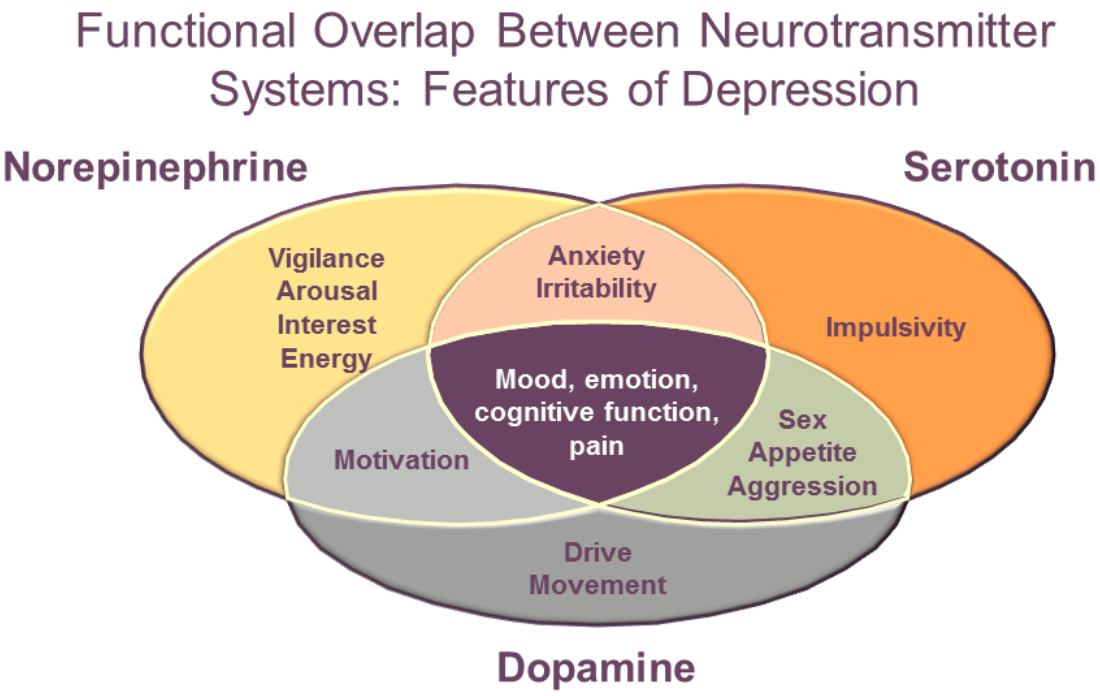
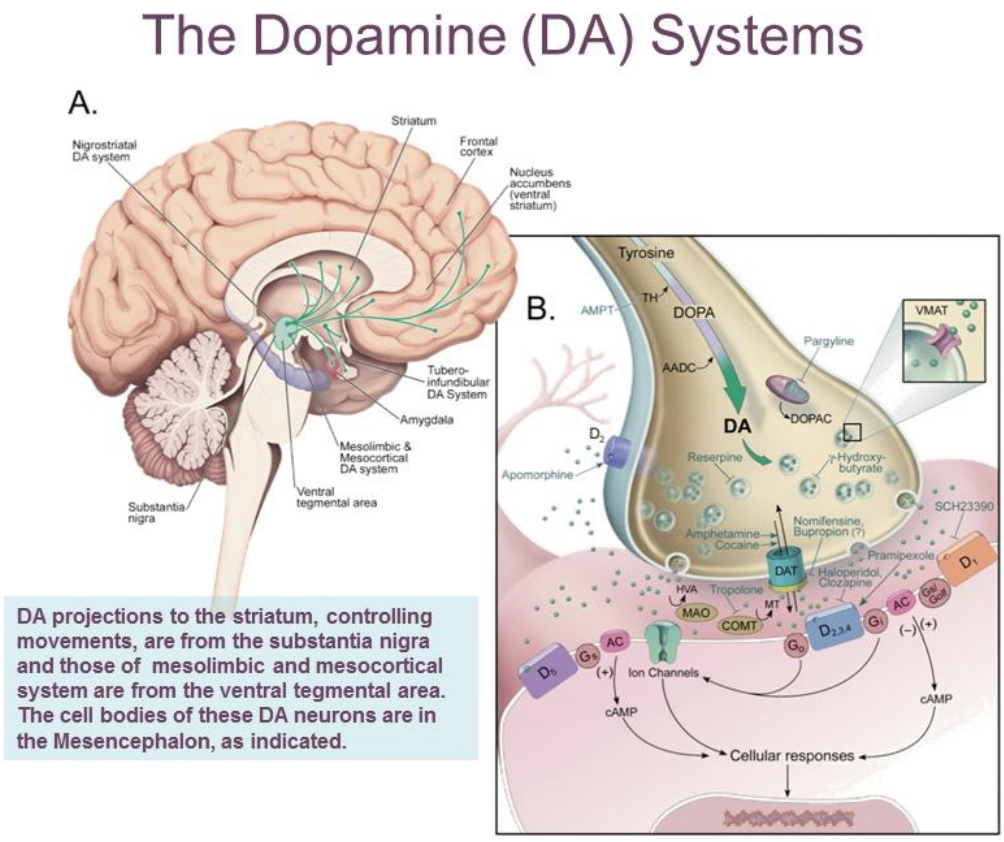
Associated neurotransmitter dysregulation

