

Beta 1 Selective Agonists

Located at Myocardium

Stimulation results in Increased Heart rate and increased force of myocardial contraction (Increased Cardiac output)

USED FOR To increase cardiac output in emergency situations such as CVS shock or to treat complications in Cardiac Surgery.

also USED FOR To increase cardiac function in the short-term treatment of certain type of heart disease, - heart failure

Dobutamine (Dobutrex) Use: Short term mx of Cardiac decompensation that occurs during heart disease or heart surgery. How: Increase force of cardiac contraction. Adm: IV pump infusion (to stable plasma levels)

Dopamine (Intropin) directly stimulates Beta 1. Low DOSE: cause peripheral vasodilatation. Adm: IV drip to maintain stable plasma levels

ADVERSE Effects Chest pain, difficulty in breathing

Beta 2 Selective Agonists

Location on bronchiole smooth muscle

How Stimulated Beta 2 --> mediates relaxation of bronchioles

Treat Bronchospasm associated with respiratory ailments such as asthma, bronchitis, emphysema. Treats ALSO Cardiac Arrhythmias or heart failure

Beta 2 Selective Agonists (cont)

Another LOCATION Uterine Muscle (When stimulated-->cause inhibition or relaxation of the uterus)

Beta 2 Selective Bronchodilators Albuterol (Proventil, Ventolin), Metaproterenol (Alupent), Pirbuterol (Maxair), Salmeterol (Servent), and Terbutaline (Brethaire, bricanyl).

what it causes Bronchodilatation at pulmonary smooth muscles - Asthma.

Isoproterenol (Isuprel) can be the same but: less beta 2 selective and affects beta 1 receptor too.

Adm Oral inhalation so that affects on the bronchial membranes.

Adverse Effect nervousness, restlessness, trembling. sometimes fatal asthmatic attacks.

When used to treat Terbutaline - increase in maternal heart rate and systolic blood pressure, as well as maternal pulmonary edema. labor, Sometimes fatal to mother.

Adrenergic Drugs

Adrenergic Refers physiological responses related to adrenaline and noradrenaline

Other names Adrenaline and NorAdrenalin = Epinephrine and NonEpinephrine

Adrenergic Drugs (cont)

Adrenergic Drugs Stimulate activity in tissues that respond to Epi and NorEpi (Adrenergic agonists) OR inhibit epinephrine and norepinephrine influence (adrenergic antagonists)

From where they release? Adrenal gland and reach to Heart, Kidneys, and various other tissues and organs via systemic circulation.

Where it is found Junction between sympathetic postganglionic neurons and peripheral tissues

Adrenergic agonists Sympathomimetic

Adrenergic antagonists sympatholytic

Subclassification of Adrenergic Drugs

Adrenergic receptors can be divided into two Alpha and Beta receptors

Five receptor subtypes Alpha 1 (a, b, d) 2 (a, b, c) beta 1,2,3,

Alpha 1 or alpha 2 Located at specific tissues throughout the body--> the responded depend upon interaction between that receptor and the receptive tissue

Agonist Increase or mimic the receptor mediated response

Antagonist decrease the receptor mediated response

Epinephrine drug affects alpha and beta receptors Equally

Receptor selectivity



MIX ALPHA AND BETA

Amphetamines	Drugs: Amphetamine (generic), dextroamphetamine (Dexedrine) and methamphetamine (Desoxyn)	Increase Norepinephrine release and decrease NorEpi reuptake and breakdown at adrenergic synapses - so increase activity at synapses with Norepinephrine receptors - Alpha 1,2 and Beta1)
	Used to treat attention-deficit disorder in children, to increase mental alertness in adults with narcolepsy.	The use to suppress appetite or to combat normal sleepiness is discouraged- as they have high potential of abuse

Ephedrine (Generic)	Stimulate Alpha 1, 2 and beta 1 and also stimulate the same by increasing release of norepinephrine at synapses	Use: Primarily for Alpha 1 effects: treat hypotension.
	IV injection	ALSO a nasal decongestant - stimulate alpha 1: combined with other agents (antitussives, antihistamines) to form cough and cold products

MIX ALPHA AND BETA (cont)

	As Bronchodilator	Narcolepsy treatment
Epinephrine (Adrenalin, Bronkaid Mist, Primatene Mist,)	All receptors are stimulate d.	Antiasthmatic inhalation products. - primary stimulate B2 bronchii.
	Effect of Alpha 1 vascular	vasoconstriction and control of bleeding during minor surgical procedures (sutures). Prolongs effects of the anesthetics
	B1 effect on heart	reestablish normal cardiac rhythm during cardiac arrest.
	Drug of choice in Anaphylactic shock	hypersensitive allergic reaction marked by CVS collapse (decreased cardiac output, hypotension) and severe bronchoconstriction.
why	Because ability to	Stimulate heart (b1), vasoconstriction periphery (alpha 1) and Dilate bronchi (beta2).

