JOURNAL OF PURE AND APPLIED MICROBIOLOGY, October 2009. Vol. **3**(2), p. 751-754

Swine Flu, The New Killer-How we Save the Humanity

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(Received: 26 April 2009; accepted: 12 May 2009)

Key words: Swine Influenza, H1N1 virus, Humanity.

This paper outlines the new developments on the latest killer virus, the Swine Flu.

Almost every five years, some or the other new virus is throwing newer challenge to the efficiency of Microbiologists and medical fraternity, to analyze and medicate the adverse effects of such viruses . Despite enormous time and energy spent on research, man is still unable to completely understand viruses and their role in human survival on this planet, though some progress is visible.

Becasuse of its complex life cycle and " finer adjustment with the host", Swine flu proliferation is difficult to understand and in fact perplexing to virologists and Biotechnologists. Latest news on swine flu (Swine influenza A H1N1) virus outbreak in USA and other zones has baffled the scientific community, with its incomprehensible entry and speed of proliferation into the human biology. From the practical point of view, the susceptibility to infection of the guinea pig proved to be the most useful step forward. Today, all laboratories use this animal for preserving the virus. An attempt is made here to unfold the life cycle of this virus and its transmission. Further, treatment available and future action require on the subject are presented in common man`s language since every one needs to understand this.

Meaning of Swine flu

Any animal of the hog kind, especially one of the domestical species. Swine secrete a large amount of subcutaneous fat, which, when extracted, is known as lard. The male is specifically called boar, the female, sow, and the young, pig. regarded as the most unclean and the most abhorred of all animals.

The disease caused by the influenza virus, it is commonly called "Swine flu".

Life cycle of swine flu

Flu viruses contain 8 strands of RNA, which code for 10 proteins. If two flu viruses infect a cell at the same time, new viruses budding from that cell can contain a mixture of RNA strands from the two original viruses - a phenomenon

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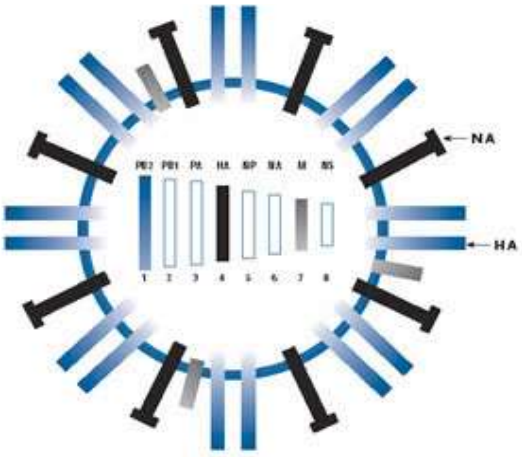
called reassortment. Recombination - "cutting and pasting" - can also produce mixing within RNA strands.

It is unusual to be infected by two flu viruses at the same time, and even rarer for one of those viruses to come from another species. But it does happen, especially in pigs, which are susceptible to both human and bird flu viruses. Repeated reassortments can produce mixtures like that found in the swine flu virus now spreading worldwide. Reassortment is the mixing of the genetic material of two similar viruses that are infecting the same cell. In particular, reassortment occurs among influenza viruses, whose genomes consist of eight distinct segments of RNA. These segments act like mini-chromosomes, and each time a flu virus is assembled, it requires one copy of each segment.

If a single host (a human, a chicken, or other animal) is infected by two different strains of the influenza virus, then it is possible that new assembled viral particles will be created from segments whose origin is mixed, some coming from one strain and some coming from another. The new reassortant strain will share properties of both of its parental lineages.

Reassortment is responsible for some of the major genetic shifts in the history of the influenza virus. The 1957 and 1968 pandemic flu strains were caused by reassortment between an avian virus and a human virus, whereas the H1N1 virus responsible for the 2009 swine flu outbreak had an unusual mix of swine, avian and human influenza genetic sequences



Model of the influenza virus showing the segmented nature of the viral genome and the two major surface glycoproteins, hemagglutinin(HA) and neuraminidase(NA).

