

Promising Cure for URTI Pandemics, Including H5N1 and SARS: Has the Final Solution to the Coming Plagues Been Discovered? (Part II)

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Historical Virotoxicity of Oligodynamic Silver

Viruses cause most upper respiratory tract infections (URTIs), such as adenovirus, coronavirus, coxsackievirus, influenza virus, parainfluenza virus, respiratory syncytial virus, and rhinovirus, which account for the majority of cases.¹ A broad-spectrum anti-viral agent that really works is needed to combat over 200 viruses that cause URTIs.² Undoubtedly oligodynamic silver fits this bill.

Emerging medical studies confirm the stellar, broad-spectrum virotoxic efficacy of oligodynamic silver (Ag^+) both *in vitro* and *in vivo*. This includes some of the most formidable viral organisms like HIV (including co-infections)^{3, 4, 5, 6, 7, 8, 9, 10} and Herpesvirus hominis (HSV).^{11, 12, 13, 14, 15, 16, 17} Despite the low yields of oligodynamic Ag^+ of the past 100 years common to silver-based drugs, the collective authoritative medical literature has documented efficacy of Ag^+ 's virotoxicity against over 24 viruses. For the viruses relevant to URTIs, the following are known to succumb to oligodynamic Ag^+ :

Adenovirus;^{18, 13}
Coxsackie virus type B-3 (CB-3);¹⁹
Influenzae (strains not identified);^{20, 21, 22}
Influenza A;^{13, 19}
Influenza B (Haemophilus influenzae);²³
Rhinovirus type 1A;¹⁹ and
HSV-(URTI), as referenced above.

Historical Bactericidal Properties of Oligodynamic Silver in URTI

Oligodynamic Ag^+ 's antimicrobial efficacy extends well beyond its virotoxicity. Oligodynamic Ag^+ 's lethal effects span across all microbial domains (viral, bacterial, and fungal). The following URTI-related bacteria are known to be susceptible to oligodynamic Ag^+ :

Beta hemolytic streptococci,^{24, 25, 11, 26, 27, 28, 29, 30, 31} which causes tonsillopharyngeal cellulitis, tonsillopharyngeal abscess²⁹ (including reduced nasopharyngeal abscesses),³² otitis media,^{33, 29, 31} plus sinusitis,^{34, 31, 35} and up to ten percent of cases of adult pharyngitis³⁶ and the associated condition – scarlet fever;³³
Streptococcus pneumoniae;²³
Corynebacterium diphtheriae;^{37, 11, 33, 26}
Neisseria gonorrhoeae;^{25, 29, 38, 33, 39, 40, 41}
Herpesvirus hominis (HSV);^{11, 12, 13, 14, 15, 16, 5, 17}
Klebsiella pneumoniae;^{42, 27, 23}
Haemophilus influenzae;²³
Bordetella pertussis;^{32, 31} causes less than 10% of acute tracheobronchitis cases; and

Mycobacterium (Tuberculosis)^{38, 31}.

Inflammatory conditions of the eyes, ears, nose, and throat;^{43, 44, 39, 40, 31, 45}

Spring Catarrh;²⁹ and

Pneumococci⁴⁶/Pneumonia.⁴⁷

Case History

Perhaps oligodynamic Ag⁺'s most compelling nature lies in its ability to successfully eradicate pervasive primary and secondary co-infections simultaneously. A controlled trial, the equivalent of a "best case series" concerning two groups of advanced AIDS (Candidiasis and Wasting Syndrome) with immunity suppressing moieties (ISM) demonstrated complete sero-negative conversion after a single treatment with oligodynamic Ag⁺ hydrosol. The studies were conducted at a medical facility in Lucha Contra el Sida, Comayagua, Tegucigalpa, Honduras, Central America.

Quoting from the study, "Furthermore, said devices [silver oxide hydrosol] are capable of killing pathogens and purging the bloodstream of immune suppressing moieties (ISM) whether or not created by the AIDS virus (HIV); so as to restore the immune system."³ (Brackets added by authors.)

This single treatment delivered a total of 200 mg of silver for a 70 kilogram patient, well within the lowest observed adverse event level (LOAEL) established by the EPA for injected silver.⁴⁸ Unlike picoscalar oligodynamic Ag⁺ hydrosol devoid of silver oxide, the former required activation into an oligodynamic state with persulfate. Nevertheless, the results were astounding.

