



College of Arts and Sciences
Department of Chemistry
Chemistry-Physics Building
Lexington, KY 40506-0055
(859) 257-4741
Fax: (859) 323-1069
www.chem.uky.edu

27 June 2003

Dockets Management Branch (HFA-305)
Food and Drug Administration
5630 Fishers Lane
Room 1061
Rockville, MD 20852

Dear Colleagues:

I would like to submit the attached 250 references from refereed research journals for consideration by the panel that will be evaluating information with regards to the safety of amalgam fillings in dentistry.

Sincerely,

A handwritten signature in black ink, appearing to read "Boyd E. Haley".

Boyd E. Haley
Professor and Chair

N3N-0169

Sup 9

Docket 2003N-0169
DENTAL AMALGAM

Dockets Management Branch
(HFA-305), Food and Drug Administration, 5630 Fishers Lane, rm. 1061,
Rockville, MD 20852. Submit electronic information to
<http://www.fda.gov/dockets/ecomments>

To Whom It May Concern: Below is a list of publications that I feel need being considered when evaluating the safety of dental amalgams with regards to increasing human mercury body burden and likely contributing to human illnesses.

Sincerely, Boyd Haley
Professor and Chair
Department of Chemistry
University of Kentucky
Lexington, KY 40506-0055

Release of Mercury from "Silver" Dental Amalgam

- 1a. Removal of Dental Amalgam and other Metal Alloys Supported by Antioxidant Therapy Alleviates Symptoms and Improves Quality of Life in Patients with Amalgam-Associated Ill Health. Lindh, U., Hudecek, R., Danersund, A., Eriksson, S. Lindvall, A. Neuroendocrinology Letters 5/6, Oct.-Dec. Vol 23 459-482, 2002.
- 1b. Influence of amalgam fillings on Hg levels and total antioxidant activity in plasma of healthy donors. Pizzichini M, Fonzi M, Gasparoni A, Mencarelli M, Rocchi G, Kaitas V, Fonzi L. Bull Group Int Rech Sci Stomatol Odontol 2001 May-Sep;43(2):62-7.
2. Mercury and selenium concentrations in maternal and neonatal scalp hair: relationship to amalgam-based dental treatment received during pregnancy. Razagui IB, Haswell SJ. Biol Trace Elem Res (2001) Jul;81(1):1-19.
3. Mobilization of mercury and arsenic in humans by sodium 2,3-dimercapto-1-propane sulfonate (DMPS). Aposhian (1998). Environ. Health Perspect. 106:1017-1025.
4. Mercury in biological fluids after amalgam removal. Sandborgh-Englund et al., (1998). J. Dent. Res. 77:615-624.
5. The absorption, blood levels, and excretion of mercury after a single dose of mercury vapor in humans. Sandborgh-Englund et al., (1998). Toxicol. Appl. Pharmacol. 150:146-153
6. Toxicological aspects on the release and systemic uptake of mercury from dental amalgam. Ekstrand et. al., (1998). Eur. J. Oral Sci. 106:678-686
7. The influence of amalgam fillings on urinary mercury excretion in subjects from Apulia. Soleo et. al., (1998). G. Ital. Med. Lav. Ergon. 20:75-81.
8. Systemic transfer of mercury from amalgam fillings before and after cessation of emission. Halbach et. al., (1998). Environ. Res. 77:115-123.
9. Mercury as a potential hazard for the dental practitioner. Kostyniak (1998). N.Y. State Dent. J. 64:40-43.
10. Methylmercury and inorganic mercury in serum-correlation to fish consumption and dental amalgam in a cohort of women born in 1922. Bergdahl et. al., (1998). Environ. Res. 77:20-24.
11. Mercury and dental amalgam fillings. Lygre et. al., (1998). Tidsskr. Nor. Laegeforen 118:1698-1701.
12. The absorption, blood levels, and excretion of mercury after a single dose of mercury vapor in humans. Sandborgh-Englund et. al., (1998). Toxicol. Appl. Pharmacol. 150:146-153.
- 13a. Mercury in saliva and feces after removal of amalgam fillings. Bjorkman et al., (1997). Toxicol. Appl. Pharmacol. 144:156-162.
- 13b. Metal Exposure from Amalgam Alters the Distribution of Trace Elements in Blood Cells and Plasma. Lindh, U., Carlmark, C., Gronquist, S-O., and Lindvall, A. Clin. Chem. Lab. Med. 39(2):134-142, 2001.
14. Effect of Pd and In on mercury evaporation from amalgams. Okabe et. al., (1997). Dent. Mater. J. 16:191-199.
15. Mercury exposure from dental amalgam fillings: absorbed dose and the potential for adverse health effects. Mackert and Berglund (1997). Crit. Rev. Oral Biol. Med. 8:410-436.

