# DEPARTMENT OF HEALTH AND HUMAN SERVICES

MAR 24 1994

The Honorable Thomas J. Bliley, Jr. Ranking Minority Member Subcommittee on Health and the Environment Committee on Energy and Commerce House of Representatives Washington, D.C. 20515-4607

Dear Mr. Bliley:

This is in response to your letter dated March 18, 1994, to Commissioner Kessler, requesting all evidence in the Food and Drug Administration's (FDA) possession regarding the intent of cigarette manufacturers with respect to the presence of nicotine in cigarettes. FDA received your letter late in the afternoon on March 18. It was not received in this Office until Monday morning, March 21. We called your office on Monday morning to discuss your request and advise you that it was impossible for the agency to meet your deadline of March 21. Our call was not returned by your staff until after this office closed Tuesday evening.

Given the scope of your request, the resources that must be devoted to identifying, reviewing, and preparing documents for production, and the extremely short timeframe involved, we are able to provide only a partial response at this time. Consistent with the agency's regulations governing disclosure of information, we wanted to provide you as much publicly available information as possible prior to the March 25th hearing.

As Commissioner Kessler indicated to you yesterday, the agency stands ready to provide all appropriate assistance to you and your staff on this and any other matters involving FDA. I hope this information is helpful.

Sincerely yours,

Diane E. Thompson Associate Commissioner for Legislative Affairs

Enclosures

HFW-14 (2) HFW-1 (2) Roger McClung cc:

R/D:JHardy:3/23/94 Edited:DThompson:3/24/94 F/T:KDuncan:3/24/94

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FDA CONTROL NUMBER:



MEMBER OF:

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# Congress of the United States House of Representatives Washington, DC 20515-4607

March 18, 1994

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The Honorable David A. Kessler Commissioner Food and Drug Administration 5600 Fishers Lane Room 14-71 Rockville, Maryland 20857

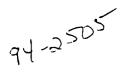
Dear Dr. Kessler:

Your correspondence of February 25, 1994 to Scott D. Ballin, Chairman of the Coalition on Smoking OR Health, contained disturbing allegations concerning the intent of cigarette manufacturers with respect to the role of nicotine in cigarettes.

Specifically, your letter stated, "Evidence brought to our attention is accumulating that suggests that cigarette manufacturers may intend that their products contain nicotine to satisfy an addiction on the part of some of their customers. The possible inference that cigarette vendors intend to achieve drug effects in some smokers is based on mounting evidence we have received that: (1) the nicotine ingredient in cigarettes is a powerfully addictive agent and (2) cigarette vendors control the levels of nicotine that satisfy this addiction."

As these are serious charges likely to be addressed before a Congressional hearing on March 25, I request that you provide the following information and documents to my office prior to the hearing.

- (1) All "evidence" in the FDA's possession "that suggests that cigarette manufacturers may intend that their products contain nicotine to satisfy an addiction on the part of some of their customers," along with
  - (a) a written summary of such "evidence" if it was given orally to the FDA; and
  - (b) copies of any and all documents given to the FDA in connection with this allegation; and
  - (c) the names, addresses and titles of all individuals and organizations from whom you received evidence in



connection with this allegation.

- (2) All "evidence" in the FDA's possession that "manufacturers commonly add nicotine to cigarettes to deliver specific amounts of nicotine," along with
  - (a) a written summary of such "evidence" if it was given orally to the FDA; and
  - (b) copies of any and all documents given to the FDA in connection with this allegation; and
  - (c) the names, addresses and titles of all individuals and organizations from whom you received evidence in connection with this allegation.
- (3) All "evidence" in the FDA's possession supporting your statement that "There is also evidence discovered in recent litigation that some of the individuals involved in the manufacture of cigarettes in the 1970s regarded their products as nicotine-delivery systems, " along with
  - (a) a written summary of such "evidence" if given orally to the FDA; and
  - (b) copies of any and all documents given to the FDA in connection with this matter; and
  - (c) the names, addresses and titles of all individuals and organizations from whom you received evidence in connection with this allegation.
- (4) All other "information" or "evidence" brought to the FDA's attention or otherwise received by the FDA that you relied on to support the statements made in your February 25 letter to Mr. Ballin regarding the intent of cigarette manufacturers concerning nicotine\*. In addition, please indicate whether you received any or all of the "information" or "evidence" before or after your February 25 letter was released.

