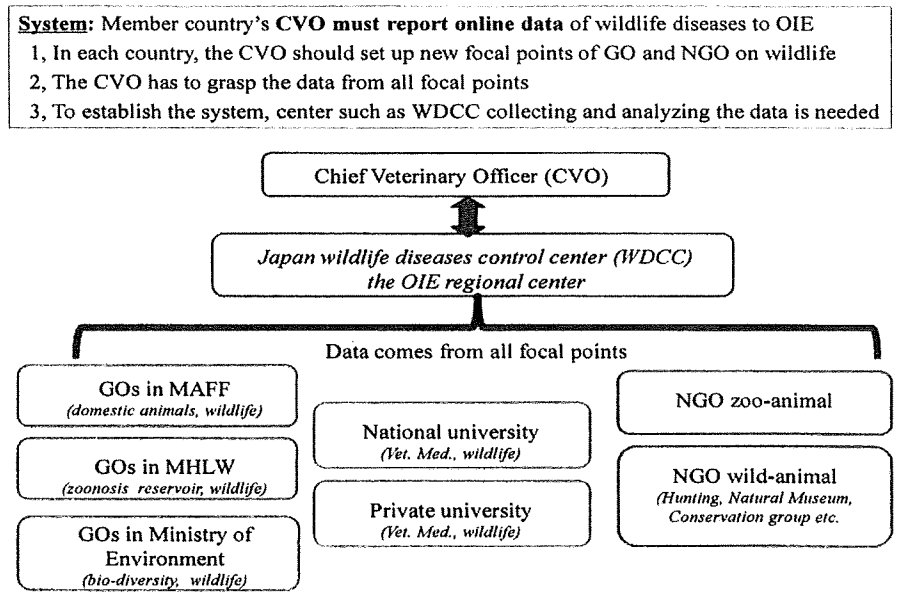
efficient defense system. In Japan after the BSE panic, the Food Safety Commission was established within the Cabinet Office as a risk assessment organization which is independent from risk management organizations such as the MHLW (Ministry of Health Labor and Welfare) and MAFF (Ministry of Agriculture, Fishery and Forest). International organizations are already bringing together infectious disease experts and government officials from different countries or regions in field-specific forums to consider measures for the sustained control of infectious diseases.

However, the control of such infectious diseases is basically a political and economic issue. As long as poverty, famine, and war continue, there is little hope for improving public hygiene globally. The path to controlling infectious diseases is one of international cooperation in the building of standards and systems for global defense against such diseases that also respect diversity in the form of national and regional differences in culture, national character, and everyday life and customs.

3. OIE-strategy of wildlife disease control

The meeting of the OIE *ad hoc* Group on Wildlife Disease Notification was held from 2 to 4 July 2008, at the OIE headquarters in Paris. The member of the Working Group on Wildlife Diseases presented a summary of the program to collect information on the global occurrence of diseases in wild animals since 1993. The program has gathered a wealth of data that has been synthesized and presented to the International Committee of the OIE each year. The Working Group developed questionnaire to obtain occurrence-information of wildlife disease included in the OIE List of Notification Diseases and for a second list of diseases in wildlife which were not on the OIE List of Notification Diseases (Non-OIE-Listed Wildlife Diseases) but which were of importance. The most commonly reported diseases in wildlife over the years have been diseases which are on the OIE-Listed Notification Diseases: for example, foot-and-mouth disease (FMD), anthrax, bovine tuberculosis, rabies, brucellosis, avian cholera, classical swine fever, and Newcastle disease. However, only about 20% of the OIE member countries have responded to the OIE Wildlife Disease Questionnaire every year, thus far.

Dr Bernard Vallat, the director general of the OIE, in his address to the *ad hoc* Group, explained the OIE's new approach to wildlife. Whereas the field was not a priority in the past, it has now been integrated in the system creating new challenges. To accommodate these changes the composition of the Working Group on Wildlife Diseases has been changed and their activities have been integrated into the mainstream activities of the OIE. He emphasized that the notification policies for listed wildlife diseases are now the same as for domestic animals, and that work is needed on diagnostic methods for diseases of wildlife. He also indicated that many of the current reference laboratories are not focussed on wildlife and that they will have to adapt to the new situation. The Terrestrial Code will have to be adapted and notification of the diseases of wildlife will have to be done in such a fashion



that the process will not have undue economic consequences and influence trade adversely. He emphasized that to deal with these matters in a scientific way, knowledge about the diseases of wildlife, and their effects on livestock will have to be determined.

He indicated that the practice of regional focal points has been terminated and that the CVOs (Chef Veterinary Officers) will now have a responsibility to enter relevant wildlife data into the WAHIS (World Animal Health Information System) reporting system. Each CVO is to nominate a focal point for the country (keeping in mind that the system of reporting can be adapted on a country basis and depending on the prevailing structures of the Directorates in the various countries) that would be responsible for collecting and entering data. He has an opinion that a large proportion of the CVOs of member countries have accepted the change in policy related to reporting wildlife diseases, and that they would support the process. He emphasized that the notification diseases of wildlife should be entered into the WAHIS system, as is the case for livestock and he raised the question as to whether the current list of wildlife diseases should be retained. Finally, he indicated that the issue of zoonoses has become important within the context of the OIE. There is an agreement with the WHO that they would retain the responsibility to deal with information pertaining to the zoonoses originating from primates and that the OIE will deal with zoonoses originating from other animals. He emphasized that the OIE should become a leader in the field of control of zoonoses in animals in addition to being the standard-setting body. These responsibilities were confirmed by an agreement between OIE, FAO, and WHO.

In response to these requests, the CVO in each country should set up new system of focal points of GO (government organization) and NGO (non government organization), which can collect scientific surveillance data on wildlife diseases. The CVO has to grasp the data from all focal points. In order to establish the system, a national center such as WDCC (wildlife disease control center) is needed, which plays a headquarter-role and is independent from a certain administration office but helps the CVO. An institution of a veterinary university may be a candidate of national WDCC, because it can make a network of GO and NGO smoothly, and scientifically assess the surveillance data collected from each focal point.

4. Tactics of wildlife disease notification system (WAHIS/Wild) of the OIE

As for OIE-Listed Diseases, the WAHIS (World Animal Health Information System) in OIE now supports notification and reporting of disease occurrences in domestic and wild animals. The OIE proposed an integration of the Wildlife Disease Questionnaire into the WAHIS through creation of a module. The module includes specifically for data input of the wildlife diseases covered by the Wildlife Disease Questionnaire and for those included in the Non-OIE-Listed Wildlife Diseases. Reporting of these wildlife diseases not on the OIE list now, is voluntary and would remain voluntary base in the new on-line module of the WAHIS.

Several diseases, however, in wildlife, which do not meet the criteria for inclusion on the OIE-Listed Notification Diseases nonetheless are important to the socio-economic well-being of people around the world. For example, some are zoonoses, others can infect domestic animals, and some affect wild animal populations and harm economies and livelihoods dependent on these wild populations. Some of the diseases have a negative impact on social, environmental, and ecological needs and objectives of member countries. Some are signals of environmental changes harmful to human well-being and thus could serve to inform member countries. Some are caused by pathogens with the potential to become highly important in recognizing effects of climate or other environmental changes, and should be monitored for this reason.

Wildlife Focal Points

There is a critical importance of wildlife focal points appointed by the country Delegates (WDCC or CVO) to the functionality of the wildlife disease data collection. The wildlife focal points will work under the authority of the Delegates but must also be fully connected with the wildlife and public health sectors of their countries.

Through the Delegate, these wildlife focal points will provide the OIE with the data and it needs to properly account for wild animals in its disease notification and reporting program. Thus, the OIE offer to wildlife focal points program of general wildlife disease information, and specific orientation to the WAHIS system, to support them in their reporting roles.

