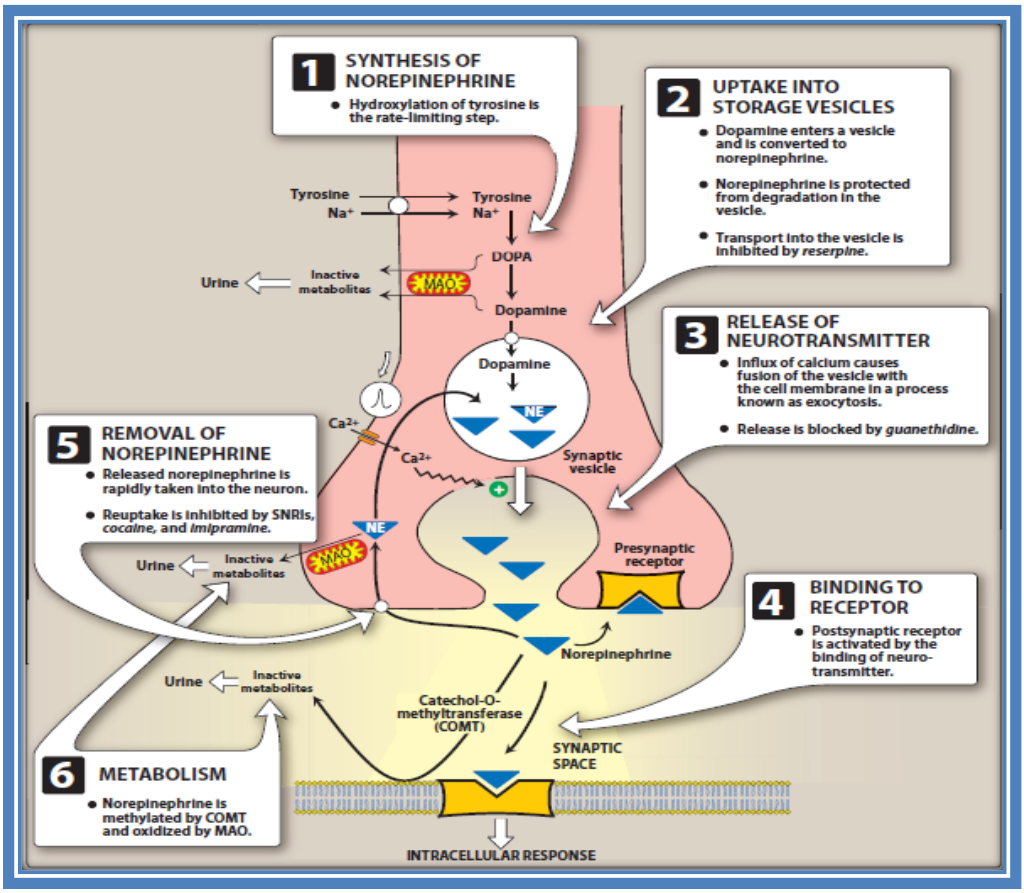
Sympathetic nervous system

Chemical transmitter is Noradrenaline (NE)



Synthesis:

1- Hydroxylation of phenylalanine into tyrosine.
2- Cytoplasmic hydroxylation of tyrosine into DOPA by tyrosine Hydroxylase (rate limiting step) (# by α methyl tyrosine). "metyrosine"
3- Decarboxylation of dopa to dopamine by dopa decarboxylase
(# by α methyl dopa & carbidopa)
4- Vesicular hydroxylation of dopamine into NE by dopamine β-(OH).
5- N-methyl transferase (PENMT) converts NE ➡ adrenaline in a cell of adrenal medulla & some CNS cells (stimulated by cortisol)

Storage: in adrenergic vesicles in combination with ATP, dopamine, β-hydroxylase & chromogranin

Release:

- Depolarization of adrenergic nerve endings ➡ Ca^{++} influx ➡ exocytosis of vesicles ➡ NE release
- Regulation of release:

a. Presynaptic inhibitory receptors:

- (+) of presynaptic α_2, D_2, H_2, M_2 ➡⬇NE release.
- (-) of these receptors especially α_2 ➡⬆NE release.

b. Presynaptic excitatory receptors:

- (+) of presynaptic β_2, angiotensin II ➡⬆ NE release