16. The future of dental amalgam: a review of the literature. Part 2: Mercury exposure in dental practice. Eley (1997). Br. Dent. J. 182:293-297.
17. The future of dental amalgam: a review of the literature. Part 3: Mercury exposure from amalgam restorations in dental patients. Eley (1997). Br. Dent. J. 182:333-338.
18. Patterns of mercury release from amalgam fillings into the oral cavity. Motorkina et. al., (1997). Stomatologiia (Mosk.) 76:9-11.
19. Compartmental transfer of mercury released from amalgam. Halbach et al., (1997). Hum. Exp. Toxicol. 16:667-672.
20. Impact of nocturnal bruxism on mercury uptake from dental amalgams. Isacsson et. al., (1997). Eur. J. Oral. Sci. 105:251-257.
21. Dissolution of mercury from dental amalgam at different pH values. Marek (1997). J. Dent. Res. 76:1308-1315.
22. Initial mercury evaporation from amalgams made with In-containing commercial alloys. Nakajima et. al., (1996). Dent. Mater. J. 15:168-174.
23. Influence of chewing gum consumption and dental contact of amalgam fillings to different metal restorations on urine mercury content. Gebel and Dunkelberg (1996). Zentralbl. Hyg. Umweltmed. 199:69-75.
24. Long-term use of nicotine chewing gum and mercury exposure from dental amalgam fillings. Sallsten et. al., (1996). J. Dent. Res. 75:594-598.
25. Mercury exposure from "silver" tooth fillings: emerging evidence questions a traditional paradigm. Lorscheider et al., (1995). FASEB J. 9:504-508. Mercury levels among dental personnel in Israel: a preliminary study. Steinberg et al., (1995). Isr. J. Med. Sci. 31:428-432.
26. People with high mercury uptake from their own dental amalgam fillings. Barregard et al., (1995). Occup. Environ. Med. 52:124-128.
27. Sodium 2,3-dimercaptopropane-1-sulfonate challenge test for mercury in humans: II. Urinary mercury, porphyrins and neurobehavioral changes of dental workers in Monterrey, Mexico. Gonzalez-Ramirez et. al., (1995). J. Pharmacol. Exp. Ther. 272:264-274.
28. Silver concentrations in human tissues. Their dependence on dental amalgam and other factors. Drasch et. al., (1995). J. Trace Elem. Med. Biol. 9:82-87.
29. An estimation of the uptake of mercury from amalgam fillings based on urinary excretion of mercury in Swedish subjects. Weiner and Nylander (1995). Sci. Total Environ. 168:255-265.
30. Mercury vaporization from amalgams with varied alloy compositions. Ferrancane et. al., (1995). J. Dent. Res. 74:1414-1417.
31. Combined estimation of mercury species released from amalgam. Halbach (1995). J. Dent. Res. 74:1103-1109.
32. Estimation of mercury dose by a novel quantitation of elemental and inorganic species released from amalgam. Halbach (1995). Int. Arch. Occup. Environ. Health 67:295-300.
33. Human exposure to mercury and silver released from dental amalgam restorations. Skare and Engqvist (1994). Arch. Environ. Health 49:384-394.
34. Mercury concentrations in the urine of children with and without amalgam fillings. Schulte et al., (1994). Schweiz Monatsschr Zahnmed 104:1336-1340.
35. Mercury burden of human fetal and infant tissues. G. Drasch , I. Schupp , H. Höfl , R. Reinke , G. Roider. European Journal of Pediatrics. Volume 153 Issue 8 (1994) pp 607-610.
36. Amalgam tooth fillings and man's mercury burden. Halbach (1994). Hum. Exp. Toxicol. 13:496-501. Long-term mercury excretion in urine after removal of amalgam fillings. Begerow et. al., (1994). Int. Arch. Occup. Environ. Health 66:209-212.
37. Evaluation of the safety issue of mercury release from dental fillings. Lorscheider and Vimy. (1993). FASEB J. 7:1432-1433.
38. The relationship between mercury concentration in human organs and different predictor variables. Weiner and Nylander (1993). Sci. Total Environ. 138:101-115.
39. An in vitro and in vivo study of the release of mercury vapor from different types of amalgam alloys. Berglund (1993). J. Dent. Res. 72:939-946.
40. Mercury release from amalgam into saliva. An in-vitro study. Lussi (1993). Schweiz. Monatsschr. Zahnmed. 103:722-726.
41. Urinary mercury after administration of 2,3-dimercaptopropane-1-sulfonic acid: correlation with dental amalgam score. Aposhian et al., (1992). FASEB J. 6:2472-2476.

