

*Christine Sanders, Ph.D.*

RE: Bion Water effect on two infectious bacteria & one pathogen strain

Dear Mr. William Branson,

Creighton has finished its lab test of your product for antibacterial activity. Bion was bactericidal at a dilution of 1/8 for *Escherichia coli* and *Pseudomonas aeruginosa*. Bion also killed *Staphylococcus aureus* during our labs twenty-four hour test.

The results are quite outstanding; I would appreciate being kept abreast of your progress as you develop this product.

Sincerely,

*Christine Sanders, Ph. D.*

*Escherichia coli* is an emerging cause of food borne illness. An estimated 73,000 cases of infection and 61 deaths occur in the United States each year. Infection often leads to bloody diarrhea, and occasionally to kidney failure. Most illness has been associated with eating undercooked, contaminated ground beef. Person-to-person contact in families and child care centers is also an important mode of transmission. Infection can also occur after drinking raw milk and after swimming in or drinking sewage-contaminated water.

*Pseudomonas* is a gram-negative rod belonging to the family Pseudomonadaceae. These pathogens are widespread in nature, inhabiting soil, water, plants, and animals (including humans). *Pseudomonas aeruginosa* has become an important cause of infection, especially in patients with compromised host defense mechanisms. It is the most common pathogen isolated from patients who have been hospitalized longer than 1 week. It is a frequent cause of nosocomial infections such as pneumonia, urinary tract infections (UTIs), and bacteremia. Pseudomonal infections are complicated and can be life threatening.

- **In the US:** *P aeruginosa* is the second most common cause of nosocomial pneumonia (17% of isolates), the third most common cause of UTI (11%), the fourth most common cause of surgical site infections (8%), the seventh most common isolated pathogen from the bloodstream (3%), and the fifth most common isolate overall (9%) obtained from all sites.
- **Internationally:** *P aeruginosa* is very common in patients with diabetes who are immunocompromised.

*Christine Sanders, Ph.D.*

*Staphylococcus aureus*, often referred to simply as "staph," are bacteria commonly carried on the skin or in the nose of healthy people. Occasionally, staph can cause an infection; staph bacteria are one of the most common causes of skin infections in the United States. Most of these infections are minor (such as pimples and boils) and most can be treated without antibiotics (also known as antimicrobials or antibacterials). However, staph bacteria can also cause serious infections (such as surgical wound infections and pneumonia). In the past, most serious staph bacteria infections were treated with a certain type of antibiotic related to penicillin. Over the past 50 years, treatment of these infections has become more difficult because staph bacteria have become resistant to various antibiotics, including the commonly used penicillin-related antibiotics (1). These resistant bacteria are called methicillin-resistant *Staphylococcus aureus*, or MRSA.

Staph bacteria can cause different kinds of illness, including skin infections, bone infections, pneumonia, severe life-threatening bloodstream infections, and others. Since MRSA is a staph bacterium, it can cause the same kinds of infection as staph in general; however, MRSA occurs more commonly among persons in hospitals and healthcare facilities.

MRSA infection usually develops in hospitalized patients who are elderly or very sick or who have an open wound (such as a bedsore) or a tube going into their body (such as a urinary catheter or intravenous [IV] catheter). MRSA infections acquired in hospitals and healthcare settings can be severe. In addition, certain factors can put some patients at higher risk for MRSA including prolonged hospital stay, receiving broad-spectrum antibiotics, being hospitalized in an intensive care or burn unit, spending time close to other patients with MRSA, having recent surgery, or carrying MRSA in the nose without developing illness (3-6).

