ by neurohumoral substance (neurotransmitter's) is known as neurohumoral transmission.
- In Preganglionic fibres neurotransmitters are filled.
- At resting fibres condition when stimulus is obtained then Ca goes inside and exocytosis starts.
- After exocytosis neurotransmitter comes in synaptic cleft and binds with the receptor of post ganglionic fibre and signal is passed



## NEUROTRANSMITTER

- It is a type of chemical messenger that transmits signals across a chemical synapse, from one neuron to another.
- Sympathetic system has non-adrenalin. So, it is also known as adrenergic system.
- While parasympathetic nervous system has acetylcholine so, it is also known as cholinergic system.

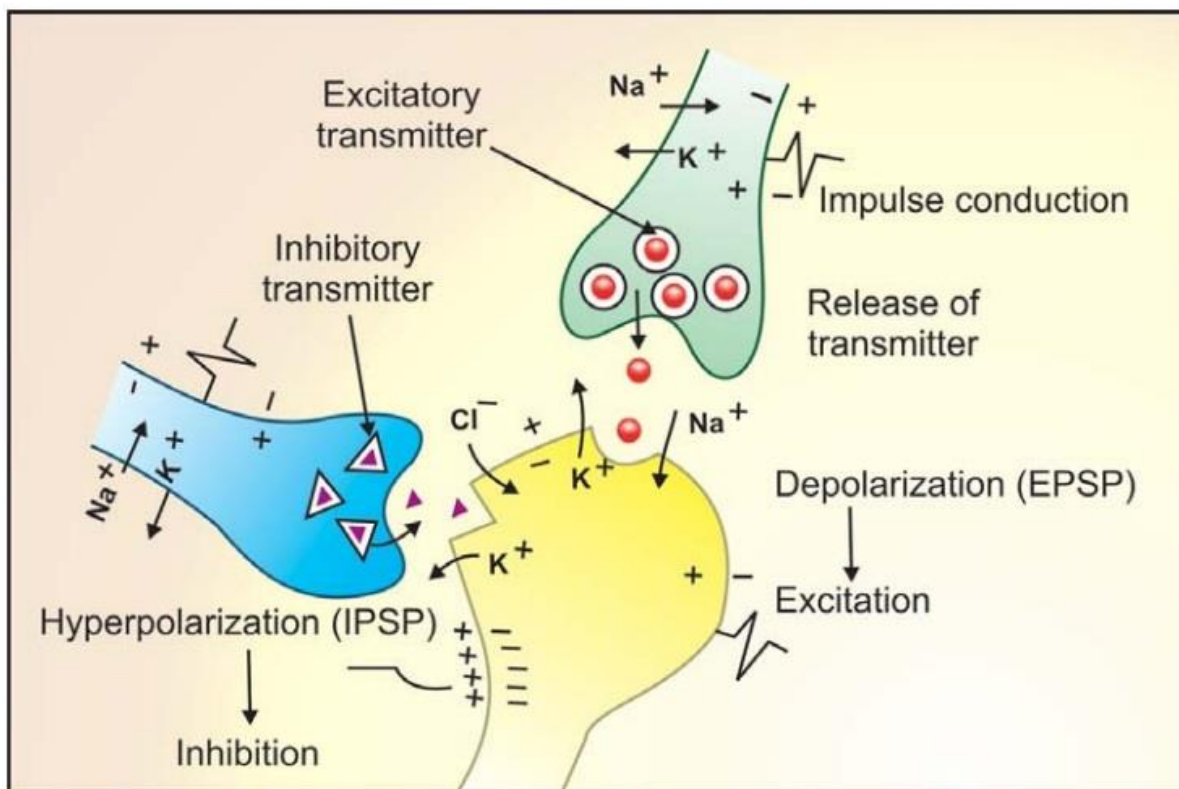
**On the basis of action neurotransmitter is of two type -**

**i. Excitatory:** They enhances or increases the action of the body.

eg.- Acetylcholine, Adrenaline, Noradrenaline, Dopamine, etc.

