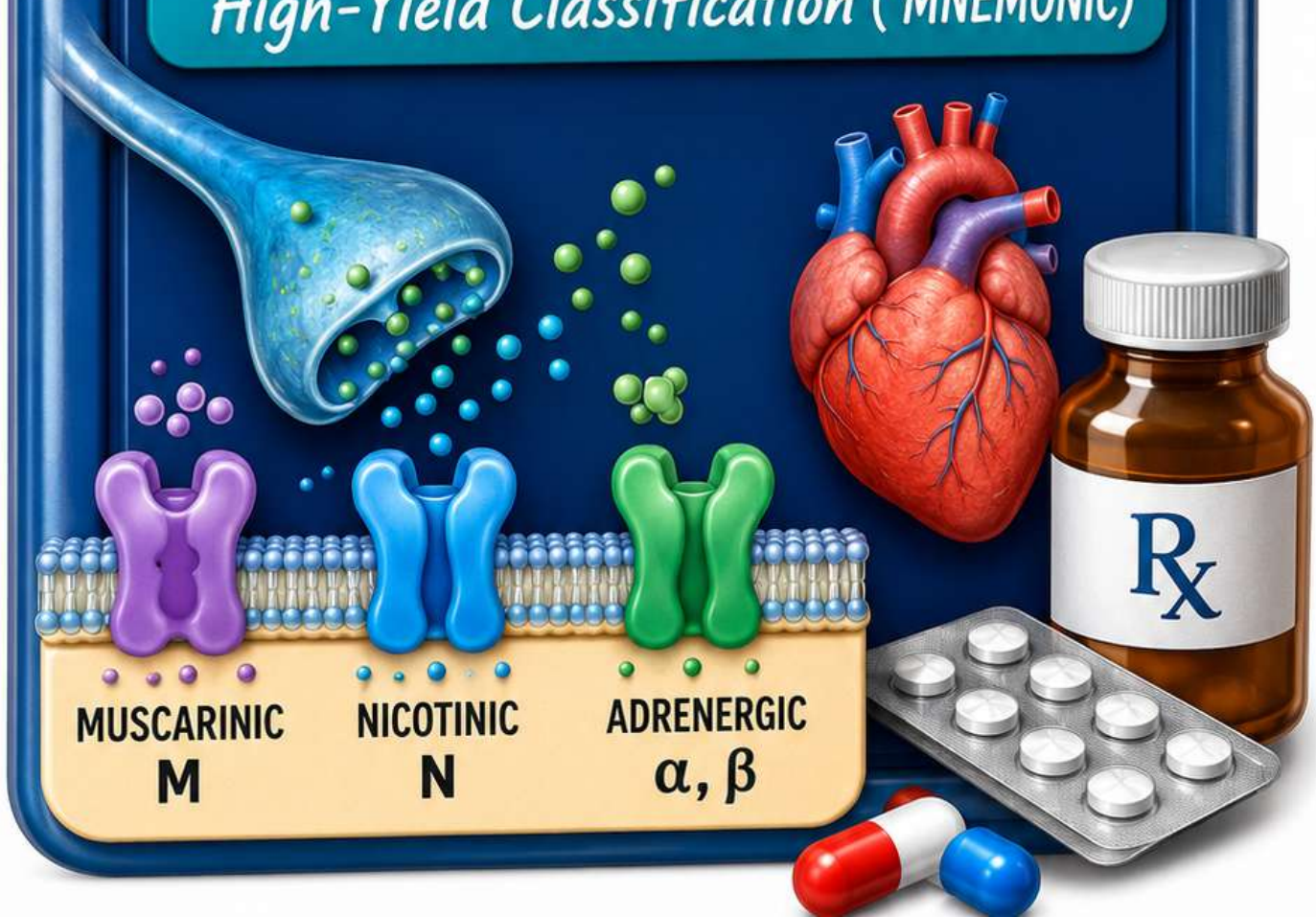
IMPORTANT DRUGS OF AUTONOMIC NERVOUS SYSTEM (ANS)

High-Yield Classification (MNEMONIC)



Pharmacology Classification + Specific Mechanism of Action (MOA) – 200 High-Yield One-Liners

TROPICAMIDE*

Muscarinic antagonist; causes mydriasis

1 DEFINITION

- Tropicamide is a short-acting antimuscarinic drug used mainly in ophthalmology.
- It blocks muscarinic receptors in the eye.
- Produces mydriasis and mild cycloplegia.

2 CLASSIFICATION

- **Class:** Anticholinergic / parasympatholytic.
- **Type:** Muscarinic receptor antagonist.
- **Use group:** Ophthalmic mydriatic.
- **Nature:** Short-acting topical ocular drug.

3 MECHANISM OF ACTION

- Competitively blocks muscarinic receptors, mainly M_3, in iris sphincter and ciliary muscle.
- Relaxes sphincter pupillae → mydriasis.
- Relaxes ciliary muscle → cycloplegia.
- Prevents parasympathetic constriction of pupil.
- Short duration compared with atropine.

