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For Immediate Release

T cells may offer some protection in an H5N1 'spillover' scenario

New LJI research suggests many people already have T cells with the power to fight "highly pathogenic" avian influenza

LA JOLLA, CA—New research led by scientists at La Jolla Institute for Immunology (LJI) suggests that many people already have immune cells on "stand by" to fight the H5N1 virus, also known as highly pathogenic avian influenza.

The H5N1 "[bird flu](#)" virus emerged in 2022 and has spread widely in animal populations, including poultry and cattle. According to the [U.S. Centers for Disease Control and Prevention](#), there have been nine confirmed H5N1 infections in U.S. poultry and dairy workers who caught the virus through animal contact. There are no known cases of human-to-human transmission, so far.

LJI scientists and vaccine experts are keeping a close eye on the emerging virus. In their new study, LJI Professor Alessandro Sette, Dr.Biol.Sci., and LJI Research Assistant Professor Alba Grifoni, Ph.D., compared genetic sequences from H5N1 to genetic sequences from seasonal influenza viruses that already circulate in humans.

The LJI team uncovered important similarities between H5N1 and these common viruses, which allowed them to predict that many people already have "cross-reactive" T cells that are ready to target H5N1—should it ever mutate to cause widespread disease in humans.

"This makes us believe that a certain number of cross-reactive T cell responses may already be in place and may help decrease disease severity," says Sette, who also serves as Co-Director of the [LJI Center for Vaccine Innovation](#).

The researchers shared their findings in a [preprint manuscript](#) published on bioRxiv.

How the new study worked

Most Americans have had the flu or received a flu shot in the past. That means their immune systems have built up some level of immunity against common influenza viruses.

Sette and Grifoni investigated how well these influenza-fighting T cells might recognize and target the new H5N1 virus. The scientists used data from the LJI-led Immune Epitope Database ([IEDB](#)) to identify exactly how human T cells attack key proteins, or epitopes, on seasonal flu viruses. They then developed a computational approach to figure out if the H5N1 virus has these same vulnerable epitopes.

The researchers found that many epitopes are shared, or "conserved" between H5N1 and seasonal influenza viruses. This means many people may already have T cells equipped to battle H5N1 infections.

"We can predict that—in the majority of cases—our T cells have memory responses and can provide pre-existing immunity to H5N1," says Grifoni. "That's good news."

Next steps for understanding H5N1 infections

The researchers cannot say for sure whether these T cell responses can lessen disease severity; however, there is reason to believe cross-reactive T cells may be good fighters. In previous studies, LJI scientists have shown that cross-reactive T cells can lessen the severity of [COVID-19](#) and even [mpox](#).

Going forward, the researchers are interested in studying the strength of these T cell responses. They are also prepared to analyze immune cells from human samples, should H5N1 begin spreading between people. "We need to continue to monitor the situation, and if an outbreak were to occur, we're ready to examine immune responses in more detail," says Sette.

Additional authors of the study, "[Targets of influenza Human T cell response are mostly conserved in H5N1](#)," include co-first authors John Sidney and A-Reum Kim, as well as Rory D. de Vries, Bjoern Peters, Philip S. Meade, and Florian Krammer.

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About La Jolla Institute

La Jolla Institute for Immunology (LJI) is dedicated to understanding the intricacies and power of the immune system so that we may apply that knowledge to promote human health and prevent a wide range of diseases. Since its founding in 1988 as an independent, nonprofit research organization, the Institute has made numerous advances leading toward its goal: life without disease. Visit lji.org for more information.

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