**ii. Inhibitory:** They blocks or prevent chemical message to pass along any farther.

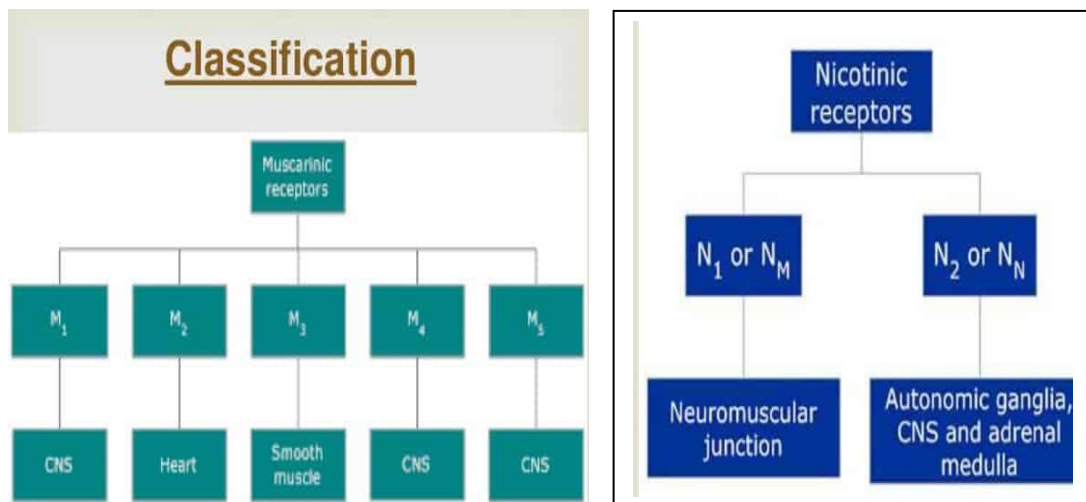
eg. - GABA, Serotonin, Endorphin.



**Fig. II.2:** Diagrammatic representation of steps in excitatory and inhibitory neurohumoral transmission:  
EPSP = Excitatory postsynaptic potential; IPSP = Inhibitory postsynaptic potential

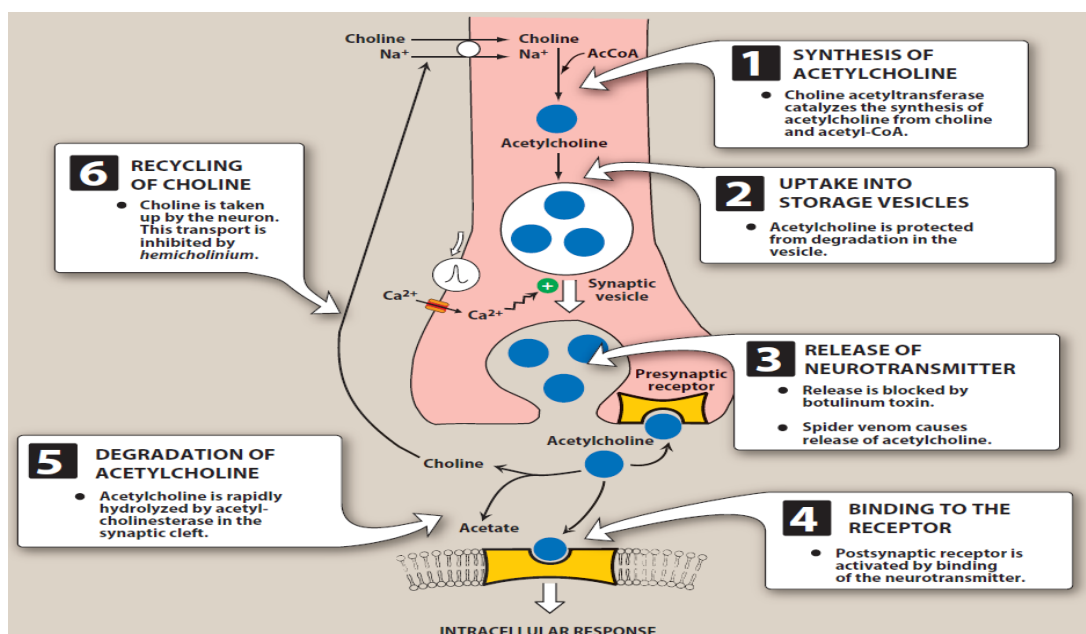
## CHOLINERGIC SYSTEM

- The cholinergic system is composed of organized nerve cells that uses the neurotransmitter acetylcholine in the transduction of action potentials.
- These nerve cells are activated by or contain and release acetylcholine during the propagation of a nerve impulse.

