Skin, soft tissue infections succumb to blue light

January 28 2013

Blue light can selectively eradicate *Pseudomonas aeruginosa* infections of the skin and soft tissues, while preserving the outermost layer of skin, according to a proof-of-principle study led by Michael R. Hamblin of the Massachusetts General Hospital, and the Harvard Medical School, Boston. The research is published online ahead of print in the journal *Antimicrobial Agents and Chemotherapy*

"Blue light is a potential non-toxic, non-antibiotic approach for treating skin and soft tissue infections, especially those caused by antibiotic resistant pathogens," says Hamblin.

In the study, animal models were infected with P. aeruginosa. All of the animals in the group treated with blue light survived, while in the control, 82 percent (9 out of 11) of the animals died.

Skin and soft tissue infections are the second most common bacterial infections encountered in clinical practice, and represent the most common infection presentation—more than 3 percent—in patients visiting emergency departments, says Hamblin. The prevalence of skin and soft tissue infections among hospitalized patients is 10 percent, with approximately 14.2 million ambulatory care visits every year and an annual associated medical cost of almost $24 billion (equivalent to $76 for every American), says Hamblin.

Treatment of skin and soft tissue infections has been significantly complicated by the explosion of antibiotic resistance, which may bring

an end to what medical scientists refer to as the antibiotic era, says Hamblin. "Microbes replicate very rapidly, and a mutation that helps a microbe survive in the presence of an antibiotic drug will quickly predominate throughout the microbial population. Recently, a dangerous new enzyme, NDM-1, that makes some bacteria resistant to almost all antibiotics available has been found in the United States. Many physicians are concerned that several infections soon may be untreatable."

Besides harming public health, antibiotic resistance boosts health care costs. "Treating resistant skin and soft tissue infections often requires the use of more expensive, or more toxic drugs, and can result in longer hospital stays for infected patients," says Hamblin.

More information: A copy of the manuscript can be found online at bit.ly/asmtip0113b . Formal publication of the paper is scheduled for the March 2013 issue of *Antimicrobial Agents and Chemotherapy*.

T. Dai, A. Gupta, Y.-Y. Huang, R. Yin, C.K. Murray, M.S. Vrahas, M. Sherwood, G.P. Tegos, and M.R. Hamblin, 2013. Blue light rescues mice from potentially fatal Pseudomonas aeruginosa burn infection: efficacy, safety, and mechanism of action. *Antim. Agents Chemother*. Published ahead of print 21 December 2012, doi:10.1128/AAC.01652-12

Provided by American Society for Microbiology