

## Scientists find previous seasonal flu infections may provide some level of H1N1 immunity

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Researchers at the La Jolla Institute for Allergy & Immunology have found that previous influenza infections may provide at least some level of immunity to the H1N1 "swine" flu.

"The question we asked was, "Is the <u>swine flu</u> more like the seasonal flu or like a totally new strain of influenza where there would be no immunity?," said Alessandro Sette, Ph.D., an internationally recognized vaccine expert and director of the La Jolla Institute's Center for Infectious Disease. "What we have found is that the swine flu has similarities to the seasonal flu, which appear to provide some level of preexisting immunity. This suggests that it could make the disease less severe in the general population than originally feared."

The researchers used the Immune Epitope Database--a worldwide research tool developed and hosted by the La Jolla Institute and funded by the National Institute of Allergy and Infectious Diseases, part of the National Institutes of Health--to conduct their study. Initially, the research team conducted their studies using computer modeling, and later used blood samples of adults representative of the normal population.

"We looked at the molecular markers for seasonal influenza viruses dating back 20 years and compared them with the molecular markers of the H1N1 <u>influenza virus</u>," said Bjoern Peters, Ph.D., lead author on the



study published today in the *Proceedings of the National Academy of Sciences.* "We found that the immune system's T cells can recognize a significant percent of the markers in swine flu." T cells are infectionfighting white blood cells in the body's immune system. "Nobody knows what level of immunity is sufficient for protection. We do know that a T cell response is not enough to prevent being infected by the virus. But, if infected, our data suggests that T cells in those who have previously been exposed to influenza may make the infection less severe," Dr. Peters said.

The findings are based on knowledge that the body's T cells recognize and will launch an attack against viruses -- in this case certain molecular pieces of the swine flu -- that they have seen before.

The research team also looked at the immune system's antibodyproducing B cell response to the H1N1 virus. In this area, they saw only 17 percent recognition of the markers on the H1N1 as compared to seasonal flu. B cells, and their ability to produce antibodies that remember a virus, are the basis for vaccines to protect against subsequent infections by similar viruses. "Since the antibody recognition of the H1N1 virus was relatively low as compared to previous flu viruses, it means that the vaccine is important to prevent being infected by the H1N1 virus," said Dr. Peters.

"The data regarding pre-existing T cell immunity helps to explain why the general population seems to be faring better against the H1N1 virus than expected," said Dr. Sette. Nonetheless, H1N1 remains a serious concern as does seasonal influenza, he said.

According to CDC estimates, between 14 million and 34 million cases of H1N1 occurred between April and October 17, 2009, and between 63,000 and 153,000 H1N1-related hospitalizations during that same period. Between 2,500 and 6,000 H1N1-related deaths occurred during



the same period, according to CDC estimates.

CDC officials have said up to 40 percent of the U.S. population may eventually be infected by the H1N1 virus.

In a normal flu season, influenza infects as much as 20 percent of the U.S. population, causes more than 200,000 hospitalizations and kills about 36,000 people.

The La Jolla Institute team used the immense power of the Immune Epitope Database to compile the data for their paper, "Pre-existing Immunity Against Swine-Origin H1N1 Influenza Viruses in the General Human Populace." The database, launched in 2006 and available freely to researchers worldwide at <u>www.iedb.org</u> is the largest collection of data in the world on how the body responds to infectious disease. It is designed to aide and speed vaccine development by giving scientists quick access to existing research data. The La Jolla Institute designed, developed and continues to host the database under a contract with the NIAID.

"I think our ability to compile this data on the H1N1 virus, which is an issue of critical worldwide importance, exemplifies the value of this database as a research and public heath tool," said Dr. Sette, who is lead investigator on the database.

To conduct their study, the La Jolla Institute team obtained <u>H1N1</u> virus data from several scientific resources. "We cross-referenced the swine flu sequence data with the epitope data on previous seasonal influenza viruses," said Dr. Peters, explaining that this provided the research team the ability to compare the molecular patterns of the viruses.

"The results of our study have been posted to the database to make it available to researchers worldwide, "he said. "We're glad to be able to



not only host, but to contribute data, to this important resource."

Source: La Jolla Institute for Allergy and Immunology

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