

# Staphylococcus aureus: Why it just gets up your 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*) colonizes our nasal passages. The study, published today in the Open Access journal *PLOS Pathogens*, shows for the first time that a protein located on the bacterial surface called clumping factor B (ClfB) has high affinity for the skin protein loricrin.

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

ClfB was previously shown to promote *S. aureus* colonization in a human nasal colonization volunteer study. This paper now identifies the mechanism by which ClfB facilitates *S. aureus* nasal colonization. Purified ClfB bound loricrin with high affinity and this interaction was shown to be crucial for successful colonization of the nose in a mouse model. A [knockout mouse](#) lacking loricrin in its skin cells allowed fewer [bacterial cells](#) to colonize its nasal passages than a normal mouse. When *S. aureus* strains that lacked ClfB were used nasal colonization could not

be achieved at all. 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* colonization of mice.

Rachel McLoughlin, the study's corresponding author and Lecturer at the School of Biochemistry and Immunology at Trinity College Dublin concludes, "Loricrin is a major determinant of *S. aureus* nasal colonization." This discovery therefore 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 ME, Geoghegan JA, Monk IR, O'Keeffe KM, Walsh EJ, 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)

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