Aspartame Approval History
From The Sweetener Wars by Janet Starr Hull, PhD, CN

It’s been thirty years since aspartame first came on the market as NutraSweet/Equal®. Researchers warned us as early as the 1960s that this artificial sugar substitute was harmful to human health, but their warnings never reached the consumer. Today, the scientific research continues with the hope that the findings that aspartame causes cancer, memory loss, birth defects, leukemia, and lymphoma will finally get through to public awareness. The question most people ask is why is aspartame still on the market if the FDA insists that it is safe? Aspartame’s history reveals the answer, and that involves a complex and alarming chronicle of events.

To unlock the doors to future health, we must find the keys from the past.

The Sweetener Timeline:

1965. G.D. Searle chemist, James Schlatter, discovered aspartame as a sweetener while originally testing the chemical compound for an ulcer drug. His boiling flask bubbled over; the formula spilled; Schlatter’s ledger fell to the floor; he licked his fingers to pick up the fallen papers, and he unexpectedly discovered aspartame was incredibly sweet.

G.D. Searle switched their FDA approval application from an ulcer drug to the newest sweetener food additive.
Physician and Biochemist, Dr. Harry Waisman, Professor of Pediatrics at the University of Wisconsin and Director of the University’s Joseph P. Kennedy, Jr. Memorial Laboratories for Mental Retardation Research, approached G.D. Searle to conduct a study on the effects of aspartame on Phenylketonurics (PKU). An expert on PKU, Dr. Waisman proposed to study the genetic disorder in response to aspartame using primates. Dr. Waisman’s experiments resulted in the following:

Of the seven infant monkeys fed aspartame mixed with milk, one died after 300 days and five other monkeys suffered grand mal seizures. Dr. Waisman reported his findings to G. D. Searle, but Searle never submitted the test results to the FDA. (In the 1975 investigations, the FDA Investigative Task Force first discovered Dr. Waisman’s 1969 study and questioned Searle why the study had been deleted from FDA records. They did not receive an answer.)

Before he completed his study, Dr. Waisman was killed in an automobile accident in March of 1971. The FDA considered his research important, but in 1980, his findings were dismissed as incomplete.

After his death, G.D. Searle granted researcher Ann Reynolds funds to study Waisman’s findings. According to Congressional records, her findings were fragmented as she evaluated plasma aspartic acid levels only; not the neurotoxicity or seizure potentiality of phenylalanine, as did Dr. Waisman.

Primates were never used in further aspartame research. All subsequent studies submitted by Searle to the FDA were performed on rodents.
Unfortunately, the tests on rodents were not as accurate as those using primates. The rodents had to be fed at least 60 times more aspartame than the primates in order to duplicate the intake effect on humans, resulting in inaccuracies between the tests.

The safety of saccharin was tested at this time, and the laboratory rats used in the studies were fed the equivalent of 600 to 800 cans of diet soda with saccharin per day. There was a public outcry over the potential abuse related to the excessive amount of saccharin fed to the test animals, but a proposed ban on saccharin began.

1970. The safety of saccharin was seriously being questioned, and the FDA banned cyclamate. The Director of the FDA Toxicological Services Center for Food Safety and Applied Nutrition, Robert Scheuplein stated, “The decision to ban cyclamate was more a matter of politics than science. Meetings were not held. Things were not pursued. Work was not done. The people who were involved at the time were inadequate to the job.”

Dr. John Olney, Research Psychiatrist, Department of Psychiatry at The Washington School of Medicine, began his research on the safety of aspartame.

1971. Dr. Olney informed G.D. Searle that the aspartic acid in aspartame caused holes to form in the brains of his test mice. Ann Reynolds, the same researcher hired by Searle to investigate Dr. Waisman’s findings, was again contracted by Searle to investigate Dr. Olney’s findings. She confirmed his findings in a similar study.
1973. G.D. Searle petitioned the FDA for approval to use aspartame in all foods.

Dr. Olney and Jim Turner, J.D. met with G.D. Searle representatives to discuss Dr. Olney’s research findings.

1974. FDA Commissioner Alexander Schmidt, M.D. approved aspartame as a food additive in dry foods only.

Olney and Turner met with FDA Commissioner Schmidt to discuss Dr. Olney’s findings.

1975. A FDA Task Force was formed to investigate aspartame safety concerns. FDA Lead Investigator, Philip Brodsky and FDA Toxicologist, Adrian Gross, M.D headed the Task Force. Both were charged with examining the original test material submitted by Searle for aspartame and their Copper-7 IUD.

