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Assignment

## Norepinephrine Synthesis and Release



Norepinephrine (NE) is the primary neurotransmitter for [postganglionic sympathetic adrenergic nerve](https://www.cvpharmacology.com/autonomic_ganglia)s. It is synthesized inside the nerve axon, stored within vesicles, then released by the nerve when an action potential travels down the nerve. Below are the details for release and synthesis of NE:

1. The amino acid **tyrosine** is transported into the sympathetic nerve axon.
2. Tyrosine (Tyr) is converted to **DOPA** by tyrosine hydroxylase (rate-limiting step for NE synthesis).
3. DOPA is converted to **dopamine** (DA) by DOPA decarboxylase.
4. Dopamine is transported into vesicles then converted to norepinephrine (NE) by dopamine β-hydroxylase (DBH); transport into the vesicle can by blocked by the drug **reserpine**.
5. An action potential traveling down the axon depolarizes the membrane and causes calcium to enter the axon.
6. Increased intracellular calcium causes the vesicles to migrate to the axonal membrane and fuse with the membrane, which permits the NE to diffuse out of the vesicle into the extracellular (junctional) space. DBH, and depending on the nerve other secondary neurotransmitters (e.g., ATP), is released along with the NE.
7. The NE binds to the [postjunctional receptor](https://www.cvpharmacology.com/autonomic_ganglia) and stimulates the effector organ response.