Pharmacology

Pharmacokinetics is concerned with how the body affects the Absorption, Distribution, Metabolism, and Excretion (ADME) of the silver-based drug:

- *Time course of Absorption:* The absorption of picoscalar silver hydrosol is nearly instantaneous. An average picoscalar Ag⁺ particle size of eight angstroms results in a Particle Diffusion Coefficient approaching 10⁻⁵ cm²/second,⁴⁹ which exponentially facilitates tissue absorption over previous versions of silver hydrosols.
- *Time course of Distribution:* "In rats, silver was unevenly distributed in organs and tissues following... intravenous injection (wherein) the highest concentrations were found, in decreasing order, in the liver, pancreas, spleen, and plasma (Klaassen 1979a)."⁵⁰ It has been observed that I.V. silver administration will readily pass the so-called blood-brain barrier,⁵¹ presumably allowing for interface and intervention with pathogens or prions associated with neuropathologies (i.e., ALS, MS, polio, spinal meningitis, viral encephalitis, and possibly BSE/hCJD - Mad Cow Disease).^{52, 53, 54, 13}
- *Time course of Metabolism:* At the cell level, Argyrophil I reduction reactions convert oligodynamic silver ions into colloidal grains of neutral silver now bound to the same tissue section.⁵⁵ This reaction is reversible. In 1979, Gallyas demonstrated that transformation of inactive silver back into bioactive silver takes place as the tissue itself becomes oxidized.⁵⁶ White blood cells (WBCs) are dedicated to such oxidizing mechanisms, and since WBCs are known to hoard silver particles out of the blood stream,^{57, 58} it is likely immunity is greatly enhanced with oligodynamic silver.
- *Time course of Excretion:* No matter how silver is administered, the predominant route of elimination is the feces.^{59, 60} Depending upon the type of silver-based drug used, the mammal studied, and the route of administration, the biologic half-life of silver is reported to range from 2 to 4 days to months.^{59, 60, 61} This provides a 12 to 24 hour therapeutic window to recharge spent silver *in vivo* by way of H₂O₂ I.V. drip administration.

Modern and Historical Body Pharmacodynamics

Pharmacodynamics relates to the biochemical and physiological effects of the drug upon the body or pathogen. Those effects include the following:

- *WBC Upregulation:* Oligodynamic Ag^+ appears to modulate and/or upregulate reactive oxygen species (ROS) generated by WBCs. ROS are the strategic hand grenades utilized by WBCs to destroy pathogens. It is now becoming clear that oligodynamic Ag^+ promotes the respiratory burst of WBCs.^{62, 58}
- *Lymphocytic Migratory Modulation:* The potential of oligodynamic Ag^+ to help support chemotaxis and tissue targeting by lymphocytes is self-evident because of its propensity to generate Jarisch-Herxheimer Effects (JHEs). JHEs modulate inflammatory cytokines which, in turn, can enhance lymphocytic migration.^{63, 64, 58} More work needs to be done to confirm this action of silver during JHEs.
- *Leucocytogenesis/leucocytosis Induction:* As early as 1916, it was noted that oligodynamic/colloidal silver formulations induced leukocytosis.⁶⁵ Bechhold confirmed that preliminary evidence was documented for oligodynamic silver to increase both RBC and WBC counts, but only after an initial hemolytic action took place that was transitory and typically uneventful.⁶⁶ One recent pilot study reported that high (120 cc of 1500 ppm silver equaling 180 mg of silver) concentrations of mild silver protein (MSP) given *at one time* can induce severe pancytopenia. Nevertheless, a total recovery rapidly ensued.^{65, 67}
- *Phagocytic Index:* A comprehensive retrospective text provided by Bechhold in 1919 supported oligodynamic silver's ability to upregulate the phagocytic index.⁶⁸ Today's peer-reviewed literature has clarified these properties for oligodynamic Ag^+ as documented in the preceding three paragraphs.
- *Jarisch-Herxheimer Events (JHEs):* Rapidly self-resolving, uneventful hepatomegaly may be seen in beneficial outcomes when extremely large doses of oligodynamic Ag^+ are given at one time (i.e., ≥ 50 mg silver). Such beneficial outcomes may undergo mid-process events that reveal interim transitory and self-resolving liver enzyme elevation due to fragmentation of pathogen loads from infected host liver cells (i.e., classical Jarisch-Herxheimer, autolysis, or apoptotic induction events).^{69, 70, 71} Likewise, self-limiting, self-resolving hemolysis, myalgia, rigors, fevers, malaise, headaches, nausea, and, rarely, a transitory immune system activation of coagulation (ISAC) may result from events associated with die-off.⁷² To mitigate these events, see Post-JHEs Management below.

