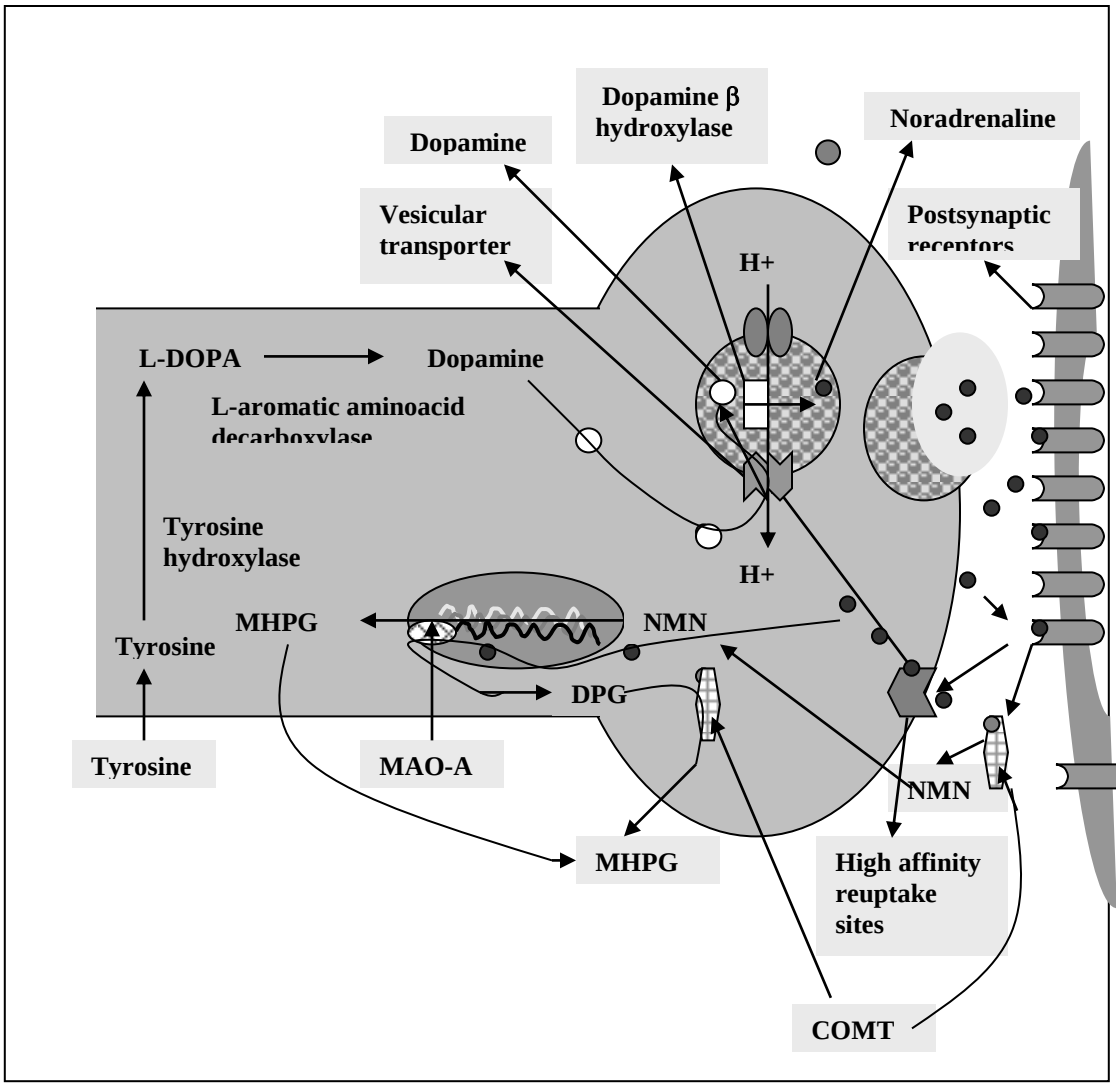
ADRENERGIC SYNAPSE



FIG

SCHEMATIC MODEL OF A DOPAMINERGIC SYNAPSE: SHOWING SYNTHESIS, STORAGE, RELEASE, REUPTAKE AND DEGRADATION OF DOPAMINE.

