

Important Neurotransmitters to Know

Neurotransmitter	Location	Function	Problems with Excess/Deficit
Acetylcholine (ACh)	Brain, spinal cord, autonomic ganglia, organs of the parasympathetic nervous system	<ul style="list-style-type: none"> • Critical to motor movement deliver messages from neurons to muscles) • Cognitive functioning (learning) • Emotion • Memory 	Deficit = Alzheimer's disease shows limited ACh production
Dopamine (DA)	Brain	<ul style="list-style-type: none"> • Motor movement (voluntary movement) • Alertness, attention • Learning • Memory • Emotion 	Excess = Schizophrenia (often treated with <i>antipsychotic drugs</i> , which block dopamine receptors, limiting the amount of DA being transmitted across the synapse) Deficit = Parkinson's disease
Endorphins	Brain – they seem to alter the sensitivity of neurons	<ul style="list-style-type: none"> • Pain control • Stress reduction • Feelings of pleasure • Memory • “Natural opiates” 	Deficit = Potentially involved in addiction?
Gamma amino butyric acid (GABA)	Brain (especially cerebral cortex), spinal cord	<ul style="list-style-type: none"> • The brain's major inhibitory neurotransmitter (slows down neural activity) 	Deficit = seizures, insomnia
Glutamate	Brain, spinal sensory neurons	<ul style="list-style-type: none"> • The brain's major excitatory neurotransmitter (speeds up neural activity) • Creates links between neurons that form basis of learning, long-term memory 	Excess = overstimulation of brain (seizures?). This is why people avoid food with MSG (MSG = monosodium glutamate)
Norepinephrine (a.k.a. noradrenaline)	Brain, spinal cord, organs of the sympathetic nervous system	<ul style="list-style-type: none"> • “fight or flight” (increases heart rate and slows intestinal activity during stress) • Controls alertness/wakefulness/arousal • Elevates heart rate, circulation, respiration, etc. • Learning • Memory • Mood elevation 	Deficit = Depressed mood
Serotonin	Brain, spinal cord	<ul style="list-style-type: none"> • Sleep • Appetite/hunger • Mood regulation • Sensory perception • Temperature regulation • Pain suppression 	Deficit = Depressed mood (often treated with <i>selective serotonin reuptake inhibitors (SSRIs)</i> , which prevent serotonin from being reabsorbed in uptake, thus leaving more serotonin in synapses)

