SILVER SEAL™ — A Truly Unique Antibacterial Solution

This year over 2 million patients will contract an infection while seeking treatment in a US hospital. Of those, close to 100,000 people will die, making hospital acquired infections a Top 10 Killer of Americans. Complicating this epidemic, a strain of antibiotic resistant staph infection, MRSA, has emerged in hospitals worldwide.

Recent studies have shown the computer keyboard and mouse to be a major source of cross-contamination infections. According to Dr. Daniel LePera, “Bacteria that reside in the upper mouth or respiratory tract can travel to an in-office computer keyboard and survive as long as 24 hours. Viruses can live on them for one hour or more.” A study reported at the American Society for Microbiology found that MRSA can survive on computer keyboards for up to 6 weeks. Increased dependence on computer technology has found the use of computers and their associated input devices to be much more common in patient care rooms and even operating rooms where open wounds are prime targets for such bacteria.

In the past, antibacterial solutions have focused on the use of a coating that contains antibacterial properties. The problem with this solution is that the coating wears off over time, leaving the item free to once again carry deadly bacteria.

Another issue with these coatings is that they tend to be organic compounds. Organic material has conventionally been the main stream of antibacterial material. But recently, there have been many reports of illness caused by organic antibacterial materials.

An article in the Mainichi Newspaper, June 9,1998, had this to say about the use of such materials: “Organic antibacterial materials can be easily transferred from the product to the skin through sweat. Also when vaporized, it is inhaled into the lungs, causing headaches and indisposition".

Generally speaking, inorganic materials are highly **safe (non-volatile)** and **heat-resistant**, compared to organic materials. Therefore, antibacterial materials, if inorganic, can be safe and gentle to the human body.

SILVER SEAL™ Is Different

SILVER SEAL™ addresses the problem by embedding the antibacterial properties in the plastic used to make the keyboards and mice.

Silver and certain other metals such as copper have antimicrobial properties. For example, silverware and copperware has been known to prevent decay of water and food since the ancient times. The question is, how could such properties be "built into" other products? Enter nanotechnology for the answer.

SILVER SEAL™ is a soluble glass containing antimicrobial silver ions.

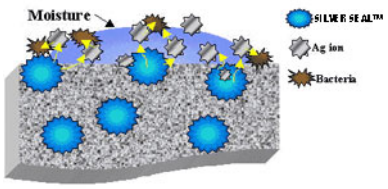
Glass is generally considered to be a material with high chemical inertness due to its strong network structure. However, it is possible to lower this chemical inertness by continuously altering its structure, especially in water.

Additionally, glass has an interesting property which allows it to retain metal as ions. The combination of this property and the above technology has enabled science to create glass with low chemical inertness which can also retain anti-microbial metal ions such as silver and copper. With the presence of water or moisture, the glass will release these metal ions gradually to function as anti-microbial material.

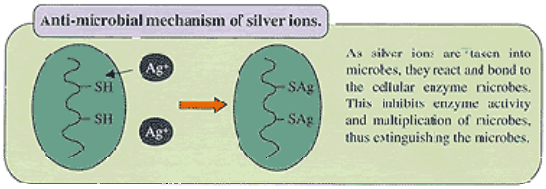
Silver ions, contained in glass particles, are the active agents. Unlike the situation with standard antibiotics, bacteria are unable to develop resistance to silver ions. Glass, as the matrix, also prevents unwanted greying known from other silver based materials. This antimicrobial effect lasts for several years.

How It Works

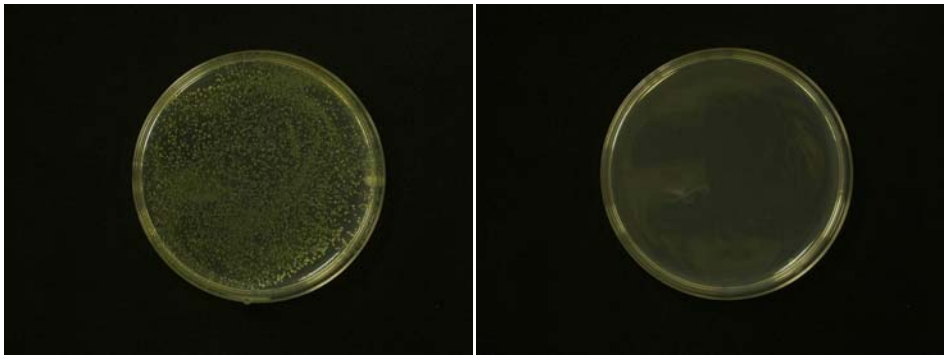
With the presence of moisture, SILVER SEAL™ releases a few silver ions gradually. Silver ions have an ability to strongly bind to cellular enzyme of microbes and inhibit enzyme activity of cell wall, membrane, and nucleic acids.



As microbes have a negative surface charge, silver ions with a positive charge are drawn toward microbes, and disturb their electric balance. The result is that the microbes burst their cell walls and are extinguished.



Otherwise, silver ions are taken into microbes where they react and bond to the cellular enzyme microbes. This inhibits enzyme activity and multiplication of microbes, thus extinguishing the microbes. The images below demonstrate this quite effectively. The image on the left shows the amount of staph infection-causing bacteria that has grown in a 24-hour period on an untreated surface compared to the amount of growth on a SILVER SEAL™ surface (none). This unique application of this technology introduces a new era in infection control as applied to computer input devices.



Non-Treated Surface SILVER SEAL™ Surface