MedicalXpress

Dutch PhD develops fast method for preparing flu vaccine

December 7 2009

(PhysOrg.com) -- A shortage of flu vaccines may soon become a thing of the past. Researcher Manon Cox has designed an alternative process for producing large quantities of safe and effective vaccines at twice to four times the usual speed. The method is based on using insect cells in bioreactors instead of fertilised chicken's eggs, which have a limited availability.

The prompt availability of sufficient suitable vaccine is always a problem when facing the outbreak of a flu epidemic. At the moment, it takes three to six months to produce a vaccine to counter a new strain of flu virus using chicken's eggs. Moreover, there is no possibility of expanding production capacity in the event of a pandemic as the limited availability of fertilised chicken's eggs needed for production inevitably becomes an insurmountable problem. Cox's new method demonstrates that it is possible to make a vaccine available in commercial quantities within 45 days. The new production method makes use of a baculovirus that multiplies inside insect cells, and which cannot spread in vertebrates. The insect cells produce huge quantities of so-called HA proteins, which mobilise the immune system into fighting the flu virus.

The aspect that most slows down the production of vaccine according to the conventional method is the need for fertilised chicken's eggs. Furthermore, it creates extra problems if the flu virus is also capable of infecting birds (as was the case in the Netherlands in 2003), as the egg production often grinds to a halt. In addition, the vaccines produced are not suitable for people with an egg allergy. The new production process

using insect cells can be used simultaneously on a large scale at all times and at various locations throughout the world.

Meanwhile, the new production process has already been put through clinical trials involving three different strains of flu virus in 460 healthy people. None of the test subjects injected with the vaccine developed symptoms of flu, while 4.6% of those taking part in the control group contracted the disease. Three follow-on studies involving some 3,000 people showed no striking or frequent side-effects. The vaccine also appears to protect people from viruses that have undergone genetic manipulation and in more than 50% of cases, it results in better antibody production than the flu vaccines currently available.

Vaccines for the flu virus contain the HA protein (haemagglutinin) which, once in the bloodstream, puts the body in a state of high alert. The protein also stimulates the production of antibodies. The same protein is found in the outer layer of a flu virus. When the virus takes hold, the antibodies produced attach themselves to the proteins in the outer layer and deactivate the virus.

Manon Cox will be conferred with a PhD at Wageningen University on 9 December on the strength of a thesis on this subject.

Provided by Wageningen University