4 PHARMACOLOGICAL EFFECTS

- Dilatation of pupil.
- Mild to moderate cycloplegia.
- Blurred near vision.
- Photophobia due to mydriasis.
- Slight rise in intraocular pressure in susceptible patients.

5 THERAPEUTIC USES

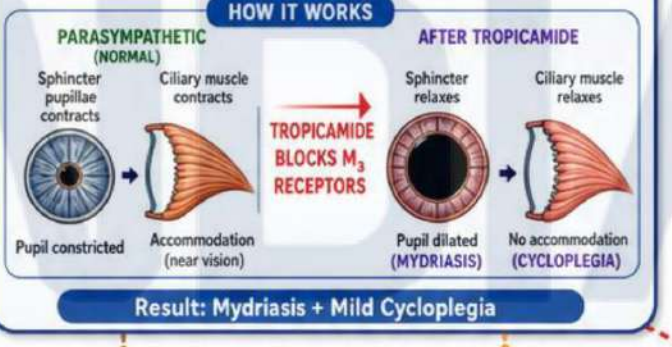
- Fundus examination.
- Diagnostic pupil dilatation.
- Cycloplegic refraction.
- Pre-operative dilatation.
- Occasionally in anterior uveitis to prevent synechiae.

6 ADVERSE EFFECTS

- Stinging or irritation in eye.
- Photophobia.
- Blurred vision.
- Dry mouth.
- Tachycardia (*rare systemic effect*).
- May precipitate acute angle-closure glaucoma.

7 CONTRAINDICATIONS

- Narrow-angle / angle-closure glaucoma.
- Hypersensitivity to tropicamide.
- Caution in elderly.
- Caution in infants / very young children.
- Use carefully in patients prone to raised IOP.



8 DRUG INTERACTIONS

- Additive anticholinergic effects with atropine, antihistamines, TCAs, antipsychotics.
- Sympathomimetics may further enhance mydriasis.
- Systemic absorption is usually low, but caution is advised.

9 IMPORTANT EXAMPLES

- Tropicamide eye drops 0.5%.
- Tropicamide eye drops 1%.
- Related ophthalmic antimuscarinics: atropine, cyclopentolate, homatropine.

★ **Highlight:** tropicamide is **shorter acting** than atropine.

10 MNEMONICS

"TROPI = Tiny Time Mydriatic"

- ✓ Short action.
- ✓ Tropicamide → dilates pupil quickly.
- ✓ Think: *"Tropicamide for testing the eye."*

11 EXAM POINTS

- ★ Short-acting muscarinic antagonist.
- ★ Causes mydriasis and cycloplegia.
- ★ Used for fundus examination.
- ★ Safer for routine eye exam than atropine because duration is shorter.
- ★ Can precipitate angle-closure glaucoma.

12 IMPORTANT QUESTIONS

1. Write the mechanism of action of tropicamide.
2. Why is tropicamide preferred over atropine for routine eye examination?
3. Mention therapeutic uses of tropicamide.
4. List adverse effects of topical antimuscarinic eye drops.
5. Differentiate tropicamide and atropine.

EXAM BOOSTER ★

High-Yield Fact:

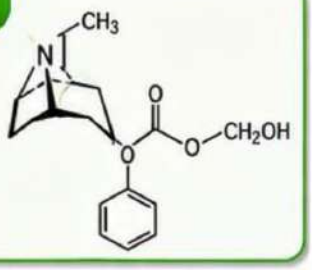
Tropicamide is a short-acting ophthalmic antimuscarinic used to produce rapid mydriasis for eye examination.

★ Pharmacology Classification + Specific Mechanism of Action (MOA) – 200 High-Yield One-Liners ★

1 DEFINITION

- Naturally occurring belladonna alkaloid.
- Competitive, reversible muscarinic receptor antagonist.
- Parasympatholytic / antimuscarinic drug.

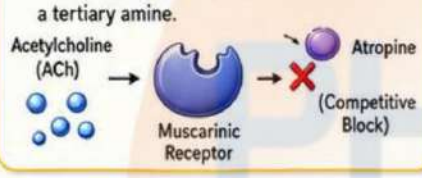
2 CLASSIFICATION

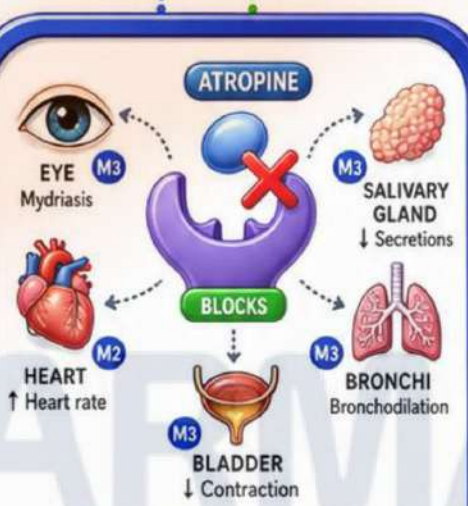


- Anticholinergic (antimuscarinic) drug.
- Tertiary amine.
- Prototype muscarinic blocker.
- Acts mainly on M1–M5 muscarinic receptors.

