AVIAN AND SWINE INFLUENZA

Avian and swine influenza. The flu is not a disease that only affects people. The same virus is capable of infecting other animals, especially pigs and birds, the topic of this video. But it also affects other species, such as dogs or horses.

To understand the importance of this virus we need to know its characteristics in detail. It is a member of the family Orthomyxoviridae, whose main characteristic is that it has a segmented RNA genome, formed by eight fragments that encode 12-14 proteins, both structural and enzymatic. Among them there are two glycoproteins inserted into the envelope of the virus: the haemagglutinin (HA), and the neuraminidase (NA). The haemagglutinin is responsible for the binding of the virus to the host cell receptor, and the neuraminidase of its release.

Influenza viruses belong to three genera: A, B and C. Only type A is able to infect birds, pigs and also humans, and it presents a great diversity of HA and NA antigens, which are used to classify them. Up-to-date 18 different subtypes of HA and 11 of NA have been described, almost all of them found in birds and just a few of them in humans or swine.

Two different processes have been described that introduce variability in these surface glycoproteins. On the one hand, there may be point mutations, since the enzyme RNA polymerase has no error-editing capability. On the other hand, there may be processes of genomic rearrangement, when two different viruses infect the same host cell, producing a combination or reassortment of genomic fragments of different viruses in the viral progeny. This is the way by which new subtypes of haemagglutinins appear, against which the immune response of the host is not ready, allowing thus a rapid multiplication of the virus.

Influenza viruses are transmitted through faeces and respiratory secretions of the birds, and are easily transmissible. The main reservoir in nature are wild birds, especially the waterfowl, such as ducks and gulls, which usually are carriers of the virus, but that don't generally sick. The outbreaks in poultry, which are much more susceptible to the disease, are caused by direct or indirect contact with wild birds.

The strains of avian influenzavirus are classified into two types: high and low pathogenicity, according to the clinical severity that they produce in chickens and turkeys. Those of low pathogenicity cause asymptomatic or mild disease, while high pathogenicity strains are very virulent. The latter cause digestive, respiratory, neurological and systemic signs, with mortality rates up to 100% in susceptible birds.

Highly pathogenic strains present only the haemagglutinins H5 or H7, and several types have caused outbreaks. But even many of these strains are of low pathogenicity.

Avian Influenza is in the list of notifiable diseases of the OIE. Any high pathogenicity influenza virus detected in wild or domestic birds must be reported immediately as well as the low pathogenicity strains with H5 and H7 subtypes detected in poultry, because of the risk that they become virulent by mutation.

Swine flu is a highly contagious disease, which is transmitted through nasal secretions, through direct contact among animals or by aerosols. The majority of the European strains cause few clinical signs (primarily respiratory) and although the morbidity is high in high-density pig farms, mortality is usually low and animals recover in the short term. The economic impact of the disease relates primarily with the delay in weight gain. Unlike the disease in birds, it is not in the list of notifiable diseases of the OIE.

Viruses which cause avian influenza, mainly H7N9, H5N1, H9N2, can infect humans, but it is not easy. Swine H1N1 and H3N2 flu viruses can also infect humans causing mild illness to severe

pneumonia. The importance of the pig is that it can be infected by both avian and human viruses and they can host the phenomenon of genomic reassortment that I have explained before. Thus, avian viruses may become infectious to humans and cause pandemics. But it should not be confused with the seasonal flu.

One of the main biosafety measures to prevent outbreaks of the disease in poultry is to prevent direct or indirect contact with wild birds, preferably keeping poultry confined or outside areas frequented by wild birds. And in general the measures for the prevention of outbreaks in poultry or pig farms focus on appropriate biosecurity measures, such as the strict control when introducing animals, the proper maintenance of the sanitary conditions of farms, the use of recommended immunizations and the declaration to the health services of any case of animal disease.

In addition, the surveillance and the control of strains of the virus circulating in a region are essential to avoid the emergence of epidemics.

Now you know much more about influenza and its importance in the animal Kingdom!