ABBREVIATION	FULL NAME
MHPG	3-METHOXY 4-HYDROXY PHENYL GLYCOL
NMN	NORMETANEPHRINE
DPG	DIPHENYL GLYCOL
COMT	CARBOXY METHY TRANSFERASE
MAO	MONOAMINE OXIDASE

TABLE 1

DRUGS ACTING PRESYNAPTICALLY AT AN ADRENERGIC SYNAPSE

SITE OF ACTION	DRUG	THERAPEUTIC USE
PRECURSOR	TYROSINE	----------
IMMEDIATE PRECURSOR	L-DOPA	----------
INHIBITOR OF TYROSINE HYDROXYLASE	α-METYL PARA TYROSINE (AMPT)	Used for the treatment of hypertension
INHIBITOR OF L-AROMATIC AMINO ACID DECARBOXYLAE	α-METHYL DOPA	Used for the treatment of hypertension
	3-HYDROXY BENZYL HYDRAZINE (NSD 1015)	----------
STORAGE DESRUPTOR	RESERPINE	Has been used for the treatment of hypertension
RELEASER	AMPHETAMINE	----------
	α–METHYLPHENIDATE	----------
REUPTAKE INHIBITOR	TRICYCLIC ANTIDEPRESSANTS	Antidepressants
COMT INHIBITOR	TROPOLINE PYROGALLOL	
INHIBITOR OF MAO-A AND MAO-B	IPRONIAZID ISOCARBOXAZID TRANYLCYPROMINE PHENELZINE	Antidepressants
INHIBITOR OF MAO-A	MOCLOBEMIDE CLORGYLINE	Antidepressants
CALCIUM CHANNEL BLOCKER	NIFEDIPINE DILTIAZEM VERAMAPIL	For the treatment of hypertension
NEUROTOXIN TAKEN UP BY HIGH AFFINITY REUPTAKE SITES	6-HYDROXY DOPAMINE (6-OH-DA)	----------

Adrenergic Receptors

α-Adrenergic receptors

Have little affinity for isoproterenol. Order of affinity is;
NA≥ E > Isoproterenol
Selective antagonist is phentolamine

α1-Adrenoceptors

- Postsynaptic in the brain as well as in the sympathetic nervous system
- Present on the vascular wall and the brain.
- Coupled with hydrolysis of phoaphatidyl ionositol biphosphate.
- Stimulation produces depolarization due to an inward flow of Ca^{+2} ions.
- Phenylephrine and methoxamine are selective agonists.
- Prazosin and phenoxybenzamine are selective antagonists.

α2-Adrenoceptors

- Presynaptic at the nerve terminal end of sympathetic nervous system, both pre and postsynaptic in the brain.
- Negatively coupled with adenylate cyclase.
- Stimulation results in hyperpolarization
- Clonidine and α-methyl NA are selective agonists
- Yohimbine and rauwolscine are selective antagonists.

β-adrenergic receptors

Have more affinity for isoproterenol. Order of affinity is;
Isoproterenol > E ≥ Isoproterenol
Selective antagonist is propranolol

β1-Adrenoceptors

- Present on the cadiac wall and the brain.
- Positively coupled with adenylate cyclase.
- Stimulation produces contraction of cardiac wall and therefore an increase in cardiac output.
- Dobutamine is a selective agonist.
- Metaprolol and atenolol are selective antagonists.
- Pindolol, timolol, nidolol are antagonists with selectivity towards both β1 and β2 receptors.

β2-Adrenoceptors

- Present on the vascular wall and bronchiolar smooth muscles.
- Positively coupled with adenylate cyclase.
- Stimulation produces bronchodilatio n and vasodilation.
- Salbutamol and terbutaline are selective agonist.
- Pindolol, timolol, nidolol are antagonists with selectivity towards both β1 and β2 receptors.

β3-adrenoceptors

- Present in the adipose tissue
- Stimulation produces lipolysis
- Selective

TABLE 2

DRUGS ACTING POSTYNAPTICALLY AT A DOPAMINERGIC SYNAPSE

SITE OF ACTION	DRUG	THERAPEUTIC USE
α-AGONIST	NORADRENALINE AND ADRENALINE	For the treatment of hypertension
α-ANTAGONIST	PHENOXYBENZAMINE PHENTOLAMINE	----------
β-AGONIST	ISOPROTERENOL	For producing Bronchodilation
β-ANTAGONIST	PROPRANOLOL PINDOLOL NADOLOL TIMOLOL	For reducing contraction of cardiac muscles to decrease heart out put in conditions of hypertension.
α1-AGONIST	PHENYLEPHRINE METHOXAMINE	For the treatment of hypotension
α1-ANTAGONIST	PRAZOSIN	For the treatment of hypertension by reducing peripheral resistance.
β1-AGONIST	DOBUTALINE	
β1-ANTAGONIST	METAPROLOL ATENOLOL	For reducing contraction of cardiac muscles to decrease heart out put in conditions of hypertension.
α2-AGONIST	CLONIDINE α–METHYL NORADRENALINE	Vasodilators, act centrally to decrease heart rate. These drugs bind to receptors on the cell body of vagus to increase activity of vagus nerve and decrease heart rate.
α2-ANTAGONIST	YOHIMBINE	
β2-AGONIST	SALBUTAMOL TERBUTALINE	For inducing Bronchodilation in asthmatic condition.