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# Spotlight on ... Food Addiction

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## In This Issue:

Sex, Drugs and Buffets? ..... 2  
Just One Look ..... 2  
More Than Meets the Eye ..... 2  
PET Peek ..... 3  
Spotlight on ... Scientists ..... 3  
First Draft ..... 4

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## Addicted to Food

Though supporting scientific evidence is plentiful, many people still have a hard time accepting the idea that addiction is a disease, and not just a behavioral habit. But science has found that **dopamine**, a naturally occurring substance that modulates feelings of pleasure, is less active in the brains of addicted people. This includes drug addicts, alcoholics and food addicts.

Food addicts? Yes—people who compulsively overeat despite feeling full may be reacting to chemical cravings in their bodies, and not just to social influences or personal problems.

*Spotlight on...Food Addictions* details how medical science has discovered some of the base causes of addiction, radically affecting common knowledge, and providing hope for the future. This issue of *Spotlight on...* will give you the facts, debunk common myths about addiction and overeating, and suggest ways in which this new science might be depicted in entertaining and accurate, ways.

If, after reading this issue of *Spotlight on...*, you have any questions about addiction or any other health-related issue, contact EIC's free *First Draft* service, and we will connect you with an expert who can tell you everything you need to know within 24 hours, guaranteed. *First Draft's* services can be accessed by calling (310) 446-7818 in the Los Angeles area, or (866) 289-4347 anywhere in the country. There is no charge for *First Draft*.



### Addiction: noun.

The word "addiction" dates back to 1599, long before positrons were scanning brains. Four hundred years later, addiction is almost exclusively accepted as related to drug, alcohol or tobacco use, and occasionally to sexual behaviors and gambling. The last two are often considered less serious, and probably even less legitimate as addictions. Food addiction is rarely even considered.

But a look at Merriam-Webster's broad definition of the word might lend that much needed legitimacy to the study of addiction as a complex psychological, physiological and behavioral concern:

**Addiction: noun. persistent compulsive use of a substance known by the user to be harmful**

Drug addiction may appear to be more of a health concern to Americans than obesity, but both can have harmful secondary effects on a person's quality of life. By looking into the roots of these two very different health concerns, scientists have found that they are built upon the same foundation and that, perhaps, each time treatment is improved for one, it may be for the other.

## Sex, Drugs and...Buffets?



Dr. Joseph Frascella of the National Institute on Drug Abuse's Division of Treatment Research and Development draws the correlation: "Although many complex factors may be involved in excessive behaviors such as compulsive drug abuse, overeating and gambling, they are all similar in that the brain is changed, reward circuits are disrupted, and the behavior eventually becomes involuntary... A common brain mechanism could contribute to such disorders."

Dr. Nora D. Volkow, a psychiatrist and current Director of NIDA, agrees. "If you have a decrease in dopamine receptors that transmit pleasurable feelings, you become less responsive to the stimuli, such as food or sex, that normally activate them," she says. "When these activities don't reward you enough, your brain signals you to do something that will stimulate circuits sufficiently to create a sense of well-being. Thus, an individual who has low sensitivity to normal stimuli learns behaviors, such as abusing drugs or overeating, that will activate them."

## Just One Look, That's All It Took...

Can the mere sight of food drive a person over the edge? Yes and no, depending on where a person draws the line.

A study at the U.S. Department of Energy's Brookhaven National Laboratory led by Dr. Nora Volkow reveals there is more to the dopamine story: While obese people's brains may transmit less dopamine, when food-deprived subjects are allowed to smell and taste their favorite foods—but not eat them—their brains exhibit a sudden spike in dopamine levels. This reaction to food is comparable to a drug addict's reaction when craving drugs and presented with them.

"Eating is a highly reinforcing behavior, just like taking illicit drugs," says Volkow. "But this is the first time anyone has shown that the dopamine system can be triggered by food when there is no pleasure associated with it since the subjects don't eat the food. This provides us with new clues about the mechanisms that lead people to eat other than just for the pleasure of eating, and in this respect may help us to understand why some people overeat."

NIDA's and Brookhaven's scientists have performed research showing that addictive drugs increase levels of dopamine in the brain, and that addicts have fewer dopamine receptors than non-addicts. The same holds true for obese people.