42. Mercury concentration in the mouth mucosa of patients with amalgam fillings. Willershausen-Zonnchen et. al., (1992). *Dtsch. Med. Wochenschr.* 117:1743-1747.
43. Side-effects: mercury contribution to body burden from dental amalgam. Reinhardt (1992). *Adv. Dental Res.* 6:110-113.
44. Dental amalgam: the materials. Marshall and Marshall (1992). *Adv. Dent. Res.* 6:94-99.
45. Quantitation of total mercury vapor released during dental procedures. Engle et. al., (1992). *Dent. Mater.* 8:176-180.
46. Daily dose calculations from measurements of intra-oral mercury vapor. Olsson and Bergman (1992). *J. Dent. Res.* 71:414-423.
47. Mercury exposure of the population. IV. Mercury exposure of male dentists, female dentists and dental aides. Zander et. al., (1992). *Zentralbl. Hyg. Umweltmed.* 193:318-328.
48. The mercury exposure of the population. III. Mercury mobilisation by DMPS (Dimaval) in subjects with and without amalgam fillings. Zander et. al., (1992). *Zentralbl. Hyg. Umweltmed.* 192:447-454.
49. Release of mercury vapor from dental amalgam. Berglund (1992). *Swed. Dent. J. Suppl.* 85:1-52.
50. Factors influencing mercury evaporation rate from dental amalgam fillings. Bjorkman and Lind (1992). *Scand. J. Dent. Res.* 100:354-360.
51. Amalgam fillings-a considerable source of exposure to heavy metals. Skare and Engqvist (1992). *Lakartidningen* 89:1299-1301.
52. Daily dose estimates of mercury from dental amalgams. Lorscheider and Vimy. (1991). *J. Dent. Res.* 70:233-237.
53. The dental amalgam issue. A review. Hanson and Pleva (1991). *Experientia* 47:9-22
54. Toxicological assessment of amalgam components released in immersion tests. Weiland and Nossek (1991). *Dtsch. Zahnrztl. Z.* 46:547-550
55. Significance of hydrogen ion concentration on the dissolution of mercury from dental amalgam. Soh et. al., (1991). *Quintesence Int.* 22:225-228.
56. Thermal effect on dissolution of mercury from two dental amalgams. Soh et. al., (1991). *J. Oral Rehabil.* 18:179-183.
57. Long-term dissolution of mercury from a non-mercury-releasing amalgam. Chew et. al., (1991). *Clin. Prev. Dent.* 13:5-7.
58. The mercury release of different amalgams in vitro. Lussi and Schoenberg (1991). *Schweiz Monatsschr Zahnmed.* 101:1405-1408.
59. Whole-body imaging of the distribution of mercury released from dental fillings into monkey tissues. Hahn et al., (1990). *FASEB J.* 4:3256-3260.
60. Estimation by a 24-hour study of the daily dose of intra-oral mercury vapor inhaled after release from dental amalgam. Berglund (1990). *J. Dent. Res.* 69:1646-1651.
61. Exposure to mercury in the population. I. Mercury concentrations in the urine of normal subjects.. Zander et. al., (1990). *Zentralbl. Hyg. Umweltmed.* 190:315-324.
62. Exposure to mercury in the population. II. Mercury release from amalgam fillings. Zander et. al., (1990). *Zentralbl. Hyg. Umweltmed.* 190:325-334.
63. Maternal-fetal distribution of mercury (203Hg) released from dental amalgam fillings. Vimy et. al., (1990). *Am. J. Physiol.* 258:R939-R945.
64. Mercury release of silver amalgams in vitro. Hellwig et. al., (1990). *Dtsch. Zahnrztl. Z.* 45:17-19.
65. Mercury release from amalgam: a study in vitro and in vivo. Ahmed and Stannard (1990). *Oper. Dent.* 15:207-218.
66. Mercury as a pollutant in the dental profession. I. Its biological cycle, toxicity and monitoring. Valerio et. al., (1990). *Minerva Stomatol.* 39:625-628.
67. Mercury exposure of different origins among dentists and dental nurses. Skare et al., (1990). *Scand. J. Work Environ. Health* 16:340-347.
68. Mercury, selenium, and glutathione peroxidase before and after amalgam removal in man. Molin et al., (1990). *Acta Odontol. Scand.* 48:189-202.
69. The influence of dental amalgam placement on mercury, selenium, and glutathione peroxidase in man. Molin et al., (1990). *Acta Odontol. Scand.* 48:287-295.
70. Dental "silver" tooth fillings: a source of mercury exposure revealed by whole-body image scan and tissue analysis. Hahn et al., (1989). *FASEB J.* 3:2641-2646.
71. Mercury vapor from dental amalgams, an intro study. Derand (1989). *Swed. Dent. J.* 13:169-175.
72. Dental "silver" tooth fillings: a source of mercury exposure revealed by whole-body image scan and

- tissue analysis. Hahn et. al., (1989). FASEB J. 3:2641-2646
73. Dental amalgam: a review of the literature. Eggleston (1989). Compendium 10:500-505.
74. Comparison of release of mercury from three dental amalgams. Chew et. al., (1989). Dent. Mater. 5:244-246.
75. Dental amalgam and mercury. Aronsson et. al., (1989). Biol. Met. 2:25-30.
76. Effect of admixed indium on mercury vapor release from dental amalgam. Powell et. al., (1989). J. Dent. Res. 68:1231-1233.
77. Dissolution of metallic mercury in artificial saliva and eleven other solutions. Takahashi et. al., (1989). Dent. Mater. 5:256-259.
78. Dental amalgam and mercury. Aronsson et. al., (1989). Biol. Met. 2:25-30.
79. Prospective study on the mercury uptake of dental students. Part 1: Increase in mercury excretion during simulated training. Pieper et. al., (1989). Dtsch. Zahnärztl. Z. 44:714-716.
80. Determination of the rate of release of intra-oral mercury vapor from amalgam. Berglund et. al., (1988). J. Dent. Res. 67:1235-1242.
81. Mercury concentrations in the human brain and kidneys in relation to exposure from dental amalgam fillings. Nylander et. al., (1987). Swed. Dent. J. 11:179-187.
82. Examination of blood levels of mercurials in practicing dentists using cold-vapor atomic absorption spectrometry. Chang et. al., (1987). J. Anal. Toxicol. 11:149-153.
83. Potential health hazard of use of mercury in dentistry: critical review of the literature. Enwonwu (1987) Environ. Res. (1987). 42:257-274.
84. Metal release from dental biomaterials. Brune (1986). Biomaterials 7:163-175.
85. Estimation of mercury body burden from dental amalgam: computer simulation of a metabolic compartment model. Vimy et. al., (1986). J. Dent. Res. 65:1415-1419.
86. Intra-oral air mercury released from dental amalgam. Vimy and Lorscheider (1985). J. Dent. Res. 64:1069-1071.
87. Serial measurements of intra-oral air mercury: estimation of daily dose from dental amalgam. Vimy and Lorscheider (1985). J. Dent. Res. 64:1072-1075.
88. A model for recording mercury release from an amalgam surface. Brune (1985). Biomaterials 6:357-359.
89. Man's mercury loading from a dental amalgam. Brune and Evje (1985). Sci. Total Environ. 44:51-63.
90. Initial corrosion of amalgams in vitro. Brune and Evje (1984). Scand. J. Dent. Res. 92:165-171.
100. Mercury toxicity and dental amalgam. Wolff et. al., (1983). Neurotoxicology 4:201-204.
101. Corrosion of amalgams. Brune (1981). Scand. J. Dent. Res. 89:506-514.
102. Release of mercury from amalgam fillings into salivary. Mayer and Diehl (1976). Dtsch. Zahnärztl. Z. 31:855-859

