

Ocular pharmacology

Class		Drug	MOA	Indication	Side effects	Extra
Cholinergic Agonists	Direct	<ul style="list-style-type: none"> - Pilocarpine. - Acetylcholine. - Carbachol. 	<ul style="list-style-type: none"> - Iris sphincter muscle contraction → Miosis. - Longitudinal ciliary muscle contraction → ↑ aqueous outflow through the trabecular meshwork. - Circular ciliary muscle contraction → accommodation. 	<ul style="list-style-type: none"> - Glaucoma. 	<ul style="list-style-type: none"> - Local: myopia, headache), miotic cysts. - Systemic: lacrimation, salivation, bronchial spasm. 	-
	Reversible indirect	<ul style="list-style-type: none"> - Physostigmine. 	-	<ul style="list-style-type: none"> - Diagnosis of Myasthenia Gravis. - Lice infestation of lashes. 	<ul style="list-style-type: none"> - CNS side effects. 	-
	Irreversible indirect	<ul style="list-style-type: none"> - Phospholin iodide 	-	<ul style="list-style-type: none"> - Accommodative esotropia. 	<ul style="list-style-type: none"> - Iris cyst. - Anterior subcapsular cataract. - Apnea (if used with succinylcholine or procain). 	<ul style="list-style-type: none"> # Angle closure glaucoma. # Asthma. # Parkinsonism.
Cholinergic Antagonists		<ul style="list-style-type: none"> - Tropicamide. - Atropine. - Cyclopentolate. - Homatropine. - Scopolamine. 	<ul style="list-style-type: none"> - Iris sphincter muscle paralyzing → mydriasis. - Ciliary muscle paralyzing → cycloplegia. 	<ul style="list-style-type: none"> - Fundoscopy. - Cycloplegic refraction. - Anterior uveitis. 	<ul style="list-style-type: none"> - Local: allergic reaction, blurred vision. - In children → flushing, fever, tachycardia. 	<ul style="list-style-type: none"> - Reverse action by DC or physostigmine.

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Adrenergic Agonists	Nonselective	- Epinephrine.	-	- Glaucoma.	- Conjunctival adrenochrome. - Headache. - Arrhythmia. - ↑ BP - Cystoid macular edema in aphakic eyes.	# Closed angle glaucoma.
	α 1	- Phenylephrine.	- Iris sphincter muscle paralyzing → mydriasis. - Without cycloplegia.	- Mydriasis. - Decongestant.	- Significant ↑ in BP. - Rebound congestion. - Precipitation of acute angle-closure glaucoma.	-
	α 2	- Brimonidine. - Apraclonidine.	- ↓ Aqueous production. - ↑ Uveoscleral outflow.	- Open angle glaucoma.	- Local: allergic reaction, mydriasis, lid retraction, conjunctival blanching - Systemic: oral dryness, vasovagal attacks.	# Infants. # MAO inhibitors users.
Adrenergic Antagonists	α	- Thymoxamine. - Dapiprazole.	-	- Reverse pupil dilation produced by phenylephrine.	- Retinal detachment	-
	Nonselective β	- Timolol. - Levobunolol. - Metipranolol. - Carteolol.	- ↓ the formation of aqueous humor.	- Glaucoma.	- Bronchospasm - Cardiac impairment.	# Asthma. # COPD.
	Cardio selective β	- Betaxolol		- Good for asthmatic.	-	-

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Carbonic Anhydrase Inhibitors		- Acetazolamide . - Methazolamide . - Dorzolamide , brinzolamide . - Dichlorphenamid	- Aqueous suppression.	- Glaucoma. - Cystoid macular edema. - Pseudotumour cerebri.	- Myopia. - Paresthesia . - Altered taste and smell - Aplastic anemia.	# Sulpha allergy. # Digitalis users. # Pregnancy.
Osmotic Agents		- Glycerol 50% syrup. - Mannitol 20% IV.	- Dehydrate vitreous body → reduce IOP significantly.	- Suppress IOP as fast as possible in Acute glaucoma attacks.	- Hyperglycemia (Glycerol) - Fluid overload (Mannitol).	# Heart failure (Mannitol).
Prostaglandin Analogues		- Latanoprost . - Bimatoprost . - Travoprost . - Unoprostone .	- ↑ Uveoscleral aqueous outflow.	- Glaucoma.	- Heterochromia iridis. - Lengthening and thickening of eyelashes. - Intraocular inflammation - Macular edema.	-
Corticosteroids	Topical	- Fluorometholone - Remixolone . - Prednisolone . - Hydrocortisone . - Dexamethasone .	- Phospholipase A2 inhibition → inhibition of arachidonic acid release from phospholipids.	- Postoperatively. - Anterior uveitis. - Severe allergic conjunctivitis. - Vernal keratoconjunctivitis. - Corneal graft. - Episcleritis. - Scleritis.	- Susceptibility to infections. - Glaucoma. - Cataract.	-
	Systemic	- Prednisolone . - Cortisone .		- Posterior uveitis. - Optic neuritis. - Temporal arteritis with anterior ischemic optic neuropathy.	- Posterior subcapsular cataract - Glaucoma. - Central serous retinopathy.	-