After several months of investigations, the Task Force submitted a 15,000-page document with a summary of over 80 pages. They reported that the problems they found throughout the Searle studies revealed a pattern of conduct that “compromised the scientific integrity of the studies.”

The FDA concluded that many of Searle’s studies were questionable, and Commissioner Schmidt’s 1974 aspartame approval was rescinded.
1976. As a result of the Task Force’s investigation results, the first Senate Subcommittee on Labor and Public Welfare hearing was called on April 8 to discuss the safety aspartame and several other Searle drugs.

Tate & Lyle, a British sugar company, began searching for ways to blend sucrose (sugar) with laboratory chemicals, discovering sucralose (Splenda).

1977. A five member FDA Task Force headed by FDA Inspector Jerome Bressler received 15 Searle aspartame studies to examine. Bressler discovered that some of the test animals had developed uterine tumors during the research studies, and determined that some of the blood tests had been tampered with. According to Bressler’s report, Searle claimed they experienced problems with their instruments, and, therefore, substituted the results of some studies with other test results.

A Rockville, Maryland firm, UAREP, examined 12 of the 15 Searle aspartame studies, and reported finding written accounts of brain tumors.

In January, FDA Chief Counsel Richard Merrill formally requested that U.S. Attorney Samuel Skinner conduct a Grand Jury investigation on the tests submitted to the FDA by G.D. Searle. The investigation was based on whether Searle “concealed material facts and made false statements in animal study reports concerning the safety of the drug aldactone and aspartame.”
At this time, the FDA cited two specific aspartame studies needing special attention. One was a primate study where the monkeys suffered seizures but were never given autopsies. The second was a toxicity study on hamsters.

Attorney Skinner removed himself from the case in March, accepting a position with the law firm Sidley and Austin, hired to defend Searle in these specific investigations.

William Conlon, Senior Assistant US Attorney, was appointed US Attorney. Conlon took no action on the aspartame case, and accepted a position with Sidley and Austin later that same year.

Thomas Sullivan was appointed US Attorney, and also took no action in the aspartame investigations.

The statute of limitations for a grand jury investigation to prosecute the case expired in December.

Donald Rumsfeld, former Congressman and Chief of Staff for the Ford Administration, was hired as G.D. Searle’s President. He immediately hired three government officials, John Robson, Robert Shapiro, and William Greener, Jr.

John Robson was hired as Executive Vice-president. He was a former lawyer with Sidley and Austin, and served as Chairman of the Civil Aeronautics Board, working with the US Department of Transportation.
Robert Shapiro was hired as Searle’s general counsel, and soon became Searle’s first Director of the NutraSweet Division. Shapiro was Robson’s special assistant at the US Department of Transportation.

William Greener, Jr. was hired as Searle’s chief spokesman. He was former spokesman for the Ford Administration.

1978. Northeastern Illinois University, Department of Psychology, submitted a study on aspartame. They documented the following research results: reproductive dysfunction in both male and female test animals; endocrine dysfunction including the pituitary gland, the thyroid gland, the ovaries, and the testes; an increase in weight; and a decrease in locomotor function.

Aspartame safety proceedings were held at The National Academy of Sciences. Research was presented showing elevated blood phenylalanine levels affecting the fetuses of mothers who carried the PKU gene, which resulted in a lower IQ and a higher incidence of developmental abnormalities in the fetus.


Several independent studies on aspartame were performed. As reported in Science magazine, studies linked methanol (10 percent aspartame) to fetal alcohol syndrome and to diminished cognitive capacity in newborn rats. The
*New England Journal of Medicine* published a study showing a high incidence of birth defects as a result of elevated phenylalanine levels in PKU women exposed to phenylalanine (50 percent aspartame).

Dr. Daniel Azarnoff, head of G.D. Searle’s Research and Development Division, stated that rats eating the required amount of DKP (Diketopiperazine) in research studies had a statistically significant number of tumors in their wombs.

The FDA requested a review of the objections to aspartame approval. Routinely, public hearings were held by Administrative Law Judges, but in this case, the FDA suggested a Public Board of Inquiry be assembled with three scientists as opposed to judges.

1980. The Public Board of Inquiry was impaneled. The Board members were: Peter J. Lampert, M.D., Professor and Chairman of the Department of Pathology, University of California, San Diego; Vernon R. Young, PhD. Professor of Nutritional Biochemistry, M.I.T., and Walle Nauta, M.D., PhD., Institute Professor, Department of Psychology and Brain Science, M.I.T. Dr. Nauta chaired the Board.

