Avian Influenza Virus

System: Terrestrial

<table>
<thead>
<tr>
<th>Kingdom</th>
<th>Phylum</th>
<th>Class</th>
<th>Order</th>
<th>Family</th>
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<tbody>
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<td>Virus</td>
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<td>Orthomyxoviridae</td>
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Common name
fowl plague (English), bird flu (English), HPAI (English), LPAI (English)

Synonym

Similar species
Infectious laryngotracheitis (ILT), Acute Fowl Cholera, Chronic Respiratory Disease (CRD), Newcastle disease virus (NDV)

Summary
Asian Influenza is a highly contagious disease caused by type A influenza virus. Waterfowl are natural hosts of the disease and are usually asymptomatic. There are two forms of AI: Highly Pathogenic Avian Influenza (HPAI), which causes rapid mortality particularly in domestic poultry, and Low Pathogenic Avian Influenza (LPAI), which is a milder form. AI can be transmitted through the respiratory secretions or faeces of infected birds and also through contact with contaminated materials or items such as clothing, equipement and vehicles (Horimoto and Kawaoka, 2001).

Species Description
AI viruses have a similar structure and consist of two glycoprotein spikes, hemagglutinin (HA) and neuraminidase (NA) and a limited number of M2 proteins that project from the viral surface (NIAID, 2004). The virus is highly pleomorphic, roughly spherical, and filamentous (NIAID, 2004). Inside the virion are eight single-stranded RNA segments waiting to be copied by a host (NIAID, 2004).

Notes
LPAI can rapidly mutate into HPAI (Perdue et al. 1998) and its ability to cause fatal infections in humans (Horimoto and Kawaoka 2001; Guan et al. 2004) is of serious concern. If a human is simultaneously infected with human and AI viruses it is possible a new virus may emerge which could be transmitted from human to human. This has not occurred and the risks of this taking place are small, but the implications would be extremely serious (pandemic).

Lifecycle Stages
The virus replicates itself once inside a host cell. AI uses the genetic material of the host for energy and for the replication process. After viral components are made inside the host cell, the components are released (Sander, 2004).
Habitat Description
Waterbirds, especially Anatidae are natural reservoirs for AI which needs a host to reproduce (Horimoto and Kawaoka, 2001).

Reproduction
AI needs a host to reproduce. Once inside, the virus uses the hosts DNA to replicate itself (Horimoto and Kawaoka, 2001).

Nutrition
AI, like most viruses, has no metabolism. Therefore, the virus does not require any nutrition (Horimoto and Kawaoka, 2001).

General Impacts
The effects of AI are felt worldwide. The virus has had a significant impact on the economy, trade industry, chicken and animal health, and human health (APHIS, 2004). For instance, in 1983 and 1984 the United States government destroyed more than 17 million birds at a cost of 65 million dollars due to an outbreak of AI (APHIS, 2004). In 1997, 6 out of 18 people in Hong Kong infected with H5N1 (a subtype, see Avian Influenza Virus for more details on different types) died (CDC, 2004).

Management Info
Control measures include trade restrictions, and biocontrol security measures on farms and at live markets (APHIS, 2004), quarantine (Butcher, G. et al. 2004), surveillance and vaccines. Swift action following an outbreak of HPAI involves depopulation.

Pathway
The virus is spread from one continent to another by migratory birds that are natural hosts for the disease. The virus has the potential to spread through agriculture industry, such as the poultry industry and live poultry markets. The virus has the potential to be spread through the food trade.


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ALIEN RANGE
GLOBAL INVASIVE SPECIES DATABASE

FULL ACCOUNT FOR: Avian Influenza Virus

[1] AUSTRALIA
[1] CANADA
[1] HONG KONG
[1] KOREA, REPUBLIC OF
[1] MALAYSIA
[1] SOUTH AFRICA
[1] THAILAND
[1] VIET NAM

[1] CAMBODIA
[1] CHINA
[1] INDONESIA
[1] LAO PEOPLE’S DEMOCRATIC REPUBLIC
[1] NETHERLANDS
[1] TAIWAN

Red List assessed species 22: EN = 2; VU = 3; NT = 1; LC = 16;

Anas penelope LC
Ardea cinerea LC
Calidris alpina LC
Calidris ferruginea LC
Calidris temminckii LC
Gavia arctica LC
Gavia stellata LC
Grus monacha VU
Larus genei LC
Mimus melanotis EN
Numenius arquata NT
Progne modesta VU
Tadorna ferruginea LC

Anas querquedula LC
Aythya ferina LC
Aythya ferina LC
Calidris ferruginea LC
Fulica atra LC
Gavia stellata LC
Grus vipljo VU
Larus ichthyaeus LC
Necrosyrtes monachus EN
Porphyrio porphyrio LC
Sarkidiornis melanotus LC
Tringa ochropus LC

BIBLIOGRAPHY

18 references found for Avian Influenza Virus

Management information
Summary: The website provides information regarding the threat of the virus, clinical signs, introduction and spread of AI virus, and biosecurity measures.

Summary: The website provides useful information about avian influenza which includes the history, clinical signs, postmortem lesions, serotypes, transmission, treatment and prevention.

Summary: The website provides information on avian diseases and diagnosis, clinical signs, prevention, and treatment of such diseases.

Department of Primary Industries and Fisheries. Avian influenza.
Summary: The website provides useful information about avian influenza which includes differential diagnosis, distribution, and control measures.

Summary: The article reviews the classification, history, biological properties, pathogenesis, transmission, host range, and influenza pandemics and outbreaks.

Summary: The website provides information on controlling the virus and prevention measures.

Summary: A review of the movements of birds in Australasia, the occurrence of AI in wild birds and the implications for managing AI outbreaks in Oceania

UN Food and Agriculture Organization (FAO). Animal health special report avian influenza.
Summary: The report presents information on what is being done to control and prevent the spread of avian influenza in Southeast Asia. A veterinary network is already in the works, which goal is to provide better diagnosis of the disease and examine epidemiological data. Being able to Exchange information is critical for managing outbreaks.
General information

**Summary:** The website provides general information about viruses in a question and answer type format.


**Summary:** The article presents information on H7N7 as well as other strains of avian influenza viruses. The characteristics of the viruses and how the viruses are spread from poultry to humans is discussed and remains unclear.


**Summary:** The fact sheet provides basic information about the avian influenza including recent outbreaks in humans, symptoms, and an historical overview of the influenza virus.


**Summary:** The article presents information on H5N1 including natural hosts of the disease, impacts, threats to humans, and genetic analysis of the virus.


**Summary:** The website provides taxonomy information on different species and has links to other useful sources.