



Sympathetic Vibratory Physics

*Therapeutic Silver
Bibliography*

Dr. A. Bart Flick

“My system, in every part and detail, both in the developing of this power and in every branch of its utilization, is based and founded on *sympathetic vibration*. In no other way would it be possible to awaken or develop this force, and equally impossible would it be to operate my engine upon any other principle.”

John Keely, 1888

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SILVER BIBLIOGRAPHY

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1. Addicks, L. et al.: *Silver in Industry*, Reinhold Pub. Corp., NY 401-450, 584-597 (1940). Extensive bibliography on silver for water purification.
2. Akiyama, H. and Okamoto, S., *Prophylaxis of indwelling urethral catheter infection: clinical experience with a modified Foley catheter and drainage system*, J. Urol., 121, 40, 1979.
3. Avakyan, Z.A., *Comparative toxicity of heavy metals for certain microorganisms*, Microbiology, 36, 366, 1967.
4. Baenziger, N.C., *Description of the structure of three silver-containing drug complexes*, First International Conference on Gold and Silver in Medicine, Bethesda, MD, May 13-14, 1987.
5. Barranco, S.D. and Colmano, G., *Electrical Inhibition of Staphylococcus aureus*, Virginia Medical, 646, 1976.
6. Barranco, S.D., Spadaro, J.A., Berger, T.J., and Becker, R.O., *In vitro effect of weak direct current on staphylococcus aureus*, Clinical Orthopaedics, 100, 250, 1974.
7. Becker, R.O., *Electrical treatment of osteomyelitis*, Surgery of the Musculoskeletal System, Churchill Livingstone, New York, 1983, 4, 10-197.
8. Becker, R.O., *The effect of electrically generated silver ions on human cells*, First International Conference on Gold and Silver in Medicine, Bethesda, MD, May 13-14, 1987.
9. Becker, R.O., *Effect of anodally generated silver ions on fibrosarcoma cells*, Electro- and Magneto-bio., 11, 57, 1992.
10. Becker, R.O. and Esper, C., *Electrostimulation and undetected malignant tumors*, Clin. Orthop., 161, 336, 1981.
11. Becker, R.O. and Spadaro, J.A., *Treatment of Orthopedic Infections with electrically generated silver ions*, J. Bone Jt. Surgery., 60-A, 871, 1978.
12. Benvenisty, A.I., Tannenbaum, G., Ahlborn, T.N., Fox, C.L., Modak, S., Sampath, L., Reemtsma, K. and Nowygrod, R., *Control of prosthetic bacterial infections: evaluation of an easily incorporated, tightly bound, silver antibiotic PTFE graft*, J. Surg. Res., 44,1, 1988.
13. Berger, T.J., Spadaro, J.A., Chapin, S.E., and Becker, R.O., *Electrically generated silver ions: quantitative effects on bacterial and mammalian cells*, Antimicrob. Agents Chemother., 9, 357, 1976.
14. Berger, T.J., Spadaro, J.A., Bierman, R., Chapin, S.E., and Becker, R.O., *Antifungal properties of electrically generated metallic ions*, Antimicrob. Agents Chemother., 10, 856, 1976.
15. Block, Seymour, Ed.: *Disinfection, Sterilization and Preservation*, Chapter 18; Lea & Febiger & Co., Philadelphia, 3rd Ed (1983). Extensive bibliography.
16. Bolton, L., Foleno, B., Means, B., and Petrucelli, S., *Direct-current bactericidal effect on intact skin*, Antimicrob. Agents Chemother., 18, 137, 1980.
17. Bolton, M., *The effects of various metals on the growth of certain bacteria*, Am. Phys., ?, 174, ?.
18. Bragg, P.D. and Rainnie, D.J., *The effect of silver ions on the respiratory chain of Escherichia coli*, Can. J. Microbiol., 20, 883, 1974.

