

Novel poxvirus threatens juvenile squirrels

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Red squirrel with poxvirus. Credit: Wibbelt G. Leibniz-IZW

A previously unknown poxvirus causes severe disease in European red squirrels from Germany. Molecular genetic investigations revealed a new virus species in the family of Poxviridae. Results of the study are published in the scientific journal *Emerging Infectious Diseases*.

For several years, juvenile [red squirrels](#) have been found in the greater Berlin metropolitan area with severe inflammatory lesions of hands, feet and ears without evidence of a cause. "The little squirrels cannot keep hold of anything because their tiny fingers are sticking together. The wounds are so painful that some animals die in shock," says Tanya Lenn from the Red Squirrel Sanctuary Berlin/Brandenburg, who saw many red squirrels recover after intensive care. "Despite all efforts, if they are found too late, not all animals will make it."

Some of the deceased red squirrels were submitted to the Leibniz Institute for Zoo and Wildlife Research (IZW) for pathological investigations. Wildlife pathologist Gudrun Wibbelt detected profound inflammatory skin infections in all animals complicated by secondary colonization of bacteria and yeasts. "But the most important finding in the diseased skin were oval inclusion bodies within the skin cells visible only by microscopical examination," explains Wibbelt. With the aid of electron microscopy, viral particles could be demonstrated in these inclusions in all investigated squirrels. Wibbelt reports that "shape and size of these viruses are similar to cowpox virus."

To verify this suspicion, samples were sent to the national reference laboratory for poxviruses at the Robert Koch-Institute (RKI). To their surprise, routine molecular diagnostic techniques did not produce positive results. Subsequently, Livia Schrick and Andreas Nitsche (RKI) isolated the virus. On the basis of this virus isolate, their colleagues Simon Tausch and Piotr Dabrowski decoded the whole genome of the virus. The researchers compared the genetic information of the virus with all known poxviruses. "We discovered that the Berlin Squirrelpox virus is a novel poxvirus species, as it is only remotely related to other poxviruses," says Nitsche. "The virus seems to specifically infect red squirrels, while infections in humans or pets are rather unlikely," comments Wibbelt.

Skin diseases caused by another squirrelpox virus are well known in red squirrels from Great Britain. This pathogen is partly responsible for large-scale regional extinction of red squirrels across most parts of England. The bigger grey squirrels, imported from North America into England in the 19th century, were carriers of this virus species. While they remain healthy, they shed the [virus](#) to the environment, where it can be transmitted to red squirrels. Grey squirrels are not present in Germany. Occasionally, the native red squirrels occur in colour variations from light grey to black – but can always be unmistakably recognized as red squirrels by the tiny hair tufts at the tips of their ears.

"The discovery of such a novel poxvirus is a small sensation among scientists working on poxviruses and all the more remarkable when this happens on your own doorstep," says Wibbelt.

More information: Gudrun Wibbelt et al. Berlin Squirrelpox Virus, a New Poxvirus in Red Squirrels, Berlin, Germany, *Emerging Infectious Diseases* (2017). [DOI: 10.3201/eid2310.171008](https://doi.org/10.3201/eid2310.171008)

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