

From the CSIRO

Bat super immunity to lethal disease could help protect people



For the first time, researchers have uncovered a unique ability in bats which allows them to carry but remain unaffected by lethal diseases. Bats are a natural host for more than 100 viruses, some of which are lethal to people, including Middle East respiratory syndrome coronavirus, Ebola virus and Hendra virus; however, bats do not get sick or show signs of disease from these viruses.

Published in the journal *Proceedings of the National Academy of Sciences*, the new research examines the genes and immune system of the Australian black flying fox, with surprising results (doi: 10.1073/pnas.1518240113).

"We focused on innate immunity of bats, in particular the role of interferons — which are integral for innate immune responses in mammals — to understand what's special about how bats respond to invading viruses," leading CSIRO bat immunologist Dr Michelle Baker said.

"Interestingly, we have shown that bats only have three interferon α genes, which is about a quarter of the number of interferon α genes we find in people.

"This is surprising given bats have this unique ability to control viral infections that are lethal in people and yet they can do this with a lower number of interferons."

The research showed that bats express a heightened innate immune response even when they were not infected with any detectable virus.

"Unlike people and mice, who activate their immune systems only in response to infection, bats' interferon α is constantly 'switched on', acting as a 24/7 frontline defence against diseases," Dr Baker said.

"If we can redirect other species' immune responses to behave in a similar manner to that of bats, then the high death rate associated with diseases, such as Ebola, could be a thing of the past."

Led by the CSIRO, this international research effort included expertise from the CSIRO, Duke-NUS Medical School and the Burnet Institute.

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doi: 10.5694/mja16.00346

Podcast with Dr Michelle Baker available at
www.mja.com.au/multimedia/podcasts