19. Buckley, W.R.: *Localized Argyria*, Arch. Dermatol. 88: 531-539, 1963.
20. Bult, A., *Silver sulfanilamides and related compounds for dermatological application*, First International Conference on Gold and Silver in Medicine, Bethesda, MD, May 13-14, 1987.
21. Burke, J.F., and Bondoc, C.C., *Combined burn therapy utilizing immediate skin allografts and 0.5% AgNO₃*, Arch. Surg., 97, 716, 1968.
22. Burleson, R., and Eiseman, B., *Mechanisms of antibacterial effect of biologic dressings*, Ann. Surg., 177, 181, 1973.
23. Burleson, R., and Eiseman, B., *Effect of skin dressings and topical antibiotics on healing of partial thickness skin wounds in rats*, Surg. Gynecol. Obstet., 136, 958, 1973.
24. Butts, A., *The chemical properties of silver*, Silver-Economics, Metallurgy, and Use, ed. Butts, A., Krieger, Huntington, NY 1975, 123.
25. Carr, H.S., Wlodkowski, T.J., Rosenkranz, H.S., *Silver-sulfadiazine: in vitro antibacterial activity*, Antimicrob. Agents Chemother., 4, 585, 1973.
26. Chu, C.S., McManus, A.T., Okerberg, C.V., Mason, A.D., and Pruitt, B.A., *Weak direct current accelerates split-thickness graft healing on tangentially excised second-degree burns*, J. Burn Care Rehab., 12, 285, 1991.
27. Chu, C.S., McManus, A.T., Mason, A.D., Okerberg, C.V. and Pruitt, B.A., *Multiple graft harvestings from deep partial-thickness scald wounds healed under the influence of weak direct current*, J. Trauma, 30, 1044, 1990.
28. Chu, C.C., Tsai, W.C., Yao, J.Y., and Chiu, S.S., *Newly made antibacterial braided nylon sutures. I. In vitro qualitative and in vivo preliminary biocompatibility study*, J. Biomed. Mater. Res., 21, 1281, 1987
29. Cieszynski, T., *Influence of negative electricity on infected callus and osteitis*, Acta Morphologica Acad. Sci. Hung., 15, 309, 1967.
30. Collinge, C.A., Goll, G., Seligson, D. and Easley, K.J., *Pin tract infections: silver vs. uncoated pins*. Orthopedics, 17, 445, 1994.
31. Colmano, G., *Medical Applications of monomolecular films of silver, gold and other metals*, International Conference on Gold and Silver in Medicine, Bethesda, MD, May 13-14, 1987.
32. Colmano, G., and Barranco, S.D., *Inhibition of staphylococcus aureus on a contaminated electrode in the femur of the rabbit by low electrical current and its relation to stress*, Biophys. J., 15, 28a, 1975.
33. Colmano, G., and Barranco, S.D., *Staphylococcus aureus inhibition by low direct current on silver electrodes in the femur of rabbits*. Fifty-third Annual meeting of the Virginia Academy of Science, Harrisonburg, VA, May 6-9, 1975.
34. Colmano, G., Edwards, S.S., Lesch, T.E., and Barranco, S.D., *Control of Staphylococcus aureus osteomyelitis by microampere activation of metal ions in monomolecular films on stainless steel pins*, Fifty-Third Annual Meeting of the Virginia Academy of Science, Harrisonburg, VA, May 6-9,
35. Colmano, G., Edwards, S.S., and Barranco, S.D. *Activation of antibacterial silver coatings on surgical implants by direct current: preliminary studies in rabbits*, __, 41, 964, 1980.

36. Colmano, G. , Edwards, S.S., Fainter, L.K. and Barranco, S. D., *Electronmicrographs of silver and stainless steel surgical implants coated with silver compounds to control S. Aureus by direct current activation*, Twenty-eighth Annual ORS, New Orleans, LA, January 19-21, 1982.
37. Colmano, G., Edwards, S.S. and Barranco, S.L., *Effects of low direct current on monomolecular layers of metal stearates coating electrodes in bacterial cultures and surgical implants*, Symposium URSI "Ondes Electro-magnetiques et Biologie", Jouy-en-Josas, Juillet, 1980, 149.
38. Colmano, G., Fainter, L.K., Edwards, S.S., and Barranco, S.D., *SEM of S. aureus on current-activated surgical pins coated with silver and silver stearate monolayers*, Second Annual BRAGS, Oxford, U.K., Sept. 20-22, 1982.
39. Cowlshaw, J., Spadaro, J.A., Becker, R.A., *Inhibition of enzyme induction in e. coli by anadoc silver*, J. Bioelectricity, 1, 295, 1982.
40. Crannell, M.Y., *Silver in Medicine, Silver-Economics, Metallurgy and Use*, ed. Butts, A., Krieger, Huntington, NY, 1975, 227.
41. Cullen, J.M. and Spadaro, J.A., *Axonal regeneration in the spinal cord: a role for applied electricity*, J. Bioelectricity, 2, 57, 1983.
42. Danscher, G., Rytter Norgaard, J.O., and Baatrup, E., *Autometallography: tissue metals demonstrated by a silver enhancement kit*, Histochemistry, 86, 465, 1987.
43. Deitch, E.A., Marino, A.A., Gillespie, T.E., and Albright, J.A., *Silver-nylon: a new antimicrobial agent*, Antimicrob. Agents Chemother., 23, 356, 1983.
44. Deitch, E. A. , Marino, A. A . , Malaleonok, V. , and Alb richt, J . A . , *Silver nylon cloth: in vitro and in vivo evaluation of antimicrobial activity*, J. Trauma, 27, 301, 1987.
45. Doherty, P.J. and Williams, D.F., *The response of cells and cellular enzymes to silver*, presented at Biointeractions '87, Cambridge, U.K., July 6-8, 1987, 38.
46. Conahue, G.F., *The analytical chemistry of silver,...*
47. Eichhom, G.L., Shin, Y.A., Butzow, J.J., Clark, P., and Tarien, E., *Interaction of metal ions with biological systems, with special reference to silver and gold*, First International Conference on Gold and Silver in Medicine, Bethesda, MD, May 13-14, 1987.
48. Ellerman-Eriksen, S., Rungby, J., and Morgensen, S.C., *Autointerference in silver accumulation in macrophages without affecting phagocytic, migratory or interferon-producing capacity*, Virchows Arch., B. 53, 243, 1987.
49. Ersek, R.A., and Navarro, J.A., *Maximizing wound healing with silver impregnated porcine xenograft*, Today's OR Nurse, 12, 4, 1990.
50. Ersek, R.A., and Denton, D.R., *Cross-linked silver-impregnated skin for burn wound management*, J. Burn Care Rehabil., 9, 476, 1988.
51. Ersek, R.A., Gadaria, U., and Denton, D.R., *New natural wound dressing*, Phys. Ther. Forum, 5, 1, 1986.
52. Ersek, R.A., and Denton, D.R., *Silver-impregnated porcine xenograft for damaged or missing skin*, Contemp. Surg., 23, 83, 1983.

