Researchers find link to severe Staph infections

December 23 2008

Researchers at The University of Texas School of Public Health recently described studies that support the link between the severity of community-acquired antibiotic-resistant *Staphylococcus aureus* (CA MRSA) infections and the *Panton Valentine leukocidin* (PVL).

The *Panton Valentine leukocidin* is made up of two components - LukF-PV and LukS-PV - and is typically produced by community-acquired methicillin-resistant *S. aureus* (CA MRSA). In the United States this strain is the most common CA MRSA isolate and can cause severe skin infections, pneumonia, bloodstream infections and surgical wound infections.

This work has identified using animal models that the PVL leukotoxin can be used as a vaccine against infections caused by CA MRSA. Results from the research will be published in the December issue of *Clinical Microbiology and Infection*.

According to the Centers for Disease Control and Prevention, the antibiotic-resistant USA300 CA MRSA strain is typically acquired by persons through contact with the bacteria. This *Staph* strain is not typically associated with hospitalizations or medical procedures.

Eric Brown, Ph.D., assistant professor of infectious diseases at the UT School of Public Health and colleagues also tested the virulence of PVL in CA MRSA by using clinical strains of USA300 that did and did not contain the pore-forming toxin.

"The bacteria is not the same as it was several years ago. It has all of the weapons and toxins that other strains don't have, which makes it easier for this strain to survive efficiently inside of cells," Brown said.

"Immunity directed against LukS was more efficient in protecting mice against a USA300 infection compared to mice vaccinated with LukF-PV or alpha toxin," Brown said. His research found that LukS-PV was effective at protecting against certain types of infections reinforcing the importance of this virulence factor in the disease process. LukS-PV given through the nose protected the mice against pneumonia, conversely if administered subcutaneously it protected against skin infections.

Brown said, "The [vaccination] route and infection routes correlated with each other i.e., intranasally-immunized mice were better protected against pneumonia than subcutaneously vaccinated mice and subcutaneously-vaccinated mice were better protected against a skin infection than against pneumonia. This in part may be related to the type of immune response generated at the skin compared to the lung."

In addition, Brown and colleagues have examined the anti-PVL antibody responses in pediatric patients diagnosed with *Staph* infections compared to antibody responses to other USA300 virulence factors. The study found patients who had *Staph* infections caused by PVL-positive strains had a dominant response to the LukS and LukF proteins.

Source: University of Texas at Houston