

Swine Flu and Human Influenza – Questions and Answers

It's been three years since the bird flu scare, six years since the outbreak of SARS and now the alerts about a potential pandemic of swine flu tops the news sections in the US, Mexico and other countries, including many countries in Europe which have not yet been affected by a swine flu.

Many of us remember that the alarming news about bird flu and SARS came suddenly and quickly faded away, incidentally shortly after our research data showing that micronutrients can control key biochemical processes involved in the spread of these infectious agents were published in the major media outlets (see our public information in the New York Times, March 23, 2006 at http://www4.dr-rath-foundation.org/open_letters/open_letter_overview.htm). In the last years we have continued our research on various aspects of influenza virus, including cooperative studies conducted with virologists and researchers in other countries. Full copies of our publications on these topics are available on our research website (www.drrathresearch.org) and they can provide detailed information on how selected micronutrients acting in a biological synergy can suppress multiplication of viruses and their spread.

Unfortunately, in currently experienced outbreaks of swine flu infections, both public information and various experts' advice are largely limited to the use of pharmaceutical drugs and vaccines as the primary strategy for prevention and therapy. There is a precedent to this. In 1976, a public warning of an impending pandemic was raised upon detection of infection by the Swine flu virus among military personnel working at Fort Dix in New Jersey. Government and health officials responded by coming up with a vaccine for voluntary inoculation of the public that turned out to have severe side-effects (a paralyzing nerve disease called Guillain-Barré syndrome). The vaccine campaign was subsequently called off and the projected pandemic failed to materialize.

While drugs and vaccine are emphasized, at the same time the clinical benefits of dietary supplementation and optimum nourishment as the basis of immunity and enhanced resistance to infectious agents are largely ignored. However, it has been long recognized that well nourished people can effectively fight various infections without any pharmacological intervention. Today we know even more on this subject.

Below are two sections containing answers to frequently asked questions on Influenza and Swine Flu.

SECTION A: The most common questions

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SECTION A

- **What is swine influenza?**

Swine flu is a respiratory disease that has regularly affected and appeared in pigs. The classical swine flu virus Type A H1N1 appeared in 1918 simultaneously in pigs and humans. This virus was first isolated in pigs in 1930 and in humans in 1933. At that time antigenic analysis did not detect any differences between them.

- **Is the flu a dangerous disease?**

We all are familiar with influenza (also called flu or gripe) and we have experienced it many times in our lives. Flu is a respiratory infection, connected with a fever, coughing, and muscle aches, which often lasts a few days. It affects about 20% of the world's population. While the disease itself is usually harmless, it can carry a risk of viral or bacterial pneumonia, which can prove fatal, especially for the very young, elderly, or those in poor health. Centers for Disease Control and Prevention based in Atlanta, Georgia estimates that during the 1990s, about 36,000 people died each year of flu-related causes in the United States. For comparison, the bird flu outbreak between 2007 and 2009 claimed about 100 deaths in total. Current swine flu deaths in Mexico exceeded 100 and the first swine flu related death (a 23-month old infant) in the US was reported on April 29.

- **How do flu viruses spread?**

The human flu virus has airborne stability and spreads through coughing, sneezing and touching the mouth or nose with contaminated hands. Therefore it is important to wash hands frequently because of a possibility of having earlier touched virus-infected objects.

Swine flu viruses spread through close animal contacts and also from contaminated objects. They can be transmitted from pigs to people and from people to pigs. The recent swine flu virus can spread by human-to-human contact. It is suspected that the current swine flu strain could have arisen from factory farming, a practice prevalent in populated countries that breed and export livestock.

People can not catch swine flu from eating meat from contaminated pigs. Cooking meat to an internal temperature of 160° F kills the bacteria and viruses, including swine flu virus

- **What medications are used to treat swine flu in people?**

Currently there are two classes of drugs approved for the treatment and prevention of flu: the adamantanes (Amantadine and its derivative Rimantadine) and the newer neuraminidase (NA) inhibitors such as Oseltamivir and Zanamivir. Adamantanes interfere with viral processing inside a cell and are associated with severe toxic side effects and development of drug resistance. The most recent swine flu viruses isolated from humans are resistant to Adamantine and Rimantadine.

