

## ***WHAT LEADING DOCTORS, EXPERTS, SCIENTISTS, INSTITUTES & UNIVERSITIES SAY ABOUT SILVER***

- "Colloidal Silver will prove to be one of the greatest discoveries in preventative, natural health care of all time." - Canty & Baranowski
- " Studies showed the spectrum of organisms susceptible to electrically generated silver ions was wide action and compared favorably with other antibiotics." - J.A. Spadaro, Ph. D
- A study in 1992 concluded that silver terminated all viruses as well as bacteria by interfering with a microbe's chemical respiration. - The University Medical Center
- "Metal-binding proteins are important components of retroviruses such as human immunodeficiency virus (HIV). Therefore, metals could be used as antiviral agents. However, most metals are toxic for humans with the exception of silver which is toxic only to prokaryotic cells and viruses...Silver has also been shown to be a potent inhibitor of HIV protease. Silver is expected to interact potently with HIV proteins and to interrupt thereby the cellular replication of HIV at various stages such as interaction with surface receptors, gene expression or cellular biosynthesis of viruses. Possible therapeutic forms of silver...remain to be investigated."
  - Hussain, Saber, Anner, Rolf M., and Anner, Beatrice M. 1992. Cysteine protects Na, K-ATPase and isolated human lymphocytes from silver toxicity. *Biochemical and Biophysical Research Communications*, 189(3), 1444-1449
- "In addition to its antibacterial properties, silver is also being studied as an antifungal agent. A study published in *Mycoses* in 2007 indicated that silver is effective against four fungi 'which cause major fungal infections in humans': *Trichophyton rubrum*, *Candida albicans*, *Microsporum canis*, and *Aspergillus flavus*. Silver has also been studied as an antiviral, and has been shown 'to prevent [certain viruses] from being infective.'"
  - S.M. Foran, *Therapeutic Properties of Silver: an Historical and Technical Review*
- "Silver, in the form of metal or as dissolved ions, fights microorganisms by interfering with processes such as how they breathe and reproduce. Tests show that silver ions kill microorganisms ranging from harmful strains of e.coli that cause food-borne diseases to the staphylococcus bacteria responsible for serious infections. "
  - "The metal becomes more active against microbes when it's made into small particles because they can cover more surface area when they come into direct contact with bacteria, says Andrew Maynard, a physicist and chief scientific adviser to the Project on Emerging Nanotechnologies at the Woodrow Wilson International Center for Scholars in Washington."
  - Wall Street Journal, June 6, 2006, *The War Against Germs Has a Silver Lining*

- "Silver, and silver-based compounds, are highly antimicrobial thanks to silver's antiseptic properties to several species of bacteria, including the common kitchen microbe, E. coli. Silver nanoparticles interact with the outer membrane of bacteria, causing structural changes that lead to degradation and eventually death of the microbe."

-- Nature Materials, 2008, doi:10.1038/nmat2099

- "Applying colloidal silver to human subjects has been done in a large number of cases with astonishingly successful results...it has the advantage of being rapidly fatal to parasites without toxic action on its host. It is quite stable. It protects rabbits from ten times the lethal dose of tetanus or diphtheria toxin."

-- The Use of Colloids in Health and Disease (1919), by Alfred Searle

- "Colloidal silver is an inexpensive healing agent and disinfectant that has a myriad of applications. It is a clear golden liquid composed of 99.9-percent pure silver particles approximately 0.001 to 0.01 microns in diameter that are suspended in pure water. Colloidal silver can be mixed with either tap or distilled water and applied topically, taken by mouth, or administered intravenously."

-- Prescription For Nutritional Healing by Phyllis A Balch CNC and James F Balch MD, pg 66

- "Trace amounts of silver are in the bodies of all humans and animals. We normally take in between 70 and 88 micrograms of silver a day, half of that amount from our diet. Humans have evolved with efficient methods of dealing with that intake, however. Over 99 percent is readily excreted from the body.

Is silver harmful to humans? Unlike other metals such as lead and mercury, silver is not toxic to humans and is not known to cause cancer, reproductive or neurological damage, or other chronic adverse effects."

-- Dartmouth University Toxic Metals Research Program

- "It killed not only the HIV virus, but every virus that was tested in the lab."

- U.C.L.A. Medical Center

"Silver is non-toxic, safe inorganic antibacterial agent being used for centuries and is capable of killing about 650 microorganisms that cause disease. Silver has been described as being 'oligodynamic', that is, its ions are capable of causing a bacteriostatic (growth inhibition) or even a bactericidal (antibacterial) impact. Therefore, it has the ability to exert a bactericidal effect at minute concentrations. It has a significant potential for a wide range of biological applications such as antibacterial agents for antibiotic resistant bacteria, preventing infections, healing wounds and anti-inflammatory. Silver ions (Ag<sup>+</sup>) and its compounds are highly toxic to microorganisms exhibiting strong biocidal effects on many species of bacteria but have a low toxicity toward animal cells."

-- Muhammad Raffi, Synthesis and Characterization of Metal Nanoparticles, Department of Chemical and Materials Engineering, Pakistan Institute of Engineering and Applied Sciences

- "I know of no microbe that is not killed in laboratory experiments in six minutes with silver"

- Dr. Henry Crooks (Use of Colloids in Health Diseases)

- "Speaking generally, the colloidal metals are especially remarkable for their beneficial action in ineffective states"

- Dr. Leonard Keene Hirschberg, A. M., M. D. (John Hopkins)

- "What we have actually done was rediscover the fact that silver kills bacteria, which had been known for centuries ... when antibiotics were discovered, clinical uses for silver as an antibiotic were discarded."

- Dr. Robert O. Becker, M.D.

- "Recent studies performed at the UCLA School of Medicine Center for Health Sciences confirmed that ionic silver kills harmful bacteria, viral, and fungal organisms just minutes after contact." - Journal of Longevity - Vol.4 / No. 10
- "When silver was present, the cancer cell dedifferentiated and the body was restored." - Dr. Gary Smith
- "In 1989, Thurman and Gerba concluded that metal ions, such as silver ions, can destroy germs located both inside and outside of our human cells." - Becker, Robert O., MD, Spadaro, JA, "Treatment of Orthopaedic Infections with Electrically Generated Silver Ions," J Bone Jt Surg, 197; 60
- "In four years we've described 87 important new medical uses for silver. We're just beginning to see to what extent silver can relieve suffering." - Dr. Richard L. Davies Executive director of the Silver Institute

The Karolinska Institute in Sweden has successfully used silver as a component in its cancer treatments for many years. - Dr. Bjorn Nordenstrom

- "Today, many antibiotics are losing the battle with germs. Fortunately, the best germ killer is finally getting the proper attention from medical science – natural silver. I sincerely recommend that everyone have electrically generated silver in their home as an antiseptic, antibacterial and antifungal agent." - Dr. Joseph Weissman, M.D., University of California Medical School
- "Silver is the best all around germ-fighter we have."

- Dr Harry Margraf of St Louis

- "Silver Colloids greatly assist in eliminating all known pathogens and guard against opportunistic infections. This 'second immune system' is synergistic..." - Dr. Robert C. Beck, DSc., in "Explore!"
- "To primitive life forms silver is as toxic as the most powerful chemical disinfectants and this, coupled with its relative harmlessness to animate life (i.e.mammals), gives it great potential as a disinfectant." N.R. Thompson - Runcorn Health Laboratory in England
- "Silver is emerging as a wonder of modern medicine. An antibiotic kills perhaps a half-dozen different disease organisms, but silver kills some 650! Resistant strains fail to develop. Moreover, silver is virtually non-toxic." The Association for Advanced Colloid Research
- "Colloidal silver is very effective in treating periodontal disease (gum disease). My patients enjoy the clean fresh breath as colloidal silver immediately cleanses the mouth and destroys odor-causing bacteria. I would recommend that colloidal silver solutions be used after each dental procedure or surgery to eliminate infection and speed healing." - S.R. Cobble, D.D.S.Obstetrics and Gynecology
- "Silver is one of the most universal antibiotic substances. When administered in the colloidal form, it is for all practical purposes non-toxic. Silver has been proven to be effective against hundreds of infectious conditions. It has tremendous anti-microbial power; the history of safe and successful colloidal silver use is extensive, and the number of current health professionals and individuals that successfully utilize colloidal silver to reduce the length and severity of infectious disorders is growing exponentially." Zane Baranowski, CN
- Colloidal Silver; it is therefore considered harmless in any concentration. However, all of the silver salts are identified as toxic, although the only adverse effect noted is Argyria. Therefore the concern is with silver salts and compounds, not colloidal silver.

#### The Environmental Protection Agency's Poison Control Center

- MacLeod reports colloidal silver being used with marked success in the following cases: "Septic and follicular tonsillitis, Vincent's angina, phlyctenular conjunctivitis, gonorrhoeal conjunctivitis, spring catarrh, impetigo (contagious acne of face and body), septic ulcer of legs, ringworm, soft sores, suppurative appendicitis after operation (the wounds cleaned rapidly), pustular eczema of scalp and pubes, chronic eczema of meatus of ear with recurrent boils, chronic suppuration in otitis media, and bromidrosis of feet. By injection: gonnorrhoea and chronic cystitis (local), boils, epididymitis." Lancet, Feb. 3, 1912 p. 83.
- "The germicidal action of certain metals in the colloidal state having been demonstrated, it only remained to apply them to the human subject, and this has been done in a large number of cases with astonishingly successful results. For internal administration, either orally or hypodermically, they have the advantage of being rapidly fatal to the parasites both bacterial and otherwise without any toxic action on the host. Colloidal silver solution is quite

stable even in the presence of salts and the normal constituents of the blood. Its destructive action on toxins is very marked, so that it will protect rabbits from ten times the lethal dose of tetanic (from tetanus) or diphtheric toxin." Searle, A. B. The Use of Colloids Health and Disease (British Medical Journal, May 12, 1917 p.83),

- " Anti-microbial and anti-bacterial effects were demonstrated in 10/5 concentrations per milliliter of the following: neisseria gonorrhoea, gardurella vaginalis, streptococcus pyogenes, staphylococcus aureus, candida albicans, candida eolobata, m. furfur, salmonella typhi." Larry C. Ford, M.D., Dept of Obstetrics & Gynecology, UCLA School of Medicine.
- Research by Dr. Robert O. Becker, and others indicated that laboratory tests conducted reverted cancer cells back to normal. Other observations made such as a correlation between silver deficiency and illness or proper immune system functioning, burns, soft tissue and bone repair acceleration, and the formation of cells that appear to be able to repair virtually any part of the body. Reduction of inflammation and the antibacterial, germicidal, astringent, antibiotic attributes so far observed are yet to be fully understood. Dr. Robert O. Becker 'The Body Electric'
- "Thanks to eye-opening research, silver is re-emerging as a wonder of modern medicine. An antibiotic kills perhaps a half-dozen different disease organisms, but silver kills some 650. Resistant strains fail to develop. Moreover, silver is virtually non-toxic." -- Science Digest, "Our Mightiest Germ Fighter" by Jim Powell 1978
- "...it has been shown repeatedly that the rapidly exerted disinfectant action is of considerable therapeutic value." -- The British Medical Journal – 1923
- "Silver is highly toxic to most microbial cells and can be used as an antimicrobial agent. Silver-containing compounds, such as silver sulfadiazine, which has broad antimicrobial as well as antifungal activity, and silver nitrate, are used in medicine as topical agents. Colloidal silver is a suspension of extremely small silver particles and was used in medicine until the 1940s as both a topical and an internal antiseptic. Colloidal silver was also known as argentum colloidal, argentum crede and collargolum."  
-- PDR For Nutritional Supplements by Sheldon Saul Hendle and David Rorvik, pg 110
- "Silver - both in liquid solution and as an airborne-aerosol - has been known since 1887 to be extremely toxic to anthrax spores. And it is widely reported in the medical literature on silver that various forms of silver, often at surprisingly low concentrations, routinely kills germs that are known to be antibiotic-resistant."  
-- International Anti-Aging Bulletin, April 1999, by James South, MA
- "Silver nanoparticles exhibit a broad size distribution and morphologies with highly reactive facets. The major mechanism through which silver nanoparticles manifested antibacterial

properties is by anchoring to and penetrating the bacterial cell wall, and modulating cellular signalling by dephosphorylating putative key peptide substrates on tyrosine residues.

Silver nanoparticles act primarily in three ways against Gram-negative bacteria:

- (1) nanoparticles mainly in the range of 1–10 nm attach to the surface of the cell membrane and drastically disturb its proper function, like permeability and respiration;
- (2) they are able to penetrate inside the bacteria and cause further damage by possibly interacting with sulfur- and phosphorus-containing compounds such as DNA;
- (3) nanoparticles release silver ions, which have an additional contribution to the bactericidal effect of the silver nanoparticles.

Although bacterial cell lysis could be one of the reasons for the observed antibacterial property, nanoparticles also modulate the phosphotyrosine profile of putative bacterial peptides, which could thus affect bacterial signal transduction and inhibit the growth of the organisms.

The effect is dose dependent and is more pronounced against gram negative organisms than gram-positive ones. The antibacterial effect of nanoparticles is independent of acquisition of resistance by the bacteria against antibiotics."

-- Nanotechnology In Medicine And Antibacterial Effect Of Silver Nanoparticles, Digest Journal of Nanomaterials and Biostructures, Vol. 3, No.3, September 2008, p. 115 - 122

- "Colloidal silver just might be the next germ-fighting wonder drug. And not just for the serious threats making headlines: It's also effective against bacterial infections like strep throat, viruses like the flu, and fungal infections like Candida. No matter how much a germ mutates, it can't change enough to escape the damaging effects of colloidal silver. And in the process, the silver doesn't harm human tissue or kill off the good bacteria in the intestine the way antibiotics and other medications do."

-- Dr. Jonathan Wright, MD

- "Thanks to eye-opening research, silver is re-emerging as a wonder of modern medicine. An antibiotic kills perhaps a half-dozen different disease organisms, but silver kills some 650. Resistant strains fail to develop. Moreover, silver is virtually non-toxic."

-- Science Digest, "Our Mightiest Germ Fighter" by Jim Powell, March 1978

- "Many strains of pathogenic microbes, viruses, fungi, bacteria or any other single celled pathogen resistant to other antibiotics are killed on contact by colloidal silver, and are unable to mutate. However, it does not harm tissue-cell enzymes and friendly bacteria."

-- Ron Barnes, PhD., Pharmacist, Capital Drugs

- "Colloidal silver has a long history in medicine as a natural antibiotic. It is very effective in killing bacteria, viruses, fungi, parasites and the cancer microbe. No serious side effects from overdosing have been reported."

-- The Natural Way to Heal by Walter Last, pg 161

- "Topically, it can be used to fight fungal infections of the skin or nails and to promote the healing of burns, wounds, cuts, rashes, and sunburn. It can be used on toothaches and mouth sores, as eye drops, and as a gargle to fight tooth decay and bad breath. It can also be used as sterilizer and can even be sprayed on air-conditioning filters and air ducts and vents to prevent germs from growing."

-- Prescription For Nutritional Healing by Phyllis A Balch CNC and James F Balch MD

- "Pierce Instruments in Stowe, Vermont, markets Silvelon, a nylon-Silver fabric used to make odor-proof socks and shoe-liners, antiseptic kitchen sponges, wound and burn healing aids, and topical applications to speed healing of cuts, canker sores, warts, and acne releasing colloidal silver on site. Argentum Research has Silverlon."

-- Anti-Aging Manual by Joseph B Marion, pg 12

- "...A study at the University of Arizona recently showed ionic silver to be effective against the coronavirus that researchers use as the surrogate for SARS. A study out of the University of Texas reportedly suggested ionic silver may be effective against HIV-1, and researchers expect it may be shown effective against other viruses and bacteria as well. 'We're testing against other viruses and the superbug (Methicillin resistant staphylococcus aureus),' said Miguel Jose Yacaman, from University of Texas, Department of Engineering and one of the study's authors. 'Our preliminary results indicate that silver nanoparticles can effectively attack other micro-organisms.'"

-- Herbert Slavin, M.D., founder and director of the Institute of Advanced Medicine, Lauderhill, Florida

- "All of the organisms that we tested were sensitive to the electrically generated silver ion, including some that were resistant to all known antibiotics...In no case were any undesirable side effects of the silver treatment apparent."

-- Dr. Robert O. Becker, M.D., Syracuse Medical University

- "Another benefit to using silver is that it does not appear to create the same amount of resistance in bacteria as traditional antibiotics. Ian Chopra, Professor of Microbiology at the University of Leeds, reported in a 2007 article in the Journal of Antimicrobial Chemotherapy that there are fewer than twenty published reports of silver resistance in bacteria...Professor Chopra went on to indicate that 'current evidence suggests the clinical threat [due to silver resistance] is low' because of the 'multifaceted mode of action of the silver ion.'"

-- S.M. Foran, Therapeutic Properties of Silver: an Historical and Technical Review

- "Silver compounds have been used as medicine since the late 1800's and have been used as a treatment against infections by hundreds of thousands of individuals in the United States. Silver is a natural mineral in the same class as zinc, chromium, cobalt, copper, iron, magnesium, molybdenum, vanadium and zinc which are important for health maintenance. Humans naturally ingest from 22 to 300 mcg of silver per day from natural sources in food and water (1,2). Levels of silver vary in foods with the highest reported levels being in immune boosting mushrooms with up to 5mg/ kg of silver. There is evidence that silver is a natural critical component of our immune system and that low tissue levels associated with a dietary deficiency may result in a relatively weakened immune system, making one more prone to infection. The modern versions of colloidal silver (oligodynamic silver) are shown to have little or no toxicity."

-- Dr. Kent Holtorf, Holtorf Medical Group, "Safety and Efficacy of Intravenous Oligodynamic Silver"

- "To treat ringworm, use a sterile pad and apply colloidal silver to the affected area. Hands and feet can also be soaked in this solution, a natural antibiotic that destroys some 650 different microorganisms."

-- Prescription For Nutritional Healing by Phyllis A Balch CNC and James F Balch MD, pg 388

- "Silver's germ-fighting ability will soon get a workout in new uses. The metal kills disease-carrying microbes without the harmful side effects of chlorine, or other sanitizing chemicals. Silver will one day be laced into socks, dish towels, toothbrushes. Even home appliances, heating and air systems will use it. Industrial uses too... treating water and cleaning food processing gear"

-- Kiplinger Letter for Business, May 4, 2001 issue

- "Colloidal silver. Dose: Internally-60 to 120 drops three to four times daily. Externally, applied to a wound or burn-two to three times daily."

-- Herbal Medicine Healing Cancer by Donald R Yance Jr, pg 314

- "Colloidal silver is commercially available with a common solution strength of five silver atoms per million molecules of water, or 5 ppm, but it may be up to 50 ppm in very concentrated remedies. However, the size of the colloids may be more important than the strength in parts per million."

