DUQUESNE UNIVERSITY
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PIC Question of the Week: 5/15/06

Q: Please clarify the nomenclature used in conjunction with the *bird flu* and available drug therapy.

A: The influenza virus is categorized into three types - A, B, and C. Influenza A can infect humans and various animal species such as birds, pigs, horses, etc. This type of influenza has various subtypes based on the *amino acid sequence* of two proteins present on the viral surface. These proteins are identified as neuraminidases (NA) and hemagglutinins (HA). Neuraminidase is an enzyme responsible for releasing newly formed viruses from one infected cell to another. Hemagglutinin has two functions, the recognition of target cells and fusion of the host cell to the tissue site. Sixteen NA subtypes have been identified, whereas, there appear to be only nine forms of HA. Combining subtypes of HA and NA results in identification of a specific subtype of influenza A virus. For example, the live, attenuated vaccines used for the 2005-6 season included two influenza A viruses, one designated H3N2 and the other H1N1. Types B and C influenza are only found in humans, do not require HA/NA classification for sub-typing, and are the cause of only mild illness. The subtype of influenza A that has drawn worldwide attention is the H5N1 variety. Avian influenza viruses occur naturally among birds. They appear to be carried in their intestines and are highly contagious, especially in domesticated birds. Avian influenza has been associated with approximately 20 subtypes of influenza A, but the most prominent form is that designated H5N1. It is also the subtype most associated with avian influenza *(bird flu*) in humans. There are four agents currently available for the treatment and prevention of influenza in humans. These are amantadine and rimantadine (also referred to as adamantanes), oseltamivir (Tamiflu), and zanamivir (Relenza). The latter two drugs are referred to as neuraminidase inhibitors and the only agents considered active against both influenza types A and B. There is little, if any, data on the efficacy of inhaled zanamivir in the treatment and prevention of influenza H5N1 in humans. Oseltamivir is now generally recommended as the drug of choice for influenza subtype H5N1. It has become apparent during the past few years that the required dose and duration of oseltamivir therapy for H5N1 infections must be increased. Although 75 mg twice daily for five days may be sufficient for some adult patients, severe infections may require a 7-10 day course of 150 mg twice daily. Increasing reports of oseltamivir resistance appear in the literature and are a cause for concern. Resistance seems to develop from the substitution of one amino acid in N1 neuraminidase.

References:

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