Host Animal Identification

It is need to correctly identify host animals to the level of species. The current situation, whereby wild animal species are all identified simply as "fauna," fails to provide the critical information regarding the species that are affected by the disease. This information is needed to properly evaluate these disease occurrences. The WAHIS module for wildlife should include two methods of host animal species identification: 1) a convenient short list of known susceptible species, by Latin and common name. These lists may increase in length over time as information is received from the member countries, and 2) a window/module/drop-down list that permits finding and

entering the correct scientific (Latin) name for any vertebrate species. This should be based on internationally-standardized taxonomy in Taxon 2000.

Frequency of Reporting

The time currently allowed to member countries entering data on the on-line system is limited and may negatively affect provision of information. However, the provision to the OIE of information on the occurrence of diseases in wildlife that are not on the OIE List of Notification Diseases may be not urgent. Therefore, a balance between the benefits of frequent data provision and the work required to provide the data should be considered.

The data on the occurrence of wildlife disease of the Non-OIE-Listed Wildlife Diseases is submitted to the OIE once each year. These data should be provided to distinguish occurrences that occur in the first 6-month period from those that occurred in the second 6-month period. Submission of data will occur only once, at the end of the year. The information will be provided for the whole country.

Data Input and Output Forms (on-line screens)

Data input will use an adaptation of the current WAHIS Template II, Quantitative Information for Entire Country. This includes adoption of the WAHIS selection of diagnostic methods, WAHIS codes to indicate the status of each disease or pathogen, number of outbreaks, and control measures applied. The WAHIS wildlife module should include a facility to permit draft data of input reports to be created and stored as data are received during the year. These inputs would then be reviewed, finalized and officially submitted only once, at the end of the year. Before final implementation, the data input screens developed for this wildlife module should be tested by a small group of wildlife focal points to ensure that instructions and intended functions are clear to users.

The output from the wildlife disease information module should be clearly understood and not to provoke misinterpretations. The output reports relating to occurrences in wildlife diseases on the OIE List of Notification Diseases should be presented separately from the output reports regarding occurrences in wildlife of diseases of Non-OIE-listed Wildlife Diseases. Likewise, the output reports of Non-OIE-listed Wildlife Diseases should be presented with explicit notice that the diseases are not on the List of Notification Diseases and do not have any bearing on trade restrictions. Because data are collected and displayed only for the whole country as the geographic unit, maps showing the geographic distribution of wildlife disease occurrences should not be created or displayed by the OIE. Such maps could be misleading. Instead, tables listing occurrence locations should be presented. Other tables that should be provided are as follows. The wildlife diseases occurring in each country, the countries in which each wildlife disease has occurred, the diseases that have occurred in each wild animal host species, and the wild animals host

Output of data on wildlife diseases by OIE

/ Data are collected and displayed for the whole country as the geographic unit.
/ Thus, mapping display could be misleading and might induce trade restrictions.

/ Data will be showed as Tables that should be provided followings:
- The wildlife diseases occurring in ***each country***
- The countries where ***each wildlife disease*** has occurred
- The diseases that have occurred in ***each wild animal*** host species
- The wild animals host species in which ***each disease*** has occurred

Wildlife diseases in a given country	A given wildlife disease in each country	Wildlife diseases in a given animal	A given wildlife disease in wild animals
Japan *Rabies* *HPAI* *FMD* *Bovine TB* ……	*HPAI* *Japan* *Korea* *China* *Indonesia* ……	*Bats* *Rabies* *Lyssa virus* *Hendra virus* *Nipah virus* ……	*FMD* *wild boar* *wild deer* *wild buffalo* *camel* ……

species in which each disease has occurred. As a longer-term goal, OIE should consider how it might acquire more precise geographical and time-related data and thus benefit from analysis of global wild animal disease distribution and trends in occurrence over time.

Diseases on the OIE List of Notification Diseases

The current WAHIS system for OIE-Listed Diseases is satisfactory for recording occurrences of these diseases in wild animals, with the exception of the classification of animal species only as "fauna." The records of occurrences of OIE-Listed Diseases in wild animals include the identification of the host animal to species, achieved in the same way as recommended for the wildlife records of Non-OIE-listed Wildlife Diseases. The *ad hoc* Group reviewed the current list of such diseases on the 2007 Wildlife Disease Questionnaire of the OIE Working Group on Wildlife Diseases. This review led to identification of several criteria by which diseases which do not meet the criteria for inclusion on the OIE-Listed Notification Diseases could be considered for inclusion on the wildlife disease list. The guiding principles for such inclusion should be relevance to human health, likelihoods and well-being, to domestic animal health and to environmental integrity and ecological sustainability. Emerging diseases affecting wildlife or important human or domestic animal disease for which wild animals serve as affected or unaffected reservoirs are examples of candidates for inclusion.

The *ad hoc* Group recognized that some non-infectious disease also should be considered for inclusion on the wildlife disease list. These may cause significant mortality and have effects on wildlife at the population level (e.g. botulism, diclofenac). It may be important to recognize these diseases to distinguish them from occurrence of diseases of more direct concern to the OIE, such as avian influenza or Newcastle disease. Such outbreaks also may serve a sentinel function for risk of the same non-infectious diseases to humans and domestic animals. The *ad hoc* Group considered whether the OIE should seek information on wildlife mortality events of undetermined cause. Some of these may be sentinels for emerging diseases. At the same time, recording of such events could overwhelm the capacity of wildlife focal points to

What kind of diseases are listed? *(candidates)*

Domestic animal diseases and others (OIE listed for wildlife)		**Wildlife diseases (OIE non-listed for wildlife)**
African Horse Sickness	Caprine Arthritis/Encephalitis (CAE)	**Infectious Diseases**
African Swine Fever	Duck Plague (DVE)	Chronic wasting disease (CWD)
Avian Influenza HPAI	Duck Hepatitis	European brown hare syndrome (EBHS)
Avian Influenza LPAI (wild birds)	Echinococcus granulosus	Ebola hemorrhagic feaver
Bluetongue	Echinococcus multilocularis	Feline leukaemia (FLV)
Foot and Mouth Disease (FMD)	Epizootic Haemorrhagic Disease (EHD)	Fibropapillomatosis in sea turtles
Vesicular Stomatitis	Equine Herpesvirus	Infection by *Baylisascaris procyonis* (racoon ascaris)
Swine Vesicular Disease	Leishmaniosis	Infection by large liver flukes (*Fasciola hepatica*)
Rinderpest	Leptospirosis	Infection by meningeal worm of cervids-*P.tenuis*
Peste des Petits Ruminants	Maedi/Visna	Lyme borreliosis
Contagious Bovine Pleuropneumonia	Myxomatosis	Marburg virus disease
Classical Swine Fever	Paratuberculosis (Johne's disease)	Morbilliviroses (Bat infection, Canine distemper, Cetacean infection, Phocine distemper)
Lumpy Skin Disease (capri ne pox)	Q-fever	Plague - (*Yersinia pestis infection*)
Newcastle Disease	Rabbit Haemorrhagic Disease (RHD)	Pseudotubeculosis (*Y. Pseudotuberculosis infection*)
Rift Valley Fever	Rabies	Psoroptic mange
Sheep/Goat Pox	Scrapie	Salmonellosis (*Salmonella enterica*)
Anaplasmosis	Trichinellosis	Sarcoptic mange (Itch mite infestation)
Anthrax	Tularemia	Tick-borne encephalitis
Aujeszky's Disease	West Nile disease	Toxoplasmosis
Avian Chlamydiosis		*Trichomonas sp.* Infection
Avian Cholera	**Amphibians**	
Avian Infectious Bronchitis	Chytridiomycosis	**Non-infectious diseases**
Avian Tuberculosis	Iridovirus diseases	Algal toxicoses
Bovine Tuberculosis		Botulism
Tuberculosis Human		Chemical poisoning
Bovine Herpesvirus (IBR)		Mycotoxin poisoning
Bovine Spongiform Encephalopathy (BSE)		
Brucella melitensis		**Diseases of unknown cause**
Brucella abortus		
Brucella suis		
Brucella sp.		