Please provide this information to my office no later than March 21, 1994.

Sincerely,

homas J. Bliley, Jr

1. Psychopharmacology, 1991	"Selective dopamine antagonists reduce nicotine self-administration," Wm. A. Corrigali, et. al,
2 British Journal of Addiction, 1991	"Refining models of dependence:variations across persons and situations," Saul Shiffman
3. Report to Congress, 1991	"Drug Abuse and Drug Abuse Research"
4. NIH Pub 92-3461	"Smokeless Tobacco or Health"
5. Psychopharmacology, 1992	"The mesolimbic dopaminergic system is implicated in the reinforcing effects of nicotine," William A. Corrigili, et. al.
6. JAMA, Nov. 18, 1992	"Tobacco Dependence and the Nicotine Patch," Michael C. Flore, M.C., et. al.
<ol> <li>international Journal of Smoking Cessation, 1992</li> </ol>	The nicotine withdrawal syndrome: a brief review and update, J.R. Hughes
8.	"Brain Reward Mechanisms," Ellot L. Gardner, Ph.D.
<ol> <li>Journal of Pharmaceutical Sciences, November 1992</li> </ol>	"Nicotine Absorption after Pulmonary Instillation," David R. David R. Herrimann, et. al.
10. Second Edition, 1992	"Substance Abuse, A Comprehensive Textbook," Joyce H. Lowinson, M.D., et. al.
11. Psychopharmacology, 1992	"RebuttalThe meaning of addiction: reply to West John H. Robinson, et. al.
12 Psychopharmacology, 1992	Review-The role of nicotine in tobacco use, John R. Robinson, et. al.
13. Psychopharmacology, 1992	Special Issue on Nicotine
14. Psychopharmacology, 1992	"Nicotine addiction: a re-analysis of the arguments," Robert West
15. Drug & Alcohol Dependence, 1993	*Clinical Evaluation of a citric acid inhaler for smoking cessation,* F.M. Behm, et. al.
15. December 14, 1992	*Cigarette Yield of Tar and Nicotine and Markers of Exposure to Tobacco Smoke,* David B. Coultas, et. al.
16. Drug and Alcohol Dependence	"Higher levels of nicotine in arterial than in venous blood after cigarette smoking," Jack E. Henningfield, et. al.
17. Journal of Consulting & Clinical Psychology, 1993	"Nicotine Delivery Kinetics and Abuse Liability," Jack E. Henningfield, et. al.

18. Jounal of Substance Abuse Treatment, 1993	"Following the Pioneers," New Brunswick, New Jersey
19. Journal of Substance Abuse Treatment, 1993	"Patterns of Alcohol, Cigarette, and Caffeine and Oher Drug Use in Two Drug Abusing Populations," L.T. Kozlowski, et. al.
20. 1993	"Serum Nicotine and cotinine levels during nicotine-patch therapy," Richard D. Hurt, M.D., et. al.
21. 1993	"Nicotine Addiction: Principles & Management," C Tracy Orleans, Ph.C., et. al.
22. Addiction, 1993	"Differences between smokers and never-smokers in sensitivity to nicotine: a preliminary report," Ovide R. Pomperleau, et.al.
23. Journal of Substance Abuse Treatment, 1993	"When to Begin Smoking Cessation in Substance Abusers," Karen Lea Seas, et. al.
24. Addiction, 1993	"Recycling with nicotine patches in smoking cessation," Philip Tonnesen, et. al.
25. Tobacco Control, Winter 1993	"Issues in Smoking Cessation: Who Quits? Who Pays?"
26. Addiction, 1993	"Self-titration of nocitone: evidence from the Scottish Heart Health Study," Mark Woodward, et. al.
27. Cancer Nursing News, Winter 1994	"Researcher Leads Way in Tobacco Control Issues"
28. Addiction, 1994	"Comments on West's editorial 'Beneficial effects of nicotine fact or fiction?"
29. JAMA, February 23, 1994	"Smoking Initiation by Adolescent Girls, 1944-1988," John P. Pierce, et. al.
30. Science, March 1994	"Nicotine Scrutinized as FDA Seeks to Regulate Cigarettes"
31.	"Have Tar and Nicotine Yields of Cigarettes Changed"
32.	"Nicotine pharmacodynamics: some unresolved issues," Robert J. West
33. British Journal of Addiction 1991	"Pharmacodynamics of nicotine: implications for rational treatment of nicotine addiction," Neal L. Benowltz
34. Medical Clinics of North America 1992	*Cigarette Smokine and Nicotine Addiction, Neal March Benowitz M.D.