-- The Natural Way to Heal by Walter Last, pg 162

- "Taken internally, colloidal silver can be used to fight infection. It has been shown to be effective against more that 650 disease-causing organisms, including Escherichia coli (E. coli) bacteria and the fungus Candida albicans."



-- Prescription For Nutritional Healing by Phyllis A Balch CNC and James F Balch MD, pg 66

- "I know of no microbe that is not killed by silver in laboratory experiments in six minutes."

-- Dr. Henry Crooks, M.D. (1921)

- "Silver nanoparticles (AgNPs) are among the emerging nanoproducts that have gained increasing interest in the field of nanomedicine due to their unique properties and obvious therapeutic potential in treating a variety of diseases, including retinal neovascularization and acquired immunodeficiency syndrome due to human immunodeficiency virus (HIV). AgNPs are also known for their antimicrobial potential against several other viruses, including hepatitis B, respiratory syncytial virus, herpes simplex virus type 1, and monkey pox virus...Silver oxide nanoparticles exhibited antitumor properties in transplanted Pliss lymphosarcoma tumor models when administered by intravenous injection in the form of aqueous dispersions. Treatment with AgNPs for a period of 15 days in DLA tumor-bearing mice led to a significant reduction in tumor volume in comparison with tumor controls. Tumor volume in control mice was about 7.3 mL but was significantly reduced to 2.6 mL in the group treated with AgNPs at a concentration of 500 nM for 15 days."

-- Int J Nanomedicine. 2010; 5: 753–762., Antitumor activity of silver nanoparticles in Dalton's lymphoma ascites tumor model, Muthu Irulappan Sriram, Selvaraj Barath Mani Kanth, Kalimuthu Kalishwaralal, and Sangiliyandi Gurunathan, Department of Biotechnology, Division of Molecular and Cellular Biology, Kalasalingam University, Tamilnadu

- "Colloidal silver is powerfully destructive of toxins of bacterial origin, though whether the reaction is purely physical or in part chemical is not known. Experiments on rabbits show that colloidal silver renders subject 'immune' from the effects of large quantities of tetanic or diphtheritic serum. Properly prepared, it is extremely stable, and is unchanged till at any rate the intestine is reached. It has been proved most useful in the treatment of diseases of the eye, the nose, and the ear, as well as in septicemia when administered by intravenous injection. C.E.A. MacLeod says (Lancet, February 3, 1912) that colloidal silver has proved its value in combating the following ailments among others -- tonsillitis, gonorrhoeal conjunctivitis, spring catarrh, pustular eczema of scalp, septic ulcers of legs, boils, chronic cystitis, ringworm, soft sores. But we must not prolong the list of the good works of colloidal silver. Suffice it that at the present time it is the most extensively used in medicine of all the sols."

-- The National Druggist, Vol. 50, page 388, August 1920

- "Silver's ability to aid the immune system has been well documented for more than 100 years. For example, in 1909, the Journal of the American Medical Association reported that electrically generated silver ions increased white blood cell production. As we noted earlier in our overview of the human immune system, white blood cells are critical factors in human immunity, aiding the body in the destruction of cancer cells, viruses, bacteria, and other invaders. What's more, while white blood cells are the defenders of the human body, red

blood cells carry life-giving oxygen to all tissues and organs. So silver apparently aids in both immune defense and in the support of life itself, by boosting both our body's red and white blood cells counts.

- In 1939, researchers Hill and Pillsbury made similar findings, demonstrating an increase in white blood cells after silver usage [see: Hill, WR, D Pillsbury, *Argyria: The Pharmacology of Silver*, The Williams & Wilkins Company, Baltimore, 1939; p. 48.] And over fifty years later, researchers Remes and Williams found that silver ions appear to 'prime' white blood cells to go on the offense against a variety of biological insults [see Remes, A, Williams, DF, *Neutrophil Polarization and Immunoelectrophoresis Assays in the Study of Complement Activation by Biomaterials*, *Biomaterials*, Aug 1991; 12(6):607-13.] Furthermore, in 1919 Dr. H. Bechold, writing in his groundbreaking book of the era, *Colloids in Biology and Medicine*, cited evidence that silver ions increased both red and white blood cell counts.

And in their study *Argyria - The Pharmacology of Silver* (Williams & Wilkins, 1939), researchers W. Hill & D. Pillsbury reported that 16 rabbits were injected with silver of arsphenamine at intervals from three to seven days. (The silver content of the drug was 14.5%.) A majority of the rabbits showed a gradual increase in oxygen-carrying hemoglobin and red blood cells during the experiment. In more recent studies conducted in the 1970's, such as *Treatment of Orthopedic Infections with Electrically Generated Silver Ions* by Dr. Robert O. Becker, M.D., it is reported that silver ions give a healthy boost to human blood cell production. This may be related to the fact that silver is a "transitional element" giving it the ability to form complex ions. This attribute gives silver the potential to interact on a cellular level in the same way as other complex ions such as vitamin B-12, chlorophyll, and heme (iron), a component of red blood cells.

And in the 1980's researchers Berger, Marino and Spadaro confirmed that electrically generated silver ions boost human blood cell production. These findings lead to the obvious conclusion that while low white blood cell counts open the door to serious immune system risks, and low red blood cells lead to oxygen starvation of the body's tissues and organs, electrically generated silver ions may help successfully counter these risks by stimulating both white and red blood cell production."

-- *The Ultimate Colloidal Silver Manual*, Barwick, Steve, Life & Health Research Group, LLC

- "Dr. Marchial-Vega has had considerable clinical experience with a colloidal silver preparation that contains between 20 and 25 parts of silver per million parts of water. This preparation has proven effective in patients with HIV in quickly resolving pneumonias due to pneumocystis, streptococcal, staphylococcal, klebsiella and fungal infections. In the hospital, the therapy is administered by a special nebulizer as well as orally."

-- *Physicians Guide To Natural Health Products That Work* by James Howenstine MD, pg 262

- "Silver belongs to the family of metals that also includes copper and gold (both of which can also have numerous health benefits when they're used properly). One of the primary

concerns people tend to have about using these metals is the risk that they'll accumulate in the body and lead to heavy metal toxicity. But if you have plenty of antioxidants in your diet, such as selenium, vitamin E, and amino acids like N-acetyl cysteine, you're safe from any harmful effects from this family of metals. Germs, however, are not."

-- Dr. Jonathan Wright, MD

- "Pure Silver is entirely non-irritant. In tests at very high concentrations, it has been shown repeatedly that the rapidly exerted disinfectant action is of considerable therapeutic value."

-- Colloidal Preparations of Silver in Pharmacy, British Medical Journal, February 1923

- "Sinus symptoms... You can also use 1 or 2 drops of colloidal silver or liquid pine bark extract in each nostril once or twice a day... Eye or ear problems, including cataracts, glaucoma, redness, blurred vision, poor eyesight, ringing in the ears, earaches, soreness or swelling of the ears, eardrum damage, hardness of hearing, and (in rare cases) loss of hearing: Use 1 drop of colloidal silver topically (directly in the eye or ear) 3 times a day."

-- The pH Miracle: Balance Your Diet, Reclaim Your Health by Robert O. Young, PhD, pg 178.

- "What we have done was rediscover the fact that silver killed bacteria, a fact which had actually been known for centuries...All of the organisms we tested were sensitive to the electrically generated silver ion, including some that were resistant to all known antibiotics...In no case were any undesirable side effects of the silver treatment apparent."

-- The Body Electric, Dr. Robert O. Becker, M.D.

- "Today, many antibiotics are losing the battle with germs. Fortunately, the best germ killer, which was discovered over 2,000 years ago, is finally getting the proper attention from medical science - natural silver. I sincerely recommend that everyone have electrically generated colloidal silver in their home as an antiseptic, antibacterial and antifungal agent."

-- Dr. Joseph Weissman, M.D. board certified immunologist and Assistant Clinical Professor at the University of California Medical School

- "The only natural substance I know of that is effective against these microbes is colloidal silver. I tested that myself when I was with the CIA, and found it effective against both anthrax and the bubonic plague pathogen."

-- Bacteriological Warfare - A Major Threat by Larry Wayne Harris

- "In contrast to medical antibiotics that can be used only against specific microbes, colloidal silver has a wide range of effectiveness, eliminating bacteria as well as viruses and fungi. Unlike medical antibiotics, colloidal silver is not known to cause undesirable side effects. Colloidal zinc can be especially effective against viruses. The colloids of copper and gold, on the other hand, are strong anti-inflammatory agents; in addition, copper and zinc can be used chelated (bound) with salicylic acid for similar benefits."

-- The Natural Way to Heal by Walter Last, pg 161

- Colloidal silver is "free from the drawbacks of other preparations of silver, viz-pain caused and discoloration of the skin; indeed, instead of producing irritation it has a distinctly soothing effect. It rapidly subdues inflammation and promotes healing of the lesions, it can be used with remarkable results in enlarged prostate with irritation of the bladder, in pruritis ani, and perineal eczema, and in haemorrhoids."

-- British Medical Journal (May 12, 1917), Sir Malcom Morris

- "Colloidal silver has been found to be beneficial for permanently restoring the patency of the Eustachian tubes and for reducing nasopharyngeal catarrh. Colloidal silver has also been used successfully in septic conditions of the mouth (including pyorrhea alveolysis - Rigg's disease), throat (including tonsillitis and quincies), ear (including Menier's symptoms and closure to Valsalva's inflation), and in generalized septicemia, leucorrhoea, cystitis, whooping cough and shingles."

-- British Medical Journal (December 15, 1917), J. Mark Hovell

- "Silver is an anti-bacterial, anti-viral, anti-fungal anti-metabolite that disables specific enzymes that microorganisms use for respiration. Silver is such an efficient anti-bacteriacidal that our 'great grandmothers put silver dollars in fresh milk to keep it from spoiling at room temperature.'...Silver has been employed in human health care and in the search for immortality since the days of the Chinese alchemist 8,000 years ago. Many feel that silver is in fact an essential element, not because it is required for an enzyme system, but rather as a systemic disinfectant and immune system support."

-- Rare Earths, Forbidden Cures by Joel D. Wallach, BS, DVM, ND and Ma Lan, MD, MS

- "This liquefied form of silver is a powerful natural antibiotic that can help knock out an acute sinus infection, says John M. Sullivan, M.D., a physician in Mechanicsburg, Pennsylvania. Buy a bottle of colloidal silver, put some full-strength into a spray bottle, and use one or two squirts into your nose twice a day until the infection has been noticeably gone for 3 days."

-- Alternative Cures by Bill Gottlieb, pg 553

- "Robert C. Beck's battery-powered electromagnetic electrode transfer of 50-100 microamperes by arm or foot electrodes may inhibit HIV outer protein's ability to bind to Lymphocyte receptor sites 50-95%, and neutralize 95-100% of pathogens in blood, lymph, and tissues in 37 days. Start with half-hour on day 1, to 2 hours on days 7 through 30, tapering off to 15 minutes on day 37; taking Ozone water, colloidal silver, activated Charcoal, and hot/cold Water showers to break-down and eliminate toxins."

-- Anti-Aging Manual by Joseph B Marion, pg 548

- "Combination Remedy for Colds and Sore Throats: One teaspoon of bee propolis in a homeopathic solution is combined with extracts of red clover and licorice root. Ten drops of

colloidal silver are added. Gargling with this formula and then swallowing it, every four hours, can help knock out local bacterial and viral infections in the throat and trachea."

-- Complete Encyclopedia Of Natural Healing by Gary Null PhD, pg 127

- "Other vitamins that have been proven to help increase fertility in women are: iron (35 mg); folic acid (one mg three times daily), to help normalize blood chemistry; vitamin B12, to help normalize reproductive function; colloidal silver, to help cleanse the system when chlamydia is causing infertility; and bioflavonoids (found in broccoli, green peppers, parsley, and citrus fruits), to help develop a healthy uterine lining."

-- Complete Encyclopedia Of Natural Healing by Gary Null PhD, pg 241

- "From 1900 to the beginning of the modern antibiotic era - circa 1940 with the introduction of sulfa drugs - Silver was one of the mainstays of medical practice in Europe and America. Various forms of Silver were used to treat literally hundreds of ailments: lung infections such as pneumonia, tuberculosis and pleurisy; sexual diseases such as gonorrhea and syphilis; skin conditions such as cuts, wounds, leg ulcers, pustular eczema, impetigo and boils; acute meningitis and epidemic cerebro-spinal meningitis; infectious diseases such as Mediterranean fever, erysipelas, cystitis, typhus, typhoid fever, and tonsillitis; eye disorders such as dacryocystitis, corneal ulcers, conjunctivitis and blepharitis; and various forms of septicemia, including puerperal fever, peritonitis and post-abortion septicemia. (This list does not even begin to exhaust the published medical uses for Silver in Europe and America, 1900-1940)."

-- -- International Anti-Aging Bulletin, April 1999, by James South, MA

- "Vitamin and mineral intake can make a difference. Specific recommendations for men are zinc, selenium, and vitamins E, D, and C. Particular suggestions for women include vitamins C, B6, and B12, in addition to iron, folic acid, colloidal silver, and bioflavonoids."

-- Encyclopedia Of Natural Healing by Gary Null PhD, pg 243

- "I also take [supplements]. I eat organic vegetarian foods. I took ozone a few times. I had the silver removed from my teeth. I took colloidal silver, which helped my pneumonia tremendously."

-- Complete Encyclopedia Of Natural Healing by Gary Null PhD, pg 465

- "Treat the infection: Your physician can prescribe an appropriate antibiotic to treat the underlying infection. If you are working with a physician who specializes in natural therapies, he or she may suggest the use of colloidal silver, golden seal and/or grapefruit seed extract."

-- Digestive Wellness by Elizabeth Lipski MS CCN, pg 274

- "Ongoing studies on antibacterial properties of silver...indicate that silver is effective even against bacteria that are already antibiotic-resistant."
  - S.M. Foran, Therapeutic Properties of Silver: an Historical and Technical Review
- "Small bowel infections, esophageal Candida and other infections are likely to reoccur. No specific research has been done to show that use of supplementation with flora and other natural therapies can help with reoccurrence, but they do help to boost the immune system. You may be able to keep the infection at bay with use of colloidal silver, grapefruit seed extract or garlic capsules. Each of these substances has wide antimicrobial properties, low toxicity and a low incidence of negative side effects."
  - Digestive Wellness By Elizabeth Lipski MS CCN, pg 313
- "Eliminate parasites, Candida, and other microbes by using an herbal parasite cure based on wormwood and investigate using colloidal silver, oxygen therapy, and an electronic zapper."
  - Disease Prevention And Treatment by Life Extension Foundation, pg 1104
- "When chlamydia is causing infertility, colloidal silver helps to clean up the system."
  - Get Healthy Now by Gary Null, pg 715
- "Rashes, including blistering types, are frequently due to what we put on our skin. One cause is soap because it may contain an artificial chemical that produces an adverse reaction. If you have a rash problem, it is advisable to use the type of soap that is 100 percent natural, or at least one that is unscented. A rash can be cleaned with a mixture composed primarily of aloe vera, along with colloidal silver, bee propolis, pau d'arco, and purified water. Then, wrap the area with gauze that is kept somewhat moist, so the mixture remains on the rash. After four or five hours, the rash should begin to heal."
  - Power Aging by Gary Null, pg 307
- "Persistent bowel problems have been correlated with recurrent UTIs. Our bodies eliminate wastes in several ways, including the excretion of feces by the bowels, the expulsion of carbon dioxide by the lungs, perspiration by the skin, and the discharge of urine by the kidneys and bladder. If any of these processes is malfunctioning, an excessive burden is placed upon the other systems. I do not believe that antibiotics are the proper treatment for UTIs because they do not get to the underlying cause. The proper approach is to rebalance the system by switching from an acidic diet to an alkaline one. Unsweetened cranberry juice with cherries and raspberries, four to five times a day, can ameliorate the severe pain. Pomegranate juice, two times a day, and grapefruit juice with the seeds and the skins are valuable too. Lemon, lime, and bee propolis with 10 drops of colloidal silver are also helpful. Because of the vitamin C content, these juices will create acidic urine (but not acid in the body), which creates an unfavorable environment for bacteria in the urine and bladder. Chlorophyll from spirulina is exceptionally good for the body as well."

-- Power Aging by Gary Null, pg 365

- "Colloidal silver, which can be found in any health food store, is a powerful antibiotic. It can cure conjunctivitis, or pink eye, as well as simple eye irritation..."Now a great remedy is available for itchy eyes that works like pure magic every time. It's colloidal silver drops. Just two drops in each eye can stop itching for a week or more."

-- Proven Health Tips Encyclopedia by American Medical Publishing, pg 197

- "Hundreds of thousands of doses of oral colloidal silver and thousands of doses of intravenous colloidal silver are given every month in the United States. This is usually done to treat acute and chronic infections including those associated with chronic fatigue syndrome (CFS) and fibromyalgia (FM).

The effectiveness of the use of oral and intravenous colloidal silver in the treatment of chronic fatigue syndrome and fibromyalgia was presented at the 38th Annual Meeting of the American Academy of Environmental Medicine (Identifying the Causes and Exploring the Newest Treatment Options for Chronic Fatigue Syndrome, Fibromyalgia and Environmental Sensitivities) in October 2003. The extremely low level of colloidal silver used at 23 parts per million (ppm) has been shown to have little or no potential for toxicity while having the significant potential for clinical benefit.

The effectiveness of oligodynamic silver's antimicrobial action at extremely low doses in combination with its potential immune stimulating actions, makes oligodynamic silver an ideal naturally occurring substance in the treatment of CFS and FM."

-- Dr. Kent Holtorf, Holtorf Medical Group, "Safety and Efficacy of Intravenous Oligodynamic Silver"

- "However, if you store drinking water for a longer time, you can add some colloidal silver or hydrogen peroxide to keep it free of molds and other microbes or possibly put a piece of clean copper or a silver coin at the bottom of the container."

-- The Natural Way to Heal by Walter Last, pg 40

- "I was told I had second-and third-degree burns on my face and third-degree burns on my hands....the very next day my mother brought me colloidal silver, with directions to use it externally and internally as frequently as possible, because it assists in growth of new tissue. She had learned from Dr. Young that silver's positive electrical charge counters the negative charge of a damaged body area, bringing it back into balance and enabling the body to regenerate and heal itself. Mom sprayed undiluted colloidal silver onto the burned areas, and I took it by drops under my tongue...My mother applied the silver many times a day. It was absorbed into my skin instantly. It felt cool and tingling and loosened the tension on my face, hands, and fingertips...After only one day of treatment with silver, it was obvious the healing was happening very rapidly. New tissue and skin grew back at an accelerated pace. The swelling of my head diminished rapidly and the breathing apparatus

came off almost immediately. The plastic surgeon told me I was healing twice as fast as any burn patient he had ever seen in his long career."

