

## Gold In Nicotine

By Wanda Hamilton

*Publication date: July 13, 2001*

***“It helps digestion, the gout, the toothache, prevents infection by scents; it heats the cold, and cools them that sweat, feedeth the hungry, spent spirits restoreth, purgeth the stomach, killeth nits and lice; the juice of the green leaf healeth green wounds, although poisoned; the syrup for many diseases; the smoke for the phthisic, cough of the lungs, distillations of rheum, and all diseases of a cold and moist cause; good for all bodies cold and moist taken upon an empty stomach; taken upon a full stomach it precipitates digestion.”***

John Josselyn on the medicinal uses of tobacco, 1675 (quoted in C.A. Weslager, *Magic Medicines of the Indians*, Signet, NY: 1974)

***“Nicotine is an amazing chemical.”***

Jack Henningfield, 1998 (quoted in “Smoking Aside, Nicotine Remains an Amazing Chemical,” Scott Shane, *The Seattle Times*, 1/11/98, p. A10). Henningfield, a pharmacologist at Johns Hopkins and former National Institute of Drug Abuse scientist, is also a consultant to SmithKline Beecham.

Tobacco was used medicinally by the indigenous populations in the Americas long before the arrival of European settlers. After the Europeans began to colonize the New World, they too used it to treat numerous physical diseases and complaints, a practice which continued in American folk remedies until well into the 20<sup>th</sup> century.

However, as the anti-tobacco movement gained strength and momentum in the 1980s, both tobacco and the nicotine it contained were excoriated by public health officials. And in 1988 the U.S. Surgeon General’s report for the first time asserted that nicotine was an addictive drug, chaining smokers to their cigarettes. This claim has become a favored weapon not only of the anti-tobacco establishment but also of trial attorneys attempting to win huge sums of money in lawsuits against the tobacco industry.

Pharmacologists and other scientists, who had been investigating the physiological effects of nicotine since at least the 1950s, began to find that nicotine could have significant therapeutic applications, both as a stop-smoking aid and as a medicine for treating various diseases. Their interest in nicotine increased as new discoveries about the substance emerged.

A time-specific online search of the National Library of Medicine’s PubMed database demonstrates quite well the pattern of increasing scientific interest in nicotine. Between 1963 (the earliest publication year PubMed indexes) and 1970, 1092 articles on nicotine are listed; between 1971 and 1980, 2346 articles are listed; between 1981 and 1990, 3771 articles are listed; and between 1991 and 2000, 6919 articles are listed. In other words, in thirty-seven years, published research involving nicotine multiplied by more than a factor of six.

The pharmaceutical industry had seen for some time the potential profits in developing nicotine-based smoking-cessation drugs. In 1962, Pharmacia’s scientists began working on such nicotine delivery devices, and by 1971 they had perfected nicotine-laden gum, which was later marketed by SmithKline Beecham as Nicorette. As the anti-tobacco movement grew, other pharmaceutical companies became interested in the potentially huge market for smoking-cessation products. When researcher Jed Rose developed the transdermal nicotine patch in the early 1980s, the pharmaceutical industry was quick to begin steps to bring it to market.

It wasn’t just the smoking-cessation applications of alternate nicotine delivery systems that interested the drug companies, of course, but a multitude of other pharmacological applications as well.

As Jed Rose, developer of the transdermal nicotine patch said, “There is a tremendous growth of interest in the nicotine field. There’s been a virtual explosion of new findings on every level,” (“A Cigarette Chemical Packed with Helpful Effects?” John Schwartz, *The Washington Post*, 11/9/98, p. A10).

### Nicotine: The Wonder Drug

*“The importance of nicotine’s safety, especially its long-term safety, is related not only to its role in the cessation of smoking but also to its potential role in the treatment of many clinical conditions.”*

Alexander Glassman, M.D., Book Review of *Nicotine Safety and Toxicity*, Ed. by Neal L. Benowitz, NY, Oxford Univ. Press, 1998, in *The New England Journal of Medicine*, 2/18/99.

Some of the already established pharmacologic applications of nicotine include: pain relief, relief of anxiety and depression; improvement in concentration and performance in those with attention deficit hyperactivity disorders; relief of some of the symptoms of acute schizophrenia; relief of some of the symptoms of Tourette’s syndrome; relief of some of the symptoms of Parkinson’s disease; and relief of some of the symptoms of Alzheimer’s disease.

New, cutting-edge research indicates even greater medical applications for nicotine:

- **“This study demonstrates that nicotine stimulates recovery from brain damage and the results are discussed in relation to neural mechanism and potential applications.”** (Brown RW, Gonzalez CL, Wishaw IQ, Kolb B, “Nicotine improvement of Morris water task performance after fimbria-fornix lesion is blocked by mecamylamine,” *Behav Brain Research*, Mar 15, 2001.)
- **“The research, involving animal studies, showed that the nicotine agent created more new blood vessels in blocked arteries than any other known growth factor. The new agent could be used to treat failing hearts and limbs with poor circulation. It holds the potential for non-surgical heart by-pass procedures.”** (Company Press Release, “Research Indicating That Nicotine Holds Potential for Non-Surgical Heart By-Pass Procedures Honored by the American College of Cardiology,” 3/17/00)