3 MECHANISM OF ACTION

- Competitively blocks muscarinic receptors.
- Inhibits actions of acetylcholine at parasympathetic neuroeffector sites.
- Reduces glandular secretion and smooth muscle tone.
- Causes mydriasis and cycloplegia in the eye.
- No nicotinic receptor blockade.
- Crosses BBB because it is a tertiary amine.





ATROPINE*

Competitive muscarinic receptor antagonist.

PHARMACOLOGICAL EFFECTS

- Mydriasis and cycloplegia.
- Tachycardia.
- Decreased salivary, bronchial, and sweat secretions.
- Bronchodilation (mild).
- Decreased GI motility and spasm.
- Relaxes bladder detrusor → urinary retention.

THERAPEUTIC USES

- Symptomatic sinus bradycardia.
- Pre-anesthetic medication to reduce secretions.
- Organophosphate poisoning (with pralidoxime).
- Ophthalmic mydriatic / cycloplegic use.
- Antispasmodic in GI tract.
- Mushroom muscarine poisoning.

ADVERSE EFFECTS

- Dry mouth.
- Blurred vision / photophobia.
- Tachycardia.
- Constipation.
- Urinary retention.
- Decreased sweating → fever / hot dry skin.
- CNS excitement, confusion, especially in high dose.

7 CONTRAINDICATIONS

- Angle-closure glaucoma.
- Prostatic hypertrophy / urinary retention.
- Paralytic ileus or pyloric obstruction.
- Tachyarrhythmias.
- Fever / hot environment with caution.
- Use cautiously in elderly patients.

8 DRUG INTERACTIONS

- Additive anticholinergic effects with antihistamines.
- Additive effects with tricyclic antidepressants and antipsychotics.
- Antagonizes cholinergic drugs / prokinetics.
- May delay gastric emptying and alter absorption of some oral drugs.

★ 9 IMPORTANT EXAMPLES

- Atropine sulfate.
- Related antimuscarinics:
  - Scopolamine
  - Homatropine
  - Tropicamide
  - Ipratropium

11 EXAM POINTS

- Prototype antimuscarinic drug.
- Tertiary amine → crosses BBB.
- Causes mydriasis, cycloplegia, tachycardia, and dry mouth.
- Used in organophosphorus poisoning.
- Does not block nicotinic receptors.
- Antidote for severe muscarinic excess.

EXAM BOOSTER

12 IMPORTANT QUESTIONS

Q. What type of drug is atropine?
A. Competitive antimuscarinic.
Q. Major use in poisoning?
A. Organophosphate poisoning.
Q. Effect on pupil?
A. Mydriasis with cycloplegia.
Q. Does it cross BBB?
A. Yes, tertiary amine.
Q. Major contraindication?
A. Angle-closure glaucoma.

10 MNEMONICS

H ot as a hare
D - ry as a bone
B - lind as a bat
R ed as a beet
M ad as a hatter

Atropine = dries secretions + dilates pupil + raises heart rate.

Pharmacology Classification + Specific Mechanism of Action (MOA) – 200 High-Yield One-Liners

1 Definition

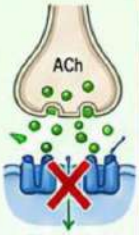
- Tertiary antimuscarinic drug
- Natural belladonna alkaloid
- Crosses blood-brain barrier

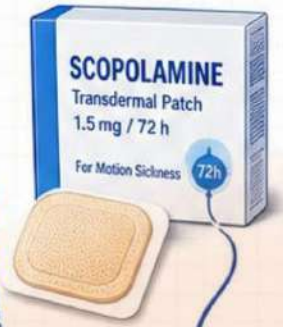
2 Classification

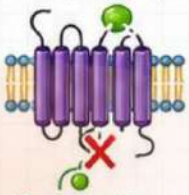
- Parasympatholytic / anticholinergic
- Muscarinic receptor blocker
- Tertiary amine tropane alkaloid

3 Mechanism of Action

- Competitive muscarinic receptor antagonist
- Blocks cholinergic transmission in vestibular pathways
- Depresses vomiting center input
- Reduces salivary and GI secretions







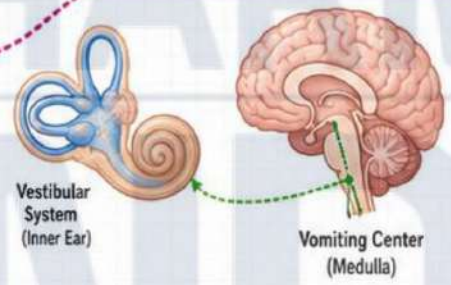
Scopolamine* – Muscarinic blocker; prevents motion sickness

