### *Alcohol and Stress*

**T**he term "stress" often is used to describe the subjective feeling of pressure or tension. However, when scientists refer to stress, they mean the many objective physiological processes that are initiated in response to a stressor. The stress response is a complex process; the association between drinking and stress is more complicated still. Both drinking behavior and an individual's response to stress are determined by multiple genetic and environmental factors.

### *The Stress Response*

The maintenance of the body's relatively steady internal state, or homeostasis, is essential for survival. The body's delicate balance of biochemical and physiological function is constantly challenged by a wide variety of stressors, including illness, injury, and exposure to extreme temperatures; by psychological factors, such as depression and fear; and by sexual activity and some forms of novelty-seeking. In response to stress, or even perceived stress, the body mobilizes an extensive array of physiological and behavioral changes in a process of continual adaptation, with the goal of maintaining homeostasis and coping with the stress (4).

The stress response is a highly complex, integrated network involving the central nervous system, the adrenal system, and the cardiovascular system. When homeostasis is threatened, the hypothalamus gland, at the base of the brain, initiates the stress response. This then triggers an integrated series of physiological and behavioral reactions.

Activation of the stress response affects smooth muscle, fat, the gastrointestinal tract, the kidneys, and many other organs and the body functions that they control (4). The stress response affects the body's regulation of temperature; appetite and satiety; arousal, vigilance, and attention; mood; and more (4). Physical adaptation to stress allows the body to redirect oxygen and nutrients to the stressed body site, where they are needed most (4).

Both the perception of what is stressful and the physiological response to stress vary considerably among individuals. These differences are based on genetic factors and environmental influences that can be traced back to infancy (5).

### *Does Stress Influence Drinking?*

Human research to clarify the connection between alcohol and stress usually has been conducted using either population surveys based on subject self-reports or experimental studies. In many but not all of these studies, individuals report that they drink in response to stress and do so for a variety of reasons. Studies indicate that people drink as a means of coping with economic stress, job stress, and marital problems, often in the absence of social support, and that the more severe and chronic the stressor, the greater the alcohol consumption (7).

### *Does Drinking Reduce or Induce Stress?*

Much research demonstrates that alcohol actually induces the stress response by stimulating hormone release by the hypothalamus, pituitary, and adrenal glands (4,6,17,18).

### *Stress, Alcoholism, and Relapse*

Stress may be linked to social drinking, and the physiological response to stress is different in actively drinking alcoholics compared with nonalcoholics (17). Researchers have found that animals preferring alcohol over water have a different physiological response to stress than animals that do not prefer

alcohol (21). Nonetheless, a clear association between stress, drinking behavior, and the *development* of alcoholism in humans has yet to be established.

There may, however, in the *already established* alcoholic, be a clearer connection between stress and relapse: Among abstinent alcoholics, personally threatening, severe, and chronic life stressors may lead to alcohol relapse (15,22). Brown and colleagues (15) studied a group of men who completed inpatient alcoholism treatment and later experienced severe and prolonged psychosocial stress prior to and independent of any alcohol use. The researchers found that subjects who relapsed experienced twice as much severe and prolonged stress before their return to drinking as those who remained abstinent. In this study, severe psychosocial stress was related to relapse in alcoholic males who expected alcohol to reduce their stress. Those most vulnerable to stress-related relapse scored low on measures of coping skills, self-efficacy, and social support. Stress-related relapse was greatest among those who had less confidence in their ability to resist drinking and among those who relied on drinkers for social support. Although many factors can influence a return to drinking, Brown and colleagues note that stress may exert its greatest influence on the initial consumption of alcohol after a period of abstinence (15).

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***Drinking and Stress--A Commentary by NIAAA Director Enoch Gordis, M.D.***

**S**tress is commonly believed to be a factor in the development of alcoholism (alcohol dependence). However, current science is more informative about the relationship between drinking and stress than about the relationship between stress and alcohol dependence.

Drinking alcohol produces physiological stress, that is, some of the body's responses to alcohol are similar to its responses to other stressors. Yet, individuals also drink to *relieve* stress. Why people should engage in an activity that produces effects similar to those they are trying to relieve is a paradox that we do not yet understand. One hypothesis is that stress responses are not exclusively unpleasant; the arousal associated with stress itself may be rewarding. This might explain, for example, compulsive gambling or repeated participation in "thrill-seeking" activities. Current studies may illuminate genetic variations in the physiological response to stress that are important in drinking or other activities with the potential to become addictive.

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