

Emerging infectious diseases and zoonoses. When biology meets anthropology

The workshop presented the biological, ecological and social factors in the transmission of zoonoses from animals to humans in different societies. The aim of the meeting was to find a common language between life sciences and human sciences in order to hold inquiries, to collect data and to analyse zoonotic risks.

Contributions were divided in three main parts:

- 1) **Species barrier**, to present the modes of interspecies and intraspecies transmission, the animal reservoirs, the transmission vectors and the diseases host-switching;
- 2) **Social and ecological transformations**, to demonstrate how human activities such as urbanization, industrial breeding, deforestation, populations migrations and ecological changes allow viruses to emerge, develop and spread to others species;
- 3) **Public policies**, to study how governments and international health authorities find and apply measures of surveillance and control to mitigate zoonoses, such as culling and vaccination. It is also interesting to understand the reason why humans who live in contact with animals infected accept or not those measures for cultural, religious, ecological, economical, political reasons.

The promotion of multidisciplinary research

Epidemiologists, pathologists, virologists, historians, geographers, anthropologists explained, according to their modes of investigation, how diseases emerge and are transmitted among species (humans, animals) considered as hosts.

For Loretta Cormier, a cultural anthropologist, the distance between species is pertinent. She explains how *Aedes* mosquito infected primates, then perhaps humans (presuming similar sylvatic/enzoonotic cycles for malaria vectors). According to her study, the Guaja, an indigenous hunter people, illustrates the complexity of human/animal relationships: living in contact with wild monkeys which constitute their food, and in the same way, incorporating them into kinship system and nurture them as pets. Understanding how viruses emerged and spread from a continent to another allows researchers to make assumptions about diseases origin and mutations in different ecological environments. New ecological zones for malaria and others zoonotic transfer are created by human activities: deforestation versus habitat destruction, migrations of workers, etc.

Most researchers claim a multidisciplinary collaboration to understand the biological and social phenomenon that includes a deep study of environment, animals and humans.

Craig Stephen, an epidemiologist, promotes an interdisciplinary study to find new strategies for diseases management, such as for Japanese encephalitis in Nepal. He promotes the “reciprocal care of human and environmental health”.

In the same way, Malik Peiris, is for a closely work between disciplines, locally, nationally and globally for “One Health”, including environment, animals and humans. Through the example of the living poultry markets in Hong Kong, he expresses how proactive surveillance, risk assessment and evidence-based intervention could be the best way to get long term positive health convincing results (in opposition to the cultural resistance to close these markets).

According to François Moutou, epidemiologists, virologists and molecular biologists are interested in bats, a reservoir of many viruses. For many researchers, the human sciences would improve the life sciences data by observing humans way of life (monkeys hunters, date palm sap harvesters, etc.) and human activities (use of insecticides, deforestation, workers migration, etc.). Steven Luby, studying bats in Bangladesh, observed that the viruses affecting bats are transmitted to humans by the sap they lick on the trees, when harvesters tap the trees to collect the date palm sap. François Moutou says that bats may be apparently not always susceptible to the diseases and this could constitute a hope to treat the contaminated humans. The investigations on an animal species and its virus(es) must then include multidisciplinary collaboration and also multi sites observations to compare the emergences and transmissions of viruses coming from an animal reservoir.

Different languages?

Antoine Gessain, an epidemiologist, promotes the microbiological surveillance and the study of high-risk populations. In Central Africa, some hunters are infected by viruses transmitted by apes and monkeys bites. This transmission has been investigated by the work of epidemiologists, virologists and molecular biologists. However, therapeutic intervention is complicated by the cultural behaviours and religious beliefs of hunters. Some of them cannot imagine that (apparently) healthy animals they are living with since centuries are contaminated by viruses, or do not accept that non-local people dictate a new lifestyle that excludes the traditional contact with wild animals. This kind of confrontation encourages life sciences researchers to rely on human sciences researchers to find a right approach and appropriate solutions.

But some anthropological studies demonstrated how the local people react to the confrontation with virologists. Guillaume Lachenal demonstrates how some Cameroonians criticize the European and American researchers, who want to promote a treatment against HIV, whereas European and American researchers are considered as the people who brought the virus in Africa.

If life sciences and human sciences do not speak the “same language”, as some researchers recognized during the meeting, how can we consider working together and getting benefits for each discipline and for populations?

Life sciences and human sciences have:

- different methods of investigation – short time for biologists, long investigation for anthropologists; a teamwork with multiple specialities (i.e. a division of tasks) for biologists, a solitary work for anthropologists for all steps of the work chain (collect, treatment, analysis and restitution data).
- different funding – high for biologists, low for anthropologists (difference of stakes).
- different modes of restitution – immediate concrete results for biologists (find treatments, provide cares, stop, decrease or eradicate endemic and pandemic diseases, etc.), long reflection for anthropologists with the comparative method.

Life and human sciences are aware they need to cooperate faced with the challenge of emerging zoonoses. To overcome this situation, disciplines could begin to collaborate from the elaboration of the project, from the definition of the study object, to the end of analysis and the practical applications. Biologists can find an anthropologist specialised in each

culture, but if each anthropologist is the specialist of one culture, it can complicate a team of scientists operating mode working in several geographical areas.

This workshop offered the opportunity to open the debate as well as to clarify the needs and the limits of this collaboration.