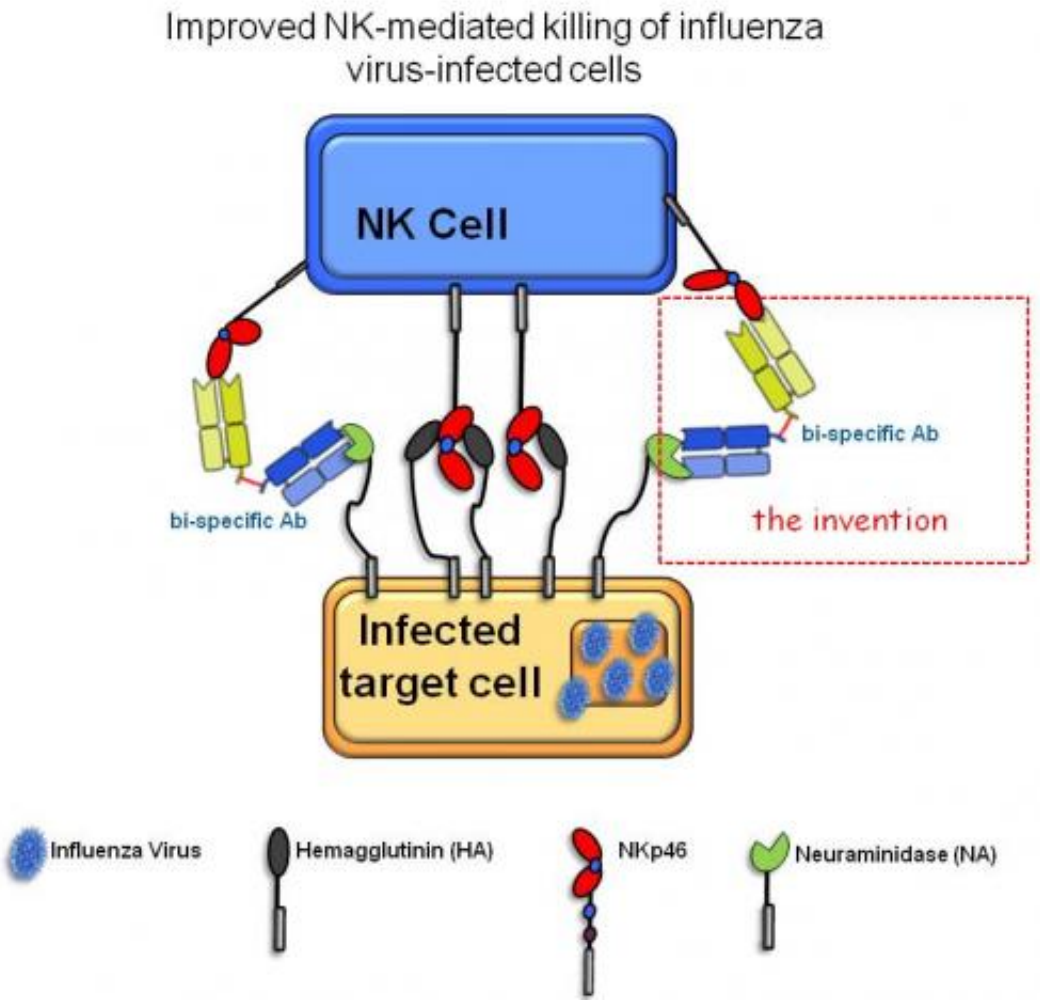
Medical Xpress

Antibody research paves the way for new, more effective influenza drugs

August 18 2014, by Dov Smith



Research toward developing new antibodies at the Hebrew University of Jerusalem's Faculty of Medicine could pave the way for more effective drugs to combat influenza infection.

Influenza is a major global health problem. Annual epidemics of seasonal influenza cause approximately three to five million cases of severe illness, leading to between 250,000 and 500,000 deaths worldwide. In the United States, seasonal influenza epidemics are estimated to account for 3.1 million hospitalization days and an average of $10.4 billion loss in direct medical costs.

"It is thus urgent to develop new drugs for fighting influenza infection, which requires an understanding of the virus's life cycle and its interaction with the host's immune system," said Yotam Bar-On, a Hebrew University Ph.D. candidate in immunology and cancer research.

Bar-On conducted his research under the tutelage of Prof. Ofer Mandelboim of the Lautenberg Center for General and Tumor Immunology, at the Institute for Medical Research Israel-Canada in the Hebrew University's Faculty of Medicine. The research earned Bar-On a Kaye Innovation Award, which was presented on June 11 in conjunction with the 77th annual meeting of the Hebrew University's Board of Governors.

In the past, says Bar-On, it was demonstrated that natural killer (NK) cells that belong to the body's innate immune system can eliminate influenza virus-infected cells. This is made possible via by one of the major NK killing receptors, NKp46, that recognizes influenza virus expressed on the infected cells.

A problem arises, however, in that the influenza viruses have a novel immune evasion mechanism that is mediated by the neuraminidase (NA) protein. NA counterattacks NKp46 recognition of infected cells and

reduces its ability to eliminate them.

Bar-On's research has shown, for the first time, that NA inhibitors (which are already commonly used to treat influenza infections) enhance the NKp46-mediated killing of infected cells. Through further research into peptide components of the NA protein, Bar-On was able to develop antibodies that can to bind the NA, in effect "tying them up" and taking them out of action.

"It is thus urgent to develop new drugs for fighting influenza infection, which requires an understanding of the virus's life cycle and its interaction with the host's immune system," said Yotam Bar-On, a Hebrew University Ph.D. candidate in immunology and cancer research.

Bar-On conducted his research under the tutelage of Prof. Ofer Mandelboim of the Lautenberg Center for General and Tumor Immunology, at the Institute for Medical Research Israel-Canada in the Hebrew University's Faculty of Medicine. The research earned Bar-On a Kaye Innovation Award, which was presented on June 11 in conjunction with the 77th annual meeting of the Hebrew University's Board of Governors.

In the past, says Bar-On, it was demonstrated that natural killer (NK) cells that belong to the body's innate immune system can eliminate influenza virus-infected cells. This is made possible via by one of the major NK killing receptors, NKp46, that recognizes influenza virus expressed on the infected cells.

A problem arises, however, in that the influenza viruses have a novel immune evasion mechanism that is mediated by the neuraminidase (NA) protein. NA counterattacks NKp46 recognition of infected cells and reduces its ability to eliminate them.

Bar-On's research has shown, for the first time, that NA inhibitors (which are already commonly used to treat influenza infections) enhance the NKp46-mediated killing of infected cells. Through further research into peptide components of the NA protein, Bar-On was able to develop antibodies that can to bind the NA, in effect "tying them up" and taking them out of action.

Bar-On's work has been patented through the Hebrew University's technology transfer company, Yissum, which is seeking commercial partners to continue research and development.

Bar-On is currently working on generating cross-reactive, anti-influenza antibodies that will bind the NA proteins in most of the influenza virus strains known today. He has shown that when injected into mice infected with influenza virus, these antibodies significantly improved their survival.

Bar-On's work is expected to make possible future new and more efficient drugs that will both target NA and at the same time more efficiently boost the NKp46-mediated killing of influenza virus. "Altogether, the novel antibodies we have developed will allow our immune system to respond more efficiently to a wide variety of influenza infections," concludes Bar-On.

Provided by Hebrew University of Jerusalem

Citation: Antibody research paves the way for new, more effective influenza drugs (2014, August 18) retrieved 2 May 2024 from https://medicalxpress.com/news/2014-08-antibody-paves-effective-influenza-drugs.html