The Board’s investigation focused on the findings of the Rockville, Maryland firm, UARP (investigators from the 1977 Task Force). After a full review, the Board voted unanimously to ban aspartame for human consumption.
Dr. Nauta expressed the Board’s concerns on aspartame safety based on the fact that Searle never submitted their testing procedures and protocols to the FDA, but submitted only their final research findings. The Board concluded that: “the available data on laboratory rats does not rule out the possibility of aspartame causing brain tumors, and indeed, the evidence suggests that aspartame might induce brain tumors.”

After these recommendations were submitted, another investigative team was assembled to study the Public Board of Inquiry’s findings. A five member Commissioner’s Team of Scientists was impaneled. By this time, so much data had been assembled, each team member was given a different review assignment.

Three team members investigated the brain tumor issue, and two members were assigned brain damage, mental retardation, and endocrine problems. The three members investigating the brain tumor studies expressed serious concerns with the data provided, showing aspartame caused tumors. The other two scientists were satisfied with the tests that showed aspartame did not cause brain tumors.

A sixth member was then appointed to the team, who voted that aspartame did not cause brain tumors. The vote was now deadlocked; three votes for aspartame approval, and three votes against.

Jacqueline Verrett, PhD., Toxicologist and senior member of the review team, criticized how the safety review was performed. She stated, “It was pretty obvious that somewhere along the line, the bureau officials were
working up to a whitewash. The Bureau of Foods under Howard Roberts 
either discarded or completely ignored problems and deficiencies outlined 
by the Team report.”

She concluded, “It is unthinkable that any reputable toxicologist giving a 
completely objective evaluation of the data resulting from such a study could 
conclude anything other than the study was uninterpretable and worthless, 
and should be repeated as the safety questions still remain unanswered.”

The scientific journal, *Neurobehavioral Toxicology*, “Brain Damage in Mice 
from Voluntary Ingestion of Glutamate and Aspartate” published the 
research results of harmful effects of aspartate; salt from aspartic acid and 40 
percent of aspartame. Their research showed that aspartate could not 
detected after years of exposure except in the form of obesity or neuro-
endocrine disturbances, which is known to occur in rodents following 
treatment in infancy.

The FDA Public Board of Inquiry denied aspartame approval pending 
进一步 brain tumor testing. The Board also formally revoked aspartame’s 
1974 approval granted by Commissioner Schmidt.

In September, Searle announced that they were repetitioning for aspartame 
approval for NutraSweet.

In November, Ronald Reagan was elected President of The United States.

In April, President Ronald Reagan appointed Arthur Hull Hayes, Jr., M.D. the new FDA Commissioner.

In July, Dr. Hayes overruled the Public Board of Inquiry’s recommendation that aspartame “not be approved until further animal testing be conducted to resolve the brain tumor issue.”

Hayes granted FDA approval for aspartame in dry foods (marketed as NutraSweet), and as a tabletop, sugar substitute (marketed as Equal).

The FDA approval of aspartame was for a food additive, as opposed to a drug, which exempted Searle from future safety monitoring. Searle was no longer obligated to defend the corporate studies, nor required to submit additional reports to the FDA.

Four FDA officials accepted jobs with NutraSweet companies: S.M. Pape, Associate Chief Counsel for Foods, Health and Human Services and Special Assistant to FDA Commissioner; Sherwin Gardner, FDA Deputy Commissioner; Mike Taylor, attorney with the Board of Inquiry; and Albert Kolbye, Associate Director for the Bureau of Foods for Toxicology.

1982. G.D. Searle presented campaign contributions to the following Senators and Representatives: Senator Robert Byrd, Democrat, W. Virginia; Senator Orrin Hatch, Republican, Utah; Senator Howell Heflin, Democrat, Alabama; and Representative Henry Waxman, Democrat, California.
Senator Howell Heflin, Chairman of the Senate Ethics Committee, proposed an amendment to change the laws to extend the US Patent for aspartame. Senator Robert Byrd initiated the amendment on Senator’s Heflin’s behalf. Senator Orrin Hatch, Chairman of the Labor and Human Resources Committee, spoke on the Senate floor supporting the proposed extension.

The patent extension for NutraSweet was approved as an amendment to the Orphan Drug Act. Representative Henry Waxman sponsored the Orphan Drug Act.

