D.PHARM • SECOND YEAR

फार्माकोलॉजी

अध्याय 3

नेत्र पर कार्य करने वाली औषधियाँ



हिंदी अध्याय नोट्स

DIPLOMA IN PHARMACY

DRUGS ACTING ON THE EYE OVERVIEW

Ocular drugs glaucoma, infection, inflammation, allergy, dry eye और retinal disease treat करती हैं। इन्हें topical, systemic या intraocular route से दिया जा सकता है।

1. PUPIL SIZE & ACCOMMODATION

- Mydriatics: phenylephrine; atropine या tropicamide।
- Miotics: pilocarpine, carbachol या physostigmine।

2. GLAUCOMA

- Aqueous production कम: timolol, brimonidine, dorzolamide।
- Aqueous outflow अधिक: latanoprost, pilocarpine, netarsudil।
- Combination example: timolol + dorzolamide।

3. ANTI-INFECTIVES

- antibiotics: ciprofloxacin, tobramycin
- antivirals: acyclovir, ganciclovir
- antifungals: natamycin, amphotericin B

4. ANTI-INFLAMMATORY DRUGS

- steroid: prednisolone
- NSAIDs: ketorolac, diclofenac

5. OTHER IMPORTANT GROUPS

- local anaesthetic: proparacaine
- antiallergics: olopatadine, cromolyn
- lubricants: carboxymethylcellulose, CMC, और polyethylene glycol, PEG
- diagnostic stains: fluorescein, Rose Bengal
- anti-VEGF: wet age-related macular degeneration, AMD, में ranibizumab
- immunomodulators: cyclosporine, lifitegrast
- hyperosmotic agent: selected acute glaucoma care में mannitol।



OCULAR DRUG MECHANISMS AND CLINICAL USES

KEY MECHANISMS (Site and Action)

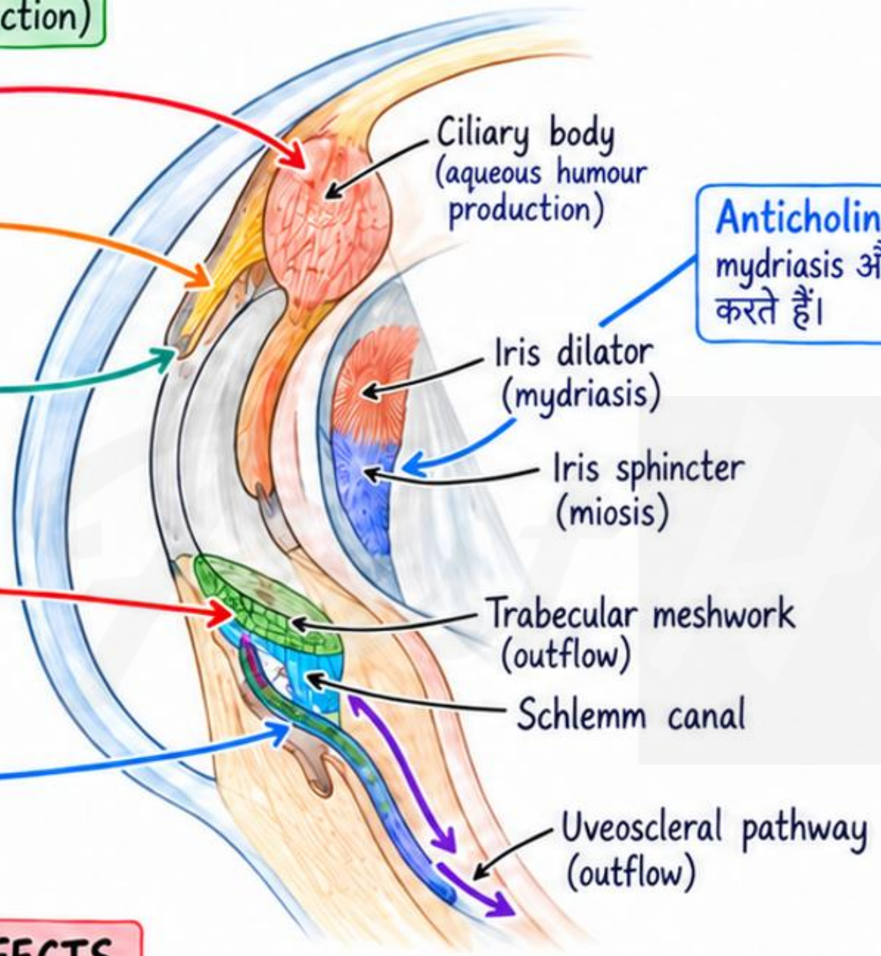
Beta blockers
aqueous-humour production कम करते हैं।

