Introduction

Obesity is increasingly being recognized as problem of major public health significance. Overeating and obesity are second only to tobacco in annual associated mortality; almost 300,000 deaths per year. Over 10 years ago, we hypothesized that loss of control over eating, which results in obesity, may be another form of addictive behavior and reported on similarities between overeating and classic descriptions of addictions (Are They Addictions or Just Other Types of Problems? ASAM Symposium-1992). Phenomenological and behavioral similarities between substance abuse disorders and food, as a substance of abuse disorder were compelling. At that time, many were critical of including overeating and obesity as an addiction because there were few scientific studies that had directly compared and studied the relationships between these disorders. Researchers only recently have come to a consensus that obesity is a disease, but the debate continues as to whether it is related to depression, personality disorders or addictions. More than a decade after the first ASAM symposium, we were asked again to address this topic (Are Eating Disorders Addictions? ASAM Symposium 2003-2004). Today there is a convincing convergence of evidence from the bench in neuroscience, to PET and fMRI neuroimaging, to data from clinical experience that support the hypothesis that there are important similarities between overeating highly palatable and hedonic foods and the classic addictions.

If drugs of abuse hijack the brain, as has been suggested, where does this occur? Certainly not through existing pathways for sex or water. Food reward, however, is a prime target. Tobacco causes weight loss, as do cocaine, amphetamine, MDMA, and long-term opiate abuse. Drugs

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of abuse have powerful effects on eating. The 1960s were known as the decade of sex, drugs, and rock and roll. Food seems to be an afterthought and it may be that it is suppressed by drug-taking. We have speculated that if it quacks you can guess that it is a duck. Starving animals self-administer drugs more avidly than those satiated with a good meal or two. Similarly, the wisdom of Alcoholics Anonymous tells us that addicts trying to avoid relapse, should never get too hungry. In this special issue, basic researchers show the relationships between eating messengers and targets for drugs of abuse and the possible inter-connections. Imaging studies show that the brain's somatosensory cortex changes with overeating and obesity so that the mouth and tongue increase their geographical area on the homunculus. Also, the hypothalamus senses that eating has occurred with a delay time that increases with increased body mass. Both these findings, by Dr. Wang and also Dr. Lui reported here, show how increased weight makes further increases more likely. In weight management and bariatric surgery clinics, it is commonly observed that the heavier the patient the less alcohol and illegal drugs they use. It is almost as if they are competing for the same reward sites in the brain. If this is the case, we might see an effect of drug treatment on weight. Treatment of addicts appears to result in weight gain. Not just smoking cessation but all supervised drug abstinence treatment causes weight gain. Here numerous researchers examine the links between overeating, obesity, and addictions in an attempt to answer the question: Are Eating Disorders Addictions?

Kalra and Kalra show the relationships between eating messengers and targets for drugs of abuse and the possible inter-connections in their paper entitled, "Overlapping and Interactive Pathways Regulating Appetite and Craving." Other imaging studies, such as the fMRI study by Dr. Liu and colleagues entitled, "Interaction of Satiety and Reward Response to Food Stimulation," show that the hypothalamus senses that eating has occurred with a delay time that increases with increased body mass. Imaging studies, such as reported by Dr. Wang and colleagues show that the brain's somatosensory cortex changes with overeating and obesity so that the mouth and tongue increase their geographical area on the homunculus. Wang and colleagues report on "Similarity Between Obesity and Drug Addiction as Assessed by Neurofunctional Imaging: A Concept Review," in this issue.

In "Adolescent Drug Addiction Treatment and Weight Gain," Dr. Hodgkins et al. report that weight gain follows supervised abstinence from drugs and alcohol. In the next article, "Examining Problem Drinking and Eating Disorders from a Gendered Perspective," Matthews

examines problem drinking and eating disorders in a college student population. Males were more likely to report problem drinking whereas women were more likely to report symptoms of eating disorders. In their study, only a small subset of female subjects had both problem drinking and eating disorder symptomatology. As they predicted, they did find a significant relationship between problem drinking and higher scores on the Impulse Regulation subscale of the Eating Disorder Inventory-2.

In the next article, Anne Becker and colleagues review the social and genetic factors related to eating disorders in "Genes and/or Jeans?: Genetic and Socio-Cultural Contributions to Risk for Eating Disorders." It appears there are numerous complex genetic and environmental etiologic mechanisms. Genetic studies have focused on anorexia nervosa more often than binge-eating or bulimia nervosa, but recent studies are demonstrating that they may be etiologically separate. In the final paper, we report that as BMI increases, alcohol use decreases. It is possible they compete for reward sites in the brain and therefore we would expect to see weight gain after substance abuse treatment.

Over a decade ago, we reported on the similarities of overeating and obesity to classic addictions. Since that time, neuroimaging studies have supported the hypothesis that loss of control over eating and obesity produces changes in the brain, which are similar to those produced by drugs of abuse. In addition, newly discovered messengers such as leptin, galanin, CART have effects in modulating eating behavior and may have roles in alcohol and other drug dependencies. Treatment of obesity, from surgery to medications, often involves 12-step meetings. Overeating and obesity are increasing in prevalence and public health significance. Applying research methodologies applied to addictions may offer hope for understanding and the development of common treatments.

Some would say if it quacks like a duck, it is a duck. Food, highly palatable and energy dense, has become a substance of abuse. Overeating and obesity may be readily included in the DSM-IV by simply considering food as a "substance" in SUDs. Loss of control, use despite diabetes and other consequences, changing priorities and so on would make criteria for SUD.

Mark S. Gold, MD
Departments of Psychiatry and Neuroscience
McKnight Brain Institute
University of Florida
Gainesville, FL 32610