Wildlife related diseases including, ☐: domestic animal diseases, : zoonoses, and : wildlife limiting diseases.
▓: non infectious diseases with high mortality.

prepare annual disease occurrence reports. The *ad hoc* Group revised the wildlife disease list from the 2007 Wildlife Disease Questionnaire for use as the initial list to be reported through the WAHIS wildlife module.

The OIE should pursue further the establishment of criteria by which to assess wild animal diseases that do not meet the criteria for inclusion on the OIE List of Notification Diseases for inclusion of the wildlife disease list for annual reporting. The criteria for inclusion on the wildlife disease list for annual reporting should not preclude non-infectious diseases. The diseases should be accepted as a provisional list of wildlife diseases which are not on the OIE List of Notification Diseases and which should be reported on an annual (voluntary) basis to the OIE through the WAHIS wildlife module. The wildlife focal points give the option, to reporting wildlife mortality events of unknown cause which they consider to be of significance.

5. Expected problems of the new system: WAHIS/Wild

It is actually very laborious to give precise answers to WAHIS of the OIE on all the questionnaires by one person (CVO), because of difficulties to get information on wildlife diseases from all focal points. For example, in the case of Japan, a kind of sectionalism of data collection by the MAFF (Ministry of Agriculture, Fishery and Forest; especially cover diseases of livestock and relevant species), MHLW (Ministry of Health Labor and Welfare; zoonosis), and Ministry of Environment (conservation of wild animals), the Zoo association (exhibition animals), and schools of veterinary medicine (pets, experimental animals and wildlife etc.) is not able to be combined easily. If wildlife diseases notification is obligated to the CVO in each country, it need to give a strong incentive and informed consent for individual member countries from OIE and worldwide agreement to control wildlife diseases. It needs also renewal of relevant law or rule in each national level adapting to the OIE mission as well as man power, budget and new facility with expertise.

Notification is Obligation or Voluntary?

To clear out the objectives of this system, it needs to show the evidence or assessing results that the diseases in wildlife can have serious threat for livestock, public health or wildlife conservation to the member countries and the data in the OIE-Homepage is effectively used by member countries to avoid the risk of outbreak of the wildlife diseases. However, the natural reservoirs having zoonosis or livestock disease agents (mainly wildlife) in general show no clinical signs, so notification of some wildlife diseases should not be obligated but be done in voluntary bases (see following tables). Selection of a notifying wildlife disease has a consistency among different wildlife diseases as evenly as possible to get an informed consent from CVO in each member country. And it needs accountability and translucency why the given diseases and sensitive animal list are determined. The risk profiling of the OIE-Listed and Non-OIE Listed Wildlife Diseases has been done in WG or other groups in OIE by using a risk profiling or decision tree for emerging diseases and OIE-selected diseases historically. However, risk assessment for the Non-OIE-Listed Wildlife Diseases in wildlife may be insufficient until now. It is needed some trial and error to settle the list of the combination of wildlife and diseases, which is notified obligatory.

I considered about two types of notification system (NS), i.e., obligation (NSO) and voluntary (NSV) systems. The merit of combination of NSO and NSV is more flexible but may induce a kind of confusion in member countries. The obligatory notification may mean a kind of active surveillance including sampling design, population analysis, statistical or stochastic analysis, if possible. However, voluntary notification may mean a kind of passive surveillance such as case reports.

Two risk scenarios are considered for the 1st mission as conservation of biodiversity of wildlife. The first case is human and domestic animal disease agents invade to wildlife and induced outbreak resulting a sudden mortality and morbidity (MM) increased, and agents are identified (NSO). For example, these are the cases of polioencephalomyelitis in chimpanzees, and canine distemper virus outbreak in seal. If the human disease agents are identified from healthy wildlife, it is no notification or voluntary base (-/NSV) depending on the importance of zoonotic agents for example *Shigella dysenteri* in monkeys. In the case of the OIE-Listed Disease agent is identified from healthy wildlife, it should be notified (NSO) in combination of animal species and diseases, such as FMD in buffalo etc. If Non-OIE-Listed Disease agent is identified from healthy wildlife, notification style should be discussed in the WG depending on the new list of wildlife diseases. If no listed disease agent is identified from healthy wildlife, there is no need for reporting (-).

The second case is distraction of ecosystem between wildlife and disease agents. "Emerging disease" may occur by a mutation of agent, or pathogenic strain spreads natural host and related species. In this case, suddenly MM increased and immediate notification (NSO) should be required. They are the cases of chytridiomycosis in frog, or carp herpes virus outbreak.

Five different risk scenarios are considered in the 2nd mission i.e., disease control of domestic animals. The first is OIE-Listed Disease agents are identified in healthy wildlife and

Yasuhiro YOSHIKAWA

Notification system of wildlife diseases *(proposal)*

Notification system (NS)

/ Obligation (NSO) and voluntary (NSV)
NSO: active surveillance (sampling design, population analysis, statistical or stochastic analysis)
NSV: passive surveillance/case report

Notified wildlife diseases

1st mission: conservation of biodiversity of wildlife

1, Human and domestic animal disease agents invade to wildlife and induced outbreak
/ sudden mortality and morbidity (MM) increased, agents are identified (NSO)
Polio in African chimpanzees, CDV outbreak in seal etc.
/ human disease agents are identified from healthy wildlife (-/NSV)
Shigella dysentery in monkeys etc.
/ OIE-listed disease agent is identified from healthy wildlife
(NSO in combination with species & diseases) FMD in buffalo etc.
/ Non-OIE-listed disease agent is identified from healthy wildlife (NSV/NVO)

2, Destruction of ecosystem between wildlife and agents ("emerging disease" in wildlife)
/ Mutation of agent, pathogenic strain spreads in natural host and related species and sudden MM increased (NSO)
Chytridiomycosis in frog, carp herpes virus outbreak etc.

2nd mission: disease control of domestic animals

1, OIE-listed diseases agents are identified in possible natural reservoir or related wildlife species without economic impact (NSV)
rabies, echinococcosis in wild fox etc.
2, OIE-listed diseases agents are identified in natural reservoir, amplifier or related wildlife species under zoning or compartmentalization (NSO)
HPAI in migrating birds etc.
3, Non-OIE listed disease agents are found in healthy wildlife (NSV)
4, Non-OIE listed agents which may affect domestic animals are identified in healthy wildlife (NSV)
Henipah viruses (Hendra virus, Nipah virus) in bat

3rd mission: zoonosis control

1, OIE-listed diseases agents with zoonosis potential are identified in possible reservoir or related wildlife species (NSV)
echinococcosis in wild fox, rabies, bat lyssavirus in bat, etc.
2, Non-OIE listed disease agents with zoonosis potential are found in natural reservoir in wildlife (NSV)
Lyme borrelia, Salmonella, Toxoplasma, Hanta virus infections
3, Non-OIE listed agents with zoonosis potential are identified in healthy wildlife (NSV)
Filoviruses (Ebola hemorrahgic fever virus, Marburg virus) in bat

it is notified as voluntary base (NSV) such as echinococcus infection in wild fox. The second, if OIE-Listed Disease agents are identified in natural reservoir, amplifier or related wildlife species, it should be notified (NSO) depending on the importance of the diseases, such as HPAI (highly pathogenic avian influenza) in migrating birds. The third is OIE-Listed Disease agents are identified in possible natural reservoir or related wildlife species. It is voluntary base (NSV) depending on diseases such as rabies, or bat Lyssa virus in bats. The forth is Non-OIE Listed Disease agents are found in healthy wildlife. It should be discussed in the WG. The fifth is the case that Non-OIE Listed Disease agents which may affect domestic animals are identified in healthy wildlife. It is voluntary base or no report (-/NSV) such as Henipah viruses in bats (Non-OIE Listed Diseases are still controversial).