53. Ersek, R.A., and Denton, D.R., *Treatment of skin graft donor sites using silver-impregnated porcine xenograft*, Contemp. Orthop., 12, 27, 1986.
54. Ersek, R. A. and Denton, D . R. , *Silver-impregnated porcine xenografts for treatment of meshed autografts*, Plast. Surg., 13, 482, 1984.
55. Ersek R.A. and Lorio, J., *The most indolent ulcers of the skin treated with porcine xenografts and silver ions*, Surg. Gynecol. Obstet., 158, 431, 1984.
56. Ersek, R.A., and Denton, D.R., *Rhinophyma: treatment with electrocautery and silver-impregnated porcine xenograft*, Plast. Reconstr. Surg., 74, 269, 1984.
57. Ersek, R.A., and Hachen, H.J., *Porcine xenografts in the treatment of pressure ulcers*, Ann. Plast. Surg., 5, 464, 1980.
58. Ersek, R.A., and Denton, D.R., *Nail bed avulsions treated with porcine xenografts*, J. Hand Surg., 10A, 152, 1985.
59. Ersek, R.A., Denton, D.R., Surak, G.M., and Peters, C.W., *Treatment of spider bites with silver-impregnated porcine xenografts*, Texas Med., 81, 32, 1985.
60. Falcone, A.E., and Spadaro, J.A., *Inhibitory effects of electrically activated silver material on cutaneous wound bacteria*, Plast. Reconstruc. Surg., 77, 455, 1986.
61. Flick, A.B., *Clinical application of electrical silver iontophoresis*, First International Conference on Gold and Silver in Medicine, Bethesda, MD, May 13-14, 1987.
62. Flowers III, R.H., Schwenzer, K.J., Kopel, R.F., Fisch, M.J., Tucker, S.I., and Farr, B.M., *Efficacy of an attachable subcutaneous cuff for the prevention of intravascular catheter-related infection*. JAMA, 261, 878, 1989.
63. Fox, C.L., Jr.: *Silver Sulfadiazine - A New Topical Therapy for Pseudomonas in Burns*; Arch. Surg., 96, 184-188 (1968)
64. Fox, C.L. and Modak, S.M., *Mechanism of silver sulfadiazine action on burn wound infections*, Antimicrob. Agents Chemother., 5, 582, 1974.
65. Fox, C.L. and Quintiliani, R., *Uses of silver sulfadiazine in burns and surgical wounds*, Inf. in Surg., 13, 1982.
66. Furst, A., Schlauder, M.C.: *Inactivity of Two Noble Metals as Carcinogens*; Jour. Environmental Pathology and Toxicology, 1, 51-57
67. Geddes, L.A., and Baker, L.E., *chlorided silver electrodes*, Med. Res. Eng., Third quarter, 33, 1967.
68. Golubovich, V.N., and Rabotnova, I.L., *Kinetics of growth inhibition in Candida utilis by silver ions*, Microbio., 43, 948, 1974.
69. Gristina, A.G., and Costerton, J.W., *Bacterial adherence to Biomaterials and tissue*, J. Bone Jt. Surg., 67-A, 264, 1985.
70. Gruen, L.C., *Interaction of amino acids with silver ions*, Biochim. Biophys. Acta, 386, 270, 1975.
71. Haeger, K., *Preoperative treatment of leg ulcers with silver spray and aluminum foil*, Acta Chir. Scand., 125, 32, 1963.