4 Pharmacological Effects

- Antiemetic
- Antisialagogue
- Sedative / CNS depressant
- Mydriasis and cycloplegia
- ↓ GI motility

5 Therapeutic Uses

- Prevention of motion sickness
- Postoperative nausea and vomiting
- Pre-anaesthetic medication
- Excess salivation control



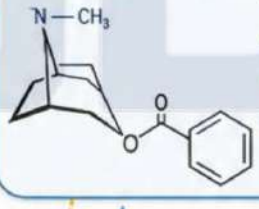
6 Adverse Effects

- Dry mouth
- Blurred vision
- Drowsiness
- Constipation
- Urinary retention
- Tachycardia
- Confusion at high dose

7 Contraindications

- Angle-closure glaucoma
- Prostatic hypertrophy
- Paralytic ileus
- Caution in elderly

Chemical Structure of Scopolamine



- Tropane alkaloid
- Tertiary amine (N–CH_3)
- Lipid soluble → crosses BBB

8 Drug Interactions

- Additive anticholinergic effects with antihistamines
- Additive with TCAs and antipsychotics
- Alcohol /CNS depressants ↑ sedation

9 Important Examples

- Scopolamine hydrobromide
- Transdermal scopolamine patch
- Related antimuscarinics: atropine, homatropine

10 Mnemonics

- "Sco-PATCH-alamine" = patch for travel sickness
- "Sea trip = Scopolamine"

11 Exam Points

- ★ Best antimuscarinic for motion sickness
- ★ Tertiary amine → enters CNS
- ★ Commonly used as transdermal patch
- ★ More sedative than atropine

Learn • Understand • Remember • Excel

12 Important Questions

Q: Why is scopolamine preferred in motion sickness?
A: It acts on vestibular pathways and vomiting center in CNS and is more sedative → effective in motion sickness.

Q: Why does it cause sedation?
A: It crosses the blood-brain barrier and depresses CNS activity.

Q: Name one common dosage form.
A: Transdermal patch (1.5 mg / 72 h).

High Yield Remember Smartly!

Key Takeaway: **Scopolamine** is a tertiary antimuscarinic that ***crosses the BBB***, blocks ***vestibular inputs*** and ***vomiting center***, thereby preventing motion sickness while causing typical ***anticholinergic effects.***

Pharmacology Classification + Specific Mechanism of Action (MOA) – 200 High-Yield One-Liners

1 DEFINITION

- Physostigmine is a reversible anticholinesterase drug.
- It inhibits acetylcholinesterase and increases acetylcholine at synapses.
- It is a tertiary amine, so it crosses the blood-brain barrier.

2 CLASSIFICATION

- **Class:** Indirect-acting cholinomimetic.
- **Type:** Reversible acetylcholinesterase inhibitor.
- **Chemical nature:** Natural carbamate alkaloid.
- Tertiary amine → CNS active.

3 MECHANISM OF ACTION

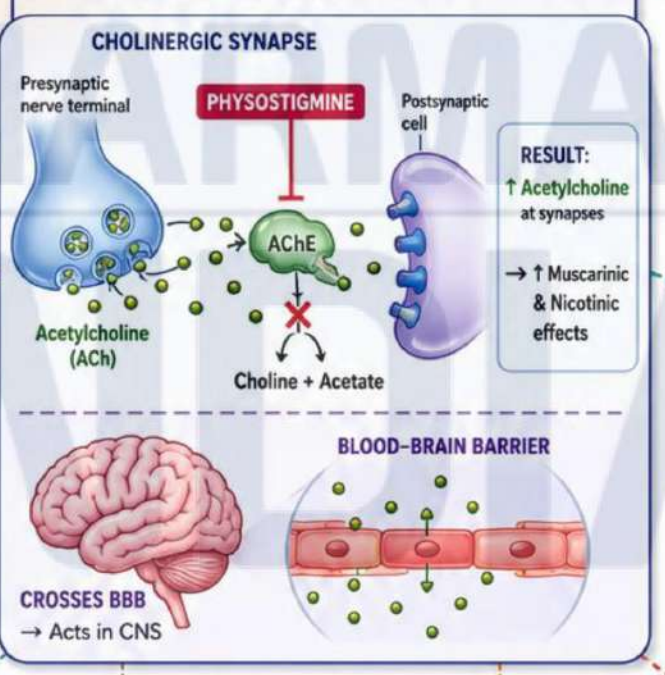
- Reversibly inhibits acetylcholinesterase.
- Prevents breakdown of acetylcholine.
- Increases ACh at muscarinic and nicotinic receptors.
- Enhances cholinergic transmission in peripheral and central nervous systems.
- Crosses BBB and reverses central anticholinergic toxicity.