Five different similar risk scenarios are considered in the

3rd mission i.e., zoonosis control for public health. The first is OIE-Listed Disease agents with zoonosis potential are identified in healthy wildlife. It is voluntary base (NSV) such as echinococcus infection in wild fox.

The second, if OIE-Listed Disease agents with zoonosis potential are identified in natural reservoir, amplifier or related wildlife species, it should be notified (NSO) depending on the importance of the diseases, such as HPAI in migrating birds. The third is in the case of OIE-Listed Disease agents with zoonosis potential are identified in possible natural reservoir or related wildlife species. It is voluntary base (NSV) depending on diseases such as rabies, or bat Lyssa virus in bats. The forth is that Non-OIE Listed disease agents with zoonosis potential are found in healthy wildlife. It should be discussed in the Working Group. Part of the list was made by this *ad hoc* group. Majority of the infections are voluntary reported such as natural reservoirs of lyme disease, salmonella outbreak, toxoplasmosis, tick-born encephalitis, Ebola hemorrhagic fever, Marburg diseases, Hantavirus infections etc. The fifth is the case that Non-OIE Listed agents with zoonosis potential are identified in healthy wildlife. It is voluntary base or no report (-/NSV) such as Henipah viruses in bats (Non-OIE Listed Diseases are still flexible).

What is incentive for member countries?

The output data should not be simple sum of the reports from CVOs of member countries. It needs additional information to be used on actual assessment of measures which have some efficacy or problems to be solved. It needs to show or suggest a good strategy for wildlife disease control in the homepage of OIE as analytical results of the WG, if some member country can succeed to do containment or zoning of the diseases in wildlife. However, data opened in the homepage is relatively old (annual summary) and not alive or ongoing one. Therefore, it is difficult to use the data for a risk management in each member country. Especially, the diseases are acute type epidemics. Therefore, the WG differentiates or categorizes the diseases by their socioeconomic importance, and long lasting or outbreak natures. The WG or its related center analyzes the data and shows a risk assessment result and good example of risk management for wildlife diseases. Even the report will be checked and sent from the CVO to OIE, real data will be collected from stakeholders, thus the homepage data of OIE is attractively opened for individual countries, institutions working with wildlife, domestic animals and public health and other stakeholders.

There is no penalty on non-reporting country, even if the country has a capacity to report the data on wildlife diseases. But, reporting is mandate to the CVO of the member country. Thus this system depends on a talent and competence of CVO in each country. It need strong financial support and technological supports for CVOs in developing countries and OIE should give a strong mission in international level,

HPAI in wildlife, domestic fowl, humans

/ HPAI cases in wild birds, domestic fowl and humans

	Wild birds	Domestic fowl	Humans *	Containment
Indonesia	1(05:Pigeon?), 1(06:pigeon?)	8 (05), 20(06), 12(07), 5(08)	135 (110)	Bad
Vietnam	(musk cat)	3(05), 1(07), 5(08)	106 (52)	Bad
Thailand	(quail, peacock)	3(05), 2(06)	25 (17)	Insufficient
China	wild goose, swan, crow, crane, owl, cormorant, condor, heron, hawk, gull	3(05), 4(06), 3(07), 3(08)	30 (20)	Insufficient
Egypt	peacock, pigeon	4(06), 7(07), 6(08)	50 (22)	Insufficient
Cambodia		3(05), 2(06), 1(07)	7 (7)	Not bad
Turkey	pigeon, wild goose, sparrow, cormorant, swan, starling	1(05), 1(06)	12 (4)	Not bad
Laos	pigeon	2(07)	2 (2)	Not bad
Pakistan	peacock, pheasant, pigeon, crow, parrot, crane	1(06), 2(07),	3 (1)	Not bad
Myanmar	quail,	1(07)	1 (0)	Not bad
Japan	2 (04:crow), 2(07:hawk), 3 (08:swan)	4(04), 4(07), 0(08)	0 (0)	Not bad

* No of Patients (No of death)

by which each country tries to effort to establish a system collecting surveillance data on wildlife diseases.

How to avoid world trade restriction?

Information/data in this system is relatively old except for an immediately alarm. However the data has two good points as follows. The data is accurate and authorized by the delegate (CVO) in each country. The data is continuous and summed every year as annual report. Continued surveillance data is important for all member countries to know the international wildlife disease tendency. Thus, output of the data should be more attractive for stakeholders for example, the summerized results of several years may be displayed in the regional map time-sequentially for each disease and each animal species, and the prevalence is categorized and shown by image colors, but it can be converted to the real digital data. However, it should be avoided that opened data is used for a trade barrier or political manner. Therefore it is important to confirm and transmit the mission of this system. Output form should be discussed in the expert group of risk communication.

In order to collect the data from member countries, OIE status verification on member countries for wildlife diseases may be done as BSE cases. For example, after categorization of the wildlife diseases, and if certain wildlife diseases are the cause of the important infections of livestock or human, OIE decide a status of the member country for example, "ambiguous, or clearness, or well controlled" by the report of wildlife diseases before validation of zoning or compartmentalization to the given country. Thus, the country has a merit and incentive to survey and report on the wildlife diseases to the OIE.

Practically the data of domestic animal diseases and the same diseases in wildlife have to be shown in the homepage. At the same time, a ratio of positive case of wildlife / positive case of domestic animal (W/P) in each country may be demonstrated. The country with high W/P value means to have a well control or enough containment system to the give disease. It gives some incentive to a member country to conduct surveillance and report on wildlife diseases to the OIE. And if W/P value shows positive correlation in many countries, it means the diseases are relatively difficult to eradicate and transmission of the agent between domestic animal and wildlife or vice versa may occur easily. Thus worldwide collaborative effort for a containment of the diseases should be needed by the support of OIE and related international organizations. The ratio of positive case in natural reservoir (wildlife) / case report of the human zoonosis (W/H) should also be calculated. The high W/H value means that the protection of human from the zoonosis is well controlled in the given country and incentive effect is similar to the case of domestic animals. As a result, OIE gets more and accurate data on wildlife diseases or

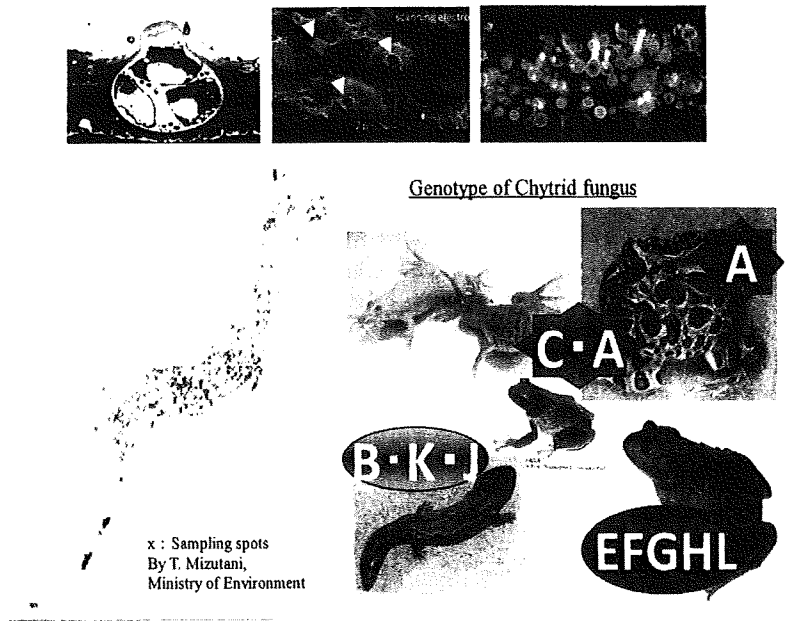
Notification of Wildlife Disease in Japan

***Obligation** to veterinarian for zoonosis control*: *(human case/year)*

/ Ebola hemorrhagic fever (EHF) and Marburg disease (MD) in monkeys : *(0)*
/ Plague (Plg) in prairie dogs: *(0)*
/ SARS in civet cats: *(0)*
/ TB and Shigella dysentery (SD) in monkeys:*(TB 25,000;SD 600/year)*
/ West Nile disease (WND) in wild birds: *(1case on 2005)*
/ HPAI in wild birds: *(0)*
/ Echinococcus (Ech) infections in dogs: *(20-30/year)*

	EHF	MD	Plg	SARS	TB	SD	WND	HPAI	Ech
2004	0	0	0	0	-(6,3)	0	0	-(4)	0
2005	0	0	0	0	-	45	0	-	5
2006	0	0	0	0	-	45	0	0	2
2007	0	0	0	0	0	51	0	5	1
2008	0	0	0	0	0	?	0	5?	?

