

# THE HEALTH NUGGET



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## Oreos on the Brain

Oreo cookies are one of America's most popular comfort foods. They are not anything that mom can whip up in the kitchen though. Oreos are made in factories from their maker's own secret recipe and some of the ingredients can only be obtained from chemistry labs.

Kraft, the maker of Oreos and America's largest food maker, was questioned some years ago about collaborating with a sister company at the time, Philip Morris, America's largest cigarette company. What could cigarettes and Oreos have in common, and what was the information they were interested in swapping?

When the Chicago Tribune broke the story, a Kraft spokesperson said it was just good business to have their scientists "look for ways to exchange information, share best practices and identify efficiencies that reduce overall costs."<sup>1</sup>

This included proposed electrophysiological studies—plans to invest jointly in brain scans, to see how the brain is rewarded, how to study nerve impulses using rats or humans, and suggestions of collaborating on foods and drinks "engineered to influence' a customer's mood or sense of fullness."<sup>2</sup> Could scientists from a food company and a cigarette company have similar research agendas? Law Professor, Richard Daynard of Boston says, "Like cigarettes, processed foods are highly engineered to make the consumer react in a particular way."<sup>3</sup>

Law Professor at Georgetown University, John Banzhaf, who successfully pioneered tobacco litigation in the 1960s, has threatened food makers with legal action as a responsible party in America's obesity epi-

dem. He contends that some food can produce the same sorts of changes in the brain as powerful drugs causing them to eat more. Researchers are finding that aside from added chemicals in food, sugar content alone can elicit powerful [brain] responses. They "are now asking whether the brain's reward circuits can also be hot-wired by mega-doses of fat and sugar."<sup>4</sup>

Professor Bart Hoebel, and his team at the Department of Psychology at the Princeton Neuroscience Institute, is coming up with answers. As lead researcher, Hoebel states, "Our evidence from an animal model suggests that bingeing on sugar can act in the brain in ways very similar to drugs of abuse.... Drinking large amounts of sugar water when hungry can cause behavioral changes and even neurochemical changes in the brain which resemble changes that are produced when animals or people take substances of abuse. These animals show signs of withdrawal and even long-lasting effects that might resemble craving."<sup>5</sup>

Drugs produce biochemical responses that create a sense of pleasure in the reward center of the brain. Apparently food can as well. Drugs stimulate the overproduction of certain brain chemicals. Sugars can trigger the production of innate opioids. Drugs can create dependency. Based on his observations, Hoebel believes sugar can also. "The implication is that some animals—and by extension some people—can become overly dependent on sweet food. The brain is getting addicted to its own opioids as it would morphine or heroin. Drugs give a bigger effect, but it's essentially the same process. . . highly palatable foods

and highly potent sexual stimuli are the only stimuli capable of activating the dopamine system with anywhere near the potency of addictive drugs.”<sup>6</sup>

Hoebel’s theories are based on his observations of laboratory rats that have developed signs of addiction to sugar such as bingeing, sensitization, craving-like behavior, and withdrawal.<sup>7</sup> Withdrawal from nicotine, morphine, and alcohol cause chemical imbalances in certain parts of the brain. It is this imbalance that drives humans to self-medicate with more drugs. A state of imbalance is also seen in sugar withdrawal and can result in a whole box of cookies being consumed instead of just one.

The brain responds to imbalance in a number of ways. Take for example the process of down-regulation. In the presence of too much of a given chemical or neurotransmitter, the cells will close down some of their receptors for these chemicals. The cell says, “I don’t need that much.” It is as if the noise is too loud and so the cell puts on noise cancellers. This limits the number of hits it can receive, and less of the given substance is perceived. The down side of this adaptation is that when not in a state of hyper-stimulation, the individual is operating at a suboptimum state. Only more of the substance can bring the desired experience as the brain develops tolerance. This is why the prolonged use of substances such as alcohol or other drugs by an individual causes them to need a higher quantity to get the same result. One beer in a first time user may bring an effect equivalent to six beers in a seasoned drinker.

Up-regulation is another adaptive process. This can occur in individuals who have low levels of certain naturally occurring chemicals, such as serotonin and beta-endorphin.

Beta-endorphin is a neurochemical, an endogenous “morphine,” that plays a role in the runner’s high, feelings of self-esteem, confidence, optimism,

as a pain killer, controlling anxiety, and reducing emotional stress. Narcotics, such as morphine, heroin, and codeine, work like beta-endorphin. They fit into the beta-endorphin receptors. Alcohol causes the brain to release additional beta-endorphin, as does sugar.<sup>8</sup>

Up-regulation has been seen for example in children of alcoholics and those who are depressed. In this scenario more receptors are opened on brain cells so they can receive as much of the chemical that is available. The individual experiences a heightened response to, say, a sugar influx. The over-reaction can result in a much stronger attachment and felt need for the desired substance. These individuals are more likely to respond to stress by grabbing a quart of ice cream out of the freezer and eating the whole thing.

Do you have Oreos on the brain? Take heart. God wants to become the Savior and Satisfier of this area of your life. He desires to turn on the pleasure centers of your brain with His Word so that you too will be able to say, “Your words were found and I ate them, and Your Word was to me the joy and rejoicing of my heart” (Jeremiah 15:16, NKJV). “How sweet are Your Words to my taste” (Psalms 119:103).

1 Callahan, P., Manier, J., Alexander, D. “Where there’s smoke, there might be food research too.” *Chicagotribune.com*. 1/29/06. p. 2. [www.chicagotribune.com/business/chi-0601290254jan29,0,1306987.story](http://www.chicagotribune.com/business/chi-0601290254jan29,0,1306987.story).

2 Ibid., p. 1.

3 Ibid.

4 Martindale, D. “Fast food may be addictive.” *The Canadian*. <http://www.agoracosmopolitan.com/home/Health/2006/03/06/01123.html>.

5 Gardner, Amanda. “Study suggests sugar may be addictive.” *MSN health & fitness*. <http://health.msn.com/health-topics/articlepage.aspx?cp-documentid=100228625>

6 Martindale, D. “Fast food may be addictive.” *The Canadian*. <http://www.agoracosmopolitan.com/home/Health/2006/03/06/01123.html>.

7 Dept. of Psychology/Princeton University. 2004. <http://weblamp.princeton.edu/~psych/psychology/research/hoebel/index.php>.

8 DesMaisons, PhD, Kathleen. *Potatoes Not Prozac*. pp. 62-64.

