

MEDICAL ADVANCE

Libreville welcomed world experts to a major international conference on the deadly ebola virus, the first time this event has been held on African soil

THE SUBJECT OF FILMS and books such as Richard Preston's best-selling bio-thriller *The Hot Zone* and the Hollywood film *Outbreak* starring Dustin Hoffman, ebola is a disease that strikes fear into us all. According to the World Health Organisation, since 1976 it is believed to have caused around 15 epidemics across Africa, notably in Sudan, Uganda, the Democratic Republic of Congo, the Republic of Congo, the Ivory Coast and Gabon, affecting 1,900 people and causing 1,300 deaths. Those infected develop a haemorrhagic fever, for which, in 50 to 90 per cent of cases, there is no treatment.

Ebola has also devastated wild ape populations, with loss of one third of the western gorilla population leading the World Conservation Union to reclassify them as critically endangered. The scientific journal *Science* reports that 5,000 were killed at a single site. The total gorilla and chimpanzee death toll from ebola is in the tens of thousands.

More than a hundred scientific experts from the United States, Europe and Africa converged on Libreville recently for a week-long conference on the disease. It was the first time the event had been held in Africa – previous conferences had taken place in the United States and Canada. Scientists were able to report that they are making progress, stating that a vaccine could be ready in five years and stressing that the world should not allow the disease to gain a hold. For the moment ebola is “emergent” but so was HIV in the 1960s.

After an average incubation period of seven days, a patient infected with ebola develops symptoms such as fever, headache, diarrhoea and bleeding, and may die within a week. Ebola's ‘cousin’, the Marburg virus, named after the town in Germany where it was first diagnosed in 1967, has claimed several dozen victims in Africa, with a death rate of over 80 per cent.

Bats played a starring role at the conference. After establishing the link between human infection and contact with infected monkeys, a team working with Eric Leroy, head of

the emerging viruses unit of the International Centre of Medical Research (CIRMF) in Franceville and a director of the French Research Institute for Development (IRD), has made a further significant advance in understanding the disease. It has discovered that bats are probably the natural reservoir for these viruses, who transmit them to monkeys, other animals or directly to man. Three species of fruit-eating bats have been identified as hosts.

Humans and monkeys, say the researchers, probably come into contact with fruit that the bats have chewed. People are directly infected, or via primates with which they have had contact. This pioneering discovery by CIRMF scientists means that populations can be better protected since a new carrier is known. Research will now concentrate on learning more about the ecology of the bats.

Spotlight on Gabonese excellence

The Fourth International Conference on the Ebola and Marburg Viruses, which was held at the French Cultural Centre, could not have taken place in Africa without the active involvement of CIRMF, founded in 1979 on the initiative of Gabonese President El Haj Omar Bongo Ondimba, and of the oil company Total Gabon. The work of CIRMF scientists, notably on malaria, HIV, haemorrhagic fevers and primatology, is recognised throughout the world. The conference provided an opportunity to turn the spotlight on its research.

With its government and business sponsorship, CIRMF has become “an outstanding centre, unique in the world. We have hundreds of available primates, indispensable for studying the transmission of viruses from animals to man,” said Mirdad Kazanji, head of CIRMF's retro-virology department, who was delighted to see such a prestigious conference held in Africa. “CIRMF is located at the epicentre of various viral diseases. We are able to work on the ground here in Africa, in conditions matching those of the best Western facilities.” The centre boasts a laboratory carrying out advanced virological research, and an animal house containing 200 →



Actor Dustin Hoffman (right) in the Hollywood film *Outbreak* which revolved around a fictional ebola virus epidemic in California

REX FEATURES

Clockwise: A scientist reviews the events of an ebola outbreak in the Republic of Congo in 2003; medical staff in protective clothing treat a patient; Eric Leroy, the conference organiser and ebola expert at CIRMF, Angélique Ngoma, Gabonese Minister of Health



GETTY, WILFRIED MBINAH

primates. It receives scientists from many prestigious organisations.

The conference was an opportunity to assess current thinking about appropriate care for ebola and Marburg patients. Given their high mortality, isolation of patients is the top medical priority. As Dr Pierre Fromenty, the Africa representative of the World Health Organisation, explained in discussions, most infection occurring during epidemics in towns is "nosocomial" in origin, in that the virus spreads in hospitals and other medical centres. Front-line medical staff are especially vulnerable. Dr Fromenty recommended that during an epidemic, centres where patients are treated should be placed in isolation.

Human vaccine

All the specialists focused on presentations outlining the current state of research on vaccines. Researchers have succeeded in developing a vaccine that is effective in monkeys. "It's a matter of time, but we have the technology needed to produce a human vaccine against ebola and Marburg," said Thomas Geisbert, from Boston University, one of the most respected specialists in the field.

"We're using a form of treatment with monkeys and it's working very well," he said, while warning that it would "take some time before we can adapt it for human use". This vaccine works similarly to that injected to treat "post-exposure" rabies, given once the patient has encountered the virus. It would, therefore, not be a question of vaccinating whole populations, but only medical staff and patients' families, once the virus has appeared.

In order to increase their knowledge of these diseases, scientists are benefiting from working in co-operation with anthropologists and sociologists. Dr Alain Epelboin, of the Museum of Natural History in Paris, is using an anthropological approach that enables him to study the impact of an epidemic on societies affected by the virus. He tries to assess the risks of infection that arise when families travel to hospitals. He is also studying local funeral customs in order to be able to better adapt them when there is a public health emergency.

Clelia Gasquet of the IRD is a geographer specialising in health, based at CIRMF. She is studying diseases that emerge in a particular place and

their spatial movement, tracing on a map the routes taken by local people – hunters, for example, or people panning for gold – through different types of forest. "You have to spend a lot of time in the villages to create these maps, but then you can begin to see the connections there may be between the movements of groups of people and the way the disease spreads," she said. ■

Marie Tarquin



CHRISTOPHE LEBETT

The reservoir of the ebola virus has long been a mystery, despite a number of deadly outbreaks in humans and great apes. Researchers have now found evidence of infection in three species of fruit bats. The bats show no symptoms of the disease and are in effect silent carriers