35. 1990	Editorial entitled, "Development of a Citric Acid Aerosol as a Smoking Cessation," by Edward D. Levin, Jed E. Rose and Frederique Behn
36. 1990	Article entitled, "Effect of Nicotine, Silver Acetate, and Ordinary Chewing Gum In Combination with Group Counseling on Smoking Cessation," by E.J. Jensen, E. Schmidt, B. Pedersen, R. Dahl
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38. Undated	Report of the Surgeon General entitled, "Preventing Tobacco Use Among Young People"
39. 1991	Article entitled, "Is Nicotine More Addictive Than Cocaine," by Jack E. Henningfield, Caroline Cohen, & John D. Slade
40. 1991	Article entitled, "Behavioral Pharmacology of Nicotine Multiple Mechanisms," by Ian P. Stolerman
41. 1991	Article entitled, "Refining Models of Dependence: Variations Across Persons and Situations," By Saul Shiffman
42. Undated	Article entitled, "Stable Isotope Method for Studying Transdermal Drug Absorption: The Nicotine Patch," BY Neal L. Benowitz, M.D., Keith Chan., Ph.D., Charles P. Denaro, FRACP, and Peyton Jacob III, Ph.D.
43. 1991	Article entitled, "Smokeless Tobacco: Current Status and Future Directions," by Dorothy Hatsukami, Richard Nelson, and Joni Jensen
44. 1991	Article entitled, "The Relevance of Receptor Binding Studies to Tobacco Research," by Susan Wonnacott
45. Undated	Article entitled, "Supercritical Fluid Extraction of Natural Raw Materials for the Flavor and Perfume Industry," by Patrick Pelierin, CAL/Pfizer, Grasse, France
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48. Undated	Article entitled, "The pH of Tobacco Smoke," by K.D. Brunnmann and D. Hoffmann
49. 1975	Article entitled, "Plasma Nicotine Levels After Smoking Cigarettes with High, Medium, and Low Nicotine Yields," by M.A.H. Russell, C. Wilson, U.A. Patel, C. eyerabend, P.V. Cole
50. 1976	Article entitled, "Plasma Nicotine Levels After Cigarette Smoking and Chewing Nicotine Gum," by M.A.H. Russell, C. Feyerabend, P.V. Cole
51. Undated	Public Health Briefs entitled, "The Misuse of Less-Hazardous Cigarettes and Its Detections: Hole-Blocking of Ventilated Filters," by L.T. Koziowski, Ph.d, et. al.
52. 1980	Article from Thorax Medical Journal entitled, "Inhaling Habits Among Smokers of Different Types of Cigarette," by Nicholas J. Wald, Marianne Idle, Jillian Boreham, and Alan Bailey
53. 1981	Papers and Short Reports entitled, "Puff Volume Increases When Low-Nicotine Cigarettes are Smoked," by Ronald I. Herning, Reese T. Jones, John Bachman, Allan Mines
54. Undated	Article entitled, "Circadian Blood Nicotine Concentrations During Cigarette Smoking," by Neal Benowltz, M.D., et. al.
55. 1982	Article entitled, "The Effects of Nicotine on Brain Neurotransmitter Systems", by D.J.K. Balfour
56. 1982	Article entitled, "Smoking Habits of Long-Term Survivors of Surgery for Lung Cancer," by G. Davison, M. Duffy
57. 1983	Article entitled, "How a Cigarette is smoke determines Blood Nicotine Levels," By Ronald I. Herning, Ph.D., et. ai.
58. 1983	Article entitled, "Nicotine's Role in Smoking: An Analysis of Nicotine Regulation," by Martin J. McMorrow and R.M. Foxx
59. 1983	Article entitled, "Taste and Nicotine as Determinants of Voluntary Tobacco Use by Hamsters," by Charles Ksir
60, 1983	Article entitled, "How a Cigarette is Smoked Determines Blood Nicotine Levels," by Ronald I. Herning, Ph.D., et.al

