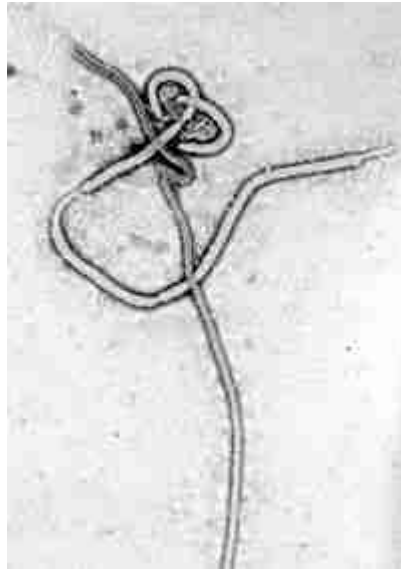


Zoonosis-

From hidden virus to deadly outbreak



Zaire Ebola virus

Module: Wildlife and Ecology
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We humans share our world with many species. Mammals, birds, reptilians and so on. In addition to all these species, there are all those organism that are too small to see with the naked eye. Viruses causing disease in humans and animals. But every once in a while we all get very aware of their existence. The avian bird flue, mad cow disease (BSE) and SARS are diseases that create big headlines in the news. Then there are those that not to many people have heard of like the Hendra virus, Ebola and SIV (Simian Immunodeficiency Virus). Most viruses and bacteria have specific hosts in which they can propagate and cause disease. Some can, if opportunity present itself jump to a new host. If a pathogen eg. a virus jumps from an animal to a human the result is a zoonosis. One example is the Hendra virus.

The first outbreak of the Hendra virus occurred in September 1994 in a suburb to Brisbane, Australia. It was a mare grazing on a distant field that was the first victim. Two days later the horse died. Two weeks after the death of the first horse several other horses got sick, showing symptoms like fever, swollen heads, breathing difficulties and moving disorders. Within a couple of days twelve horses died. Nineteen of the twenty three horses that got infected died. The virus also infected two humans, only one survived. Their symptoms included kidney failure, fever and breathing difficulties. It is believed that they got infected by frothy nasal discharge from the first mare who got sick. The veterinarian treating the horses was helpless against this infectious disease. One of the horses died such a violent death that he never was able to get close enough to give it the injection.

The Hendra virus was previously unknown and killed its hosts very quickly. Seven horses died within twelve hours from showing symptoms. The virus was traced to bats living in a tree on the field where the first horse was grazing. It is believed that the horse went underneath the tree and got exposed to the virus by digesting dropped fruit, bat urine and faeces from the ground when grazing the grass.

Antibodies against the Hendra virus was also found in blood samples from a flying dog species. Also other closely related species living in the areas around the town of Hendra, from which the virus got its name, showed antibodies against the virus. This showed that these animals serve as reservoirs for the virus. After analysis the virus turned out to be a very old virus, probably lying dormant in its reservoir for thousands of years.

The SIV infects humans and monkeys in parts of Asia. This virus is a retrovirus infecting primates. There are two strains that can infect humans, HIV-1 and HIV-2. Humans can come in contact with the virus when hand feeding the monkeys. These places may be temples where tourist feed the monkeys unaware of the risk they are exposing themselves to. At some places, the guides even encourage the tourists to feed the monkeys and the local people make money on selling bananas and other fruits to use as food. This makes the monkeys very friendly towards the people and they loose their natural fear of humans. The monkeys and the people live very close together and the risk of spreading an infectious disease increases.

The Ebola virus is the causative agent for Ebola hemorrhagic fever which is a severe and often fatal disease infecting humans and nonhuman primates. When Ebola had an outbreak in the village of Mayibout II in Gabon, eighteen people got sick with symptoms like fever, head ache, vomiting, bleeding from the eyes and gums and bloody diarrhoea. Of the eighteen people getting sick five died. As the villagers did not know the cause of the deaths they brought back the dead to the village and buried them without any precautions. Soon after more people got sick, these people were all relatives to the diseased or had handled the dead bodies. A total of twenty one people died, giving the virus a 68% kill rate.

Discussion and conclusion

As our human civilization expands, it does so, on the expense of the wildlife and nature which surrounds us. Cities grow and more and more species are forced out of their natural habitats. Wild animals and humans live closer and closer together and so our contact with each other increases. A contact that under natural circumstances never would have happened. Diseases that normally only effect certain animals can transfer to humans and other animals to which they can be very fatal. Many of these viruses do not cause sickness in their original hosts. They lie dormant in these reservoirs not causing any symptoms, but when introduced to a new host they cause serious illness.

I strongly believe that the proximity of the wild animals to domestic ones and humans is the major reason of outbreaks. Proximity caused by us humans.

Concerning the Hendra virus, four more incidents are reported. In Cairns in 1999 and 2004, Townsville in 2004 and on the Sunshine Coast in 2006, each resulting in the death of one horse. In the Townsville incident, a veterinarian who was involved in the autopsy of the horse developed a Hendra related illness soon after the procedure but recovered.

Viruses are not affected by antibiotics making them very difficult to treat. These viruses “disappear” as fast as they appear. They may be extinct when disappearing, at least at that specific location, but they may also just go back to their reservoirs. Finding the reservoirs of the viruses can be most difficult and thus tracing the virus and its different pathways will be hard. The viruses are hidden from us. Those pathogens hiding in, for instance mosquitoes, are very hard to exterminate for obvious reasons. One example of this is the yellow fever caused by a virus found in several mosquito species.

Not all viruses are zoonoses. One example is the smallpox. This virus infects humans and occasionally other primates. Since the virus is confined to one species it was more easily destroyed. Smallpox was exterminated in 1979.

I believe that we ourselves are the cause for many of the zoonotic outbreaks. If we hadn't interfered with the wild life, forcing the animals to seek new hunting and feeding grounds many of these pathogens would not have been introduced to humans. It is not the animals bringing the viruses to us, so much as it is us, bringing ourselves to the viruses. The enormous number of people on the planet, and how easily we can travel all over the world, contributes to the increased spreading of infectious agents. A virus can spread from one continent to another within days and infect a huge number of people in a very short period of time.

To completely prevent new outbreaks is an impossibility. No one knows where new unknown pathogens may be resting. But I still think that more strict precautions must be taken, both by veterinarians and human doctors. In case of unknown infectious diseases the proper quarantine should be established. The proper precautions at autopsies and investigation of sick animals are of highest importance. I believe that new, unknown or rare infectious diseases will be a large part of our future. And it will be one of the biggest battles that we have to fight.

Even though we humans are a big part of the problem, we must not forget that we are also part of the solution.

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