

Adrenergic Agents

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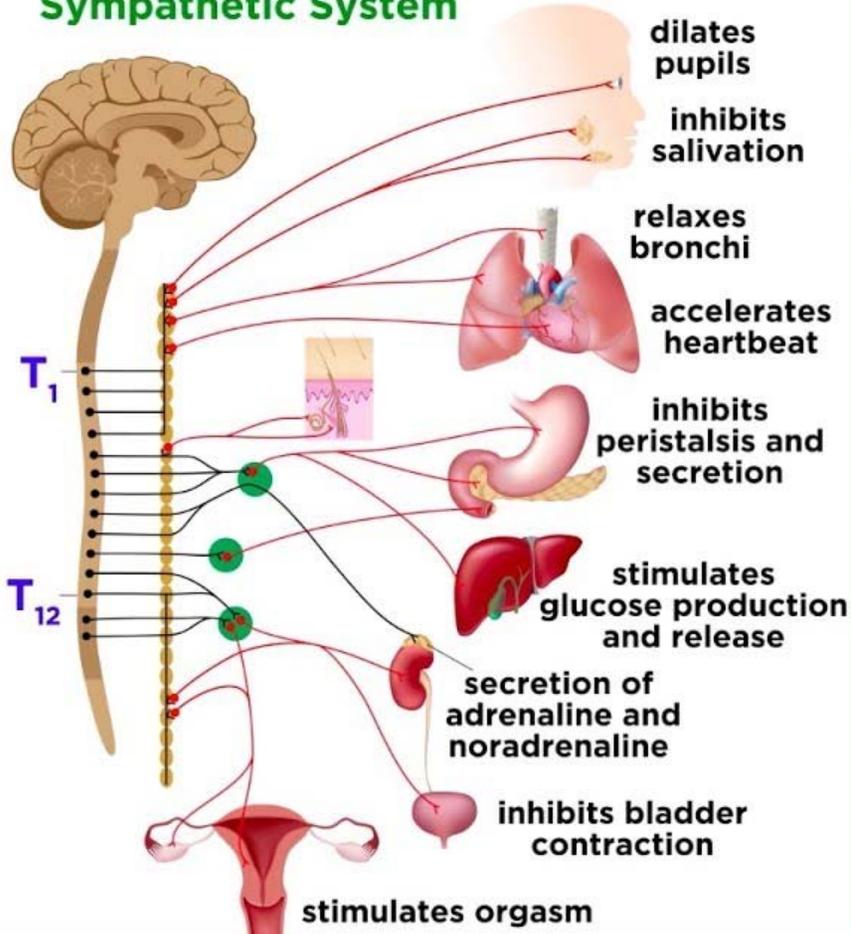
Definition

These are the chemical substance that exert their therapeutic action either enhancing or reducing the activity of sympathetic division of the autonomic nervous system.

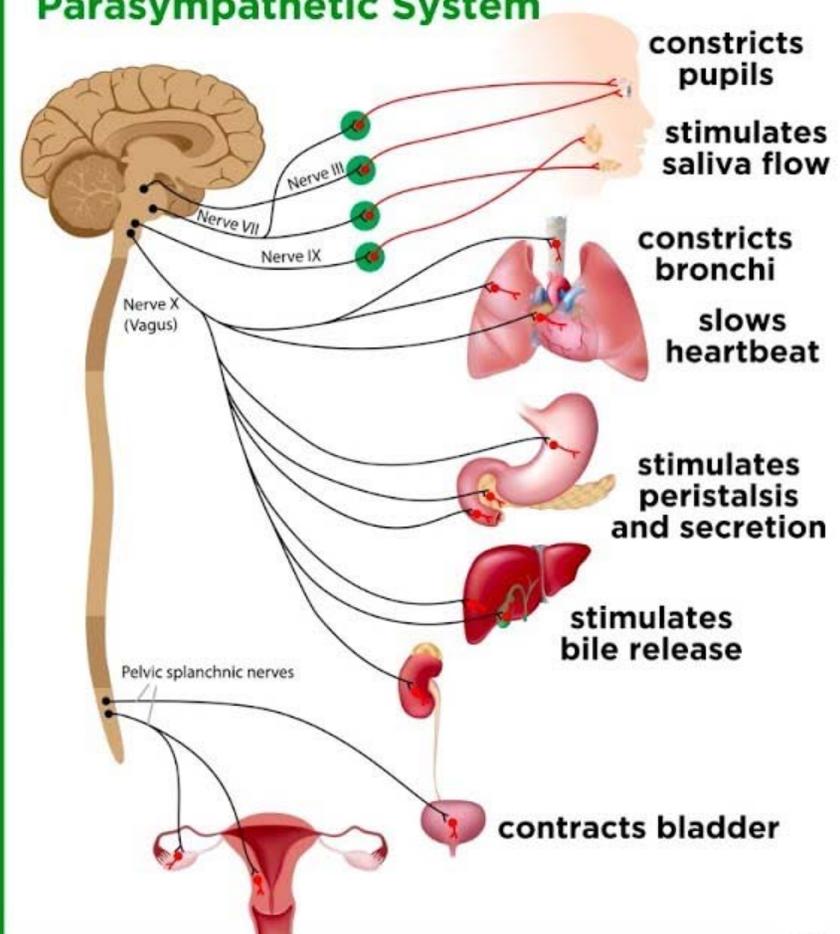
Substance that decrease the activity of sympathetic nervous system are known as sympatholytic /adrenergic antagonist/Anti-adrenergic