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NSAID		<ul style="list-style-type: none"> - Ketorolac. - Diclofenac. - Flurbiprofen. 	<ul style="list-style-type: none"> - Inactivation of cyclooxygenase. 	<ul style="list-style-type: none"> - Postoperatively. - Mild allergic conjunctivitis. - Episcleritis. - Mild uveitis. - Cystoid macular edema. 	<ul style="list-style-type: none"> - Stinging. 	-
Antibiotics		<ul style="list-style-type: none"> - Penicillins, - Cephalosporins. - Sulfonamides. - Tetracyclines. - Chloramphenicol - Aminoglycosides. - Fluoroquinolone. - Vancomycin. - macrolides. 	<p>Topically:</p> <ul style="list-style-type: none"> - Trachoma (tetracycline or erythromycin, or systemic azithromycin). - Bacterial keratitis (penicillin's, cephalosporin's, aminoglycosides, vancomycin). - Bacterial conjunctivitis (erythromycin, aminoglycosides, fluoroquinolones). <p>Orally:</p> <ul style="list-style-type: none"> - Preseptal cellulitis (amoxicillin <u>with</u> clavulanate) <p>Intravenously:</p> <ul style="list-style-type: none"> - Orbital cellulitis (gentamicin, cephalosporin, vancomycin, flagyl) <p>Intravitreally:</p> <ul style="list-style-type: none"> - Endophthalmitis (vancomycin and septazidine). 		-	-
Antifungals	Polyenes	<ul style="list-style-type: none"> - Amphotericin B. - Natamycin. 	<ul style="list-style-type: none"> - Damage cell membrane of susceptible fungi. 	<ul style="list-style-type: none"> - Fungal keratitis. - Fungal endophthalmitis. 	<ul style="list-style-type: none"> - Nephrotoxicity 	-
	Imidazoles	<ul style="list-style-type: none"> - Miconazole. - Ketoconazole. 	<ul style="list-style-type: none"> - ↑ Fungal cell membrane permeability. 		<ul style="list-style-type: none"> - 	-
	Flucytosine		<ul style="list-style-type: none"> - Act by inhibiting DNA synthesis. 		<ul style="list-style-type: none"> - 	-

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Antivirals		- Acyclovir.	- Interact with viral thymidine kinase.	- Herpetic keratitis.	-	-
		- Trifluridine.	- More corneal penetration.	- Herpetic iritis - The best in uveitis.	-	-
		- Ganciclovir.		- IV for CMV retinitis	-	-
Ocular Diagnostic Drugs		- Fluorescein dye.	- Drops or strips.	- Corneal abrasions. - Applanation tonometry. - Wound leak. - Nasolacrimal obstruction. - Fluorescein angiography.	- Drops can be contaminated by Pseudomonas sp.	-
		- Rose bengal stain.	- Stains devitalized epithelium.	- Severe dry eye. - Herpetic keratitis.	-	-
Local Anesthetics	Topical	- Proparacaine. - Tetracaine (acts longer).	-	- Applanation tonometry. - Gonioscopy. - Removal of corneal FB - Suture removal. - Examination of patients with pain.	- Toxic to corneal epithelium. - Ocular damage. - allergic reaction.	-
	Orbital infiltration	- Lidocaine. - Bupivacaine.	- Peribulbar or retrobulbar.	- Intraocular surgery.	-	-
Lubricants		- Polyvinyl alcohol. - Cellulose. - Methylcellulose	-	-	-	-

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Intravitreal injection	Anti-VEGF (vascular endothelial growth factor)	- Bevacizumab. - Ranibizumab. - Aflibercept.	-	-	- PDR (proliferative diabetic retinopathy) - DME (Diabetic macular edema). - CRVO (central retinal venous occlusion). - BRVO (Branched retinal venous occlusion). - Wet AMD (age related macular degeneration).	
Ocular Toxicology		- Amiodarone.	-	- Antiarrhythmic drug.	- Optic neuropathy → mild ↓ vision, visual field defects, bilateral optic disc swelling. - Corneal vortex keratopathy (corneal verticillata).	
		- Digitalis.	-	- Cardiac failure drug.	- Chromatopsia	
		- Chloroquine.	-	- Malaria, SLE. - Rheumatoid arthritis.	- Vortex keratopathy (corneal verticillata). - Retinopathy (bull's eye maculopathy)	
		- Chlorpromazine.	-	- Psychiatric drug.	- Corneal punctate epithelial opacities. - Lens surface opacities	
		- Thioridazine	-	- Psychiatric drug.	- Pigmentary retinopathy after high	
		- Diphenylhydantoin	-	- Epilepsy drug.	Cerebellar vestibular effects → - Horizontal nystagmus in lateral gaze - Diplopia, ophthalmoplegia. - Vertigo/ ataxia.	
		- Topiramate.	-	- Epilepsy.	- Acute angle-closure glaucoma	Treatment of this type of glaucoma: - <u>Cycloplegia.</u> - <u>Topical steroids.</u>
		- Ethambutol.	-	- Anti-TB drug.	- Optic neuropathy. - Visual damage.	
		- Statins.	-	- Cholesterol lowering.	- Cataract specially if used with erythromycin.	