

EQUINE INFLUENZA

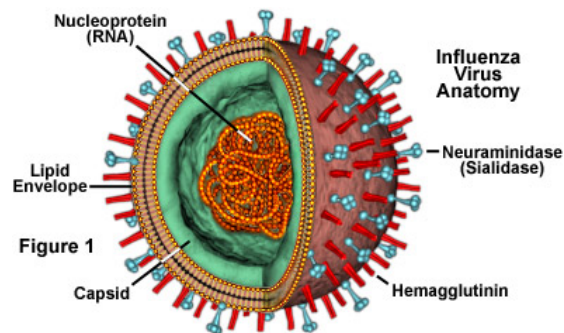
Influenza virus infection continues to be the most frequently diagnosed and economically important cause of viral respiratory disease of the horse. Outbreaks of horse respiratory diseases resembling influenza have been reported as early as the mid-1700's; however, the specific equine disease causing influenza virus was not isolated and characterized until 1956 in Prague Czechoslovakia. Since 1956, influenza outbreaks have been reported in horse populations in most countries of the world. All ages and all breeds of horses are susceptible to the equine influenza virus, but most outbreaks occur in the younger 2 and 3 year old horse populations. The young horses are not only most vulnerable because they have never been exposed to the influenza virus, but through horse shows, sales and race training, horses from many different farms, states, and countries are mixed together. These intermixed horses are also under much greater stress from shipping, training, changes in diets, and their new environment.

Medical scientists today recognize five different types (genera) within the family of influenza viruses. The specific virus family to which Influenza viruses belong is called *Orthomyxoviridae*; and the five genera are Influenza A, B, C, Thogoto and Isa viruses. Horses get Influenza A virus. Type A infects many different species, including human beings, horses, swine and avian species. Ordinarily, birds and different animals have their own flu viruses. That is to say, human Influenza A does not spread to horses, horse flu Influenza A does not spread to cats, and so on. But, on rare, unpredictable occasions, a flu virus of one host animal or bird crosses into a different animal/bird host. For example, in the year 2000, an Equine Influenza A virus spread to some dogs; probably first introduced through a dog eating infected raw horse products as dog food. This new dog adapted, mutated influenza virus then had the capacity to pass from dog to dog making them sick.

Although we now have well-established, long-lived host-specific lineages of influenza virus families occurring in domestic poultry, pigs, horses and humans, the grandfather (primordial) virus common to all of the above hosts, however, was probably living within Far East water fowl. The biological significance of wild birds (more specifically wild water birds) being the natural host for these influenza viruses is very critical to viral scientists monitoring natural virus shifts. Scientists have initiated extensive surveillance of domestic poultry and migratory wild birds looking for the deadly H5N1 Influenza A virus. The great concern is not only to protect our domestic poultry as a very important human food source, but to also avert a possible human influenza pandemic.

Influenza virus as seen under a very powerful electron microscope is round, and its surface is covered with approximately 500 protruding spikes that radiate outward. These spikes are proteins, and they function in part to give the virus its ability to infect a host cell. In the horse, the important host cells [the cells the Influenza A virus attacks] are principally the cells lining the nose, throat, trachea (wind pipe) and to a lesser extent, the lungs.

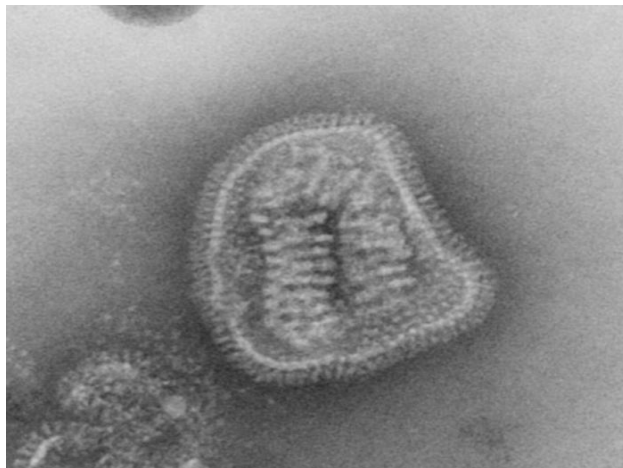
One major category of spikes on the virus surface is called the hemagglutinin (H) antigen spike. Another major category of spikes on the viral surface is called the Neuraminidase (N) antigen spike. Scientists use the antigenic properties of the influenza virus Hemagglutinin (H) antigen spikes and the Neuraminidase (N) antigen spikes to classify Influenza A viruses. Horses are most susceptible to H3N8 Equine Influenza A virus. The original Prague horse isolates was an H7N7 type. All recent and current outbreaks in horses have been attributed to H3N8 (also called Type 2 or A/equine/2/Miami/1/63). The great concern in humans is the avian variant H5N1. For information about the federal government's overall efforts related to Avian Influenza H5N1 and human pandemic concerns and preparations, go to www.avianflu.gov.



