

New single vaccination approach to killer diseases

May 20 2019



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Scientists from the University of Adelaide's Research Centre for Infectious Diseases have developed a single vaccination approach to simultaneously combat influenza and pneumococcal infections, the world's most deadly respiratory diseases.

The researchers say a single vaccination—combining vaccines from the new class of vaccines they are developing—will overcome the limitations of current influenza and pneumococcal vaccines used around the world.

Published today in the prestigious journal *Nature Microbiology*, they have shown that the new Influenza A [virus vaccine](#) under development (based on inactivated whole influenza virus) induces enhanced cross-protective immunity to different influenza strains, when it is co-administrated with the new class of pneumococcal [vaccine](#).

They showed the enhancement in immunity is associated with a direct physical interaction between the virus and the bacterium.

Led by Dr. Mohammed Alsharifi and Professor James Paton, this latest study builds on previous research on the development of a new class of inactivated vaccines that target components of both the virus and the bacterium that do not vary from strain to strain.

Current influenza vaccines target surface molecules that are affected by mutations and so an annual update is required to match newly emerging viruses. Existing pneumococcal vaccines provide longer lasting protection, but cover only a minority of disease-causing strains. The researchers say there is a clear need for better vaccines capable of providing universal protection.

"Influenza infection predisposes patients to severe pneumococcal pneumonia, with very [high mortality rates](#)," says Dr. Alsharifi. "Despite this well-known synergism, current vaccination strategies target the individual pathogens.

"We're investigating combining our novel influenza and [pneumococcal vaccines](#) into a single vaccination approach and have demonstrated a

highly significant enhancement of immune responses against diverse subtypes of influenza."

Previously published work from the team show a similar boost in efficacy of their pneumococcal vaccine when co-administered with the [flu vaccine](#), so there is bi-directional enhancement of pathogen-specific immunity.

"Our findings challenge an age-old immunological dogma about mixing viral and bacterial vaccines in a single injection", says Dr. Alsharifi.

"Influenza virus and pneumococcus worked together to cause up to 100 million deaths during the great 'Spanish flu' pandemic of 1918-1919," says Professor Paton.

"A century later, we have shown analogous, but this time highly protective, synergy with our novel vaccination strategy that targets both pathogens simultaneously."

Commercial development of the new class of vaccines is being undertaken by two University of Adelaide-associated Biotech companies, Gamma Vaccines Pty Ltd and GPN Vaccines Pty Ltd, respectively.

More information: Direct interaction of whole-inactivated influenza A and pneumococcal vaccines enhances influenza-specific immunity, *Nature Microbiology* (2019). [DOI: 10.1038/s41564-019-0443-4](https://doi.org/10.1038/s41564-019-0443-4) , www.nature.com/articles/s41564-019-0443-4

Provided by University of Adelaide

Citation: New single vaccination approach to killer diseases (2019, May 20) retrieved 6 October 2023 from <https://medicalxpress.com/news/2019-05-vaccination-approach-killer-diseases.html>

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