## Pharmacology Drug Chart

Cholinergic Agonists			
Drug Name	Receptor	Therapeutic Uses	Adverse Effects
Acetylcholine	Muscarinic	<ul> <li>↓ HR, CO and BP</li> <li>↑ Salivary Secretions</li> <li>↑ Secretions and Motility in the GIT</li> <li>↑ Bronchiolar Secretions</li> <li>Miosis (Constriction of the Pupil)</li> </ul>	
Bethanechol	Muscarinic	Stimulates the detrusor while relaxing the trigone and sphincter causing urination in Nonobstructive retention i.e. postoperative and postpartum	Sweating, Salivation, Flushing, ↓ BP, Nausea, Abdominal Pain, Diarrhea, and Bronchospasam
Carbachol	Muscarinic	Similar to Bethanechol to treat urinary retention Used on the Eye to cause Miosis  ↓ Intraocular Pressure to treat Glaucoma	When used to treat Glaucoma there are little to no side effects b/c of direct administration
Pilocarpine	Muscarinic	Miosis  ↓ Intraocular Pressure in BOTH Narrow and  Wide angle Glaucoma	Can enter the brain and cause CNS disturbances  ↑ Sweating  ↑ Salivation

Anticholinesterases - Irreversible			
Drug Name	Receptor	Therapeutic Uses	Adverse Effects
Organophosphates	Covalently bonds to	Chronic treatment of Open-angle Glaucoma	Death ⊗
	AChase		

Anticholinesterases - Reversible			-
Drug Name	Receptor	Therapeutic Uses	Adverse Effects
	Competitive Inhibitor	↑ Intestinal Motility	Bradycardia
	of AChase	↑ Bladder Motility	Can enter the CNS and high doses may cause
Physostigmine		Miosis	convulsions
		↓ Intraocular Pressure	
		Used to treat an overdose of Atropine	
	Competitive Inhibitor	↑ Intestinal Motility	Sweating, Salivation, Flushing, ↓ BP, Nausea,
	of AChase	↑ Bladder Motility	Abdominal Pain, Diarrhea, and Bronchospasam
Neostigmine		Antidote for Tubocurarine	
		Treatment of Myasthenia Gravis	

Cholinergic Antagonists			
Drug Name	Receptor	Therapeutic Uses	Adverse Effects
	Non-specific	Mydriasis (Dilation of the Pupil)	Dry Mouth
	Muscarinic Blocker	Relaxes the GIT	Blurred Vision
	via Competitive	Antispasmodic activity in the Bladder	Tachycardia
	Binding	Treatment of Organophosphate overdose by	Constipation
Atropine		blocking the effects of excess ACh caused by	↑ Intraocular Pressure (Bad for Glaucoma)
		Anti-AChase	Enters the CNS to cause Confusion,
		Blocks secretions of the upper and lower	Hallucinations, Depression and collapse of the
		respiratory tract	Circulatory and Respiratory systems

Ganglionic and Neuro	muscular Blockers		
Drug Name	Receptor	Therapeutic Uses	Adverse Effects
		Low Dose - Ganglionic stimulation by	Irritability and Tremors
		depolarization	Intestinal Cramps and Diarrhea
		High Dose - Ganglionic blockade	↑ HR
Nicotine		Sympathetic Stimulation followed by paralysis of	↑ BP
		the ganglia	↑ Rate of Metabolism of other drugs - Induction
	Competitive	Used for the emergency lowering of BP	
Hexamethonium	Nicotinic Ganglionic		
(Trimethaphan)	Blocker		
	Nondepolarizing NM	Low Dose - Nicotinic Receptor and	Histamine Release
	Blocker	competitively blocks the binding of ACh	Ganglionic Blockade
Tubocurarine		High Dose - blocks the Ion Channels of the End	↓ BP
		Plate	
		Used to relax skeletal muscle during surgery	
Sugainulah alima	Depolarizing NM	Rapid endothelial intubations	Hyperthermia
Succinylcholine	Blocker		Apnea due to the paralysis of the Diaphragm