4 PHARMACOLOGICAL EFFECTS

- **Eye:** miosis, spasm of accommodation, reduced intraocular pressure.
- **GIT:** increased motility and secretions.
- **Glands:** increased salivation, sweating, lacrimation.
- **CVS:** bradycardia.
- **Skeletal muscle:** improved neuromuscular transmission.
- **CNS:** enhances central cholinergic activity.

PHYSOSTIGMINE*

Reversible AChE inhibitor; crosses BBB



5 THERAPEUTIC USES

- Antidote in atropine poisoning / anticholinergic toxicity.
- Reversal of central and peripheral antimuscarinic effects.
- Occasionally used in glaucoma.
- Historical / less common use in myasthenia gravis.

6 ADVERSE EFFECTS

- Salivation, sweating, lacrimation.
- Nausea, vomiting, diarrhea, abdominal cramps.
- Bradycardia and hypotension.
- Bronchospasm.
- Muscle cramps or fasciculations.
- CNS effects: seizures at high dose.

7 CONTRAINDICATIONS

- Asthma or severe COPD.
- Peptic ulcer disease.
- Bradycardia or heart block.
- GI or urinary obstruction.
- Epilepsy / seizure disorders: caution.

8 DRUG INTERACTIONS

- Antimuscarinics (e.g., atropine) antagonize many muscarinic effects.
- Other cholinomimetics or AChE inhibitors increase toxicity.
- Beta-blockers may enhance bradycardia.
- Drugs lowering seizure threshold may worsen CNS toxicity risk.

9 IMPORTANT EXAMPLES

- Physostigmine salicylate.
- Compare related reversible AChE inhibitors:
  - Neostigmine
  - Pyridostigmine
  - Edrophonium
- ★ Highlight: Physostigmine is the one that crosses BBB.

10 MNEMONICS

"PHYSO = PHYSically enters the brain"

- ☑ Physostigmine = tertiary amine → crosses BBB.
- ☑ Use in atropine poisoning.

11 EXAM POINTS

- ★ Reversible AChE inhibitor.
- ★ Tertiary amine; crosses BBB.
- ★ Drug of choice for atropine toxicity / central anticholinergic syndrome.
- ★ Increases both muscarinic and nicotinic actions indirectly.
- ★ Different from neostigmine: neostigmine does **NOT** cross BBB.

12 IMPORTANT QUESTIONS

1. Why is physostigmine used in atropine poisoning?
2. How does physostigmine differ from neostigmine?
3. Why can physostigmine produce CNS effects?
4. Mention therapeutic uses and adverse effects of physostigmine.
5. Explain its mechanism as a reversible AChE inhibitor.

EXAM BOOSTER ★

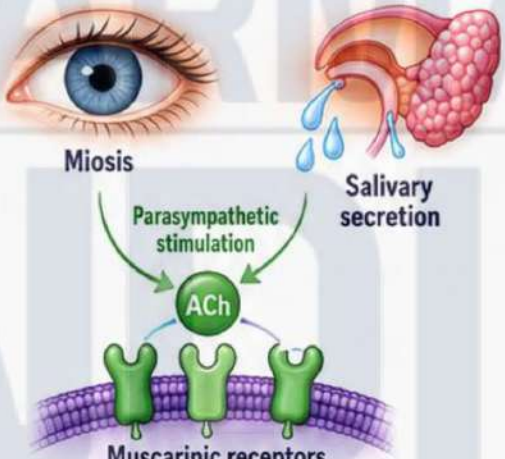
High-Yield Fact:

Physostigmine is the classic reversible AChE inhibitor that crosses the BBB and is used in anticholinergic toxicity.

Pharmacology Classification + Specific Mechanism of Action (MOA) – 200 High-Yield One-Liners

PILOCARPINE*

Muscarinic agonist; increases salivation and miosis



1. DEFINITION

- Pilocarpine is a direct-acting **parasympathomimetic** drug.
- Natural alkaloid and selective **muscarinic** receptor agonist.
- Increases exocrine secretions and causes **miosis**.

2. CLASSIFICATION

- **Class:** Cholinergic agonist.
- **Type:** Direct-acting muscarinic agonist.
- **Source:** Natural alkaloid from *Pilocarpus*.

3. MECHANISM OF ACTION

- Stimulates muscarinic receptors, mainly M3.
- Contracts iris sphincter → **miosis**.
- Contracts ciliary muscle → opens trabecular meshwork.
- Increases aqueous humor outflow → **lowers intraocular pressure**.
- Increases salivary, lacrimal and sweat secretion.

4. PHARMACOLOGICAL EFFECTS

- Marked salivation and sweating.
- Miosis and spasm of accommodation.
- Decreased intraocular pressure.
- Increased bronchial and lacrimal secretions.
- Increased GI motility and mild bradycardia.

5. THERAPEUTIC USES

- Xerostomia (dry mouth).
- Sjögren syndrome.
- Glaucoma, especially to reduce intraocular pressure.
- Produce miosis in ophthalmic practice.

