

Evolution of equine influenza led to canine offshoot which could mix with human influenza

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Equine influenza viruses from the early 2000s can easily infect the respiratory tracts of dogs, while those from the 1960s are only barely able to, according to research published ahead of print in the *Journal of Virology*. The research also suggests that canine and human influenza viruses can mix, and generate new influenza viruses.

Canine influenza is a relatively new disease. The first appearance is believed to be in 2003, as a result of direct transfer of a single equine influenza virus to [dogs](#) in a large greyhound training facility and was subsequently carried to many states by the infected greyhound, say the researchers. Similar transfers have occurred among foxhounds in the UK, and in dogs kept near infected horses during a 2007 outbreak in Australia, they report.

In the study, investigators from the United States and the United Kingdom infected dog tracheal explant cultures—essentially pieces of trachea cultured in the laboratory to mimic the cellular complexity and the host physiology of the host—with canine influenza virus, equine influenza virus, and human [influenza viruses](#). (The use of explants has increased in recent years, and they have been shown to be useful for studies of viral pathogenesis.) They then compared the growth of the viruses, and the damage they wrought.

Infection of equine influenza virus from 2003 caused an infection much

like that from canine [influenza virus](#) in terms of the virus' rate of replication and the extensive tissue damage it caused. In contrast, viruses from 1963 replicated poorly, and caused relatively minor lesions in comparison with the 2003 virus.

The investigators also transfected cells with DNA containing the genes of both canine and [human influenza](#) viruses, to determine whether the genes from the two viruses were compatible with each other.

"We showed that the genes are indeed compatible, and we also showed that chimeric viruses carrying human and [canine influenza](#) genes can infect the dog tracheas," says corresponding author Pablo Murcia of the University of Glasgow Centre for Virus Research, UK.

That, he says, means that such chimeric viruses might occur naturally, and would likely be able to infect dogs. These findings have significant implications because they show that dogs might act as "mixing vessels" in which [novel viruses](#) with pandemic potential could emerge.

Studies investigating whether they could infect human lungs are underway.

More information: The manuscript can be found online at [jvi.asm.org/content/early/2014 ... 887-14.full.pdf+html](http://jvi.asm.org/content/early/2014/.../887-14.full.pdf+html)

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