

Macaque trials offer hope in pneumonia vaccine development

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Control



Vaccine



Left: Control group (non-vaccine-treated); the red arrow shows the area where pneumonia developed. Right: Vaccine-treated group comprising cynomolgus macaques or crab-eating macaques; suppression of infection was observed. Credit: Department of Immunology and Genomics at the Graduate School of Medicine, Osaka Metropolitan University

The global impact of the coronavirus pandemic has ignited a renewed focus on emerging and re-emerging infectious diseases. Researchers at Osaka Metropolitan University are making great strides in combating pneumococcal pneumonia, one of the leading causes of respiratory deaths worldwide.

Despite the existence of vaccines against pneumococcal infections such as [otitis media](#), sinusitis, and meningitis, the prevalence of pneumococcal [pneumonia](#) remains high. Currently, around 100 new serotypes of *Streptococcus pneumoniae* have been identified, and the increase in [pneumococcal infections](#) caused by serotypes not covered by the [vaccine](#) has become a concern. This situation underscores the need for a more versatile vaccine.

Building on their previous success in mucosal responses in 2019, in which they developed a mucosal vaccine that can induce antigen-specific mucosal immune responses, mainly immunoglobulin A (IgA), on the target mucosal surface, a research team led by Professor Satoshi Uematsu and Associate Professor Kosuke Fujimoto from the Department of Immunology and Genomics at the Graduate School of Medicine, Osaka Metropolitan University, has this time set out to bridge the gap in pneumococcal pneumonia vaccination efficacy.

Their findings were published in [*Inflammation and Regeneration*](#).

To successfully develop a novel pneumococcal vaccine, the research team combined its proprietary mucosal vaccine technology with pneumococcal surface proteins that can cover a wide range of serotypes. Experiments conducted on mice and macaques have demonstrated the vaccine's efficacy in suppressing pneumococcal pneumonia in the target animal groups.

"This research has succeeded in developing a vaccine formulation that

can potentially be used in humans, which will advance the development of this vaccine for clinical applications," said Professor Fujimoto. "This next-generation vaccine technology is expected to contribute to the treatment of [infectious diseases](#) in the future."

More information: Chieko Yokota et al, Prime-boost-type PspA3 + 2 mucosal vaccine protects cynomolgus macaques from intratracheal challenge with pneumococci, *Inflammation and Regeneration* (2023).
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