6. ADVERSE EFFECTS

- Excess sweating.
- Excess salivation.
- Nausea, abdominal cramps, diarrhea.
- Bronchospasm.
- Bradycardia and hypotension.
- Blurred vision or brow ache.

7. CONTRAINDICATIONS

- Asthma or severe COPD.
- Peptic ulcer disease.
- Severe bradycardia or hypotension.
- GI or urinary obstruction.
- Caution in iritis/uveitis.

8. DRUG INTERACTIONS

- Antimuscarinics (e.g. atropine) block its action.
- Other cholinomimetics or anticholinesterases increase cholinergic effects.
- Additive bradycardia with other rate-lowering drugs.

9. IMPORTANT EXAMPLES

- ✓ Pilocarpine eye drops.
- ✓ Oral pilocarpine tablets.
- ✓ Related muscarinic agonists: bethanechol, methacholine, cevimeline.

10. MNEMONICS

"PILO = Pupil In, Liquids Out"

Pupil in = miosis;
Liquids out = salivation, sweating, tears.

11. EXAM POINTS

- Direct muscarinic agonist; no significant nicotinic action.
- Natural alkaloid.
- Used in xerostomia and glaucoma.
- Causes miosis and ciliary muscle contraction.
- Lowers IOP by increasing aqueous outflow.

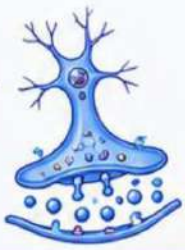
12. IMPORTANT QUESTIONS

1. Write the mechanism of action of pilocarpine.
2. Why is pilocarpine used in xerostomia?
3. Mention therapeutic uses of pilocarpine.
4. List adverse effects of muscarinic agonists.
5. Differentiate pilocarpine and atropine.

Pharmacology Classification + Specific Mechanism of Action (MOA) – 200 High-Yield One-Liners

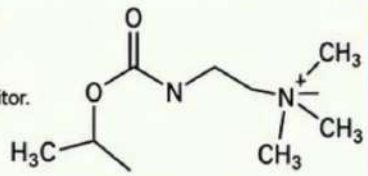
1. DEFINITION

- Reversible anticholinesterase drug.
- Inhibits acetylcholinesterase and increases acetylcholine at cholinergic synapses.



2. CLASSIFICATION

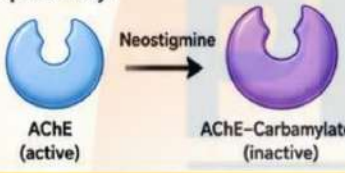
- Indirect-acting cholinomimetic.
- Reversible acetylcholinesterase inhibitor.
- **Carbamate ester.**
- Quaternary ammonium compound.
- Mainly peripheral acting.

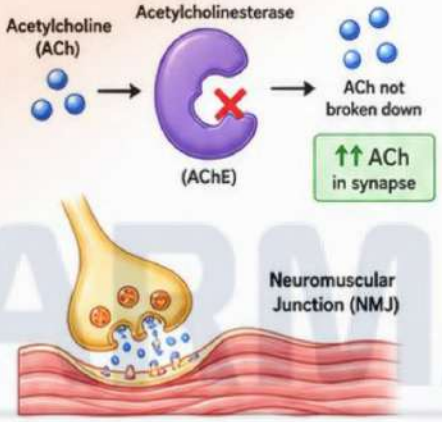


Chemical Class:
Carbamate ester

3. MECHANISM OF ACTION

- Carbamylates acetylcholinesterase reversibly.
- Prevents breakdown of acetylcholine.
- Increases both muscarinic and nicotinic activity.
- Enhances transmission at neuromuscular junction.
- Poor CNS entry because it is quaternary.





NEOSTIGMINE*

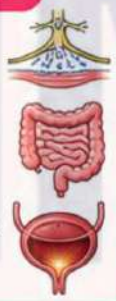
Reversible acetylcholinesterase inhibitor.

4. PHARMACOLOGICAL EFFECTS

- Miosis.
- Bradycardia.
- Increased salivation and secretions.
- Bronchoconstriction.
- Increased GI motility.
- Bladder contraction.
- Improves skeletal muscle strength in myasthenia gravis.

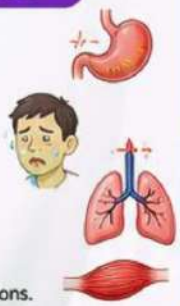
5. THERAPEUTIC USES

- Myasthenia gravis.
- Reversal of non-depolarizing neuromuscular block.
- Postoperative paralytic ileus.
- Postoperative/non-obstructive urinary retention.



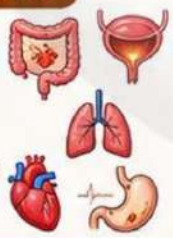
ADVERSE EFFECTS

- Abdominal cramps.
- Diarrhea.
- Nausea and vomiting.
- Excess salivation.
- Sweating.
- Bradycardia.
- Bronchospasm.
- Muscle cramps or fasciculations.



