Introduction

Adrenergic drugs	release acetylcholine at the post synaptic level. Only post ganglionic sypathetic 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-adrenoceptors	Norepinephrine → epinephrine → isoprenaline
β-adrenoceptors	Isoprenaline → epinephrine → norepinephrine
α,β adrenoceptors	Epinephrine + norepinephrine

Groups of drugs

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

Adreno-positive drugs

α, β-adrenomimetics (natural - used intravenously)	**Epinephrine, norepinephrine**
α-adrenomimetics (selective)	**α1-adrenomimetics** = **phenylephrine** (increases BP locally + effective orally) **α2-adrenomimetics** = **Naphazoline**, **clonidine** (decreases BP, antihypertensive drug)
β-adrenomimetics (selective)	**β1,β2-adrenomimetics** = **isoprenaline** **β1-adrenomimetics** = **dobutamine** (if patient doesnt have hypoxia or ischemic disease) **β2-adrenomimetics** = **salbutamol** (short acting drug), **phenoterol**, **salmeterol** (slow/-prolonged acting drug)
Sympathomimetics (indirect binding on receptors)	**Ephedrine** (acts on sypathetic endings, stimulates release of norepinephrine, indirectly produces efftecs on post synaptic receptors)

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Adreno-negative drugs

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- Adrenoblockers / adrenoceptor antagonists **β1,β2-Adrenoblockers** (non-selective) - **Propranolol**, timolol **β1-adrenoblockers** - **atenolol, metrolol**
Sympatholytics (indirect binding on receptors)	**Reserpine**, guanethidine

Indications + side effects

α adrenomimetics	Pharmacological effects - Vasoconstriction of blood vessels Mydriasis Decrease NA peripheral

Indications + side effects (cont)

β adrenomimetics	**Indications** - Bronchial asthma, uterine relaxation (preserving pregnancy) **pharmacological effects** - cause dilation of brochial passages, Vasodilation in muscle and liver, Relaxaion of uterine muscle, Release of insulin
α adrenoblockers	**Side effects** - hypotension Tachycardia
β adrenoblockers	**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 β1 AB -

Specific drugs

Phentolamine (anatgonises α1+2 adrenoceptors)	Decreases BP caused by adrenaline, affects -ive feedback mechanism (α2-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

Specific drugs (cont)

Tamsulosin (Selectively anatgonises/-blocks α1A-adrenoceptors)	**Indication** - benign prostate hyperplasia (increased cell production in a normal tissue or organ) Relax smooth muscle of prostate gland Help to decrease these symptoms
Prazosin (Selectively atangonises/blocks α1B-adrenoceptors in bood vessels)	Does not affect the -ive feedback mechanism in synapse **Indication** - arterial hypertension **Side effect** - othostatic collapse

Specific drugs

Propanolol - Non-selective β1,β2-adrenoblocker	Decrease heart output, decrease activity of SA + AV nodes, decrease BP due to action on: Heart - decreases heart output Kidney (propanolol decreases production production of renin in the kidney CNS (decrease sympathetic activity on PNS))
Atenolol, Metoprolol (Selective β1-Adrenoblocker)	Cardioselective in therapeutic doses drugs of choice in cardiac patients

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