72. Hall, R.E., Bender, G., and Marquis, R.E., *In vitro effects of ion intensity direct current generated silver on eukaryotic cells*, J. Oral Maxillofac. Surg., 46, 128, 1988.
73. Hall, R.E., Bender, G., and Marquis, R.E., *Inhibitory and cidal antimicrobial actions of electrically generated silver ions*, J. Oral Maxillofac. Surg., 45, 779, 1987.
74. Halsted, W.S., *Ligature and suture material: the employment of fine silk in preference to catgut and the advantages of transfixion of tissues and vessels in control of hemorrhage - also an account of the introduction of gloves, gutta-percha tissue and silver foil*, JAMA, LX, 1119, 1913.
75. Harker, J.M., and Hunter, D.: *Occupational Argyria*, Br J. Dermatol. 47: 441-455, 1935.
76. Harrison, H.N., *Pharmacology of Sulfadiazine silver*, Arch. Surg., 114, 281, 1979.
77. Haynes, J.L., and Schulte, T.H., *Antibacterial silver surfaces and assessment of needs and opportunities for clinical devices*, First International Conference on Gold and Silver in Medicine, Bethesda, MD, May 13-14, 1987.
78. Hendry, A.T., and Stewart, I.O., *Silver-resistant enterobacteriaceae from hospital patients*, Can. J. Microbiol., 25, 915, 1979.
79. Holder, I.A., Knoll, C.A., and Wesselman, J., *Norfloxacin and silvernorfloxacin as topical antimicrobial agents: results of in vitro susceptibility testing against bacteria and Candida sp. isolated from burn patients*, First International Conference on Gold and Silver in Medicine, Bethesda, MD, May 13-14, 1987.
80. Janz, G.J., and Ives, D.J.G., *Silver, silver chloride electrodes*, Ann. N.Y. Acad. Sci., ?, 210, ?.
81. Jono, K., Yamano, T., Fujimoto, T., and Eguchi, Y.: *Bactericidal Action of Active Carbon Coated With Silver and Its Application to Water Purifiers*; J. Takeda Research Lab., 33, 9-18, (1974).
82. Jones, A.M., and Bailey, J.A.: *Effect of Silver from Cloud Seeding on Rabbits; Water, Air and Soil Pollution*, 3/3, 353-363 (1974).
83. Kahn, J., *Acetic acid iontophoresis for calcium deposits*, Phys. Ther., 57, 658, 1977.
84. Kahn, J., *Calcium iontophoresis in suspected myopathy*, Phys. Ther.
85. Kirchoff, D.A.: *Localized Argyria After a Surgical Endodontic Procedure*, Oral Surg. 32: 613-617, 1971.
86. Kramer, S.J., Spadaro, J.A. and Webster, D.A., *Antibacterial and osteoinductive properties of demineralized bone matrix treated with silver*, Clin. Orthop. Rel. Res., 161, 154, 1981.
87. Kul'skii, L.A., Savluk, O.S., Moroz, O.G., and Kornievakay, L.P.: *Disinfection and Conservation of Water with Silver* (Russian), Aktualne Vodoprovedeniye Sanitarniy Mikrobiologii, 111 (1973).
88. Landeen, L.K., Yahya, M.T., Kutz, S.M., Gerba, C.P.: *Microbiological Evaluation of Copper: Silver Disinfection Units for Use in Swimming Pools*; Water Science Tech., 21, 3, 267-270 (1989).
89. Lee, J.V., Hibberd, M.L. and Stanley, S.C.: *A Comparison of the Biocidal Properties of Silver Ions and Chloride Against Legionella Species*; PHLS Centre for Applied Microbiology and Research, Porton Down, Salisbury SP4 OJG, England, DD3/2 AGREPORT (1989).
90. McHugh, G.L., Moellering, R.C., Hopkins, C.C. and Swartz, M.N., *Salmonella typhimurium resistant to silver nitrate, chloramphenicol and ampicilin*, Lancet, ii, 235, 1975.