Pathogen-Associated Pharmacodynamics

Particle charge

Feng has noted, "It is revealed that bulk silver in an oxygen-charged aqueous media catalyzes the complete destructive oxidation of microorganisms. *Silver and hydrogen peroxide acted synergistically* on the viability of *E. coli* K-12. It appears that the combined toxic effect of silver and hydrogen peroxide may be related with damage to cellular proteins. However, the mechanism of antimicrobial effects of silver is still not fully understood. The effects of silver ions on bacteria may be complicated; however, direct observation of the morphological and structural changes may provide useful information for understanding the comprehensive antibacterial effects and the process of inhibition of silver ions."⁷³ (Italics added by authors.)

Further elucidation on the complicated effects of nanoscale Ag^+ on bacteria now extends beyond its known (a) lethal oxidation of the pathogen. It also involves (b) an "intermolecular electron transfer," resulting in an electrocution of the pathogen;³ (c) a binding and chelating to essential pathogen receptor sites, which defeats the pathogen's mechanisms of invasion into host cells;³ (d) an

ion non-dependent heightened catalytic action⁷⁴ and (e) cleavage, which fragments essential pathogen/proteinaceous structures.⁷⁵

Particle size

The size of each oligodynamic Ag⁺ particle in colloidal dispersion creates a cumulative surface area. Such *surface area* is of utmost importance. (See Baker et al. below) The antimicrobial actions of biocatalysts like oligodynamic Ag⁺ hydrosol are directly proportional to the *adsorption* power upon a pathogen.⁷⁶ Ostwald demonstrated there was a geometric progression related to the surface area of hydrosol silver particles by assuming a starting point of one cubic centimeter of silver. When silver is incrementally reduced into smaller and smaller cubes, the net silver particles produced will eventually approach *six square kilometer surface areas*:^{77, 78}

Uniform picoscalar oligodynamic Ag⁺ hydrosol generates an adsorption power many magnitudes of order greater than any previous silver hydrosol product. A high nanometer nanoscalar silver product produced in a NASA-funded experiment produced the following observation in regards to adsorption power: “It had already been noted that at 10⁴ cells ml⁻¹ and 50 ppb of silver [ions], there are approximately 2.8 x 10¹⁰ silver ions per cell. This is a commentary on the use of the term ‘oligodynamic.’ In the most extreme situation (10⁴ cells ml⁻¹ with 250 ppb of silver), if one estimates the dry weight of a bacterial cell at 2.5 x 10⁻¹³ g, *there should actually be more than one silver ion in the system for every atom in every bacterial cell.*”⁷⁹ (Italics added by authors.)

Particle concentration

See the following section on Therapeutic Index (TI).

Therapeutic Index

Fundamentally, the Therapeutic Index (TI) range falls specifically between silver concentration levels that will be toxic to the host versus non-toxic silver concentration levels that will reliably and consistently cure infection. The EPA has established one end of the TI by determining the lowest observed adverse event level (LOAEL) for both intravenous and oral intake. Note that only a *non-pathological* cosmetic discoloration (i.e., argyria) is established as the sole “adverse event.” Comprehensive retrospective analysis spanning over 56 years by EPA⁸⁰ and ATSDR⁸¹ found *NO* other adverse events associated with silver exposure. For a 70 kilogram patient, intravenous silver is limited to one (1) gram over any two-to nine-year period, and for oral intake, to twenty-five (25) grams over a 70-year period. These values reflect the best gauge to prevent argyric iatrogenesis.