7. CONTRAINDICATIONS

- Intestinal obstruction.
- Urinary obstruction.
- Asthma or severe COPD.
- Bradycardia or heart block.
- Peptic ulcer.



9. IMPORTANT EXAMPLES

- Neostigmine methylsulfate (injection).
- Neostigmine bromide (oral).

Related reversible inhibitors:
- Pyridostigmine.
- Physostigmine.

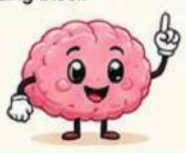
DRUG INTERACTIONS

- Atropine antagonizes muscarinic effects.
- Glycopyrrolate often co-used during reversal.
- Aminoglycosides may worsen neuromuscular weakness.
- May prolong effect of succinylcholine.
- Additive effect with other cholinergic drugs.

10. MNEMONICS

"NEO-STIM"

- **N** – NMJ strength ↑
- **E** – Empty bladder
- **O** – Opposes non-depolarizing block
- **S** – Secretions ↑
- **T** – Tears / sweating
- **I** – Ileus relief
- **M** – Myasthenia gravis



11. EXAM POINTS

- Reversible AChE inhibitor.
- Quaternary ammonium → poor BBB penetration.
- Acts on both muscarinic and nicotinic sites indirectly.
- Used to reverse non-depolarizing muscle relaxants.
- Often given with atropine or glycopyrrolate.

EXAM BOOSTER

IMPORTANT QUESTIONS

1. **What type of drug is neostigmine?**
   → Reversible AChE inhibitor.
2. **Does it cross BBB well?**
   → No, poor CNS entry.
3. **Main use in muscle disease?**
   → Myasthenia gravis.
4. **Reverses which block?**
   → Non-depolarizing neuromuscular block.
5. **Muscarinic adverse effects are treated with?**
   → Atropine.

Pharmacology Classification + Specific Mechanism of Action (MOA) – 200 High-Yield One-Liners

1. DEFINITION

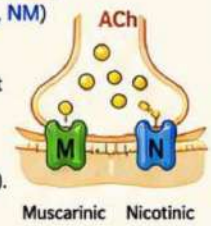
- Acetylcholine (ACh) is an endogenous neurotransmitter that acts as an **agonist** at both **muscarinic** and **nicotinic** receptors.

2. CLASSIFICATION

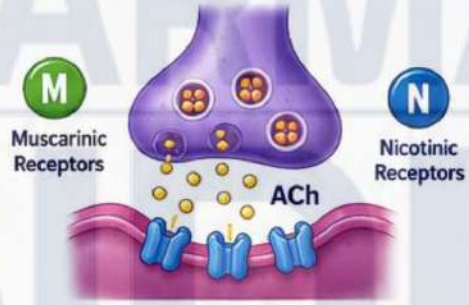
- **By Source:** Endogenous
- **By Receptor:**
  - Muscarinic Receptor Agonist
  - Nicotinic Receptor Agonist
- **Chemical Class:** Choline Ester

3. MECHANISM OF ACTION

- Binds to and activates muscarinic (M1–M5) and nicotinic (N_N, NM) receptors.
- Mimics the action of ACh at cholinergic synapses.
- Rapidly hydrolyzed by acetylcholinesterase (AChE).



ACETYLCHOLINE* – MUSCARINIC AND NICOTINIC RECEPTOR AGONIST



Endogenous neurotransmitter at cholinergic synapses

4. PHARMACOLOGICAL EFFECTS

Muscarinic (M)

- Miosis
- Bronchoconstriction
- ↓ Heart rate
- ↑ Salivation, lacrimation
- ↑ GI motility & secretion
- Urination (detrusor contraction)

Nicotinic (N)

- N_N: Ganglionic stimulation (↑ autonomic activity)
- N_M: Skeletal muscle contraction

5. THERAPEUTIC USES

- Post-operative ileus & urinary retention
- Myasthenia gravis
- Reversal of non-depolarizing neuromuscular blockers
- Glaucoma (topical; intraocular pressure reduction)
- Diagnostic use in autonomic function tests

6. ADVERSE EFFECTS

- Bradycardia
- Hypotension
- Bronchospasm
- Excess salivation, sweating & lacrimation
- Nausea, vomiting, diarrhea
- Muscle cramps, fasciculations (N_M stimulation)

7. CONTRAINDICATIONS

- Asthma or severe COPD
- Peptic ulcer disease
- Mechanical obstruction (GI or urinary)
- Bradycardia or heart block
- Hypersensitivity to drug

8. DRUG INTERACTIONS

- **Anticholinesterases** (e.g., Neostigmine) ↑↑ prolongs ACh action
- **Anticholinergics** (e.g., Atropine) ↓↓ block effects
- **β-Blockers** ↑ risk of bradycardia
- **Depolarizing NM blockers** (e.g., **Succinylcholine**) ↑ prolonged neuromuscular block

9. IMPORTANT EXAMPLES

- ✓ **Acetylcholine chloride (ACh)** – Natural neurotransmitter
- ✓ **Carbachol** – More stable cholinergic agonist
- ✓ **Methacholine** – Selective muscarinic agonist
- ✓ **Nicotine** – Nicotinic receptor agonist (non-selective)

10. MNEMONICS

"MUSCLES & GLANDS GO, NERVE NODES GO TOO!"

