

# **Benzodiazepines**

## **Profile**

Benzodiazepines are among the most commonly prescribed depressant medications in the United States today. More than 15 different types of benzodiazepine medications exist to treat a wide array of both psychological and physical maladies based on dosage and implications.<sup>1</sup> To be characterized as such, each benzodiazepine displays one or more of the following drug actions: anxiety relief, hypnotic, muscle relaxant, anti-convulsant, or an amnesiac (mild memory-loss inducer). Due to their sedative properties, benzodiazepines have a high potential for abuse, especially when used with other depressants such as alcohol or opiates.<sup>2</sup> Benzodiazepines are classified as Schedule IV in the Controlled Substances Act.

Commonly prescribed benzodiazepines include Xanax© (alprazolam), Librium© (chlordiazepoxide), Valium© (diazepam), and Ativan© (lorazepam).<sup>3</sup> Another benzodiazepine that has been the focus of a great deal of media attention is flunitrazepam, trade name Rohypnol©, which is known widely as "the date-rape drug" due to its involvement in many sexual assault cases in recent years.<sup>4</sup>

## **History**

During the 1930's, Leo Sternback discovered benzodiazepines while working for the Hoffman-LaRoche Company. However, the first benzodiazepine was not introduced to the general public until 1957, when Hoffman launched Librium©, which is used primarily to relieve anxiety.<sup>5</sup> Abuse of benzodiazepines was not specifically addressed until the 1980s, when they became among the most prescribed medications in America.

## **Methods of Use<sup>6</sup>**

Methods of use vary greatly depending on the purpose of the administered benzodiazepine. The most common method of ingestion is orally, in tablet or capsule form. Valium©, Ativan©, and Librium© are also sometimes dispensed intravenously, while midazolam (Versed©) is used exclusively as an intravenous medication. Ativan© comes in a tablet form that can be dissolved under the tongue.

## **Pharmacology**

Benzodiazepines affect a key neurotransmitter in the brain called gamma-amino butyric acid (GABA). This neurotransmitter has an inhibitory effect on motor neurons, thus the presence of GABA slows or stops neuronal activity. Benzodiazepines enhance the activity of GABA, effectively slowing nerve impulses throughout the body. The human nervous system has two different types of benzodiazepine receptors: one that causes the anti-anxiety effect, and one that elicits the sedative effect.<sup>7</sup>

Although most benzodiazepines trigger the same physical effects, their dosage and absorption time into the bloodstream can vary widely.<sup>8</sup> The medications are broken into two separate categories for classification-short-acting and long-acting.<sup>9</sup> A short-acting

benzodiazepine is cleared from the body in a short period of time, whereas long-acting benzodiazepines may either accumulate in the bloodstream or take a much longer period of time to leave the body. A particular benzodiazepine's classification determines what it is prescribed for, as well as its potential for tolerance, dependence, and abuse.

### **Short Term Effects<sup>10</sup>**

#### *Low to Moderate Doses*

Benzodiazepines are prescribed for relaxation, calmness, and relief from anxiety and tension. In some cases side effects will occur; these vary widely depending on the type of benzodiazepine, the dose, and the person. They can include:

- Impaired motor coordination
- Drowsiness, lethargy, fatigue
- Impaired thinking and memory
- Confusion
- Depression
- Altered vision
- Slurred speech, stuttering
- Vertigo
- Tremors
- Respiratory depression
- Nausea, constipation, dry mouth, abdominal discomfort, loss of appetite, vomiting, diarrhea

#### *High Doses*

At high doses benzodiazepines can cause extreme drowsiness. In addition to the adverse effects listed above, the following are also observed:

- Slowed reflexes
- Mood swings
- Hostile and erratic behavior
- Euphoria

### **Long Term Effects<sup>11</sup>**

Some benzodiazepines are eliminated from the body slowly. Thus, ingesting multiple doses over long periods of time can lead to significant accumulation in fatty tissues. The symptoms of over-sedation may not appear for a few days. Some include:

- Impaired thinking, memory, and judgment
- Disorientation
- Confusion
- Slurred speech
- Muscle weakness, lack of coordination

## Tolerance, Dependence & Withdrawal<sup>12</sup>

Tolerance to certain benzodiazepines occurs most often in those who have used for 6 months or more. Physicians counteract the effects of tolerance by increasing dosage in small increments or by adding another benzodiazepine to the prescription. Users most often develop tolerance to the milder effects of the drug, such as sedation and impairment of motor coordination. A fair amount of cross-tolerance exists between benzodiazepines and other depressants such as alcohol and barbiturates, thus users may not feel the effects of these drugs as potently as they would otherwise.

To ease the symptoms of withdrawal, physicians recommend that users gradually reduce the amount of medication ingested until the dose is low enough that the individual will not feel discomfort. Withdrawal symptoms are most severe when a high dose of either a short-acting or intermediate-acting benzodiazepine is abruptly discontinued.

### Terminology

- General benzodiazepines:  
tranks, downers<sup>13</sup>
- Valium:  
V's<sup>14</sup>
- Xanax:  
Z bars<sup>15</sup>

### Links

- [DEA: Benzodiazepines](#)
- [NIDA: Prescription Drugs: Abuse and Addiction](#)

### Foot Notes

<sup>1</sup> US Drug Enforcement Administration. (2002). DEA briefs and background: Benzodiazepines. Retrieved on October 13, 2006, from <http://www.dea.gov/concern/benzodiazepines.html>.

<sup>2</sup> Brands, B., Sproule, B., Marshman, J. (1998). Drugs & Drug Abuse (3rd edition). Addiction Research Foundation: Toronto, Ontario: Canada.

<sup>3</sup> Ibid.

<sup>4</sup> Medscape. (2000). Drug-Facilitated Sexual Assault ('Date Rape'). Retrieved October 13, 2006, from [http://www.medscape.com/viewarticle/410558\\_2](http://www.medscape.com/viewarticle/410558_2).

<sup>5</sup> "Chlordiazepoxide." Retrieved on October 13, 2006, from <http://www.psyweb.com/Drughtm/librium.html>.

<sup>6</sup> Brands, B., Sproule, B., Marshman, J.

<sup>7</sup> Cohen, Sidney, M.D. (1983). The Anxiolytic Agents. Drug Abuse and Alcoholism Newsletter. Vol. XII, No. 5.

<sup>8</sup> Ibid.

<sup>9</sup> US Drug Enforcement Administration.

<sup>10</sup> Brands, B., Sproule, B., Marshman, J

<sup>11</sup> Ibid.

<sup>12</sup> Ibid.

<sup>13</sup> Ibid.

<sup>14</sup> Ibid.

<sup>15</sup> The Vaults of Erowid. (2004, Mar 16). Alprazolam. Retrieved on October 13, 2006, from <http://www.erowid.org/pharms/alprazolam/alprazolam.shtml>.