The function of the HA protein is to bind virus particles to susceptible cells in the host animal. The function of the NA protein is mainly at the end of the life cycle of the virus at which time it facilitates the release of the virus particles from the infected cell surfaces during the budding processes. The HA and NA proteins are the antigens against which neutralizing antibodies are directed by the host animal's immune defense system.

The hallmark of the Influenza A virus is the ability of its HA and NA proteins to undergo change—either by "drift" or "shift", allowing the influenza virus to have tremendous variability and survivability. Virologists have identified fifteen (15) distinct HA and nine (9) distinct NA subtypes of the influenza A virus to date. That's a lot of potential variation. The epidemiology of influenza is essentially a story of the dog-fight between host defense and the wily influenza virus that attempts to dodge the host defense through drift and shift. This fact has also been the most difficult problem in making of a vaccine against influenza.

Drift (also called antigenic drift) means that point mutations in the HA and/or NA genes accumulate during viral replication. Antibody produced in response to an influenza virus infection is very specific for the influenza virus type that stimulated antibody development in the first place. If sufficient drift occurs, previously developed host antibody will be ineffective against the new "drifted" virus type.

Shift (also called antigenic shift) occurs when an influenza A virus containing an immunologically new HA or NA (or both) is introduced into an immunologically naïve population of, say, pigs.

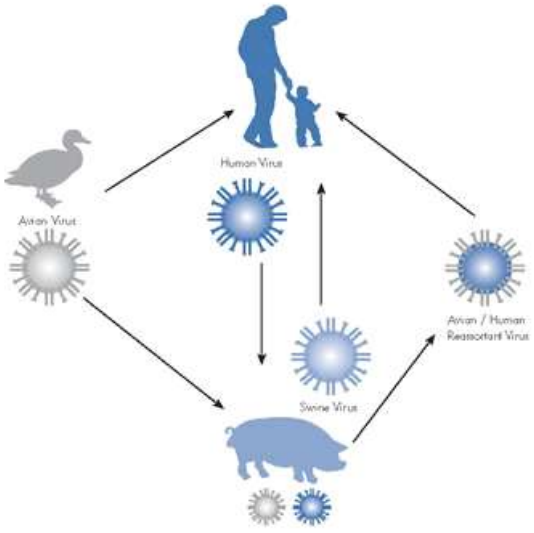
Transmission of Swine Virus

Shift occurs via three routes

1. A virus bearing a new HA/NA can arise through genetic reassortment between species, as when, for example, a pig farmer sick with human influenza becomes co-infected with the swine influenza while he tends an infected herd. The farmer is

"double infected." A reassortment of viral genetic material from the human and the pig within the human host cell can occur, giving rise to a novel HA/NA strain.

2. A wholly species-specific influenza virus from one species (e.g., birds or swine) can infect another species (e.g., humans) directly without undergoing genetic reassortment as described in #1 above. This is exactly what scientists think is happening during the current avian flu epidemic in Asia in which humans are becoming ill with wholly avian flu virus.
3. An influenza virus can be passed from one species (e.g., birds) through an intermediate animal host (e.g., pigs) to a third species (e.g., humans). Pigs have been proposed to the "mixing vessel" for the generation of reassortment influenza A viruses between humans and birds because—and this is very important—pigs can easily support replication of both avian and human influenza A viruses within their cells.



possible mechanisms for the introduction of novel influenza a virus into the human popyulation, including dried transmisssion of entire bird or swine viruses or transmission of reassortment viruses.

Transmission of the influenza virus through species:

Influenza spreads between humans through coughing or sneezing and people touching something with the virus on it and then touching their own nose or mouth. Swine flu cannot be spread by pork products, since the virus is not transmitted through food. The swine flu in humans is most contagious during the first five days of the illness although some people, most commonly children, can remain contagious for up to ten days. Diagnosis can be made by sending a specimen, collected during the first five days for analysis.