-- The pH Miracle: Balance Your Body, Reclaim Your Health by Robert O. Young, PhD., pgs 137-138

- "At the beginning of your health improvement efforts and several times each year, you can take a remedial course of colloidal silver for several weeks to keep down any undesirable microbes that have arisen in your body. Have a sip or tablespoonful three times daily. Preferably, store colloidal silver in a dark glass bottle in a dark and cool place."

-- The Natural Way to Heal by Walter Last, pg 162

- "Many people are skeptical of claims that colloidal silver can take away pain and accelerate healing. Nevertheless, these impressive attributes are firmly grounded in medical science. Pain is caused by an interruption of the electrical current that normally flows throughout the body at 50 to 70 millivolts. At the point of injury, the current drops towards zero millivolts. This lack of electrical energy also impedes healing. Silver is a superconductor that bridges the electrical gap and restores healthy current flow. You can prove this to yourself by placing a silver coin on a burn and experiencing instant pain relief. In clinical trials at an FDA-approved laboratory, even silver-coated bandages were proven to have analgesic and regenerative properties."

-- Dr. Aundrea Adams, Ph.D, CTN

- "Beginning in the 1970s, several independent researchers found that silver ions easily destroy Candida and other fungi. But it wasn't until a pilot study during the mid- 1990s that included human patients suffering from terminal AIDS that medical researchers established solid evidence showing just how quick and effective silver ions can be in the treatment of Candida as well as HIV. In this study, nine individuals who were near death were divided into two subgroups. One group suffered from HIV and a terrible Candida infection. The other group suffered from both HIV and an extreme form of malnutrition (known as Wasting Syndrome). The researchers found that in both groups the colloidal silver was capable of killing pathogens and purging the bloodstream of germ defenses in order to restore the immune system."

-- Dr. Jonathan Wright, M.D.

- "I have a friend who has suffered for years from chronic pneumonitis, caused by Pseudomonas. Sputum cultures were consistently positive, despite massive doses of horribly expensive antibiotics. Then colloidal silver was suggested, and taken. Sputum cultures since have been negative, and the patient's general health and vitality greatly improved. Her internist can't deny the improvement, but won't attribute it to the silver, of course! It would have occurred anyway; the silver just happened to come on the scene at the right time. Uh-huh."

-- Dr. Paul Hine, M.D. (retired ophthalmologist)



- "Those of you who have joined us for an HSI Symposium in the past surely remember Dr. Victor Marcial-Vega. He is a board-certified oncologist and the director of Health Horizons Rejuvenation Clinic in Coral Gables, Florida. Based on his experience treating other types of bacterial lung infections, Dr. Marcial-Vega believes he has discovered a way to prevent anthrax from developing even if you've already been exposed. He's currently talking with government health authorities about testing his hypothesis on live anthrax spores, but asked us bring this information directly to you now.

Just in his last decade of medical practice, Dr. Marcial-Vega has treated hundreds of people with a variety of viral, fungal, and bacterial pneumonias. And of all the available treatments, he has seen the greatest success with nebulizer treatments using a colloidal silver preparation. Silver has long been known for its anti-bacterial properties, and the nebulizer allows the mineral to reach the lungs and kill harmful bacteria. Now, in the face of the anthrax threat, he believes it can do the same thing with anthrax spores.

'We are constantly filtering all kinds of bacteria through our lungs,' explained Dr. Marcial-Vega. Normally, a healthy body is able to kill off any dangerous bacteria on its own. But in the case of illness, like pneumonia, or an especially lethal bacteria like anthrax, the body may need some extra help. For anthrax prevention, he recommends a daily nebulizer treatment with 4 cc's of colloidal silver. By following this protocol, Dr. Marcial-Vega says your body can likely kill off the anthrax spores before you even know you were exposed. Colloidal silver may even be useful to treat cutaneous anthrax with the preparation being directly applied to the affected skin.

Dr. Marcial-Vega says there are no concerns about using this treatment because colloidal silver has no toxicity and no side effects. He has used the colloidal silver nebulizer treatments on infants, the elderly, and AIDS patients with pneumonia and has seen great results. All have responded quickly to the treatment even when no other approach seemed to help and no one reported any adverse reactions.

Nebulizers are widely used to treat asthma, and are readily available at stores nationwide. The cost generally runs between \$50 and \$120 for the machine. Each member of the family should have their own mask, and both adult and pediatric sizes are available for a few dollars each. But the entire family can share the nebulizer machine and the tubing."

-- Health Sciences Institute e-alert (10/26/2001)

- "In four years we've described 87 important new medical uses for silver. We're just beginning to see to what extent silver can relieve suffering."
- Dr. Richard L. Davies, executive director of the Silver Institute
- "The best defense against swine flu, or any flu, is the age old remedy of colloidal silver. The metal silver in its colloidal state can be safely consumed and used in the body. Bacteria and viruses cannot develop resistance to colloidal silver. Silver disables a vital enzyme and mechanism in all bacteria and pathogens so that they cannot survive. It is good to take a

few teaspoons of colloidal silver daily to maintain health. More colloidal silver should be taken if experiencing illness."

-- Babu G. Ranganathan, Pravda

- "Silver has a long history as an antibiotic in human health care. Since medieval times silver has been used as a bactericidal agent that helps heal skin abrasions and burns, water purification, wound care, bone prostheses, reconstructive orthopaedic surgery, cardiac devices, catheters and surgical appliances.

Colloidal silver has been approved by the Environmental Protection Agency for disinfection purposes in hospitals. In natural cosmetics, colloidal silver makes a safe and nonirritating preservative with an added anti-inflammatory bonus. I do recommend colloidal silver in my book, *The Green Beauty Guide*, as an alternative to paraben and formaldehyde preservatives.

Colloidal silver sprays are commonly used to treat burns and throat infections. Today, colloidal silver is widely used in British hospitals, especially in intensive care where it is used in bandages to treat burns and infected wounds. As a UK-based company, we are happy to support British medical science that permits the use of this non-toxic alternative to common antibiotics."

-- Julie Gabriel, author of *The Green Beauty Guide*

- "Silver ions stimulate the lymphatic system by cleaning out the dead cells and bringing oxygen to the healthy cells."

-- Dr. Stephen West, DL, PMD (son of Dr. C. Samuel West, DN, ND, renowned chemist and internationally recognized lymphologist)

- "Many people successfully treat mycoplasmas infection by drinking large amounts of colloidal silver."

-- Dr. Nenah Sylver, Ph.D

- "Mycoplasma seems to respond especially well to the colloidal silver treatments."

-- Gwen Scott, N.D., author of *Natural Medicine: A Survivor's Guide*

- "Doxycycline and rifampin are among the medications used to treat mycoplasma, but I also have success with natural agents such as colloidal silver."

-- Nicola McFadzean, N.D., *Insights Into Lyme Disease Treatment* (BioMed Publishing Group)

- "We have found colloidal silver to be quite effective against all mycoplasma-related organisms that we have tested in vitro."

-- Brooks Bradley, Harborne Research Foundation

- "Few things in life are as cut-and-dried as the fact that silver is completely safe when used within normal limits."

-- Herbert Slavin, M.D., director of the Institute of Advanced Medicine in Lauderhill, Florida

- "Common substances like table salt and aspirin are harmless with normal use, but excessive intake can become toxic and even life-threatening. With normal responsible usage, silver supplements are entirely harmless to humans."

-- Jeffrey Blumer, M.D., Ph.D., director of the Center for Drug Research, former director of the Greater Cleveland Poison Control Center

- "Colloidal silver appears to be safe for children and pregnant and nursing women. It is tasteless, odorless, contains no free radicals, is harmless to human enzymes and has no adverse reactions with medications. Taken internally, it may improve digestion, help prevent colds, flu and all organism-caused diseases. It can be used as a douche, atomized, nebulized or inhaled. Applied externally, it has been shown to help with things such as skin abrasions and burns (including sun burn). It can also be dropped into the eyes and ears to help the body overcome infection."

-- Kurt Grange, Ph.D., N.D., Nutritional Biophysicist, author, lecturer

- "Sometimes a treatment can be worse than the illness, but not in the case of Colloidal Silver. I have my patients spray or swish Colloidal Silver in their mouths from one to three times daily, depending on the severity of their condition, or, in a dose of one quarter to one teaspoon, and even up to one tablespoon, one to three times daily for situations that are more problematic. I also have them use it in small amounts daily as a preventative...

...A patient I was treating for an ear infection continued to have pain. His ear canal was severely inflamed and had the appearance of what you would think of as a burn. After taking an injection of an antibiotic, as well as using a prescription ear drop and an oral antibiotic for several days, he returned with an internal canal that was bright red and an ear that was tender to the touch. I prescribed 3 Colloidal Silver drops in his affected ear three times daily, and he returned the next day with a 75% improvement...

...Some of my teenage patients with facial skin infections seem to do well with a spray on the skin and into the mouth once or twice daily. Sometimes higher amounts are needed. This certainly beats taking antibiotics for years and years to prevent these skin conditions...It's interesting how many of my patients improve with the use of Colloidal Silver. It enhances the immune system where other antibiotics cause yeast overgrowth...

...Another patient has had persistent yeast infections. Having had no success with both prescription and non-prescription treatments, she called me, at her wit's end. I suggested that she try a douche of two teaspoons of Colloidal Silver in a quart of water. Three days later she was evaluated in my office. The symptoms of her yeast infection had vanished, and there was no visible sign of infection."

-- Dr. Ron Surowitz, head of the Florida Osteopathic Medical Association

- "In medical treatment, Colloidal Silver has been used for the eyes, nose, throat, skin, and everything in-between. It has been proven to promote rapid healing, with less scar tissue. Colloidal Silver solutions have been administered orally, topically, vaginally, rectally, intravenously, intramuscularly, as a gargle, as well as eye and ear drops. It can be atomized or inhaled into the nose or lungs, therefore, safely used in a vaporizer or humidifier for respiratory infections...Some therapists, such as Dr. Becker, use direct application of electrically charged silver rods (his "silver wands") to the skin, using the bodily fluids as the solution medium. The most widely accepted applications of Colloidal Silver are to ingest it or apply it directly to the skin. KEY APPLICATIONS: Infection, Immune Support, Wound Healing."

-- The Wonders of Colloidal Silver, by Dyhana L. Coburn and Patrick D. Dignan

- "While analyzing hair samples and questioning the parties involved, I noticed the correlation between low silver levels and sickness. People who showed low silver levels in their hair analysis were frequently sick. They seemed to have innumerable colds, flu, fevers, and various other sickness. I believe that a silver deficiency may be the key to the improper function of the immune system."

-- Dr. Robert O. Becker, M.D., author, The Body Electric

- "...metallic silver in colloidal suspension...yield silver ions in such a quantity as to have a detrimental effect on microorganisms but slowly enough not to be irritating to the tissues. The Colloidal Silver particles provide a continuous source of these ions, yet the particles are not absorbed by the body tissue taken en masse in true solution by the body fluids; consequently, Colloidal Silver can be applied directly to delicate mucous membranes, such as those in the eye, with no irritation and with beneficial results...The colloidal particles diffuse gradually throughout the blood and give prolonged therapeutic action."

-- Robert J. Hartman, in his book, Colloid Chemistry

- "We have had instant success with Colloidal Silver and immune compromised patients. A few examples are: Pink Eye (topical) totally are solved in less than six hours; recurrent sinus infections (oral ingestion) resolved in eight days; acute cuticle infections - (topical) - twenty four hours. Another major area in which we have improved our clinical results is in the area of bowel detoxification and dialysis. The Colloidal Silver has provided excellent removal of abnormal intestinal bacteria; also it has proved to be a great adjunct to our Candida Albicans, Epstein Barr virus, and Chronic Fatigue Syndrome protocols."

-- Dr. Evan M., Kansas, quoted in Colloidal Silver, The Amazing Alternative to Antibiotics

- "Research has shown that silver is a powerful antimicrobial agent that is non-irritating and non-toxic."

-- Valerie Edwards Jones, professor of microbiology at Manchester Metropolitan University

- "Research with the Heart of England NHS Foundation Trust has found that silver, incorporated in the surfaces of hospital equipment furniture, can reduce bacterial levels by 99 per cent. This, in turn, cuts infection risk from superbugs such as MRSA, E. coli and salmonella."

-- Dr Richard Hastings, microbiologist for BioCote, Ltd.

- "We also have a water purification system that sterilizes the water through the use of silver ions. This product, called Jowa AG-S, has made us world-famous in the shipping industry! This sterilization method provides long-term protection and is a suitable method for long-term storage of drinking water. Since its introduction in 1970, this unit has been installed in thousands of ships. Incidentally, sterilizing water with the help of silver is an old and well-tried method that goes all the way back to antiquity. It is completely harmless to humans and animals and the silver ions do not change the taste or smell of the water."

-- The Jowa Group, Technology for Living Oceans

- "A recent paper by Das et al. provides the remarkable datum that some 275,000 kg [(605,000 pounds)] of edible metallic silver foil are consumed every year (in food) in India. No known adverse health effects have ever been recorded. This epidemiological evidence that silver as a metal is not toxic in any way needs no further comment. Further support for the obvious safety of consuming metallic silver (Ag<sup>0</sup>) is in the worldwide consumption of (so called) silver colloids, often made at home in primitive electrochemical cells by probably some millions of citizens, again with no ill effects."

-- Das, M. Dixit, S. Khanna, S. K. Journal title Food Additives and Contaminants

- "The cover story of the most recent edition of the Journal of the American Chemical Society (JACS) describes how nanoparticles formed by very small numbers of silver atoms can protect against the cell damage caused by ethanol. The study was led by researchers from the University of Barcelona and conducted in conjunction with the Magnetism and Nanotechnology laboratory of the University of Santiago de Compostela. The results of the study show that these clusters of small numbers of silver atoms catalyze ethanol oxidation at similar concentrations to those found in the blood of alcoholics and at values of membrane potential and pH that are compatible with those exhibited by mammalian cells...

Alcohol has particularly harmful effects on nerve cells, and in the specific case of astrocytes it induces programmed cell-death and an alteration of the actin cytoskeleton. Following application of the silver nanoparticles to ethanol-exposed cells, the actin cytoskeleton shows marked improvements and cell-death does not occur. 'So, the harmful effect of ethanol on astrocytes is mitigated by the silver nanoparticles, which act as a cytoprotective agent,' explains Javier Selva, a lecturer with the Department of Cell Biology, Immunology and Neuroscience and first author of the paper."

-- University of Barcelona web site, commenting on the study, "Silver sub-nanoclusters electrocatalyze ethanol oxidation and provide protection against ethanol toxicity in cultured

mammalian cells" published in the Journal of the American Chemical Society. DOI: 10.1021/ja907988s

- "But Dr. David Weber, an infectious disease and public health expert at the University of North Carolina in Chapel Hill, isn't convinced that silver resistance will prove much of a problem. Resistance to antibiotics occurs quite readily in bacteria once prolonged exposure to, say, penicillin, occurs. But there's little reason to suppose that resistance to silver would develop so easily, he says.

An antibiotic like penicillin works by hitting a bacterium in a limited fashion, at specific sites. Because the killing is done precisely, the bacterium has a good chance of developing a mutation that would confer resistance.

In contrast, silver kills microbes in a broad, unspecific fashion -- like tossing a bomb at a bacterium. It hits many essential points such as a bacterium's entire respiratory system. This makes it much more difficult for silver-resistance to develop.

And even if tolerance did develop, Weber says, increasing the dose of silver the bacterium is exposed to will solve the problem in most cases."

-- Los Angeles Times, August 4, 2008, Margaret Woodbury

- "Occasionally people with muscle aches, pains, and backaches are improved with silver, probably because these are associated with viral or bacterial infections in the spinal fluid, which traditional antibiotics or colloidal silver cannot reach. Zinc and silver make a very powerful synergistic team as a secondary immune system. Silver is also effective in controlling warts. Angstrom-size silver is the best source."

-- Gabriel Cousens, M.D., author, *Spiritual Nutrition: Six Foundations for Spiritual Life and the Awakening of Kundalini*

- "Research on colloidal silver shows it to be an effective resource against infections and pathogens, yet very little is known about it by the general public or the medical profession. Prior to 1938 it was in common use by doctors. According to Alexander G. Schauss, PhD, of Johns Hopkins University, considerable scientific evidence has been published regarding the effectiveness of silver as an antiseptic against 'several hundred pathogenic organisms.' He also points out that silver is not an antibiotic because, by definition, antibiotics are derived from living organisms."

-- Ron Garner, author, *Conscious Health: A Complete Guide to Wellness Through Natural Means*

- "Silver was used 1,200 years ago by Egyptians, Romans, Greeks, sailors, and then by the pioneers who populated our country. They used it for various illnesses and to keep their foods and liquids from spoiling. Prior to 1938, before antibiotics, colloidal silver was used by doctors as their main substance to fight bacteria in a more natural way than through the

antibiotics they use today. Antibiotics can harm our kidneys and liver functions. Colloidal silver promotes healing."

-- A. Gore Gregory, author, Defeat Cancer

- "Silver in the colloidal state is highly germicidal, quite harmless to humans and absolutely non-toxic. Rather than in a chemical compound, the silver in the colloidal state may be applied in a much more concentrated form, with correspondingly better results. All virus, fungus, bacterium, streptococcus, staphylococcus, and other pathogenic organisms are killed in three or four minutes upon contact. There are no side effects whatsoever from the highest concentrations."

-- Dr. Henry Crooks, quoted from Use of Colloids in Health and Disease

- "Several years ago we conducted some rather extensive evaluations of various protocols promising effective results against various pathogenic agents which cause 'food poisoning'. The one protocol, effective against ALL agents evaluated, was colloidal silver. A 5 ppm solution proved effective against all pathogens tested; yielding complete control within 6 to 8 minutes.....regardless of concentration of the pathogenic agent. Control was effected in some solutions as weak as one part of 5 ppm CS, to 50,000 parts contaminated solution. Among the many agents tested were botulinum, campyobacter, salmonella and listeria (bacterial agents); and norwalk-like viruses and hepatitis A (viral agents). Although we did not conduct researches involving the marine form of vibrio vulnificus, generally regarded as the most toxic of food poisons, a facility associated with us---did. Their results, using colloidal silver at 5 ppm, paralleled those of ours....on the pathogens we evaluated."

-- Brooks Bradley, Harbone Research Foundation

- "Colloidal silver appears to be one of the greatest discoveries in natural preventive health care of all time. When properly prepared, colloidal silver is a completely non-toxic, tasteless, internally and externally applicable, broad-spectrum germ fighter and disinfectant, which can significantly reduce the length and severity of many viral and bacterial infections."

