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Avian influenza survivors' antibodies effective at neutralising H5N1 strain

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Adults who have recovered from the potentially deadly H5N1 strain of avian influenza may hold the key to future treatments for the virus, according to an international team of researchers. In a study published today in the open access journal PLoS Medicine, the researchers have shown how specific antibodies taken from avian flu survivors in Vietnam can be reproduced in the laboratory and prove effective at neutralising the virus in culture vitro and in mice.

The H5N1 influenza virus has caused disease and death in millions of poultry across the globe and occasionally has been transmitted to humans, often fatally. By mid-May 2007, according to the World Health Organization, there had been 306 known cases in humans, 185 of them fatal.

Now, doctors based at the Hospital for Tropical Diseases in Ho Chi Minh City, Vietnam, the Institute for Research in Biomedicine in Bellinzona, Switzerland and the National Institute of Allergy and Infectious Diseases in Bethesda, US, have shown that monoclonal antibodies generated from blood of human survivors of the H5N1 virus are effective at both preventing infection in mice and neutralising the virus in those already infected. The research had been fast-tracked for funding by the UK's Wellcome Trust and is also supported by grants from the National Institutes of Health in the US and the Swiss National Science Foundation.

The researchers found that the antibodies provided significant immunity

to mice that were subsequently infected with the Vietnam strain of H5N1. This reduced significantly the amount of virus found in the lungs and almost completely prevented the virus reaching the brain or spleen. In those people in Vietnam who died from the H5N1 strain, the virus was found to have spread from the lungs; this was not the case in those who survived.

"We have shown that this technique can work to prevent and neutralise infection by the H5N1 'bird flu' virus in mice," says Dr Cameron Simmons, a Wellcome Trust researcher at the Oxford University Clinical Research Unit, Vietnam. "We are optimistic that these antibodies, if delivered at the right time and at the right amount, could also provide a clinical benefit to humans with H5N1 infections."

"In particular, we found that it was possible to administer the treatment up to 72 hours after infection. This is particularly important as people who have become infected with the virus do not tend to report to their local healthcare facilities until several days after the onset of illness."

The antibodies were discovered in the laboratory of Professor Antonio Lanzavecchia at the Institute for Research in Biomedicine in Switzerland. The researchers used a new technique that allows them to rapidly reproduce human monoclonal antibodies starting from a small sample of blood.

"We can't say for certain that a pandemic influenza virus will resemble the H5N1 strain that we have been studying or that the monoclonal antibodies generated using our technique will be able to tackle such a virus," says Professor Lanzavecchia. "Nevertheless, we are encouraged by the broad neutralizing activity of these antibodies in the lab and the moderate doses required."

Using administered antibodies has a historical precedent. During the

1918 Spanish H1N1 influenza pandemic, there were multiple reports of physicians administering blood taken from survivors to patients infected with the disease. A recent review suggested that this treatment was associated with a halving in mortality. However, directly administering blood carries a risk of infection with other blood diseases, such as Hepatitis C and HIV.

Source: Wellcome Trust