Neuraminidase inhibitors are aimed at blocking the enzymatic function of neuraminidase thereby preventing release of the viruses from infected host cells. Neuraminidase inhibitors must be administered very early since the replication of influenza virus in the respiratory track reaches its peak after 24-72 hours since infection. However, the benefits of their use are not so evident. For instance Tamiflu (oseltamivir) may reduce illness by only 1-2 days, but at the same time it poses a risk of developing side effects such as nausea, vomiting, and abdominal pain in about 5% of patients. Also, Tamiflu does not prevent the flu - it can only slightly reduce its length or severity of symptoms. However, recent reports of its use in Japan, where Tamiflu prescriptions are ten times higher than in the US, reported bizarre psychiatric problems in children, even leading to death. More recently, the US FDA has recommended a new warning about possible dangerous psychiatric side effects of Tamiflu and Relenza. During the last winter flu season of 2007-2008, about 11% of flu cases were reported to be resistant to Tamiflu, with substantially higher incidence of resistance reported this fall for the most common circulating viral strain causing the flu.

Unfortunately, because of their synthetic nature it is difficult to find a drug which interferes with the biological processes of the virus and which does not also hurt the cell. This is why drugs always carry a risk of side effects, especially in immune challenged patients, particularly the very young, and the elderly suffering from other diseases and taking multiple medications at once.

Antibiotics, do not affect the flu or viral infections. They are often prescribed against secondary bacterial infections. Unnecessary use of antibiotics leads to the development of bacterial resistance, rendering them ineffective against many types of infections.

Vaccines, which trigger the body's production of antibodies without actually causing the disease, are usually more productive, however, due to frequent genetic changes in the flu virus they are often ineffective for this problem.

- **Are there natural ways to fight influenza?**

The Cellular Medicine approach in cases of viral infections and other health problems has been based on applying natural components known to the body in order to enhance specific biological functions critical in controlling a disease.

Since some viruses can spread in the body using similar mechanisms such as cancer cells, we investigated whether the use of a nutrient mixture effective in controlling the invasion of cancer cells can affect the ability of viruses to spread and multiply. Our studies conducted with avian flu viruses (H5N1 and H9N2) and with human influenza A (H1N1) virus have shown the benefits of this nutrient mixture in various aspects of viral infections. For instance, application of a micronutrient mixture in the diet of birds resulted in a complete absence of signs of toxicity from the infection with the bird flu virus. Also, other benefits were evident including the protection of respiratory track cells against pathological changes triggered by the virus and reduced infectivity of the virus with nutrient supplementation.

These benefits of micronutrients observed in vivo were confirmed when we investigated mechanisms of these nutrient actions at the level of cells. The studies showed that these nutrients can protect cells against viral infection, inhibit the multiplication of the viruses and halt the spread of viruses to other cells. Our studies with the human influenza A (H1N1) strain showed that in the presence of micronutrients the production of viral nucleoprotein (antigen) is markedly suppressed, rendering them less effective.

- **Is vitamin C effective against flu?**

The importance of vitamin C against the common cold was popularized by the late Dr. Linus Pauling. Vitamin C is an important nutrient for the function of our immune system and it has been shown to suppress the multiplication of the HIV. Since the HIV is a virus carrying RNA as its genetic material it is possible that other RNA viruses, such as flu viruses can respond to it.

However, our further research has shown that vitamin C effects against various aspects of viral infections can be enhanced if it is combined with other nutrients working in a synergy. Recent studies published in the scientific journal BioFactors by Dr. Raxit Jariwalla and other researchers from our Institute have shown that the activity of a key enzyme responsible for human flu virus infectivity, which is Neuraminidase (N), can be

effectively suppressed by the nutrient combination, while vitamin C alone had a minimal effect.

- **Which micronutrients are important in controlling flu infections?**

There are several of them. A key nutrient is vitamin C, which according to our studies can decrease viral multiplication by about 50%. Its level is usually lower in those affected by viral infections. This vitamin is also taken up in increasing amounts by the white blood cells when they become stimulated by infectious agents.

Vitamin C cooperates with the amino acids Lysine and Proline in enhancing the resistance of connective tissue to enzymatic digestion, which is important for halting the spread of viruses. The importance of maintaining the integrity and strength of connective tissue in halting the spread of cancer and infectious agents was first introduced by Dr. Rath. Green tea extract rich in polyphenols, such as EGCG, is a potent inhibitor of cellular replication of viruses and their entry into the cells. Various other micronutrients also contribute to the natural control of viral spread in the tissue, and they include, N-acetylcysteine, copper, manganese, selenium and others. N-acetyl cysteine was also shown to decrease mortality in mice infected with influenza and selenium deficiency was associated with increased pathogenicity of this virus. While all of these micronutrients have beneficial effects when used individually, their combination has markedly enhanced and more complex health benefits.