-- Zane Baranowski, Colloidal Silver: the Natural Antibiotic

- "I regard stable Colloidal Silver as a most useful preparation in Ophthalmic practice."

-- Dr. Legge-Roe, Lancet, British Medical Journal, 1915

- "Silver is a powerful, natural prophylactic/antibiotic, used for thousands of years...It is a catalyst, disabling the particular enzyme that all one-celled bacteria, fungus and virus, use for their oxygen metabolism, they suffocate. Yet it is of no harm to human enzymes or any part of the human body chemistry. And it kills all disease-causing organisms, in six minutes or less, upon contact, even those pleomorphic, no matter how they mutate. Resistant strains fail to develop, and the body doesn't develop a tolerance. Colloidal Silver is both a remedy and a prevention of infections of many kinds. Having sufficient Colloidal Silver in your body

is to have a superior, second immune system. It was in common use until 1938. Great Grandma put a silver dollar in the milk, to keep it fresh at room temperature."

-- Health Consciousness magazine, Vol. 15 No. 4

- "Silver is the best all around germ fighter we have...The value of silver in medicine, and as a purifier has been acknowledged for centuries. Egyptians implanted silver plates into skulls with surgery. In Ancient Greece and Rome, people used silver containers to keep liquids fresh. When settlers moved across the American West, they would purify a container of water by putting a silver dollar in it overnight. Towards the end of the 19th century, other medicinal uses for silver were developed including the use of silver and mercury in filling cavities, and the dropping of a silver filtrate solution into the eyes of newborn babies to prevent blindness due to infection."

-- Dr. Harry Margraf, Biochemist, The Story of Silver in Medicine; Gold & Silver Newsletter, September 1974

- "Scores of independent tests have shown that silver promptly kills bacteria in water and maintains water purity over long periods of time."

-- The Silver Institute Letter, December 1976, Tests Show Silver Best Water Purifier

- "The most dramatic purification tests occurred in 1976 in a 20,000 gallon swimming pool in Nebraska. There was no disinfectant of any kind in the water. Fifty gallons of municipal sewage waste water was put into the pool. That produced a dangerous concentration of 7,000 E.Coli cells per 100 millilitre [half a cup] of water. Contents of the pool were then pumped through a tank containing silver for disinfection. Within three hours the pool was entirely free of e.Coli and the water contained only 3.2 parts of silver per billion parts of water (0.0032ppm).

-- The Silver Institute Letter, May 1975, Silver Guards Good Health

- "The Allegheny County Health Department in Pennsylvania conducted tests in a 152,000 gallon pool which previously had been disinfected by a 50 pounds per day chlorinator. The system was replaced by a silver system for the swimming pool season. The County Health Department took up to 50 daily samples and found that silver ions remained in the pool at the low steady rate of 20 parts per billion (0.02ppm). The water remained free of bacteria throughout two seasons. In contrast, 65 water samples from 30 other pools having a concentration of 700 parts per billion (0.7ppm) of available chlorine showed a mean of 1.3 pseudomonas and 7.3 staph cells per millilitre of water."

-- The Silver Institute Letter, May 1973, Silver Carbon Filter Purifies Swimming Pool

- "In my group's experiments with human fibrosarcoma cells in vitro, negative and positive currents both speeded up growth by over 300 percent. On the other hand, as mentioned in Chapter 8, we found that we could suspend mitosis in the fibrosarcoma cells with silver ions injected by minute levels of positive current. During one day of exposure, the cells appeared



to dedifferentiate completely, and they stopped dividing for a month without additional treatment, even though we changed the nutrient medium regularly. Obviously, this entire subject needs to be investigated more thoroughly.

-- Robert O. Becker M.D., author, *The Body Electric*, researcher Syracuse Medical University, NY

- "Silver compounds have a wide variety of uses as caustics, astringents, antiseptics, and germicides. Their activity resides in the silver ion, which is a protein precipitant. It is toxic to bacteria by precipitating the protein in the bacteria protoplasm. Colloidal silver preparations, in which the silver does not exist to any large extent as free ions, act by the milder and sustained antiseptic effect brought about by the formation of a protein silver compound which slowly liberates small amounts of ionic silver. Colloidal silver compounds, contain very little ionizable silver. Use of any silver preparation over a long period may cause permanent blue discoloration of the skin and mucous membranes, (particularly the lips and under the fingernails) known as Argyria. There are no known adverse health effects of Argyria. The colloidal silver preparations contain high concentrations of silver, largely in non-ionized form. Their antiseptic value depends on the activity of the free silver ions and not on their content. They do not precipitate protein but penetrate the tissues. Those mentioned here are silver proteins and silver halides."

-- Handbook of the Hospital Corps of the United States Navy, 1953

- "Big Pharma hates silver. Pure and simple. It's too competitive. It allows the little guy a way of taking care of infectious illness without using pharmaceutical drugs. On the broader level, Big Pharma and the ruling elite know extremely well that the less nutrition a consumer gets his hands on, the more prone he is to become malnourished and end up at a doctor's office with symptoms of some disease that requires prescription drugs."

-- Anders Sultan, Sweden's largest colloidal silver manufacturer, maker of the Ionosil brand

- "The efficacy of AgNPs (i.e, silver nanoparticles) against HIV-1 has been reported by many laboratories including ours [19,26]. It has been shown that AgNPs have got anti-HIV-1 activity and can help the host immune system against HIV-1. This has laid ground for the development of new, potent antiviral drugs capable of preventing HIV infection and controlling virus replication. Recently, it has been demonstrated that AgNPs function as broad-spectrum virucidal and bactericidal agents, and in addition, increase wound healing."

-- Journal of Nanobiotechnology, September 2011, "Silver nanoparticles are broad-spectrum bactericidal and virucidal compounds," Humberto H Lara, Elsa N Garza-Treviño, Liliana Ixtepan-Turrent and Dinesh K Singh

- "I know of nothing which could quite take its place, nor, have I known anyone to abandon it who had thoroughly familiarised himself with the technique of its application. We may only have scratched the surface of silver's medical brilliance! Already it is an amazing tool! It

stimulates bone - forming cells, cures the most stubborn infections of all kinds...and stimulates healing in skin and other soft tissues".

-- Dr. William Steward Halsted, 1913

- "The germicidal properties of silver, although not recognized as such, have been utilized since the times of the ancient Mediterranean and Asiatic cultures, references being made to the use of silver vessels to prevent spoilage of beverages, and silver foil or plates in the surgical treatment of wounds and broken bone."

-- N.R. Thompson, 1973. Silver. In the journal *Comprehensive Inorganic Chemistry*, Vol .3. New York, Pergamon, 79-80.

- "In veterinary medicine, claims have been made that an ionic Ag aerosol, upon inhalation, has protected chickens against coli- bacteriosis and pullorosis -typhus infections. Thus, one may extrapolate to the future and predict a further development and significant place for silver compounds in the prevention and treatment of at least some infectious diseases". Mechanism of action and silver resistance is discussed."

-- N. Grier, 1983. Silver and Its compounds. In the journal *Disinfection, Sterilization and Preservation*. Third Edition. Philadelphia, Lea & Febiger, 375-389.

- "Thirty burn patients were treated with either silver nitrate, or a silver-coated dressing. The silver-coated dressing was more effective in preventing bacterial growth."

-- Edward Tredget, Edward, et al. 1998. In *Journal of Burn Care & Rehabilitation*, 19(6), 531-537. A matched-pair, randomized study evaluating the efficacy and safety of Acticoat silver-coated dressing for the treatment of burn wounds.

- "In recent decades, studies have revealed the biochemical reactions of ionic silver that result in the inactivation of bacteria, fungi, protozoa, spirochetes, viruses, etc. However, the broad use of silver as a powerful clinical tool is still in the future because its full range of activity remains to be elucidated."

-- Davies, Richard, and Etris, Samuel. 1997. The development and functions of silver in water purification and disease control. In *Catalysis Today*, 36, 107-114.

- "Silver has healing properties as an ingredient in plasters, being extremely effective in causing wounds to close up."

-- Pliny the Elder, 78 A.D.

- Study Synopsis: Sixteen patients with leg ulcers were treated with a colloidal silver spray. The solution was applied once daily for the first few days, then twice weekly. The infection subsided in all cases. After instruction, patients performed the therapy at home without supervision. No discomfort or side effects were observed. There was no persistent discoloration of the skin that could be attributed to silver. "In all cases the infection subsided."

-- Haeger, Knut. 1963. Preoperative treatment of leg ulcers with silver spray and aluminum foil. *Acta Chirurgica Scandinavica*, 125, 32-41.

- "The germicidal action of a specified amount of silver was found to be related to the concentration of silver ions rather than to the physical nature of the silver from which the ions were originally derived".

-- Chambers, Cecil W., Proctor, Charles M., and Kabler, Paul W. 1962. Bactericidal effect of low concentrations of silver. *Journal of the American Water Works Association*, 208-216.

- "Silver is taken up rapidly by fungus spores, so that germination can be completely inhibited after a contact time of 1 minute or less. Only mercury( I) and (II), and to a lesser extent copper, offer serious competition."

-- Miller, Lawrence P., and McCallan, S.E.A. 1957. Toxic action of metal ions to fungus spores. *Agricultural and Food Chemistry*, 5(2), 116-122.

- "Silver was similarly toxic to a range of pathogens including *Pythium aphanidermatum*, *Thielaviopsis basicola* and *Fusarium oxysporum* f.spp. Most zoospores of *phytophthora* spp. Were killed by Ag<sup>+</sup> in the range 5-50 ppb, bursting at the higher concentrations..." Zoospore cysts and germlings showed the same sensitivity to silver. Oospores were mostly killed over the range 25-100 ppb...It is surprising that no silver-based fungicide has been developed."

-- Slade, S.J., and Pegg, G.F. 1993. The effect of silver and other metal ions on the in vitro growth of root-rotting *Phytophthora* and other fungal species. *Annals of Applied Biology*, 122, 233-251.

- "The wide antimicrobial spectrum, the high microbicidal potency, the good water solubility and the safety of anodic silver, therefore, provide an encouraging background to the investigation of the use of this ion as a preservative in pharmaceutical or cosmetic formulations...The high rate of kill of anodic silver is very useful to ensure a rapid reduction of microorganisms. However, the effectiveness of silver in keeping the number of surviving organisms at less than 0.01% of the starting inoculum after repeated inocula, even in the presence of strong interfering additives, appears the most interesting feature for its possible use as a preserving agent in multiple-dose products".

-- Scalzo, M., et al. 1996. Antimicrobial activity of electrochemical silver ions in nonionic surfactant solutions and in model dispersions. *Journal of Pharmacy and Pharmacology*, 48, 60-63.

- "The drugs of colloidal silver collargol and protargol were found to have activity against smallpox virus...Silver metal particles may make a great contribution to the mechanism responsible for antiviral effects."

-- Bogdanchikova, N.Y., et al. 1992. Activity of colloidal silver preparations against variolovaccine virus. *Khimiko-Farmatsevticheskii Zhurnal*, 26(9-10), 90-91.

- "Ag<sup>+</sup> solutions exhibited better antimicrobial effectiveness against bacteria, a yeast species, and a mold than did analogous silver solutions from inorganic salts (silver nitrate and silver chloride). Ag<sup>+</sup> could be used effectively in preservatives. The microbicidal activity of silver is significantly ion influenced."

-- Simonetti, N., et al. 1992. Electrochemical Ag<sup>+</sup> for preservative use. *Applied and Environmental Microbiology*, 58(12), 3834-3836.

- "The hypothesis that coating a pin with a silver-containing compound will decrease colonization and/or pin tract infection has been confirmed in other studies in vitro and in vivo experiments. These studies have shown that silver is neither genotoxic or cytotoxic as compared to stainless steel, a material widely used as a metal implant. Silver has long been known to be a potent antibacterial agent with a very broad spectrum of activity and has been used safely in medicine for many years."

-- Bosetti, M., et al. 2002. Silver coated materials for external fixation devices: in vitro biocompatibility and genotoxicity. *Biomaterials*, 23, 887-892.

- "On the basis of these experiments, it appears that silver nylon is an effective antimicrobial agent. We presume that the release of silver ions from the silver nylon fabric was the basis of the antimicrobial action of silver nylon. Although the bacteriostatic and bacteriocidal sensitivity of organisms to silver vary widely, they are generally in the range of 10 to 20 micrograms/ml. Silver is not associated with significant side effects, is not an allergen, and is only rarely associated with the induction of resistant strains of bacteria".

-- Deitch, Edwin A., et al. 1983. Silver-nylon: a new antimicrobial agent. *Antimicrobial Agents and Chemotherapy*, 23(3), 356-359.

- "A significant enhancement of the fabrics' antimicrobial effect was achieved by the passage of weak DC currents, which cause increased liberation of silver ions".

-- Marino, Andrew A., et al. 1984. Electrical augmentation of the antimicrobial activity of silver-nylon fabrics. *Journal of Biological Physics*, 12, 93-98.

- "Silver sulfadiazine at a concentration of 10 micrograms/ml suppresses or completely inactivates the infectivity of Herpesvirus hominis... Because sulfadiazine does not have antiviral activity, the inhibitory activity of the silver salt of this agent is probably related to the presence of the silver ion... Silver sulfadiazine has been shown to be effective in the prevention of herpetic keratoconjunctivitis and encephalitis in rabbits. Because of the wide spectrum of antimicrobial activity (*Treponema*, yeast, *Neisseria gonorrhoeae*, and Herpesvirus), the use of silver sulfadiazine as a prophylactic agent for genital infections merits serious considerations."

-- Chang, Te-Wen, and Weinstein, Louis. 1975. In vitro activity of silver sulfadiazine against Herpesvirus hominis. *The Journal of Infectious Diseases*, 132(1), 79-81.

- "Electrically activated silver-coated fabric can effectively inhibit a number of bacterial species commonly found in cutaneous ulcers. Electrical activation in all cases in our study increased the tendency for spontaneous inhibition of bacterial growth by the silver ion."

-- Falcone, Alfred E., and Spadaro, Joseph A. 1986. Inhibitory effects of electrically activated silver material on cutaneous wound bacteria. *Plastic and Reconstructive Surgery*, 77(3), 455-458.

- "The antimicrobial effect of a silver compound is due to the constant presence of free silver ions in the local wound environment. Additionally, since silver ions released from a silver fabric would not be accompanied by a carrier molecule or anion, there would not be any associated potential side effects due to the carrier molecule, such as occurs with both silver nitrate and silver sulfadiazine."

-- Deitch, Edwin A., et al. 1987. Silver nylon cloth: In vitro and in vivo evaluation of antimicrobial activity. *The Journal of Trauma*, 27(3), 301-304.

- "Silver, a well-known antimicrobial agent, has been used in clinical settings for more than a century. During this period, the safety of this agent has been well established. In addition to being effective against fungi, this method of silver application has also been demonstrated to be efficacious against a broad spectrum of bacteria, including antibiotic-resistant strains. The results of the current study demonstrate the excellent in vitro performance of silver, particularly the nanocrystalline form, against a variety of common fungal pathogens. The most remarkable aspect of the fungicidal experiments is that nanocrystalline silver appears to be effective against the resistant spores produced by some of these organisms."

-- Wright, J.B., et al. 1999. Efficacy of topical silver against fungal burn wound pathogens. *American Journal of Infection Control*, 27(4), 344-349.

- "To be bactericidal, the silver must be available as a solution, and the efficacy of the solution is dependent on the concentration of silver ions present in the solution. Silver is effective against a broad range of antibiotic-resistant organisms, which is expected because silver has been regularly found to be effective against antibiotic-resistant organisms."

-- Wright, J. Barry, Lam, Kan, and Burrell, Robert E. 1998. Wound management in an era of increasing bacterial antibiotic resistance: a role for topical silver treatment. *American Journal of Infection Control*, 26(6), 572-577.

- "Electrically generated silver ions have been shown previously to be a potent antibacterial agent with an exceptionally broad spectrum...The present study reports on clinical experience using electrically generated silver ions as adjunctive treatment in the management of chronic osteomyelitis...wound care (usually provided by the patient) resulted in control of the infection in twelve of the fifteen treatment attempts and in healing of the non-union after follow-up ranging from three to thirty-six months. In this small series, the silver ions seemed to have been an effective local antibacterial agent with advantages over other antibiotics that included: activity against all of the bacterial types encountered in these

patients, negligible toxic effect on local tissues, and penetration of poorly vascularized tissue to the distance believed to be about one centimeter. The rapid subsidence of the infection once treatment with silver ions was initiated convinced us that the silver iontophoresis had had a beneficial antibacterial effect. An added benefit, which was unexpected, was the deposition of substantial amounts of new bone produced during treatment with the silver-nylon anode."

-- Becker, Robert O., and Spadaro, Joseph A. 1978. Treatment of orthopaedic infections with electrically generated silver ions. *The Journal of Bone and Joint Surgery*, 60- A( 7), 871-881.

- "Broad spectrum antibacterial effect of electrically generated silver ions has been fully established. Proved cases of chronic osteomyelitis, with or without pathological fractures and septic non-unions, wound care yielded not only control of bone infections in 85% of cases, but also produced healing of pathological fractures in 83% of patients. In the present series, silver ions have been used as an effective local antibacterial agent with multiple advantages over many conventionally used methods with or without antibiotics. Silver ions are not only effective in different cases, where bacteria had become resistant to most of the commonly used antibiotics but also have only negligible toxic effects on tissues. No patient was subject to this treatment without waiting for outcome from previous treatment."

-- Nand, Sanjiv, et al. 1996. Dual use of silver for management of chronic bone infections and infected non-unions . *Journal of the Indian Medical Association*, 94(3), 91-95.

- "The silver cation is known to have an exceptionally broad spectrum involving gram-positive, gram-negative, aerobic and anaerobic microorganisms. A number of species have been found to have a minimum inhibitory concentration for anode-derived silver considerably lower than antibiotics in current use, and resistance to silver ions is rare."

-- Webster, Dwight A. et al. 1981. Silver anode treatment of chronic osteomyelitis. *Clinical Orthopaedics and Related Research*. 161: 105-114.

- "A method of producing local antibiotic effects by means of an iontophoretic technique using free silver ions has been evaluated in vitro and in vivo for more than two decades. The antibiotic properties of the technique have proved useful in both animal and human studies. Beginning in 1973, in vitro studies demonstrated that such ions were an effective antibiotic with a very broad spectrum and favorable quantitative evaluations compared with synthetic antibiotics. The failure of other nontoxic metal ions to produce a similar alteration with the same electrical parameters strongly indicates that the electrically generated silver ion is the agent responsible for the observed cellular changes. Healing rates in these wounds are significantly accelerated and are accompanied by enhanced healing of the bone, soft tissue, nerve, and skin, with replacement of missing tissues by histologically normal tissues. The responsible agent for these cellular effects is believed to be the electrically generated silver ion."

