

Antibiotics cure anthrax in animal models

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In the absence of early antibiotic treatment, respiratory anthrax is fatal. The 2001 bioterrorism attacks in the US killed four people, out of 22 infected (10 of them with respiratory anthrax), despite massive antibiotic administration, probably because therapy did not begin until the disease had reached the fulminant stage. But a multi-agent prophylaxis initiated within 24 hours post-infection prevented development of fatal anthrax respiratory disease, and treatment combining antibiotics with immunization with a protective antigen-based vaccine conferred long-term protective immunity against reestablishment of the disease, according to a study in the April 2011 issue of the journal *Antimicrobial Agents and Chemotherapy*. This study is the first to characterize the severity of respiratory anthrax that can be cured.

The researchers, all from the Israel Institute for Biological Research, Ness-Ziona, tested both the efficiency of different therapeutic approaches in preventing fatal disease from developing in infected animals, and their ability to cure animals in which the disease had developed into a systemic, septic phase. Rescue remains possible with appropriate agents even if initiated two days after infection.

Treatment initiated 24 hours after infection with any of four [antibiotics](#) protected the animals during treatment, but many of the animals died of [anthrax](#) after treatment was stopped, the antibiotics conferring degrees of protection ranging from 10-90 percent. Combining antibiotic treatment with a protective antigen vaccine left all animals fully protected even after the end of treatment.

Animals whose treatment was delayed beyond 24 hours post-infection developed varying degrees of bacteremia and toxemia. Treatment with doxycycline cured both sick guinea pigs and rabbits exhibiting low to moderate bacteremia; adding protective antigen vaccine to the mix boosted the level of bacteremia that was curable 10-fold in the guinea pigs and 20-fold in the rabbits. But [ciprofloxacin](#) plus a monoclonal anti-protective antigen antibody was still more effective.

In all cases, the surviving animals developed immunity against anthrax via subcutaneous challenge.

“Our results suggest that doxycycline and ciprofloxacin are efficient antibiotics to treat anthrax, not only as post-exposure prophylaxis, but also during the systemic phase of the disease,” the researchers write. “Treatment with both antibiotics can cure guinea pigs and rabbits in an advanced stage of systemic anthrax”

More information: S. Weiss, D. Kobiler, H. Levy, A. Pass, Y. Ophir, N. Rothschild, A. Tal, J. Schlomovitz, and Z. Altboum, 2011. Antibiotics cure anthrax in animal models. *Antim. Agents Chemother.* 55:1533-1542.

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