Addressing both flu and COVID-19 through a single, multitasking injection

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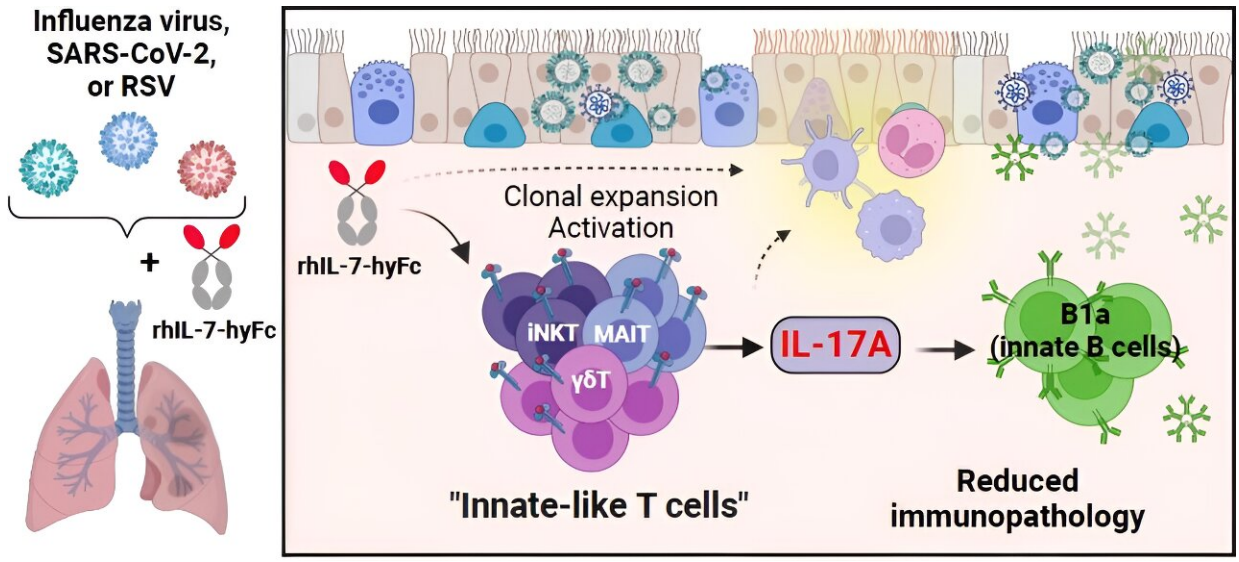

Mechanism of antiviral action by the rhIL-7-hyFc recombinant protein. Credit: POSTECH

In preparation for the winter season last year, the Korean Medical Association recommended that people with compromised immune systems receive both the flu and COVID-19 vaccines simultaneously. The prospect of receiving shots in both arms may have been a shock, especially for children. However, there is now exciting news about a multitasking substance capable of preventing and treating both flu and COVID-19 infections concurrently, and it is gaining momentum.

A research team has identified new drug candidates for preventing and treating major respiratory viral infections. This research has recently been published in the journal *Cell Reports Medicine.*

In recent times, a global resurgence of infections has been observed, predominantly linked to a novel variant of COVID-19 known as "JN.1." The Korean Disease Control and Prevention Agency reports that this variant has become the dominant strain in Korea, surpassing a detection rate of 50%.

While vaccines prove effective against specific viruses, the emergence of new variants necessitates considerable time for the development of corresponding vaccines, leading to potential public health crises as witnessed during the COVID-19 pandemic. To address this challenge, there is a pressing need for more broadly applicable treatments capable of swiftly responding to the ongoing mutations.

The research team explored the potential application of the long-acting recombinant cytokine protein rhIL-7-hyFc (NT-I7; efineptakin alfa), currently undergoing clinical development as an immunotherapy drug. This exploration aimed to assess its suitability as a treatment for major respiratory viruses due to its capacity to activate diverse immune cells within the respiratory tract.

In experimental settings, the protein triggered the influx of acquired T cells and the proliferation of innate-like T cells in the lungs. These innate-like T cells demonstrated a swift and comprehensive defense against a broad spectrum of pathogens, functioning as if they were deploying inherent mechanisms.

Consequently, the treatment exhibited both therapeutic and preventive effects against COVID-19, influenza virus, respiratory syncytial virus, and others. Notably, the drug candidates were not tailored to a specific

virus but demonstrated universal applicability to major respiratory diseases.

Professor Seung-Woo Lee from the Department of Life Sciences and the School of Convergence Science and Technology, Subin Park and Yujin Jeong, Ph.D. candidates from the Department of Life Sciences at Pohang University of Science and Technology (POSTECH), and Dr. Donghoon Choi from NeoImmuneTech (CEO Sehwan Yang) collaborated with the Gyeongbuk Institute for Bio Industry and the International Vaccine Institute for this study.

Professor Lee, leading the study, stated, "Through collaborative study involving industry, academia, and the research community, we have discovered insights to prepare for future respiratory virus pandemics." He added, "We are committed to advancing our efforts to transform the prospect of a universal treatment, capable of controlling co- and serial infections of respiratory viruses and bacteria, into a reality."

More information: Dong-il Kwon et al, Fc-fused IL-7 provides broad antiviral effects against respiratory virus infections through IL-17A-producing pulmonary innate-like T cells, *Cell Reports Medicine* (2024). DOI: 10.1016/j.xcrm.2023.101362

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