

## Letters to the Editor

### Aspartame and Incidence of Brain Malignancies

**To the Editors:** Lim et al. (1) found no relationship between the "Consumption of aspartame-containing beverages and incidence of hematopoietic and brain malignancies" by surveying retired individuals about their consumption of diet sodas and determining whether they had an increase in brain tumors 5 years later. In fact, this study design was not able to test the hypothesized relationship because it did not assess all exposures to aspartame and because it only evaluated short-term exposures in older adults.

Lim et al. estimated average daily aspartame consumption values based solely on the consumption of beverages containing aspartame. Lim et al. states that 70% of consumed aspartame is obtained through diet beverages, citing the American Dietetic Association as the source of this information. The American Dietetic Association, in turn, cites Equal.com, a large supplier of aspartame-containing products, as the authority for their statement; when contacted for corroborating information, Equal.com could not provide this corroboration. According to the Aspartame Information Center, more dry products contain aspartame than do drink products. The Lim et al. study assumed that the average daily intake of aspartame was equivalent to approximately one 12-oz. can of diet soda and did not include products, such as table sugars, candies, yogurt, nutrition bars, and even chewing gum (2).

Table 1, from the European Ramazzini Foundation, estimates the average daily amount of aspartame consumed from some of the most commonly used products out of the more than 6,000 in which it is present (3). If a woman ate these foods and weighed 60 kg (~132 lb), she would consume an aspartame daily dose of 15.1 mg/kg of body weight; a child weighing 30 kg (~66 lb) with a similar daily intake would have an aspartame daily dose twice as high—30.3 mg/kg of body weight (4). This estimated average daily level is well above the dose that was examined in Lim et al.'s study.

For those who are dieting, daily consumption of aspartame can be considerably higher. For instance, the South Beach Diet attempts to eliminate sugar intake by endorsing the extensive use of sugar substitutes, such as aspartame (5). Despite its popularity in various diet programs, research does not indicate that aspartame promotes weight loss, and some report that it functions as an appetite stimulant (6).

The Lim et al. study included members of the AARP of ages 50 to 71 years. Aspartame was not approved by the Food and Drug Administration as a food additive until July 1981. The population of the Lim et al. study grew during a period when aspartame use was considerably less than it is now, and none would have consumed aspartame as children (7). Aspartame is now used in countless consumer products, some we may not even be aware of, and is consumed by about 200 million Americans every day. In America today, more than 10 million children regularly consume sodas and other foods containing aspartame. This study cannot evaluate the possibility that infants and children whose exposures can begin *in utero* and young persons who can drink several sodas a day will incur a greater risk of brain and other cancers when they reach the older ages.

The greater vulnerability of the young to carcinogens has consistently been shown experimentally for aspartame and a number of other compounds (8). Some experimental studies have not found a connection to brain malignancies and aspartame consumption in rats (9). But these studies ended after 2 years. In a rodent, 2 years corresponds to about 60 years in humans, and more and more of the population are living into their 80s. The Ramazzini Foundation relies on a lifespan protocol in which rodents live their entire life span and are examined for signs of tumors or other damage upon natural death or by the end of the third year. Soffritti's September 2007 publication (10) supported the 2005 (11) experiment that found an obvious association between aspartame and multiple types of cancers. Animals exposed prenatally to aspartame in this latest work have double the risk of multiple tumors compared with those exposed postnatally.

In light of these experimental findings, in evaluating public health effects of widely used materials, it is important to consider information on lifetime exposures, especially those that may begin prenatally. The possible effect of full lifetime and prenatal exposures on humans of aspartame cannot be evaluated in the Lim et al. study population, which only examined persons exposed as adults to aspartame.

More than half of all Americans are estimated to use aspartame everyday, including many pregnant women and children. The negative findings in the Lim et al. study do not prove that there are no long-term effects

**Table 1. Average daily intake of aspartame**

Substance	Quantity per day	Concentration of aspartame consumed (mg)
Diet soda (200 mg/can)	2 cans	400
Yogurt (125 mg/yogurt)	2 yogurts	250
Diet custard/pudding (75 mg/mouse)	1 serving	75
Coffee with sweetener (40/mg packet)	4 cups	160
Candy/chewing gum (2.5/candy)	10 candies	25
Totals		910

of aspartame. The older study population analyzed and the limited ingestion of aspartame evaluated cannot reflect the long-term public-health effects of aspartame that may begin prenatally and run throughout a lifetime. In light of the limited nature of the study by Lim et al. and recent reports of Soffritti finding that aspartame significantly increases the risks of tumors in rodents, with a doubled risk in those in which exposures begin prenatally, the Food and Drug Administration should review its approval of aspartame.

Devra Lee Davis  
Leanne Ganter  
Jonathan Weinkle  
*Department of Epidemiology,  
Graduate School of Public Health,  
University of Pittsburgh Cancer Institute,  
Center for Environmental Oncology,  
Pittsburgh, Pennsylvania*

## References

1. Lim, et al. Consumption of aspartame-containing beverages and incidence of hematopoietic and brain malignancies. *Cancer Epidemiol Biomarkers Prev* 2006;15:1654–9.
2. Aspartame Information Center. Available from: <http://www.aspartame.org>.
3. Available from: [http://www.fda.gov/fdac/features/2006/406\\_sweeteners.html](http://www.fda.gov/fdac/features/2006/406_sweeteners.html).
4. Davis DL. The secret history of the war on cancer. Published by Basic Books 2007. 387 Park ave. south, New York, NY 10016–8810.
5. Available from: <http://www.southbeachdiet.com/sbd/publicsite/index.aspx?puuid=9468E236-C791-4E29-9D03-9A31ADD41BA3>.
6. Vermunt SHF, Pasman WJ, Schaafsma G, Kardinaal AFM. Effects of sugar intake on body weight: a review. *Obes Rev* 2003;4:91–9.
7. The history of aspartame. Legal electronic document archive of Harvard Law School. Available from: [http://leda.law.harvard.edu/leda/data/244/Nilil\\_Ashley\\_-\\_The\\_History\\_of\\_Aspartame.html](http://leda.law.harvard.edu/leda/data/244/Nilil_Ashley_-_The_History_of_Aspartame.html).
8. Soffritti M, Belpoggi F, Esposti DD, Falcioni L, Bua L. Consequences of exposure to carcinogens beginning during developmental life. *Basic Clin Pharmacol Toxicol* 2008;102:118–24.
9. Ishii H. Incidence of brain tumors in rats fed aspartame. *Toxicol Lett* 1981;7:433–7. Available from: <http://www.scopus.com/scopus/record/display.url?eid=2-s2.0-0019460728&view=basic&origin=inward&txGid=TLaKrPghg4X-6BseUas7PpA%3a2>.
10. Soffritti M, Belpoggi F, Tibaldi E, Esposti DD, Lauriola M. Life-span exposure to low doses of aspartame beginning during prenatal life increases cancer effects in rats. *Environ Health Perspect* 2007;115:1293–7.
11. Soffritti M. Aspartame induces lymphomas and leukaemias in rats. *Eur J Oncol* 2005;10:107–16.

Copyright © 2008 American Association for Cancer Research.  
doi:10.1158/1055-9965.EPI-07-2869