

AUTONOMIC NEUROTRANSMITTERS

1/31/89, rvsd 1/28/94, 1/31/95, 1/30/97, 2 February 04, 4 Feb 08, 1Feb10

Solomon & Davis, p 342, Thibodeau & Patton, p 364-365, Tortora & Anagnostakos, 363-364), DeGraaf & Fox, 426-427 & 510-512, Tortora and Evans, 2nd, 341-347, Martini 6th: 543-545, 7th: 529-533

AUTONOMIC TRANSMITTERS

Adrenal medulla served by splanchnic nerve, activating chromaffin cells (modified post-ganglionic cells), release norepinephrine (20%) : epinephrine (80%) :

SYMPATHETIC RECEPTORS:

ADRENERGIC TRANSMISSION:

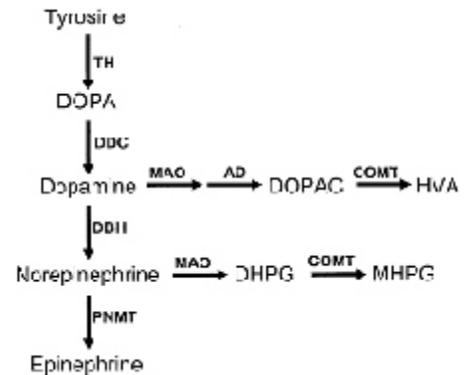
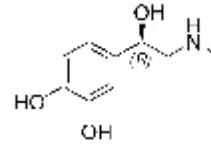
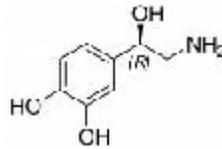
Most sympathetic post-ganglionic fibers release **norepinephrine**

Exceptions: sweat glands, uterus, and pilomotor which release acetylcholine

Catecholamines generally inactivated by reuptake, but also by Monoamine oxidase (MAO) (found on mitochondria membranes) (slow)

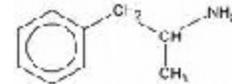
Adrenergic Receptors determine the effect of the neurotransmitter:

- alpha receptors:** alpha₁: *inhibits* adenylate cyclase (constricts vascular smooth muscle)
(stim apocrine sweat) alpha₂: mobilization of Ca⁺
- beta receptors:** beta₁ or beta₂: *activate* adenylate cyclase in membrane (dilate vascular smooth muscle) stimulates heart rate and force



ADRENERGIC DRUGS:

- Epinephrine: acts on alpha and beta receptors, relaxes respiratory passages, reduce swelling: treat asthma
Isoproterenol: acts on beta receptors, cardiac resuscitation
Phenylephrine: acts on alpha receptors, decongestant, constricts nasal vessels.
Ephedrine: stim release of norepi, original adrenergic drug, asthma, allergic disorders, stim heart.
Amphetamine: causes accumulation of norepi in synapses, used to be used to treat narcolepsy, hyperkinetic children.

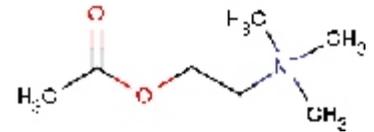


ADRENERGIC BLOCKING DRUGS:

- Reserpine: blocks synth and storage of norepinephrine, treats hypertension, some psychotics intolerant of phenothiazines
Propranolol (Inderal): beta blocker, relieve pain in angina, reduces heart rate and force, control migraines. treats hypertension

PARASYMPATHETIC RECEPTORS:

- Nicotinic: found on both para and symp post gang receptors, acetylcholine and nicotine have same action on these (nausea, convulsions, twitching) .
Muscarinic: on all effectors enervated by postganglionic parasympathetic axons



CHOLINERGIC DRUGS:

- Pilocarpine: stimulates muscarinic receptors, constricts iris

CHOLINERGIC BLOCKERS:

- Atropine: blocks muscarinic receptors, surgery prep, inhibits salivation, secretions, dilate pupils
Scopolamine: blocks muscarinic receptors, motion sickness, in labor to promote drowsiness with amnesia (twilight sleep)

