



Why Did Steve Jobs Die?

Steve Jobs gave tacit permission and encouragement for me to write this newsletter article about the medical and nutritional aspects of his life when he commissioned his biographer to tell a true account. "I wanted my kids to know about me..." "Also, when I got sick, I realized other people would write about me if I died, and they wouldn't know anything. They'd get it all wrong. So I wanted to make sure someone heard what I had to say." (556) Jobs would have been pleased to hear my challenging second opinions about his pancreatic cancer and his diet, because my thoughts are in agreement with what he intuitively and factually knew to be correct. Hopefully, my account will bring some peace of mind to his family and friends after his untimely death.

This article is not meant as a critique of his doctors and their medical care. I am certain these professionals performed their best for him. In hindsight, everything is clearer. The purpose of this article is to set the record straight.

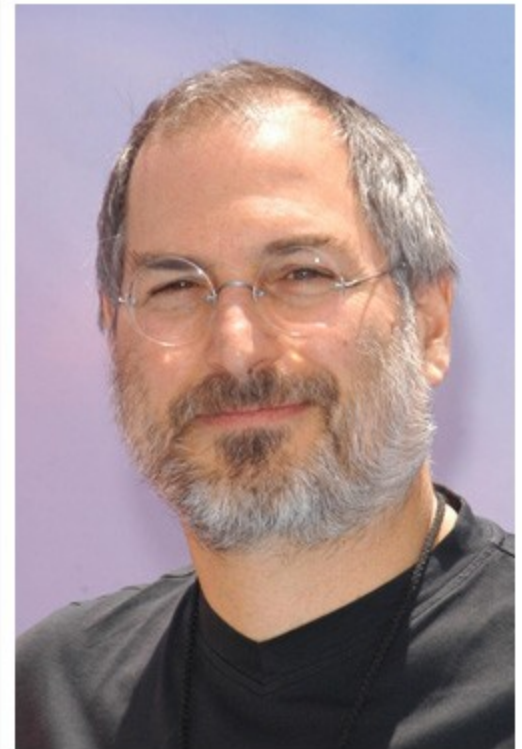
Jobs' Cancer Began and Metastasized When He Was a Young Man

"In October 2003 he happened to run into his urologist who had treated him, and she asked him to get a CAT scan of his kidneys and ureter. (453) It had been 5 years since his last scan. The new scan revealed nothing wrong with his kidneys, but it did show a shadow on his pancreas." By the time a tumor is large enough to be seen on a CAT scan it has grown to a size of at least 2 millimeters (mm) (half the size of a BB, twice the size of a period on this page). My guess is that the [shadow seen on his pancreas](#) was at least one centimeter (cm) in diameter (the size of an eraser on a pencil). This size mass contains 1 billion cells and has been [growing on average for 10 years](#). Death usually occurs when the size of individual tumors reaches ten centimeters in diameter (4 inches). Pancreatic neuro-endocrine (islet cell) tumors, the kind that Jobs had, fit this [pattern of growth](#).

The natural history of the growth of Steve Jobs' pancreatic cancer can be determined by mathematical calculations. The interval between his diagnosis at age 48 and his death at age 56 was approximately 8 years (October of 2003 and October 5, 2011). From these dates it can be determined that the tumor mass in his pancreas doubled in size every 10 months. (Commonly, solid tumors of various organs double in size every 3 to 9 months.) His was a very slow growing tumor.

By knowing this stable rate of doubling (every 10 months), the date when Jobs' cancer began can be calculated. His cancer started when he was a young adult, possibly as young as 24 years old. Similar calculations show that his cancer spread from his pancreas to his liver (and other parts of his body) more than two decades before his surgery on July 31, 2004. (Exact methods for doing these calculations are found at the end of this article.)

One of Jobs' greatest regrets when he found out he had incurable cancer was that he had refused to have surgery for 9 months after being diagnosed. He believed he might have been cured if he had acted earlier. Since he was in his mid-twenties when the



The following account is based largely on information I gathered by reading *Steve Jobs*, the authorized biography by author Walter Isaacson, published by Simon & Schuster (2011). Numbers found in parenthesis represent pages from this book. **Steve Jobs** was most noted as the cofounder of Apple computers and the CEO of Pixar.