Carbonic anhydrase inhibitors, CAIs
aqueous formation घटाते हैं।

Alpha2 agonists
aqueous production कम और outflow अधिक करते हैं।

Miotics
ciliary muscle contract करके trabecular outflow बढ़ाते हैं।

Prostaglandin analogues
uveoscleral outflow बढ़ाते हैं।



CLINICAL USES

glaucoma:
intraocular pressure, IOP, कम करने वाली drugs

eye examination या surgery:
mydriatics, local anaesthetics और stains

infection:
antibiotics, antivirals या antifungals

inflammation:
indicated होने पर corticosteroids या ocular NSAIDs

dry eye:
lubricants; selected cyclosporine या lifitegrast

allergy:
antibistamines और mast-cell stabilizers

retinal disorders:
anti-VEGF agents

IMPORTANT ADVERSE EFFECTS

- ocular beta blockers: bradycardia, bronchospasm risk और dry eye
- prostaglandin analogues: iris darkening, eyelash growth और conjunctival redness
- ocular corticosteroids: prolonged या unsuitable use में cataract और IOP बढ़ना
- miotics: brow ache और blurred vision
- anticholinergics: photophobia और susceptible eye में angle closure trigger होने का risk

KEY SAFETY POINT

Absorption के बाद eye drops systemic effects कर सकती हैं। सही medicine, concentration और technique use करके professional instructions follow करें।

MIOTICS CLASSIFICATION AND MECHANISM

Miotics pupil को constrict करके miosis कराती हैं। ये iris sphincter और ciliary muscle पर cholinergic activity stimulate करती हैं।

A. DIRECT-ACTING MUSCARINIC AGONISTS

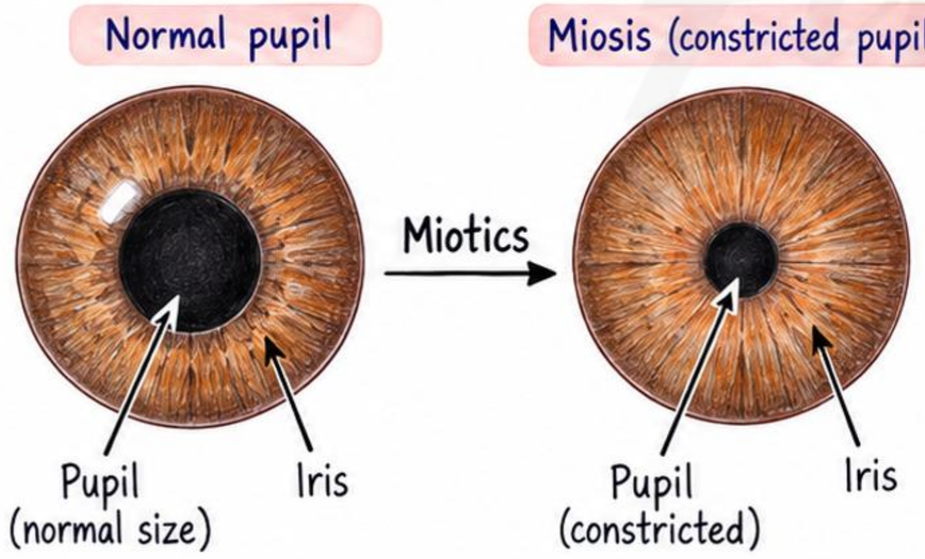
Muscarinic receptors को directly stimulate करती हैं।