Artist depiction of Influenza virus particle.

80% of the spikes are Hemagglutinin and the remaining are Neuraminidase

Picture from: <http://micro.magnet.fsu.edu/cells/viruses/influenzavirus.html> The Florida State University.



Negative-stained electron micrograph of an influenza virus particle.

Picture from: <http://phil.cdc.gov/Phil/details.asp> Public Health Image Library # 8430

As previously stated, Equine Influenza A is a frequently (if not the most frequent) occurring contagious disease of horses, mules and donkeys throughout the world. New Zealand and Iceland, through strict biosecurity measures, have been free from Influenza A type disease. Influenza A most commonly affects 2 and 3 year old horses and is probably the most common respiratory illness in show horses, sale horses and race horses. Some tracks, sale barns and show grounds experience influenza outbreaks 2 to 3 times within a show, sale, or racing season. This is in part due to poor ventilation systems, poor vaccination protocols, a very short natural immunity length and an even shorter vaccination immunity length [4-7 month max.], stress of transport and training, and rapid transmission of the virus from horse to horse. Clinical signs begin in about 1-3 days post infection. Infection entry is through the upper respiratory tract (nose & throat) and the lungs (to a lesser extent). The influenza virus multiplies and destroys cells in the nose and throat causing fever, depression, horses going off feed, and coughing. A clear nasal discharge may be noted and some horses will experience swelling of the legs. The course of the infection usually lasts 2 to 10 days in uncomplicated cases. Unique features of influenza disease in horses that will lead your veterinarian to make a presumptive diagnosis of an influenza virus infection are:

- High fever, sometimes exceeding 106°F.
- Dry, hacking cough.
- Rapid onset and rapid spread of a respiratory disease; exposed horses can get sick in 24 hours, 1-3 days is typical.

Exercise will make the signs more pronounced and is likely the initiating stress for many secondary bacterial infections. Horses generally remain infectious for just 3 to 6 days after the last signs of illness, but two weeks is suggested as an isolation time. Most horses do not require treatment unless complications like secondary bacterial infections arise. All horses require rest and stopping of training, as the stress of exercise prevents and prolongs healing. Lost training time/lost racing starts/lost showing opportunities are the most expensive aspect of influenza infection. The severity of the disease depends considerably on immune status, level of stress and age; with some severely affected horses requiring 50-100 days to fully recover. We do not recognize a carrier state (like Strangles or EHV), but the mixing of horses not fully healed or recovered with well horses probably maintains the virus. The virus can also live on clothing, vehicles, feed, grooming equipment, trailers, tack and buckets for 2 to 3 days.

Vaccination, biosecurity measures, reducing stress, and providing excellent housing ventilation are important practices for the control of Equine Influenza A. Killed vaccines are most common, but modified live and recombinant vaccines (Europe only) are commercially available. Many vaccination programs have been used, but most veterinarians use initial vaccines with several boosters. It is not uncommon to follow up the regimen of three initial doses with subsequent booster vaccinations at 6-month intervals in high-risk populations. Consultation with your veterinarian will be necessary in setting up an effective Influenza A vaccination program for your horse or stable. Husbandry procedures, such as isolation and the vaccination of new horses, must be considered.

In conclusion, proper nutrition, regular exercise, horse-to-horse companionship, and reducing stress to your horses are necessary for maximum health and performance. Horses not rested adequately before returning to training and long trailer rides are two of the most stressful events that bring on complications following infection with Influenza A virus. Control of Equine Influenza virus can be significantly aided through wise management practices. Adequate vaccination, isolation of all new horses for two full weeks prior to mixing, and proper barn ventilation are three of the most important influenza husbandry preventative procedures. Your veterinarian's timely and accurate diagnosis, therapeutic and recuperative council, and preventative recommendations are essential in the control and restoration of health with influenza disease in the horse.