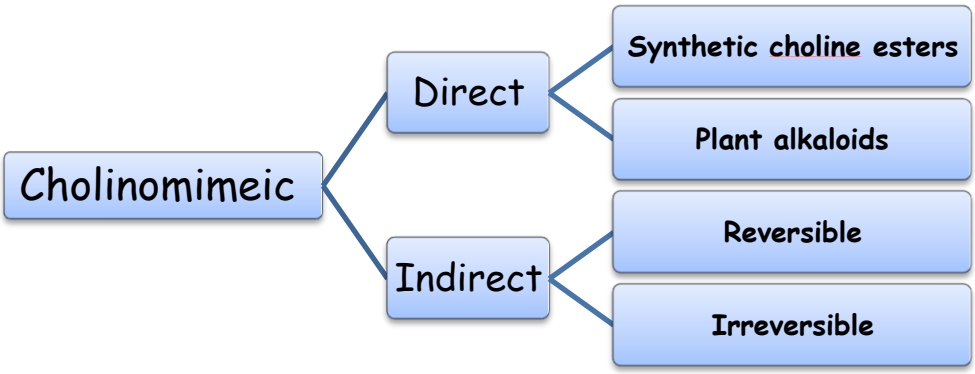
Cholinergic agonists

Also called : Cholinomimeic (parasympathomimetics).



Direct:

DRUG		RECEPTOR	FUNCTION	NOTEs
Carbachol	Synthetic	M & Some N	Given topically as eye drops: Produce miosis → ↓ I.O.P.	Nonselective. **Quaternary**. Don't degradation by ChE → Long duration.
Bethanechol	Synthetic	M only (mainly M3 & some M2)	1) Stimulates contraction and evacuation of bowel and so helps to↓abdominal distension. 2) Stimulates contraction of bladder, so relieves retention of urine.	**S.Es:** Salivation, sweating, brady-cardia, hypotension, bronchospasm. **C/I:** Mechanical obstruction of intestine or bladder outlet, peptic ulcer, asthma, heart block. **Quaternary**. Don't degradation by ChE → Long duration.
Methacholine	Synthetic	M	Local use on eye to produce miosis.	Slowly hydrolyzed by ChE. Called: Acetyl β-methyl choline.
Pilocarpine	Alkaloid	M3	1) Topically as eye drops in glaucoma → ↓ I.O.P. Contraction of ciliary & circular m. → pull on trab-ecular meshwork → increase drainage of aqueous humor. 2) Oral: for **xerostomia**: here it stimulates salivation.	**S.Es.:** Eye: lacrimation, frontal headache due to cyclospasm, accommodation of eye for near vision, miosis, sweating, ↑ bronchial secretion, bronchospasm in asthma.
Muscarine	Alkaloid	M	In **Mushroom poisoning**: symptoms occur 30 min to 1 h after ingestion; they include : **Abdominal pain**, **diarrhea**, **salivation**, **sweating**, & **brady-cardia**.	In mushrooms Clitocybe and Inocybe. **Antidote: atropine**.
Nicotine	Alkaloid	N	**Uses:** a. Smoking cessation program, as chewing gum or transdermal patch. b. Rodenticide.	**Poisoning in man**: vomiting + convulsions (CNS action), skeletal muscle fasciculation followed by weakness, blood pressure swings & arrhythmias . Eliminated in 6 – 12 h by liver **Treatment:**support for respiration, control of convulsions, arrhythmias and hypertension.

Indirect: **Reversible**

DRUG	FUNCTION	NOTEs
Edrophonium	**Diagnosis** of **myasthenia gravis**. When given i.v., it improves drooping of eyelids + facial muscles weakness + handgrip weakness. **Given** i.v. helps to **differentiate** **cholinergic crisis** from **myasthenic crisis** .	**Quaternary** alcohol. **Short** duration : 5 – 10 min. **Treatment**: Reduce dose. Oxygen + ventilatory support. **Atropine**: for reversing muscarinic effects .
Physostigmine	1) In Glaucoma: as eye drops. 2) In **Atropine poisoning**: given i.v. to reverse peripheral & central effects of **atropine**.	**Act** for 0.5 – 2 h. **natural**, **tertiary alkaloid** from Calaber beans.
Neostigmine	1) Treatment of myasthenia gravis: given oral. 2) **Antidote** to reverse the skeletal muscle paralysis caused by competitive non-depolarizing (NMJ) blockers e.g. **d-tubocurarine** + similar acting drugs. 3)Sometimes for post-operative ileus or pot-partum atony of urinary bladder : neostigmine or distigmine. 4) **Glaucoma**: demecarium eye drops (4–6 h).	**Synthetic** and **Quaternary**. **Act** for 0.5 – 2 h. **S.E.**:**Muscarinic**:salivation, sweating, bradycardia, intestinal spasm, diarrhea, bronchospasm. Reversed or prevented by muscarinic receptor blocker **atropine**. **Nicotinic**: skeletal muscle fascicul-ation if slight overdose.
Pyridostigmine	It acts **slower** but is **longer** acting than **neostigmine** (3- 4 h), **commonly** used in **myasthenia gravis**.	**Synthetic** and **Quaternary**.
Carbaril +others	Acarbamate insecticide in agriculture. A Reversible ChE blocker.	If poisoning occurs in man, it is of **short** duration. The **cholinergic crisis** in poisoning is treated by **atropine**.
Donepezil and Tacrine **Acridine derivatives**	More **selective** for ChE in **CNS** than in **periphery**; so less peripheral cholinergic side effects. Used for **presenile dementia** (**Alzheimer's disease**). They ↑ **Ach**. In limbic system in brain resulting in ↑ cognition.	**Both drugs are eliminated mainly by liver metabolism.** **Tacrine** is hepatotoxic, and is no longer used. **Donepezil is still in use**; it has active metabolites