**Close surveillance of Avian flu in Europe**

**Commentary**
Influenza is the name of a virus - or rather a family of viruses - which frightens people because they know it can kill. But what exactly do we mean when we talk of avian flu? avian plague or avian virus? "Avian" means concerning birds. We are therefore talking about a virus present in birds.

In order to understand the intense scientific research which Europe is supporting to combat this virus, we first of all have to understand what exactly a virus is … A virus is an envelope containing a coded message which speaks the same language as all living animal or human cells. It is the genetic code.

So when the virus enters a living cell and delivers its message, not only does the cell understand it, but it also executes the order. In some cases, this genetic deviation can be fatal.

This is precisely the case with the influenza virus whose envelope is spiked with two types of sharp point - proteins. In orange, Hemaglutinin H and in blue, Neuraminidase N. Hence the famous reference H5N1…

**ITW: Ilaria Capua , Head virology laboratory, Istituto Zooprofilattico Sperimentale delle Venetie (IZSVe)**
It causes death of 80 to 100% of the birds it infects and it is also capable of infecting humans and of killing 50% of the humans it infects.

**Commentary**
There are 16 different forms of H and 9 of N and it was the most dangerous combination - H5N1 - the most pathogenic form, which started to propagate itself amongst birds in Asia in 1999.

**ITW Ilaria Capua , Head virology laboratory, Istituto Zooprofilattico Sperimentale delle Venetie (IZSVe)**
In Asia what has happened is that the virus has found an ideal situation with very many different species that is capable of infecting. And it has done its best to spill over into different species. So we have seen infection in different bird species which are in fact quite distinct from another, like chicken, like wild birds, like ducks, like geese….we have seen infection spilling over into pigs and we have seen infection spilling over into humans.

**Commentary**
Because influenza can easily spread from one species to another. This manipulation clearly shows how virulent viruses are. A sample suspected of containing the H5N1 virus is injected into a living egg.

In the absence of the virus, the embryo survives… We can even see how it moves, with the help of this special lamp.

« Questo uovo è vivo… »

However, if the virus is present, in just a few hours, the egg dies

« Questo uovo è morto … »
But at the same time it produces a quantity of analysable and identifiable virus. Detecting and recognising the H5N1 virus, understanding the way it is transmitted between species and judging the efficacy of appropriate vaccines is the objective of the AVIFLU project, financed by the European Union. It is a joint research project with five members from Italy, the Netherlands, France, Denmark and the United Kingdom.

**ITW GIOVANNI CATTOLI** Head of Research & Development, Istituto Zooprofilattico Sperimentale delle Venizie

One of the main goal is to evaluate the efficacy of these vaccines. In order to evaluate the efficacy and the level of protection from clinical disease in birds and also to evaluate the virus shed by vaccinated birds. Because we want to know if vaccinated birds are still carriers of the virus.

**ITW Dr. GUUS KOCH** CIDC Lelystad

What we showed is that we only needed to vaccinate birds once. After 14 days after vaccination, they were protected. They didn’t show any disease anymore. And the virus didn’t spread. But 7 days after vaccination they became infected. Didn’t show any disease but still spread the virus to other birds.

**Commentary**

This is why researchers at the Zooprophylactic Institute in Venice have developed the DIVA process which allows scientists to differentiate between animals which have been vaccinated and infected and animals which have simply been infected.

A vaccine (that is a virus rendered harmless) is injected which presents H5 on its surface and, not N1, but N9.

As a result, this mouse will be protected against H5N1 because it will have developed antibodies against H5 but it will produce antibodies against N9, proof that it has been vaccinated.

As well as the diagnostic aspect and vaccination of the animal population, a whole area of European research is dedicated to veterinary surveillance.

The European Union’s NOVA FLU project has allowed six member states to establish a real network to monitor wild birds in collaboration with ornithologists and birdwatchers. Because we know that migration routes are a potential way for the virus to reach Europe.

These are the polders in the Netherlands and, using tame geese and large nets, these men are capturing wild geese from Siberia.

The sampling effort is massive in order to have, at any moment, a very clear picture of the level of penetration of the virus as well as the type of virus entering. But that’s not all…

**ITW Albert Osterhaus,** Director of the National Influenza Centre, Head of the Department of Virology, Erasmus University Rotterdam

When we had the outbreak of the highly pathogenic avian influenza in the Netherlands in 2003. When we had to kill more than 30 million chickens in this country and where 89 people became infected, developed disease and even one person died. Right at the beginning of the outbreak we could tell within a day on the basis of what we had been doing...within a day that it was an H7 N7 virus. That is the first thing. And also that the virus came in principle from wild birds because the ancestors of the virus we had identified them in the years before in wild mallards and in wild ducks.

**Commentary**

Breeding animal populations must also be monitored. This is why a consortium of seven European countries plus Hong Kong and the United States has developed the ESNIP, project to monitor influenza in pigs.
There is concern that avian influenza viruses will transmit to swine and then from swine to humans. It is possible that avian influenza viruses infect swine. This is well known. But usually this is without consequences...

Commentary
Without consequences, but surveillance remains essential because, as the pig is genetically very close to man, it could provide a favourable environment for the avian virus to recombine with the human form.

That is a long way off, but researchers know that three sub-types of the influenza virus which are harmless to humans are present in pig populations in Belgium, Germany, The Netherlands, Italy, France and Spain. Sub-types which the pig gets rid of very quickly, but which can cause it suffering.

Many of those infections are without any disease but the virus can cause severe respiratory problems, breathing difficulties, dyspnoea, coughing, fever and loss of weight. This is why it can be economically important for swine production and so some swine farmers prefer to vaccinate against swine influenza.

Commentary
The European Union has invested and will continue to invest a lot of money in research in order to be able to respond immediately to the order of the day: be ready!. Ready with rapid diagnostic techniques, with a clear understanding of how the virus propagates, with the development of a vaccine and the monitoring of the health of vaccinated animals. And add to that the global monitoring of both wild animals and domestic ones.