-- Becker, Robert O. 2000. Effects of electrically generated silver ions on human cells and wound healing. *Electro- and Magnetobiology*, 19(1), 1-19.

- "There is now strong evidence in the literature that the active component of any silver compound is the silver itself. The data show that electrically generated silver cations are more effective than silver sulfadiazine or silver nitrate."

-- Berger, T.J., et al. 1976. Antifungal properties of electrically generated metallic ions. *Antimicrobial Agents and Chemotherapy*, 10(5), 856-860.

- "Silver ion concentration of about 3 micrograms/liter was sufficient to control the growth of legionellae in circulating warm water."

-- Kusnetsov, Jaana, et al. 2001. Copper and silver ions more effective against legionellae than against mycobacteria in a hospital warm water system. *Water Research*, 35(17), 4217-4225.

- "The US Food and Drug Administration has approved silver compounds for clinical use and various versions have been formulated by compounding pharmacies. Silver nitrate is used in the eyes of newborns to prevent blindness. Concentrated silver nitrate is used topically on mucus membranes to stop bleeding. Silver sulfadiazine is used for the treatment of burns and to prevent sepsis or bacterial infection in severe burns. Silver formulations have also been used in hundreds of various infections and other conditions including pneumonia, tuberculosis, STD's, eczema, meningitis, erysipelas, Mediterranean fever, corneal ulcers, conjunctivitis and septicemia."

-- Dr. Kent Holtorf, Holtorf Medical Group, "Safety and Efficacy of Intravenous Oligodynamic Silver"

- "The most commonly used topical antibacterial agent worldwide is silver sulfadiazine cream."

-- Kucan, John O., and Smoot, E. Clyde. 1989. Topical antibacterials and soft-tissue wounds. *Surgical Rounds*, April, 60-70.

- "Silver sulfadiazine is a topical antimicrobial agent with a broad spectrum of activity against fungi as well as gram-positive and gram-negative bacteria."

-- Rosenkranz, Herbert S., and Carr, Howard S. 1978. The determination of the susceptibility of bacterial isolates to silver sulfadiazine. *Chemotherapy*, 24, 143-145.

- "In 100 percent of the ulcers treated with silver sulfadiazine cream (15 patients) the bacterial counts were reduced to 10<sup>5</sup> or less per gram of tissue within the three-week test period, compared to 78.6 percent in those treated with saline (14 patients) and 63.6 percent in those treated with povidone-iodine solution (11 patients). Moreover, the ulcers treated with silver sulfadiazine cream responded more rapidly."

-- Kucan, John O., et al. 1981. Comparison of silver sulfadiazine, povidone-iodine and physiologic saline in the treatment of chronic pressure ulcers. *Journal of the American Geriatrics Society*, 29(5), 232-235.

- "Silver sulfadiazine 1% in a cream proved to statistically reduce the ulcer size compared with a biologically active tripeptide copper complex 0.4% cream formulation or the placebo."

-- Bishop, John B., et al. 1992. A prospective randomized evaluator-blinded trial of two potential wound healing agents for the treatment of venous stasis ulcers. *Journal of Vascular Surgery*, 16(2), 251-257.

- Study Synopsis: 657 different types of bacteria from 22 different bacterial species were exposed to silver sulfadiazine. All strains were inhibited by levels which can easily be obtained topically. Strains resistant to sulfadiazine or multiple antibiotics were sensitive to silver sulfadiazine.

-- Carr, Howard S., Wlodkowski, Theodore J., and Rosenkranz, Herbert S. 1973. Silver sulfadiazine: in vitro antibacterial activity. *Antimicrobial Agents and Chemotherapy*, 4(5), 585-587.

- "Silver allantoinate was used because it has highly effective antibacterial properties when tested in vitro. The number of bacteria at the end of operations exceeded the number after scrubbing in 35% of the control hands but in only 8% of those treated with silver allantoinate powder".

-- Ballinger, Walter F., et al. 1970. Silver allantoinate as an inhibitor of cutaneous bacteria upon the hands of operating room personnel. *Annals of Surgery*, 171(6), 836-842.

- "Bacterial proliferation on the surface of the catheter and biofilm production are also substantially reduced by the elution of free silver ions from the catheter matrix. Bacteriostatic and bactericidal activities can be determined complexing silver ions with sulfur, which results in the formation of water insoluble Ag<sub>2</sub>S, abolishes the activity of silver ions. We consider this phenomenon to be additional evidence for the antimicrobial activity of silver ions".

-- Bechert, T., et al. 1999. The Erlanger silver catheter: in vitro results for antimicrobial activity. *Infection*, 27, suppl. 1, S24..

- "...silver-containing silica glass powders are believed to be useful as an antibacterial material for medical applications such as composite resin for dental restoration."

-- Kawashita, M., et al. 2000. Antibacterial silver-containing silica glass prepared by sol-gel method. *Biomaterials*, 21, 393-398.

- "An in vitro bacterial cell-killing assay shows that the released silver is biocidal. In clinical evaluation, sustained release of silver at bactericidal levels for at least 21 days was observed, and efficacy was demonstrated with a significant reduction in anaerobic bacteria.



Staining due to the released silver was minimal and was reversible. Hence, the developed wafer has potential for superior efficacy in the treatment of periodontitis ".

-- Bromberg, Lev E., et al. 2000. Sustained release of silver from periodontal wafers for treatment of periodontitis. *Journal of Controlled Release*, 68, 63-72.

- "In summary, a bioresorbable LDD which releases silver ions in the periodontal pocket has been developed. The results presented here suggest that the tested LDD possesses desirable silver release pharmacokinetics and that the delivery of silver to the periodontal pocket resulted in a reduction in the anaerobic as well as the aerobic microflora. These results indicate that future clinical evaluations of this LDD are warranted."

-- Straub, A.M., et al. 2001. Phase 1 evaluation of a local delivery device releasing silver ions in periodontal pockets: safety, pharmacokinetics and bioavailability. *Journal of Periodontal Research*, 36(3), 187-193.

- Study Synopsis: 88 patients with peptic ulcers orally ingested tablets containing colloidal silver oxide over a period of 9 days. Within 6 weeks, all cases except one were healed. The particle size of the silver oxide was "three-tenths of a micron and smaller." Comment: This study was conducted before it was discovered that peptic ulcers are caused by bacteria.

-- Rending, Larry J, Gamba, Carl L., and Johnson, Wallace M. 1958. Colloidal oxide of silver in the treatment of peptic ulcer. *Pennsylvania Medical Journal*. 61: 612-614.

- Study Synopsis: Collargol (colloidal silver protein), silver nitrate, and a mixture of Collargol and silver nitrate (colloidal silver complex) were tested for antibacterial efficiency against *S. aureus*, *A. aerogenes*, and *P. aeruginosa* in water, human plasma, and trypticase soy broth. The presence of proteins significantly decreased the antibacterial efficacy of all 3 agents tested. Colloidal silver complex and silver nitrate inhibited the bacteria in water at 2.5 ppm, while a concentration of 100 ppm of Collargol was required to inhibit the bacteria in water. In trypticase soy broth, the silver nitrate and colloidal silver complex required concentrations of 100 ppm to inhibit the bacteria, while the Collargol required a concentration of 1000 ppm to inhibit the bacteria in the same medium. In human plasma, the inhibiting concentration of silver nitrate was 100 ppm, while the inhibiting concentration of colloidal silver complex was 1000 ppm, and the inhibiting concentration of Collargol was 5000 ppm.

-- Brentano, Loreno et al. 1966. Antibacterial efficacy of a colloidal silver complex. *Surgical Forum*. 17: 76-78.

- Study Synopsis: Electrically generated silver ions, silver nitrate, and silver fluoride were tested for antibacterial effectiveness against 5 different bacteria. Based on silver content, no significant difference was found in the antibacterial effectiveness of the 3 agents.

-- Thibodeau, E.A., S.L. Handelman, and R.E. Marquis. 1978. Inhibition and killing of oral bacteria by silver ions generated with low intensity direct current. *Journal of Dental Research*. 57: 922-926.

- "The Ag+ filler showed significantly more antibacterial activity than the control filler without silver ions. The findings indicate that the antibacterial effect is due to silver ions released from the Ag+-containing filler."

-- Yamamoto, Kohji, et al. 1996. Antibacterial activity of silver ions implanted in silicone dioxide filler on oral Streptococci. *Dental Materials*. 12: 227-229.

- "To primitive life forms oligodynamic silver is as toxic as the most powerful chemical disinfectants and this, coupled with its relative harmlessness to animate life, gives it great potential as a disinfectant."

-- N.R. Thompson, 1973. Silver. In *Comprehensive Inorganic Chemistry*, Vol .3. New York, Pergamon, 79-80.

- "Tens of thousands of swimming pools in Europe and the United States have used electrically driven silver-copper ion systems to provide satisfactory sanitation for decades."

-- Davies, Richard, and Etris, Samuel. 1997. The development and functions of silver in water purification and disease control. In *Catalysis Today*, 36, 107-114.

- "Colloidal silver has been used with marked success in the following cases, cited by C.E.A. MacLeod:

- Septic and follicular tonsillitis, Vincent's angina, phlyctenular conjunctivitis, gonorrheal conjunctivitis, spring catarrh, impetigo (contagious acne of face and body), septic ulcers of legs, ringworm of body, tinea versicolor, soft sores, suppurative appendicitis after operations, pustular exzema of scalp and pubes, chronic eczema of meatus of ear with recurrent boils, chronic eczema of anterior nares, offensive discharge in case of chronic suppuration in otitis media, bromidrosis of feet, axillae and blind boils of neck.

- Colloidal silver has also been used successfully in septic conditions of the mouth (including tonsillitis and quinsies), ear (including Menier's symptoms and closure to Valsava's inflation), and in generalized septicemia, leucorrhoea, cystitis, whopping cough, and shingles.

Colloidal silver has also been used successfully in septic conditions of the mouth (including tonsillitis and quinsies), ear (including Menier's symptoms and closure to Valsava's inflation), and in generalized septicemia, leucorrhoea, cystitis, whopping cough, and shingles.

- ..Collosol argentum has also proved useful in influenza, both as a prophylactic and for curative purposes when applied as a spray to the nostrils, for bathing the eyes, and as a gargle for the throat.

B. Seymour Jones has used an intranasal spray of colloidal silver in a case of cerebro-spinal meningitis. He has also used colloidal silver with marked advantage in several cases of rhinitis and oedematous enlargement of the posterior ends of the middle and inferior turbinates with true hyperplasia."

-- Alfred B. Searle, Use of Colloids In Health and Disease, pgs. 83-86, published in 1920

- "Spherical silver nanoparticles (nano-Ag) were synthesized and their antifungal effects on fungal pathogens of the skin were investigated. Nano-Ag showed potent activity against clinical isolates and ATCC strains of Trichophyton mentagrophytes and Candida species (IC80, 1-7 microg/ml). The activity of nano-Ag was comparable to that of amphotericin B, but superior to that of fluconazole (amphotericin B IC80, 1-5 microg/ml; fluconazole IC80, 10- 30 microg/ml). Additionally, we investigated their effects on the dimorphism of Candida albicans. The results showed nano-Ag exerted activity on the mycelia. Thus, the present study indicates nano-Ag may have considerable antifungal activity, deserving further investigation for clinical applications."

-- J Microbiol Biotechnol. 2008 Aug;18(8):1482-4., Kim KJ, Sung WS, Moon SK, Choi JS, Kim JG, Lee DG. Department of Microbiology, College of Natural Sciences, Kyungpook National University, Daegu 702-701, Korea.

- "Colloidal silver is the product the FDA and many mainstream medical people love to hate. Listening to them you would think every person taking colloidal silver is going to turn gray with silver accumulation in their skin (argyria). Their worst nightmare is people taking colloidal silver to combat the H1N1 swine flu – the nightmare for them is that it might actually work.

...Silver in today's medicine is undergoing a renaissance, with innovative new products that are able to sustain the release of silver ions enabling better surgical and wound-related uses. Silver nanoparticles are even being incorporated into clothes, like socks and stockings. You can buy a washing machine that uses silver ions to kill germs in clothes.

The high efficacy in the use of silver to kill bacteria and fungus is not in question by anyone. This does not mean it kills every type of bacteria or fungus. And in the ones it does kill it does not mean it kills all of them. It simply means that the antibiotic properties of silver are quite potent – and the risk to human health in terms of toxicity is negligible. This is a far better risk/benefit profile than commonly used antibiotics."

-- Byron J. Richards, CCN (Board Certified Clinical Nutritionist, charter member of the International & American Association of Clinical Nutritionists (IAACN), author Fight for Your Health: Exposing the FDA's Betrayal of America)

- "Metallic silver and silver compounds are used widely in medical devices and health care products to provide antibacterial and antifungal action. Experience has shown that they are generally safe in use and effective in controlling pathogenic organisms."

-- A.B.G. Lansdown, PHF, FRCPath, Honorary Senior Lecturer, Department of Chemical Pathology, Faculty of Medicine, Imperial College, London, UK

- "Silver has germicidal effects and kills many lower organisms effectively without harm to higher animals."

-- CRC Handbook of Chemistry and Physics: 80th Edition, ed. by David R. Lide, CRC Press, Boca Rotan, FL, 1999-2000.

- "One study of animals drinking silver compounds mixed with water for most of their life found no effect on fertility. Another study found reproductive tissues were damaged in animals after they received injections of silver nitrate. However, the tissues recovered even while the animals received more injections of silver nitrate. Tests in animals show that silver compounds are likely to be life threatening for humans only when large amounts (that is, grams) are swallowed and that skin contact with silver compounds is very unlikely to be life threatening."

-- ATSDR – Agency for Toxic Substances and Disease Registry Toxicological Profile for Silver – CAS# 7440-22-4, Dec. 1990.

- "Blood counts were reported to be normal in all individuals observed in the occupational study of silver- exposed workers conducted by Rosenman et al. (1979) with the exception of one individual with an elevated hemoglobin level...A study that measured levels of several liver enzymes (alanine transferase, aspartate amino transferase, gamma glutamyl transferase, and alkaline phosphatase) found no significant differences between workers exposed to silver and insoluble silver compounds and those with no history of silver exposure (Pifer et al. 1989)."

-- ATSDR – Agency for Toxic Substances and Disease Registry Toxicological Profile for Silver – CAS# 7440-22-4, Dec. 1990.

- "The data suggests that with the low toxicity associated with colloidal silver, in general, and the broad spectrum of antimicrobial activity of this colloidal silver preparation, this preparation may be effectively used as an alternative to antibiotics."

-- Dr. Ron Leavitt, Microbiology Department, Brigham Young University

- "Silver has a long history of use in medicine as an antimicrobial agent. Silver ions have been found to have antibacterial effects on some microbes. Several studies have demonstrated that silver ions are selectively toxic for prokaryotic microorganisms, with little effect on eukaryotic cells (Park and Jang, 2003; Spadaro and Becker, 1976; Webster et al., 1981; Marino et al., 1974)."

-- International Biodeterioration & Biodegradation 57 (2006) 155–162

- "The targeting of cancer cells using silver nanoparticles has proven to be effective, but neither the exact mechanism of action nor the modes of activation of the downstream signaling molecules have been revealed yet. The review illustrates a probable signaling pathway and mechanism by which silver nanoparticles target the cancer cells."

--from the study Nanosilver: The burgeoning therapeutic molecule and its green synthesis, Department of Biotechnology, Division of Molecular and Cellular Biology, Kalasalingam University, Anand Nagar, Krishnankoil-626190, Tamilnadu, India

- "...we performed some limited, plant-oriented evaluations utilizing colloidal silver. Our initial investigation involved experiments designed to determine if colloidal silver would yield beneficial effects on 'fire-blight' associated with pear trees and pyracantha shrubs. The only effective protocol we had found, prior to our colloidal silver evaluations, was the application of streptomycin (water soluble form) in an aerosol spray.

A solution of 10 ppm strength colloidal silver mixed at the rate of 1 pint colloidal silver to 2.5 gallons of water and 1/4 teaspoon household detergent was applied to affected trees (in various states of challenge, from 10% to 50% foliage involvement).

Visually detectable improvement manifested within 48 hours. Marked improvement and pathogenic stabilization evidenced within 72 hours. New leaf growth---in former areas of heavy attack---started to appear within 7 days of the initial treatment. This protocol was repeatable (we performed it 4 times)."

-- Brooks Bradley, of the Harborne Research Foundation, Nov. 19, 2000

- "Beginning in 1973, in vitro studies demonstrated that such [electrically generated silver] ions were an effective antibiotic with a very broad spectrum and favorable quantitative evaluations compared with synthetic antibiotics (2-5). Animal studies indicated equal efficiency in experimental osteomyelitis in rabbits with no acute deleterious side effects (6). In all studies, precautions were taken to avoid overt electrolysis, which would have introduced erroneous results in vitro and produced tissue damage in clinical use. The level of voltage required to produce measurable electrolysis in human soft tissue with silver wire electrodes was determined to be approximately 1.1 volts (7). Accordingly, applied voltage in all studies was limited to 0.9 volts or less.

The first clinical studies were cautiously begun in 1975 using a variety of silver materials including silver wire, silver foil, and a commercially available silvered nylon fabric. A standardized technique was evolved using silver nylon fabric placed as the anode in open osteomyelitic lesions with the application of 0.9 volt DC between the fabric and a cathode of carbon-impregnated rubber. The electrical current was provided by a simply battery-operated DC generator limited to 0.9 volts output. Initial treatments were limited to 4-h periods twice a day. As the bacteriologic monitoring revealed useful results and no overt local or systemic side effects were noted, the treatment time was gradually extended to be continuous, with once daily electrode removal and replacement with a new silver nylon anode. Detailed results of these initial studies have been reported (8,9), and the technique was found to be a useful and safe clinical treatment for recalcitrant, open osteomyelitis (10).

As the clinical study progressed, improvements in electrical generator design and the silver nylon fabric were made, with a resulting increase in antibacterial effect and the appearance of several unexpected clinical phenomena.

A profuse, sterile exudates began to appear in the wound during the second and fourth day of treatment (Fig. 1). Shortly thereafter it became evident that an enhancement of wound healing was occurring beyond that which could be attributed to infection control. Open

cavities began to fill with abundant, healthy granulation tissue, producing rapid coverage of exposed bone surfaces. This was followed by rapid in growth of full thickness, innervated skin and healing of bony non-unions. These observations have been under evaluation since 1979.”

