

Immunization for MRSA on the horizon

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Methicillin resistant staph aureus (MRSA) infections are resistant to antibiotics and can cause a myriad of problems -- bone erosion, or osteomyelitis, which shorten the effective life of an implant and greatly hinder replacement of that implant. MRSA can result in prolonged disability, amputation and even death.

Although only 2 percent of the American population that undergo total joint replacement surgery will suffer an infection, half of those infections are from MRSA. The results of a MRSA infection after a total joint replacement can be devastating. Currently, there is no effective treatment for MRSA-infected implants. With the increasing incidence of total joint replacement surgeries, the prevalence of MRSA-infected implants is expected to rise.

A team of investigators from the University of Rochester Medical Center has developed a vaccine that can prevent [bacterial infection of orthopaedic implants](#). Their findings were presented at the Orthopaedic Research Society (ORS) 2012 Annual Meeting in San Francisco, California.

The team, led by Edward Schwarz, PhD, Professor of Orthopaedics and Associate Director of the Center for Musculoskeletal Research, has generated an antibody that prevents MRSA bacteria from dividing properly.

"What makes the staph such a challenging pathogen is that it has an ironclad cell wall. But that is also its Achilles' heel," Dr. Schwarz said.

He explained that if the cell wants to divide, it has to "unzip the cell wall" to break into two "[daughter cells](#)." Their team produced an antibody that targets a component of the zipper, Gmd—preventing normal bacterial cell division by causing them to form clusters of cells.

The researchers tested the antibody prior to implantation of a MRSA-infected pin to simulate an infected [joint replacement](#). They monitored bacterial growth and found that their antibody protected 50 percent of their sample from infection. Further analysis found that the antibody prevented formation of sequestrum, or a piece of dead bone, which is a hallmark of osteomyelitis. Additionally, immunization led to decreased bacterial presence on the pins themselves.

Based on these findings, this immunization appears to be a promising treatment to prevent the [MRSA infection](#)/reinfection of orthopaedic implants.

Dr. Schwarz and his team were recently awarded a five-year multimillion dollar grant from AOTrauma, a not for profit Swiss foundation, for the Clinical Priority Program grant on infection. This grant deals with the diagnosis, treatment, prevention, and education about musculoskeletal infection.

Provided by Orthopaedic Research Society

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