How Australian wildlife spread and suppress Ross River virus

15 January 2019, by Eloise Stephenson, Cameron Webb And Emily Johnston Flies

Ross River virus is Australia’s most common mosquito-borne disease. It infects around 4,000 people a year and, despite being named after a river in North Queensland, is found in all states and territories, including Tasmania.

While the disease isn’t fatal, it can cause debilitating joint pain, swelling and fatigue lasting weeks or even months. It can leave sufferers unable to work or look after children, and is estimated to cost the economy A$2.7 to A$5.6 million each year.

There is no treatment or vaccine for Ross River virus; the only way to prevent is to avoid mosquito bites.

Mosquitoes pick up the disease-causing pathogen by feeding on an infected animal. The typical transmission cycle involves mosquitoes moving the virus between native animals but occasionally, an infected mosquito will bite a person. If this occurs, the mosquito can spread Ross River virus to the person.

Animal hosts

Ross River virus has been found in a range of animals, including rats, dogs, horses, possums, flying foxes, bats and birds. But marsupials – kangaroos and wallabies in particular – are generally better than other animals at amplifying the virus under experimental infection and are therefore thought to be "reservoir hosts".

The virus circulates in the blood of kangaroos and wallabies for longer than other animals, and at higher concentrations. It's then much more likely to be picked up by a blood-feeding mosquito.

Dead-end hosts

When we think of animals and disease we often try to identify which species are good at transmitting...
the virus to mosquitoes (the reservoir hosts). But
more recently, researchers have started to focus on
species that get bitten by mosquitoes but don't
transmit the virus.

These species, known as dead-end hosts, may be
important for reducing transmission of the virus.

With Ross River virus, research suggests birds that
get Ross River virus from a mosquito cannot
transmit the virus to another mosquito. If this is
true, having an abundance of birds in and around
our urban environments may reduce the
transmission of Ross River virus to animals,
mosquitoes and humans in cities.

Other reservoir hosts?

Even in areas with a high rates of Ross River virus
in humans, we don't always find an abundance of
kangaroos and wallabies. So there must be other
factors – or animals yet to be identified as
reservoirs or dead-end hosts – playing an important
role in transmission.

Ross River virus is prevalent in the Pacific Islands,
for instance, where there aren't any kangaroos and
wallabies. One study of blood donors in French
Polynesia found that 42.4% of people tested had
previously been exposed to the virus. The rates are
even higher in American Samoa, where 63% of
people had been exposed.

It's unclear if the virus has recently started
circulating in these islands, or if it's been circulating
there longer, and what animals have been acting as
hosts.

What about people?

Mosquitoes can transmit some viruses, such as
dengue and Zika between people quite easily.

But the chances of a mosquito picking up Ross
River virus when biting an infected human is low,
though not impossible. The virus circulates in our
blood at lower concentrations and for shorter
periods of time compared with marsupials.

If humans are infected with Ross River virus,
around 30% will develop symptoms of joint pain
and fatigue (and sometimes a rash) three to 11
days after exposure, while some may not
experience any symptoms until three weeks after
exposure.

To reduce your risk of contracting Ross River virus,
take care to cover up when you're outdoors at
sunset and wear repellent when you're in outdoor
environments where mosquitoes and wildlife may
be frequently mixing.

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