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Red squirrels stricken by medieval strain of leprosy, study shows

Leprosy in Britain's red squirrels is being caused by the same species of bacteria responsible for human infections, a DNA study has found.

One of the strains – affecting squirrels on Brownsea Island, off England's south coast – shares close similarities with that responsible for outbreaks of the disease in medieval Europe.

Researchers tested 25 samples from red squirrels on the island and found that all were infected with the bacteria *Mycobacterium leprae*, though not all showed signs of the disease.

The bacteria shared close similarities with a strain discovered in the skeleton of a leprosy victim buried in Winchester 730 years ago. It is also similar to a strain that is endemic in armadillos in southern states of the US.

Scientists say their findings suggest that leprosy has affected red squirrels on Brownsea Island for centuries but stress that the chances of people catching the disease are low.

Red squirrels in other parts of England, Scotland and Ireland are also affected by leprosy. The study found that these animals were infected with another species of the bacteria called *Mycobacterium lepromatosis*.

DNA analysis revealed that this strain is similar to those found in human cases of leprosy in Mexico and the Caribbean.

The international team – led by the University of Edinburgh in collaboration with the École Polytechnique Fédérale de Lausanne (EPFL) – collected samples of the bacteria during post mortems carried out on red squirrels from each of the locations.

Not all of the squirrels that were infected with the bacteria showed symptoms of leprosy. Those that did had swelling and hair loss on the ears, muzzle and feet.

Red squirrels have drastically declined in the UK with fewer than 140,000 remaining. The main threat is from habitat loss and the squirrelpox virus carried by grey squirrels.

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The species was re-introduced into Ireland by transfer of animals from England in the early 1800s. The team says their findings suggest that the squirrels transported were likely infected with leprosy at the time.

Researchers say it is unclear whether leprosy poses a significant threat to the future of red squirrels. They have recently launched a major study on Brownsea Island to study the disease.

Human cases of leprosy are virtually unheard of in the UK but the disease continues to affect people in developing countries. The scientists say their findings suggest that animals could be a reservoir for the bacteria in these areas, thwarting efforts to eradicate the disease.

Vet experts from the University's Royal (Dick) School of Veterinary Studies worked with researchers at the Moredun Institute and experts in human leprosy from EPFL in Switzerland. The study is published in the journal *Science*.

Professor Anna Meredith, of the University of Edinburgh's Royal (Dick) School of Veterinary Studies, said: "The discovery of leprosy in red squirrels is worrying from a conservation perspective but shouldn't raise concerns for people in the UK. We need to understand how and why the disease is acquired and transmitted among red squirrels so that we can better manage the disease in this iconic species."

Professor Stewart Cole, of the École Polytechnique Fédérale de Lausanne, said: "It was completely unexpected to see that centuries after its elimination from humans in the UK, *Mycobacterium leprae* causes disease in red squirrels. This has never been observed before."

Ongoing research on Brownsea Island is supported by its owners – National Trust and Dorset Wildlife Trust – which manage a large nature reserve on the island. Brownsea will remain open as usual during the four-year project.

Angela Cott, National Trust General Manager for Brownsea Island, said: "Brownsea's wild red squirrel population has been living with leprosy for at least four decades. But by working with the University of Edinburgh and Dorset Wildlife Trust, we hope to understand how best to look after Brownsea's wild red squirrels. Brownsea Island remains a spectacular place for people to see wildlife."

For further information, please contact:

Jen Middleton, Press & PR Office, tel 0131 650 6514, email Jen.Middleton@ed.ac.uk