Effects of Mercury Exposure Central Nervous System

103. Neurobehavioral effects from exposure to dental amalgam Hg0: new distinctions between recent exposure and Hg body burden. Echeverria D, et al. (1998). FASEB J. 12:971-980.
104. Behavioral effects of low-level exposure to Hg0 among dental professionals: a cross-study evaluation of psychomotor effects. Bittner et. al., (1998). Neurotoxicol. Teratol. 20:429-439.
105. Behavioral effects of low-level exposure to elemental Hg among dentists. Echeverria et. al., (1995). Neurotoxicol. Teratol. 17:161-168.
106. Chronic neurobehavioural effects of elemental mercury in dentists. Ngim et. al., (1992). Br. J. Ind. Med. 49:782-790.
107. The relationship between mercury from dental amalgam and mental health. Siblerud (1989). Am. J. Psychother. 43:575-587.
108. Chronic elemental mercury intoxication: neuropsychological follow-up case study. Hua et. al., (1996). Brain Inj. 10:377-384.
109. Mercury vapor inhalation inhibits binding of GTP to tubulin in rat brain: similarity to a molecular lesion in Alzheimer diseased brain. Pendergrass et. al., (1997). Neurotoxicology 18:315-324.
110. Inhibition of brain tubulin-guanosine 5'-triphosphate interactions by mercury: similarity to observations in Alzheimer's diseased brain. Pendergrass and Haley (1997). Met. Ions Biol. Sys. 34:461-478.
111. Increased blood mercury levels in patients with Alzheimer's diseases. Hock et. al., (1998). J. Neural.

- Transm. 105:59-68.
112. Metals and trace elements in plasma and cerebrospinal fluid in normal aging and Alzheimer's disease. Basun et. al., (1991). J. Neural Transm. Park. Dis. Dement. Sect. 3:231-258.
113. Brain trace elements in Alzheimer's disease. Ehmann et. al., (1986). Neurotoxicology 7:195-206. Regional brain trace-element studies in Alzheimer's disease. Thompson et. al., (1988). Neurotoxicology 9:1-7.
114. Trace element imbalances in isolated subcellular fractions of Alzheimer's disease brains. Wenstrup et. al., (1990). Brain Res. 533:125-131.
115. Trace element imbalances in hair and nails of Alzheimer's diseases patients. Vance et. al., (1988). Neurotoxicology 9:197-208.
116. Imbalances of trace elements related to oxidative damage in Alzheimer's disease brain. Cornett et. al., (1998). Neurotoxicology 19:339-345.
117. Evidence that mercury from silver dental fillings may be an etiological factor in multiple sclerosis. Siblerud and Kienholz (1994). Sci. Total Environ. 15:191-205.
118. A comparison of mental health of multiple sclerosis patients with silver/mercury dental fillings and those with fillings removed. Siblerud (1992). Psychol. Rep. 70:1139-1151.
119. Amyotrophic lateral sclerosis after accidental injection of mercury. Schwarz et al., (1996). J. Neurol. Neurosurg. Psychiatry 60:698.
120. Relationship between exposure to environmental toxins and motor neuron disease: a case report. Vanacore et al., (1995). Med. Lav. 86:522-533.
121. Amyotrophic lateral sclerosis and mercury-preliminary report. Mano et. al., (1990). Rinsho Shinkeigaku 30:1275-1277
122. Trace element imbalances in amyotrophic lateral sclerosis. Khare et. al., (1990). Neurotoxicology 11:521-532.
123. Mercury in hair of patients with ALS. Mano et. al., (1989). Rinsho Shinkeigaku 29:844-848.
124. Mercury intoxication simulating amyotrophic lateral sclerosis. Adams et al., (1983). JAMA 250:642-643.
125. Inorganic mercury intoxication reminiscent of amyotrophic lateral sclerosis. Barber (1978). J. Occup. Med. 20:667-669.
126. The enigma of parkinsonism in chronic borderline mercury intoxication, resolved by challenge with penicillamine. Finkelstein et al., (1996). Neurotoxicology 17:291-295.
127. Toxicological and neurophysiological findings in patients presenting to an environmental toxicology service. Koppel and Fahron (1995). J. Toxicol. Clin. Toxicol. 33:625-629
128. Imbalances of trace elements related to oxidative damage in Alzheimer's diseases brain. Cornett et. al., (1998). Neurotoxicology 19:339-345
129. Demonstration of mercury in the human brain and other organs 17 years after metallic mercury exposure. Opitz et al., (1996). Clin. Neuropathol. 15:139-144.
130. Entry of low doses of mercury vapor into the central nervous system. Pamphlett and Coote (1998). Neurotoxicology 19:39-47.
131. Acute and chronic neuropsychological consequences of mercury vapor poisoning in two elderly adolescents. Yeates and Mortensen (1994). J. Clin. Exp. Neuropsychol. 16:209-222
132. Psychometric evidence that mercury from silver dental fillings may be an etiological factor in depression, excessive anger, and anxiety. Siblerud et al., (1994). Psychol. Rep. 74:67-80.
133. Behavioral consequences of in-utero exposure to mercury vapor. Newland et al., (1996). Toxicol. Appl. Pharmacol. 139:374-386.
134. Behavioral effects of neonatal metallic mercury exposure in rats. Frederickson et. al., (1992). Toxicology 74:151-160
135. Effect of subchronic mercury exposure on electrocorticogram of rats. Desi et al., (1996). Neurotoxicology 17:719-723.
136. Neurological abnormalities associated with remote occupational elemental mercury exposure. Albers et. al., (1988). Ann. Neurol. 24:651-659
137. Psychological effects of low exposure to mercury vapor: application of a computer-administered neurobehavioral evaluation system. Liang et al., (1993). Environ. Res. 60:320-327
138. Uptake of inorganic mercury in the olfactory bulbs via olfactory pathways in rats. Henriksson and Tjalve (1998). Environ. Res. 77:130-140
139. A stereological study of dorsal root ganglion cells and nerve root fibers from rats exposed to