91. McNamara, A. and Williams, D.F., *Scanning electron microscopy of the metal-tissue interface*, Biomaterials, 3, 160, 1982.
92. MacKeen, P.C., Person, S., Warner, S.C., Snipes, W., and Stevens, S.E., *Silver-coated nylon fiber as an antibacterial agent*, Antimicrob. Agents Chemother., 31, 93, 1987.
93. Madden, M.R., Nolan, E., Finkelstein, J.L., Yurt, R.W., Smeland, J., Goodwin, C.W., Hefton, J., and Staiano-Coico, L., *Comparison of an occlusive and semi-occlusive dressing and the effect of the wound exudate upon keratinocyte proliferation*, J. Trauma, 29, 924, 1989.
94. Mahan, J., Seligson, D., Henry, S.L., Hynes, P., and Dobbins, J., *Factors in pin tract infections*, Orthopedics, 14, 305, 1991.
95. Maki, D.G., Cobb, L., Garman, J.K., Shapiro, J.M., Ringer, M., and Helgerson, R.B., *An attachable silver-impregnated cuff for prevention of infection with central venous catheters: a prospective randomized multicenter trial*, Am. J. Med., 85, 307, 1988.
96. Marchant, R.E., Miller, K.M. and Anderson, J.M., *In vivo Leukocyte interactions with Biomer*, J. Biomed. Mater. Res., 18, 1169, 1984.
97. Marino, A.A., Malakonok, V., Albright, J.A., Deitch, E.A. and Specian, R.D., *Electrochemical properties of silver-nylon fabrics*, J. Electrochem. Soc., 132, 68, 1985.
98. Marino, A.A., *Electromagnetic fields, cancer and the theory of neuroendocrine related promotion*, Bioelectrochem. Bioenergetics, 29- 255, 1993.
99. Marino, A.A., Deitch, E.A., Malakanok, V., Albright, J.A., and Specian, R. D., *Electrical augmentation of the antimicrobial activity of silver-nylon fabrics*, J. Biol. Phys., 12, 93, 1984.
100. Marino, A.A., Malakanok, V., Deitch, E.A., and Albright, J., *Electrical properties of silver-nylon*, Third Annual BRAGS, San Francisco, CA, Oct. 2-5, 1983, 36.
101. Marino, A.A., Deitch, E.A. and Albright, J.A., *Electric silver antisepsis*, IEEE Trans. Biomed. Eng., BME-32, 336, 1985.
102. Marino, A.A., Berger, T.J., Becker, R.O. and Spadaro, J.A., *The effects of selected metals on marrow cells in culture*, Chem. Biol. Interactions, 9, 217, 1974.
103. Marshall, J.P., and Schneider, R.P.: *Systemic Argyria Secondary to Topical Silver Nitrate*, Arch. Dermatol. 113: 1077-1079, 1977.
104. Mears, D.C., *Electron-probe microanalysis of tissue and cells from implant areas*, J. Bone Joint Surg., 48B, 567, 1966.
105. Merrill, C.R., *Silver-stain detection of proteins separated by polyacrylamide gel electrophoresis*, First International Conference on Gold and Silver in Medicine, Bethesda, MD, May 13-14, 1987.
106. Modak, S.M. and Fox, F.L., *Binding of silver sulfadiazine to the cellular components of Pseudomonas aeruginosa*, Biochem. Pharmacol., 22, 2391, 1973.
107. Modak, S.M., Sampath, L., Fox, C.L. *Combined use of silver sulfadiazine and antibiotics topically in burn wounds as a possible solution to bacterial resistance*, First International Conference on Gold and Silver in Medicine, Bethesda, MD, May 13-14, 1987.
108. Modak, S.M., Sampath, Lester and Fox, C.L.: *Combined Use of Silver Sulfadiazine and Antibiotics*

as a Possible Solution to Bacterial Resistance in Burn Wounds; Jour. Burn Care, Vol. 9, No. 4, p. 359 (July/Aug 1988).

