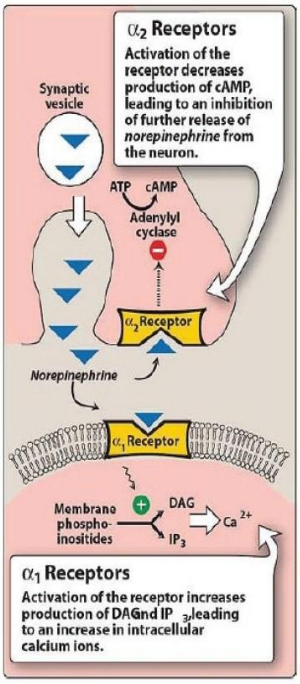
Sympathetic (Adrenergic receptors)

α (Alpha adrenergic receptor)



α subdivision

- α_{1A}, α_{1B}, α_{1C} & α_{1D}
- α_{2A}, α_{2B} & α_{2C}

For example → Tamsulosin is selective α_{1A} antagonist.

α_1 (Excitatory Action) G_q

- ***Postsynaptic*** on effector organ e.g. **Eye and Vascular smooth muscle.**

Action

VC

Mydriasis

α_2 (Inhibitory Action) G_i

- ***Presynaptic*** nerve ending
- β cell of pancreas

Action

CNS

Symp. activity

Renin and insulin

Nor-Adrenaline

(Feedback inhibition)

β_3 (Excitatory Action) G_s

- Increase lipolysis (increase FFA)

β (Beta adrenergic receptor)

β_1 (Excitatory) G_s

- Presynaptic nerve
- Postsynaptic effectors cells especially → **Heart**

Action

Renin

Heart contraction

lipolysis

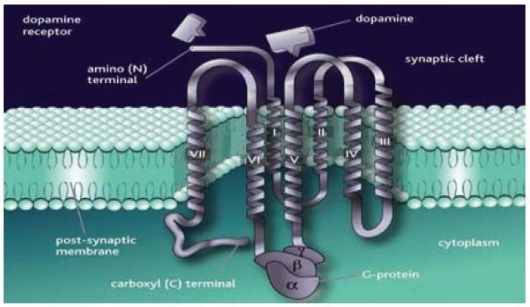
β_2 (Inhibitory Action) G_s

- Presynaptic nerve.
- Postsynaptic effectors cells especially → **Bronchi, GIT and Skeletal muscle.**

Action

Bronchodilatation, Relax smooth muscle (Uterine) and skeletal muscle twitches (VD)

Dopamine receptors	
D_1 and D_5 → Brain; effector tissues, especially smooth muscle of the renal blood vessels.	G_s
D_2 → Brain; effector tissues, especially smooth muscle; presynaptic nerve.	G_i
D_3 → Brain	G_i
D_4 → Brain, Cardiovascular system	G_i



N.B: → β_2 → Gs → Increase cAMP in Smooth muscle → Relaxation of muscle (Inhibitory Action)
→ β_1 → Gs → Increase cAMP in Cardiac muscle → Contraction of muscle (Excitatory Action)

Drugs acting on Autonomic nervous system

Parasympathetic (Cholinergic receptor)

Sympathetic (Adrenergic receptor)

Adrenergic agonists

Adrenergic antagonists

Next Page

Direct-acting

Mixed-acting

Indirect-acting

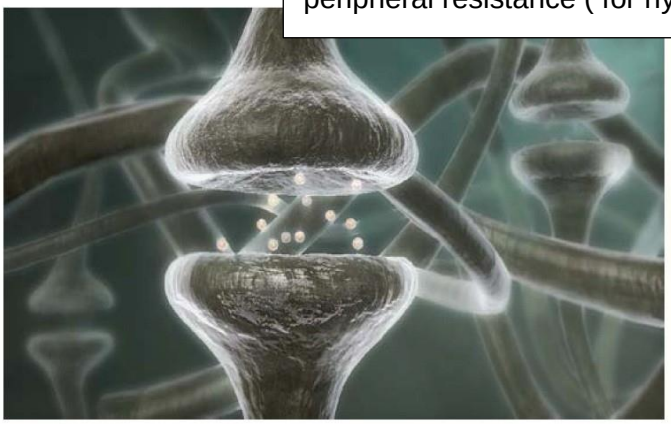
Non-Selective
Adrenaline
Nor-adrenaline
Iso-proterenol
Dopamine

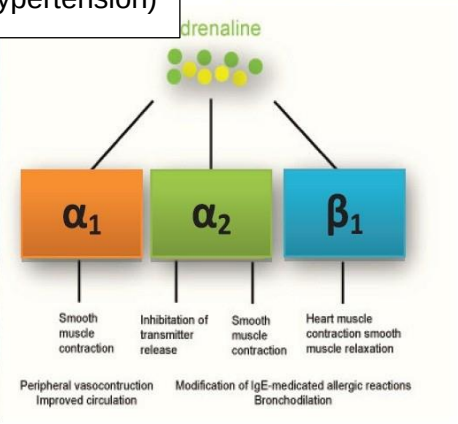
Mixed-acting
Ephedrine Pseudoephedrine

Releasing agent
Amphetamine Tyramine
Uptake inhibitor
Cocaine
MAO / COMT Inhibitors
Pargyline Entacapone

Selective	
α_1	Phenylephrine - Methoxamine -Midodrine - Metaraminol Naphazoline - Tetrahydrozoline – Oxymetazoline - Xylometazoline
α_2	Clonidine - α-Methyldopa - Others
β_1	Dobutamine
β_2	Metaproterenol - Albuterol - Terbutaline - Salmeterol Formoterol - Ritodrine
D_1	Fenoldopam

rapid-acting vasodilator; decreases peripheral resistance (for hypertension)





Termination of action: reuptake, diffusion, metabolism Catechol-O-methyltransferase (COMT): postsynaptic neurons, liver, kidney Monoamine oxidase (MAO): Presynaptic neurons, blood; MAO-A (NE, serotonin); MAO-B (dopamine)

Clinical uses of adrenergic drugs :

1- Cardiovascular arrest (adrenaline)
2- Cardiogenic shock
(doubutamine , dopamine)
4- Prolong local anesthetic
(adrenaline)
5- Asthma (salbutamol)
6-Decongestant (adrenaline)
7- Ophthalmatic ephedrine ,phenyl ephedrine

Adrenergic antagonists

α blockers

non selective (α_1 and α_2): phentolamine used for peripheral vasodilator for treatment of pheochromacytoma

Selective

α_{1} blockers :: Prazosin, terazosin and doxazosin

relaxation of arterial and venous smooth muscle
treatment of hypertension .
α_{1A} blockers: Tamsulosin treat benign prostate hyperpasia