Direct Acting Adrenergic Agonists			<i>3.</i> 5
Drug Name	Receptor	Therapeutic Uses	Adverse Effects
	Low Dose β	<u>ACTIONS</u>	CNS Disturbances
	Med Dose D	Positive Inotropic βI	Hemorrhage
	High Dose $\alpha$	Positive Chronotropic βI	Cardiac Arrhythmias
		↑ <b>co</b>	Pulmonary Edema
		↓ TPR	
		Vasoconstriction in Skin and Viscera $lpha$ I	
		Vasodilation in Liver and Skeletal Muscle β2	
		↓ Renal blood flow	
		↑ Systolic Pressure	
		↓ Diastolic Pressure	
Epinephrine -		Bronchodilation $\beta$ 2	
FIGHT OR FLIGHT		↑ Glycogenolysis in Liver β2	
		↑ Release of Glucagon β2	
		$\downarrow$ Release of Insulin $lpha$ 2	
		$\uparrow$ Lipolysis - $\beta$ 1 Receptors in Adipose Tissue	
		THERAPEUTIC USES	
		↓ Intraocular Pressure (↓ Aqueous Humor)	
		Used to treat Anaphylactic Shock	
		Used to treat acute Asthma	
	Mostly $\alpha 1$ ,	↑ TPR	Reflex Bradycardia
	$\alpha$ 2 are for Negative	↑ BP	
Norepinephrine	Feedback		
	βΙ	50	
	L	0	I

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	βI and β2	Positive Inotropic	CNS Disturbances
Isoproterenol /	Decreased Uptake	Positive Chronotropic	Hemorrhage
Isoprenaline		Vasodilation of Skeletal Muscle	Cardiac Arrhythmias
•		Bronchodilation	Pulmonary Edema
	High Dose $\alpha$	↑ TPR	Sympathetic Stimulation
	Med Dose $\beta$	↑ co	Nausea
	Low Dose D	↓ TPR	Hypertension
Dopamine		Drug of choice for shock because it \(^1\) Renal and	Arrhythmias
		Splanchnic blood flow	
		Treatment of CHF	
	βΙ	↑co	Use with caution in Atrial Fibrillation because the
Dobutamine		Treatment of CHF	drug ↑ atrioventricular conduction
	$\alpha$ I and $\alpha$ 2 but mostl	y Resistant to COMT	Reflex Bradycardia
	αΙ	Vasoconstriction	Hypertensive Headache
Phenylephrine		↑ Systolic Pressure	Cardiac Irregularities
		↑ Diastolic Pressure	
		Mydriasis	
	α2	$\downarrow$ BP due to its action on the CNS	
<b>6</b> 1		Treatment of Hypertension	
Clonidine		Treatment for the withdrawal from Opiates and	
		Benzodiazepines	
	β2	Bronchodilation	Reflex Tachycardia
Salbutamol		Treatment of Asthma	
	α2 Agonist	Treatment of Hypertension	Sedation
o. Mathadana		↓ TPR	Drowsiness
α-Methyldopa		↓ BP	
		Organ Blood Flow is NOT Reduced	

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Indirect Acting Adrenergic Agonists				
Drug Name	Receptor	Therapeutic Uses	Adverse Effects	
Amphetamine	α, β, CNS	CNS stimulant in the treatment of children with	↑ BP	
		ADD	↑ HR	
		Also used in the treatment of Depression,		
		Narcolepsy and Appetite Control		

Mixed Acting Adrenergic Agonists			
Drug Name	Receptor	Therapeutic Uses	Adverse Effects
	α, β, CNS	Resistant to COMT and MAO	↑BP
		Treatment of Asthma	↑ HR
Ephedrine		Nasal Decongestant	
		$\downarrow$ Fatigue	
		↑ Athletic Performance	

lpha Adrenergic Antagonists			
Drug Name	Receptor	Therapeutic Uses	Adverse Effects
	$\alpha$ I and $\alpha$ 2	Treatment of Pheochromocytoma - a	Postural Hypotension
	Irreversible and	catecholamine secreting tumor	Epinephrine Reversal
	Noncompetitive		Nasal Congestion
Phenoxybenzamine			Nausea
,			Vomiting
			May induce Tachycardia
			Inhibits Ejaculation