Recommendations to prevent spread of the virus among humans include using standard infection control against influenza. This includes frequent washing of hands with soap and water or with alcohol-based hand sanitizers, especially after being out in public. Although the current trivalent influenza vaccine is unlikely to provide protection against the new 2009 H1N1 strain, vaccines against the new strain are being developed and could be ready as early as June 2009.

Experts agree that hand-washing can help prevent viral infections, including ordinary influenza and the swine flu virus. Influenza can spread in coughs or sneezes, but an increasing body of evidence shows small droplets containing the virus can linger on tabletops, telephones and other surfaces and be transferred via the fingers to the mouth, nose or eyes. Alcohol-based gel or foam hand sanitizers work well to destroy viruses and bacteria. Anyone with flu-like symptoms such as a sudden fever, cough or muscle aches should stay away from work or public transportation and should contact a doctor to be tested.

Social distancing is another tactic. It means staying away from other people who might be infected and can include avoiding large gatherings, spreading out a little at work, or perhaps staying home and lying low if an infection is spreading in a community. Public health and other responsible authorities have action plans which social distancing actions to request or require depending on the severity of the outbreak.

The swine flu is a strain of virus that pigs contract and transmit. The swine flu of interest in 2009 is the H_1N_1 strain, which can be

passed from pigs to human beings. It was first identified in pigs in 1930. Now it is causing illness in humans, with the potential of reaching pandemic levels.

Symptoms of Swine flu

These are broadly the same as those of ordinary flu, but may be more severe and cause more serious complications. It starts with Sudden fever or a sudden cough. Other symptoms may include – headache,tiredness, chills, aching muscles, limb or joint pain, diarrhoea or stomach upset, sore throat, running npose, sneezing, loss of apetite. If the flu becomes pandemic, potentially, everyone is at risk because few people, if any at all, will have immunity (resistance) to it.

Treatment for SWINE flu

Antivirals

One of the ways to lessen the symptoms of pandemic flu is to treat infected people with antiviral medicines, which have been used against the current swine flu. The UK has stocks of these medicines and there is enough to treat up to half the population should they become ill during a pandemic, which is a reasonable worst-case scenario. However, the drugs must be administered at an early stage to be effective.

Testing has shown that the swine flu can be treated with the antiviral medicines oseltamavir (brand name Tamiflu) and zanamivir (Relenza).

Antivirals will help to

1. reduce the length of time you are ill by around one day
2. relieve some of the symptoms
3. reduce the potential for serious complications such as pneumonia

Antivirals will not cure, but they lessen the symptoms and help to recover.

1. The government is currently giving antivirals to the close contacts of the confirmed cases. The government will keep this under review as the situation develops.

The definition of close contacts is based on Health Protection Agency guidance, which states that individuals exposed to a probable or confirmed case within a distance of one metre or less and for longer than one hour should be offered antivirals as a precautionary measure.

Is Swine flu – a Bioweapon?

Experts agree that the swine flu virus does not appear to be natural. Scientists agree that it is peculiar for a flu virus not to come from the east as well as a virus to come with such force out of season. Stephen Quayle spoke about the swine flu on Coast to Coast AM on Monday April 27. Stephen in his book *Breathe No Evil,* brought up the possibility that the recent deaths of microbiologists in the past years could be connected with the swine flu outbreak. From 1994 to 2009 eighty one microbiologists have died of mostly mysterious and suspicious deaths. Stephen Quayle explained how many of these scientists that could have helped stop this pandemic were mysteriously killed.

Only time will tell if the swine flu is a genetically altered bioweapon or if it is a random act of nature. Either way the point is that people are sick and people need to stick together and think and react for themselves in times of need.

However, Scientists are striving hard enough to get the vaccine for this dreadful killer. It was the first time the WHO had declared a Phase 5 outbreak, the second-highest on its threat scale, indicating a pandemic could be imminent.

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