61. Undated	Article entitled, "Smokers of Low-Yield Cigarettes Do Not Consume Less Nicotine," by Neal L. Benowitz, M.D. et. al.
62. 1984	Article entitled, "Daily Intake of Nicotine During Cigarette Smoking," by Neal L. Benowitz, M.D., and Peyton Jacob III., Ph.D.
63. Undated	Article entitled, "Nicotine and Carbon Monoxide intake from High-and Low-Yield Cigarettes," by Neal L. Benowitz, M.D., and Peyton Jacob III., Ph.D.
64. 1984	Article entitled, "Smoking Following Myocardial Infarction: A Critical Review of the Literature," by Thomas A. Burling, Edward G. Singleton, et. al.
65. 1984	Article entitled, "Daily intake of Nicotine during Cigarette Smoking," by Neal L. Benowitz, M.D., and Peyton Jacob III., Ph.D.
66. Undated	Article entitled, "Influence of Nicotine on Cardiovascular and Hormonal Effects of Cigarette Smoking," by Neal L. Benowitz, M.D., et. al.
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68. 8/24/85	Article entitled, "Smoking Habits After Laryngectomy," by Sarah Himbury and Robert West
69. 1985	Article entitled, "Changes in Overwrap and Butt Length of American Filter Cigarettes
70. 1985	Article entitled, "Tar and Nicotine Yields of U.K. Cigarettes 1972-1983: Sales-weighted Estimates from Non-Industry Sources," by M.J. Jarvis, M. Phil and M.A.H. Russell, F.R.C.P.
71. Undated	Article entitled, "Methods of Assessing the Reinforcing Properties of Abused Drugs," by Michael A. Bozarth
72. 5/87	Editorial from <u>The American Journal of Public Health.</u> entitled, "Less Hazardous Smoking and the Pursuit of Satisfaction," by Lynn T. Koziowski
73. 1968	Article entitled, "Evaluation of a Low to Middle Tar/Medium Nicotine Cigarette Designed to Maintain Nicotine Delivery to the Smoker

74	. Undated	Article entitled, "Nicotine Absorption and Cardiovascular Effects with Smokeless Tobacco Use: Comparison with Cigarettes and Nicotine Gum
75	. 1988	Article entitled, "Drugs Abused by Humans Preferntially Increase Synaptic Dopamine Concentrations in the Mesolimbic System of Freely Moving Rats," by Gaetano Di Chiara, and Asunta Imperato
76	. 1968	Article entitled, "Cue Properties of Oral and Transdermal Nicotine in the Rat," by Rebecca M. Craft and James L. Howard
77.	. 12/88	Editorial from The Washington Report, entitled, "Ingenious Drug Delivery," by James Dickinson
78.	. 1988	Article entitled, "Caffeine Physical Dependence: A Review of Human and Laboratory Animal Studies," by Roland R. Griffiths and Phillip P. Woodson
79.	Undated	Article entitled, "Nicotine Dependence: Interface Between Tobacco and Tobacco-Related Disease," by Jack E. Henningfield, Ph.D., and R. Nemeth-Coslett, Ph.D.
<b>80</b> .	1993	Letter to the Editor entitled, "Smoking is a Drug Dependence: a Reply to Robinson and Pritchard," by John R. Hughes
81.	11/17/88	article entitled, "Medical Intelligence Drug Therapy: Pharmacologic Aspects of Cigarette Smoking and Nicotine Addiction," by Neal L. Benowitz, M.D.
82.	1987	Article entitled, "Nicotine and Smoking: a Perspective from Animal Studies," by P.B.S. Clarke
83.	2/28/9	Letter from James W. Johnston, Chairman, R.J. Reynolds Tobacco Company, to Dr. Kessier, regarding nicotine in cigarettes
84.	1968	Recent Studies of Nocotine Metabolism in Humans
85.	April 1989	The Psychologist-Book Reviews also is Nicotine Use an Addiction? Screen Violence
86.	1986	Clinical Pharmacology of Nicotine, by Neal L. Benowitz, M.D.
87.	August 3, 1973	The pH of Tobacco Smoke, by K. d. Brunnemann, et,
88.	1986	Reduction of Tar, Nicotine and Carbon Monoxide intake in Low tar Smokers, by M A H Russell, et.