The three most common brain neurotransmitters associated with MDD are serotonin, norepinephrine and dopamine, each of which may be correlated with different symptoms.



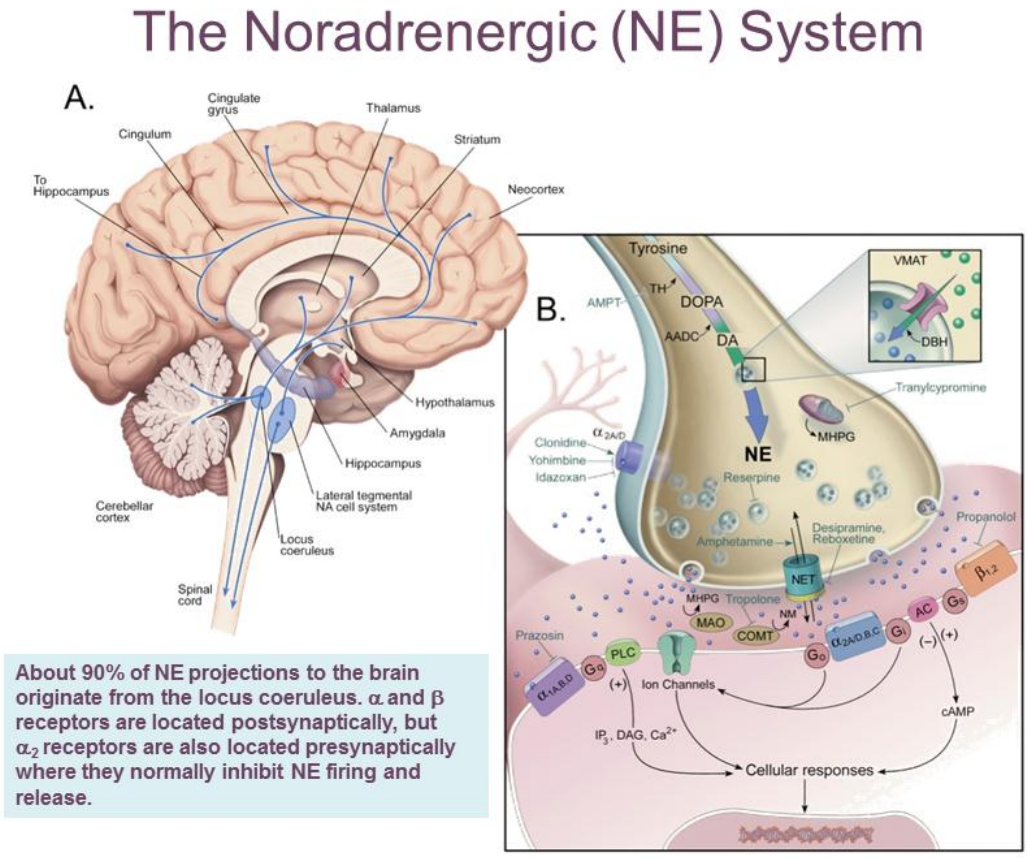
Adapted from Stahl SM, Stahl's Essential Psychopharmacology, Third Edition, Cambridge University Press, 2008.

