Open Access Journal of Toxicology
ISSN 2474-7599

Juniper Publishers
key to the Researchers

Mini Review
Volume 2 Issue 4 - March 2018
DOI: 10.19080/OAJT.2018.02.555593

Open Acc J of Toxicol


# Epidemic Flu Viruses & the influenza a virus subtypes H1N1, H1N2 and H3N2, HDFx

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**Submission:** October 31, 2017; **Published:** March 07, 2018

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**Abstract**

For the emergency created by the epidemic of influence of the pigs in Mexico it was correct not to create alarmisms being victims of a bad information. The possibility that the virus arrives in other parts of the world is real as for all the types of influence virus. In order that a strain has a wide distribution, its antigenic characteristics must ensure that it escapes the neutralization of antibodies of the host and of the surrounding population. The discovery of a new, biologic Host-Defense protein, "HDFx", may provide a unique way to ameliorate and prevent the "cytokine storms" and haemorrhages seen in severe influenza infections. The influenza A virus subtypes H1N1, H1N2 and H3N2 are prevalent in pig populations worldwide. All scientific data point towards swine as the key host species for new human influenza pandemics, which have been suggested to evolve in pigs from viral genes of avian, human and porcine origin. Therefore, it is of major importance torecord the evolution of swine influenza viruses in pigs, and in particular monitor hallmarks of adaptation to humans. The scope of this paper was to increase the understanding of the genetics of Swine Influenza Virus (SIV), and to investigate the importance of different viral gene markers in association with differences in pathogenicity of two viruses of H1N2 subtype in pigs. The results from this study demonstrate, for the first time, natural reassortment in H1N2 viruses in the pig populations of Sweden as well as in india.

So the outbreaks will happen with those strains that have dominant antigens that fit the deficiency, or better, the abscences of antibody in the population. It seems, in conclusion that the flu virus showes an ability and an aptitude for survival built on the possibility of émergence of new models that allow the virus being confused easily through populations still partly immune to previous antigenic forms. According to this view, the changes in the influenza A can be designed in single meaning, in the context of a principle and of an evelutionary progress, from Burnet said immunological drift or steering immunology. The antiviral drugs (inhibitors of the neuraminidasis, receptor of the virus surface) should be assumed within 48 hours by the appearance of the influence symptoms and for the subjects that have had a close contact with people infected by the flu virus. The vaccination against the influence is the most effective method to prevent the illness. From the moment that we find the isolation of a new flu virus, we must wait for the preparation of a new specific vaccine that will be ready for the next influence season in Autumn.

**Keywords:** Virus; Influenza; Flu; Avian; Swine

## Mini Review

The history of flu viruses teaches that the influence has origin from animal's birds, generically aquatic, and then transferred to man through the leap into pigs. The promiscuity of the herds, as it is in use in Asia, determines this transition and then the spread. The Spanish influence (1918, H1N1), the one from Asia (1957, H2N2), that of Hong Kong (1968, H3N2) and soon have had this origin [1].

The strains common in some years may have also relations with those of other years. The person's mostly old people have antibodies directed towards the antigens more important of the strains with which they were in contact. With the progress of the age it is a broader spectrum immunity that is reflected in antibodies polyvalent made through the contact with many antigens primary and secondary present in strains that they meet during the following years. But each contact following with a flu virus of type A involves not only specific antibodies, but also an increase in those directed towards the strain responsible for the first flu infection of the subject (phenomenon of Davenport or doctrine of original sin). In this way, the immunization to a particular strain, spread in a certain period, involves progressively increasing difficulty in its further distribution and creates the selective advantage, for some variant of the virus, to multiply and spread. The new strains will be in conditions of an increase in visitors, regardless of whether they have or not an immunologic experience with the previous strains. As a result of that, shortly after the appearance of a new type, the old forms will disappear and the new family will become dominant for a period which in general covers 10-20 years, in which there is, for the emergence of minor antigenic variation, the subdivision in various subtypes. The outcrops of a new epidemic strain may, therefore, be regarded as a process of development interesting