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	$\alpha$ I and $\alpha$ 2	Used in the diagnosis of Pheochromocytoma	Postural Hypotension
	Competitive		Tachycardia
Phentolamine			Cardiac Stimulation
			Epinephrine Reversal
			Anginal Pain
			Arrhythmias
	$\alpha$ I Competitive	Treatment of Hypertension	First Dose Effect Syncope
		↓ TPR	Postural Hypotension
Prazosin		Alternative to surgery in benign Prostatic	Lack of Energy
		Hypertrophy thus improving urine flow	Nasal Congestion
			Headache

β Adrenergic Antagonists			
Drug Name	Receptor	Therapeutic Uses	Adverse Effects
	βI and β2	↓ Intraocular Pressure	Bronchoconstriction
	Nonselective	↓ Aqueous Humor	Arrhythmias
		Treatment of Migraine	Sexual Impairment (unclear as to why)
Propranolol		Curbing the effects of Hyperthyroidism	↓ Glycogenolysis
'		Treatment of STABLE Angina (NOT ACUTE)	↓ Glucagon - Adverse of Insulin dependent
		Can aid in the prevention a Second MI	diabetics
	β1 Selective	Treatment of Hypertension	May compromise respiratory activity in
	Cardioselective	↓ BP	Asthmatics
Atenolol		Treatment of Angina	
		Treatment of Atrial and Ventricular Arrhythmia	
		Treatment of Tachycardia	
		forms.or	

	α I Antagonist	Vasodilation	Postural Hypotension αI
	β1 Antagonist	↓ BP	Dizziness α I
	β2 Partial Agonist	↓ HR	
		Treatment of Hypertension - Especially useful for	
		patients with Asthma and Diabetics due to the	
		eta2 partial agonist effect	

	Drugs Affecting Neu	ırotransmitter Release	
Drug Name	Receptor	Therapeutic Uses	Adverse Effects
	Mg <sup>2+</sup> / ATP	ACTION	Causes the ultimate depletion of Norepinephrine
	Dependent	Blocks the Mg <sup>2+</sup> / ATP Dependent transporter	in the adrenergic neuron
	Transporter	from transporting Norepinephrine, Dopamine	Sympathetic function is greatly impaired
Reserpine		and Serotonin from the cytoplasm into the	May cause Bradycardia
		storage vesicles	
		THERAPEUTIC USES	
		Treatment of Hypertension	
		Mechanism I - Displaces Norepinephrine from	Postural Hypotension
		storage vesicles	Male sexual function interference
		Mechanism 2 - Blocks the release of stored	Hypertensive Crisis in patients with
Guanethidine		Norepinephrine	Pheochromocytoma due to a supersensitivity to
		Treatment of Hypertension (Rarely Used)	Norepinephrine
		↓ BP	
		↓ HR	
	Na <sup>+</sup> / K <sup>+</sup> ATPase	Inhibits reuptake I of Norepinephrine from the	Causes the accumulation of Norepinephrine in
		synaptic cleft by blocking Na/K ATPase	the synaptic space
Cocaine		fforms.org	Causes an enhancement of Sympathetic activity

Antiarrhythmic Drugs			
Drug Name	Receptor	Therapeutic Uses	Adverse Effects
Quinidine	Binds to Open and	Slows Phase 0 Depolarization	May cause SA and AV Block
Class IA	Inactive Na Channels	Treatment of Atrial, AV, and Ventricular	Asystole
Na <sup>+</sup> Channel Blocker	to Prevent Influx	Arrhythmias	May induce ventricular Tachycardia
	Binds to Open and	Shortens Phase 3 Repolarization	Drowsiness
	Inactive Na Channels	Suppresses arrhythmias caused by abnormal	Slurred Speech
	to Prevent Influx	automaticity within the cells	Agitation
Lidocaine		Treatment of Ventricular Arrhythmias during MI	Confusion
Class IB		Drug of choice for the emergency treatment of	Convulsions
Na <sup>+</sup> Channel Blocker		Cardiac Arrhythmias - Wide therapeutic to toxic	Ventricular Arrhythmias
		ratio	Does not slow down conduction therefore it is
			not useful for AV junction arrhythmias
	Binds to Open and	Markedly Slows Phase 0 Depolarization	Negative Inotropic
Flecainide	Inactive Na Channels	Treatment of Refractory Ventricular	Can aggravate CHF
Class IC	to Prevent Influx	Arrhythmias	Ventricular Tachycardia
Na <sup>+</sup> Channel Blocker			Dizziness
			Blurred Vision

