ADRENERGIC AGONISTS

(Adrenergic drugs/ Sympathomimetic amines/ Sympathomimetic agents)

DRUG	MECHANISM OF ACTION	USES	STORAGE CONDITION	TYPES OF FORMULATION	BRAND NAMES
Nor-Epinepherine/ Nor Adrenaline - Direct acting Adrenergic agonist - Catecholamine derivative	Acts on α and β adrenergic receptors	- Peripheral vasoconstriction - Inotropic stimulation of heart - Dilation of coronary arteries - Maintains BP in hypotensive states	Store in PVC bags at 4°C for 61 days	- Injectable solution - Intravenous solution	- Levarterenol - Leveophed
Epinephrine/ Adrenaline - Direct acting Adrenergic agonist - Catecholamine derivative	Acts on α, β_1 and β_2 adrenergic receptors	- Potent vasoconstrictor (α) - Increases systolic BP - Cardiac stimulant - Produces positive inotropic and chronotropic actions on heart (β_1) - Dilates skeletal muscle blood vessels (β_2) - Relaxes muscles in intestine and bronchi	20-25°C Excursions permitted: 15-30°C	- Injectable solution	- Adrenalin - Epinephrinesnap-EMS - Epinephrinesnap-V

Phenylephrine - Direct acting Adrenergic agonist - Non-Catecholamine derivative	Selective α_1 adrenergic agonist	- Vasoconstrictor - Increases BP by increasing peripheral resistance - Constricts ciliary body blood vessels and produces mydriasis, thereby reduces intraocular tension - Nasal decongestant - Treating hypotension	20-25°C Excursions permitted: 15-30°C	- Capsules - Tablets - Solutions - Granules	- Neo-Synephrine - Suphedrine PE
Dopamine - Direct acting Adrenergic agonist - Catecholamine derivative	Acts on Dopamine receptor sub-types in brain	- Produces positive inotropic and chronotropic actions on heart (β) - Acute congestive heart failure - Acute pancreatitis - Septic and surgical shock	20-25°C Excursions permitted: 15-30°C	- Injectable solution	- Intropin
Terbutaline - Direct acting Adrenergic agonist	- Stimulates β_2 adrenoreceptors - Stimulates intracellular adenyl cyclase and increases cAMP levels	- Relaxes bronchial smooth muscles	15-30°C	- Powder - Solution	- Brethine - Bricanyl - Brethaire

Salbutamol/ Albuterol - Direct acting Adrenergic agonist - Non-Catecholamine derivative	Selectively agonizes β_2 receptors	- Induces bronchodilation - Treating broncho spasm - Peripheral vascular diseases - Prevention of premature labour	15-30°C	- Aerosol - Solution - Tablets	- Airomir - Combivent - Proair
Naphazoline - Direct acting Adrenergic agonist - Non-Catecholamine derivative	Acts on α adrenergic receptors	- Systemic vasoconstriction - Decreases nasal congestion	20-25°C	- Ophthalmic gel forming solution - Ophthalmic solution	- Privine
Tetrahydrozoline - Direct acting Adrenergic agonist	Selectively stimulates α_1 adrenergic receptors	- Vasoconstriction - Provides temporary relief from minor eye redness, swelling or draining caused by minor iritants	Room temperature	- Ophthalmic solution	- Colirio ocusan - Visine
Hydroxy amphetamine - Indirect acting Adrenergic agonist	Stimulates α receptors Releases nor-epinephrine from adrenergic nerve terminals	- Mydriasis - Narcolepsy - Children having hyperkinetic syndrome - Anorexiant for treating obesity	20-25°C	- Solution	- Paremyd