- mercury vapor. Schionning et al., (1998) *Acta Neuropathol.* 96:185-190
140. Mercury in the rat hypothalamic arcuate nucleus and median eminence after mercury vapor exposure. Ernst et al., (1993). *Exp. Mol. Pathol.* 58:205-214.
141. Detection of mercury in rat spinal cord and dorsal root ganglia after exposure to mercury vapor. Schionning et al., (1993). *Exp. Mol. Pathol.* 58:215-228.
142. Oxidative damage to nucleic acids in motor neurons containing mercury. Pamphlett et al., (1998). *J. Neurol. Sci.* 159:121-126.
143. Pathological changes in the Brown Norway rat cerebellum after mercury vapour exposure. Hua et al., (1995). *Toxicology* 104:83-90.
144. The effect of mercury vapour on cholinergic neurons in the fetal brain: studies on the expression of Nerve Growth Factor and its low- and high- affinity receptors. Sodestrom et al., (1995). *Brain Res. Dev. Brain Res.* 85:96-108.
145. Mercury distribution in cortical areas and fiber systems of the neonatal and maternal adult cerebrum after exposure of pregnant squirrel monkeys to mercury vapor. Warfvinge et al., (1994). *Environ. Res.* 67:196-208.
146. Metallothionein induction in fetal rat brain and neonatal primary astrocyte cultures by in utero exposure to elemental mercury vapor (Hg0). Aschner et al., (1997). *Brain Res.* 778:222-232.
147. An epidemiologic study of the relation between symptoms of fatigue, dental amalgam and other factors. Michel et. al., (1989). *Swed. Dent. J.* 13:33-38.
148. Does mercury from amalgam restorations constitute a health hazard. Weiner et al., (1990). *Sci. Total Environ.* 99:1-22.

Effects of Mercury Exposure on Reproduction and Development

149. Placental transfer of mercury in pregnant rats which received dental amalgam restorations. Takahashi Y, Tsuruta S, Arimoto M, Tanaka H, Yoshida M. *Toxicology* 2003 Mar 14;185(1-2):23-33
150. Placental to fetal transfer of mercury and fetotoxicity. Yoshida M. *Tohoku J Exp Med* 2002 Feb;196(2):79-88
151. Release of mercury from dental amalgam fillings in pregnant rats and distribution of mercury in maternal and fetal tissues. Takahashi Y, Tsuruta S, Hasegawa J, Kameyama Y, Yoshida M. *Toxicology* 2001 Jun 21;163(2-3):115-26
152. Disposition of inhaled mercury vapor in pregnant rats: maternal toxicity and effects on developmental outcome. Morgan DL, Chanda SM, Price HC, Fernando R, Liu J, Brambila E, O'Connor RW, Beliles RP, Barone S Jr. *Toxicol Sci* 2002 Apr;66(2):261-73.
153. Maternal-fetal distribution of mercury (203Hg) released from dental amalgam fillings. Vimy et. al., (1990). *Am. J. Physiol.* 258:R939-R945.
154. Maternal amalgam and prenatal mercury exposure. Halbach and Summer (1995). *Eur. J. Pediatr.* 154:498-499.
155. Mercury burden of human fetal and infant tissues. Drasch et al., (1994). *Eur. J. Pediatr.* 153:607-610.
156. Maternal-fetal transfer of metallic mercury via the placenta and milk. Yang et al., (1997). *Ann. Clin. Lab. Sci.* 27:135-141.
157. Concentrations of heavy metal in maternal and umbilical cord blood. Ong et al., (1993). *Biometals* 6:61-66.
158. Concentration of mercury, cadmium and lead in brain and kidney of second trimester fetuses and infants. Lutz et. al., (1996). *J. Trace Elem. Med. Biol.* 10:61-67
159. Distribution of mercury in guinea pigs offspring after in utero exposure to mercury vapor during late gestation. Yoshida et al., (1986). *Arch. Toxicol.* 58:225-228.
160. Dental amalgam and pregnancy. Drasch and Roider (1995). *Geburtshilfe Frauenheilkd* 55:63-65.
161. The effect of occupational exposure to mercury vapour on the fertility of female dental assistants. Rowland et al., (1994). *Occup. Environ. Med.* 51:28-34.
162. Environmental pollutants and fertility disorders. Heavy metals and minerals. Gerhard and Runnebaum (1992). *Geburtshilfe Frauenheilkd* 52:383-396.
163. Heavy metals and fertility. Gerhard et al., (1998). *J. Toxicol. Environ. Health* 54:593-611. Impact of heavy metals on hormonal and immunological factors in women with repeated miscarriages. Gerhard et al., (1998). *Hum. Reprod. Update* 4:301-309.
164. Prenatal coexposure to metallic mercury vapour and methylmercury produce interactive behavioural

