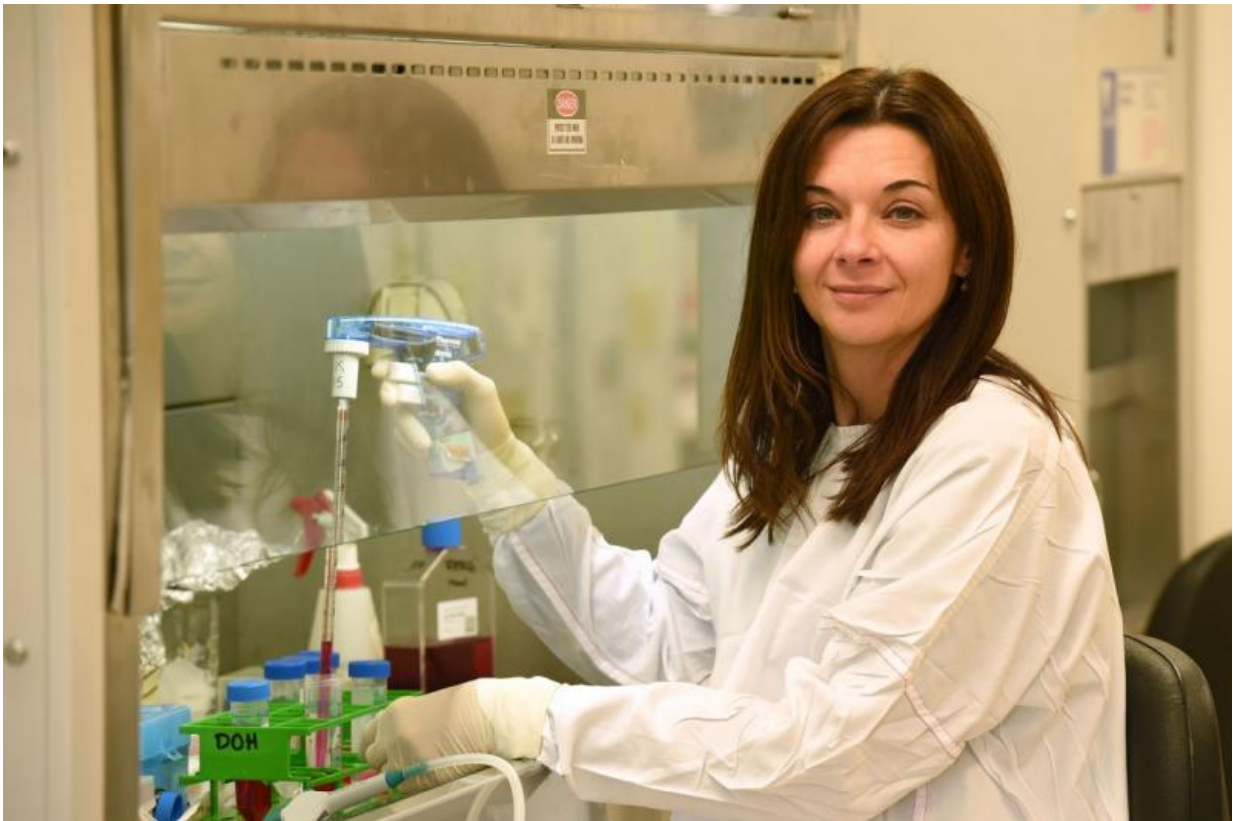


# Memory code for flu-killing 'assassin' cells cracked in quest for one-shot flu 'jab' for life

May 13 2015, by Rajiv Maharaj

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The extraordinary breakthrough in how 'killer' CD8 + T cells - the body's 'army of hitmen' tasked with taking out new viruses - retain memories of [virus strains](#) they encounter was published in the prestigious *Nature Communications* journal this week (May 13).

University of Melbourne's Associate Professor Katherine Kedzierska explained how the Australia-Sino collaboration began during the first outbreak of the avian-derived H7N9 virus in China in 2013.

That contagion saw 99% of people infected hospitalised, with a 30% mortality rate. Patient zero was an elderly man who caught the virus from a chicken his wife asked him to buy at the local live bird market.

"We'd never seen anything like H7N9," Associate Professor Kedzierska said. "The virus was infecting more people rapidly and nobody had immunity. Thankfully, we did manage to contain the virus but we knew we had come face-to-face with a potential pandemic that could kill millions of people around the world if the virus became able to spread between humans," she said.

"After collecting samples from infected patients we found that people who couldn't make these T cell flu assassins were dying. These findings lead to the potential of moving from vaccines for specific influenza strains toward developing a protection, which is based on T-cells," she said.

"From the 30% mortality rate in China we knew the clock was ticking on the situation. Had the contagion spread broken out globally, we're talking about a history-altering event on the Spanish Flu scale. As it turns out, boosting the T cell adaptive memory capacity is our way in," Associate Prof Kedzierska said.

"Our extraordinary breakthrough could lead to the development of a vaccine component that can protect against all new influenza viruses, with the potential for future development of a one-off universal flu vaccine shot," she said. "This work will also help clinicians to make early predictions of how well a patient's immune system will respond to viruses so they can manage early interventions such as artificial ventilation more effectively, particularly in cases where the patient is at risk of dying."

Published in *Nature Communications*, the research paper - Recovery from severe H7N9 disease is associated with diverse response mechanisms dominated by CD8+ T cells – was led by the University of Melbourne and the Shanghai Public Health Clinical Center and Fudan University in China, with scientists from St Jude Children's Research Hospital, Memphis.

Co-author and Nobel Laureate Professor Peter Doherty from the University of Melbourne said: "After spending the past 40 years working on the virus-specific 'killer' T cells, this is the first study from our group that shows their role in protecting people against a novel human influenza A virus."

Professor Xu, who co-led the study from Fudan University, said that this study would significantly enlighten T-cell based vaccine development and immune intervention during severe [influenza](#) infection in the future.

Professor Elizabeth Hartland, Head of the Department of Microbiology

and Immunology at the University of Melbourne added that the international collaboration has brought together the immunological expertise in Melbourne and the clinical knowledge in Shanghai to produce a study of much higher impact than could be achieved individually. "It exemplifies the approach we are taking at the Peter Doherty Institute for Infection and Immunity," she said.

**More information:** "Recovery from severe H7N9 disease is associated with diverse response mechanisms dominated by CD8<sup>+</sup> T cells." *Nature Communications* 6, Article number: 6833 [DOI: 10.1038/ncomms7833](https://doi.org/10.1038/ncomms7833)

Provided by University of Melbourne

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