

## **Methylphenidate (Ritalin)**

Methylphenidate is a medication prescribed for individuals (usually children) who have attention-deficit hyperactivity disorder (ADHD), which consists of a persistent pattern of abnormally high level of activity, impulsivity, and/or inattention that is more frequently displayed and more severe than is typically observed in individuals with comparable levels of development. The pattern of behavior usually arises between the ages of 3 and 5, and is diagnosed during the elementary school years due to the child's excessive locomotor activity, poor attention, and/or impulsive behavior. Most symptoms improve during adolescence or adulthood, but the disorder can persist or present in adults. It has been estimated that 3–7 percent of school-age children have ADHD. Methylphenidate also is occasionally prescribed for treating narcolepsy.

### **Health Effects** —————

Methylphenidate is a central nervous system (CNS) stimulant. It has effects similar to, but more potent than, caffeine and less potent than amphetamines. It has a notably calming and "focusing" effect on those with ADHD, particularly children.

Recent research at Brookhaven National Laboratory may begin to explain how methylphenidate helps people with ADHD. The researchers used positron emission tomography (PET—a noninvasive brain scan) to confirm that administering normal therapeutic doses of methylphenidate to healthy, adult men increased their dopamine levels. The researchers speculate that methylphenidate amplifies the release of dopamine, a neurotransmitter, thereby improving attention and focus in individuals who have dopamine signals that are weak.<sup>1</sup>

Methylphenidate is a valuable medicine, for adults as well as children with ADHD.<sup>2, 3, 4</sup> Treatment of ADHD with stimulants such as Ritalin and psychotherapy help to improve the abnormal behaviors of ADHD, as well as the self-esteem, cognition, and social and family function of the patient.<sup>2</sup> Research shows that individuals with ADHD do not become addicted to stimulant medications when taken in the form and dosage prescribed by doctors. In fact, it has been reported that stimulant therapy in childhood is associated with a reduction in the risk for subsequent drug and alcohol use disorders.<sup>5, 6</sup> Also, studies have found that individuals with ADHD treated with stimulants such as

methylphenidate are significantly less likely than those who do not receive treatment to abuse drugs and alcohol when they are older.<sup>7</sup>

Because of its stimulant properties, however, in recent years there have been reports of abuse of methylphenidate by people for whom it is not prescribed. It is abused for its stimulant effects: appetite suppression, wakefulness, increased focus/attentiveness, and euphoria. Addiction to methylphenidate seems to occur when it induces large and fast dopamine increases in the brain. In contrast, the therapeutic effect is achieved by slow and steady increases of dopamine, which are similar to the natural production by the brain. The doses prescribed by physicians start low and increase slowly until a therapeutic effect is reached. That way, the risk of addiction is very small.<sup>8</sup>

When abused, the tablets are either taken orally or crushed and snorted. Some abusers dissolve the tablets in water and inject the mixture; complications can arise from this because insoluble fillers in the tablets can block small blood vessels.

## **Trends in Ritalin Abuse** ———

### **Monitoring the Future Survey (MTF)\***

Each year, MTF assesses the extent of drug use among adolescents and young

adults nationwide. MTF 2003 data on annual\*\* use indicate that 2.6 percent of 8th-graders abused Ritalin, as did 4.1 percent of 10th-graders and 4.0 percent of 12th-graders.

ADHD has been more frequently reported in boys than in girls; however, in the last year, the frequency among girls has greatly increased.<sup>9</sup>

A large survey at a public university showed that 3 percent of the students had used methylphenidate during the past year.<sup>10</sup>

Because stimulant medicines such as methylphenidate do have potential for abuse, the U.S. Drug Enforcement Administration (DEA) has placed stringent, Schedule II controls on their manufacture, distribution, and prescription. For example, DEA requires special licenses for these activities, and prescription refills are not allowed. States may impose further regulations, such as limiting the number of dosage units per prescription.

## **Other Information Sources** ———

For more information on treating ADHD, visit the Web site for the National Institute of Mental Health, National Institutes of Health, at [www.nimh.nih.gov](http://www.nimh.nih.gov).

\* These data are from the 2003 Monitoring the Future Survey, funded by the National Institute on Drug Abuse, National Institutes of Health, DHHS, and conducted by the University of Michigan's Institute for Social Research. The survey has tracked 12th-graders' illicit drug use and related attitudes since 1975; in 1991, 8th- and 10th-graders were added to the study. The latest data are online at [www.drugabuse.gov](http://www.drugabuse.gov).

\*\* "Annual" refers to an individual's drug use at least once during the year preceding their response to the survey.

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