109. Modak, S.M. and Fox, C.L. *Sulfadiazine silver-resistant Pseudomonas in burns: new topical agents*, Arch. Surg., 116, 854, 1981.
110. Nordenstrom, B.E.W. *Biokinetic impacts of structure and imaging of the lung: the concept of biologically closed electric circuits*. AJR, 145, 1985, 447.
111. Olcott, C.T.: *Experimental Argyrosis, IV, Morphological Changes in the Experimental Animal*; Am. Jour. of Pathology, 24, 813, (1948).
112. Orr, M.A., *Electroplating....*
113. Owen, M.C.R.: *A Case History of 30 Years of Use With Silver Disinfected Drinking Water*; Records of EPA Public Hearing on Revised Primary Drinking Water Regulations held Jan. 28, 1986.
114. Pareilleux, A. and Sizard, N., *Lethal effects of electric current on Escherichia coli*. Appl. Microbiol., 19, 421, 1970.
115. Pariser, R.J., *Generalized argyria: Clinopathologic Features and Histochemistry*, Arch. Dermatol., 114; 373-377, 1978.
116. Parker, W.A.: *Argyria and Cyanotic Heart Disease*, Am. J. Hosp. Pharm. 34: 287-789, 1977.
117. *Pharmacology and Therapeutics*; Pergamon Press, Series A, Vol. 1. 127-130 (1976).
118. Pifer, J.W., Fridlander, B.R., Kintz, R.T., and Stockdale, D.K., *Absence of toxic effects in silver reclamation workers*, Scand. J. Work Environ. Health, 15, 210, 1989.
119. Polachek, A.A., Cope, C.B., Willard, B.S., and Enns, T.: *Metabolism of Radioactive Silver in a Patient with Carcinoid*; Jour. Lab. and Clinical Medicine, 56, 1976-1979 (1949).
120. Rich, L.L., Epinette, W.W., and Wasser, W.K.: *Argyria Presenting as Cyanotic Heart Disease*, Am J. Cardiol. 30: 290, 1972.
121. Rode, H. de Wet, P.M. and Cywes, S., *Germicidal efficacy of silver sulfadiazine in burn wounds*. First International Conference on Gold and Silver in Medicine, Bethesda, MD, May 13-14, 1987.
122. Ronchese, F.: *Argyrosis and Cyanosis - Melanosis and Cyanosis*, Arch. Dermatol. 80: 277-282, 1959.
123. Rosenberg, B., Van Camp, L., and Krigas, T., *Inhibition of cell division in Escherichia coli by electrolysis products from a platinum electrode*, Nature, 205, 1965.
124. Rosenkranz, H.S. and Carr, H.S., *Silver sulfadiazine: effect on the growth and metabolism of bacteria*, Antimicrob. Agents Chemother., 2, 948-951, 1972.
125. Rosenkranz, H. S., Coward, J.E., Wlodkowski, T.J. and Carr, H. S. *Properties of silver sulfadiazine-resistant enterobacter cloacae*. Antimicrob. Agents Chemother., 5, 199, 1974.
126. Rosenkranz, H.S. and Rosenkranz, S., *Silver sulfadiazine: interaction with isolated deoxyribonucleic acid*, Antimicrob. Agents. Chemother., 2, 373, 1972.
127. Rosenman, K.D., Moss, A., Kon, S. *Argyria: Clinical Implications of Exposure to Silver Nitrate and Silver Oxide*; Jour. Occupational Med. 21, 430-435 (1979)

128. Ross, E.M.: *Argyria Caused by Chewing of Photographic Film*, N Engl. J. Med. 299: 798, 1963.
129. Rowley, B.A., and McKenna, J.M. *Electrical current effects on E. coli growth rates* (36269), P.S.E.B.M., 139, 929, 1972.
130. Rungby, J., *Experimental argyrosis: ultrastructural localization of silver in rat eye*, Exp. Mol. Pathol., 45, 22, 1986.
131. Rungby, J., *Exogenous silver in dorsal root ganglia, peripheral nerve, enteric ganglia and adrenal medulla*, Acta Neuropathol. (Berlin), 69, 46, 1986.
132. Rungby, J., Ellerman-Eriksen, S. and Danscher, G., *Effects of selenium on toxicity and ultrastructural localization of silver in cultured macrophages*, Arch. Toxicol., 61, 40, 1987.
133. Rungby, J., Huffman, P., and Ellermann-Eriksen, S., *Silver affects viability and structure of cultured mouse peritoneal macrophages and peroxidative capacity of whole mouse liver*, Arch. Toxicol., 59, 408, 1987.
134. Savluk, O.S.: *Influence of Anodically Dissolved Silver on the Reticuloendothelial System in Test Animals* (Russian); Vodopodgotovka I Ochistka Promyshlennyh Stokov, 10, 72-77 (1973).
135. Schaefer, A.J., K.O. and Johnson, S.M., *Effect of silver oxide/trichloroisocyanuric acid antimicrobial urinary drainage system on catheter associated bacteriuria*, J. Urol., 139, 69, 1988.
136. Shafik, A., *The electrified drain. A new device for sterilizing the field of drainage*, Int. Surg., 78, 357, 1993.
137. Sobotka, H., *Monomolecular layers,...*
138. Spadaro, J.A., *Silver anode inhibition of bacteria*, First International Conference on Gold and Silver in Medicine, Bethesda, MD, May 13-14, 1987.
139. Spadaro, J.A., *Antibacterial effects of silver electrodes*, Third Ann. Conf. Eng. Med. Biol. Soc. of IEEE, 1981, 215.
140. Spadaro, J.A., *Bioelectric stimulation of bone formation: methods, models and mechanisms*, J. Bioelect., 1, 99, 1982.
141. Spadaro, J.A., *Electrically stimulated bone growth in animals and man*. Clin. Orthop. Rel. Res., 122, 325, 1977.
142. Spadaro, J.A., *Bone formation arterial inhibition with silver and other electrodes*, Reconstr. Surg. Traumat. 19, 40, 1985.
143. Spadaro, J.A., *Electrical osteogenesis - role of the electrode material*, Electrical Prop. Bone Cartilage, ?, 189, 1979.
144. Spadaro, J.A., *Electrically enhanced osteogenesis at various metal cathodes*, J. Biomed. Mat. Res., 16, 861, 1982.
145. Spadaro, J.A. and Becker, R.O., *Function of implanted cathodes in electrode-induced bone growth*, Med. Biol. Eng. Comput., 17, 769, 1979.
146. Spadaro, J.A. and Becker, R.O. *Some specific cellular effects of electrically injected silver and gold ions*, Bioelectrochem. Bioenergetics, 3, 49, 1976.

