

How the bacterium that plays role in spread of MRSA colonises the human nose

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A collaboration between researchers at the School of Biochemistry and Immunology and the Department of Microbiology at Trinity College Dublin has identified a mechanism by which the bacterium *Staphylococcus aureus* (*S. aureus*) colonises our nasal passages. The study, recently published in the prestigious journal *PLOS Pathogens*, shows for the first time that a protein located on the bacterial surface called clumping factor B (ClfB) recognises a protein called loricrin that is a major component of the envelope of cells in the nose and skin.

S. aureus is an important [human pathogen](#), with the potential to cause severe invasive diseases. It is a major concern in hospitals and healthcare facilities, where many infections are caused by strains such as MRSA that are resistant to commonly used antibiotics. Interestingly, *S. aureus* persistently colonises about 20% of the human population by binding to skin-like cells within the [nasal cavity](#). Being colonised predisposes an individual towards becoming infected so it is vital that we understand the mechanisms involved.

ClfB was previously shown to promote *S. aureus* colonisation in a human nasal volunteer study. This paper now identifies the mechanism by which ClfB facilitates *S. aureus* nasal colonisation. ClfB binding to loricrin was shown to be crucial for successful colonisation of the nose in a mouse model. A mouse lacking loricrin allowed fewer bacterial cells to colonise its nasal passages than a normal mouse. When *S. aureus* strains that lacked ClfB were used nasal colonisation was dramatically reduced. Finally it was shown that soluble loricrin could reduce binding of *S.*

aureus to human nasal skin cells and that nasal administration of loricrin reduced *S. aureus* colonisation of mice.

Trinity's Assistant Professor at the School of Biochemistry and Immunology Rachel McLoughlin and Professor of [Molecular Microbiology](#) Tim Foster, the study's corresponding authors concluded: "Loricrin is a major determinant of *S. aureus* nasal colonisation. This discovery opens new avenues for developing therapeutic strategies to reduce the burden of nasal carriage and consequently infections with this bacterium. This is particularly important given the difficulties associated with treating MRSA infections".

More information: Mulcahy, M. et al. (2012) Nasal Colonisation by *Staphylococcus aureus* Depends upon Clumping Factor B Binding to the Squamous Epithelial Cell Envelope Protein Loricrin. *PLoS Pathog* 8(12): e1003092. [doi:10.1371/journal.ppat.1003092](https://doi.org/10.1371/journal.ppat.1003092)

Provided by Trinity College Dublin

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