To determine the other end of the TI, the following publications collectively provide compelling data regarding safe and effective dosage levels for oligodynamic Ag⁺ hydrosol when treating a broad scope of human infections:

Zhao et al. provided an excellent retrospective review on the key 13 factors critical to the chief pharmacodynamic *in vitro* parameters establishing oligodynamic Ag⁺'s therapeutics, including the complete inhibitory concentrations (CIC), the Minimum Bactericidal Concentration (MBC), as well as the log killing time (LKT).⁸²

A comprehensive study commissioned by NASA reported that, “Three experiments were done with *E. coli*. The first two employed silver propionate (a silver salt). Cell populations were quite stable at room temperature in the absence of the added silver. The silver killed the cells. The process was not precisely exponential, but there was no indication that killing would not ultimately be complete. The extinction times (10⁻⁴ killing) might have ranged from < 2 hrs. to approximately 4 hrs. at 50 ppb of silver and from < 1 hr to approximately 2 hrs. at 250 ppb. Silver from the electrolytic ion generator was used in the third experiment, and the probable extinction times were approximately 4 hrs. and approximately 2 hrs. again at 50 and 250 ppb, respectively.”⁸³

Berger has shown that the minimal lethal dose (MLD) for both gram-positive and gram-negative pathogens with oligodynamic Ag^+ is ten to 100 times greater than silver sulfadiazine (also a silver salt).⁸⁴

More recently, an *in vitro* study by Baker et al. found that, “Nanometer-sized silver particles were... found to exhibit antibacterial effects at low concentrations. The antibacterial properties were related to the total surface area of the nanoparticles. Smaller particles with a larger surface to volume ratio provided a more efficient means for antibacterial activity. The nanoparticles were found to be completely cytotoxic to *E. coli* for surface concentrations as low as 8 microg of Ag/cm^2 .”⁸⁵

These *in vitro* studies follow closely to the authoritative medical literature for *in vivo* applications. The key to *in vivo* dosing is saturating the foci (whether local or systemic) with approximately 1 ppm to approximately 10 ppm oligodynamic Ag^+ for acute infectious processes, and up to 27 ppm for chronic infectious with heavy pathogen loads.

For example, in acute local and systemic infectious processes, the older, authoritative medical literature reported on two popular silver hydrosol products used to treat humans, namely Collosol Argentum and Electrargol. Collosol Argentum, also known as Colsargen, was a 500 ppm concentration of silver in water, equivalent to 500 mcg/cc. For local infections, it was diluted to a 167 ppm concentration. “For injections in systemic infections the recommended dose is 30 drops (2 cc.)”⁸⁶ Therefore, the typical I.V. dosage for systemic infections totaled 1 mg of silver as silver hydrosol. However, for more severe acute and invasive infections such as advanced puerperal septicemia, a clinical report appearing in *The Lancet* called for up to 20cc administered as an I.V. push 2 to 4 times weekly.⁸⁷ In summary, the typical I.V. push dose in such situations would be the equivalent of 10 mg elemental silver. For today’s equivalency, this translates into 400cc to 500cc of a hypotonic picoscalar oligodynamic Ag^+ hydrosol rendered isotonic with sorbitol (4.9 grams sorbitol per 100cc hydrosol mixed together *at the time of administration* ~280mOSM) with a concentration range between 20ppm and 25ppm respectively.

Electrargol was a 400 ppm concentration of silver in water equivalent to 400 mcg/cc.^{88, 89} “The dose is 80 to 160 drops (5-10 cc.), injected intramuscularly or directly into a vein.”⁸⁶ This dose was given several times weekly when indicated.^{90, 53} Therefore, the typical single I.V. dosage totaled 2 mg to 4 mg silver as silver hydrosol.

So, what would be the modern dose equivalents when treating for acute local or systemic infections for a picoscalar silver hydrosol containing a pure oligodynamic content of 20 ppm to 25 ppm Ag^+ ? Answer: I.V. dosages given once or several times weekly for an average 70 kilo patient, as either a 50cc to 75cc slow push or 150cc to 200cc isotonic drip, as indicated. When exceeding 150cc in a single I.V. drip, it is important to diligently monitor for hemolysis with urine dip sticks. Limit dosage on subsequent treatments to 150cc if significant hemolysis warrants. Insignificant levels of hemolysis need not alter dosage levels.

For chronic infections with heavy loads and co-infections, what are the *in vivo* guidelines for utilizing I.V. oligodynamic Ag^+ hydrosol in humans? Research conducted at a medical facility in Lucha Contra el Sida, Comayagua (discussed above) appears to have determined this guideline, as well as the other end of the TI for oligodynamic Ag^+ . The study’s conclusion found that the equivalent⁹¹ of 27 ppm oligodynamic Ag^+ (as the target saturation point for the blood plasma) was sufficient to completely convert to sero-negative *all* advanced AIDS patients presenting with frank Candidiasis or Wasting Syndrome, when provided as a single treatment dose.³ To approach a 27 ppm blood plasma concentration with a 20 ppm to 25 ppm oligodynamic Ag^+ hydrosol formulation, see the following section on Protocol Proposal.