-- Becker, Robert O., Department of Orthopaedic Surgery, State University of New York, Health Science Center at Syracuse, NY, Effects of Electrically Generated Silver Ions on Human Cells and Wound Healing

- "Silver has been used for centuries as an antimicrobial agent to reduce bioburden and prevent infection. Its usage diminished when antibiotics were introduced but remained one of the most popular agents for wound infections, especially in burned patients. Incorporation of silver into a range of hygiene and healthcare applications has increased, and this has raised concerns over the development of silver resistance, toxicity, methods of testing products and evidence of efficacy. The published evidence for resistance and toxicity is limited and associated with frequent and high levels of silver used. Increasing evidence of improved antimicrobial activity of nanoparticles of silver and possible dual immunomodulatory effects are exciting. This may lead to further product development as potential alternative preservatives as some currently available preservatives have an increasing incidence of allergic reactions. Acknowledging the role of the carrier is important, and as silver is active when in solution, opens a window of opportunity in personal hygiene area. This is important in an age when multiple antibiotic-resistant bacteria are becoming prevalent."

-- Letters in Applied Microbiology, V. Edwards-Jones, The benefits of silver in hygiene, personal care and healthcare

- "Silver has been used for at least six millennia to prevent microbial infections. It has been effective against almost all organisms tested and has been used to treat numerous infections and noninfectious conditions, sometimes with striking success. Silver also has played an important role in the development of radiology and in improving wound healing...Silver was the most important antimicrobial agent available before the introduction of antibiotics. Historically, silver has been a major therapeutic agent in medicine, especially in infectious disease, including surgical infections. Its risk:benefit ratio is advantageous."

-- Alexander J.W., Department of Surgery, University of Cincinnati College of Medicine, Cincinnati, Ohio 45267-0558, USA, Surg Infect (Larchmt). 2009 Jun;10(3):289-92.

- "Argentum Colloidale — Collargolum is possessed of the most valuable properties. This preparation is an allotropic modification of metallic silver, and is soluble in water and albuminous fluids generally. When introduced by inunction or hypo-dermatically, or by application to wounded surfaces, or when swallowed, it enters the vascular system, the blood, and lymphatics, and becomes an active germicide or antitoxic agent. Although so diffusible, permeating all parts of the tissues, it seems never to induce argyria.

Collargolum, or soluble metallic silver, occurs in the form of hard pieces, having a somewhat metallic luster. The dose for internal administration in pill form is 1/2 to 1 gr. The gastrointestinal catarrhs, tuberculosis of the intestine, infectious entero-colitis, and other septic states, are successfully treated by this remedy. It may also be employed subcutaneously in the proportion of 1 to 200 parts of distilled water, repeated once or twice a week.

As a topical agent, it may be used in surgical diseases, wounds, injuries, and in cases of septic decomposition. Wherever diseases— either pure or mixed infectious—are caused by the staphylococcus, the streptococcus, and other forms of low organisms, this remedy is effective in a high degree.

Unguentum Crede is the proprietary form in which this remedy is now offered to the medical public. Rubbed into the skin, collargolum diffuses readily into the lymphatics and blood, acting powerfully on septic processes. It is recommended that three grammes be used for adults. The remedy should be applied by inunction to the thoroughly cleansed skin for twenty or thirty minutes.

Where inunctions are not feasible, collargolum should be given in pill form, made up with sugar of milk and some glycerin and water. It is also recommended in solution, thus: Rx Argenti colloid (Crede), 0.75 or 2; distilled water, 50 to 200 grammes; egg albumin, 0.75 to 2. Of this a teaspoonful to a tablespoonful is to be taken with a glass of water or a cup of tea a quarter to a half an hour before meals.

These methods in pill or solution—are said to be especially applicable to the chronic infectious, general tuberculosis, gonorrhoeal rheumatism, gonorrhoea, etc.

For subcutaneous injection, a solution of argentum colloidal—1 to 200 of distilled water—of which one half to two syringefuls (seven to thirty grains) are to be given in one or several places according to the size of the lesion. Very little pain is caused by the injection. It is to be repeated once a week or once in two weeks.

Collargolum is also used in bougie form for the treatment of infectious fistulae, uterine, and urethral diseases. The mass is made of sugar of milk, gum, albumin, and glycerin, molded into the desired shapes. Each bougie may contain three grains of the medicament. Collargolum may also be dissolved in sterilized water (seven to fifteen grains to the pint of water) and used as a topical application, or as a rectal enema by the addition of some albumin.

The extraordinary claim is made that the various applications containing the soluble silver diffuse into the system by the lymph stream, preventing all growth of the staphylococci and streptococci. The evidence as furnished by Prof. Crede and his friends seems to justify the claims they have put forth."

-- A Practical Treatise On Materia Medica And Therapeutics, by Roberts Bartholow, 1908

- "Silver -- The inunction of metallic silver, in the form of unguentum Crede' has been successfully employed in many forms of general sepsis. Gustav Shriner reports a number of

cases of cerebrospinal meningitis successfully treated by this agent. Crede' states that two-thirds of the ointment penetrates the skin, and he has proved this by microscopic sections. Forty-five grains are sufficient in mild cases, and friction should be employed from twenty to thirty minutes. Roswell, Park, Marx, Jones, Osborne and others have had excellent results from it's use. The literature is quite extensive."

-- Journal of the American Medical Association, Volume 36, page 252, January 26, 1901

- "A 2001 study published in Clinical Practice of Alternative Medicine demonstrated the efficacy of intravenous mild silver protein (MSP) in the reduction of HIV Viral Load and significant clinical improvement in AIDS patients. In addition there was significant improvement in CD 4 and WBC counts. There was no significant toxic effect when MSP is utilized below the 400 ppm concentration. The authors conclude, 'First, IV MSP 400 ppm appears to be a safe, effective virucidal agent in HIV-positive patients...most important, is the apparent ability of MSP to dramatically reduce the viral load and cause clinical reversals of rapidly deteriorating patients with HIV. Although the optimum dosage and frequency of infusions has not been determined, 1-2 infusions weekly appears to be a safe and effective regimen.'"

-- Dr. Kent Holtorf, Holtorf Medical Group, "Safety and Efficacy of Intravenous Oligodynamic Silver"

- "Colloidal Silver as a Specific -- Dr. P. Viett advocates the use of colloidal silver as an efficient means of combatting sepsis. He reports a number of illustrative cases, all resulting favorably. Should his results be substantiated, a distinct advance step in therapeutics can be recorded. He has used the unguentum Crede' in larger doses than those usually prescribed (forty-five grains), using it in one inunction. In patients suffering from phlegmon, lymphangitis, and lymphadenitis his results were excellent. In one case of pneumonia inunctions over the chest were employed. The patient recovered promptly, but on special credit is given to the therapy, save that recovery began almost immediately after the use of the remedy. In two severe toxemic cases of scarlet fever and in one of diphtheria favorable results followed promptly after the introduction of the treatment. The results were equally striking in two patients suffering apparently from acute appendicitis. Three patients suffering from puerperal sepsis recovered. From his experience in the twenty cases reported, the author is led to believe that as an effective agent against various pyogenic organisms colloidal silver should be regarded as taking first place, and that the results are certainly encouraging that an internal antiseptic has been made practicable."

-- The American Journal of Medical Sciences, Volume 121, page 605, 1901

- "Professor Crede belongs the credit of having shown that in metallic silver in the colloid form, we possess an agent which not only destroys pathogenic organisms, but renders their toxins inert and harmless.

In an article recently published in the Medical Summary, Dr. Max Staller, Surgeon to Mt. Sinai Hospital, Philadelphia, relates his experience with the unguentum Crede, a 15 per



cent. preparation of soluble silver, and this report serves well to illustrate the wide range of utility of this remedy in affections of bacterial origin.

During the past two years the author has treated 25 cases of erysipelas with unguentum Crede. The ointment was rubbed gently into the inflamed area for 20 or 25 minutes, by which time the greater portion had been absorbed. Any case, if seen early, was cured in 3 to 5 days. Improvement was noticeable within 5 to 6 hours, the skin losing its parchment-like appearance, becoming softer, and the burning sensations also subsiding.

A case of cellulitis' phlegmonosa of the leg in a patient suffering with nephritis was cured within 3 days by four applications of unguentum Crede of 2 drachms each at intervals of 5 hours. In gonorrhoea at the first threatening symptoms of bubo, two or three inunctions of one-half drachm over the affected area, with rest for 24 hours, always aborted pus formation.

Remarkably successful results were obtained in mammary abscess from the use of the ointment in connection with the ice bag. Even when it failed to prevent suppuration, it localized the process and completely relieved the pain and discomfort. An inunction of 2 drachms, repeated three times at intervals of 4 hours, usually prevented pus formation if the case was seen early enough.

During an epidemic of cerebro-spinal fever the author employed unguentum Crede in 7 cases, with only one death, each patient receiving six inunctions, besides the routine treatment. In 50 cases of scarlet fever, some of marked severity, the remedy also exerted a pronounced beneficial effect. A mixture of unguentum Crede, 2 drachms, to 2 ounces of ung. aqu. rosae was rubbed into the body, and in none of these cases was the least trace of albumen observed in the urine."

-- International Journal Of Surgery, Volume 14, page 137, Treatment of Some Septic Conditions, April, 1901.

- "Crede first used the Colloidal Silver in medicine. It is almost entirely soluble in water and albuminous fluids, and its seems either to inhibit the action of staphylococci and streptococci, or destroy them altogether.

Colloidal Silver is employed-internally dissolved in equal parts of albumin and glycerin, to prevent its conversion into a chloride in the stomach; in aqueous solution hypodermically, since it is non-irritating; as a 15 per cent, ointment, known as Unguentum Crede, for inunction; and by rectal and intravenous injection. Schlossmann has shown that it is non-toxic and unirritating to mucous membranes, and thus far no case of argyria has been reported.

Crede claimed that the Colloidal Silver has a very beneficial influence and often effects a rapid cure in recent and chronic sepsis and furunculosis, when secondary changes in the vital organs have not occurred. He and others have treated osteomyelitis, phlegmonous angina, furunculosis, erysipelas, so-called gonorrhoeal and articular rheumatism, etc., by this method.

Various reports, some very enthusiastic, have been presented ; on puerperal fever (Peters, Jones, Voorhees), cerebrospinal meningitis (Schirmer), acute mastitis (Cumston), malignant scarlet fever (Crede), divers septic processes (Werler), furunculosis (Wolfram), and finally in purpura in the horse (Dieckerhoff).

Wilcox's own experience in septic phlebitis, of which an unusually large percentage has occurred in his typhoid fever cases, has been most satisfactory. He employed it as inunctions of thirty minutes' duration. In one instance of septic phlebitis following amoebic dysentery the results were almost marvelous."

-- Deering J. Roberts, M.D., Southern Practitioner, Vol. 23, page 21, Dec. 31, 1901

- "Collargol (Colloidal Silver) in Puerperal Infection -- by Dr. C. Jeanxin (Le Progres Medical, August 1, 1908). The collargol used is that obtained by the disintegrating action of electricity (electrargol) and assumed to be much purer than that obtained by chemical measures. The properties of colloidal silver are, therapeutically, the following: antiseptic, inhibiting bacterial growth, inorganic ferment exercising catalytic action. The drug is absolutely harmless and should be used (1) when at the outset the infection assumes a serious aspect; (2) when an infection, at first localized, tends to become generalized."

-- Post-Graduate, Volume 23, #10, page 911, New York Post-graduate Medical School and Hospital, October, 1908

- "Schlossmann, of Leipsig, reports extensive experiments with colloidal silver in acute conjunctivitis, and especially in gonorrhoeal ophthalmia. One to five per cent. albuminous solutions were employed, being applied to the conjunctiva by means of a camel's-hair brush. The results were very excellent in all cases, and he places the drug at the head of all the remedies at our disposal for the treatment of this often so obstinate affection. The instillations were entirely painless. Improvement began with the first application, and not infrequently the children were discharged cured after four or five days. Schlossmann also employed colloidal silver internally in acute intestinal catarrhs of infectious origin. A teaspoonful of the one per cent. albuminous solution was administered with a little milk or syrup every hour or two, the children taking it willingly. It is possible that the improvement may have been partly due to the simultaneous regulation of the diet. But the author recommends the colloidal silver to all practitioners who treat these infectious intestinal affections with intestinal antiseptics, as worthy of a place in the very first ranks of the drugs available for that purpose. Besides its great antiseptic power, it has the advantage of being absolutely non-poisonous."

-- Interstate Medical Journal, Volume 7, #10, October, 1900

- "Schlossmann (Therapcut. Monatshefte, May, p. 278) has experimented with colloidal silver ("collargolum") for more than a year. In this form are obtained the medicinal properties of silver itself, which differ from those of its salts owing to the absence of the various acid constituents.

Colloidal silver is readily absorbed and in therapeutic doses is quite harmless, since as much as 1 part in 360 of the body weight can be introduced per os, by inunction, or into the peritoneal cavity, without toxic effects. Children take a 1 per cent, solution readily when mixed with sweetened milk. A 1 per cent, solution in albuminised water has no irritating effect on healthy or inflamed mucous membranes.

Colloidal silver has a bactericidal power superior to that of perchloride of mercury. The writer found that guinea-pigs and rabbits survive the opening of the peritoneal cavity and infection of the peritoneum with staphylococci, streptococci or diphtheria bacilli if a few pieces of metallic silver are introduced simultaneously, but die if this is omitted.

...Clinically colloidal silver was employed internally and hypodermically by the writer ; as Crede's ointment, containing 15 per cent, colloidal silver ("review," Vol. I, p. 177), and in a 1 per cent, albuminised solution, externally. The ointment was used for inunctions in 18 cases, comprising cellulitis, pemphigus neonatorum, post-vaccinal glandular swellings, scarlatina and diphtheria. Some cases of cellulitis appeared to be benefited, though others were uninfluenced. Glandular swellings in acute diseases rapidly subsided, often when from past experience suppuration was expected. Others have obtained more brilliant results by inunction, possibly owing to better technique.

Colloidal silver was employed subcutaneously in a few cases of deep-seated glandular swellings, and the results were satisfactory and painless, though once the injection was followed by an abscess.

The writer's most extensive experience was in acute, and especially gonorrhoeal, ophthalmia, and he now places the remedy above all others. The treatment is painless and cure is generally complete in a few days, 1 to 5 per cent, albuminised solutions being used. The same solution is not satisfactory in suppurative otitis media, but gives excellent results when injected into the bladder in cystitis.

Internally good results were obtained in the acute infectious intestinal catarrhs of children; a drachm of the 1 per cent, solution being given in milk every 1 or 2 hours.

...In conclusion, the writer is convinced that colloidal silver is an excellent, non-irritant and non-toxic antiseptic both in surgery and internal medicine, and that colloidal mercury deserves further trial."

-- The Medical Review, Volume 3, Page 38, January-December, 1900

- "Administration of Colloidal Silver. (Deutsch. Amer. Apoth. Zeit., xx. 109, and Nouv. Rem., xv. 472.) A. Schlossman has investigated the therapeutic value of colloidal silver and finds it to be an excellent internal and external antiseptic. In septicaemia it may be given in the form of pills composed of colloidal silver, 50 centigrammes; milk sugar, 5 grammes; glycerin and water, of each sufficient to make a mass. Divide into fifty pills. Two to be taken for a dose, twice or three times 'a day before meals. In mixture form it maybe dispensed as follows: Colloidal silver, J to 2 grammes; distilled water, 50 to 200 grammes; fresh white of egg and glycerin, of each 0.5 to 2 grammes. A teaspoonful to be taken in a glass of water three times

daily, from 15 to 30 minutes before meals. Pills, each containing 5 centigrammes of colloidal silver and 25 milligrammes of milk sugar, are employed in surgical practice for introduction into the cavities of fistulas, and into deep lesions of various organs. In endometritis, Klein has employed it in the form of rods, containing 20 centigrammes of colloidal silver, massed with milk sugar, gum arabic, and glycerin."

-- Year-Book of Pharmacy, by J. O. Braithwaite, page 184, July 1, 1899 to June 30, 1900

- "Silver products have been used for thousands of years for their beneficial effects, often for hygiene and in more recent years as antimicrobials on wounds from burns, trauma, and diabetic ulcers. Silver sulfadiazine creams (Silvazine and Flamazine) are topical ointments that are marketed globally. In recent years, a range of wound dressings with slow-release Ag compounds have been introduced, including Acticoat, Actisorb Silver, Silverlon, and others."

-- Journal of Industrial Microbiology & Biotechnology, Volume 33, Number 7, 627-634, May 25, 2006

- "Antibiotic resistance of microorganisms is one of the major problems faced in the field of wound care and management resulting in complications like infection and delayed wound healing. Currently a lot of research is focused on developing newer antimicrobials to treat wounds infected with antibiotic resistant microorganisms. Silver has been used as an antimicrobial agent for a long time in the form of metallic silver and silver sulfadiazine ointments. Recently silver nanoparticles have come up as a potent antimicrobial agent and are finding diverse medical applications ranging from silver based dressings to silver coated medical devices."

-- Journal of Materials Science: Materials in Medicine, Volume 21, Number 2, 807-813, May 2006

- "...the mechanism of action of AgNPs (i.e., silver nanoparticles) as an antiviral and virucidal has been studied against several enveloped viruses. Recently, it has been suggested that nanoparticles bind with a viral envelope glycoprotein and inhibit the virus by binding to the disulfide bond regions of the CD4 binding domain within the HIV-1 viral envelope glycoprotein gp120, as suggested by Elechiguerra and colleagues. This fusion inhibition was later elegantly demonstrated by Lara and colleagues in their latest report.

The antiviral effects of AgNPs on the hepatitis B virus (HBV) have been reported using a HepAD38 human hepatoma cell line. There has been evidence of high binding affinity of nanoparticles for HBV DNA and extracellular virions with different sizes (10 and 50 nm). Moreover, it has been demonstrated that AgNPs could also inhibit the production of HBV RNA and extracellular virions in vitro, which was determined using a UV-vs absorption titration assay. Further investigation will be needed to determine whether this binding activity prevents HBV virions from entering into host cells or not.

In an another report Sun and colleagues showed that AgNPs were superior to gold nanoparticles for cytoprotective activities toward HIV-1-infected Hut/ CCR5 cells. It is

generally understood that Ag, in various forms, inactivates viruses by denaturing enzymes via reactions with sulfhydra, amino, carboxyl, phosphate, and imidazole groups. However, it is necessary to design studies in vivo to increase therapeutic benefit and minimize adverse effects. Among antiviral activities, the capacity of AgNPs to inhibit an influenza virus was determined in a MDCK cell culture and was demonstrated that with AgNPs at 0.5 µg/ml concentration viral infectivity was reduced. Nanosilver may interfere with the fusion of the viral membrane, inhibiting viral penetration into the host cell.

