

Scientists discover 21st century plague

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Bacteria that can cause serious heart disease in humans are being spread by rat fleas, sparking concern that the infections could become a bigger problem in humans. Research published in the December issue of the *Journal of Medical Microbiology* suggests that brown rats, the biggest and most common rats in Europe, may now be carrying the bacteria.

Since the early 1990s, more than 20 species of *Bartonella* bacteria have been discovered. They are considered to be emerging zoonotic pathogens, because they can cause serious illness in humans worldwide from heart disease to infection of the spleen and nervous system.

"A new species called *Bartonella rochalimae* was recently discovered in a patient with an enlarged spleen who had travelled to South America," said Professor Chao-Chin Chang from the National Chung Hsing University in Taiwan. "This event raised concern that it could be a newly emerged zoonotic pathogen. Therefore, we decided to investigate further to understand if rodents living close to human environment could carry this bacteria."

Scientists have found that rodents carry several pathogenic species of *Bartonella*, such as *B. elizabethae*, which can cause endocarditis and *B. grahamii*, which was found to cause neuroretinitis in humans. Although scientists are unsure about the main route of transmission, these infections are most likely to be spread by fleas. *Ctenophthalmus nobilis*, a flea that lives on bank voles, was shown to transmit different species of *Bartonella* bacteria. These pathogens have also been found in fleas that live on gerbils, cotton rats and brown rats.

"We analysed bacteria found in *Rattus norvegicus* in Taiwan. The brown rat is also the most common rat in Europe," said Professor Chang. "By analysing the DNA of the bacteria, we discovered a strain that is most closely related to *B. rochalimae*, which has been isolated recently from a human infection in the United States".

The researchers took samples from 58 rodents, including 53 brown rats, 2 mice (*Mus musculus*) and 3 black rats (*Rattus rattus*). 6 of the rodents were found to be carrying *Bartonella* bacteria; 5 of these were brown rats. Four of the rodents were carrying *B. elizabethae*, which can cause heart disease in humans, and one of the black rats was found to be harbouring *B. tribocorum*. However, the scientists noticed one strain that had not been identified in rodents previously. The strain was finally shown to be close to *B. rochalimae*.

"Because of the small sample size used in this study, we cannot say for sure that the common brown rat is spreading *B. rochalimae*," said Professor Chang. "However, several different *Bartonella* bacteria are surely transmitted by rodents. These results raise concerns about the existence of other reservoirs and vectors for this emerging infection. This certainly warrants further investigation."

Source: Society for General Microbiology

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