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	$\beta$ I and $\beta$ 2	Suppresses Phase 4 Depolarization	Bronchoconstriction
	Nonselective	↓ cAMP causes    ↓ Ca <sup>2+</sup> Influx in Cardiac Tissue	Arrhythmias
		which leads to ↓CO	Sexual Impairment (unclear as to why)
		↓ HR	↓ Glycogenolysis
Propranolol		↓ Intraocular Pressure	↓ Glucagon
Class II		↓ Aqueous Humor	
$\beta$ Adrenorecepter		Treatment of Migraine	
Blocker		Curbing the effects of Hyperthyroidism	
REPEAT		Treatment of STABLE Angina (NOT ACUTE)	
		Treatment of arrhythmias caused by ↑	
		sympathetic activity	
		Can aid in the prevention of a Second MI	
		Prolongs Phase 3 Repolarization	Interstitial Pulmonary Fibrosis
		Treatment of severe Supraventricular and	GI Intolerance
Amiodarone	Current During	Ventricular Tachycardia	Hyper or Hypothyroidism
Class III	Repolarization	Has Class I, II, III, IV Effects	Liver Toxicity
K <sup>+</sup> Channel Blocker			Neuropathy
			Muscle Weakness
			Blue Skin (Iodine accumulation)
	Binds to Voltage	Shortens Action Potential	Negative Inotropic
	Gated Ca Channels	Greater effect on the heart than on vascular	↓ BP due to peripheral vasodilation
	to Decrease the	smooth muscle	
Verapamil	Inward Current	Treatment of Atrial Dysrhythmias	
Class IV		Treatment of Reentrant Supraventricular	
Ca <sup>2+</sup> Channel Blocker		Tachycardia 💂	
		Reduction in Atrial Futter	
		Treatment of Hypertension	
		***	

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	Binds to Voltage	Shortens Action Potential	Negative Inotropic
	Gated Ca Channels	Greater effect on the heart than on vascular	$\downarrow$ BP due to peripheral vasodilation
	to Decrease the	smooth muscle	
Diltiazem	Inward Current	Treatment of Atrial Dysrhythmias	
Class IV		Treatment of Reentrant Supraventricular	
Ca <sup>2+</sup> Channel Blocker		Tachycardia	
		Reduction in Atrial Flutter	
		Treatment of Hypertension	
	Blocks Na/K	Shortens the refractory period in both the atria	Can cause Ectopic ventricular beats
	Channels and	and the ventricles while prolonging the effective	Ventricular Tachycardia or Fibrillation
Digoxin	Reverses Ca/Na	refractory period and decreasing the conduction	
	Antiport to ↑	velocity	
	Intracellular Ca		
	Inhibits cAMP	Slows AV Nodal Conduction	Flushing
Adenosine	Dependent Ca and ↑	Treatment of Supraventricular Tachycardia	Shortness of Breath
	K Conduction		AV Block
	(Hyperpolarization)		
M _2+	Unknown	Treatment of Digitalis Induced Arrhythmias	
Mg <sup>2+</sup>		Treatment of Ventricular Tachycardia	

Cardiac Glycosides			<i>.,</i> .
Drug Name	Receptor	Therapeutic Uses	Adverse Effects
	Reversibly Binds with	Digoxin is used in the treatment of severe left	Progressively more severe Dysrhythmia
	the Na/K ATPase	ventricular systolic dysfunction	Supraventricular Tachycardia
		Positive Inotropic - improved circulation leads to	Ventricular Fibrillation
		$\downarrow$ TPR and eventually $\downarrow$ HR	Complete Heart Block
		Negative Chronotropic	Small therapeutic level before Digitalis Toxicity -
Digitalis			Ca overload together with diuretics
Digoxin			Hyperkalemia
Digitoxin			Anorexia, Nausea and Vomiting
			Headache, Fatigue, Confusion, Blurred Vision,
			Alteration of Color Perception and Haloes

