

Common Neurotransmitters

Neurotransmitter	Function	Examples of Malfunctions
<p>Acetylcholine (Ach)</p>	<p>Enables Muscle Action (movement), Learning, Memory</p>	<p>Alzheimer's disease: too little effects memory, Ach-producing neurons deteriorate in hippocampus deteriorate causing memory problems</p> <p>Too little – (Botulism poison which blocks Ach) leads to paralyzation of respiratory muscles</p> <p>Too much (Black Widow bite) - muscles in violent convulsions (spasms.)</p>
<p>Dopamine</p>	<p>Influences movement, learning, attention, and emotion Movement and reward</p> <p>Strongly associated with reward mechanisms in brain</p> <p>Part of rewarding property in drugs like cocaine, alcohol, opium, heroin, nicotine... THESE INCREASE DOPAMINE</p>	<p>Excess dopamine receptor activity linked to <u>schizophrenia</u> (positive symptoms)</p> <p>Too little dopamine - the brain produces tremors and decreased mobility of <u>Parkinson's disease</u></p> <p>(Alcohol consumption initially raises dopamine levels, continued use leads to decrease in dopamine. Decrease leads to anxiety, anger, cravings.)</p>
<p>Serotonin</p>	<p>Affects mood, hunger, sleep, and arousal, impulsivity</p>	<p>Undersupply – linked <u>OCD, anxiety, mood disorders(depression), anger control, insomnia, and suicide</u></p> <p>Prozac and other antidepressant increase serotonin levels</p> <p>Drink warm milk at night – help you sleep because contains an amino acid that brain uses to make serotonin (relax)</p> <p><u>Plays a role in schizophrenia, may interact with dopamine system to alter the way it operates.</u></p> <p>*Role in perception: LSD attaches to serotonin receptor sites blocking perceptual paths</p>
<p>Norepinephrine Aka Noradrenaline</p>	<p>Helps control alertness and arousal Mood, sleep, learning</p> <p>Increases heart rate and slows digestion during stress</p>	<p><u>Undersupply can depress mood</u></p> <p>Oversupply – insomnia, mania</p> <p>Undersupply - depression</p>

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<p>GABA (gamma-aminobutyric acid)</p> <p><u>(Main Inhibitory NT)</u></p>	<p>A major (best known) inhibitory neurotransmitter</p> <p>Sleep; movement</p> <p>Seems needed to keep neuron activity in check</p>	<p><u>Undersupply linked to seizures, tremors, and insomnia</u></p> <p>Anxiety, Huntington's disease, epilepsy</p> <p>Too little GABA also may be anxiety drugs – Valium works by enhancing effects of GABA</p> <p>Too little GABA in some brain areas can be epilepsy</p>
<p>Glutamate</p>	<p>Major excitatory neurotransmitter</p> <p>Involved in memory</p> <p>Most common in CNS – as much as ½ of all brain neurons</p> <p>Curiously...Actually toxic to neurons and an excess will kill them</p>	<p>Oversupply – over stimulate brain leading to migraines or seizures (why some avoid MSG, monosodium glutamate, in food)</p> <p><u>Damage after stroke</u> Sometimes brain damage or stroke leads to excess and many more brain cells die than from original trauma</p> <p>ALS – (Lou Gehrig's Disease) excessive glutamate production.</p> <p><u>Schizophrenia – lack of glutamate production. (negative symptoms)</u></p> <p>Many neurologists feel this is responsible for many CNS diseases</p>
<p>Endorphins (produced within) morphine)</p>	<p>Released in response to pain or vigorous exercise</p> <p>Pain control</p> <p>Structurally similar to heroin and has similar functions: pain reduction, pleasure</p> <p>Opioids work by attaching at endorphin receptor site... AGONISTS</p>	<p>If brain is flooded with opiates like heroin and morphine the brain may stop producing these natural opiates</p> <p>Lack of – no established disorder</p> <p>This is the neurotransmitter responsible for allowing bears and other animals to hibernate. Heroin slows heart rate, respiration, and metabolism in general... exactly what you need to hibernate... if you were a bear. Heroin can slow it to nothing... death or Permanent Hibernation</p>