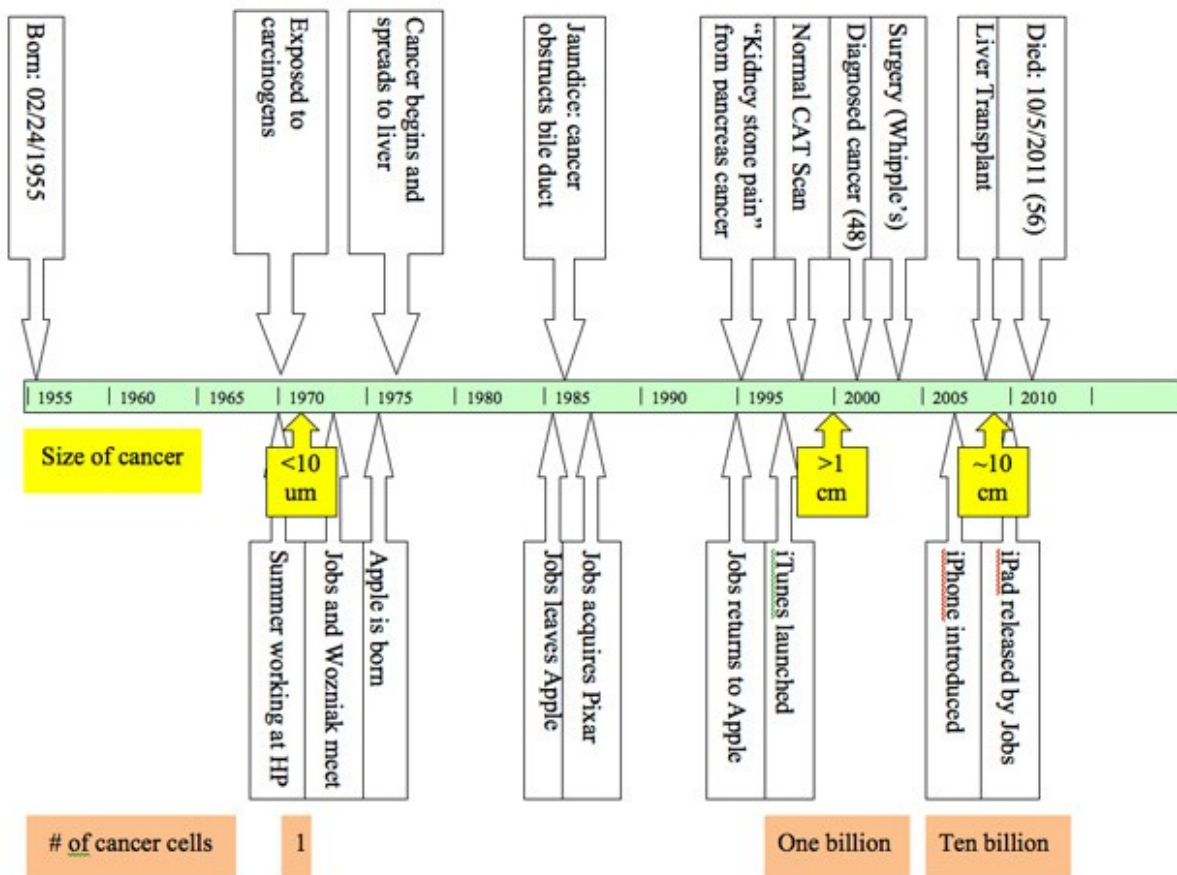
cancer spread throughout his body, removing his CAT-scan-detected cancer in October of 2003 would never have cured him.

How Cancer Grows

People unfamiliar with the manner in which cancer grows are easily fooled into thinking it spreads like wildfire, almost overnight, because one moment the person appears to be in good health, and then the next moment the patient has a body full of disease. When the cancer is first diagnosed people believe that this is “early disease,” that can be “caught in time and cured” if removed. This fairytale view is, unfortunately, untrue.