Phosphodiesterase Inhibitors			
Drug Name	Receptor	Therapeutic Uses	Adverse Effects
Milrinone / Amnirone	Inhibits	↑ cAMP causes ↑ Ca2+ Influx in Cardiac Tissue	Toxicity and Death ⊗
	Phosphodiesterase	which leads to ↑ CO	
	Enzyme	↑ Vasodilation	
		Treatment of CHF	

Antihypertensive Drugs		T Hat Hiaco	
Drug Name	Receptor	Therapeutic Uses	Adverse Effects
Thiazide Diuretics Bendrofluazide	Mechanism Unknown	Treatment of Hypertension  ↑ Water and Na Excretion  ↓ BP  ↓ TPR  ↓ CO  ↓ [Ca2+] in the Urine	Induce Hypokalemia and Hyperuricemia Can induce Hyperglycemia Gout Diabetics Mellitus
Loop Diuretics		Cause ↓ Renal Vascular Resistance and ↑ Renal Blood Flow ↑ [Ca2+] in the Urine Used on patients with poor renal function rather than the Thiazide Diuretics	
	βI and β2 Nonselective	<ul> <li>↓ Intraocular Pressure</li> <li>↓ Aqueous Humor</li> <li>Treatment of Migraine</li> <li>Curbing the effects of Hyperthyroidism</li> <li>Treatment of STABLE Angina (NOT ACUTE)</li> <li>Can aid in the prevention of a Second MI</li> </ul>	Bronchoconstriction Arrhythmias Sexual Impairment (unclear as to why)  ↓ Glycogenolysis  ↓ Glucagon
	βΙ Selective Cardioselective	Treatment of Hypertension  ↓ BP  Treatment of Angina  Treatment of Atrial and Ventricular Arrhythmia  Treatment of Tachycardia	May compromise respiratory activity in Asthmatics

		Pharmacology Drug Chart Page
$\alpha$ l Antagonist	Vasodilation	Postural Hypotension $\alpha$ I
β1 Antagonist	↓ BP	Dizziness α I
β2 Partial Agonist	↓ HR	
	Treatment of Hypertension - Especially useful for	
	patients with Asthma and Diabetics due to the	
	$\beta$ 2 partial agonist effect	
Blocks the ACE	↓ Peripheral Vascular Resistance without	Dry Cough due to a diminished rate of
enzyme	affecting CO, HR or Contractility	Bradykinin Inactivation
	Treatment of Hypertension	Renal Damage
		Rashes
		Fever
		First Dose Effect Syncope
Highly Selective	Similar to ACE Inhibitors	Improved of ACE Inhibitors
Angiotensin II	Vasodilation	Fetotoxic
Receptor Blocker	Blocks Aldosterone Secretion	
(AT <sub>1</sub> Subtype)	No Dry cough because Bradykinin is not affected	
αI Competitive	Treatment of Hypertension	First Dose Effect Syncope
	↓ TPR	Postural Hypotension
	Alternative to surgery in benign Prostatic	Lack of Energy
	Hypertrophy thus improving urine flow	Nasal Congestion
		Headache
	βI Antagonist β2 Partial Agonist  Blocks the ACE enzyme  Highly Selective Angiotensin II Receptor Blocker (AT <sub>1</sub> Subtype)	β I Antagonist       ↓ BP         β2 Partial Agonist       ↓ HR         Treatment of Hypertension - Especially useful for patients with Asthma and Diabetics due to the β2 partial agonist effect         Blocks the ACE enzyme       ↓ Peripheral Vascular Resistance without affecting CO, HR or Contractility Treatment of Hypertension         Highly Selective Angiotensin II Receptor Blocker (AT₁ Subtype)       Similar to ACE Inhibitors Vasodilation Blocks Aldosterone Secretion No Dry cough because Bradykinin is not affected         α I Competitive       Treatment of Hypertension ↓ TPR Alternative to surgery in benign Prostatic

