Gain weight by "going diet?"
Artificial sweeteners and the neurobiology of sugar cravings

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KEY POINTS FROM THIS STUDY

1) "A rise in the percent of the population who are obese coincides with an increase in the widespread use of noncaloric artificial sweeteners, such as aspartame (e.g., Diet Coke) and sucralose (e.g., Pepsi One), in food products."

2) "While people often choose "diet" or "light" products to lose weight, research studies suggest that artificial sweeteners may contribute to weight gain."

3) Saccharin is the oldest artificial sweetener, discovered at Johns Hopkins in 1879, and is made from coal tar.

4) Cyclamate was discovered in 1937 at the University of Illinois, and was often blended with saccharin to improve the taste.

5) Saccharin and Cyclamate were both deemed "generally recognized as safe" by the FDA in 1958.

- Cyclamate was banned in 1969 because of cancer risk. Cyclamate continues to be marketed in about 50 countries, including Canada.

6) Aspartame was discovered in 1965 by drug maker Searle while trying to make a new ulcer drug.

7) Aspartame consists of phenylalanine and aspartate, linked to a methanol backbone. "Unlike the other artificial sweeteners that are usually excreted unchanged, aspartame can be metabolized." [This means that after consumption, humans are exposed to the methanol, a toxin]

8) "Aspartame is about 200 times sweeter than sucrose. Due to the small amount ingested at a time, its caloric contribution is negligible."

9) The FDA approved aspartame first for use in dry foods in 1981, then as a general sweetener in 1996. Monsanto bought Searle and converted it into NutraSweet in 1984. The patent on aspartame expired in 1992. Amid competition from generic manufacturers, NutraSweet engineered neotame, which was approved

in 2002. Neotame is the most potent sweetener on the market, at 7,000 times the sweetness of sucrose.

10) Acesulfame potassium [such as *Sunett* and *Sweet One*] resembles saccharin and cyclamate in structure and taste. The FDA approved its use in dry foods in 1988 and as a general sweetener in 2003.

11) Sucralose [Splenda, the yellow packet] was discovered in 1979 at drug maker Tate & Lyle, and approved for consumption by the FDA in 1999. Sucralose is synthesized from sucrose by substituting chlorine for three of its hydroxyl groups. [Since Sucralose has 3 Chlorine-Carbon bonds, it is classified as an organo-chloride toxin]. Sucralose is 600 times sweeter than sucrose. In 2008, Sucralose produced 23% of Tate & Lyle's total operating profit.

12) In last decade there has been an "explosive increase in the number of food products containing non-caloric artificial sweeteners."

13) Currently, there are 3,648 products containing one or more of the 5 FDA approved artificial sweeteners:

#1	Sucralose	1,500 products	[Splenda]
#2	Acesulfame potassium	1,103 products	[Sunett and Sweet One]
#3	Aspartame	974 products	[Nutri-Sweet]

14) 65% of American households bought at least one sucralose-containing product in 2008.

15) Artificial sweeteners are mostly used in carbonated drinks. They also are found in baby food (e.g., Pedialyte) to frozen food (e.g., Lean Pockets).

16) 15% of the population regularly uses artificial sweeteners.

17) "The weight conscious public often considers artificial sweeteners 'health food'."

18) "Do artificial sweeteners actually help reduce weight? Surprisingly, epidemiologic data suggest the contrary." Apparently, consumption of artificial sweeteners increases total food energy intake, resulting in increased weight gain and adiposity. This may be because they damage or cause dysfunction of the hypothalamus. The hypothalamus regulates energy and feeding behavior.

19) Several studies have shown that increased diet soda consumption is associated with weight gain.

20) "Both diet and regular soda drinking was associated with increase in total daily energy intake."

21) A study "looking at 3,111 children and youth found diet soda drinkers had significantly elevated BMI."

22) Artificial sweeteners as a mono-therapy do not help reduce weight.

23) "Sweet taste, whether delivered by sugar or artificial sweeteners, enhanced human appetite."

24) Aspartame increases hunger compared to glucose or water.

25) Studies show that the consumption of the artificial sweeteners aspartame, acesulfame potassium, and/or saccharin heightened the motivation to eat more, increasing the overall consumption of calories.

26) "What drives the desire to eat? Food reward shares brain circuitry with other pleasurable activities such as sex and drug administration." Dopaminergic activation is associated in sucrose consumption. [This means that sugar and sweetness consumption is a biological addiction, as is sex].

27) "Increasing evidence suggests that artificial sweeteners do not activate the food reward pathways in the same fashion as natural sweeteners."

28) Apparently, sweetness without calories "may contribute to increased appetite."

29) "Artificial sweeteners, precisely because they are sweet, encourage sugar craving and sugar dependence."

30) "Unsweetening the world's diet may be the key to reversing the obesity epidemic."

COMMENTS FROM DAN MURPHY
Apparently consumption of artificial sweeteners:

- Does ***not*** result in weight loss.
- Actually results in weight gain.
- May be toxic.
- May increase the risk of some cancer.
- May increase adverse vascular events.

We have reviewed several related studies:

- **Article Review 16-05**: Aspartame induces lymphomas and leukemias in rats; Aspartame, a leukaemogenic compound
- **Article Review 04-13**: Diet Soft Drink Consumption is Associated with an Increased Risk of Vascular Events in the Northern Manhattan Study
- **Article Review 15-13**: Fueling the Obesity Epidemic? Artificially Sweetened Beverage Use and Long-term Weight Gain