

BSE pathogens can be transmitted by air

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Airborne prions are also infectious and can induce mad cow disease or Creutzfeldt-Jakob disorder. This is the surprising conclusion of researchers at the University of Zurich, the University Hospital Zurich and the University of Tübingen. They recommend precautionary measures for scientific labs, slaughterhouses and animal feed plants.

The prion is the infectious agent that caused the epidemic of [mad cow disease](#), also termed [bovine spongiform encephalopathy](#) (BSE), and claimed the life of over 280,000 cows in the past decades. Transmission of BSE to humans, e.g. by ingesting food derived from BSE-infected cows, causes variant Creutzfeldt-Jakob disease which is characterized by a progressive and invariably lethal break-down of brain cells.

It is known that prions can be transmitted through contaminated surgical instruments and, more rarely, through blood transfusions. The consumption of food products made from BSE-infected cows can also induce the disease that is responsible for the death of almost 300 people. However, prions are not generally considered to be airborne – in contrast to many viruses including influenza and chicken pox.

A high rate of infection

Prof. Adriano Aguzzi's team of scientists at the universities of Zurich and Tübingen and the University Hospital Zurich have now challenged the notion that airborne prions are innocuous. In a study, mice were housed in special inhalation chambers and exposed to aerosols containing prions. Unexpectedly, it was found that inhalation of prion-

tainted aerosols induced disease with frightening efficiency. Just a single minute of exposure to the aerosols was sufficient to infect 100% of the mice, according to Prof. Aguzzi who published the findings in the Open-Access-Journal "*PLoS Pathogens*." The longer exposure lasted, the shorter the time of incubation in the recipient mice and the sooner clinical signs of a prion disease occurred. Prof. Aguzzi says the findings are entirely unexpected and appear to contradict the widely held view that prions are not airborne.

The prions appear to transfer from the airways and colonize the brain directly because immune system defects – known to prevent the passage of prions from the digestive tract to the brain – did not prevent infection.

Protecting humans and animals

Precautionary measures against prion infections in scientific laboratories, slaughterhouses and animal feed plants do not typically include stringent protection against aerosols. The new findings suggest that it may be advisable to reconsider regulations in light of a possible airborne transmission of prions. Prof. Aguzzi recommends precautionary measures to minimize the risk of a [prion](#) infection in humans and animals. He does, however, emphasize that the findings stem from the production of aerosols in laboratory conditions and that Creutzfeldt-Jakob patients do not exhale prions.

More information: Haybaeck J, Heikenwalder M, Klevenz B, Schwarz P, Margalith I, et al. (2011) Aerosols Transmit Prions to Immunocompetent and Immunodeficient Mice. *PLoS Pathog* 7(1): e1001257. doi:10.1371/journal.ppat.1001257

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