NutraSweet’s patent was extended until 1992.

1983. NutraSweet was approved in carbonated beverages and carbonated beverage syrup bases. FDA Commissioner Hull Hayes resigned his position to accept a position as senior medical advisor to Searle’s public relations firm, Burston Marsteller.

Anthony Brunetti, FDA Consumer Product Officer, drafted notice to approve NutraSweet in soft drinks. Brunetti accepted a position with the Soft Drink Association as their Science Advisor later that year.

Acting FDA commissioner, Mark Novitch, approved aspartame for use in carbonated beverages.

The FDA raised the acceptable maximum daily intake of aspartame from 20mg/kg/day (milligrams per kilograms of body weight per day) to 50mg/kg/day, the equivalent of increasing from two cans per day to 17 cans
per day for a 150-pound person. The acceptable maximum daily intake of 50mg/kg/day for a 25 to 30 pound child was raised to accumulative levels of three cans of soda per day, or a pack of chewing gum, a multi-vitamin, cereal, pudding, or sugar-free ice cream combined per day.

A two-liter bottle of Diet Coke® contained 1,200 mg of aspartame.

1984. Aspartame was approved in children’s chewable multivitamins.

Seven million pounds of NutraSweet was consumed in the United States.

NutraSweet sales exceeded $600 million.

Woodrow Monte, PhD., Director of the Science and Nutrition Laboratory, Arizona State University, announced that there were presently no animal nor mammalian studies that had evaluated the possible mutagenic or carcinogenic effects of chronic intake of methanol, now 10 percent of aspartame.

Based on the methanol issue, Dr. Monte requested an Arizona State hearing on a petition to ban NutraSweet in Arizona. He was granted the hearing in April the following year. Pushing his efforts to get Arizona to recognize the dangers of consuming aspartame, he did not succeed. The Arizona legislature changed the laws without public notice, barring any state regulation of FDA-approved food additives. The measure passed under a “toxic waste bill.”
Searle hired over a dozen lobbyists. United Press International traced nearly $200,000.00 in campaign contributions, including contributions to House Majority Leader, Burton Barr and Representatives Don Aldridge, Karen Mill, and Jan Brewer.

Searle hired the following lobbyists to oppose Dr. Monte’s efforts to ban aspartame in Arizona: Andrew Herwitz (Arizona Governor Babbitt’s former Chief of Staff), Charles Pine (Arizona lobbyist), Roger Thies (Searle lawyer), and David West (Searle official).

Richard Wurtman, M.D., Department of Brain and Cognitive Science, M.I.T. began research on NutraSweet.

Drs. Monte and Wurtman had received over 1,000 complaints against aspartame. The most common complaints were: dizziness, visual impairment, disorientation, ear buzzing, pancreatitis, tunnel vision, loss of equilibrium, severe retinal hemorrhaging, menstrual flow changes, and depression.

The Center for Disease Control (CDC) submitted a report, “Evaluation Of Consumer Complaints Related To Aspartame Use.”

1985. Sixteen million pounds of aspartame was added to the US food supply.

NutraSweet sales exceeded $1 billion.
The FDA petitioned the CDC (Centers for Disease Control) to review the first 650 complaints they received about aspartame; a record number of complaints filed for one product after only three years on the market. The CDC reported that between 25 percent and 30 percent of female users experienced some form of symptom from aspartame use, and when all use stopped, all health symptoms stopped.

Ohio Senator Howard Metzenbaum called for a hearing on NutraSweet. Metzenbaum introduced the Aspartame Safety Act of 1985 in the Senate, August 1. The bill called for:

1. Clinical studies on brain chemistry, behavioral and neurological effects on children, pregnant women, and fetuses;
2. A study into the sudden increases in seizures;
3. Drug interactions with aspartame;
4. A moratorium on the introduction of aspartame into new products until independent testing was completed;
5. Labeling of products to include the amount of aspartame in each serving, as well as allowable daily intake;
6. A warning that aspartame is not intended for infant use;
7. Mandates for the FDA to set up a Clinical Adverse Reaction Committee to compile reports, establish a telephone service information hotline, and send written notices to physicians about aspartame concerns.

Senator Metzenbaum’s press secretary, Drew Von Bergen, drafted the statement: “Members of the scientific community have grave reservations
about the safety of aspartame. The Senator is not out to ban aspartame, but to set up independent tests to clear up the problem.”