- : before obligation



infections via this WAHIS/Wild system.

6. Wildlife disease surveillance and control in Japan

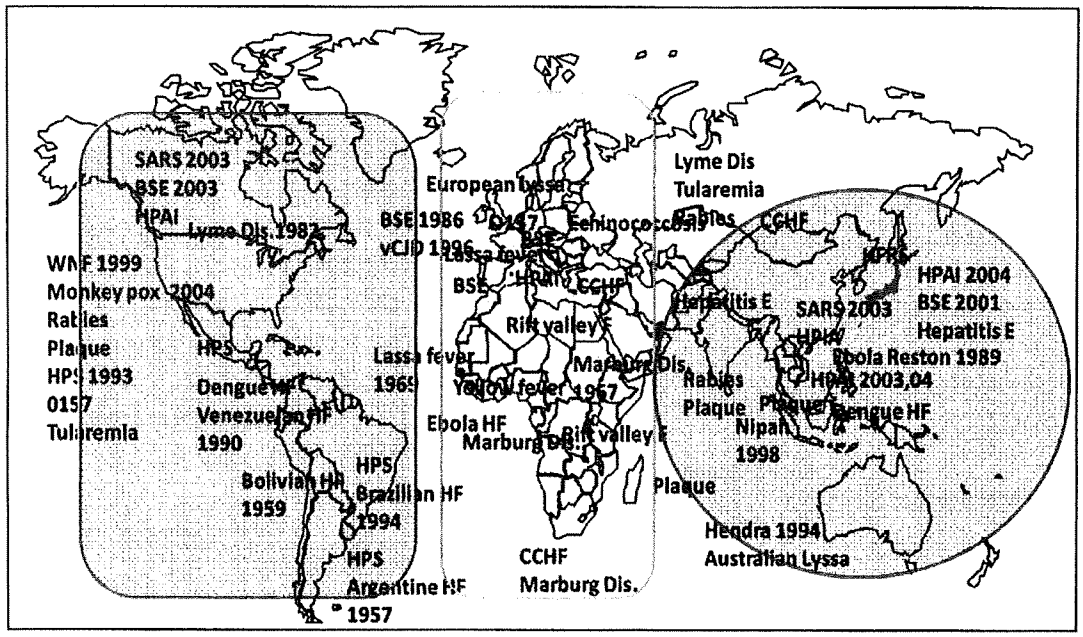
In Japan, some kinds of wildlife infections relating zoonosis are to be settled as obligatory notification by the "Infection Preventing Law (renovated in 1999)", for example Ebola hemorrhagic fever or Marburg disease in monkeys, Shigella dysentery and tuberculosis in monkeys, West Nile disease in wild birds, plaque in prairie dogs, SARS in civet cats etc. There are also epidemiological studies on wildlife infection with zoonosis agents in voluntary base as follows (No. of positive/examined in 2006 and 2007). They are leptospira infection in wild rats (Hokkaido 1/64, Chiba, 1/64; Nagoya, 26/89, 27/85: Miyazaki, 6/14), imported rodents (1/30), dogs (Miyazaki, 17/20), *Bartonella henselae* in cats (35/150, 22/227), lung worm in dogs, cats (0/65), *Salmonella typhimurium* in wild birds (Kanto-outbreak 35/61, healthy 5/214, 3/88), zoo birds (5/113, 3/63), turtle (15/40, 25/26), raccoon ascarid in wild raccoon (0/35, 0/268), raccoon in zoo (6/22), *Chlamydia psittasi* in zoo birds (5/87, 5/879), Lassa virus in experimental animal of mastomis (0/126), *Brucella canis* in dogs (14/497), *Toxoplasma gondii* in wild raccoon (16/231) and *Toxocara canis* in dogs (Tokyo 20/26, Hokkaido 73/4761), cats (Hokkaido 62/478).

The trial of wildlife disease controls have been conducted and successfully implemented for example chimpanzee were completely cured from *Mycobacterium tuberculosis* infection (Tennoji zoo) by anti-bacterium drug treatment as humans, and echinococcus eradication from a part of wild foxes in Hokkaido by scattering vermicide baits. For the conservation of wildlife, active surveillance for chytridiomycosis infection in the frogs in Japan was performed. Frogs were sampled at 956 different points in Japan, and a total of 5192 samples were checked by nested PCR. Positive case was 96 (1.9%) and majority of positive species were bullfrogs and salamanders but others are very rare (one or two cases). There is neither hot spot nor relation between positive cases and reduction of frog number. It is revealed that there are different genotypes of chytridio-fungus, such as pathogenic A and C types, and others might be nonpathogenic.

7. Conclusion

Actual strategy of wildlife disease control

The obligation of wildlife disease notification should reflect to develop effective measures which control outbreak of wildlife diseases. In order to control wildlife diseases around the world, surveillance (diagnosis and epidemiology) and risk analysis are key points. Action plan for wildlife disease control may be as follows. Eradication of pathogens from wildlife should be considered for example scattering vaccine or vermicide in



baits such as rabies or echinococcus controls in wild foxes. Moreover, successful treatment of zoo animals, especially endangered species, such as tuberculosis in great apes and restricted vaccination of HPAI to wild birds in zoo are also protection methods by compartmentalization.

In the case of prevention of diseases between domestic animals and wildlife, zoning or compartmentalization should be conducted. For example, there are containments of domestic fowl physically from wild birds to avoid HPAI infection or domestic ruminants from wildlife with FMD virus. Ordinal vaccination of domestic animals is another way. In the case of zoonosis control, separation of humans from territory of wildlife with zoonoitc agents such as wild rodents with hemorrhagic fever viruses such as Lassa fever, Hemorrhagic fever with renal syndrome (HFRS) or Hantavirus pleumonary syndrome (HPS) is important. In the case of an outbreak of emerging diseases in wildlife, a crisis management and holding information in common by the global network are key points. A given endangered species involved in the outbreak should be isolated, reproduced and released in nature again (conservation system) by the help of zoo techniques.

A network of wildlife disease control progressed in the developed countries of Europe and North America. Three major regions of the rain forest (in Africa, South America and Asia) and tropical countries have large biodiversity and various wildlife diseases. The African region may be supported by the European countries and South American region can have a network with the North American countries. Therefore, it is needed acutely to establish an intimate network in Asian countries for disease control of wildlife.

＊ Major parts of content (issues 3 and 4) are quoted from the report of the *ad hoc* meeting of Wildlife Disease Working Group in OIE at 2 - 4, July 2008, Paris.

