PERSPECTIVE

Bacterial nasal colonizers

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Citation: Priyadarshini VS, Bacterial nasal colonizers. J Exp Clin Microbiol 2021;5(3):1-1.

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Nasal *Staphylococcus aureus* colonies up to 30% of the human population asymptomatically and permanently. *S. aureus* must establish stable connections with human nasal epithelial cells and overcome host defensive mechanisms to colonize human nares. However, several factors, such as bacterial interactions in the human nose, can impact and even prevent *S. aureus* colonization. Certain host features and environmental conditions, on the other hand, can predispose to colonization. Nasal colonization can lead to opportunistic and potentially life-threatening infections in non-surgical patients, such as surgical site infections or other infections, which increase morbidity, mortality, and healthcare costs. *Staphylococcus aureus* is a commensal bacteria found on human skin and mucosae, but it is also a common source of major infections with high morbidity, mortality, and healthcare expenditures. The vestibulum nasi (or anterior nares), which serves as a reservoir for the pathogen's propagation, is the most common carriage location. This bacterium can create strong bonds with nasal epithelial cells using a variety of proteins and cell surface components, resulting in chronic carriage. S. aureus infects the anterior nares of 20 to 80 percent of people.

The adult nasal microbiota varies by individual, although bacteria from the genera *Corynebacterium*, *Propionibacterium*, and *Staphylococcus* are the most common. In a study of 178 adults nasal microbiota, 88.2% were carriers of *Corynebacterium*, 83.7% of *Propionibacterium acnes*, and 90.4% of *Staphylococcus epidermidis*. Individuals' proportional abundance differed significantly. The nasal microbiota can influence one's health and vice versa. Healthy adults had a nares microbiota dominated by Actinobacteria (primarily *Propionibacterium* and *Corynebacterium* spp.) in a study comprising healthy and hospitalized people, whereas patients' microbiota was dominated by *S. aureus* and *S. epidermidis*. The presence of other bacteria, such as *S. epidermidis*, was found to be adversely linked with *S. aureus* colonization. In fact, several bacteria have been shown to secrete anti-staphylococcal compounds that regulate *S. aureus* abundance. *In vitro* generation of H_2O_2 by *Streptococcus pneumoniae,* for example, has been shown to be bactericidal against *S. aureus*. A recent *in vitro* and human study found that legumin, a non-ribosomal synthesized bioactive chemical produced *by Staphylococcus lugdunensis*, can prevent *S. aureus* nasal colonization by acting as a bactericide.

The skin, rectum, vagina, gastrointestinal system, and axilla are all places where *Staphylococcus aureus* can be found, with the anterior nares serving as the major reservoir. *S. aureus* can enter the nasal mucosa through a cutaneous commensal site and interact with epithelial cell ligands such loricrin and cytokeratin 10 (K10). *S. aureus* can disseminate into the anterior nares once the host's defenses have been overcome, making the host a *S. aureus* nasal carrier. Mupirocin has emerged as the most effective topical antibacterial drug for eradicating *S. aureus* nasal carriage. *Pseudomonas fluorescens* produces mupirocin, which inhibits bacterial protein synthesis by reversibly binding to isoleucyl—tRNA-synthetase. It's a novel substance, and many antibiotic-resistant *S. aureus* strains that haven't been exposed to it are susceptible. Resistance to mupirocin is known to develop with repeated exposure. Mupirocin has a lot of potential as a treatment for nasal colonization and subsequent systemic *S. aureus* infection. Its usage should be guided by clinical evidence to reduce the danger of overuse and the development of resistance. Increased carriage rates have been discovered in patients who regularly puncture the skin (e.g., hemodialysis or continuous ambulatory peritoneal dialysis [CAPD] patients and intravenous drug injectors) as well as individuals with human immunodeficiency virus (HIV) infection. In patients undergoing surgery, those on hemodialysis or CAPD, those with HIV infection and AIDS, those with intravascular devices, and those colonized with MRSA, carriage has been established as a major risk factor for infection. In surgical patients, hemodialysis patients, and CAPD patients, removing carriage has been reported to minimize infection rates. In patients at risk, eliminating carriage looks to be an appealing preventive strategy.

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Received: October 08, 2021, Accepted: October 22, 2021, Published: October 29, 2021