

Scientists' unique system of oral vaccine delivery to address global health threats

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Scientists at The Forsyth Institute and Tufts University have succeeded in describing and validating a unique system of oral vaccine delivery using a common bacteria found in the mouth. Findings published today by Elsevier in *Microbes and Infection* identify *Streptococcus mitis* as a successful vector for oral mucosal immunization, and further research will determine its potential clinical use in tuberculosis vaccine development.

"Although injected vaccines are traditionally viewed as effective means of immunization to protect internal organs, these vaccines rarely induce strong mucosal protection in the gastrointestinal tract, respiratory tract and genitalia. In contrast, oral vaccinations have the potential to affordably, safely and effectively protect these areas, thus assisting in the fight against global health threats including diarrheas and diseases such as tuberculosis and AIDS," said lead research Dr. Antonio Campos-Neto, a senior member of the Department of Immunology and Infectious Diseases at The Forsyth Institute. Dr. Campos-Neto is also the director for the Center for Global Infectious Disease Research, and lecturer at the Harvard School of Dental Medicine.

According to the World Health Organization, nine million people were diagnosed with tuberculosis in 2013, the latest year in which data is available, and 1.5 million people died from the disease. It is second only to HIV/AIDS in prevalence.

The published findings, titled, "*Streptococcus mitis* as a Vector for Oral

Mucosal Vaccination," are co-authored by a team of Forsyth Institute researchers including Campos-Neto, Nada Daifalla, Mark J. Cayabyab, Emily Xie, Philip Stashenko, and Margaret Duncan, as well as Saul Tzipori and Hyeun Bum Kimb of the Cummings School of Veterinary Medicine at Tufts University. This paper outlines materials, methods and results that demonstrate promising advances in making mass immunization safer, less costly, and more accessible to developing countries.

Background

Although many strains of viruses and bacteria have been tested as live vaccine vectors, Forsyth research confirms *S. mitis*, a bacteria found in the human oral microbiome from infancy, is more abundant, more apt to colonize long-term, and more successful in eliciting mucosal immunity than many other organisms. Using *S. mitis* as a vaccine vector successfully induces mucosal immune responses locally in the mouth, at remote mucosal sites, and systemically throughout the body. Further studies will assess whether this delivery system could effectively aid in protecting against tuberculosis, as well as other diseases like AIDS, and certain intestinal diseases.

Provided by Forsyth Institute

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