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レポート No. 499

新型インフルエンザ—懸念される第二波への対応

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（平成21年9月17日、当倶楽部第476回定例月例会における講演要旨で文責は事務局にあります）

はじめに

前回お招きいただいた時（平成十九年六月八日）には、「BSE（牛海綿状脳症）とトリインフルエンザ」と題して、動物からヒトへの感染症とともに予想される世界的なトリインフルエンザの脅威についてお話ししました。しかし、今回は想定外のブタインフルエンザが発生してしまいました。その意味では、やや当初のシナリオからずれて、多少の混乱を招いた面も伺えました。

そこで、本日はブタインフルエンザのお話とともに、「ウイルスの生態と対策」と題して、インフルエンザウイルスについても、少し掘り下げてご説明していきたいと思っています。なぜならば、インフルエンザウイルスの自然界での振る舞いが極めて複雑で、ある程度そのことを理解しておく必要があるからです。人間世界を襲ってきた、突然の現象のみに捉われていたのでは、本質を見誤りかねません。

例えば、新型インフレエンザと言われている今回のブタインフルエンザについても、多くのウイルス専門家は「新型とは言えない」と考えています。本日は専門家が

なぜそう判断しているのかも含め、順序としては、トリ、ブタ、ヒトそれぞれのインフルエンザの話をした後に、今回の新型と呼ばれているインフルエンザウイルスの背景と問題点、そして、どのように対応していくことが適切なのかについてご説明していきたいと思います。

全ての原型はトリのウイルス

まずトリですが、前回もご説明したように、現在の自然界に存在する、全てのA型インフルエンザの基になるウイルスは、カモを含めた渡り鳥のミズドリが持っています。ただ、ここが微妙なのですが、ミズドリはインフルエンザウイルスを持っているにもかかわらず、インフルエンザ症状を発症することはありません。

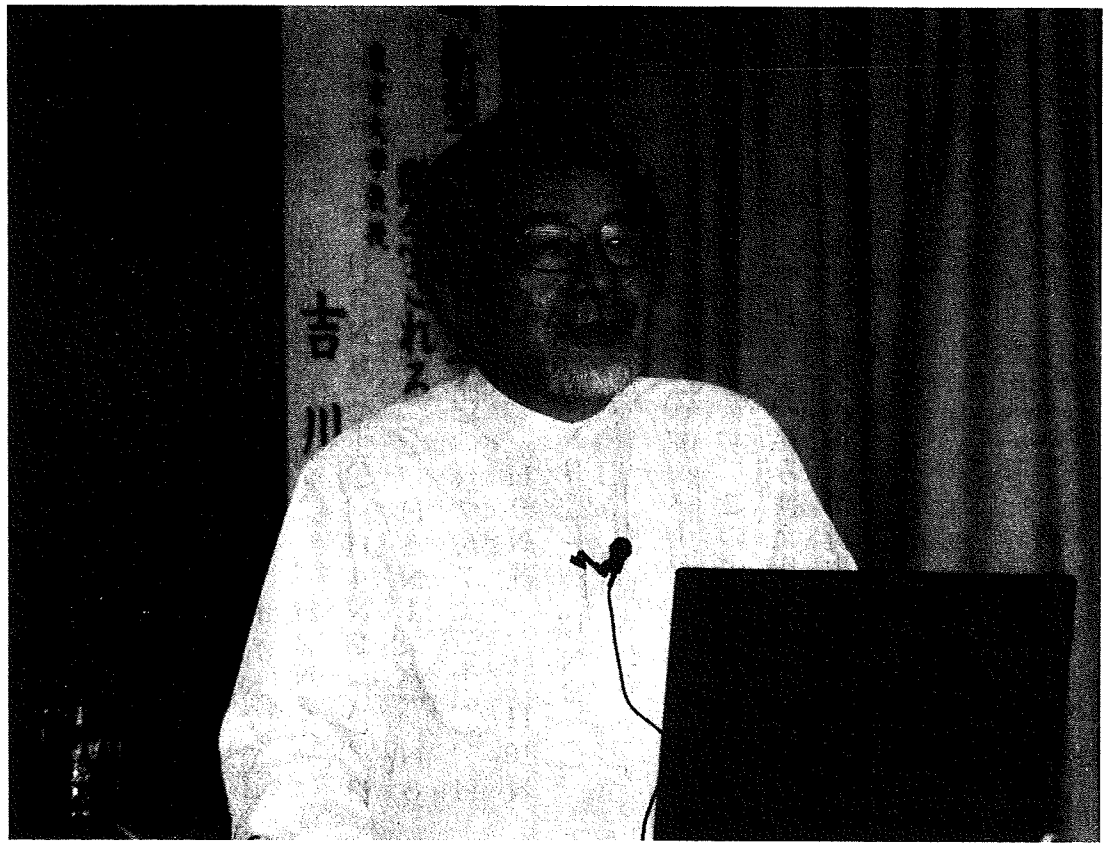
また、インフルエンザウイルスも、私どものように肺や気管などの呼吸器で増えることはなく、消化管で増えていきます。消化管で増えたウイルスが糞とともに排出され、水中に出てそれが口から消化管に運ばれ増えていくという循環です。したがって、野生のミズドリにとっては、インフルエンザウイルスも、ヒトの大腸菌のような存在で、常に飲んで排出することを繰り返しています。

インフルエンザウイルスは、専門的には、ヘマグルチニン（ＨＡ）で十六通り、ニューラミンデース（ＮＡ）で九通りと、百四十四通りの組み合わせが存在します。これが「Ｈ１Ｎ１」「Ｈ５Ｎ１」などと呼ばれるインフルエンザウイルスの型になります。

これまでに大流行したインフルエンザウイルスは、ミズドリからブタを介してヒトに感染したもので、直接トリからヒトに感染することは基本的にありません。なぜならトリのインフルエンザウイルスは、トリの持っている受容体（レセプター）にしか感染しないからです。同じように、ヒトのインフルエンザウイルスはヒトの受容体にしか感染しません。しかし、ブタだけは例外で、上部気道に、ヒトとトリ両方のウイルスに感染できる受容体を持っています。

したがって、基本的に新型インフルエンザウイルスが誕生する時の原型は常にトリのウイルスであり、それがブタの体内で遺伝子組み換えを起こし、ヒトに感染することになります。

自然界には、このようなトリウイルスを原型とした多くのA型インフルエンザウイルスが、多彩な宿主の元に



拡散しています。時折、ウマのインフルエンザが大流行して中央競馬が中止になることがあります。ウマインフルエンザウイルスの型は、「H7N7」「H3N8」ですが、ブタが「H1N1」「H3N2」「H1N2」、クジラが「H3N2」「H13N9」、アザラシが「H7N7」「H4N5」―などと、いろいろな型のインフルエンザウイルスが、いろいろな動物を宿主としています。

そして、ヒトに定着しているのが、いま騒がれている新型インフルエンザと同じ型に属する「H1N1」と「H2N2」「H3N2」です。ヒトの場合、基本的には、この三つの型が、おとなしい季節性インフルエンザとして流行を繰り返しています。

さて、シベリヤやアラスカから南下する渡り鳥がどれほどのインフルエンザウイルスを運んでいるかですが、北海道大学の喜田 宏教授が二〇〇四年～二〇〇六年、モンゴル、中国との共同研究で、野鳥からウイルスを分離した記録によると、ヒト→ヒト感染の発症が懸念される高病原性トリインフルエンザの「H5N1」や今回のブタインフルエンザの「H1N1」以外にも、実に多くのインフルエンザウイルスが発見されています。

具体的には、①モンゴルでH2N2（一、カッコ内は分離株数）、H2N3（二）、H3N2（一）、H3N6（八）、H3N8（三十八）、H4N2（一）、H4N6（三十一）、H8N1（一）、H8N4（一）、H9N2（一）、H10N3（十一）、H10N5（三）、H10N7（一）の計百分離株、②北海道でH1N1（一）、H2N5（一）、H3N2（一）、H3N8（十六）、H4N2（八）、H4N6（十三）、H5N3（三）、H6N1（六）、H6N2（十七）、H6N8（四）、H7N7（三十一）、H8N4（四）、H9N2（二）、H9N4（一）、H10N5（七）、H10N6（一）、H11N9（一）、H12N2（一）、H12N5（一）の計百十九株、③中国でH3N8（一）、H4N6（一）の計二株、④オーストラリアでH2N5（六）の六株―に上っています。このように、渡り鳥の消化管では、絶えず遺伝子の組み換え作業が行われ、実に多くのインフルエンザウイルスが誕生し、運ばれています。