Lara and colleagues further demonstrated that AgNPs inhibited a variety of HIV-1 strains regardless of their tropism, clade and resistance to antiretrovirals. The fact that AgNPs inhibited number of HIV-1 isolates suggest that their mode of action does not depend on cell tropism and that AgNPs are broad spectrum anti-HIV-1 agents. A cell-based fusion assay using Env expressing cells (HL2/3) and CD4 expressing cells mixture demonstrated that AgNPs efficiently blocked cell-cell fusion in a dose-dependent manner within the 1.0-2.5 mg/mL dose range including: Tak-779 (Fusion Inhibitor), AZT (NRTI), Indinavir (PI) and 118-D-24 (Integrase Inhibitor) as controls (Figure 2). In addition, efficient inhibitory activity of AgNPs against gp120-CD4 interaction was measured in a competitive gp120-capture ELISA. The results of the cell-based fusion assay confirm the hypothesis that AgNPs inhibit HIV-1 infection by blocking the viral entry, particularly the gp120-CD4 interaction.

Other studies also showed that AgNPs at non-toxic concentrations effectively inhibit arenavirus replication during the early phases of viral replication."

-- Journal of Nanobiotechnology, September 2011, "Silver nanoparticles are broad-spectrum bactericidal and virucidal compounds," Humberto H Lara, Elsa N Garza-Treviño, Liliana Ixtepan-Turrent and Dinesh K Singh

- "We measured the silver levels produced in vitro by three silver-coated fabrics, and the resulting antimicrobial effect on *Pseudomonas aeruginosa*, *Staphylococcus aureus*, and *Candida albicans*. A significant enhancement of the fabrics' antimicrobial effect was achieved by the passage of weak DC currents, which cause increased liberation of silver ions. The antimicrobial effectiveness of each fabric depended on its textile characteristics. Thus, a silver-coated fabric could potentially serve as an antimicrobial dressing by continuously releasing silver ions into a wound either by passive dissociation or through electrical stimulation."

-- Journal of Biological Physics, Volume 12, Number 4, 1984, Electrical augmentation of the antimicrobial activity of silver-nylon fabrics

- "Silver has been known for years for its broad spectrum antimicrobial properties. Colloidal silver was used in wound antisepsis and in combination with citrate salts for skin infections. One to two percent silver nitrate was employed almost 100 years ago for the treatment of ophthalmia neonatorum. Shortly thereafter silver acetate was formulated into eye lotions and creams, silver nitrate (0.01%) was used in bladder irrigations and silver lactate (1 : 100 to 1 : 2500) was employed as a general antiseptic [11]. Silver sulfadiazine, the non-ionized, water-insoluble powder (1%) was applied in creams for treatment of burn wounds and prevention

of infections by Fox in 1968 [8] and is currently still in use. Colloidal preparations of silver salts are still used medically for local antiseptics on mucous membranes, silver acetate-containing antismoking lozenges, and coatings for breath mints. Other medical applications of silver involve silver-coated nylon fabrics that are used to treat and manage postoperative debridement wounds in cases of severe chronic osteomyelitis and antimicrobial Foley catheters [3,9,11,14]. Aside from medical uses, silver is employed in water treatment partly because of concerns about the production of possible carcinogens during the disinfection of water with chlorine. Various silver-treated charcoal filters that remove odors and reduce organics in drinking waters are commercially available. Also, various ionization apparatus that produce low levels of silver ions ( $<0.5 \mu\text{g/l}$ ) are manufactured for microbial control in recreational pool waters."

-- Journal of Industrial Microbiology (1995) 15, 372-376

- "The susceptibility of *Escherichia coli* B to the antibacterial activity of silver ions was measured in terms of the initial inhibitory concentration, complete inhibitory concentration, postagent effect for bacteriostatic susceptibility, minimum bactericidal concentration, maximum tolerant concentration, and log killing time for bactericidal activity. At a concentration of 9.45 M and an inoculum size of 10 CFU/ml, silver caused growth delay of *E. coli*; at a concentration of 18.90 M, silver completely inhibited bacterial growth."

-- BioMetals, Volume 11, Number 1, 27-32, 1998

- "It has been established that certain heavy metals including silver have antibacterial properties, and that they may be useful components of antibacterial materials. This knowledge of the antibacterial activity of silver has already been put to use to decrease the occurrence of urinary catheter infections and to develop topical antibacterial agents for burn victims. In this study, the ability of silver-coated ceramic beads (Ag-CBs), sintered at 375, 400, 425, or 450 °C, to sterilize *Sphingomonas* sp. in commercial mineral water was evaluated. Over 3% (w/v) Ag-CBs in mineral water completely sterilized *Sphingomonas* sp. after 6 h, regardless of the sintering temperature. The Ag-CBs sintered at 400 °C were the most useful since they did not produce clouding in the water and the bacteria were effectively killed. The antimicrobial activity of the 400 °C-sintered Ag-CBs was comparable to that of free silver ions at 15 µg/l, showing that the silver ions released from the Ag-CBs resulted in the complete sterilization of the microbial cells in mineral water. These results suggest that Ag-CBs present an easy-to-use option for mineral water sterilization."

-- World Journal of Microbiology and Biotechnology, Volume 21, Numbers 6-7, 921-924, 2005

- "Research designed to prevent human beings from being infected by microorganisms such as bacteria, molds, yeasts, and viruses from the living environment has attracted tremendous interest. Therefore, many researchers have tried to develop novel and effective antimicrobial materials with free of resistance and low cost [1, 2]. One of the most widely used antibacterial materials is based on silver (silver ions or silver nanoparticles) which

exhibits strong biocidal effects towards a broad range of microorganisms, along with advantages such as a lack of odor, taste, and color [3– 6]."

-- J Mater Sci, 45:3106–3108, 9 March, 2010, Facile method of preparing silver-embedded polymer beads and their antibacterial effect

- "Infections caused by drug-resistant microorganisms result in significant increases in mortality, morbidity, and cost related to prolonged treatments. The antibacterial activity of silver nanoparticles against some drug-resistant bacteria has been established, but further investigation is needed to determine whether these particles could be an option for the treatment and prevention of drug-resistant microbial infections. Hence, we challenged different drug-resistant pathogens of clinical importance (multidrug-resistant *Pseudomonas aeruginosa*, ampicillin-resistant *Escherichia coli* O157:H7 and erythromycin-resistant *Streptococcus pyogenes*) with a suspension of silver nanoparticles. By means of a luciferase-based assay, it was determined that silver nanoparticles (1) inactivate a panel of drug-resistant and drug-susceptible bacteria (Gram positive and Gram negative), (2) exert their antibacterial activity through a bactericidal rather than bacteriostatic mechanism, and (3) inhibit the bacterial growth rate from the time of first contact between the bacteria and the nanoparticles."

-- World J Microbiol Biotechnol (2010) 26:615–621

- "Silver nanoparticles (Ag-NPs) represent a new generation of antimicrobials. Ag-NPs have a very broad range of antimicrobial activity and kill both Gram-negative and Gram-positive bacteria, including *Escherichia coli*, *Staphylococcus aureus*, *Bacillus subtilis*, *Streptococcus mutans*, and *Staphylococcus epidermidis*...Moreover, Ag-NP's have strong antifungal activity on *Candida albicans*, *Candida glabrata*, *Candida parapsilosis*, *Candida krusei*, and *Trichophyton mentagrophytes*. AgNPs also have antiviral activity against human immunodeficiency virus-1 (HIV-1), hepatitis B virus, herpes simplex, monkeypox and respiratory syncytial virus."

-- Biometals, 24 September 2010, Antibiotic effect of silver nanoparticles on *Staphylococcus aureus*

- "The antimicrobial effects of silver (Ag) have been recognized for thousands of years. In ancient times, it was used in water containers (Grier 1983) and to prevent putrefaction of liquids and foods. In ancient times in Mexico, water and milk were kept in silver containers (Davis and Etris 1997). Silver was also mentioned in the Roman pharmacopoeia of 69 b.c. (Davis and Etris 1997)."

-- Dr. Charles P. Gerba, Silver As a Disinfectant, Reviews of Environmental Contamination and Toxicology 2007, Volume 191, 23-45

- "Metallic silver was known to the Chaldeans as early as 4,000 B.C.E., and it was the third metal known to be used by the Ancients, after gold and copper [1]. Over these millennia, silver has been used for numerous medical conditions, mostly empirically before the

realization that microbes were the agents of infection. The metal was used in many configurations, including vessels or containers for liquid, coins, shavings, foils, sutures, solutions (e.g., nitrate, oxide, bromide, chloride, and iodide), colloids providing fine particles, and electric colloids (introduced in 1924, which provide even smaller particles of 0.1µm to 0.001µm in diameter). Electric colloids of silver became the mainstay of antimicrobial therapy in the first part of the 20th Century until the introduction of antibiotics in the early 1940s. Complexes of silver and protein known as mild silver proteins also were employed. These formulations were delivered topically (by solution, ointment, or direct application of colloids or foils), orally, and by injection. By 1940, at least 50 silver products were marketed in the United States."

-- Surgical Infections, Volume 10, Number 3, 2009, J. Wesley Alexander, History of the Medical Use of Silver

- "From Crede's practice scores of cases have been reported in which this treatment attained marvelous results in various forms of septic infection. Werler, of Berlin, regards it as almost a specific in acute and chronic sepsis. Wolfran, of Magdeburg-Buchan, finds it a valuable agent in acute and chronic infections. In chronic furunculosis particularly have the results been most gratifying. Dr. Shirmer, of New York, reported several cases of cerebro-spinal meningitis cured by daily inunctions. Seabury Jones has reported a remarkable case of puerperal sepsis which rapidly subsided under this treatment. Crede states that he has had no deaths from sepsis in his surgical hospital since the introduction of silver salts and colloidal silver. There seems, therefore to be quite a large number of clinical cases reported to induce the clinician to give this medicament a trial. It is stated that eight to twelve hours after the inunction the temperature falls and all symptoms of sepsis become ameliorated."

-- The Therapeutic Value of Soluble Silver, John Zahorsky, M.D., Medical Review, May 6, 1899

- "In Ayurvedic medicine silver is used in small amounts as a tonic or elixir or rejuvenative agent for patients debilitated by age or disease. Silver was also used in homeopathic medicine. The dilute concentrations were in the same range as the modern low concentrations of colloidal silver. Recently, with the development of antibiotic resistance in many diseases and the increase in new strains of bacteria and viruses worldwide, there is renewed interest in silver. Large companies are developing and introducing new silver compounds for a variety of anti-microbial applications, including protection against the spread of the AIDS virus."

-- Colloidal Silver: A Literature Review: Medical Uses, Toxicology & Manufacture, by John Hill

- "An experimental investigation of the Christiansen-effect applied to colloidal silver was made. The method employed was to vary the refractive index of the liquid by means of other solvents and noting whether the colour-changes were in accord with theory. The colloidal silver was made by Carey Lea's method from silver nitrate by means of Rochelle salt and ferrous sulphate. The results obtained show that: (1) Colloidal silver solutions of all colours



can easily be prepared from one set of reagents, by simply varying the conditions. (2) The colour-changes in colloidal silver solutions are not satisfactorily explained by the Christiansen refractive index phenomenon. A colour-change produced by increasing the refractive index of the liquid is not reversed when the refractive index is again diminished. (3) Light is essential to the changes of colour, and the velocity of these changes depends on the intensity of the light. (4) The colour of colloidal silver is due to a selective light absorption. The author concludes that there is only one form of colloidal silver, not several allotropic forms, and the various colours and properties, such as electrical conductivity, density, action towards reagents, are to be explained by the state of aggregation or number of the particles of this colloidal form. F. J. B.”

-- Allotropic Silver and its Colours. F. E. Gallagher. (Journ. Phys. Chem. 10. pp. 701-714, Dec., 1906.)

- “Dr. P. Viett of Horneburg, Germany, has employed Argentum Colloidale in many cases since 1898, and, in the Allg. Med. CentralZeit. of January 19 and 23, 1901, considers its claims to be regarded as a specific in sepsis of various kinds. He concludes that it has the same importance in septic infections that antitoxin has in diphtheria. He employed the Unguentum Crede, using one inunction of 3 grams (45 grains) once daily at first. But finding that there were no by-effects, that no argyria occurred, he increased the dose to 6, 9 or more grams to 214 drams) daily in severe cases. He also gave the silver internally in many instances.

B Argent. Colloid 2.0 (30 grs.) Albuminis 20.0 (5 drams) Aq. dost 180.0 (6 ozs.) M. Sig. A tablespoonful every two hours.

- Viett records a number of cases of phlegmon, lymphangitis and lymphadenitis as examples of many instances of local septic infection by streptococci or staphylococci treated in this way; and they show the superiority of the soluble silver to other methods.

In many cases the ordinary antiseptic remedies were first employed with very unsatisfactory results. The disease process progressed along the lymphatic channels and to the lymphatic glands, and only the Colloidal Silver could limit the evil effect of the pus cocci, stop the malady and cure the patient. Large doses, such as 12 grams (3 drams) of Unguentum Crede in twelve hours gave brilliant results in an astonishingly short space of time.

Several cases of septicemia and pyemia were treated by the same method. In one the prognosis was very bad from the beginning, in consequence of the severity of the infection and the patient's bad condition. In the others, however, the effect of the Colloidal Silver was brilliant and unmistakable. One was that of a girl thirty-five days old, who stood large doses, up to 2 grams (30 grains) daily, of the ointment by inunction excellently.

Finally, the author employed the treatment in three cases of puerperal fever very effectively. He therefore believes that it should be used on every case. In reviewing the 20 cases which he cites, the author ascribes the absence of the expected effect in the one case to the fact that it was employed too late and not with sufficient energy, and in the other one to the

obstinacy of the patient. All the others reacted in a way that, as he says, caused him most heartfelt joy.

He ascribes the failures that have been noted in some quarters entirely to insufficient dosage.

We must not ask too much of a remedy. Colloidal Silver is not meant to displace any other remedy of proven usefulness, but it fills in unexpected measure a want that has long been painfully felt in the treatment of septic diseases. He is willing to stand by this assertion.

Used early and with sufficient energy, Colloidal Silver is a specific for sepsis.”

-- Surgical Journal, Volume 7, Page 516, "Unguentum Crede in Sepsis," April 2, 1901

- “Among the general internal antiseptics the author considers chlorin, the salicylates, and quinin, and silver, recently suggested for that purpose. In 1890, Carey Lea first produced it in allotropic form, and seven years later, Crede' first used the colloidal silver in medicine. It is almost entirely soluble in water and albuminous fluids, and it seems either to inhibit the action of staphylococci and streptococci, or destroy them altogether.

Colloidal silver is employed internally, dissolved in equal parts of albumin and glycerin, to prevent its conversion into a chloride in the stomach; in aqueous solution hypodermically, since it is non-irritating; as a 15 per cent. ointment, known as unguentum Credd, for inunction; and by rectal and intravenous injection. Schlossmann has shown that it is non-toxic and unirrhating to mucous membranes and thus far no case of argyria has been reported.

Crede- claimed that the colloidal silver has a very beneficial influence and often effects a rapid cure in recent and chronic sepsis and furunculosis, when secondary changes in the vital organs have not occurred. He and others have treated osteomyelitis, phlegmonous angina, furunculosis, erysipelas, so-called gonorrhoeal and articular rheumatism, etc., by this method. Various reports, some very enthusiastic, have been presented; on puerperal fever (Peters, Jones, Voorhees), cerebrospinal meningitis (Schirmer), acute mastitis (Cumston), malignant scarlet fever (Crede), diverse septic processes (Werler), furunculosis (Wolfram), and finally in purpura in the horse (Dieckerhoff). Wilcox's own experience in septic phlebitis, of which an unusually large percentage has occurred in his typhoid fever cases, has been most satisfactory. He employed it as inunctions of thirty minutes' duration. In one instance of septic phlebitis following amoebic dysentery the results were almost marvelous.”

-- New England Medical Monthly and Prescription, "Internal Antisepsis," by Reynold Webb Wilcox, M.D., LL.D, Volume 19, Page 466, January, 1900

- “Collargolum.—In a brochure on "Colloidal Metals in Medicine" (L. Simion Nf., Berlin, 1904) Dr. J. L. Beyer, of Dresden, gives some interesting facts regarding the history, constitution and therapeutic action of colloidal silver or collargolum. The term colloidal designates the peculiar property of this water-soluble metal of not diffusing through animal membranes in distilled water.

Colloidal silver was first described by Carey Lea in the American Journal of Sciences in 1889, but his discovery was simply a laboratory curiosity without practical value, as his product was unstable and impure and had no field of application. Crede', of Dresden, working wholly independently (Lea's experiments were found by him only in later researches), came to the conviction that an efficient general body disinfection could be accomplished only by metallic but soluble silver, and not by means of silver salts; and he instructed the Heyden chemical factory to make experiments in this direction. It is due to his work, as well as to that of the Heyden factory, that, by new and improved processes, a stable and pure colloidal silver (collargolum) was elaborated. And it was Cred6 who developed the method of internal silver treatment.

Collargolum consists of small, hard, brittle, bluish-black scale-like pieces. It is soluble in distilled water to the extent of 1:20, and remains stable even after months. Solutions may be prepared with ordinary drinking water. They may be boiled, but this is unnecessary, as collargolum is itself antiseptic. Lea's colloidal silver precipitates on being boiled.

Collargolum may be introduced into the organism by inunction, subcutaneously, by mouth, rectally, and intravenously. When given by inunction, absorption takes place in the upper layers of the corium. The dose of collargolum ointment (unguentum Cred£) is 1 to 3 grams given one to four times daily. In chronic sepsis (furunculosis, puerperal fever) up to 30 inunctions may be given.

The effects of the subcutaneous injection are less rapid and certain, absorption being slow. Per os, 1:1000 to 1:200 collargolum solutions may be given in teaspoonful or tablespoonful doses 2 to 5 times daily on an empty stomach; this is especially indicated in dysentery, gastric catarrhs, etc. As an enema, 1:500 solutions are used, a cleansing clyster being given beforehand. This should be given twice daily for at least eight days. The method is praised by Prof. Schlesinger and Drs. Loebel and Kornfeld for its simplicity and safety, and because larger doses can be conveniently administered. The action of the silver when introduced by this route is especially energetic on the neighboring organs, such as the uterus and peritoneum. But the best method is the intravenous, which is perfectly safe and is especially indicated when the blood is the seat of infection, as in endocarditis.

As collargolum is rapidly eliminated, it must be constantly supplied to the organism when a permanent effect is desired. Its efficacy is fully apparent only when the whole clinical picture, not merely temperature and pulse, is considered. In a septic process the temperature does not always correspond to the severity of the infection; and equal importance must be conceded to the general symptoms.

After the use of collargolum subjective improvement almost invariably precedes temperature or pulse improvement, occurring, when given intravenously, after four to six hours, and when inuncted, after eight to twelve hours. Nervousness, headache and stupefaction abate, the patient is relieved and refreshed, and shows more interest in his surroundings. Appetite and sleep return. Often there is a mild diaphoresis and increased intestinal activity. Collargolum directly combats the septic affection and inhibits bacterial development.