Cancer grows at a steady rate (referred to as *the doubling time*). Early growth is invisible because the cancer is microscopic in size. This increase in size of the cancer is hidden from view as one cancer cell divides into two cells, two into four, and so on. The doublings remain undetectable until the cancer reaches a size of 1 mm (period-size), which now contains a million cells, after about 6 years of growth. After 10 years of growth, the tumor is 1 cm in diameter (eraser-size) and contains one billion cells. At this point in its natural history the doublings become very apparent: one billion cancer cells divide into a mass containing two billion cells, and with the next doubling there are 4 billion cancer cells inside the patient’s body. Thus, cancer is undetectable by the patient and his physician for the first two-thirds of its natural history, and this leads to confusion.

Steve Jobs' Life



Cancer Caused Steve Jobs Troubles in His Thirties and Forties

A report about Jobs' mannerisms during meetings in 1987 said, "His hands, which are slightly and inexplicably yellow, are in constant motion." (223). Yellow discoloration of the skin is a classic sign of [jaundice](#). Cancer in the head of the pancreas commonly [causes blockage of the flow of bile](#), resulting in jaundice. Possibly, the tumor was at this time (1987), causing partial and intermittent obstruction.

His cancer also caused him abdominal and back pains at least 5 years before his diagnosis in October of 2003. "I was driving up to Pixar and down to Apple in my black Porsche convertible, and I started to get kidney stones. I would rush to the hospital and the hospital would give me a shot of Demerol in the butt and eventually I would pass it." (334) The CAT scan obtained in October of 2003 (which showed the shadow on his pancreas) revealed nothing wrong with his kidneys. (453)

Kidney stones are [caused by a diet](#) high in animal protein. As a strict vegan, it is unlikely that Jobs had kidney stones. I do not have his medical reports, however, I believe some or all of these episodes of pain were misdiagnosed and mistreated as pain from kidney stones. Jobs was actually suffering from the cancer growing in his pancreas.

Proof that the cancer had been present for at least 10 years before the time of diagnosis came at the time of his surgery on July 31, 2004. "Unfortunately, the cancer had spread. During the operation the doctors had found three liver metastases." (456) For his surgeons to see these tumors on the surface of his liver with the naked eye, each cancer would likely have been at least 1 cm in size. As I explained above, these metastasizes began more than two decades before, when Jobs was in his mid-twenties. Finding tumors on the liver means the cancer has also spread to other organs of the body many years before.

Jobs considered himself to be a very intuitive person, who relied on his own [gut feelings](#). At some level of consciousness he may have known that he had disease twenty or more years before his diagnosis. In 1983, "Jobs confided in John Sculley (Apple's CEO) that he believed he would die young." (155) Jobs was only 28 years old when he spoke this prophecy.

Lead (Pb) and Other Carcinogens from Computers Caused Jobs' Cancer

Jobs would speculate that his cancer was caused by the grueling year that he spent, starting in 1997, running both Apple and Pixar. (452, 333) He guessed, "That's probably when this cancer started growing, because my immune system was pretty weak at that time." (452) However, based on reliable calculations, his cancer likely started decades earlier, as a young adult, when he was building computers and other electronics by his own hands without adequate safety precautions.

The summer after his freshman year at Homestead High School in Los Altos, California, Jobs called Bill Hewlett of HP on the phone, "And he answered and chatted with me for about twenty minutes. He got me the parts, but he also got me a job in the plant where they made frequency counters." (17) Here he was exposed to [toxic chemicals](#), known to cause cancer of the pancreas. Another example; Jobs soldered circuit boards in the early days of Apple. (67) This compound (solder) is typically an alloy containing lead, tin, and other metals. Lead is classified as a probable human carcinogen, a class of substances that are directly responsible for damaging DNA, and promoting or aiding cancer. Lead is suspected of [causing cancer of the pancreas](#).

Steve Jobs may be the best-known example of the high risk of cancer for people working in the [electronics industries](#) from occupational exposure to carcinogens. [The metals](#) contained in personal computers include aluminum, antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, gallium, gold, iron, lead, manganese, mercury, palladium, platinum, selenium, silver, and zinc.