M = Muscarinic – Glands, Gut, Heart, Eye
N = Nicotinic – Nerve ganglia, Muscles

Think: ACh Activates All!

11. EXAM POINTS

- ACh is rapidly inactivated by acetylcholinesterase.
- Produces brief and short-lived effects.
- Stimulates both muscarinic and **nicotinic** receptors.
- Basis for parasympathomimetic actions.
- Key neurotransmitter of both autonomic & somatic systems.

12. IMPORTANT QUESTIONS

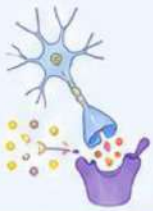
1. Differentiate between muscarinic and nicotinic actions of acetylcholine.
2. Why is acetylcholine not used therapeutically systemically?
3. How does acetylcholine help in myasthenia gravis?
4. List the adverse effects of acetylcholine.
5. Mention drugs that potentiate and block the action of acetylcholine.

High-Yield Fact: ACh is the first discovered neurotransmitter and the master key of cholinergic transmission!

Pharmacology Classification + Specific Mechanism of Action (MOA) – 200 High-Yield One-Liners

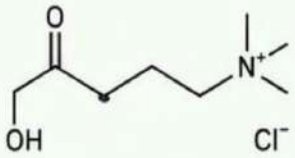
DEFINITION

Bethanechol is a direct-acting cholinergic (muscarinic) agonist which stimulates muscarinic receptors.



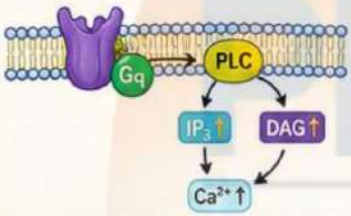
CLASSIFICATION

- **Class:** Cholinergic agonist
- **Subclass:** Muscarinic agonist
- **Chemical Class:** Choline ester
- **Mechanism:** Direct-acting
- **Source:** Synthetic



MECHANISM OF ACTION

- Directly stimulates muscarinic receptors (M_2, M_3).
- Activates G_q protein → Phospholipase C activation → ↑ IP_3 & DAG → ↑ intracellular Ca^{2+} → Smooth muscle contraction & glandular secretion.



BETHANECHOL*

Direct muscarinic agonist; stimulates bladder contraction.

PHARMACOLOGICAL EFFECTS

- Stimulates bladder contraction (↑ detrusor tone)
- Increases GI motility
- Increases salivary, lacrimal, bronchial & gastric secretions
- Causes miosis (pupil constriction)
- May cause bradycardia
- Facilitates nasal drainage

THERAPEUTIC USES

- Postoperative or postpartum urinary retention
- Neurogenic (atonic) bladder
- Non-obstructive urinary retention
- To assist in bladder emptying (e.g., after surgery or spinal injury)

ADVERSE EFFECTS

- Abdominal cramps
- Diarrhea
- Nausea & vomiting
- Increased salivation
- Urinary urgency
- Bradycardia
- Sweating
- Bronchospasm (in susceptible)

CONTRAINDICATIONS

- Mechanical obstruction in GI or urinary tract
- Asthma or severe COPD
- Bradycardia or heart block
- Peptic ulcer
- Peritonitis
- Hypersensitivity

IMPORTANT EXAMPLES

- Bethanechol chloride (Most commonly used)

DRUG INTERACTIONS

- Anticholinergics (e.g., atropine): Antagonize effect
- Cholinesterase inhibitors: Prolong & enhance effect
- Beta-blockers: ↑ risk of bradycardia
- Succinylcholine: Prolongs apnea

MNEMONICS

"BETHA – Bladder Tightens"

- B – Bladder contraction
- E – Enhances GI motility
- T – Tears & Saliva ↑
- H – Heart rate ↓
- A – Assists urination

EXAM POINTS

- ★ Direct muscarinic agonist
- ★ Not degraded by AChE easily
- ★ Poor CNS penetration
- ★ Used in atonic bladder
- ★ Causes miosis & bradycardia

EXAM BOOSTER

IMPORTANT QUESTIONS

1. **What is bethanechol?**
   → Direct muscarinic receptor agonist.
2. **Main use of bethanechol?**
   → Atonic (neurogenic) bladder.
3. **Does it cross BBB?**
   → Poorly.
4. **Major adverse effect?**
   → Bradycardia.

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