## More Than Meets the Eye



The brain works in mysterious ways, but those ways are becoming less and less mysterious as scientists find out how different parts of the organ affect our lives. As with other addictions, food addiction is not entirely psychological. Physical differences between those who overeat and those who don't may hold one of the keys necessary to unlock the prevalent disorder of overeating.

Results from a 2002 study suggest that overweight and obese people may overeat because the parts of their brains that activate sensation in the mouth, lips and tongue are more active in obese people than in those who are a healthy weight. Gene-Jack Wang, a physician and researcher at Brookhaven National Laboratory, led the study.

"This enhanced activity in brain regions involved with sensory processing of food could make obese people more sensitive to the rewarding properties of food, and could be one of the reasons they overeat," Wang said.

Enhanced sensory activity combined with a lesser feeling of satisfaction resulting from difficulty activating dopamine, the "pleasure" neurotransmitter, in the brain might explain why many people eat compulsively.

## PET Peek

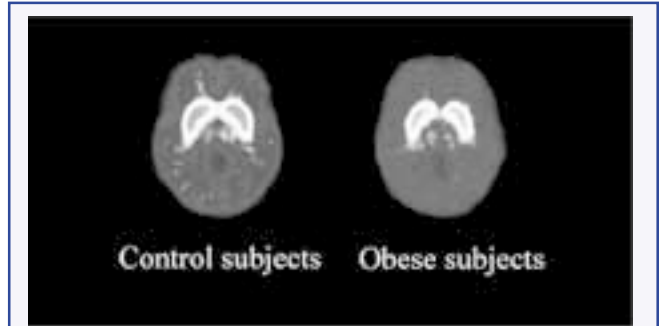
In Wang's study, the overall metabolism of both normal weight and overweight subjects did not differ. But PET (positron emission tomography) technology revealed "hot spots" in the brains of obese patients that relate directly to sensory input from the mouth, lips and tongue. Taste-related senses also "report" to this area of the brain.

"The enhanced activation of these regions in obese patients is consistent with an enhanced sensitivity to food palatability, which is likely to increase the rewarding properties of food," Wang said.

The brain scans below detail the areas of decreased dopamine activity in obese people.

These findings suggest that obesity may be treatable by prescribing obese patients drugs that decrease the appeal of food to the brain, as well as those that increase rates of dopamine absorption. Pharmaceutical treatments, however, would likely be most effective in combination with behavioral therapies to reduce food intake. *This study appeared in the July 2, 2002 issue of the scientific journal NeuroReport.*

This work was funded by the U.S. Department of Energy, which supports basic research in a variety of scientific fields, and the National Institute on Drug Abuse, a component of the National Institutes of Health, Department of Health and Human Services.



These composite brain scans images show that obese individuals have significantly fewer dopamine receptors in the outlined area that control subjects. These receptors transmit pleasurable feelings from basic activities such as eating and sex. Low levels of these receptors also have been found in people addicted to drugs of abuse. The reduced reward experienced by people with this deficiency may make them more likely to engage in addictive behaviors.

## Spotlight on... Scientists



Dr. Nora Volkow, Director of NIDA, is the great-granddaughter of exiled Russian revolutionary Leon Trotsky. Nora was the subject of a *Washington Post* feature article that revealed "her own path to greatness." She is continuing her family's tradition by thinking ahead of her time, breaking ground in the study of food addiction.

*Post* writer Guy Gugliotta revealed "Nora Volkow was born three years after Stalin died, and 16 years after the Soviet dictator sent a student with an ice ax to kill her great-grandfather. Her grandmother committed suicide, and her grandfather was shot to death in a Stalinist prison. She grew up in Mexico City knowing that her family was both steeped in greatness and marked by tragedy."

The Volkow family was on edge until the late 1980s, when *perestroika* brought an end to the persecution of Trotsky's family, and to the kill order that had persisted throughout Nora Volkow's lifetime. Nora's father, Esteban Volkow, returned to his homeland "about 10 years ago" to find his sister Eva, who the family thought had been killed long ago, dying of cancer.

Nora spent a week in Moscow last year with her husband, she says, anonymously. Incredibly, she was able to find peace and quiet in the country that almost destroyed her family; there, she was away from the worldwide attention she gets on a daily basis as the Director of NIDA, which supports more than 85% of the world's research on drug abuse and addiction. Revolutionary thinking is in her blood.

