

# Alcohol Fact Sheet

## Alcohol and Metabolism

**M**etabolism is the body's process of converting ingested substances to other compounds. Metabolism results in some substances becoming more, and some less, toxic than those originally ingested.

Metabolism involves a number of processes, one of which is referred to as oxidation. Through oxidation, alcohol is detoxified and removed from the blood,

preventing the alcohol from accumulating and destroying cells and organs. A minute amount of alcohol escapes metabolism and is excreted unchanged in the breath and in urine. Until all the alcohol consumed has been metabolized, it is distributed throughout the body, affecting the brain and other tissues.



### The Metabolic Process

**W**hen alcohol is consumed, it passes from the stomach and intestines into the blood, a process referred to as absorption.

Alcohol is then metabolized by enzymes, which are body chemicals that break down other chemicals. In the liver, an enzyme called alcohol

dehydrogenase (ADH) converts the alcohol to acetaldehyde.

Acetaldehyde is rapidly converted to acetate by other enzymes and is eventually metabolized to carbon dioxide and water. Most of the alcohol consumed is metabolized in the liver, but the small quantity that remains unmetabolized permits alcohol concentration to be measured in breath and urine.

The liver can metabolize only a certain amount of alcohol per hour, regardless of the amount that has been consumed. The rate of alcohol metabolism depends, in part, on the amount of metabolizing enzymes in the liver, which varies among individuals based on some genetic determinants.



#### Inside this issue:

The Metabolic Process	1
Factors Influencing Alcohol Absorption and Metabolism	2
Effects of Alcohol Metabolism	2
The Path to Healing	3

After the consumption of one standard drink, the amount of alcohol in the drinker's blood (blood alcohol concentration, or BAC) peaks within 30 to 45 minutes.

***A standard drink is defined as 12 ounces of beer, 5 ounces of wine, or 1.5 ounces of 80-proof distilled spirits.***

## Factors Influencing Alcohol Absorption and Metabolism

**Food.** A number of factors influence the absorption process, including the presence of food and the type of food in the gastrointestinal tract when alcohol is consumed.

The rate at which alcohol is absorbed depends on how quickly the stomach empties its contents into the intestine. The higher the dietary fat content, the more time this emptying will require and the longer the process of absorption will take.

One study found that subjects who drank alcohol after a meal that included fat, protein, and carbohydrates absorbed the alcohol about three times more slowly than when

they consumed alcohol on an empty stomach.



**Gender. Women absorb and metabolize alcohol differently from men.** They have higher BAC's after consuming the same amount of alcohol as men and are more susceptible to alcoholic liver disease, heart muscle damage, and brain damage. The difference in BAC's between women and men has been attributed to women's smaller amount of body weight.

Another factor contributing to the difference in BAC's may be that women have lower activity of the alcohol metabolizing enzyme ADH in the stomach. This causes a larger proportion of the ingested alcohol to reach the blood.

## Effects of Alcohol Metabolism

**Body Weight. Although alcohol has a relatively high caloric value, alcohol consumption does not necessarily result in increased body weight.**

Data collected from the first National Health and Nutrition Examination Survey found that although drinkers had significantly higher intakes of total calories than nondrinkers, drinkers were not more obese than nondrinkers.

In fact, women drinkers had significantly lower body weight than nondrinkers. As alcohol intake among men increased, their body weight decreased. An analysis of data from other large national studies found similar results for women, although the relationship between drinking and body weight for men is inconsistent.

While moderate doses of alcohol added to the diets of lean men and women do not seem to lead to weight gain, some studies have reported weight gain when alcohol is

added to the diets of overweight persons.

When chronic heavy drinkers substitute alcohol for carbohydrates in their diets, they lose weight and weigh less than their non-drinking counterparts. Furthermore, when chronic heavy drinkers add alcohol to an otherwise normal diet, they do not gain weight.

**Sex Hormones. Alcohol metabolism alters the balance of reproductive hormones in men and women.** In men, alcohol metabolism contributes to testicular injury and impairs testosterone synthesis.

In a study of normal healthy men who received 220 grams of alcohol daily for 4 weeks, testosterone levels declined after only 5 days and continued to fall throughout the study period. In addition, alcohol may interfere with normal sperm structure and movement by inhibiting the metabolism of vitamin A.

In some women, alcohol researchers think metabolism may contribute to increased production of a form of estrogen called estradiol (which contributes to increased bone density and reduced risk of coronary artery disease) and to decreased estradiol metabolism, resulting in elevated estradiol levels.

**Medications.** Chronic heavy drinking appears to activate the enzymes which may be responsible for transforming the over-the-counter pain reliever acetaminophen (Tylenol) and many others into chemicals that can cause serious liver damage, even when taken in standard therapeutic doses.

Reviews of studies of liver damage resulting from acetaminophen-alcohol interaction reported that in alcoholics, these effects may occur with as little as 2.6 grams of acetaminophen (four to five "extra-strength" pills) taken over the course of the day in persons consuming varying amounts of alcohol.

## The Path to Healing

Gaining the benefits of treatment begins by recognizing the signs of alcohol addiction. This step is best facilitated by having a comprehensive assessment by a qualified healthcare professional. Although alcohol addiction can be diagnosed by primary care physicians, most often the physician will refer the patient to a psychiatrist, psychologist, counselors, or other professionals specializing in addictions.

**Treatment is a partnership between the patient and the healthcare provider.** It is important that informed consumers understand their treatment options and discuss all concerns with a treatment provider as they arise.

**A key element of Rimrock's treatment is the active involvement of patients in the management of their own illness.**

Empowerment is developed through the use of patient education, skills training and a strong emphasis on encouraging the individual patient to accept responsibility in managing their own condition. Along with the empowerment of our patients, is the emphasis on a treatment regimen which includes comprehensive clinical assessments and individualized patient plans.

Another important part of Rimrock's program is the emphasis we place on the integration of a broad spectrum of community, health and human services for the benefit of the patient. This includes addressing



the patient's physical, psychological, social and economic needs, which improves the likelihood of a successful treatment experience.

Healthcare services should be readily available to those persons needing treatment for addictions, since taking advantage of opportunities when they are ready for treatment is often crucial. Many times, patients can easily be lost in red tape if treatment is not immediately available or is not readily accessible.

Counseling (individual and/or group) and other behavioral therapies are critical components of effective treatment for addiction. In therapy, patients address issues of motivation, build skills to resist drug use, replace drug-using activities with constructive and rewarding non-drug-using activities, and improve problem-solving abilities. Behavioral therapy also facilitates interpersonal relationships and the individual's ability to function in the family and community.

**Successful recovery in addiction treatment is characterized by the integration of personal, family, professional and other community resources toward the goal of enhancing the duration and quality of life of those we serve.**

*For further information about treatment for Alcoholism, please call Barbara Hansen, Rimrock Foundation Admissions Supervisor at 1-800-227-3953 or 1-406-248-3175.*

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