the characteristics of the strain and the susceptibility of the population. In order that a strain has a wide distribution, its antigenic characteristics must ensure that it escapes the neutralization of antibodies of the host and of the surrounding population. So the outbreaks will happen with those strains that have dominant antigens that fit the deficiency, or better, the absences of antibody in the population. It seems, in conclusion, that the flu virus shows an ability and an aptitude for survival built on the possibility of emergence of new models that allow the virus being confused easily through populations still partly immune to previous antigenic forms. According to this view, the changes in the influenza A can be designed in single meaning, in the context of a principle and of an evolutionary progress, from Burnet said immunological drift or steering immunology. Very important to remember that it was demonstrated the presence of antibodies to the more recent strains of 1957 Asian flu (A2) in older segment of that population: in Asian influence there were obviously strains with dominant characters, other than those that had characterized the previous years, more or less, but similar to those of the strains widespread much before (1889-90 pandemic).

For the emergency created by epidemic of avian flu in Asia it was right not to create panic as victims of bad information [2]. The possibility that the avian virus entries in other parts of the world it was like the rest for all types of flu viruses. It is clear that the dead animal is harmless, and therefore there are other veterinary and agricultural interests there is a potential risk of genetic recombination with human flu viruses that might hesitate to a viral variant capable of a transmission from human to human.

In the course of epidemic of avian influenza that struck in 2005 10 Asian countries (China, Pakistan, Thailand, Cambodia, Indonesia, North Korea, South Korea, Taiwan, Laos, Vietnam) with 80 million chickens died or sacrificed and 42 fatal human cases it was identified H5N1 as an etiologic agent, the same as the one that in 1997 had caused an epidemic outbreak in Hong Kong with 18 human subjects infected and 6 dead and with the sacrifice of 1.5 million chickens [3].

## Discovery and Unique Characteristics of HDFx

Approximately 85 years ago, the first flu vaccine was made by Jonas Salk andThomas Francis after it was discovered that viruses (influenza virus types A, B, and C rarely) cause flu [see 4, for review]. It was first utilized to protect the U.S. military forces against the flu in World War II [4]. The most dangerous (virulent) influenza, the 1918 H1N1 Spanish flu, pandemic infected about 5% of the world's population and killed approximately 2% of the world's population. In an attempt to prevent a pandemic, and an increased risk of Guillain-Barre syndrome (i.e., approximately one to nine cases per million doses), 25% of the people, in 1979, in the U.S.A. were given the vaccine [5]. Since that time, influenza vaccines have been vastly improved in design. Highly pathogenic avian influenza viruses of the H5 subtype are a current, serious problem for poultry and human health. Despite the advent of drugs like oseltamivir, and other antiflu therapies, severe influenzastill kills tens of thousands in the U.S. A. every year and millions worldwide

## Details of the studies included in the review

Numerous pathophysiological responses, in the body, take place after infection by flu viruses [6]. The classical clinical signs are high fevers, coughs, headaches, muscle and joint pain, and severe fatigue. However, when the lungs become severely inflamed, by an overproduction of a host of mediators (primarily by respiratory epithelial cells and alveolar macrophages), i.e., cytokines or chemokines (e.g. interferons, tumor necrosis factor, interleukins, macrophage factors, etc), this gives rise to what is termed a "cytokine storm" [7]. These "cytokine storms" often proceed, unabated, to cause severe tissue damage and hemorrhages, followed by death which is preceded by multiple organ failure triggered by a spillover of the cytokines and chemokines into the generalcirculation, particularly in the lungs, kidneys, and cardiovascular system [4-8]. These inflammatory responses are triggered as the infected cells die via apoptosis and necrosis. It must be noted, here, that surgically-operated hospitalized patients are often at gréât risk for developing influenza infections which result in severe "cytokine storms", particularly among the elderly population. These deadly scenarios have intensified immunological research into devising new thérapies that could be utilized to either prevent or stem the course of events leading to massive release of diverse cytokines [6,7,9]. Pharma laboratories, for more than 30 years, have been working on a new approach to develop host-defense factors that stimulate various arms of the innate and adaptive immune systems. To this end, we have discovered a new host-defense factor we have termed "HDFx", that is a conserved protein found, so far, in rats, mice, guinea-pigs, rabbits, dogs and subhuman primates [10-12].