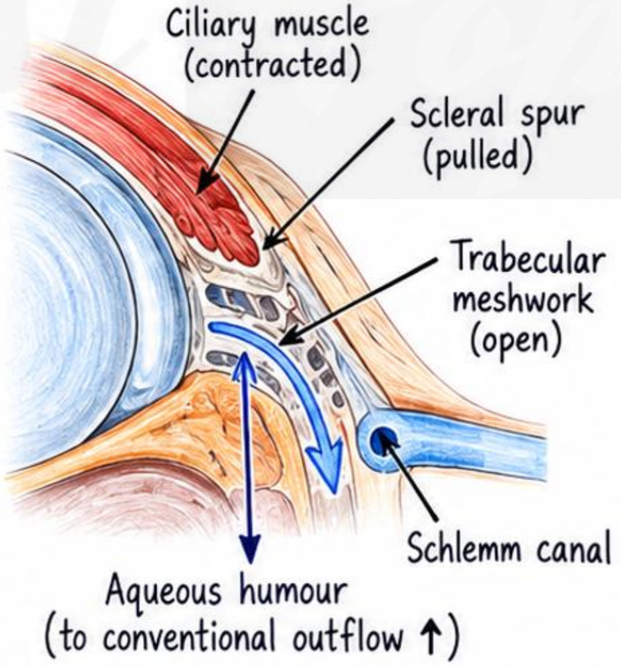
- pilocarpine
- carbachol

B. INDIRECT-ACTING AGONISTS: ANTICHOLINESTERASES

Acetylcholinesterase inhibit → muscarinic receptors पर endogenous ACh अधिक।

- physostigmine
- echothiophate
- demecarium





OCULAR MECHANISM

1. M_3 receptor stimulation iris sphincter contract करता है → miosis।
2. Ciliary-muscle contraction scleral spur को खींचता है।
3. Trabecular meshwork खुलता है → Schlemm canal से conventional aqueous outflow बढ़ता है।
4. IOP घटता है।

OTHER OCULAR ACTION

Ciliary-muscle contraction accommodation spasm, brow ache, headache और blurred distance vision कर सकता है।

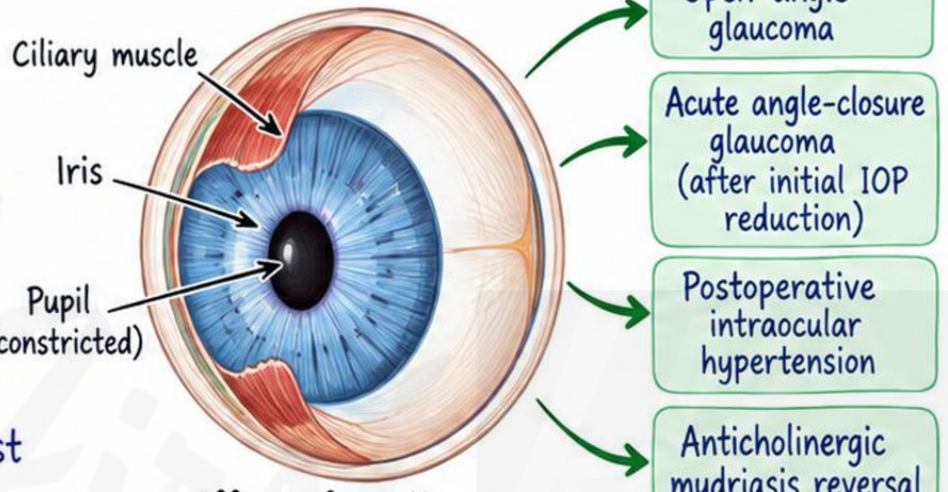
SYSTEMIC EFFECTS IF ABSORBED

Bradycardia, hypotension, salivation, diarrhoea और muscle cramps; potent या long-acting indirect agents में risk अधिक है।

MIOTICS USES, DOSES AND PRECAUTIONS

Important Uses

1. selected patients में primary open-angle glaucoma
2. initial IOP reduction और specialist assessment के बाद acute angle-closure glaucoma में adjunct
3. selected postoperative intraocular hypertension
4. Adie pupil के लिए dilute pilocarpine test
5. selected anticholinergic mydriasis reversal



Effect of miotics
(miosis, ↑ aqueous outflow, ↓ IOP)

Contraindications or Major Cautions

1. uveitis या iritis: miosis और ciliary spasm inflammation या pain बढ़ा सकते हैं
2. retinal detachment का predisposition
3. cataract या दूसरी media opacity: miosis vision और खराब कर सकती हैं
4. clear lens वाले young patients: marked accommodation spasm
5. hypersensitivity

Dose Examples (Ophthalmic)

Rx	• pilocarpine 1%, 2% या 4% eye drops: 1–2 drops, daily 3–4 times
	• carbachol 1% eye drops: 1–2 drops, daily up to 3 times
	• physostigmine 0.25% eye drops: 1 drop, daily 2–4 times
	• echothiophate 0.03% या 0.06% solution: 1 drop once or twice daily

Dose और duration diagnosis, product तथा specialist advice पर depend करते हैं।

Acute Angle-Closure Glaucoma

Acute angle closure ophthalmic emergency हैं। बहुत high IOP पर pilocarpine ineffective हो सकती हैं और emergency protocol में pressure घटना शुरू होने के बाद ही generally use होती हैं।

Stop and Seek Help

Severe eye pain, sudden visual loss, marked wheze, faintness या pronounced bradycardia में urgent assessment चाहिए।

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