Protocol Proposal & Call for Clinical Investigators

In cases of acute URTIs, *per os*, nebulized and intravenous administration may prove to be the best infectious control method yet discovered. What follows is a call for clinical investigators to discover its fullest potential.

- *Early Acute URTI: Per os* dosage ranges are from one teaspoon to one tablespoon taken on an empty stomach every 20 to 60 minutes during initial stages (first week) of acute URTI – reducing dosages accordingly with symptom alleviation. If symptoms do not show clear improvement within 24 to 36 hours, or if symptoms should worsen, then in addition to continuing the upper *p.o.* dosage schedule, incorporating investigational nebulized dosages of 5 cc given once or twice daily or even hourly may be required. Follow up immediately with standard respiratory therapy, when indicated. Reduce dosage amount and frequency accordingly as symptoms improve. (Also, see below the section on jurisprudence.)
- *Acute Respiratory Distress:* In severe cases that are stable or *slowly deteriorating* (acute respiratory distress), or in cases where rapid improvement is deemed medically necessary, investigational use of slow I.V. push given over 15 minutes of 50cc to 75cc once daily may bring about a rapid recovery within the following 24 to 36 hours. I.V. push contents should be prepared by a compounding pharmacy or an equivalent in-clinic “clean-field” processing system incorporating micofilters that meets applicable state or provincial regulations. By rendering the Ag⁺ hydrosol suspension isotonic with sorbitol, doses above 50cc may be frequently given safely and comfortably. 75cc of isotonic Ag⁺ hydrosol may be administered daily as a slow push over three consecutive days, if the case warrants. Reduce dosage amount and frequency accordingly as symptoms improve.
- *Severe Acute Respiratory Distress:* In acute, critical cases with *rapid deterioration* (severe respiratory distress), investigational use of isotonic I.V. drips administered to attain a cumulative 1 ppm to 10 ppm oligodynamic Ag⁺ blood plasma concentration from all sources (*p.o.*, nebulizer, and intravenous) should bring about a swift efficacious response. To bring under control a rapidly deteriorating case, providing an I.V. drip over three hours of 150cc isotonic Ag⁺ hydrosol may be given daily for three or more consecutive days, in conjunction with *p.o.* and nebulizer treatments. Close monitoring for uneventful hepatomegaly or hemolysis is required. Run a liver panel and/or a complete CBC if symptoms indicate. Otherwise, simple monitoring for hemolysis via urine dip sticks should suffice. If non-significant hemolysis or hepatomegaly develops, dosage schedule may continue at the higher levels. In the rare event that significant hemolysis or hepatomegaly arises, if possible discontinue dosage for 24 to 72 hours, except for nebulized administration, then resume dosage schedule as indicated above. Reduce dosage amount and frequency accordingly as symptoms improve.
- *Chronic Infections with Heavy Loads and Co-Infections:* In chronic non-URTI viral cases involving heavy pathogen loads, with or without significant URTI co-infections such as bacterial pneumonia or fungal pneumocystis carinii or even Tuberculosis, administering a cycle of 150cc to 200cc isotonic Ag⁺ hydrosol as an I.V. drip over three hours daily for four consecutive days, followed by a rest period of three days, can be repeated (when deemed necessary) for a total of three more cycles (16 isotonic Ag⁺ hydrosol drips in all over 30 days). *P.o.* dosages should be six tablespoons daily only taken on an empty stomach. Nebulized dosages remain the same as described above. To further approach the “equivalent” of the 27 ppm silver plasma concentration, 90 minutes after completion of each 150cc to 200cc isotonic Ag⁺ hydrosol drip; administering 125 cc of 0.0375% H₂O₂ over 90 minutes may recharge inactive silver back into oligodynamic Ag⁺, thereby greatly extending the therapeutics of the Ag⁺ without adding in additional quantities of silver hydrosol. (See Gallyas F, and Feng QL, et al., references.) If non-significant hemolysis or hepatomegaly develops, dosage schedule may

continue at the higher levels. As RNA copies/ml plummet and symptoms improve, reduce dosages accordingly.

