You and the Flu: Your Nasal Microbiome Protects You from the Flu

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Influenza infects ~35 million people and causes ~79,000 deaths in the United States annually. Vaccination can be highly effective, but is often a neglected tool for preventing infection. In this project, three methods were developed to compare an individual's flu susceptibility to the types and amounts of nasal bacteria to assess if certain bacteria may be protective against the flu. Method 1, developed last year, evaluated the impacts of nasal Staphylococcus and Micrococcus levels on flu susceptibility. This year, this method was validated in a larger population and two additional methods assessing other genera of nasal bacteria - Haemophilus, Streptococcus - were developed. Amounts of each type of bacteria were compared to participant survey answers regarding their history of influenza in their lifetimes. In Method 1, a Kirby-Bauer disc diffusion test distinguished isolates of Staphylococcus from Micrococcus. Higher ratios of Staphylococcus to Micrococcus were found in individuals more susceptible to influenza ($p = 0.0032$). In Method 2, S. pyogenes and S. pneumoniae were distinguished based on their hemolytic patterns. Higher S. pyogenes to S. pneumoniae ratios significantly correlated with more frequent influenza infections ($p < 0.00001$). In Method 3, total numbers of Staphylococcus spp. and H. influenzae were compared. More H. influenzae significantly correlated with higher flu frequency ($p < 0.00001$). While all three methods indicate correlations between specific nasal bacteria and flu susceptibility, Method 2 was both the simplest and the most inexpensive. Commercialization of these methods could result in an easy and inexpensive test to identify at-risk individuals.

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