Bird ‘Flu and Beta Glucans

by Dr Paul Clayton, PhD

The next global ‘flu pandemic is coming. By the time this article is published it may already have started. Klaus Stohr of the WHO Global Influenza Programme recently stated: ‘There will be another pandemic. In the best case we expect billions to fall ill, with 2 to 7 million deaths - but it could be far worse.' Here in the UK, our very own Department of Health predicts as many as 750,000 deaths. Why are the experts so pessimistic?

Introduction

History shows that ‘flu pandemics occur every 30 years or so. After this time the genetic make-up of a 'flu virus has changed so much that immunity built up from previous strains becomes irrelevant, so that herd immunity, our main defence against pandemics, has become negligible. There were three pandemics in the 20th century and all spread worldwide within a year of being detected. The Spanish ‘flu in 1918-19 killed up to 50 million people. In the 1950s the Asian ‘flu pandemic killed a mere million and in 1968 Hong Kong ‘flu killed another million or so. That was 37 years ago - so we’re due for the next one. The prime candidate is the bird ‘flu now gathering momentum in Asia and which has already shown human-to-human transmission.

Antibiotics are of no use in treating viral infections and the right vaccines to protect us against the new strain of bird ‘flu won’t be ready until at least six months after the epidemic has started, which will be too late for many. Our benevolent and all-wise government has decided to purchase antiviral treatments for 14 million Brits - about one in four of the population. That decision was based on two assumptions: first, that the emergency could be managed and, secondly, that the anti-viral drugs (eg. amantadine, Tamiflu) will be reasonably effective.

Both of these assumptions are highly questionable. Our ability to deal with the fall-out of a contagious and highly lethal viral epidemic is, realistically, inadequate. And the efficacy of the anti-virals (which was never very high) is being seriously undermined by Chinese Government-backed schemes to give the anti-viral drug amantadine to infected flocks of poultry in China. Nothing is more likely to breed new drug-resistant viruses. The WHO has asked for urgent ‘clarification.’

Let us assume, however, that the anti-viral drugs are still at least partially effective when the time comes and the emergency plans will actually work. One in four people deemed sufficiently important (army, police, medical personnel and the political classes) will be protected. What should the rest of us, the expendable folk, do?

Boosting your immune system

The best defence against viral infection is to prepare your innate immune system, which is the body’s first line of defence against invasion by bacteria and viruses. Unlike the acquired (or adaptive) immune system, the innate immune system does not recognise every possible antigen. Instead, it is geared up to recognise and react to a small number of highly conserved molecules which are present in the cell walls of many pathogens, including lipopolysaccharide [LPS] (gram negative bacteria), lipoteichoic acids (gram positive bacteria), and 1-3, 1-6 beta glucans (bacteria and fungi).

Once stimulated, the innate immune response mounts both cellular and humoral responses.

These involve:

1. Phagocytic cells. These include macrophages and related cell species such as Langerhans cells in the epidermis, Kupffer cells in the liver, microglia in the brain and osteoclasts in bone.
2. Cells that produce inflammatory mediators (mast cells, eosinophils and basophils).
3. Natural Killer cells.

4. Mediator molecules such as complement proteins, acute phase proteins and cytokines. These include tumour necrosis factor (TNF), interleukins 1 and 6, hydrogen peroxide and gamma interferon, all of which fight against invading pathogens.

Of all the natural compounds known to stimulate the innate immune system, the best documented and most effective are the 1-3, 1-6 beta glucans, generally derived from brewer’s yeast1,2. These molecules activate the innate immune system very strongly indeed; in humans and other mammals and in birds, fish and even crustacea3,4,5,6. Macrophages have receptors that specifically recognise 1-3, 1-6 beta glucans because they occur in the cell walls of many bacteria and fungi. This means that when you ingest beta glucans your innate immune system thinks, not unreasonably, that an enemy has arrived and it rises to the challenge. This important first line of defence is now fully activated and several well-conducted research papers have shown that resistance to infection is greatly enhanced1,8,9.

The beta glucans’ ability to activate macrophages has been extensively tested10-16 and has been shown to protect animals such as mice against otherwise fatal infections15, 17-26. Trials have shown the same substantial protective effects in human infections also27-30.

Looking at the references above shows that most of the key studies had already been completed by the mid-1990s; but the work was not thought to be commercial and was not developed for clinical use. Antibiotics still ruled the roost and were highly profitable for the drug companies, while brewer’s yeast extracts were cheap and belonged to everybody. This meant that none of the drug companies were interested in investing in them.

The US Army, however, was taking careful note. Starting in the late 1980s, it ran an exhaustive test programme to measure the immuno-protective effects of beta glucans and over 100 other immuno-stimulants, and as recently as 2004 reported that the beta glucans were the most effective of them all. Not only did they protect against infection with bacteria, viruses and fungi, they also conferred protection against radiation injury31,32.

Given that soldiers may at any time face an unpredictable range of biological weapons and even, in the worst case, radiation, the US Army began to stock-pile beta glucans. To this day Washington keeps significant amounts of beta glucans in readiness, to be issued as and when circumstances dictate. (To put this in context, all cases of supposed international ‘bacterial warfare’ reported in the US to date - such as the notorious ‘anthrax by post’ episode – have since been identified as being internal affairs; in the case of a genuine bacterial warfare incident, US troops are likely to be given beta glucans.)

I personally think that these valuable compounds are too good to be left to just the armed forces. As bird ‘flu continues to advance, I have put up a couple of kilos of purified beta glucans on the top kitchen shelf. When the time comes I will give them to my children, at a dose of 500 mg of beta glucans per day, armed with the knowledge that in trials with pigs, beta glucans reduce the harm done to the lungs after infection with swine ‘flu virus and reduced replication of the virus itself33. As pigs and people have a good deal in common (metabolically and physiologically speaking), the pig model is very relevant to our own situation. When one looks at the UK Government’s ‘flu management strategy, George Orwell’s porcine metaphors seem more appropriate than ever.


Paul Clayton is a visiting lecturer at the Universities of Westminster and Amsterdam, and at the Centre for Nutrition Education and Lifestyle Management. He is also the author of numerous books and articles on pharmaco-nutrition. He is a member of the scientific boards of Food & Behaviour Research (Oxford), the Allergy Research Foundation (London), the Nutritional Therapy Council, the Alliance for Natural Health, Leatherhead Food International and the Scandinavian Healthcare Group.