- changes in adult rats. Fredriksson et. al., (1996). *Neurotoxicol. Teratol.* 18:129-134.
165. Behavioural effects of prenatal metallic mercury inhalation exposure in rats. Danielsson et. al., (1993). *Neurotoxicol. Teratol.* 15:391-396.
166. Behavioural effects of neonatal metallic mercury exposure in rats. Fredriksson et. al., (1992). *Toxicology* 74:151-160.
167. Behavioral consequences of in utero exposure to mercury vapor: alterations in lever-press durations and learning in squirrel monkeys. Newland et. al., (1996). *Toxicol. Appl. Pharmacol.* 139:374-386.
168. Mercury distribution in cortical areas and fiber systems of the neonatal and maternal adult cerebrum after exposure of pregnant squirrel monkeys to mercury vapor. Warfvinge et al., (1994). *Environ. Res.* 67:196-208.
169. Distribution of mercury in guinea pig offspring after in utero exposure to mercury vapor during late gestation. Yoshida et al., (1986). *Arch. Toxicol.* 58:225-228.
170. Effect of inorganic mercury on in vitro placental nutrient transfer and oxygen consumption. Urbach et. al., (1992). *Reprod. Toxicol.* 6:69-75.
171. In vitro effect of mercury on enzyme activities and its accumulation in the first-trimester human placenta. Boadi et. al., (1992). *Environ. Res.* 57:96-106.
172. In vitro effect of mercury on aryl hydrocarbon hydroxylase, quinone reductase, catecholamine-O-methyltransferase and glucose-6-phosphate dehydrogenase activities in term human placenta. Boadi et. al., (1991). *Pharmacol. Toxicol.* 68:317-321.
173. Toxic effects on embryos derived from amalgam restorations containing mercury. West German considerations. Strubelt et. al., (1989). *Tandlakartidningen* 81:283-290.
174. Breast-feeding exposure of infants to cadmium, lead, and mercury: a public health viewpoint. Abadin et al., (1997). *Toxicol. Ind. Health* 13:495-517.
175. Total and inorganic mercury in breast milk in relation to fish consumption and amalgam in lactating women. Oskarsson et al., (1996). *Arch. Environ. Health* 51:234-241.
176. Exposure to toxic elements via breast milk. Oskarsson et al., (1995). *Analyst* 120:765-770.
177. The mercury concentration in breast milk resulting from amalgam fillings and dietary habits. Drexler and Schaller (1998). *Environ. Res.* 77:124-129.
178. Mercury in human colostrum and early breast milk. Its dependence on dental amalgam and other factors. Drasch et. al., (1998). *J. Trace Elem. Med. Biol.* 12:23-27.
179. Exposure to mercury via breast milk in suckling offspring of maternal guinea pigs exposed to mercury vapor after parturition. Yoshida et. al., (1992). *J. Toxicol. Environ. Health* 35:135-139.
180. Milk transfer and tissue uptake of mercury in suckling offspring after exposure of lactating maternal guinea pigs to inorganic or methylmercury. Yoshida et. al., (1994). *Arch. Toxicol.* 68:174-178.
181. Kinetics of methylmercury and inorganic mercury in lactating and nonlactating mice. Sundberg et al., (1998). *Toxicol. Appl. Pharmacol.* 151:319-329.
182. Occupational mercury vapour exposure and testicular, pituitary and thyroid endocrine function. McGregor and Mason (1991). *Hum. Exp. Toxicol.* 10:199-203.
183. Paternal exposure to mercury and spontaneous abortions. Cordier et. al., (1991). *Br. J. Ind. Med.* 48:375-381.
184. Effect of organic and inorganic mercury on human sperm motility. Ernst and Lauritsen (1991). *Pharmacol. Toxicol.* 68:440-444.
185. Autometallographic detection of mercury in testicular tissue of an infertile man exposed to mercury vapor. Keck et al., (1993). *Reprod. Toxicol.* 7:469-475.
186. Hong Kong male subfertility links to mercury in human hair and fish. Dickman et al., (1998). *Sci. Total Environ.* 214:165-174.

Amalgam Mercury, Antibiotic Resistant Bacteria and Immune System Impairment

187. Antibiotic resistance in oral/respiratory bacteria. Roberts (1998). *Crit. Rev. Oral Biol. Med.* 9:522-540.
188. The dental amalgam mercury controversy-inorganic mercury and the CNS; genetic linkage of mercury and antibiotic resistances in intestinal bacteria. Lorscheider et al., (1995). *Toxicology* 97:19-22.
189. Mercury released from dental "silver" fillings provokes an increase in mercury- and antibiotic -resistant bacteria in oral and intestinal floras of primates. Summers et. al., (1993). *Antimicrob. Agents Chemother.* 37:825-834.

