Major Neurotransmitters, Functions, and Effects

Neurotransmitter	Main Mode of Action	Function in the Brain	Effects of an Imbalance	Drug Interaction
Acetylcholine	Excitatory neurotransmitter	Used by the spinal cord to control muscle action-movement, autonomic function-slows heart rate and function, , and by the brain to regulate memory and learning.	With Alzheimer's disease, Ach-producing neuron deterioration.	Some ACh receptors stimulated by nicotine
Dopamine (DA)	Excitatory neurotransmitter	Produces feelings of pleasure and emotion, motivation, reward, influences movement, planning of behavior-motor control, learning, and attention.	Oversupply linked to schizophrenia. Undersupply linked to tremors and decreased mobility in Parkinson's disease; substance abuse	Cocaine and amphetamines elevate activity at DA synapses
GABA (gamma-aminobutyric acid)	Inhibitory neurotransmitter	Major inhibitory effects in the CNS, participating in mood.	Undersupply linked to seizures, tremors, and insomnia; anxiety disorders	Valium and similar antianxiety drugs work at GABA synapses
Glutamate	Excitatory neurotransmitter	Major excitatory effect in the CNS, participates in learning and memory.	Oversupply can overstimulate brain, producing migraines or seizures (which is why some people avoid MSG monosodium; glutamate in food); neural death following head injuries	

Glycine	Inhibitory neurotransmitter	Used by neurons in the spinal cord.	Used in treatment of schizophrenia and stroke	
Endorphins		Neurotransmitters that influence- reduces the perception of pain or pleasure; eating; cardiovascular functioning	Over supply with opiate drugs can suppress the body's natural endorphin supply; depression	Resembles opiate drugs in structure and effects
Norepinephrine (NE)	Usually excitatory, but is inhibitory in a few brain areas.	Acts as a neurotransmitter and hormone. In peripheral nervous system, speeds heart rate and breathing, participates in arousal, part of fight-or-flight response, vigilance, and mood. In brain, acts as a neurotransmitter regulating normal brain processes.	Excess may lead to depression, anxiety and other mood disorders.	Cocaine and amphetamines elevate activity at NE synapses
Serotonin	Inhibitory neurotransmitter	Involved in functions of mood, appetite, sleep, and sensory perception.	Deficiency may lead to depression, obsessive compulsive disorder and other anxiety disorders; eating disorders; chronic pain.	Prozac and similar antidepressant drugs affect serotonin circuits