



Media Release
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Student Solves Streptococcal Secrets

Detective work by a New Zealand student is featured in this week's leading scientific journal *Science*, telling the secret of how certain bacteria attach themselves to human cells and giving clues for better treatment of infections like sore throats and tonsillitis.

Bacteria such as *Streptococci* use very fine hairlike structures to cling on to cells and cause infection. HaeJoo Kang, a PhD student of the Maurice Wilkins Centre at The University of Auckland, has been able to show that these hairlike structures, called pili, are made up of hundreds of protein molecules joined end to end, like beads on a string. Even though they are extremely thin, only one molecule wide, these pili remain amazingly tough.

HaeJoo, with support from Wilkins Centre Investigators Professor Ted Baker and Dr Thomas Proft, discovered that this strength comes from a previously undiscovered cross-link known as an "isopeptide bond". She showed this special type of molecular glue not only joined each molecule to the next along the string, but also used the same bonds internally to make itself super-tough. Such extra bonding means that the pili can withstand most chemical and mechanical onslaught.

Other researchers had missed the existence of these bonds before HaeJoo began studying them. Professor Baker says that this work could have potential to make stronger protein materials, as well as its importance for human disease.

"Many bacteria use pili to attach to cells, allowing them to gather together and infect," says Professor Baker. "By understanding the structure of the pili, how they are assembled and what gives them their strength, we can also look for their weak points. We may be able to disrupt their ability to attach, or find the means to develop vaccines. Then the body can recognise the pili and destroy the bacteria before they have a chance."

Streptococcus pyogenes is a bacterium that infects the human throat causing common infections such as sore throats and tonsillitis. It can also be the cause of severe illnesses such as rheumatic fever and streptococcal toxic shock syndrome.

The research was funded by the Maurice Wilkins Centre for Molecular Biodiscovery, a New Zealand Centre of Research Excellence hosted by The University of Auckland, with support from the New Zealand Foundation for Research Science and Technology and the Health Research Council of New Zealand. HaeJoo Kang was the recipient of a FRST Bright Futures Scholarship and Dr Proft is a HRC Hercus Fellow.

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