89. April 26, 1985	Analytical Cigarette Yields as Predictors of Smoke Bioavallability, by Gio B. Gori, et.
90. February 1989	Evidence for Limits on the Acceptability of Lowest-Tar Cigarettes, by Lynn T. Kozlowski, PhD
91. June 17, 1980	Have Tar and Nicotine Yields of Cigarettes Changed?
92. October 17, 1983	Daily intake of nicotine during cigarette smoking, by Neel L. Benowitz, M.D., et.
93. May 20, 1986	Mouth Versus Deep Airways Absorption of Nicotine in Cigarette Smokers, by Gio B. Gori, et.
94. September 21, 1984	Sensory Blockade of Smoking Satisfaction, by Jed E. Rose, et
95. January 24, 1992	Addictive Drugs: The Cigarette Experience, by Thomas c. Schelling
96. Undated	Summary Basis of Approval-Habitrol (Nicotine Transdermal Therapeutic System, with attachments
97. undated	The Pleasures of Nicotine, by David M. Warburton
98. 1990	Pharmacokinetic Considerations in understanding nicotine dependence, by Neal L Benowitz
99. undated	Health Consequences of Smoking, 25 Years of Progress-A report of the Surgeon General
100. February 1988	Federal Trade Commission-Report to Congress, Pursuant to the Federal Cigarette Labeling and Advertising Act
101. March 4, 1994	Citizen Petition by Action on Smoking and Health pursuant to 21 C.F.R Section 10.25, 10.30, and other relevant authority
102. January 1993	Consumer Reports: vol. 48, no. 1, pp. 26-27;50, January, 1993
103. undated	Changes in Smoke Chemistry of Modern Day Cigarettes, by Vello Norman
104. undated	Nifedipine, page 6441
105. February 15, 1991	Primary Manufacturing: A Few New Old Ideas
106. March 1991	Stable isotope studies of nicotine kinetics and bioavailability, by Neal L. Benowitz, M.D., et.

107. 1977	Influence of Tobacco Type on Smoke Composition-vol 3. 31stTobacco Chemists' Res Conf Greensboro, NC 1977
108. October 31, 1989	Development of a Citric acid aerosol as a smoking cessation aid, by Edward D. Levin, et
109. May 16, 1992	Clinical Evaluation of a Citric Acid Inhaler for Smoking Cessation, by F.M. Behm, et.
110. February 16, 1994	Analyses of Reconstituted Tobacco in Cigarette Brands
111 January 14, 1992	Review-The Role of Nicotine in Tobacco use, by John H. Robinson, et.
112 March 25, 1992	Rebuttal-The Meaning of Addiction: reply to West, by John H. Robinson, et.
113 1986	Relapse and Recovery in Drug Abuse, Frank M. Tims, Ph.D., et.
114. 1982	Smoking habits of Long-term Survivors of Surgery for Lung Cancer, by G. Davison, et.
115. August 24, 1985	Smoking Habits after Laryngectomy
116. 1984	Smoking Following Myocardial Infarction: A Critical Review of the Literature, by Thomas A. Burling, et. al.
117. June 28, 1988	Memo regarding the lack of FDA Jurisdiction over Conventional Cigarettes History
118. Undated	FDA and Tobacco/Nicotine Issues
119. June 10, 1953	113 F. Supp. 336-United States v. 46 Cartons, More or Less, Containing Fairfax Cigarettes, etc., Clv. No. 557-52
120. November 30, 1959	178 F. Supp. 847-United States, Libelant, V. 345 Bulk Cartons, Civ. A. No. 1128-58
121. March 25, 1977	
June 7, 1977	557 F. 2d 325-The National Nutritional Foods Association and Solgar, Co., Inc., v. F. David Mathews, Docket No. 76-6135 No. 561-September Term, 1976
122. May 13, 1980	
December 19, 1980	Federal Reporter, 2d Series-Action on Smoking and Health, Appellant, v. Patricia Roberts Harris, No. 79-1397
123, July 29, 1988	Testimony-Hearing before the Subcommittee on Health and the Environment of the Committee on Energy and Commerce, House of Representatives Serial No. 100-168