Sympathetic System



Parasympathetic System



Biosynthesis of Catecholamine

Catecholamine biosynthesis begins with uptake of the amino acid **tyrosine** (TYR) into the cytoplasm of sympathetic neurons.

Step-I

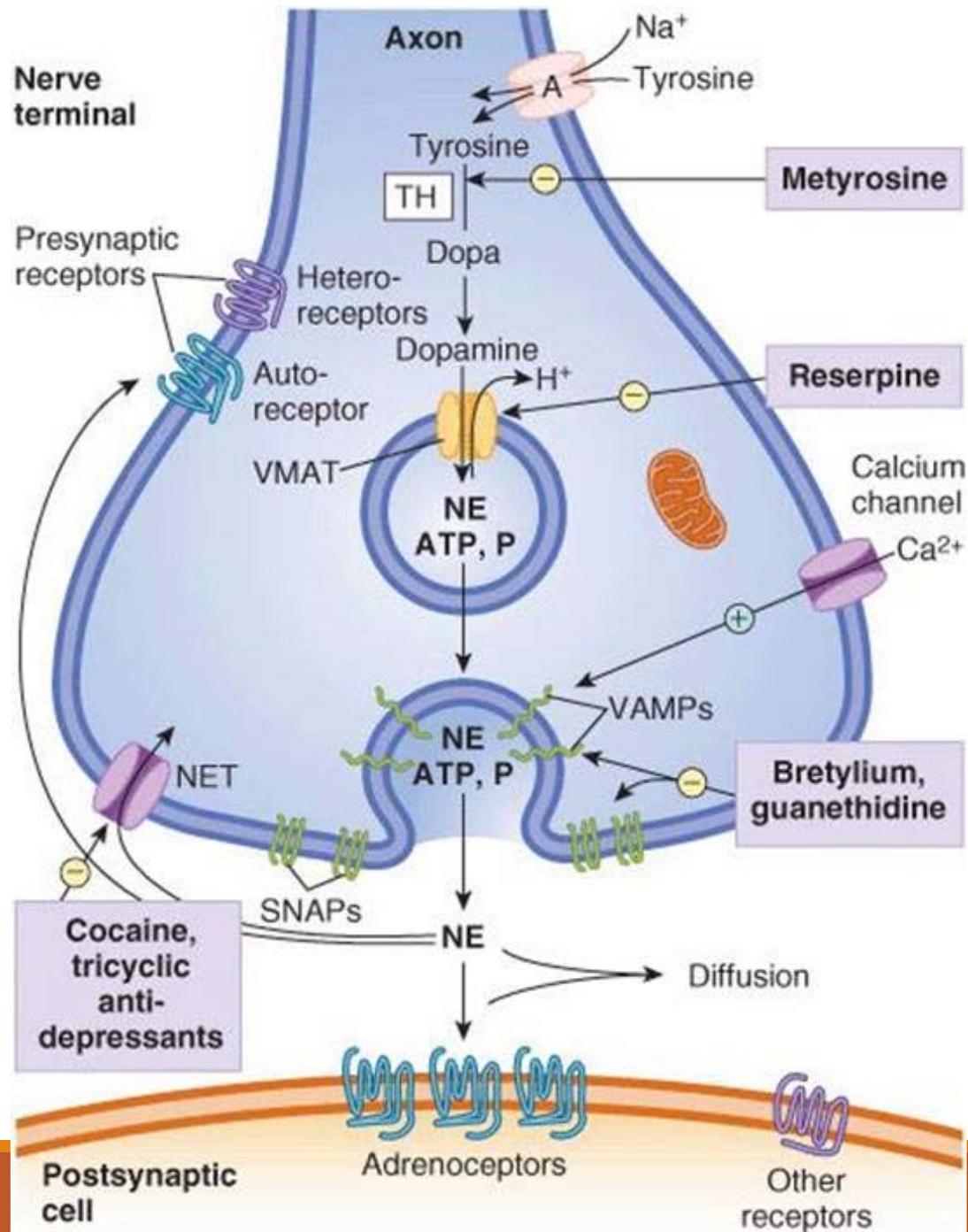
The enzyme **Tyrosine hydroxylase** (TH) catalyzes the conversion of Tyrosine to **DOPA**. This is the enzymatic **rate-limiting step** in catecholamine synthesis.