			Pharmacology Drug Chart Page
	Binds to Ca Channels	Shortens Action Potential	Negative Inotropic
	to Decrease the	Greater effect on the heart than on vascular	$\downarrow$ BP due to peripheral vasodilation
Verapamil	Inward Current	smooth muscle	
Class IV		Treatment of Atrial Dysrhythmias	
Ca <sup>2+</sup> Channel Blocker		Treatment of Reentrant Supraventricular	
REPEAT		Tachycardia	
1121 27 11		Reduction in Atrial Flutter	
		Treatment of Hypertension	
	Binds to Ca Channels	Shortens Action Potential	Negative Inotropic
	to Decrease the	Greater effect on the heart than on vascular	$\downarrow$ BP due to peripheral vasodilation
Diltiazem	Inward Current	smooth muscle	
Class IV		Treatment of Atrial Dysrhythmias	
Ca <sup>2+</sup> Channel Blocker		Treatment of Reentrant Supraventricular	
REPEAT		Tachycardia	
		Reduction in Atrial Flutter	
		Treatment of Hypertension	
	α2 Agonist	↓ BP due to its action on the CNS	
Clonidine		Treatment of Hypertension	
REPEAT		Treatment for the withdrawal from Opiates and	
		Benzodiazepines	
	α2 Agonist	Treatment of Hypertension	Sedation
α-Methyldopa		↓ TPR	Drowsiness
REPEAT		↓ BP	
		Organ Blood Flow is NOT Reduced	

	Mg <sup>2+</sup> / ATP	ACTION	Causes the ultimate depletion of Norepinephrine
<b>Reserpine</b> REPEAT	Dependent	Blocks the Mg <sup>2+</sup> / ATP Dependent transporter	in the adrenergic neuron
	Transporter	from transporting Norepinephrine, Dopamine	Sympathetic function is greatly impaired
		and Serotonin from the cytoplasm into the	May cause Bradycardia
		storage vesicles	
		THERAPEUTIC USES	
		Treatment of Hypertension	

Vasodilators			
Drug Name	Receptor	Therapeutic Uses	Adverse Effects
		Atrial Dilation	Tachycardia
Hydralizine		↓ TPR	GI discomfort
		Treatment of Hypertension	Hirsuitism
		Atrial Dilation	Tachycardia
Minoxidil		↓ TPR	GI discomfort
		Treatment of Hypertension	Hirsuitism

K+ Sparing Diuretics			
Drug Name	Receptor	Therapeutic Uses	Adverse Effects
Spirolactene	Competes with	Leads to Na Secretion and K Retention	Hyperkalemia
	Aldosterone	Weak Diuretic	
	Receptors		

Autacoids			That macology Drug Cha	
Drug Name	Receptor	Therapeutic Uses	Adverse Effects	
Prostaglandins		Abortion	With Alprostadil there is pain at the site of	
		Peptic Ulcers	injection	
		Inhibits the secretion of HCl in the stomach		
		Erectile Dysfunction (Alprostadil)		
Histamine	Hı	Bronchial and Intestinal Smooth Muscle	Respiratory Symptoms	
		Contraction	↓ Lung Capacity	
		↑NO	Intestinal Cramps	
		↑ Production of Nasal and Bronchial Mucus	Diarrhea	
		Stimulates Itch and Pain and Sensory Nerve		
		Endings		
	$H_2$	↑ Gastric HCl secretion		
	H <sub>1</sub> and H <sub>2</sub>	↓ Systemic BP		
		↓ Peripheral Resistance		
		Positive Inotropic ( $H_1$ and $H_2$ )		
		Positive Chronotropic (H <sub>2</sub> )		
		Capillary Permeability		
		Vasodilation		
		Triple Response - Wheal Formation, Reddening		
		and Halo		

Antihistamines			
Drug Name	Receptor	Therapeutic Uses	Adverse Effects
	H <sub>I</sub> Receptor	Treatment of Allergic Conditions	Sedation
	Competitive	CANNOT treat Bronchial Asthma	Dry Mouth
H <sub>I</sub> Receptor Blockers		Motion Sickness and Nausea	Drug Interactions (MAO Inhibitors)
Chlorpheniramine		Treatment of Insomnia	Overdose in Children
•			Tremor
			Vertigo
H <sub>2</sub> Receptor Blockers	H <sub>2</sub> Receptor	Treatment of Peptic Ulcers	
Cimetidine	Competitive	$\downarrow$ Gastric HCl Secretion	