Steve Jobs getting cancer was an unfortunate accident—like being struck by lightning or hit by a car. The carcinogen(s) entered his body and due to genetics, "bad luck," or other unknown and uncontrollable factors his body was susceptible. The cause of his cancer was not due to his vegan diet. In fact, his healthy diet likely slowed the growth of his tumor, delayed the time of diagnosis, and prolonged his useful life.

Jobs Suffered with Unfounded Regret, Believing He Had Hastened His Own Death

Jobs lived the final 8 years of his life with regret, guilt, and remorse over delaying his surgery for 9 months after the initial diagnosis of cancer. With one honest sentence his doctors could have relieved him of this heavy burden. This simple fact could have been told: "Mr. Jobs, you had a body full of cancer long before October of 2003, when you were diagnosed by a needle biopsy." Apparently, not one of his doctors—not Jeffrey Norton, who had operated on his pancreas in 2004, nor James Eason, who had performed

his liver transplant in 2009—told Jobs this indisputable truth.

In October of 2003, after confirming he had a mass in his pancreas, one of his doctors “suggested that he should make sure his affairs were in order, a polite way of saying that he might have only months to live. That evening they performed a biopsy by sticking an endoscope down his throat and into his intestines so they could put a needle into his pancreas and get a few cells from his tumor...It turned out to be an islet cell or pancreatic neuro-endocrine tumor...”(453)

Jobs initially refused surgery to remove the cancer. “I really didn’t want them to open my body, so I tried to see if a few other things would work.”(454) Nine months later, “In July 2004 a CAT scan showed that the tumor had grown and possibly spread.”(455) Jobs underwent surgery on Saturday, July 31, 2004, at Stanford Medical Center. He had a modified Whipple procedure, which took part of his pancreas.(455) He reassured his Apple employees the next day when he wrote in an e-mail that the type of cancer he had, “represents about 1% of the total cases of pancreatic cancer diagnosed each year, and can be cured by surgical removal if diagnosed in time (mine was).”(455) In retrospect, all would agree this statement was untrue.

Unfortunately, he spent the remainder of his life believing he could have been cured if he had not delayed his surgery for nine months. “[According to Steve Jobs’ biographer](#), Walter Isaacson, the Apple mastermind eventually came to regret the decision he had made years earlier to reject potentially life-saving surgery in favor of alternative treatments like acupuncture, dietary supplements and juices. His early resistance to surgery was apparently incomprehensible to his wife and close friends, who continually urged him to do it.” “We talked about this a lot,” says his biographer. “He wanted to talk about it, how he regretted it. ... I think he felt he should have been operated on sooner.” This falsehood was repeated to the world shortly after Jobs death in a [60-minutes interview](#) with Mr. Isaacson.

By the beginning of 2008 it was clear to Jobs and his doctors that his cancer was spreading.(476) In April 2009 he underwent a liver transplant. “When his doctors took out his liver, they found spots on the peritoneum, the thin membrane that surrounds internal organs. In addition, there were tumors throughout the liver, which meant it was likely that the cancer had migrated elsewhere as well.”(484) “But, by July 2011, his cancer had spread to his bones and other parts of his body...”(555). Almost everyone had admitted defeat. He died October 5, 2011 from a body full of cancer that began when he was a young adult working in Silicon Valley.

The overall consensus was, and still is, that Jobs acted selfishly, stupidly, and irresponsibly when he refused surgery in October of 2003, at the time of his original diagnosis. Based on the natural history of his disease, Jobs acted in none of these ways. The cancer had spread many years before his diagnosis, and was unstoppable by any means.

Job’s Vegan Diet Prolonged His Life

Jobs became a vegetarian in his freshman year at Reed College in Portland, Oregon.(36) He would at times eat only fruit, and considered himself a fruitarian.(63, 68, 83) He was a lifelong strict vegan (no animal foods), except for occasional lapses.(91, 155, 260, 458, 527, 528) Jobs often became very upset when his meals were not prepared to his specifications. When a waiter at a restaurant served him a sauce with sour cream, Jobs got nasty.(185). He was observed to “spit out a mouthful of soup one day after he learned that it contained butter.”(260)

Throughout most of his life he was considered a “prickly, whip-thin vegetarian.”(243) He was described as looking “rather like a boxer, aggressive and elusively graceful, or like an elegant jungle cat ready to spring at its prey.”(297) However, most of his family, friends, and coworkers did not understand or sympathize with Jobs’ vegan diet.