All dosages are for an average 70 to 75+ kilo adult patient, with *per os*, investigational nebulized or investigational I.V. dosages being cut by one-half for patients approximately 37 kilos in size. For toddlers less than 20 kilos, the dosages are further reduced to just one-quarter of the adult amounts.

JHE Pre- And Post-Management

Pre-JHE Management: Prevention or lessening of expected JHEs or hepatomegaly and hemolysis is a new concept. By giving the antioxidants selenium, glutathione + anthocyanins, vitamin E, lipoic acid, milk thistle (silymarin), and phosphatidylcholine in “loading” doses, a rapid upregulation of the seleno-enzyme glutathione peroxidase system will ensue. Tolerance to silver may go up by several orders of magnitude with such loading doses.⁵¹ In fact, Murine studies indicated tolerance to silver was enhanced over 10,000 fold by the use of selenium and vitamin E pre-treatment.^{92, 93, 51} Therefore, the key either is to take such loading doses a month or two prior to undergoing high amounts of I.V. treatment, or at the very least, to take these loading dosages daily, but always separated by a six-hour period post-I.V. administration. If taken together, each will tend to cancel out the other’s benefits by binding to one another, as opposed to their intended targets.

Post-JHE Management: To rapidly control and eliminate post-JHE symptoms, drinking an abundance of Licorice and Green tea (½ to one gallon daily) is usually sufficient. Non-flush niacin, such as Inositol hexaniacinate, is also highly effective in the amount of 500 mg t.i.d. Historically, especially in terminal cases of disease it is extremely valuable to have patients perform enemas which involves one cup strong organic coffee or double-strength green tea *rectal implants*. Patients often report that they feel dramatically better since this procedure typically brings about instantaneous results.⁹⁴ Retain the rectal implant for 20 minutes or longer. Performing a purified water enema prior to the rectal implant will better insure retention compliance and best results. In rarer situations, careful screening for immune system activation of coagulation (ISAC)⁹⁵ must be treated with heparin and/or lumbokininase or nattokinase.

CAM Adjunctive Support

In addition to the recharging effects of administering H₂O₂ post-I.V. Ag⁺^{55, 56, 73} hydrosol, garlic capsules rich in Alliin, as opposed to Allicin, such as Pharmax’s Garlic Freeze-Dried,^{96, 97, 98, 99} and probiotics, such as Pharmax’s HLC Intensive Capsules containing over 20 billion viable organisms per capsule,¹⁰⁰ prove very important in the management of URTIs, as well as any associated gut dysbiosis.

Olive leaf extract rich in d-lenolate,^{101, 102, 103, 104} can serve as an excellent means to more slowly reduce viral loads. When given one to two months in advance of I.V. Ag⁺ hydrosol administration, this ability of d-lenolate also will serve indirectly as an “adaptogen,” wherein low-levels of die-off will induce tolerance for more significant die-offs expected in the near future from silver administration.

Currently IMREF is devising oral protocols to induce endogenous production of H₂O₂. This is accomplished with Vitamins C and K. More on this later.

Jurisprudence

Four steps are required for proper jurisprudence concerning Ag⁺ hydrosol administration when used off-label: (1) A well written Informed Consent form should be read and signed by any patients undergoing nebulized or I.V. Ag⁺ hydrosol treatment. (2) Clinical progress notes must be complete and

thorough. (3) Careful regular monitoring with urine dip sticks for hemolysis, and if warranted, follow-up CBC counts and liver function tests (LFTs) may be advisable. (4) Utilizing a compounding pharmacy or “in-clinic equivalent” according to all state regulations when processing Ag⁺ hydrosol off-label into an injectible format is required. Please see the IMREF web site to download a sample patient informed consent form.

Conclusion

Nanoscience has produced low nanoscale or better oligodynamic Ag⁺ hydrosol, which is a very promising and safe anti-viral agent. Its proper use will undoubtedly impact the global control of these diseases within this century.

Correspondence

The two authors have extensive clinical experience using picoscale oligodynamic Ag⁺ hydrosol. Neither author has any financial ties to commercial or proprietary silver hydrosol products. Eric Gordon, MD, is Medical Director for Gordon Medical Associates in Santa Rosa, California; 707-575-5180. He may be contacted at gordonmd@sonic.net. Kent Holtorf, MD, is Medical Director for the Hormone and Longevity Medical Center, Inc. at 23441 Madison Street, #215, Torrance, California 90505; 310-375-2705. He may be reached at www.hormoneandlongevitycenter.com.

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