But the antiseptic has, of course, its limitations. It may fail to save moribund patients or those in whom the powers of heart and the vasomotors are exhausted. Nor can it affect abscesses which are out of the reach of the body fluids. Its use should be begun as soon as there is danger of the spread of a local infection."

-- The American Therapist, Volume 12, No. 1, July 15, 1903

- "Research conducted by Jonathan V. Wright, M.D., has found that bacteria have an enzyme system that is disrupted by the presence of silver ions, causing the organism to die. Before the advent of pharmaceutical antibiotics in the 1940's, colloidal silver was a commonly used antibacterial agent."

-- Jenny Thompson, Director, Health Sciences Institute, September 2009

- "Silver ions have long been known to have strong inhibitory and bactericidal effects as well as a broad spectrum of antimicrobial activities. Some forms of silver have been demonstrated to be effective against burns, severe chronic osteomyelitis, urinary tract infections, and central venous catheter infections..."

...To investigate the mechanism of inhibition of silver ions on microorganisms, two strains of bacteria, namely Gram-negative *Escherichia coli* (*E. coli*) and Gram-positive *Staphylococcus aureus* (*S. aureus*), were treated with  $\text{AgNO}_3$  and studied using combined electron microscopy and X-ray microanalysis. Similar morphological changes occurred in both *E. coli* and *S. aureus* cells after  $\text{Ag}^+$  treatment. The cytoplasm membrane detached from the cell wall. A remarkable electron-light region appeared in the center of the cells, which contained condensed deoxyribonucleic acid (DNA) molecules. There are many small electron-dense granules either surrounding the cell wall, or depositing inside the cells. The existence of elements of silver and sulfur in the electron-dense granules and cytoplasm detected by X-ray microanalysis suggested the antibacterial mechanism of silver: DNA lost its replication ability and the protein became inactivated after  $\text{Ag}^+$  treatment. The slighter morphological changes of *S. aureus* compared with *E. coli* recommended a defense system of *S. aureus* against the inhibitory effects of  $\text{Ag}^+$  ions."

-- Journal of Biomedical Materials Research, A Mechanistic Study of the Antibacterial Effects of Silver Ions on *Escherichia coli* and *Staphylococcus aureus*, Q.L. Feng, et. al., Volume 52, Issue 4, 15 December 2000

- "Since ancient times, the silver ion has been known to be effective against a broad range of microorganisms. Today, silver ions are used to control bacterial growth in a variety of medical applications, including dental work, catheters, and the healing of burn wounds (17, 30, 31). Silver ions are also used for a number of nonmedical purposes, such as in electrical appliances (14, 36). The slow-release "nanosilver" linings of laundry machines, dishwashers, refrigerators, and toilet seats are also marketed and advertised. It is clear that we are exposed to a wide range of mostly unfamiliar uses of silver-containing products intended to function as antimicrobial biocides.

Therefore, it is necessary to elucidate the antimicrobial activity of the silver ion, which is widely used in these products. The mechanism of the antimicrobial action of silver ions is closely related to their interaction with thiol (sulfhydryl) groups (1, 5, 9, 10), although other target sites remain a possibility (27, 34). Amino acids, such as cysteine, and other compounds containing thiol groups, such as sodium thioglycolate, neutralized the activity of silver against bacteria (18). By contrast, disulfide bond-containing amino acids, non-sulfur-containing amino acids, and sulfur-containing compounds, such as cystathione, cysteic acid, L-methionine, taurine, sodium bisulfate, and sodium thiosulfate, were all unable to neutralize the activity of silver ions. These and other findings imply that the interaction of silver ions with thiol groups in enzymes and proteins plays an essential role in its antimicrobial action, although other cellular components, like hydrogen bonding, may also be involved (10).

Silver was also proposed to act by binding to key functional groups of enzymes. Silver ions cause the release of K ions from bacteria; thus, the bacterial plasma or cytoplasmic membrane, which is associated with many important enzymes, is an important target site for silver ions (9, 22, 25, 29). In addition to their effects on bacterial enzymes, silver ions caused marked inhibition of bacterial growth and were deposited in the vacuole and cell wall as granules (6). They inhibited cell division and damaged the cell envelope and contents of bacteria (27). Bacterial cells increased in size, and the cytoplasmic membrane, cytoplasmic contents, and outer cell layers all exhibited structural abnormalities. Finally, silver ions interact with nucleic acids (35); they interact preferentially with the bases in DNA rather than with the phosphate groups, although the significance of this in terms of their lethal action is unclear (12, 24, 34, 37)."

-- Applied and Environmental Microbiology, "Antibacterial Activity and Mechanism of Action of the Silver Ion in Staphylococcus aureus and Escherichia coli," Vol. 74, No. 7, April 2008

- "Textiles are appealing materials for use in several medical applications, including hospital uniforms and linens; prosthetic valves; and wound dressings. One promising innovation is to impart these textiles with antimicrobial properties. Noble metals such as copper, gold, and silver have broad-spectrum antimicrobial activity. For example, silver has several effects on microorganisms, including impeding the electron transport system and preventing DNA replication. Nanocrystalline silver provides Ag<sub>0</sub> and Ag<sup>+</sup> ions to the surrounding environment. As silver ions are depleted, an equilibrium shift allows additional Ag<sub>0</sub> and Ag<sup>+</sup> ions to be liberated from nanocrystalline silver. In previous studies, silver has demonstrated antimicrobial activity against a broad range of fungi, viruses, and bacteria."

-- Journal of Materials Engineering and Performance, "Antifungal Textiles Formed Using Silver Deposition in Supercritical Carbon Dioxide," Volume 19(3) April 2010, Page 368

- "Infections caused by drug-resistant microorganisms result in significant increases in mortality, morbidity, and cost related to prolonged treatments. The antibacterial activity of silver nanoparticles against some drug-resistant bacteria has been established, but further investigation is needed to determine whether these particles could be an option for the treatment and prevention of drug-resistant microbial infections...The data presented here are novel in that they prove that silver nanoparticles are effective bactericidal agents

regardless of the drug-resistance mechanisms that exist in multidrug-resistant *P. aeruginosa*, ampicillin-resistant *E. coli* O157:H7 and erythromycin-resistant *S. pyogenes* and show the importance of silver nanoparticles in the nosocomial and community environment. Therefore, silver nanoparticles can be recommended as an effective broad-spectrum bactericidal agent."

-- World Journal of Microbiology and Biotechnology, "Bactericidal effect of silver nanoparticles against multidrug-resistant bacteria," (2010) 26:615–621

- "...we did find that some human cancer cells in culture appeared to dedifferentiate when exposed to these silver ions. I also had a patient with a severe, chronic bone infection who had an associated cancer in the wound. He refused amputation, which would have been the treatment of choice, and insisted that I treat his infection with the silver technique. After three months, the infection was under control, and the cancer cells in the wound appeared to have changed back to normal. When I last heard from him, eight years after the treatment, he was still fine.

It is important to realize that this is not simply an electrical effect, but the result of the combined action of the electrical voltage and the electrically generated silver ions. It is an electrochemical treatment. While we do not have firm evidence at this time, what probably happens is that the silver ion is shaped so as to connect with some receptor group on the surface of the cancer-cell membrane. After that connection is made, an electrical-charge transfer sends a signal to the nucleus of the cancer cell that activates the primitive-type genes, and the cell dedifferentiates. In that state it awaits instructions as to what it is to become. The process is exactly the same as that in Rose's experiments, except that in this case the dedifferentiation is caused by the unexpected action of the positive silver ions.

This technique obviously requires more study before any clinical use can be made of its antitumor effect. However, it does appear to be a promising lead in an otherwise rather grim picture."

-- Robert O. Becker, M.D., author, *Cross Currents*, researcher Syracuse Medical University, NY

- "Silver ions and preparations containing silver in an ionic state have been used for over a century for medicinal and bactericidal purposes. Because of its bactericidal properties, silver has been used as a topical treatment for burns, as a treatment for venereal diseases, as an ingredient in cosmetic formulations and in the sanitation of swimming pools and hot tubs/spas. Silver has also been used in dentistry (as amalgams and as an ingredient in mouth washes), in acupuncture, jewelry making, and photography. Silver can be found in electroplating as well as in paints and in water purification systems."

-- Environmental Protection Agency, 40 CFR Part 180 [EPA-HQ-OPP-2007-0395; FRL-8412-1], Federal Register / Vol. 74, No. 110 / Wednesday, June 10, 2009 / Rules and Regulations

- "Available animal and human experience through occupational and medicinal exposure scenarios have not indicated a carcinogenic potential for silver. Therefore, silver is not expected to be carcinogenic to humans particularly in light of its low systemic toxicity potential and our understanding of its metabolism."

-- Environmental Protection Agency, 40 CFR Part 180 [EPA-HQ-OPP-2007-0395; FRL-8412-1], Federal Register / Vol. 74, No. 110 / Wednesday, June 10, 2009 / Rules and Regulations

- "For all bacterial, fungal and viral attacks on plants, flowers and fruit, simply spray diluted colloidal silver on the leaves; also, add to water, mixing one tablespoon per liter. I put silver in my hydroponic system to eradicate root rot. A friend of mine grows very rare orchids; these are sold overseas for a large amount of money. He was getting a fungus growing on some of them and they became worthless. We came up with the idea that the silver might eradicate the fungus, as it does on humans and animals. So why not give it a try? It worked and he is a very happy man. he has now put a spray system in and all his flowers are sprayed at regular intervals and have never had any trouble since."

-- Colloidal Silver: the Hidden Truths, by Dr. Keith F. Courtenay (U.L.C., USA)

- "Recent studies performed at the UCLA School of Medicine Center for Health Sciences confirmed that colloidal silver kills harmful bacterial, viral, and fungal organisms just minutes after contact...Prepared as a colloidal, silver is potent against all types of infectious organisms. Its reputation was established many years before antibiotics became the wonder drug, and was a staple in doctors' medicine chests. By 1918, the British Medical Journals had published two different articles stating colloidal silver's powerful effect on bacterial and viral infections (Duarte 1998)."

-- Journal of Longevity - Vol.4 / No. 10

- "In 1989, Thurman and Gerba concluded that metal ions, such as silver ions, can destroy germs located both inside and outside of our human cells."

-- Becker, Robert O., MD, Spadaro, JA, "Treatment of Orthopaedic Infections with Electrically Generated Silver Ions," J Bone Jt Surg, 197; 60

- "Studies showed the spectrum of organisms susceptible to electrically generated silver ions was wide action and compared favorably with other antibiotics."

-- J.A. Spadaro, Ph. D

- "Colloidal silver is very effective in treating periodontal disease (gum disease). My patients enjoy the clean fresh breath as colloidal silver immediately cleanses the mouth and destroys odor-causing bacteria. I would recommend that colloidal silver solutions be used after each dental procedure or surgery to eliminate infection and speed healing."

-- S.R. Cobble, D.D.S., Obstetrics and Gynecology

- "Silver is one of the most universal antibiotic substances. When administered in the colloidal form, it is for all practical purposes non-toxic. Silver has been proven to be effective against hundreds of infectious conditions. It has tremendous anti-microbial power; the history of safe and successful colloidal silver use is extensive, and the number of current health professionals and individuals that successfully utilize colloidal silver to reduce the length and severity of infectious disorders is growing exponentially."

-- Zane Baranowski, CN

- MacLeod reports colloidal silver being used with marked success in the following cases: "Septic and follicular tonsillitis, Vincent's angina, phlyctenular conjunctivitis, gonorrheal conjunctivitis, spring catarrh, impetigo (contagious acne of face and body), septic ulcer of legs, ringworm, soft sores, suppurative appendicitis after operation (the wounds cleaned rapidly), pustular eczema of scalp and pubes, chronic eczema of meatus of ear with recurrent boils, chronic suppuration in otitis media, and bromidrosis of feet. By injection: gonnorrhoea and chronic cystitis (local), boils, epididymitis."

-- Lancet, Feb. 3, 1912 p. 83.

- "The Great King, when he goes to the wars, is always supplied with provisions carefully prepared at home, and with cattle of his own. Water too, from the river Choaspes, which flows by Susa is taken with him for his drink, as that is the only water which Kings of Persia taste. Wherever he travels, he is attended by a number of four-wheeled carts drawn by mules, in which Choaspes water, ready boiled for use, and stored in flagons of silver is moved with him from place to place."

-- Records of Herodotus (Rawlinson's translation), 425 B.C.

- "Silver attacks all three of the germ's vulnerable targets at once. First, the silver ions easily rupture a germ's outer membrane when present in the right amounts, causing the germ's vital internal components to be exposed in the bloodstream to our white blood cells. While the white blood cells attack the internal components, the micro-particulate silver continues to destroy these vital internal components by cutting up vital enzymes. The silver ions then easily attack the germ's third vulnerable target: its delicate gene pool. Silver ions have the ability to reach into the nucleus of the germ, where its gene pool is located. Once they combine with the genes, the genes become paralyzed, and the germ cannot replicate itself...In 1909, the Journal of the American Medical Association was the first medical journal to point out that colloidal silver could actually increase our immune cells' phagocytic index. In the past few years, more studies have shown that silver ions greatly enhance the essential second part of the phagocytic index-the part where the germ is digested by our immune cells. This is brought about because silver ions increase the "digesting juices" (what you know as hydrogen peroxide) of these immune cells."

-- Dr. Jonathan Wright, M.D., Tahoma Clinic, Washington State, Stop Supergerms in Their Tracks With One Powerful Silver Bullet



- “Silver, one of humankind's first weapons against bacteria, is receiving new respect for its antiseptic powers thanks to the growing ability of researchers to tinker with its molecular structure. Doctors prescribed silver to fight infections at least as far back as the days of ancient Greece and Egypt. Their knowledge was absorbed by Rome, where historians like Pliny the Elder reported that silver plasters caused wounds to close rapidly. More recently, in 1884, a German doctor named C.S.F. Crede demonstrated that putting a few drops of silver nitrate into the eyes of babies born to women with venereal disease virtually eliminated the high rates of blindness among such infants.

But silver's time-tested if poorly understood versatility as a disinfectant was overshadowed in the latter half of the 20th century by the rise of antibiotics. Now, with more and more bacteria developing resistance to antibiotic drugs, some researchers and health care entrepreneurs have returned to silver for another look. This time around, they are armed with nanotechnology, a fast-developing collection of products and skills that helps researchers deploy silver compounds in ways that maximize the availability of silver ions - the element's most potent form.

Scientists also now have a better understanding of the weaknesses of their microbial adversaries. One of the urgent goals is to prevent bacterial infections that each year strike 2 million hospital patients in the United States and kill 90,000, according to the Centers for Disease Control and Prevention. Such infections are usually treated with large doses of antibiotics and sometimes with repeat surgeries. They cost the U.S. health care system roughly \$4.5 billion annually, and the challenge is growing with the spread of drug-resistant microbes.”

-- New York Times, January 10, 2006

- "...Ionic silver is emerging as the new antimicrobial wonder in dealing with bacterial as well as, yes, viral conditions too, both in medicine and in industry...Ionic silver was actually a commonly-used antimicrobial 100 years ago, before the advent of modern antibiotics, which only address bacteria and are becoming largely obsolete while posing risks related to resistant super-germs. Ionic silver is increasingly being recognized for its broad-spectrum antimicrobial qualities and the fact that it presents virtually none of the side-effects related to antibiotics.

Ionic silver is entirely non-toxic to the body...Reports of any pathogens developing resistance to ionic silver are rare. Some reports indicate it even kills drug-resistant strains of germs. Ionic silver is also a powerful tissue-healing agent, so much so that it has been used topically for decades in burn centers and currently represents one of the fastest growing sectors – if not the fastest growing sector – in wound care today.

The fact that ionic silver is effective against a very broad range of bacteria is well established and, due to recent advances in the delivery of ionic silver, together with the problems associated with antibiotics, it is being used in a rapidly growing range of dietary-supplement, medical, and industrial products."

"From 1900 to the beginning of the modern antibiotic era - circa 1940 with the introduction of sulfa drugs - Silver was one of the mainstays of medical practice in Europe and America. Various forms of Silver were used to treat literally hundreds of ailments: lung infections such as pneumonia, tuberculosis and pleurisy; sexual diseases such as gonorrhea and syphilis; skin conditions such as cuts, wounds, leg ulcers, pustular eczema, impetigo and boils; acute meningitis and epidemic cerebro-spinal meningitis; infectious diseases such as Mediterranean fever, erysipelas, cystitis, typhus, typhoid fever, and tonsillitis; eye disorders such as dacryocystitis, corneal ulcers, conjunctivitis and blepharitis; and various forms of septicemia, including puerperal fever, peritonitis and post-abortion septicemia. (This list does not even begin to exhaust the published medical uses for Silver in Europe and America, 1900-1940).

...Silver is unique among antimicrobial agents in its broad spectrum of action. It has been claimed to kill some 650 different disease organisms. And unlike antibiotics, Silver is an 'equal opportunity destroyer' - it doesn't discriminate, but effectively kills germs of all major types: gram-positive and gram-negative bacteria, spore-forming bacteria, fungus/yeasts, viruses and protozoal parasites. Silver sulfadiazine (Silvadene<sup>®</sup>), used almost universally in hospitals to prevent serious burn infections, kills dozens of different bacteria; it also kills 95% of 72 strains of herpesvirus, as well as the protozoal parasite Plasmodium berghei (malaria). Silvadene also kills various yeasts, including several Aspergillus varieties, Mucor pusillus, Rhizopus nigricans and 50 different clinical isolates of Candida albicans.

...Electrically-generated colloidal silver [Ag(e)] has been shown to kill dozens of bacteria, including Providencia stuartii, a germ already resistant in the 1970's to all antibiotics except amikacin, as well as two strains of Enterobacter cloacae that were isolated from burn patients and were relatively resistant even to Silvadene. Ag(e) has also proved adept at killing various yeast/fungus species at very low Silver concentrations, including Candida albicans, C. parapsilosis, C. tropicalis, C. pseudotropicalis, Torulopsis glabrata and Aspergillus niger.

Ag(e) has been shown to kill cysts of the common water-borne protozoal parasite Entamoeba histolytica. Ag(e) has also killed the protozoa Paramecium when exposed to 2.2 PPM Silver, as well as the protozoa Varicella at 5.9 PPM Silver. Ag(e) was even somewhat effective in killing Poliovirus in swimming pool water, at the extremely low concentration of 0.015mg Silver per liter of water (only 15 parts per billion!)."

-- James South, MA, Biochemist

"Among the most prominent of the colloidal metals is colloidal silver. Many varieties of this are on the market under such names as Argyrol, Silvol, Protargol, Collargol, Argentum, etc. All of these are antiseptic and germicidal."

-- Bulletin of Pharmacy: A Live Journal for Druggists, Vol. 33, January to December 1919