His diet was in sharp contrast to that of his Apple co-founder, Steve Wozniak, who ate at Denny’s and whose favorite foods were typical American pizzas and burgers.(189) Wozniak, who is overweight, was four years older than Jobs and is still alive. Because of this apparent paradox many people discount the importance of a healthy vegan diet.

After he developed cancer Jobs remembered some of his earlier teachings about the benefits of low-protein vegetarian diets for cancer.(548) I believe Jobs was right, and a healthy low-fat vegan diet will slow the growth (doubling times) of a cancer and prolong a patient’s life. However, animal fats, animal proteins, vegetable oils, and vegetarian foods made with isolated soy proteins can promote cancer growth. Steve Jobs ate in restaurants often. His vegan diet was likely too high in vegetable oils and “fake” meats and cheeses (foods with high amounts of isolated soy proteins).

The Ultimate Insult: Jobs Was Forced to Eat Meat

“One of the side effects of the operation would become a problem for Jobs because of his obsessive diets and the weird routine of purging and fasting that he had practiced since he was a teenager. Because the pancreas provides the enzymes that allow the stomach to digest food and absorb nutrients, removing part of the organ makes it hard to get enough protein.”(455) He was advised to eat meat and fish.(455) Lack of protein in Jobs’ diet was not his problem, however his friends, family, biographer, nutritionist, and physicians would not stop attacking his weird obsession with extremely restrictive diets.(477) Jobs lost 40, and then eventually 50 pounds, which was from the partial loss of his pancreas from the initial surgery, the use of morphine to control his pain, his chemotherapies, his liver transplant surgery and drugs used to suppress organ rejection.(477) Until his death, his doctors begged him to consume high quality protein.(548) Obviously the insistence that he eat animal foods made no difference at all in his health; and part of the reason is that the advice was incorrect.

“Powell (Jobs’ wife) had been a vegan when they were first married, but after her husband’s operation she began to diversify their family diet with fish and other proteins.”(477) Jobs eventually did succumb to these intense demands and ate seafood and eggs. (527,528) For the false hope that eating animals would help, he was forced to turn his back on what he knew to be good for his body, his religious beliefs, and his concerns for the welfare of animals and the environment.

The overall consensus was, and still is, that Jobs acted selfishly, stupidly, and irresponsibly by being a vegan. But, he lived more than 30 years with cancer of the pancreas. (His medical treatments did little or nothing to prolong his life, and caused him great misery at huge expense.)

Summary Comments

Neither Steve Jobs’ vegan lifestyle nor turning down surgery were the acts of an insane man. Rather both decisions demonstrate his rationality, genius, intuitiveness, and internal strength to stand up for what he knew to be right. The truth may now give family and friends some peace of mind. Also those who tied Jobs’ cancer to his vegan diet can now go back to healthy eating. Understanding and publicizing the cause of his cancer should also focus more attention on the serious harms caused by chemicals used in the electronic industries.

Consider the misfortune that happened to Steve Jobs, one of the wealthiest and most powerful men to have ever lived. A little cost-free, harmless, and honest counsel would have greatly improved the physical, mental, and emotional wellbeing of Jobs—especially during the last 8 years of his life, when he gave so much to us. I own two MacBook Pro computers, an iPhone, an iPad2, use iTunes daily, and my grandchildren love Pixar movies. Thank you Steve Jobs—I offer this report as a small gratitude for all you have done.

Calculations on the Growth of Steve Jobs’ Cancer of the Pancreas

Use the doubling time calculator found at: <http://www.chestx-ray.com/spn/DoublingTime.html>. This calculator is a simple math tool—it makes no difference what kind of cancer cell (lung or pancreas) is being examined.

Calculations from the time of diagnosis in October of 2003:

Using the doubling time calculator (enter the day of his diagnosis, say October 15, 2003 and the day of his death, October 5, 2011) to determine that the tumor was growing for 2912 days (~8 years) during the time Jobs was known to have cancer.

