

Scientists look at 'syringe' assembly in plague bacteria

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Bacteria that cause the bubonic plague avoid death in our bodies by injecting our cells with immune evasion proteins. Scientists have discovered a new way bacteria build and hold the syringes, according to research published in the journal *Microbiology*.

Some pathogenic bacteria have a complex injection device made of many proteins. This molecular syringe has to be attached across two membranes so that proteins can be passed from the bacterial cells into human cells.

Until now, scientists thought that the position of a key lipoprotein component of the syringe was determined by one or two specific amino acids as is true for all other bacterial lipoproteins. But research led by Dr Gregory Plano at the University of Miami Miller School of Medicine suggests that location is not always determined by these previously identified sorting signals.

“The YscJ lipoprotein in *Yersinia pestis* is an essential part of the injection device,” says Dr Plano. “It serves as a platform for the syringe to be built on and it is a major component of the structure that links the two bacterial cell membranes together. The sequence of YscJ suggests that it should be attached to the outer membrane, but it is actually attached to the inner membrane of the bacterial cell.” Instead of being controlled by a few key amino acids, the location of the YscJ lipoprotein is determined by the presence of a specific section of the protein.

Injection devices help pathogenic bacteria to survive in our bodies by injecting proteins that stop our immune cells from communicating and launching an attack. Some bacteria that are beneficial to plants and animals also use these devices to evade their hosts' immune systems.

Understanding this mechanism tells us more about how *Yersinia pestis* causes plague. “We now want to find out why the YscJ protein uses this unusual mechanism instead of the traditional method used by other lipoproteins,” says Dr Plano.

Source: Society for General Microbiology

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