

The Function and Purposes of **ADDERALL**

Adderall is a brand of pharmaceutical psychostimulant created and prescribed to correct mental disorders, most commonly **ADHD**, as a possible alternative to Ritalin. By altering chemicals in the brain, Adderall increases user concentration and alertness, while decreasing cognitive fatigue. When used properly, Adderall will improve overall cognitive performance and assist function for those individuals who have particular cognitive and psychological impairments.

Adderall has been manufactured in two formulations, immediate release and extended release (XR). The United States Food and Drug Administration (FDA) approve the immediate release formula, for the treatment of ADHD and **narcolepsy**. However, the XR formula has only been approved for the treatment of ADHD. While being a controlled substance, Adderall is not considered a narcotic under the [Controlled Substance Act](#) for the United States.

Chemical Composition and Biological Function

Adderall is composed of mixed amphetamine salts, which work by increasing the amount of the active *neurotransmitters*², *norepinephrine*³ and *dopamine*¹, in the brain. More formally known as Dextroamphetamine, it acts primarily on the **DA** systems. The primary reinforcing and behavioral-stimulant effects of amphetamine enhance dopaminergic activity, primarily in the **mesolimbic dopaminergic pathway**. Amphetamine binds to the dopamine transporter (DAT) and blocks the transporter's ability to clear DA from the space located each *synapse*⁴. Simultaneously, amphetamine is transported into the cell, which leads to DA transport out of the cell and into the synaptic space (dopamine efflux).

Amphetamine also inhibits the enzymes **MAO** when present in high concentration. This eliminates the break down of the neurochemicals serotonin, dopamine, norepinephrine, and epinephrine. This inhibition is involved with feelings of lust, confidence, obsession, and sexuality. With this ability, Adderall has the ability for a similar action to some of the first successfully prescribed antidepressants. Amphetamine's ability to cause the inhibition of MAO results in the accumulation of monoamines, while also directly stimulating the release of neurochemicals. The end result is a potent elevation in monoamine transmission in the brain.

Attention-Deficit/Hyperactivity Disorder (ADHD) is a neurobehavioral developmental disorder resulting in patterns of impulsiveness and inattention.

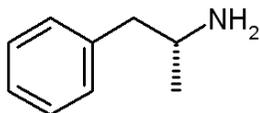
Narcolepsy is a chronic sleep disorder characterized by overwhelming daytime drowsiness and sudden attacks of sleep.

Dopaminergic (DA) is the title given for the association with the neurotransmitter dopamine.

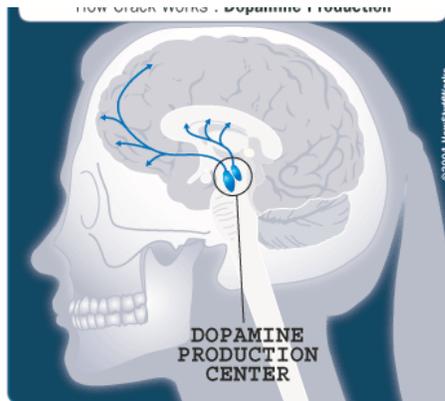
Mesolimbic Dopaminergic Pathway is a neural pathway in the brain, which transmits the neurotransmitter dopamine from the midbrain to the frontal cortex.

Monoamine Oxidases (MAO) are enzymes that catalyze the oxidation of monoamines.

In sum, Adderall has the effect to increase neurotransmitter availability in the synapses of the brain. To increase the availability, it releases more of each neurotransmitter, and prolongs their availability by slowing their removal. By creating an abundance of each of the neurotransmitters in the synaptic space of the brain, they can be utilized to their full capacity. The two figures below represent the two-dimensional chemical composition of Dextroamphetamine and the pathway of which dopamine travels when released.



This image of Dextroamphetamine was taken from the site:
<http://health.howstuffworks.com/crack.htm/printable>



This image of the dopaminergic pathway was taken from the site:
<http://commons.wikimedia.org/wiki/File:Dextroamphetamine.png>

Treatment

ADHD

Adderall is commonly prescribed as treatment for individuals of all ages with ADHD. Within a short time of ingesting Adderall, individuals with ADHD will be more attentive in concentration demanding situations. Depending on dosage, the beneficial effects of Adderall can last several hours, allowing improved performance throughout the day. Compared to similar medication, such as Ritalin, Adderall is considered more potent and is effective for longer periods of time, especially at lower doses. Therefore, Adderall is an ideal substitute for individuals using Ritalin that have experienced adverse effects or have become too tolerant to it.

Other Uses

Apart from its most typical application in the treatment of ADHD, Adderall has also been used successfully to manage severe cases of treatment-resistant depression. Individuals who show little or no response to typical antidepressants are more likely to respond to Adderall by means of psychostimulant therapy. However, these are very rare cases and are not an FDA-approved treatment.

Other recognized uses include:

- Idiopathic Central Nervous System Hypersomnia established by recognized diagnostic criteria
- Drug-induced brain dysfunction
- Epilepsy
- Senile apathetic behavior
- Psychiatric differential diagnosis of depression
- Obesity

Dosage

Adderall has been manufactured to function in two different phases, immediate release and extended release. Both, the immediate-release tablets, Adderall, and the extended-release capsules, Adderall XR, come in a variety of different doses. Each dose has a distinct color, shape, and size.

<i>Adderall</i>	<i>Adderall XR</i>
<p>Tablets are available in 5, 7.5, 10, 12.5, 15, 20, and 30 mg doses. Each dose is dissolved immediately into the blood stream, maximizing its effect within three hours of ingestion. Below is an image of the dosages of Adderall tablets.</p>  <p>Adderall® (dextroamphetamine saccharate, dextroamphetamine sulfate, amphetamine aspartate, amphetamine sulfate)</p> <p>This image of the dosages of Adderall tablets was taken from the site: http://www.schwimmerlegal.com/image/adderall.jpg</p>	<p>Capsules are available in 5, 10, 15, 20, 25, and 30 mg doses. Each dose contains two types of beads that allow for a prolonged, but less intense effect. Upon ingestion, half of the medication dissolves immediately. The other half of the medication dissolves more slowly for release and an effect about 4 hours later. Below is an image of the dosages of Adderall XR capsules.</p>  <p>Adderall XR® (mixed salts of a single-entity amphetamine product) (dextroamphetamine saccharate/dextroamphetamine sulfate/amphetamine aspartate/amphetamine sulfate)</p> <p>This image of the dosages of Adderall XR capsules was taken from the site: http://www.pdrhealth.com/drugs/rx/rx-mono.aspx?contentFileName=Add1008.html&contentName=Adderall&contentId=16</p>

Possible Adverse Effects

Adderall, as well as other stimulant medications, have a high abuse potential due to the tendency of amphetamines to be addicting. Furthermore, users with pre-existing heart conditions are at risk of sudden death, a stroke, or a heart attack. Other effects can include loss of appetite, leading to weight loss, and changes in vision. Due to these possible adverse effects, Adderall is listed as a Schedule II drug under the Controlled Substance Act.

Glossary

1. Dopamine: A neurohormone that has many functions in the brain, including important roles in behavior, cognition, motor activity, motivation and reward, inhibition of prolactin production, sleep, mood, attention, and learning.
2. Neurotransmitter: Chemicals which relay, amplify, and modulate signals between a neuron and another cell.
3. Norepinephrine: A stress hormone that affects parts of the brain where attention and responding actions are controlled.
4. Synapse: Specialized junctions through which neurons signal to each other and to non-neuronal cells such as those in muscles or glands.