The Dopamine (DA) Systems



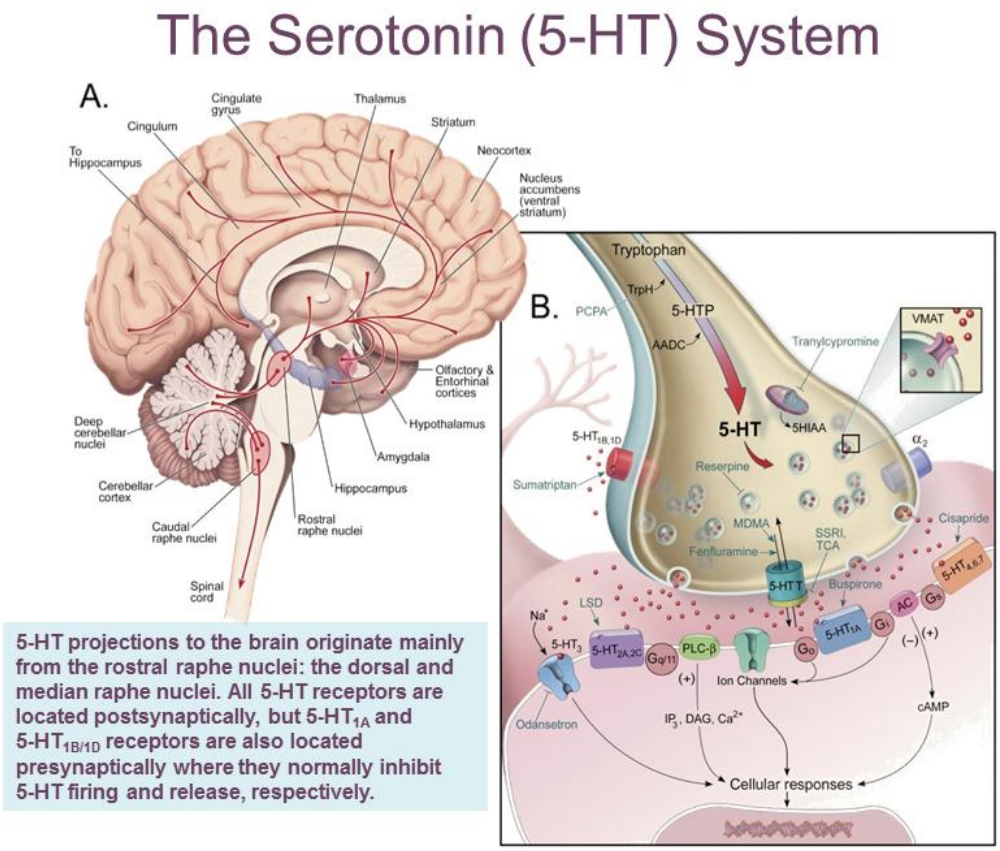
A. Representation of the human brain with the DA nuclei located within the green area; the substantia nigra and the ventral tegmental area are at the same level but the substantia nigra is located more laterally than the ventral tegmental area. B Diagram of a dopaminergic synapse with the various DA receptors, their transduction mechanisms, and examples of specific ligands, both agonists and antagonists. The DA reuptake transporter is identified as the DAT.

The Noradrenergic (NE) System



A. Representation of the human brain with the NE nuclei located within the blue area in the pons; the locus coeruleus is a bilateral structure that is located just below the floor of the fourth ventricle. B Diagram of a noradrenergic synapse with the various NE receptors, their transduction mechanisms, and examples of specific ligands, both agonists and antagonists. All atypical antipsychotics exert some antagonistic activity on alpha 1 receptors; the clinical significance of this effect in the brain is not well known, but in the periphery, it can lead to hypotension especially at the beginning of a treatment. The NE reuptake transporter is identified as the NET.

The Serotonin (5-HT) System



5-HT projections to the brain originate mainly from the rostral raphe nuclei: the dorsal and median raphe nuclei. All 5-HT receptors are located postsynaptically, but 5-HT_{1A} and 5-$HT_{1B/1D}$ receptors are also located presynaptically where they normally inhibit 5-HT firing and release, respectively.

A. Representation of the human brain with the main raphe (midline) nuclei giving rise to 5-HT projections. B Diagram of a serotonergic synapse with the various 5-HT receptors, their transduction mechanisms, and examples of specific ligands, both agonists and antagonists. The 5-HT reuptake transporter is identified as the 5-HTT.

Images are a courtesy of Dr Steven Szabo, from the Textbook of Psychopharmacology, chapter 1, 4th edition,The American Psychiatric Publishing 2009.