The Avian Influenza recent outbreaks with involvement of viral strains as H9N2 in 1999, infected two children and other individuals, and in 2003, infected a boy in Hong Kong, while H5N1 hit three subjects of a family killing two in 2003. At the same time in the Netherlands an epidemic from avian influenza viruses H7N7 hit 83 people and led to death a veterinarian.

In 2005 in the USA outbreaks of avian influenza have been identified in Texas and in Delaware (virus H7N2), and in the last State together with territories of Maryland and of Virginia there are working 14,000 people and 1,900 families that produce the 8% of the meat of American poultry, with a budget of one and a half billion dollars. In 2003 the American export in Europe has reached the share of eight million and eight hundred thousand eggs and 452 thousand chicks, respectively for 20 million and 3 million of Euro.

For the emergency created by the epidemic of "influence of the pigs" in Mexico it is correct not to create alarmism being


How to cite this article: Krishnasarma Pathy. Epidemic Flu Viruses & the influenza a virus subtypes H1N1, H1N2 and H3N2, HDFx. Open Acc J of Toxicol. 2018;2(4): 555593. DOI: 10.19080/OAJT.2018.02.555593

victims of bad information [13]. The possibility that the virus arrives in other parts of the world is real as for all the types of influence virus [10]. For the SARS a direct contact was necessary, in practical terms the so-called droplets of Pflugge, for this swine influence it is different, in fact, it also spreads through the air to distance. And a potential risk exists of a panic syndrome that it often happens through bad information or a scarce knowledge of the phenomenon. Then no alarmism because the number of the victims is decidedly inferior to other pandemics [14].

Few years ago there were announced in Naples of an outbreak of disease of Newcastle in a group of parrots coming from Pakistan. The disease of Newcastle represents a useful paradigm of the influence infection in man. Fortunately there is not a reported human pathology to this virus, for which the discovery of the outbreak of disease of Newcastle in Naples did not give worries of any sort for the health of the Neapolitans. Finally the risks of the disease of Newcastle are more tied to the breedings of home volatile that, not immune to this virus, can be exposed to the epidemic [4].

The vaccination against the influence is the most effective method to prevent the illness. From the moment that we find the isolation of a new flu virus, we must wait for the preparation of a new specific vaccine that will be ready for the next influence season in Autumn [15].

The antiviral drugs (inhibitors of the neuraminidasis, receptor of the virus surface) should be assumed within 48 hours by the appearance of the influence symptoms and the subjects that have had a close contact with people infected by the flu virus [16].

## Conclusion

The history of flu viruses teaches that influence originates from birds, usually aquatic, then it is transferred to man through the leap into pigs. The promiscuity of the herds, facilitates this transition and then the spread. Three pandemics caused by influenza A viruses, which occurred in the 20th century, have all had this origin: the 'Spanish flu' (1918, H1N1), the 'Asian flu' (1957, H2N2) and the 'Hong Kong flu' (1968, H3N2). The 2009 H1N1 influenza virus acted during the winter in Australia and New Zealand yielding a pattern effect for the treatment of patients during the winter in the Northern Hemisphere. The performance of rapid diagnostic test for the detection of novel influenza A (H1N1) virus was evaluated by the Centers for Disease Control and Prevention.

The findings of severe respiratory disease concurrent with the circulation of H1N1 influenza was proved by the aforementioned test. Even the potential impact of pandemic influenza during the Hajj pilgrimage was taken in account to reduce the substantial effect on the crowd to spread the infection.

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**How to cite this article:** Krishnasarma Pathy. Epidemic Flu Viruses & the influenza a virus subtypes H1N1, H1N2 and H3N2, HDFx. Open Acc J of Toxicol. 2018;2(4): 555593. DOI: 10.19080/OAJT.2018.02.555593

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