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Peramivir protects mice from lethal H5N1 infection

Memphis, Tennessee, May 1, 2007

The antiviral drug peramivir might offer humans significant protection during a pandemic of the avian influenza virus H5N1, according to results of mouse studies conducted by investigators at St. Jude Children's Research Hospital.

Peramivir, an antiviral drug, blocks the ability of influenza viruses to use an enzyme called neuraminidase, thus preventing the release of new virus particles and their spread from one infected cell to another.

The St. Jude team studied different approaches to treating infected mice according to duration of administration (one day versus eight days); route of administration of peramivir (intramuscular injections alone versus intramuscular injections followed by oral administration) and frequency of administration on the first day of treatment (once versus twice). In all cases, the investigators administered peramivir to mice one hour after nasally administering a lethal Vietnam strain of H5N1 influenza virus.

The researchers reported 100 percent survival among 10 infected mice given intramuscular injections of peramivir daily for eight days. The drug also inhibited replication of the deadly strain of H5N1 virus in the lung, brain and spleen. The key to the high survival rate was treating the infected mice within 24 hours after infection with H5N1 and continuing the treatment for eight days. In contrast, a single intramuscular injection resulted in a 40 percent survival rate, while two intramuscular injections increased the rate to 60 percent. The single intramuscular injection did not completely inhibit H5N1 virus replication in the lungs and spleen, but did decrease the spread of virus to the brain.

“Peramivir should be given as soon as H5N1 infection is suspected, since onset of symptoms in infected humans can be delayed,” said David A. Boltz, Ph.D., a postdoctoral fellow in the laboratory of Robert G. Webster in the Infectious Diseases department at St. Jude. “The drug could also be given as a preventive measure during an outbreak to decrease the risk of infection,” he said. Boltz is first author of the paper that was presented April 30 at the 20th International Conference on Antiviral Research in Palm Springs, Calif.

“We were surprised to see a 40 percent survival rate among mice after just a single dose of peramivir,” said Elena A. Govorkova, Ph.D., a scientific manager in the Infectious Diseases department at St. Jude. Govorkova is the paper’s senior author.

“Our findings support the use of peramivir during a pandemic, and we are currently studying the emergence of H5N1 variants that are resistant to this drug and may occur in the course of treatment,” said Natalia A. Ilyushina, Ph.D., a postdoctoral fellow in Webster’s laboratory. Ilyushina is a co-author of the paper.

Other authors of this report include Robert G. Webster (St. Jude) and C. Shane Arnold and Y. Sudhakar Babu (BioCryst Pharmaceuticals Inc., Birmingham, Ala.).

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St. Jude Children's Research Hospital

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