



# Hi-yo silver, away with infection!

The use of silver for medicinal purposes is increasing as more research is done

MANY ANTISEPTIC, anti-inflammatory, and otherwise medicinally beneficial agents derived from plants, animals, and minerals have been used since the beginning of recorded time. Clay tablets found in Mesopotamia describe topical wound treatments as far back as 2500 B.C., and both Greek and Roman healers wrote of the beneficial effects of some of these early compounds. In fact, germicides have been in use even before mankind knew what a germ was.

One of the most ancient of these agents is silver. Its medical use is mentioned in Egyptian hieroglyphics, and Greek sailors commonly used silver urns to keep water and other liquids fresh. In the fifth century B.C., Hippocrates, known as the father of medicine, wrote of his use of silver in healing wounds, and troops drinking from silver vessels were not affected by dysentery, while others using wooden or animal skin containers were ravaged by this disease.

The Middle Ages in Europe saw this class distinction intensify with royalty or wealthy individuals consuming their food and drink from silver tableware, utensils, and cups. It was noticed that these individuals were often healthier, but tended to develop a bluish skin tone because of their chronic low-level silver ingestion. This phenomenon gave rise to the phrase "blue bloods," meaning individuals of rank and wealth, and also led ancient healers to further investigate the powers of silver.

In the early 1700s, silver nitrate was being used to treat syphilis and chorea, and in 1884 German obstetrician Carl Credé developed a 1% silver nitrate solution that was administered to the eyes of newborn infants to eliminate gonococcal ophthalmia, a disease causing blindness in newborns. This practice was continued for decades.

Many uses for silver were found and, while clinically beneficial, there was not a lot of research on this agent and scientific documentation was lacking.

"The discovery and development of antibiotics during the 20th century provided potent antimicrobial agents with high specificity, which revolutionized clinical therapy," according to Dr. Rose Cooper, principal lecturer in microbiology at the Centre for Biomedical Sciences at the University of Wales Institute, Cardiff. "The emergence of antibiotics also marked the decline of many former remedies."

That marked a decline in the use of silver as well as research on its medicinal properties.

Recently the relentless emergence of antibiotic-resistant strains of pathogens (bacteria, viruses, and fungi) along with the severely slowed development of novel anti-



Donna Dixon Woodall photo

Research has shown that the average barn environment challenges the respiratory tract of the racehorse and chronic low-grade respiratory inflammation can adversely affect performance. Silver vaporization kills microbes in the airways and lungs and reduces respiratory inflammation

biotics has led to a renewed interest in some of the older remedies. Silver, in particular, is enjoying a strong comeback.

## Properties of silver

Silver exists in a number of forms. Elemental silver is the primary metal ion and has limited medical use since it is too large to pass through cell membranes. Silver compounds, such as silver nitrate, can be fairly effective topically but are dangerous due to potentially toxic side effects. Colloidal silver is a solution in which microscopic silver particles are produced from a pure silver electrode and these charged silver ions are kept in suspension.

The medical efficacy of a colloid depends on the quality of the silver used to produce it, the consistency of the electric charge during production, and the eventual size of the particles. All of these forms of silver carry potential toxicity risks at high enough concentrations as well as contamination risks as they can leak into the environment.

Colloidal silver products are generally stable, though chloride salts will disrupt the ions, and are best suited to topical application for burns and surface wounds where they work quite well. The bonding of a chelator (generally a citrate) to a metal atom produces a chelate. It is proposed that chelators are treated as desirable molecules by the recognition systems in cell walls and that they serve to carry metal ions into the body in larger amounts than would usually be allowed. Chelated silver is exceptionally stable, nonreactive, and less of a threat to the environment.

"In my research and clinical use, I have found chelated silver to achieve better tissue penetration and to be a more stable compound," said

Mike Cavey, D.V.M., a veterinarian and trainer who has been researching the uses of silver for decades.

Silver exerts its effect on microbes by blocking the enzymatic use of oxygen, by inhibiting DNA replication, and by interfering with microbial cellular energy production. Because silver acts in multiple ways on multiple microbial systems, there



Courtesy of Kenneth L. Marcella, D.V.M.

This horse is calm and comfortable during her silver vaporization therapy. Horses generally tolerate the nasal mask and associated equipment and relax as their ability to breathe improves

is far less chance of resistance development, and current research has shown that nearly 650 types of bacteria, viruses, and fungi are affected by silver, with most eliminated within minutes of contact.

This potent antimicrobial activity, even against some viruses and bacteria that resist the strongest antibiotics currently available, has attracted the attention of leading scientists and researchers around the world who are looking into the efficacy and applications of silver

products. Veterinarians are applying that same scientific curiosity to equine health issues and silver's possible benefits.

"Topical silver products for equine burns and wounds have been in use for years," said Mickey Ballew, founder of EquiSilver, a company pioneering uses of chelated silver in equine medicine, "and while we are interested in this aspect of treatment, we started to get excited about other areas where we thought silver could help horses."

For the past few years, Ballew, in conjunction with various veterinarians and researchers, has been investigating the treatment of throat and respiratory conditions in racehorses.

"A major limiting factor in equine performance is low-grade respiratory tract infections," said Thomas Tobin, D.V.M., Ph.D., a pharmacologist at the Gluck Equine Research Center at the University of Kentucky. "Silver inhalation eliminates infections in the respiratory tract and is active against all types of microorganisms. This translates into improved performance and meets the criteria for therapeutic medication."

Initially chelated silver solution (20 to 30 cubic centimeters via catheter) was flushed up the nasal passage as a "head spray," Ballew said. "We quickly found that we achieved much better concentra-

chronic obstructive pulmonary disease (COPD), exercise-induced pulmonary hemorrhage (EIPH) (bleeding), and a number of other respiratory conditions. Delivering a high volume of very small silver chelate particles in the back of the throat, guttural pouches, trachea, and large airways of the lungs of the racehorse has proven to be very beneficial, with more trainers opting for this treatment. Silver inhalation therapy is currently certified by the Hong Kong Jockey Club and was the only allowed respiratory therapy at the 2010 Alltech FEI World Equestrian Games, which speaks to its acceptance as a viable treatment option and its safety.

"We are looking at flushing guttural pouches, using silver as a uterine lavage for chronically infected mares, utilizing it as an additive or semen extender [beneficial if the stallion has some type of infectious agent in its sperm or if the mare tends to become infected upon breeding], and even possibly injecting silver into joints and tendon sheaths as an aid in treating bacterial infections secondary to various types of trauma," Cavey said.

Cooper said that while silver use is "field validated," more work remains to be done.

"There is a need for scientific study and controlled experimentation to see if indeed silver will help with all of these situations," she said.

Yet the climate is right for continued support for silver use.

"There is going to be more and more interest in inorganic molecules, more and more interest in getting away from drug therapy," Cavey said. "In the [Federation Equestre Internationale], the Jockey Club, and the general horse community there is a strong desire to get away from drugs, so things like silver are going to come to the forefront. I just don't think it's a flash in the pan."

Silver, in very small amounts on a daily basis, is taken internally by many people. Some trainers recently have suggested this practice for use in the horse, claiming that the silver ions will attack only the pathogenic or disease-causing bacteria.

There is, however, no evidence that this is the case and most veterinarians and researchers caution against silver ingestion. These individuals worry that silver molecules will make no special distinction between "good" and "bad" bacteria and that colitis (inflammation of the lining of the intestine) may result. ☺

Kenneth L. Marcella, D.V.M., is a practicing veterinarian in Canton, Georgia.