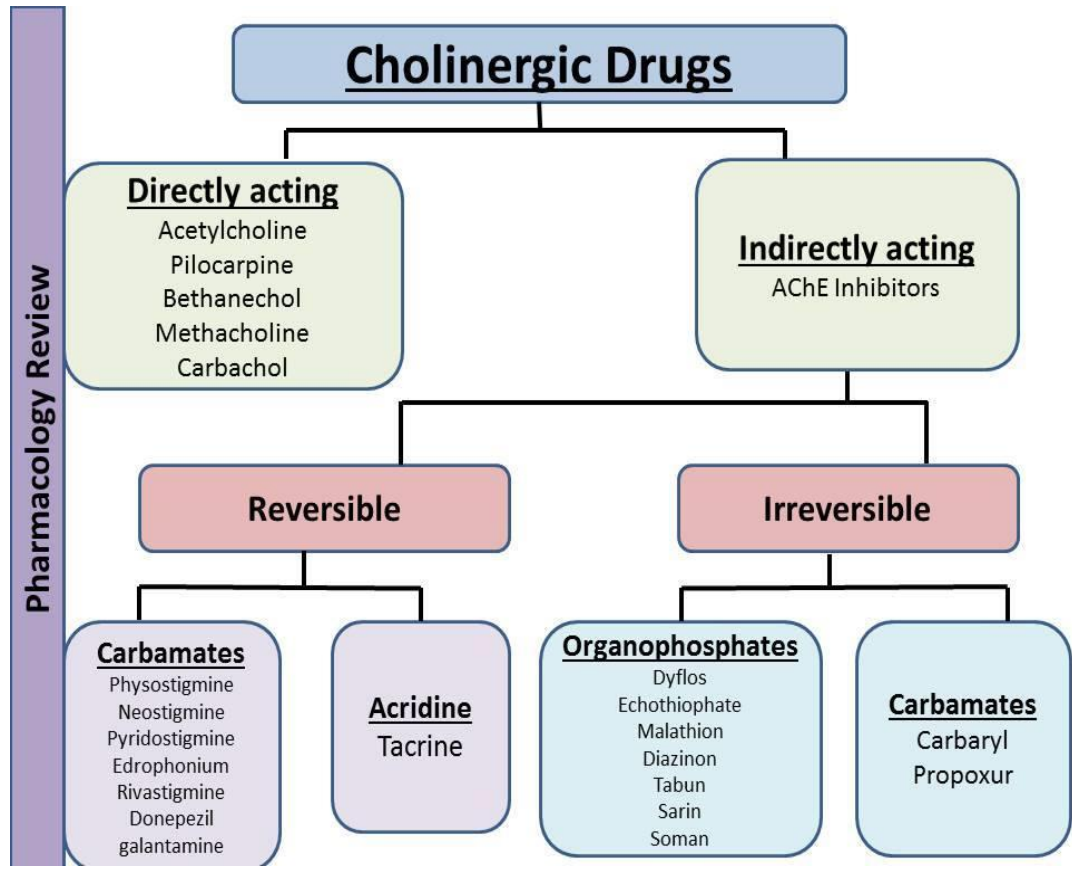


## ACETYLCHOLINE-SYNTHESIS, RELEASE AND DEGRADATION

- It is an acetic acid ester of choline & synthesized within the cholinergic neurons.
- It is the physiological stimulant of both muscarinic and nicotinic receptors.



## CLASSIFICATION OF PARASYMPATHOMIMETIC DRUGS



## PHARMACOLOGICAL ACTION OF ACETYLCHOLINE

On the basis of pharmacological action of acetylcholine, it is divided into two

**Categories: -**

1. Muscarinic action
2. Nicotinic action

### Muscarinic action

**1. Action of eye:** Cholinergic stimulation brings about constriction of pupil (miosis) by contracting the circular muscles of the iris and intraocular tension.

**2. Action on glands:** secretions (e.g., sweat, intestinal, pancreas etc).

**3. Action on smooth muscles:** Contraction of smooth muscles (eg: bronchi, GIT, bladder).

**4. Action on heart:** Decreases heart rate (bradycardia) and contractility by acting on M<sub>2</sub> receptor.

**5. Action on blood vessels:** ACh relaxes the vascular smooth muscles and dilates the blood vessels.

**6. Action on GIT:** Tone and peristalsis is enhanced, sphincters are relaxed.

### **Nicotinic action**

**1. Action on autonomic ganglia:** ACh stimulates the sympathetic and parasympathetic ganglia and the adrenal medulla.

**2. Action on NMJ:** ACh brings about contraction of skeletal muscles by stimulating the NM receptors.