- **What are the benefits of taking micronutrients combined in a synergy versus their random combination or using a single nutrient?**

Combining selected micronutrients in the right proportions is important to achieving a biological synergistic effect. This means better health benefits than those obtained with an individual compound, such as a vitamin or other nutrient. We pioneered this biological synergy approach in our formulations and today it is increasingly applied by others. For instance, even “Centrum” multivitamins are now advertised as “working in a synergistic way.”

Key benefits of using “nutrient synergy”:

- Several cellular processes can be affected simultaneously (i.e., decreased infectivity of a virus together with its lower multiplication and spread in the tissue as well as other aspects accompanying infection.).
 - Final health effect can be achieved with lower doses of individual components.
 - Cellular metabolic balance can be preserved. When a large dose of one micronutrient is taken it can pose a risk of unmasking any prior micronutrient deficiencies thereby triggering cellular metabolic imbalance and unwanted effects.
- **Do the benefits of nutrient synergy have any scientific confirmation?**

Yes, the effectiveness of synergistically acting nutrient combinations in viral infections, as well as other diseases, has strong scientific support. The results of these studies, including clinical studies with nutrient synergy, have been published in numerous scientific and medical journals. All these publications are available on our research institute website at www.drrathresearch.org

SECTION B

- **What does Type A H1N1 influenza mean?**

There are three types of influenza viruses: type A, which is usually the cause of outbreaks; type B, which is linked to sporadic cases, and type C, which rarely causes disease response.

In order to understand what N and H letters stand for we need to look at the structure of the virus particle itself. The influenza virus looks like a globule of approximately 100 nanometers in diameter. The coat of the virus is made up of a lipid layer taken from the plasma membrane of the infected host. Within its center there are about 3000 matrix proteins (which differ depending on the type of the influenza) and a set of RNA genes. The surface membrane of the virus is spiked with two types of protein molecules: hemagglutinin (marked with letter "H") and neuraminidase (marked with letter "N"). Hemagglutinin molecules are used to bind the virus to a cell and inject its contents into it. Neuraminidase is a special enzyme which is required for viral infectivity and used to break the infected cell in order to release new viruses, which can spread infecting other cells.

The influenza virus has an ability to change its H and N molecules, a phenomenon called antigenic shift. For example, the swine flu that appeared in 1918 was named H1N1, while a later strain of influenza which was found to have changed its hemagglutinin molecules was named H2N1, and an even later influenza was found to have changed both its surface molecules (double antigenic shift), and was named H2N2. These changes are the result of an exchange of genetic materials between flu viruses originating from different sources. For instance, if a flu virus from a swine was mixed with a human flu virus, this could create a new strain that has swine-type hemagglutinin (H) and human-type neuraminidase (N). At this time there are four main Influenza A swine flu virus subtypes: H1N1, H1N2, H3N2 and H3 N1. However, the most recently isolated viruses from pigs have been of H1N1 subtype which was the cause of the original 1918 pandemic. The new flu strain is a combination of pig, bird and human viruses to which humans may have no natural immunity.

- **What is the meaning of a large variety of flu viruses?**

In addition to the exchange of genetic material between viruses of different origins (i.e., human with animal viruses) there are frequent point mutations in the viral RNA and other changes that make such a variety of flu strains. Such variations in the genetic composition of viruses usually occur after the population has built up immunities to the old strain. These frequent genetic changes of a virus make it difficult to produce effective vaccine that can protect against many variants of flu. This is why a vaccine produced in one year is often ineffective the following flu season.

- **Is the H1N1 swine flu virus the same as human H1N1?**

No, the human immune system recognizes them as different. This means that vaccines produced against human H1N1 flu virus will not protect pigs infected with swine flu H1N1 virus.

- **How do viruses infect cells?**

Viruses enter respiratory tract and bind to the cells lining the lung airways. After entering the cell, viruses use their genetic material, which is in the form of RNA, to transform the cellular machinery of the host cell to set up the production of new copies of viral genes. These genes combine with new viral proteins created in the host cell and bud out of the cell as fresh viruses.

These newly produced viruses spread out causing infection of neighboring cells of the lung tissue. In order to spread they produce enzymes that destroy collagen and other components of the connective tissue surrounding all cells. Inhibition of these enzymes, which is possible with the use of vitamin C, Lysine and other components of “nutrient synergy,” is very important for curtailing the spread of any viral infection in the body.