

Bacteria's sticky glue is clue to vaccine says scientist

September 9 2008

Sticky glue secreted by the bacterium *Staphylococcus aureus* could be the clue scientists have been searching for to make an effective vaccine against MRSA, medical researchers heard today at the Society for General Microbiology's Autumn meeting being held this week at Trinity College, Dublin.

Around one third of all people and many animals carry *Staphylococcus aureus*, which simply lives on most of us as a biofilm fairly harmlessly. Occasionally it causes minor spots on our skin, abscesses and soft tissue infections and some people can get infected over and over again. On much rarer occasions it causes severe and life threatening infections that are significant medical problems. Many of these infections are made worse by the biofilm component of the overall disease, which helps to protect the bacteria from antibiotics.

"If individuals get infections many times, even after they have been cured by antibiotics, it indicates that their bodies have not become immune to Staph bacteria," said Professor Gerald Pier from Harvard Medical School in Boston, USA.

Staph bacteria tend to grow in cellular communities, particularly on medical devices commonly used on patients, producing what are called biofilm type infections. The devices range from simple catheters placed into blood vessels to those used for blood access for patients on dialysis to artificial heart valves, knees and hips. All patients with these types of devices in them have an increased risk for Staph infections. Living in

biofilms protect the bacteria from antibiotics, making treatment more difficult.

"To grow as a biofilm the bacteria must produce sticky factors, one of which is a type of complex sugar called PNAG. We are targeting this material as a possible vaccine, but natural exposure to the sugar compound does not result in most people and animals making an immune response that would protect them from attack by the bacteria or recurring infections," said Professor Pier.

By manipulating the sugar chemically the scientists have discovered that they can produce variant forms which can be used as vaccines by causing the right type of immune response, an approach that has already been shown to work successfully in animal studies.

"We now have a way to tip the balance for resistance to infection back towards humans by vaccination," said Professor Pier. "It is most likely that one or more forms of the vaccine will be prepared to test in humans to see which form is best to get the most desirable antibodies made."

In addition, the researchers have created an antibody with the desired properties to give to people if they have a high risk of getting a Staph infection, thus preventing infection. "This antibody is being manufactured to start tests in humans in about 12 to 18 months," said Professor Pier. "An effective antibody treatment for Staph infections could have a major benefit for anyone who enters a hospital or works in the community and is at risk of Staph infections."

Source: Society for General Microbiology

Citation: Bacteria's sticky glue is clue to vaccine says scientist (2008, September 9) retrieved 20

March 2024 from <https://phys.org/news/2008-09-bacteria-sticky-clue-vaccine-scientist.html>

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