147. Spadaro, J.A. and Becker, R.O., *Size-specific metal complexing sites in native collagen*, Nature, 225, 1134, 1970.
148. Spadaro, J.A., Berger, T.J., Barranco, S.D., Chapin, S.E., and Becker, R.O., *Antibacterial effects of silver electrodes with weak direct current*, Microb. Agents. Chemother., 6, 637, 1974.
149. Spadaro, J.A., Chase, S.E., and Webster, D.A., *Bacterial inhibition by electrical activation of percutaneous silver implants*, J. Biomed. Mater. Res., 20, 565, 1986.
150. Spadaro, J.A., Kramer, S.J., and Webster, D.A., *Antibacterial demineralized bone matrix using silver*, 28th Annual ORS, New Orleans, LA, Jan. 19-21, 1982.
151. Spadaro, J.A., Mino, D.E. and Chase, S.E., *Bone formation without current: The effect of electrode motion*, 30th Annual ORS, Atlanta, GA, Feb. 7-9, 1984, 69.
152. Spadaro, J.A., Mino, D.E., Chase, S.E., Werner, F.W. and Murray, D.G., *Mechanical factors in electrode-induced osteogenesis*, J. Orthop. Res., 4, 37, 1986.
153. Spadaro, J.A., Webster, D.A., Chapin, S.E., Yuan, H.A., Murray, D.G. and Becker, R.O. *Silver-PMMA antibacterial bone cement*, 24th Annual ORS, Dallas, TX, Feb. 21-23, 1978, 173.
154. Spadaro, J.A., Webster, D.A. and Chase, S.E., *Direct current activation of bacteriostatic silver electrodes*, Third Annual BRAGS, San Francisco, CA, Oct. 2-5, 1983.
155. Spadaro, J.A., Webster, D.A., and Becker, R.O., *Silver polymethyl methacrylate antibacterial bone cement*, Clin. Orthop. 143, 266, 1979.
156. Spadaro, J.A., Webster, D.A., Kovach, J. and Chase, S.E. *Antibacterial fixation pins with silver: animal models*, 30th Annual ORS, Atlanta, GA, Feb. 7-9, 1984, 335.
157. Tarr, R., Luck, J.V., Snyder, S. and Mills, B., *Laboratory experiences with silver electrode bone stimulation*, 29th Annual ORS, Anaheim, CA, March 8-10, 1983, 253.
158. Taubes, G., *An electrifying possibility*, Discover, 7, 23, 1986.
159. Thibodeau, E.A., Handelman, S.L. and Marquis, R.E., *Inhibition and killing of oral bacteria by silver ions generated with low intensity direct current*, J. Dent. Res., 57, 922, 1978.
160. Thurman, R.B., and Gerba, C.P.: *The Molecular Mechanisms of Copper and Silver Ion Disinfection of Bacteria and Viruses*; CRC Critical Reviews in Environmental Control, Vol 18, Issue 4 (1989). Extensive bibliography.
161. Tsai, W.C., Chu, C.C., Chin, S.S. and Yao, J.Y., *In vitro quantitative study of newly made antibacterial braided nylon sutures*, Surg. Gynecol. Obstet., 165, 207, 1987.
162. Vince, D.G. and Williams, D.F., *Determination of silver in blood and urine by graphite furnace atomic absorption spectrometry*, Analyst, 112, 1627,
163. Vince, D.G. and Williams, D.F., *Systemic distribution of metals following implantation*, presented at Biointeractions'87, Cambridge, U.K., July 6-8, 1987, 40.
164. Wataha, J.C., Hanks, C.T. and Craig, R.G., *The effect of cell monolayer density on the cytotoxicity of metal ions which are released from dental alloys*, Dent. Mater., 9, 172, 1993.
165. Watts, S.H., *The silver bolt as a means of fixing ununited fractures of certain long bones*. Johns

Hopkins Hospital Bulletin, April 1904, 135.