高病原性トリインフルエンザ

私どもは、それぞれの親から受け継いだ二十二プラスXもしくはYの計四十六本の染色体を持っています。その中から、次世代にどの染色体を伝えていくかは確率の問題となりますが、それは八本の染色体を持つインフルエンザウイルスも同じです。ブタの体内でヒトから感染した遺伝子を持ち出すか、それともトリから感染したものを持ち出すかで組み合わせが決まり、場合によっては遺伝子組み換えを起こします。同じような状況はトリの体内でも絶えず起こっています。

いずれにしても、ウイルスを保持した渡り鳥が南下する過程で、多くの野鳥や家畜化された鳥類に、そのウイルスを伝えていきます。そして、アヒルやガチョウ、極めて感受性の高いニワトリ、七面鳥などのグループが感染、ウイルスが爆発的に増える過程で、非病原性だったトリインフルエンザウイルスが、低病原性インフルエンザウイルスに、さらに頻度は多くないものの、時折、高病原性トリインフルエンザと言われる、トリにとって致命的な強毒性を帯びたウイルスに変貌します。

このように、カモが最初に持ってくるウイルスは、決して高病原性のものではありません。しかし、それがアヒルなどを仲介してニワトリに伝わり、六カ月～九カ月

程度かけて密やかに回転している間に、突然、病原性の高いものに変わってしまうのです。

ウイルスも呼吸器だけで増えていれば、基本的に問題はなく、せいぜいカタル性気管支炎や軽い肺炎ですみます。しかし、専門的な説明は省略しますが、ウイルスが呼吸器だけでなく、体中にあるどのタンパク分解酵素でも増えることができるように変異してしまうと、一気に病原性が上がり、ニワトリの大量死が発生、大騒動となってしまいます。

高病原性トリインフルエンザが発生した場合には、その瞬間に残酷なようですが、発症が確認された地域のニワトリなどを全て撲滅する、全群淘汰しか有効な対応策はありません。中国やインドネシア、ベトナムなどでは殺さずにワクチンで防ごうとしていますが、とても不可能で、それらの地域では高病原性トリインフルエンザが常在化してもいます。

さて、いま最も心配されている高病原性インフルエンザウイルス「Ｈ５Ｎ１」の問題点ですが、一つ目は、トリから直接ヒトに感染することです。これまではブタを介さない限り、トリのウイルスはトリ、ヒトのウイルスはヒトにしか感染しませんでした。しかし、Ｈ５Ｎ１は、一九九七年に最初に香港で発生した時から、ある頻度でヒトを巻き込んでいます。

二つ目は、先日も北海道や東北で白鳥が北に帰る時に、自から感染、発症して死んでしまったように、これまで野鳥→ニワトリで終わっていた感染ルートの流れが、ニワトリ→野鳥へと、再び野鳥に戻ってしまったことです。このため渡り鳥の移動とともに、感染範囲がアジア、ヨーロッパ、アフリカへと広がってしまいました。これはこれまでには考えられなかった想定外の事態です

三番目は、専門家が最も心配し始めていることですが、Ｈ５Ｎ１が東南アジアでブタに感染し始めたことです。最初に発見された一九九七年の香港では、十八人が感染して六人が死亡しました。当時の香港当局の防疫担当責任者は、現在のチャンＷＨＯ（世界保健機関）事務長でしたが、彼女は即座に百四十万羽のニワトリを全て撲滅する全群淘汰を決断し感染を止めることに成功しました。

その後、散発的に徐々に東南アジア地域に感染が広がっていきましたが、二〇〇五年に中国の青海湖で野鳥が大量に死亡した頃から、同じ「Ｈ５Ｎ１」ウイルスでも、

その性格が、渡り鳥を殺して感染を広げていくものへと大変異を遂げてしまいます。この渡り鳥に戻った強毒株のＨ５Ｎ１が、シベリヤに帰り、そこから再び南下してウイルスを世界中に広げていく危険性があります。しかし、幸いなことにアメリカ大陸だけは、まだ巻き込まれていません。

そのような中で、二〇〇九年五月にインドネシアでＨ５Ｎ１陽性のブタが発見されました。ブタがなぜ怖いかというと、今回のブタインフルエンザもそうですが、ブタとヒトは体温やタンパク分解酵素が似ているために、種の壁が極めて低く、感染しやすいからです。

しかも、Ｈ５Ｎ１に感染したニワトリのようにバタバタと死んでいけば気がつきますが、Ｈ５Ｎ１に感染したブタは症状をほとんど示さないため、ウイルスはブタからブタへと蔓延してしまいます。その過程でヒトに感染しやすい型に変質してしまうことが心配されます。

現状では、発症者四百十七人で死亡者二百五十七人と死亡率は約六〇％です。いまのブタインフルエンザの死亡率が〇・一～〇・二％ですから、病原性の強さが伺われます。二〇〇二、三年の頃にベトナム、それを追うようにインドネシアで大流行しましたが、ここ一年ほどで急速に発症者数の伸びているのがエジプトです。そのような意味で感染症は、時代とともに次々と姿や発症場所を変えていきます。情報を常に更新しながら注視していくことが不可欠です。

ちなみに、トリインフルエンザで多くの死者を出しているのは、インドネシア百十五人（発症者百四十一人）、ベトナム五十六人（百十一人）、中国二十五人（三十八人）、エジプト二十三人（六十八人）―などです。

「Ｈ５Ｎ１」を想定したフェーズ

高病原性トリインフルエンザの危険性は、現在のところは、まだトリからヒトに感染している段階ですが、それがヒトに感染した後で変異を遂げ、ヒトからヒトに感染しやすいウイルスになってしまうと大変です。大パニックとなったＳＡＲＳ（重症急性呼吸器症候群）でも死亡率は一〇％程度でしたから、死亡率六〇％、感染者の二人に一人が死亡するトリインフルエンザは驚異的で、今回のブタインフルエンザの比ではありません。

リスクシナリオとしては、①トリ由来ウイルスがヒト

↓ヒト感染で病原性を強める（変異）、②ヒトの体内でトリ由来ウイルスとヒト由来ウイルスが組み換えを起こす（遺伝子組み換え）、③トリ由来ウイルスが、トリ↓ブタ↓ヒトへと宿主を変えてくる―の三通りが想定されます。願わくはどのシナリオも起こらず、ウイルスには静かに消えていってもらいたいものですが、油断は禁物です。

今回のブタインフルエンザで、多少の混乱を招いたＷＨＯの新型インフルエンザのフェーズ勧告ですが、もともとは、強毒性を備えた高病原性トリインフルエンザ「Ｈ５Ｎ１」を想定したものでした。

具体的には、ヒトに感染しにくいウイルスが徐々に変異する段階を、①新しいインフルエンザウイルスがまだヒトに感染した例が報告されていない（フェーズ１）、②ヒトに感染した例はまだ見つからないが、動物の感染例が見つかっており、ヒトが感染するリスクがある（フェーズ２）、③ヒトが感染した例が出現し、ヒトからヒトへの伝播はないが、あっても非常に稀である（フェーズ３）、④ヒトからヒトへの感染はあるが、伝播地域が非常に限定的で、ウイルスが充分にヒトに適応していない（フェーズ４）、⑤ヒトからヒトへの感染はまだ地域限定的なものの、大きな集団での感染が認められ、大流行のリスクが高い（フェーズ５）、⑥感染が一般に拡大、大流行するパンデミック（フェーズ６）―の六フェーズに区分しています。そして、Ｈ５Ｎ１のトリインフルエンザの場合は、ヒトが感染した例が出ているものの、ヒトからヒトへの伝播は非常に稀な段階であり、依然としてフェーズ３に止まっています。