Assume that the tumor mass—the shadow found on the CAT scan in October of 2003—was 10 mm (1 cm) in size (likely the tumor was much larger, but I do not have his medical records). When he died more than 8 years (2912 days) later the tumor would have grown to about 100 mm (10 cm), if it had not been removed.

Entering the size of the initial tumor in the pancreas (10 mm) and the size at death (100 mm), and the 2912 days it took for the cancer to grow during this interval, the calculator tells us that the doubling time of his tumor was 292 days (meaning the tumor doubled in size about every 10 months).

Calculating backwards to find the time when the cancer began: enter a figure of 10 micrometers (um) (use .01 mm) for the size of the first cancer cell in his pancreas, and enter 10 mm for size of the tumor found by CAT scan on October 15, 2003. (One micrometer (um) = 1/1,000,000 meter = 0.000001 meter = 1/1000 millimeter (mm) = .001 millimeter (mm); therefore 10 um = .01 mm.)

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With this doubling time of 292 days, the time to grow from 10 μm to 1 cm would be 8,740 days or about 24 years. (The number of 8,740 is determined by guessing various time intervals in the doubling time calculator, so that the correct doubling time is reached.) Jobs was 48 years old when diagnosed. Subtracting 24 years means he could have been as young as 24 years old when the cancer started. By no coincidence this is just after he started working at Hewlett Packard and continued over the next several years to work intimately with many carcinogenic substances found in the electronics industries.

Calculations about the metastatic disease found on Jobs' liver during his surgery on July 31, 2004:

Using the doubling time calculator (entering the day of his surgery, July 31, 2004, and the day of his death, October 5, 2011) means Jobs' tumors in his liver (and the rest of his body) were known by his doctors to be growing for 2622 days (~7 years) during this time interval.

Assume that the 3 metastatic tumors found on the surface of his liver at the time of his initial surgery on July 31, 2004 were each 1 cm (10 mm) in size. When he died more than 7 years later (2622 days), then these tumors would have grown to about 100 mm (10 cm) in size each (if his liver had not been removed during his 2009 liver transplant).

Entering the size of the liver tumors at the time of surgery (10 mm) and the size at the time of death (100 mm), and the 2622 days it took for the cancer to grow during this interval, the calculator tells us that the doubling time of his liver tumors was 263 days (meaning every 8½ months the tumor in his liver doubled in size). The doubling times of the original pancreatic tumor and the metastatic liver tumors should be the same; and they are similar: 10 vs. 8½ months.

Calculating backwards to find the time when the tumor metastasized to his liver (and his bones and the rest of his body): enter the figure of 10 micrometers (.01 mm) used for the first cell that spread to the liver, and 10 mm for the tumor found on July 31, 2004 on the liver. You then look for a time interval that would fit for a doubling time of 263 days. The time to grow from 10 μm to 10 mm would be 7,870 days or about 22 years. At the time of his surgery, on July 31, 2004, when he was found to have metastatic cancer, he was 49 years old. Subtracting 22 years from this age means he was 27 years old when his pancreatic cancer metastasized.

The best-case scenario would be that the tumors seen on Jobs' liver during his July 31, 2004 surgery were only 1 mm in size (period-size, seen with a magnifying glass or microscope.) The doubling time would then have been every 132 days. (Enter into the calculator 1 mm and 100 mm and 2622 days to get a 132-day doubling time.)

Calculating backwards from 1 mm to .01 mm at a doubling time of 132 days would mean the tumor started growing in Jobs' liver more than 7 years (2640 days) before his surgery on July 31, 2004. Under this best-case scenario, he would have been 42 years old when the tumor had spread from his pancreas to his liver and the rest of his body.

There is no possible way that the cancer could have been caught in time (before it spread), even if he would have submitted to surgery at the time of his initial diagnosis in October of 2003, or even 6 years before this date. However, because no one told him these easy-to-determine facts, well known in the medical-scientific community, he lived for 8 years until his death with unfounded and unnecessary guilt. Until now, his family and friends have lived under that same dark cloud.

Calculations and text updated on 12/2/2011 (math error corrected)