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125.	November 17, 19	88	Pharmacologic Aspects of cigarette smoking and nicotine addiction, by Neal L. Benowitz, M.D.
126.	1989		Reducing the Health Consequences of Smoking, 25 Years of Progress-a report of the Surgeon General 1989
127.	September 4, 199	2	Memo regarding the FDA regulation of Tobacco Products as Drugs
128.	March 1992		Trends in Cigarette Smoking in the United States-The Epidemiology of Tobacco Use, by Michael C. Flore, MD, MPH
129.	September 1992		Tobacco Control-Policy Research: Strategic Directions
130.	1982		The Most Often Asked Questions About Smoking, Tobacco, and Health andThe Answers
131.	1989		Nicotine, Smoking, and the Low Tar Programme, edited by Nicholas Wald et.,
132.	May 16, 1989		United States Patent-Patent Number:4,830,028
133.	undated		More or Less Nicotine
134.	March 1992		Cigarette Smoking and Nicotine Addiction, by Neal L. Benowitz, MD
135.	December 12, 196	37	European Patent Application - 0 280 817 A2
136.	1993		Nicotine Addiction: Principles and Management, Edited by C. Tracy Orleans, Ph.D.
137.	1972		1972 Philip Morris Document
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139.	May 6, 1993		e Effects of Quantified cigarette-smoke delivery on EEG Dimensional axity, by Walter S. Pritchard, et.
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142.	1993	Federa	Trade Commission Report

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143. 1990	Same .
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153. May 1993	<u>Addiction.</u> Vol. 88, No. 5, "Beneficial effects of nicotine: fact or fiction?" editorial by Robert West.
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155. 1992	Psychopharmacology, various articles on nicotine and smoking.
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157. 1993	<u>Drug and Alcohol Dependence</u> , Vol. 33, "Higher levels of nicotine in arterial than in venous blood after cigarette smoking," by Jack E. Henningfield, June M. Stapleton, Neal L. Benowitz, Roger F. Grayson, and Edythe D. London.
158.	U.S. Department of Health and Human Services. Public Health Service. Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, "Preventing Tobacco Use Among Young People," A Report of the Surgeon General.
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162. 1993	Mayo Clin. Proc., Vol. 68, Symposium on Intrathoracic Neoplasms.
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167. 189	Article entitled, "Comparing Tabacco Cigarette Dependence With Other Drug Dependencies, Greater of Equal 'Difficulty Quitting' and 'Urges to Use,' by Less 'Pleasure' From Cigarettes" by Lynn T. Koziowski, Ph.D, Adrian Wilkinson, DPhil; Wayne Skinner, MSW; Carl Kent, MSW, Tom Franklin, MSW; Marilyn Pope
168. Undated	Article entitled, "Clinical Pharmacokinetic of Non-Opiate Abused Drugs" by U. Busto, R. Bendayan, and E.M. Sellers
169. 1990	Article entitled, "Clinical and pharmacokinetic properties of a transdermal nicotine patch" by Seamus C. Mulligan, MSc, Joseph G. Masterson, M.D., John G. Devane, Ph.D., and John G. Keliy, Ph.D.
170. 1989	Article entitled, "Nicotine, Smoking, and the Lower Tar Programme" by Nicholas Wald and Sir Peter Froggatt
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172. 1984	Article entitled, "Sensory Blocade of Smoking Satisfaction" by Jed E. Rose, Donald P. Tashkin, Alan Ertle, Michael C. Zinser, and Robert Lafer
173. 1985	Article entitled, "Effects of Different Cigarette Smoke Yields on Puffing and Inhalation: Is the Measurement of Inhalation Volumes Relevant for Smoke Absorption?" by Rico Nii, Roberto Buzzi, and Karl Battig
174. 1987	Article entitled, "Spontaneous Cigarette Brand Switching: Consequences for Nicotine and Carbon Monoxide Exposure" by Cornelius J. Lynch, Ph.D., and Neal L. Benowitz, M.D.

