Interrupting death messages to treat bone disease

September 7 2010

A surface molecule on bacteria that instructs bone cells to die could be the target for new treatments for bone disease, says a scientist speaking at the Society for General Microbiology's autumn meeting today.

Blocking the death signal from bacteria could be a way of treating painful bone infections that are resistant to antibiotics, such as those caused by Meticillin-resistant *Staphylococcus aureus* (MRSA).

Bone disease, or osteomyelitis, affects 1 in 5,000 people around the world. It can occur at any stage in life and attack any bone in the body, where it leads to progressive bone destruction.

Osteomyelitis is usually caused by the bacterium *Staphylococcus aureus* that lives commonly on human skin and in the nose. It can reach the bones through open wounds or during surgery and most often causes infections in people with compromised immune systems.

Research led by Dr. Steve Kerrigan from the Royal College of Surgeons in Ireland in collaboration with Trinity College Dublin has revealed that the ability of *S. aureus* to latch onto bone cells depends on a specific protein called Spa, which is presented on the bacterium's surface. Once attached to the bone cell, the bacteria transmit signals prompting the bone cell to commit suicide. This causes a gradual loss of bone cells leading to progressive bone destruction and weakening of the skeletal system.

Ms Tania Claro who is presenting the group's work explained how the group's findings could lead to new therapies for osteomyelitis. "Bacteria that do not have the Spa protein on their surface are unable to bind to bone cells, which prevents them from sending suicide messages," she said. "Blocking bacterial attachment to cells via Spa could therefore be a way of treating osteomyelitis, or even preventing it in the first place."

Therapies that could effectively prevent and/or treat osteomyelitis could greatly improve the quality of life of sufferers. "This disease is very painful for patients and frustrating for both them and their doctors." explained Ms Claro. Current treatment involves prolonged aggressive antibiotic therapy, however this approach is often less than successful and surgical debridement is required.

New treatments for the disease that do not rely on existing antibiotics would be advantageous. "The danger of invasive bacterial disease is compounded by the rapid emergence of multi-drug resistant bacteria worldwide," explained Ms Claro. "The findings of this study will help develop better diagnostic tools and treatments for osteomyelitis that will not over-rely on antibiotics."

Provided by Society for General Microbiology