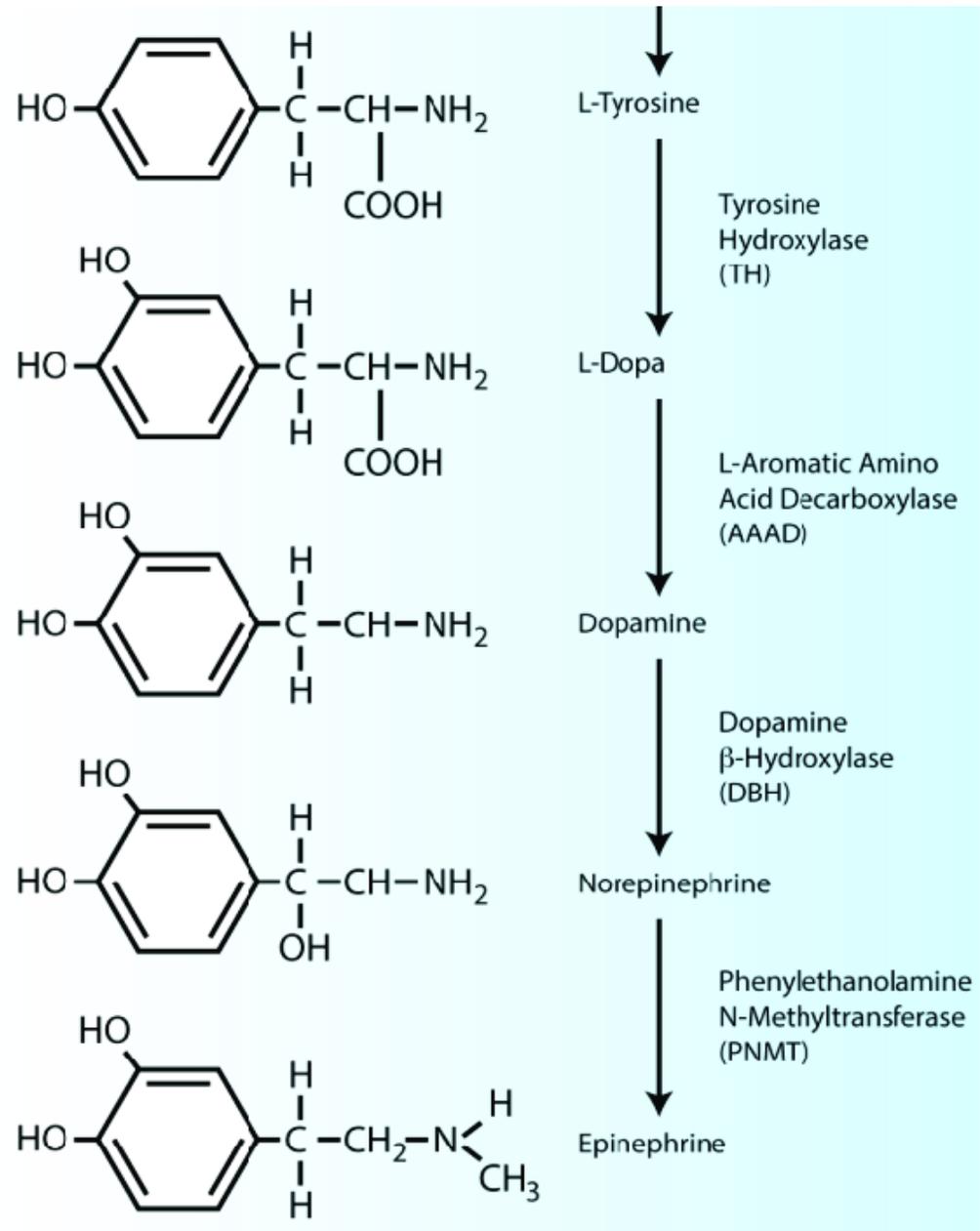
Step-II

L-DOPA is decarboxylated by the enzyme **DOPA decarboxylase** to form **dopamine** (DA).

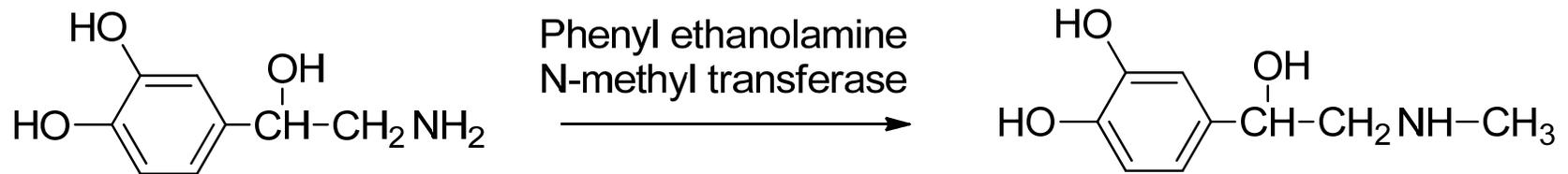
Step-III

The dopamine formed is taken up by active transport into the storage vesicle. Inside the vesicle the enzyme, **dopamine β -hydroxylase** introduce a hydroxyl group on the β carbon to form **nor-epinephrine** (Nor-adrenaline)



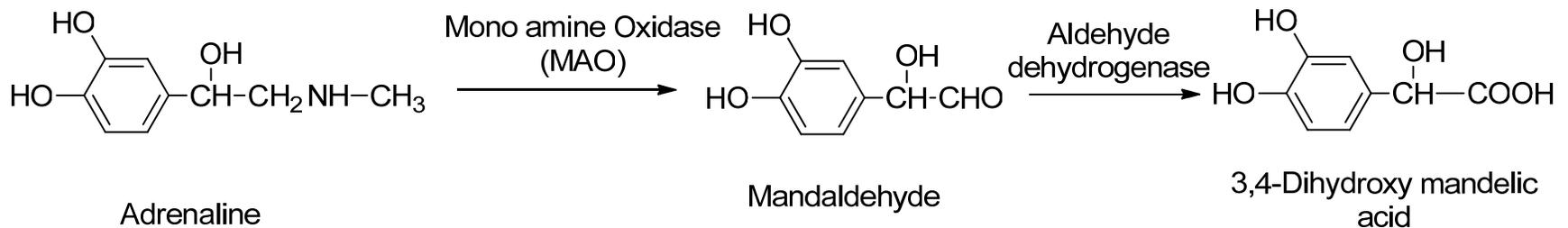


The biosynthesis of adrenaline in the adrenal medulla is similar to nor-adrenaline with the additional steps of conversion of nor-adrenaline to adrenaline by the enzyme **phenyl ethanol amine-N-methyl transferase**.



Metabolism of Catecholamine

- ❖ Two principal enzymes involved in the catabolism of catecholamines are mono amine oxidase (MAO) and Catechol-O-methyl transferase (COMT).
- ❖ Mono amine oxidase (MAO) converts catecholamines into their corresponding aldehyde which is rapidly metabolized by the enzyme aldehyde dehydrogenase to the corresponding carboxylic acid.



- ❖ The enzyme Catechol-O-methyl transferase (COMT), methylate one of the hydroxyl group of catechol to give methoxy derivative. This can be further oxidized by mono amine oxidase to form mendelic acid.

