

Introduction

Adrenergic drugs release acetylcholine at the post synaptic level. Only post ganglionic sympathetic nerves are adrenergic as they use epinephrine as neuron transmitters.

Function Norepinephrine is a neurotransmitter of adrenergic synapse, coming from tyrosine → DOPA → Dopamine, stored in vesicles until it needs to be released, when impulses from CNS send the signals. They use exocytosis so the norepinephrine gets into the synaptic cleft. In synaptic cleft, norepinephrine needs to act on post synaptic receptors.

Norepinephrine is released from the presynaptic membrane 1) Most of it is taken back w/out any changes to be reused (uptake 1), 2) Taken by factors cells AKA non neuronal uptake (uptake 2) 3) Diffuse 4) Degrade (by enzyme present in the synaptic left, minor).

Introduction (cont)

Norepinephrine can act on presynaptic receptors, regulate release of Norepinephrine from sympathetic nerve endings (AKA alpha 2 receptors), regulates -ive feedback mechanism (uptake 1)

Drugs - based on potency

α-adrenoc-reptors	Norepinephrine → epinephrine → isoprenaline
β-adrenoc-reptors	Isoprenaline → epinephrine → norepinephrine
α,β adreno-ceptors	Epinephrine + norepinephrine

Groups of drugs

Subtypes	Mechanism of action
α1 adreno-ceptors	Postsynaptic - mediate effect on sympathetic nerve system (smooth muscle tissues + organs + blood vessels))
α2 adreno-ceptors	Presynaptic - out of synapse (mediate effects on catecholamines released from adrenal medulla)
β1 adreno-ceptors	Postsynaptic - mediate effect on sympathetic nerve system (heart)
β2 adreno-ceptors	Presynaptic - out of synapse (mediate effects of catecholamines circulating in blood leads to vasodilation)

Adreno-positive drugs

α, β-adre-nom-imetcs (natural - used intravenously)	Epinephrine, norepinephrine
α-adre-nom-imetcs (selective)	α1-adrenomimetcs = phenylephrine (increases BP locally + effective orally) α2-adrenomimetcs = Naphazoline, clonidine (decreases BP, antihypertensive drug)
β-adre-nom-imetcs (selective)	β1,β2-adrenomimetcs = isoprenaline β1-adrenomimetcs = dobutamine (if patient doesn't have hypoxia or ischemic disease) β2-adrenomimetcs = salbutamol (short acting drug), phenoterol, salmeterol (slow/-prolonged acting drug)
Sympat-hom-imetcs (indirect binding on receptors)	Ephedrine (acts on sympathetic endings, stimulates release of norepinephrine, indirectly produces effects on post synaptic receptors)

Adreno-negative drugs		Indications + side effects (cont)		Specific drugs (cont)	
Adrenoblockers/-adrenoceptors antagonists (direct binding on receptors)	α, β-adrenoblockers (natural) - Labetalol α-adrenoblockers - α1,α2-adrenoblockers (non-selective) - Phentolamine , dihydroergotamine α1-adrenoblockers - α1a-adrenoblockers - tamsulosin α1b-adrenoblockers - prazosin	β adreno mim- etics	Indications - Bronchial asthma, uterine relaxation (preserving pregnancy) pharmacological effects - cause dilation of bronchial passages, Vasodilation in muscle and liver, Relaxation of uterine muscle, Release of insulin	Tamsulosin (Selectively antagonises/- blocks α 1A-ad- renoceptors)	Indication - benign prostate hyperplasia (increased cell production in a normal tissue or organ) Relax smooth muscle of prostate gland Help to decrease these symptoms
	β- Adrenoblockers / adrenoceptor antagonists β1,β2-Adrenoblockers (non-selective) - Propranolol , timolol β1-adrenoblockers - atenolol, metoprolol	α adreno blo- ckers	Side effects - hypotension Tachycardia	Prazosin (Selectively antagonises/blocks α 1B-adrenoceptors in blood vessels)	Does not affect the - ive feedback mechanism in synapse Indication - arterial hypertension Side effect - orthostatic collapse
Sympatholytics (indirect binding on receptors)	Reserpine , guanethidine	β adreno blo- ckers	Mechanism of action of antihypertensive action of beta adrenoblockers - decrease cardiac output Decrease renin secretion reduce central sympathetic activity (selective BB)) Side effects Side effects β2 AB - Heart insufficiency, bronchoconstriction, *hypoglycemia*, fatigue, dizziness, nausea, diarrhea Side effects β 1 AB -	Specific drugs Propranolol - Decrease heart output, decrease activity of SA + AV nodes, decrease BP due to action on: Heart - decreases heart output Kidney (propranolol decreases production of renin in the kidney) CNS (decrease sympathetic activity on PNS)) Atenolol, Metoprolol (Selective β 1-Adrenoblocker)	
Indications + side effects		Specific drugs			
α adreno- mim- etics	Pharmacological effects - Vasoconstriction of blood vessels Mydriasis Decrease NA peripheral	Phentolamine (antagonises α 1+2 adrenoceptors)	Decreases BP caused by adrenaline, affects -ive feedback mechanism (α 2-adrenoceptors) in the synapse Indications - Pheochromocytoma (adrenal gland tumour) + endarteritis (inflammation of arteries, legs) Side effects - Orthostatic (standing) collapse (severe drop in BP) + tachycardia reverse effects of adrenaline on BP		