190. Resistance of the normal human microflora to mercury and antimicrobials after exposure to mercury from dental amalgam fillings. Edlund et. al., (1996). *Clin. Infect. Dis.* 22:944-950.
191. The impact of mercury released from dental "silver" fillings on antibiotic resistances in the primate oral and intestinal bacterial flora. Liebert et. al., (1997). *Met. Ions Biol. Syst.* 34:441-460.
192. The resistance and adaptation of selected oral bacteria to mercury and its impact on their growth. Lyttle and Bowden (1993). *J. Dent. Res.* 72:1325-1330.
193. Effects of mercury on the immune system. Pollard and Hultman. (1997). *Met. Ions Biol. Sys.* 34:421-440.
194. Dental amalgam and antibiotic resistance-an association? Editorial (1997). *Sci. Prog.* 80:103-106. Antibiotic resistance mechanisms in bacteria of oral and upper respiratory origin. Roberts (1998). *Int. J. Antimicrob. Agents* 9:255-267.
195. Effects of occupational exposure to mercury vapors on T-cell and NK-cell populations. Moszczynski et al., (1996). *Arch. Med. Res.* 27:503-507.
196. Cloning of mercury-resistance gene from R-plasmid in *Escherichia coli* isolated from dental hospital sewage. Arai and Abiko (1989). *Gen. Pharmacol.* 20:609-614.
197. Heavy metal resistance in clinical isolates of *Pseudomonas aeruginosa*. Vasishta et. al., (1989). *Folia Microbiol. (Praha)* 34:448-452.
198. Loss of mercury from amalgam fillings and abnormal oral bacterial flora as a cause of periodontal disease. Till (1978). *ZWR* 87:1076-1083.
199. Study of the horizontal transfer of mercury resistance genes in natural populations of bacteria using antibodies to mercury reductases. Bogdanova et. al., (1988). *Mol. Gen. Mikrobiol. Virusol.* 12:16-23.
200. Does amalgam affect the immune system? A controversial issue. Enestrom and Hultman (1995). *Int. Arch. Allergy Immunol.* 106:180-203.
201. Effects of mercury on the immune system. Pollard and Hultman (1997). *Met. Ions Biol. Syst.* 34:421-440.
202. Activation of the immune system and systemic immune-complex deposits in Brown Norway rats with dental amalgam restorations. Hultman et. al., (1998). *J. Dent. Res.* 77:1415-1425.
203. Adverse immunological effects and autoimmunity induced by dental amalgam and alloy in mice. Hultman et al., (1994). *FASEB J.* 8:1183-1190.
204. Localized cellular inflammatory responses to subcutaneously implanted dental mercury. Nadarajah et. al., (1996). *J. Toxicol. Environ. Health* 49:113-125.
205. Cellular inflammatory responses to implanted dental materials. Nadarajah et. al., (1996). *J. Prosthet. Dent.* 75:552-561.
206. In vitro effects of mercuric chloride ($HgCl_2$) on human mononuclear cells. Loftus et. al., (1997). *Clin. Exp. Immunol.* 110:418-422.
207. Cytotoxicity and accumulation of Hg, Ag, Cd, Cu, Pb, and Zn in human peripheral T and B lymphocytes and monocytes in vitro. Steffenson et. al., (1994). *Gen. Pharmacol.* 25:1621-1633.
208. Immunotoxic effects of mercuric compounds on human lymphocytes and monocytes. I. Suppression of T-cell activation. Shenker et. al., (1992). *Immunopharmacol. Immunotoxicol.* 14:539-553.
209. Immunotoxic effects of mercuric compounds on human lymphocytes and monocytes. II. Alterations in cell viability. Shenker et. al., (1992). *Immunopharmacol. Immunotoxicol.* 14:555-577.
210. Immunotoxic effects of mercuric compounds on human lymphocytes and monocytes. III. Alterations in B-cell function. Shenker et. al., (1993). *Immunopharmacol. Immunotoxicol.* 15:87-112.
211. Immunotoxic effects of mercuric compounds on human lymphocytes and monocytes. IV. Alterations in cellular glutathione content. Shenker et. al., (1993). *Immunopharmacol. Immunotoxicol.* 15:273-290.
212. Immunotoxicology of cadmium and mercury on B-lymphocytes I. Effects on lymphocyte function. Daum et al., (1993). *Int. J. Immunopharmacol.* 15:383-394.
213. In vitro effects of mercuric chloride ($HgCl_2$) on human mononuclear cells. Loftus et. al., (1997). *Clin. Exp. Immunol.* 110:418-422.
214. Effects of mercury on human polymorphonuclear leukocyte function in vitro. Contrino et. al., (1988). *Am. J. Pathol.* 132:110-118.
215. Low levels of mercury inhibit the respiratory burst in human polymorphonuclear leukocytes. Malamud et. al., (1985). *Biochem. Biophys. Res. Commun.* 128:1145-1151.
216. Parameters of immunity acute phase reaction in men in relation to exposure duration to mercury vapours. Moszczynski et. al., (1991). *J. Hyg. Epidemiol. Microbiol. Immunol.* 35:351-360.
217. The level of mercury in human dental plaque and interactions in vitro between biofilms of

- Streptococcus mutans and dental amalgam. Little and Bowden (1993). *J. Dent. Res.* 72:1320-1324
218. Acute exposure to mercury from amalgam: no short-time effect on the peripheral blood lymphocytes in healthy individuals. Loftenius et al., (1998). *J. Toxicol. Environ. Health* 54:547-560.)
219. Methylation of mercury from dental amalgam and mercuric chloride by oral streptococci in vitro. Heintze et. al., (1983). *Scand. J. Dent. Res.* 91:150-152
220. Mercury sensitization induced by environmental exposure. Mori et al., (1998). *Nippon Eisenigaku Zasshi* 52:661-666
221. An epidemiological study of factors relating to mercury sensitization. Sato et al., (1995). *Arerugi* 44:86-92

Toxic Effects of Mercury Released from Dental Amalgam Restorations and Endodontic Filling Materials.