175.	1986	Meeting Report entitled, "Progress in Understanding the Relationship Between the Pharmacological Effects of Nicotine and Human Tobacco Dependence" edited by Steven R. Goldberg and Jack E. Henningfield
176.	Undated	Article entitled, "Clinical Pharmacology of Nicotine" by Neal L. Benowitz
177.	1986	NIDA Research Monograph - "Relapse and Recovery in Drug Abuse" edited by Frank M. Tims, Ph.D. and Carl G. Leukefeld, D.S.W.
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180.	1987	Article entitled, "Determinants of nicotine intake while chewing nicotine polacrilex gum" by Neal L. Benowitz, M.D., Peyton Jacob III, Ph.D., and Chin Savanapridi, M.D.
181.	1987	Article entitled, "Clinical Pharmacokinetics of Nicotine" by Craig K. Svensson
182.	Undated	Article entitled, "Health and Public Policy Implications of the "Low Yield" Cigarette" by Neal L. Benowitz, M.D.
183.	1989	Article entitled, "Nicotine Intake in Young Smokers: Longitudinal Study of Saliva Cotinine Concentrations" by Ann D. McNeill, BSc, Martin J. Jarvis, BSc, MPhil, John A. Stapleton, MSc, Robert J. West, BSc, Ph.D. and Andrew Bryant, LRSC
184.	1989	Article entitled, "Nicotine dependence and tolerance in man: pharmacokinetic and pharmacodynamic investigations" by Neal L. Benowitz, Herve Porchet and Peyton Jacob, III
185.	1989	Article entitled, "Nicotine, Smoking, and the Low Tar Programme" edited by Nicholas Wald and Sir Peter Froggatt
186.	1989	Article entitled, "Effects of nicotine administration following 12 h of tobacco deprivation: assessment on computerized performance tasks" by Frederick R. Snyder and Jack E. Henning field
187.	1989	Article entitled, "Tobacco "chipper' individual differences in tobacco dependence" by Saul Shiffman
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197.	1965	Article entitled, "Analytical Cigarette Yields as Predictors of Smoke Bioavallability" by Gio B. Gori and Cornelius J. Lynch
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## List of United States Patents

/	May:14, 1991	United Sta	tes I	Patent-Patent	Number:	5,015,741
2	May 20, 1986	United Sta	tes p	patent-Patent	Number:	4,590,278
3	May 22, 1979	United Sta	tes I	Patent-4,155,9	09	
4	March 23, 1982	United Sta	tes 1	Patent-4,321,3	187	- ·
5	September 2, 1980	United Sta	tes I	Patent-4,220,7	81	
6	April 10, 1984	United Sta	tes I	Patent-4,442,2	192	
7	June 1, 1982	United Sta	tes I	Patent-4,332,9	45	
8	June 5, 1984	United Sta	tes I	Patent-4,452,9	84	
9	May 16, 1989	United Sta	tes I	Patent-4,830,0	28	

### PATENT NUMBER

### DATE OF PATENT

/a· 4,590,278	May 20, 1986
// 4,452,984	June 5, 1984
/2 4,442,292	April 10, 1984
/3. 4,332,945	June 1, 1982
/ <del>4</del> 4,321,387	March 23, 1982
15.4,220,781	September 2, 1980
16.4,155,909	May 22, 1979
17.5,015,741	May 14, 1991
/3.5,138,062	August 11, 1992
19.5,033,484	July 23, 1991
205,260,205	November 9, 1993
21.5,025,812	June 25, 1991
22:5,018,540	May 28, 1991
23.4,967,771	November 6, 1990
21.4,962,773	October 16, 1990
25.4,920,990	May 1, 1990
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27 4,848,376	July 18, 1989
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40,	8/11/92	United States Patent - Osdene - Nicotine Analogs (Patient Number 5,138,062)
71.	5/14/91	United States Patent - Osdene - Nicotine Analogs (Patient Number 5,015,741)
42.	5/20/86	United States Patent - Edwards, III - Nicotine Analogs (Patient Number 4,590,278)
43,	6/5/84	United States Patent - Edwards, III - Optically Active Nicotine Analogs and Process for their Preparation (Patient Number 4,452,984)
44.	4/10/84	United States Patent - Edwards, III - Optically Active Nicotine Analogs and Process for their Preparation (Patient Number 4,442,292)
45.	6/1/82	United States Patent - Edwards, III - Optically Active Nicotine Analogs and Process for their Preparation (Patient Number 4,332,945)
46.	3/23/82	United States Patent - Chavdarian - Process for the Preparation of Optically Active Nicotine Analogs (Patient Number 4,321,387)
47.	9/2/80	United States Patent - Sanders - Process for Preparing 2-ALKYL Nicotinoids (Patient Number 4,220,781)
18,	5/22/79	United States Patent - Sanders - 2-ALKYL Nicotinoids and Processes for their Production (Patient Number 4,155,909)