

Structure of influenza B virus protein gives clues to next pandemic

October 15 2007

Determining the structure of a protein called hemagglutinin on the surface of influenza B is giving researchers at Baylor College of Medicine and Rice University in Houston clues as to what kinds of mutations could spark the next flu pandemic.

In a report that goes online today in the *Proceedings of the National Academy of Sciences*, Drs. Qinghua Wang, assistant professor of biochemistry and molecular biology at BCM, and Jianpeng Ma, associate professor in the same department and their colleagues describe the actual structure of influenza B virus hemagglutinin and compare it to a similar protein on influenza A virus.

That comparison may be key to understanding the changes that will have to occur before avian flu (which is a form of influenza A virus) mutates to a form that can easily infect humans, said Ma, who holds a joint appointment at Rice. He and Wang have identified a particular residue or portion of the protein that may play a role in how different types of hemagglutinin bind to human cells.

“What would it take for the bird flu to mutate and start killing people” That’s the next part of our work,” said Ma. Understanding that change may give scientists a handle on how to stymie it.

There are two main forms of influenza virus – A and B. Influenza B virus infects only people while influenza A infects people and birds. In the past, influenza A has been the source of major worldwide epidemics

(called pandemics) of flu that have swept the globe, killing millions of people. The most famous of these was the Pandemic of 1918-1919, which is believed to have killed between 20 and 40 million people worldwide. It killed more people than World War I, which directly preceded it.

The Asian flu pandemic of 1957-1958 is believed to have killed as many as 1.5 million people worldwide, and the so-called Hong Kong flu pandemic of 1968-1969 is credited with as many as 1 million deaths. Each scourge was accompanied by a major change in the proteins on the surface of the virus.

Hemagglutinin sits on the membrane or surface of the virus. When it finds a receptor in a cell, it clicks in – just as a key fits into a lock and enters to infect the cell. The hemagglutinin on influenza B only fits into a receptor on human cells. However, influenza A virus hemagglutinin fits into receptors on human and bird cells. Understanding the differences in the two “keys” may provide a clue as to how the avian flu virus, which infects only bird cells easily now, must change to infect humans easily. Understanding those changes could provide researchers with information about how likely a pandemic of bird flu might be, said Ma.

Source: Baylor College of Medicine

Citation: Structure of influenza B virus protein gives clues to next pandemic (2007, October 15) retrieved 2 May 2024 from <https://medicalxpress.com/news/2007-10-influenza-virus-protein-clues-pandemic.html>

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