166. Webster, D.A., Spadaro, J.A., Kramer, S., and Becker, R.O., *Silver anode treatment of chronic osteomyelitis*, Clin. Orthop., 1961, 105, 1981.
167. West, H.D., Johnson, A.P., and Johnson, C.W.: *The Use of Radioactive Silver for the Detection of Abscesses and Tumors*; Jour. Lab. and Clinical Medicine, 34, 1976-1979 (1949).
168. Whalberg, Vivian: *The Crede Prophylaxis*; Acta Paediatrica Scandinavica, Supplement 295, Stockholm 1982.
169. Williams, D.F. *The biocompatibility of silver*, First International Conference on Gold and Silver in Medicine, Bethesda, MD, May 13-14, 1987.
170. Williams, D.F., *Definitions in Biomaterials*, Elsevier, Amsterdam, 1987.
171. Williams, D.F., and Doherty, P.J. and Oliver, C., *The analysis of inflammatory exudates in the assessment of biocompatibility*, presented at Biointeractions '87, Cambridge, U.K., July 6-7, 1987, 22.
172. Williams, R.L., Doherty, P.J., Vince, D.G., Grashoff, G.J. and Williams, D.F., *The biocompatibility of silver*, Critical Reviews in Biocompatibility, 5, 221, 1989.
173. Williams, R.L. and Williams, D.F., *Albumin absorption on metal surfaces*, Biomaterials, 1988.
174. Williams, R.L. and Williams, D.F., *The spatial resolution of protein absorption onogeneous metallic biomaterials*, J. Biomed. Mater. Res., 23, 339, 1989.
175. Williams, R.L. and Williams, D.F., *The effect of albumin on the wettability of pure metal and metal oxide surfaces*, J. Colloid Interface Sci., 126, 596, 1988.
176. Wlodkowski, T.J. and Rosenkranz, H.S., *Antifungal activity of silver sulphadiazine*, Lancet, 1972, 739.
177. Wysor, M.S. and Zollinhofer, R.E., *On the mode of action of silver sulfadiazine*, Pathol. Microbiol., 38, 296, 1972.
178. Wysor, M.S. and Zollinhofer, R.E., *Silver phosphanilamidopyrimidine*, Chemother. 18, 342, 1973.
179. Wysor, M.S. and Zollinhofer, R.E., *Reactivity of silver sulfadiazine and the silver uracils with the glucose oxidase of Aspergillus niger*, Enzyme, 14, 185, 1972-73.
180. Wysor, M.S. and Zollinhofer, R.E., *Deoxyribonucleic acid repair replication in Pseudomonas aeruginosa after sublethal doses of silver sulfadiazine*, Path. Microbiol. 39, 434, 1973.
181. Wolcott, L.E., Wheeler, P.C., Hardwicke, H.M. and Rowley, B.A., *Accelerated healing of skin ulcers by electrotherapy: preliminary clinical results*, Southern Med. J., 62, 795, 1969.
182. Zimmerman, R.L., *Piezoelectricity and biological materials*, J. Bioelectricity, 1, 265, 1982.
183. Zmener, O. and Dominguez, F., *Silver accumulations in periapical granulomas: report of five cases using the scanning electron microscope, the electron microprobe and other complementary methods*, Oral Surg. Oral Med. Oral Pathol., 65, 94, 1988.

ABSTRACTS AND OTHER INFORMATION

- Abstracts, silver and others.
- Colloidal Silver, general and ordering information.
- Gold Leaf/Gold - general information.
- Medical Uses of Silver.
- The Silver Institute: Silver is safe for purifying drinking water.
- E-Z Derm - abstracts.
- Hydron - abstracts
- Silver-activated charcoal dressings - abstracts.
- Silver antibiotic-bonded vascular grafts - abstracts.
- Silver and cell metabolism - abstracts.
- Silver nitrate electrophoresis - abstracts.
- Cultured epidermal autografts - abstracts.
- Inositol-phosphate: metabolism - abstracts.
- Interleukin-2 and Interleukin-6 - abstracts.
- Silver nitrate - abstracts.
- Povidone-iodine - abstracts.
- Epidermal growth factor - abstracts.
- Burns, physiology - abstracts.
- Silver sulfadiazine - abstracts.