Pseudo ephedrine - Indirect acting Adrenergic agonist	- Acts on α and β adrenergic receptors - Increases nor-epinephrine release	- Vasoconstriction (α) - Relaxes bronchial smooth muscles (β) - Vasomotor rhinitis - Nasal, sinus ans eustachian tube congestion	Room temperature	- Syrup - Tablets	- Sudafed congestion - SudoGest - Sudafed children's nasal decongestant
Ephedrine - Agent with mixed mechanism/ Dual acting - Non-Catecholamine derivative	- Agonizes α and β adrenergic receptors - Increases release of Nor-epinephrine from sympathetic neurons	- Used for hypotension - Appetite suppression - Nasal congestion	15-25°C	- Tablets - Capsules	- Akovaz - Bronkaid - Corphedra
Metaraminol - Agent with mixed mechanism/ Dual acting - Non-Catecholamine derivative	- Acts on α adrenergic receptors - Inhibits adenyl cyclase and inhibits cAMP production - Releases nor-epinephrine from its storage sites indirectly	- Treating and preventing acute hypotensive state due to spinal anaesthesia	Stable between 2-8°C for 24-48 hrs in an IV infusion of NaCl	- Solution	- Aramine

ADRENERGIC ANTAGONISTS

(Sympatholytic agents/ Adrenoceptor antagoinsts/ Adrenergic blocking agents/ Anti-adrenergic drugs)

Tolazoline - α – Adrenergic antagonist	- Blocks α – adrenergic receptors - Agonizes and indirectly release endogenous histamine	- Vasodilation - Reduces pulmonary arterial pressure and vascular resistance - Cause mydriasis - Treating Raynaud's disease and cerebral vascular accidents - Treating persistent pulmonary hypertension in new born	Room temperature	- Injection solution	- Priscoline Hydrochloride
Phentolamine - Non selective reversible α blocker	- Blocking α adrenergic receptors	- Diagnosing pheochromocytoma - Treating hypertensive crisis	At room temperature for 48 hrs At 2-8℃ for 1 week	- Powder for injection - Injection solution	- Oraverse - Rogitine
Phenoxy benzamine - Non selective irreversible α blocker	- Blocking α adrenergic receptors	- Pheochromocytoma - Raynaud's syndrome - Reduces blood pressure	15-30℃	- Capsules	- Dibenzyline

Prazosin α_1 selective blocker Quinazoline derivative	- Inhibits post synaptic α_1 adreno receptors on vascular smooth muscles - Inhibits catecholamines release	- Hypertension - Symptomatic benign prostatic hyperplasia - Severe congestive failure - Pheochromocytoma	Room temperature	- Capsules	- Minipress - Prazin - Prazo
Propanolol Non selective β Adrenergic blocker Naphthalene ring	- Binds with β_1 adrenergic receptors	- Reduces heart rate, cardiac output, systolic and diastolic blood pressure - Treating hypertension, angina, tremors and heart rhythm disorders	15-30°C	- Solution - Tablets	- Hemangeol - Hemangiol - Inderol - Innopran
Atenolol β Adrenergic blocker	- Binds with β_1 adrenergic receptors in heart and vascular smooth muscles	- Reduces heart rate, cardiac output, systolic and diastolic blood pressure	20-25°C	- Tablets	- Tenormin
Carvedilol Non selective β Adrenergic blocker	- Blocks β_1, β_2 and α_1 adrenergic receptors - Prevent OH^- radical induced decrease in sarcoplasmic reticulum Ca^{2+} - ATPase activity	- Treating mild to moderate heart failure of cardiomyopathic or ischemic origin	20-25°C	- Tablets	- Coreg

CHOLINERGIC AGENTS

(Parasympathomimetic agents/ Cholinergic Agonists)

Acetylcholine - Direct acting - Choline ester	Acts on muscarinic and nicotinic receptors - Produce relaxation of heart, contraction of GIT and pupil, increased gastric and salivary secretion(muscarinic) - Produce skeletal muscle contraction(nicotinic)	- Cataract surgery, keratoplasty, iridectomy.	Stored in vesicles by following its synthesis	○ Powder for injection ○ Gels ○ Lozenges	○ Miochol-E
Carbachol - Direct acting - Choline ester	Acts on muscarinic and nicotinic receptors - Decreases HR, causes vasodilation, increases smooth muscle tone and contractibility - Stimulates autonomic ganglia, skeletal muscles, salivary glands, ocular glands and sweat glands.	- Treating intestinal and bladder atony seen post operatively - Severe chronic glaucoma	Store under dry conditions	○ Tablet ○ Solution	○ Carbastat ○ Miostat