Dr. Louis Elsas, M.D., Director of Medical Genetics at Emory University School of Medicine, performed a study on the effects of phenylalanine on the fetus and on infants. He examined two groups ranging from eight to 24 years of age, monitoring the reaction time and the reduction in the production of adrenaline-like chemicals in the brain. He concluded that both pregnant women and infants should not consume foods containing aspartame because of the danger of brain damage to the fetus and to infants.

Keith Conners, M.D., Children’s Hospital, Washington, D.C., documented a study of children who suffered extreme agitation when consuming aspartame in an amount equivalent to a 6-oz. serving of Kool-Aid® sweetened with NutraSweet.

Roger A Coulombe, Jr., PhD., Center for Environmental Toxicology, Utah State University, demonstrated that it was possible for aspartame to produce nervous system and behavioral affects, particularly in children and susceptible individuals.

Ronald Gautieri, PhD. and Michael Mahalik, PhD., Department of Pharmacology, Temple University, demonstrated in a study that aspartame produced brain dysfunction in newborn mice.

William Pardridge, M.D., University of California at Los Angeles, testified along with Dr. Wurtman before a Senate Committee on Labor and Human
Resources, urging that labeling requirements for aspartame be amended to include quantity consumed. They brought into the discussion two important points:

- Children may be at risk of suffering brain damage from excessive intake of aspartame;
- Aspartame consumed at the same time as simple carbohydrates, as in carbonated soft drinks, could double the effect on the brain as ingesting aspartame alone.

1986. Dr. Pardridge released a study in the *American Medical Association of Scientific Affairs Review*, stating the two amino acids found in aspartame, aspartic acid and phenylalanine, were neurotoxic. He recorded a drop in IQ in babies born to mothers with elevated phenylalanine levels, and noted a decrease in choice reaction time in adults with slightly elevated phenylalanine levels.

Current sales figures were no longer unavailable.

The 1986 Quarterly Report submitted by the Department of Health and Human Services showed 3,000 complaints against aspartame were reported to the FDA and the Center for Disease Control (CDC). Most of the complaints related to brain function and to behavior disorders.

*Food Chemical News*, 1986, reported the Community Nutrition Institute had petitioned the FDA to ban aspartame, citing cases of seizures and visual problems. Request denied.
The Department of Psychology, Leeds University, Leeds, England, reported in the British medical journal, *Lancet*, May 10, 1986, that consumption of aspartame caused an increase in appetite and weight gain. Leeds researchers Blundell and Hill stated in their findings that aspartame increased the rated motivation to eat and decreased the ratings of fullness in the test volunteers. They concluded that people using aspartame receive ambiguous signals important for the control of appetite and ingestion, and that aspartame may contribute to disordered patterns of eating prevalent among certain groups of normal weight individuals.


The US General Accounting Office reported they were monitoring the food additive process for aspartame.

A third United States Senate Hearing was summoned on “NutraSweet; Health and Safety Concerns.” Senator Howard Metzenbaum chaired the Committee on Labor and Human Resources overseeing the hearings.

Many research scientists and medical researchers responded to the Senate Hearings, addressing letters to Senators Edward Kennedy, Howard Metzenbaum, and Orrin Hatch, particularly concerning the safety issues concerning pregnant women and fetuses.
Dr. Louis Elsas, M.D., Emory University Medical School, determined that pregnant women’s blood phenylalanine levels increased from aspartame use, resulting in the placenta magnifying phenylalanine levels four to six times the normal levels. This resulted in mental retardation and birth defects in his studies.

Alfred Miller, M.D., San Antonio, Texas, noted in clinical observations that aspartame was linked to mood swings and severe headaches in many of his patients.

**1988.** Researchers began tallying increases in headaches, seizures, tumors, depression, and brain lesions - all confirming the predictions if aspartame’s neurotoxicity from twenty years before.

Aspartame critics came upon strong corporate resistance.

**1989.** NutraSweet’s patent was due to expire in four years.

NutraSweet was now in over 2,000 products worldwide.

Media advertising intensified; information against NutraSweet became more suppressed.

United Press International announced the “Aspartame Technical Committee”, consisting of the NutraSweet Company, Ajinomoto Company (Searle’s Japanese aspartame supplier), the Coca-Cola Company, Pepsico, Inc., Royal Crown Cola Company, and General Foods, along with various
smaller food manufacturers utilizing aspartame. The Committee launched a campaign to discourage researchers and critics from receiving Research Funding Awards grants, in particular those awarded by the International Life Sciences Institute, an organization predominant in awarding grants to research scientists.