222. Toxicity assessment of mercury vapor from dental amalgams. Goering et. al., (1992). *Fundam. Appl. Toxicol.* 19:319-329.
223. The future of dental amalgam: a review of the literature. Part 6: Possible harmful effects of mercury from dental amalgam. Eley (1997). *Br. Dent. J.* 182:455-459.
224. Documented clinical side-effects to dental amalgam. Ziff (1992). *Adv. Dent. Res.* 6:131-134. Evaluation of the safety issue of mercury release from dental fillings. Lorscheider and Vimy (1993). *FASEB J.* 7:1432-1433.
225. Mercury neurotoxicity: mechanisms of blood-brain barrier transport. Aschner and Aschner (1990). *Neurosci. Biobehav. Rev.* 14:169-176.
226. The toxicology of mercury. Clarkson (1997). *Crit. Rev. Clin. Lab. Sci.* 34:369-403.
227. Cytotoxicity of amalgams, alloys, and their elements and phases. Kaga et. al., (1991). *Dent. Mater.* 7:68-72.
228. Cytotoxic effects of restorative materials on early passage cultured cells derived from human gingiva. Yamagata and Oshima (1990). *Shika Zairyo Kikai* 9:541-554.
229. Cytotoxicity of amalgams. Kaga et. al., (1988). *J. Dent. Res.* 67:1221-1224.
230. Correlation of cytotoxicity with element release from mercury- and gallium-based dental alloys in vitro. Wataha et. al., (1994). *Dent. Mater.* 10:298-303..
231. Cytotoxicity of gallium and indium ions compared with mercuric ion. Chandler et. al., (1994). *J. Dent. Res.* 73:1554-1559.
232. Quantitative evaluation by measuring affected area for cytotoxicity of dental materials. Kaga et al., (1990). *Shika Zairyo Kikai* 9:591-599.
233. The mechanism of Hg²⁺ toxicity in cultured human oral fibroblasts: the involvement of cellular thiols. Liu et. al., (1992). *Chem. Biol. Interact.* 85:69-78.
234. Toxic effects of various retrograde root fillings materials on gingival fibroblasts and rat sarcoma cells. Peltola et. al., (1992). *Endod. Dent. Traumatol.* 8:120-124.
235. In vitro testing of dental materials by means of macrophage cultures: II. Effects of particulate dental amalgams and their constituent phases on cultured macrophages. Syrjanen et. al., (1986). *J. Biomed. Mater. Res.* 20:1125-1138.
236. Cytotoxicity of endodontic materials. Osorio et. al., (1998). *J. Endod.* 24:91-96.
237. Cytotoxicity of retrofill materials. Bruce et. al., (1993). *J. Endod.* 19:288-292. .
238. Corrosion products from dental alloys and effects of mercuric and cupric ions on a neuroeffector system. Moberg (1985). *Swed. Dent. J. Suppl.* 29:1-51.
239. Development of low- and high-serum culture conditions for use of human oral fibroblasts in toxicity testing of dental materials. Liu et. al., (1991). *J. Dent. Res.* 70:1068-1073
240. A possible case of mercury-related toxicity resulting from the grinding of old amalgam restorations. Taskinen et. al., (1989). *Scand. J. Work Environ. Health* 15:302-304.
241. Toxic Effects of Mercury on the Cardiovascular System Marked elevation of myocardial trace elements in idiopathic dilated cardiomyopathy compared with secondary cardiac dysfunction. Frustaci et al., (1999). *J. Am. Coll. Cardiol.* 33:1578-83.
242. Intake of Mercury From Fish, Lipid Peroxidation, and the Risk of Myocardial Infarction and Coronary, Cardiovascular, and Any Death in Eastern Finnish Men. Jukka et al., (1995) *Circulation.* 91:645-655. .
243. Effects of mercury on the isolated heart muscle are prevented by DTT and cysteine. Vassallo et al.,

- (1999). Toxicol. Appl. Pharmacol. 156:113-118. .
244. The chamber exposure of laboratory rats to metal oxides originating from metal producing industry. Kovacikova and Chorvatovicova (1997). Physiol. Res. 46:41-45. .
245. Mercury effects on the contractile activity of isolated heart muscle. Oliveira et al., (1994). Toxicol. Appl. Pharmacol. 128:86-91..
246. Mercury compounds: lipophilicity and toxic effects on isolated myocardial tissue. Halbach (1990). Arch. Toxicol. 64:315-319..
247. The relationship between mercury from dental amalgam and the cardiovascular disease. Siblerud (1990). Sci. Total Environ. 99:23-35. .
248. Hemodynamic and electrophysiological effects of mercury in intact anesthetized rabbits and in isolated perfused hearts. Rhee and Choi (1989). Exp. Mol. Pathol. 50:281-290.
249. Cardiovascular homeostasis in rats chronically exposed to mercuric chloride. Carmignani and Boscolo (1984). Arch. Toxicol. Suppl. 7:383-388.
250. Mechanisms in cardiovascular regulation following chronic exposure of male rats to inorganic mercury. Carmignani et al., (1983). Toxicol. Appl. Pharmacol. 69:442-450