Pilocarpine - Direct acting - Cholinergic alkaloid	Acts on M_3 receptor - Increases the secretions by exocrine glands - Produces contraction of iris sphincter & ciliary muscle.	- Xerostomia - Open angle glaucoma	Cool and dry place	○ Tablets ○ Solution	○ Salagen
Neostigmine - Indirect acting - Reversible carbamate - Quaternary amine - Anticholinesterase inhibitor	- Acts directly on skeletal muscle - Inactivates cholinesterase enzyme	- For treating Urinary retention - Ogilvie syndrome - As a test for early pregnancy - Provoke menstrual bleeding	< 25℃	○ Injectable solution	○ Bloxiverz ○ Prostigmin bromide ○ Prostigmin
Edrophonium chloride - Reversible - Anticholinesterase inhibitor	- Inhibits acetylcholinesterase enzyme - Stimulates muscarinic and nicotinic receptors	- Diagnosis of myasthenia gravis	15-30℃	○ Injectable solution	○ Enlon ○ Reversol ○ Tensilon
Tacrine hydrochloride - Reversible Acridine - Anticholinesterase inhibitor	- Inhibits acetylcholinesterase enzyme	- Respiratory stimulant - Countering the effect of muscle relaxants - Alzheimer's disease - CNS disorders	15-30℃	○ Capsules	○ Cognex

Echothiopate iodide - Irreversible Organophosphorus compound - Anticholinesterase inhibitor	- Inhibits acetylcholinesterase enzyme - Causes miosis	- Sub-acute or chronic angle closure glaucoma after iridectomy	Initial reconstitution: 2-8℃ After reconstitution: 25℃	○ Solution ○ Powder	○ Phospholine iodide
Pralidoxime chloride - Cholinesterase reactivator	- Binds to esteric site of acetyl cholinesterase - Cleaves the phosphate-ester bond formed between organophosphate and acetyl cholinesterase and reactivates cholinesterase enzyme.	- Treating the poisoning caused by pesticides and chemicals of organophosphates having anticholinesterase activity. - Controlling overdosage of anticholinesterase drugs. - Myasthenia gravis	20-25℃	○ Injection	○ Atnaa ○ Duodote ○ Protopam

CHOLINERGIC BLOCKING AGENTS

(Muscarinic/ cholinergic antagonists, Anti-parasympathetic agents, Anti-muscarinic agents, Antispasmodics)

Atropine sulphate - Anti-Muscarinic agent - Muscarinic Antagonists	- Inhibits muscarinic acetylcholine receptors	- Treating poisoning caused by organo phosphorous/ carbamate insecticides	< 40°C	○ Injection solution	○ Atnaa ○ Busulfex ○ Isopto atropine
Ipratropium bromide - Anti-Muscarinic agent - Muscarinic Antagonists	- Decreases the formation of cGMP by blocking muscarinic cholinergic receptors. - Decreases contractility of smooth muscles	- Chronic bronchitis - Emphysema	< 25°C	○ Spray ○ Solution	○ Ipratropium inhalation solution ○ Ipratropium inhalation aerosol
Tropicamide - Muscarinic Antagonists	- Blocks M_4 receptors - Dilates pupil and paralyses ciliary muscle	- Inducing mydriasis & cycloplegia	20-25°C Excursions permitted: 15-30°C	○ Injection ○ Solution	○ Minims tropicamide ○ Mydriacyl ○ Paremyd

Cyclopentolate hydrochloride - Muscarinic Antagonists	- Blocks muscarinic receptors - Causes mydriasis	- Producing mydriasis and cycloplegia during diagnostic procedures.	Cool and dry place	○ Solution	○ Cyclogyl ○ AK-Pentolate
Clidinium bromide - Muscarinic Antagonists	- Inhibits M_1 muscarinic receptors - Antispasmodic and anti-secretory effect on GIT	- Treating peptic ulcer - Relieving abdominal or stomach spasms/ cramps	-20°C for 2 years	○ Tablet ○ Capsules	○ Quarzan
Dicyclomine hydrochloride - Muscarinic Antagonist	- Blocks muscarinic receptors - Affects smooth muscles directly (musculotropic action)	- Treating irritable bowel syndrome	Cool and dry place	○ Solution ○ Syrup ○ Capsule ○ Tablet	○ Bentyl ○ Dibent ○ Dicyclocot