MIX ALPHA AND BETA (cont)

Metaraminol (aramine)	act like Epinephrine	Directly stimulates alpha 1, 2 and beta1
	Treat	shock or general anaesthesia
NorEpiNephrine (Levophed)	Stimulates : Alpha 1, 2 and Beta 1.	displays little agonistic activity toward beta2.
	Adm IV injection	Treat: Hypotension during shock or general anaesthesia.
Adverse Effect	Nervousness, restlessness, anxiety.	Prolonged use Causes- hypertension, arrhythmias, cardiac arrest.
		Prolonged Use in inhalation: Cause bronchial irritation.

ALPHA 1 SELECTIVE AGONISTS

Alpha 1 or alpha 2	Contraction and VasoConstriction : Increase BP
Mephentermine (Wyamine)	Maintain/restore BP during hypotensive episodes. Administered: IV or IM injections.



ALPHA 1 SELECTIVE AGONISTS (cont)

Methoxamine (Vasoxyl) Increase and maintain BP in severe hypotension- during general anesthesia and spinal anesthesia. Treats: Paroxymal supraventricular tachycardia by causing peripheral vasoconstriction, activation of baroreceptor reflex. Adm : IV injection

Midodrine (ProAmatine) Treat: orthostatic hypotension
Adm: Orally Also: treat hypotension in patients who go under dialysis, offset the hypotensive effects of psychotropic drugs like antipsychotic medications

Oxymetazoline (Afrin, OcuClear, Many others) Adm: nasal drops and nasal sprays. Treat: Decrease nasal congestion and decrease redness and minor eye irritation

Phenylephrine (Neo-Synephrine, Others) Treat: hypotension, treat certain episodes of supraventricular tachycardia. Adm: Orally a Iso or nasal spray, or topically as eye drops.

Pseudoephedrine (Drixoral, Sudafed, etc) Adm: Orally - relieve cold symptoms

Xylometazoline (Otrivin) nasal spray to decrease congestion during cold and allergies.

ALPHA 1 SELECTIVE AGONISTS (cont)

Adverse Effect: increased BP, headache, abnormally slow heart rate, sometimes chest pain, difficulty in breathing, feelings of nervousness

ALPHA 2 SELECTIVE AGONISTS

Primary use Hypertension, spasticity..

How Drug stimulate alpha-2 receptors located at brain and brainstem --> central alpha2 exert an inhibitory effect on sympathetic discharge from the vasomotor center in the brainstem ---> diminished sympathetic discharge results in decreased BP.

Also effective on Spinal cord Stimulation of Alpha 2 --> causes interneuron inhibition and a subsequent decrease in excitability of motor neurons supplied by interneurons. USE TO normalize the neuronal activity in Spasticity

Brimonidine (Alphagan) Adm: local to eye to treat glaucoma. (Decreases vitreous humor production and increasing drainage of vitreous humor from the eye)

ALPHA 2 SELECTIVE AGONISTS (cont)

Clonidine (Catapres, Duraclon) Antihypertensive and analgesic, It does not effect ALONE. so given with PRAZOSIN (Minipress - alpha antagonists). also useful to treat severe pain in cancer.

Guanabenz (Wytensin) decrease BP (same as Clonidine)

Guanfacine (Tenex) similar to Guanabenz

Methyldopa (Aldomet) Antihypertensive.

Tizanidine (Zanaflex) To treat spasticity. Similar to Clonidine but has fewer vasomotor effects and less likely to cause hypotension and other CVS problems.

Adverse Effects Hypotension, dizziness, drowsiness, dry mouth. Difficulty in breathing, slow heart rate, persistent fainting - overdose of drugs.