しかし、今回のブタインフルエンザは、極めて伝播力が強く、感染性だけから判断すると、容易にヒトからヒトへ感染し、地方伝播、国全体、北アメリカから南アメリカ、そして大陸を越えたヨーロッパ、アジアへと瞬く間に広がり、ＷＨＯもフェーズ６の「パンデミック宣言」をせざるを得なくなってしまいました。

しかし、行動計画（アクション・プラン）はあくまでも、二人に一人が死亡するＨ５Ｎ１のパンデミック状況を想定し、経済活動から人的移動まで止める、極めて厳格な対応プログラムとして作成されています。これを今回のブタインフルエンザにも適応してしまったことから、各国で混乱が生じてきてしまいました。

この教訓を生かして、確かに感染は拡大しているものの、対応行動プランについては、ウイルスの病原性を考えるべきだとの意見が、アメリカなどから出始めています。今後は、当然、広がる速度や性格、感染力や病原性を加味した対応策へと変えていくべきでしょう。

トリインフルエンザについては、東南アジアでの常在化をどう防いでいくのか、新たに巻き込まれ始めているアフリカでの感染をどう監視して止めていくのかが、国際的な統御の根底になってきます。

珍しくないブタインフルエンザ

次にブタですが、冒頭にお話ししたように、ブタだけはトリとヒトのどちらのウイルスにも、感染する特徴を持っています。もしもヒトとトリのインフルエンザウイルスが、同時に一匹のブタに感染すると、両方が混ざりあって遺伝子組み換えを起こす可能性があります。そして、ヒトとブタでは比較的容易にウイルス伝播が行われます。

今回のブタインフルエンザウイルスについては、騒動が起こるまで誰も注目していませんでした。なぜかというと、ブタインフルエンザは、ブタにとって大した病気でないだけでなく、ヒトにとってもヒトインフルエンザよりも軽く、せいぜい農家の人が気にする程度で、農林水産省や国際機関のＯＩＥ（国際獣疫事務局）でも、ほとんど問題にしていなかったためです。

しかし、大流行した一九一八年のスペイン風邪の基になったのは、ブタ（トリ）インフルエンザＨ１Ｎ１で、これが後のヒトインフルエンザウイルスの基になります。

一九九八年に詳細に調べられていますが、この古典的なＨ１Ｎ１のブタインフルエンザに、ブタの体内でヒトのＨ３Ｎ２、トリのＨ１Ｎ２ウイルスが混ざり合い、交雑することで、それぞれの亜型（サブタイプ）の混ざった三重のインフルエンザウイルスが発生してきています。今回の新型ブタインフルエンザＨ１Ｎ１の基になったのも、北アメリカで、一九九八年に見つかったブタ・トリ・ヒトの三重の遺伝子を持つものと古典的なブタウイルスＨ１Ｎ１の四遺伝子群が混ざり合ったＨ１Ｎ２です。

一方、ヨーロッパでは、トリ由来の古典的なＨ１Ｎ１とヒト、ブタのウイルスが交雑したブタインフルエンザが流行していました。遺伝子調査から、今回のブタイン

フルエンザは、アメリカのＨ１Ｎ２とヨーロッパ、アジアのＨ１Ｎ１がブタの体内で組み換えを起こし、新しいＨ１Ｎ１が発生したと考えられています。

ブタはウイルスが上部気道で増え、肺の奥まで感染する機会が少ないため、重症化せず、簡単に空気感染を起こしてしまいます。また、今回大量感染した最大の理由としては工場型の飼育システムが挙げられます。昔は農家で三頭～五頭ほど飼育するのが普通でしたが、いまでは一カ所の食料生産用豚舎で数千頭飼育しています。その中に病原体が入り込むと、爆発的な流行を起こしてしまいます。

当然、個体から個体への感染過程でウイルスが変異する可能性も高くなります。しかも、ブタが次々と倒れていけば気がつきますが、軽い不顕性状態のまま広がっていくので、家畜の感染症リスクは、過去に比べて飛躍的に高まっています。

今回だけでなく、ブタインフルエンザウイルスは、過去に何回となくヒトに感染しています。一九七五年から二〇〇五年にかけて、北アメリカではＨ１Ｎ１型ブタインフルエンザのヒト感染が十例報告されています。

ヨーロッパでは、オランダを中心にＨ１Ｎ１型だけでなく、Ｈ３Ｎ２型も含めたブタインフルエンザウイルスのヒト感染が一九八六年から二〇〇二年にかけて、五例報告されています。

アジアの香港では、Ｈ３Ｎ２型ブタインフルエンザウイルスが十カ月の幼児に感染しています。このようにブタからヒトへのブタインフルエンザ伝播は、決して珍しいものではありません。

しかし、繰り返しとなりますが、今回はヨーロッパ、アジアのブタインフルエンザウイルスと、北アメリカのブタインフルエンザウイルスが組み換わったＨ１Ｎ１型で、しかもヒトに感染しやすい性質をあわせ持っていたために、大流行してしまったと考えられます。これらの経緯は、ウイルスの遺伝子を調べることで明らかにすることができます。

今回の新型ブタインフルエンザですが、ＷＨＯがまとめた八月二十三日時点の発症ケース、死亡例は、アフリカ発症三千八百四十三人、死亡十一人、南北アメリカ発症十一万百十三人、死亡千八百七十六人、東地中海発症三千百二十八人、死亡十人、ヨーロッパ発症四万二千五

百五十七人、死亡八十五人、東南アジア発症一万五千七百七十一人、死亡百三十九人、西太平洋発症三万四千二十六人、死亡六十四人―と、合計で発症ケースが二十万九千四百三十八人以上、死亡例が少なくとも二千百八十五人に上っています。

ただ、発症二十万ケースといっても、日本でも当初こそ、一人ずつ報告していましたが、現在ではそれほど詳細には報告されておらず、実際にはこの十倍近くの感染者がいると予測されます。また、死亡者が二千人程度と死亡率は〇・一%～〇・二%となります。

二十五万人～五十万人が死亡

さて、ヒトインフルエンザですが、歴史的には二十世紀に入ってから、新型インフルエンザは三回出現しています。その中で最も大流行したのが、最初に出現した一九一八年のスペイン風邪です。北アメリカのトリインフルエンザがブタに伝播、ヒトに感染したＨ１Ｎ１型ウイルスで、患者数六億人、死亡者二千万人と膨大な数に上り、これ以降、このような新型インフルエンザの大流行は起きていません。

次が一九五七年のアジア風邪で、カモ、アヒル、ブタに伝播、ヒトに感染したＨ２Ｎ２型ウイルスです。そのほぼ十年後の一九六八年に出現したのが、Ｈ３Ｎ２型のＡ香港ウイルスです。ヒトのＨ２Ｎ２型とカモのＨ３型がブタ体内で遺伝子を組み換えたもので、いまも季節性インフルエンザとして毎年のように発生しています。

その後、一九九七年に高病原性トリインフルエンザウイルスＨ５Ｎ１が香港で流行、ヒトに感染するなど、くすぶり続けている中で、今回の新型ブタインフルエンザＨ１Ｎ１の流行となっています。

したがって、本当の大流行（パンデミック）はスペイン風邪だけで、それにアジア風邪とＡ香港が続いているのが実態です。今回のブタインフルエンザも地域的な広がりは確かにパンデミックですが、それ以外にも抗原変異や組み換えを起こした季節性インフルエンザは、繰り返し流行しています。

その規模ですが、季節性インフルエンザでは世界の人口の約二割（日本では毎年二千万人程度）が感染し、三百万人～五百万人が重症患者となり、年間二十五万人～五十万人の方が亡くなっていると推定されています。