- **“Nicotine might be a surprising alternative someday for treating stubborn forms of tuberculosis....”**The compound stopped the growth of tuberculosis in laboratory tests, even when used in small quantities,’ said Saleh Naser, an associate professor of microbiology and molecular biology at UCF.... Naser said nicotine worked better than about 10 other substances also tested.” (“Shocker: ‘Villain’ nicotine slays TB,” Robyn Suriano, Orlando Sentinel, 5/22/01).
- **“In addition, nicotine can exert a neuroprotective effect by attenuation of AA-induced upregulation of nNOS metabolism. These data may have therapeutic implication for he treatment of acute spinal cord trauma.”** (Toborek M, Garrido R, Malecki A, Kaiser S, et al, “Nicotine Attenuates Arachidonic Acid-Induced Overexpression of Nitric Oxide Synthase in Cultured Spinal Cord Neurons,” *Experimental Neurology*, 161(2), Feb 2000).
- **“According to a new study, nicotine may reduce cramping and other symptoms of colitis, a painful intestinal disease that affects hundreds of thousands of people in the U.S. and millions around the world. The study, published in the Annals of Internal Medicine (Mar 1, 1997), could lead to better treatment for the estimated 320,000 people who suffer from ulcerative colitis in the US.”** (AP, Mar 1, 1997).
- **Possible use of nicotine in the prevention of classical Kaposi’s sarcoma with KS herpes virus infection.** (Goedert J, Vitale F, Lorenzo G, Romano N, National Cancer Institute, “Classical Kaposi’s Sarcoma With KS Herpes Virus Infection: Reduced Risk with Cigarette Smoking,” *Proceedings of the American Association for Cancer Research*, Vol 42, March 2001).
- **Treatment of clinical depression.** “That could mean a whole new arena for new antidepressant drugs. It’s quite possible you could make derivatives of nicotine that wouldn’t have the medical complications of nicotine but could prove very useful in the treatment of clinical depression.” Dr. Alexander Glassman, chief of clinical psychopharmacology at Columbia University’s New York State Psychiatric Institute (quoted in “Kicking Habit Kicks Up Depression,” Neil Sherman, HealthScout, 6/19/01).

Given studies such as these, in addition to the wealth of studies on the established therapeutic applications of nicotine, it’s not difficult to understand the drug industry’s interest in the substance. Though the pharmaceutical companies cannot patent nicotine per se, they *can* patent nicotine delivery devices and new therapeutic compounds containing nicotine as a primary ingredient. In fact, they have already accomplished a portion of this task by patenting nicotine delivery devices as smoking cessation aids and receiving FDA approval for their efficacy and safety. The pharmaceutical industry would of course be delighted if the tobacco companies and their “nicotine delivery devices” (i.e. cigarettes) were eradicated entirely. Then Big Drugs would be the sole provider of nicotine to the world.

### Tobacco Companies and Therapeutic Nicotine

Despite Big Drugs’ efforts to wrest control of nicotine from the proprietary hands of the tobacco industry, some of the tobacco companies are fighting back by starting pharmaceutical companies of their own.

In 1997 R J Reynolds formed Targacept, Inc., a pharmaceutical division focusing on developing “compounds” to treat such disorders as Alzheimer’s, Parkinson’s, depression, pain, ulcerative colitis, Tourette’s Syndrome, attention deficit disorder and schizophrenia--all of which had been shown to respond to treatment with nicotine. On August 24, 2000, RJR announced that it had spun off Targacept after completing a \$30.4 million equity financing with lead investor EuclidSR Partners and other venture investors. RJR will own 43 percent of the new company, which has “more than 60 issued patents and pending applications, as well as hundreds of compounds that may have the potential to treat disease,” (PR Newswire, company press release, 8/25/2000).

On February 8, 1999, Rhone-Poulenc Rorer, a global pharmaceutical company, announced an alliance with Targacept for a “collaborative research, development and commercialization agreement...to develop new drugs to treat Alzheimer’s and Parkinson’s diseases” (Company Press Release, 2/9/99).

Japan Tobacco, now the world’s third largest tobacco company, also has a pharmaceutical arm. On Oct. 26, 1997 Johnson & Johnson, marketers of Nicotrol, announced it had signed a licensing agreement with Japan Tobacco for the rights to a novel class of compounds for the treatment of pain and inflammation. J&J would have exclusive rights to develop and market the “compounds” worldwide except in Japan and South Korea. J&J ended the licensing agreement in July 2000, but Japan Tobacco said it would continue trials of the drug in Japan and consider other options for its development and marketing overseas.

In May 2001 Brown & Williamson, a division of British American Tobacco, announced the release of Ariva, a mint hard candy containing as much nicotine as a cigarette. B&W did not claim therapeutic uses for the candy, but said it was for smokers to use in venues where they cannot smoke.

Also in May 2001, chewing tobacco and snuff giant Swedish Match announced the development of a nicotine gum which would be launched in Europe later in the year. As with the mint candy, no therapeutic applications are claimed. Swedish Match is simply billing it as an alternative chew.

Nicotine is indeed a wondrous substance. It can be used as a pesticide and is toxic in sufficient quantities at sufficient strength, but it can also heal and soothe man’s body and soul. The Indians revered the tobacco plant, the greatest natural source of nicotine, as a gift from the gods. Now it appears that multinational corporations are battling over golden nicotine just as European countries battled over control of the New World’s gold more than four centuries ago.