Samuel Molinary, Co-chairman of the International Life Sciences Institute grant panel, accepted employment as G.D. Searle’s Director of Scientific Affairs.

Shortly afterward, Molinary accepted a position as Pepsico’s Research Director.

1991. The first National Symposium on the Safety of NutraSweet/Equal was held at The University of North Texas at Denton, November 8-9.

Canada became the first country to approve the use of Splenda.

1992. NutraSweet’s patent for aspartame expired. Now available in both sugar-free and regular food products, aspartame was no longer exclusively identified with the NutraSweet swirl. Saccharin sales increased, reappearing in more food products.

Over 10,000 complaints against aspartame were filed with the FDA.

Shephard and her colleagues attempted to simulate *in vitro* the conditions that occur in the human digestive tract, and in particular the conditions that result in the nitrosation of dietary ingredients. They reported that the nitrosated aspartame had significant mutagenic action. This research identified a mechanism through which aspartame can exert a carcinogenic action.


Olney analyzed cancer statistics from the US National Cancer Institute covering a sample of approximately 10 percent of the US population for the period from 1975 to 1995.

He found that the introduction of aspartame into dry goods in 1981 and into soft drinks in 1983 was followed by an abrupt increase in the reported incidence of brain tumors. The change was most noticeable between 1984 and 1985, and it corresponded to approximately 1,500 extra cases of brain cancer per year in the US.

1998. The diet sweetener industry was worth $1.5 billion, with 70 to 80 percent of the market from diet soft drinks.
The US FDA granted marketing approval for Splenda.

Johnson & Johnson purchased the rights to develop sucralose in the United States as a commercially available product. They formed McNeil Specialty Products (renamed McNeil Nutritionals) as a part of the Johnson & Johnson corporate umbrella for the exclusive purpose of marketing Splenda.

The Trocho study was published on aspartame toxicity performed through the Bosch & Gimpera Foundation, Barcelona, Spain. The study concluded that aspartame consumption may constitute a health hazard because of its contribution to the formation of formaldehyde adducts. The binding of methanol-derived carbon to tissue proteins was widespread in the study, affecting all body systems, and fully reaching the most sensitive targets such as the brain and the retina.

Johnson & Johnson bought the rights to sell sucralose in the United States as Splenda.


Monsanto Chemical Company sold their sweetener division for $440 million.

2004. Coca Cola introduced C2 Coke despite suffering sharp loses in the third quarter earnings.

For the four weeks ending January 26, Splenda’s dollar-market share of the tabletop-sweetener had exceeded that of Equal-brand products for the first time in sweetener history.

In February, the Sugar Association sued McNeil Nutritionals, charging McNeil with false advertising and unfair competition.

Two weeks later, McNeil filed suit against The Sugar Association, each of The Sugar Association's members and Qorvis Communications (a public relations firm representing the Sugar Association) for false advertising and deceptive trade practices.

In December, Equal’s manufacturer, Merisant, filed a lawsuit against the manufacturers of Splenda for false advertising, claiming its top-selling competitor, sucralose in Splenda, isn't really made from sugar as its packaging claimed.


Dr. Stylianos Tsakiris, Department of Experimental Physiology, Medical School, University of Athens and his research team at the Institute of Child
Health, Research Center, Aghia Sophia Children's Hospital, Athens, Greece published a study that showed high levels and cumulative toxic concentrations of aspartame decreased the membrane AChE activity, resulting in memory loss.

**2006.** Splenda became the runaway leader in the sugar-substitute category with $212.3 million in US sales, while Equal brought in $48.7 million\(^\text{ii}\).

Dr. Soffritti published a second study on the carcinogenic effects of aspartame.

**2007.** The Faculty of Medicine, Institute of Public Health University of Pecs, Pecs, Hungary, published an aspartame study showing that aspartame ingested up to the maximum daily dose changed the genes in various organs in animals.

**2009.** Sugar-free gum accounted for 82 per cent of the US chewing gum market by value, equivalent to sales worth almost $3.38 billion.

**2010.** NutraSweet introduced Equal® in a pink packet, in addition to the original blue packet.

**2010.** The EU is expected to approve the use of Stevia in food manufacturing throughout Europe.

The rest is history in the making.
\footnote{The Washington Post, May 16, 1989.}

\footnote{Information Resources Inc.}