

# Tick-borne pathogens and diseases



*Stephen R Graves*

Welcome to this edition of *Microbiology Australia* in which we examine the second most dangerous ectoparasite for humans, the tick (the most dangerous being without doubt the mosquito!), for the pathogens it carries and the diseases it can cause.

Ticks of many different species, in all parts of the world, transmit many different infections to humans and various vertebrate animal species, including those that are of great importance to Man (e.g. cattle, sheep, goats, dogs and cats). Some tick-transmitted diseases, such as Lyme Disease, have been only recently recognised (late 1970s), while others, such as Rocky Mountain Spotted Fever in the Americas, have been known for over 100 years. Some have a very Australian focus, such as Q Fever and Flinders Island Spotted Fever, first recognised in Australia but now known to be virtually world-wide in their distribution.

Of the 11 articles included in this edition of *Microbiology Australia*, seven are about the Australian tick situation and four about overseas ticks (Europe, Asia and the USA) and cover both human and animal pathogens carried by ticks.

Overseas, the most important tick-transmitted infections are probably Lyme Disease (Abdallah *et al.*), tick-borne encephalitis (TBE) (Dobler) and rickettsiae (Robinson *et al.*). In Australia we appear to not have Lyme Disease *Borrelia spp* or TBE virus in our ticks. However, we do have protozoal infections (theileriosis) in cattle (Jenkins), bacterial infections, including *Rickettsia spp* and *Coxiella spp* in humans and animals (Irwin *et al.*, Oskam *et al.*) and possibly human viral infections also (O'Brien *et al.*). The field is still in its infancy and there remains a lot to be learned.

An understanding of the ticks present in Australia, both the endemic and exotic species, is crucial basic knowledge in tackling the problems of tick-transmitted illness (Barker and Barker).

There is also a plethora of non-infectious illness associated with tick bites (Beaman), which, in Australia, may well exceed the cases of infectious disease. This has been of recent concern by the parliament of the Commonwealth of Australia.

Diagnosing tick-transmitted infections requires both the treating doctor to think of the possibility of tick-bite in their patient and a microbiology diagnostic laboratory with the expertise to confirm or refute the tentative diagnosis. Newer lab techniques for diagnosing rickettsial infections in the USA (Kato) and Australian tick-transmitted microbes (Stenos and Graves) are reported.

As you browse through this edition of *Microbiology Australia*, I trust that you will come to appreciate that it is not only mosquitos that are the invertebrate curse of Mankind, but that the non-flying, biting tick is also a biological force with which to be reckoned!

## Biography

**Stephen R Graves** is a medical microbiologist. He obtained his BSc (honours in Microbiology) from the University of WA, when Neville Stanley was the Professor of Microbiology. He then completed his PhD in the field of leptospirosis with Solly Faine at Monash University and later his medical degree at The University of Melbourne. After post-doctoral research on *Treponema pallidum* at the University of Minnesota with Russ Johnson, he became a Lecturer/Senior Lecturer in Microbiology at Monash University. He established the Australian Rickettsial Reference Laboratory in 1996 while Director of Microbiology at The Geelong Hospital, Geelong, Victoria. This not-for-profit boutique, diagnostic and research laboratory specialises in *Rickettsia spp* and other ectoparasite-transmitted microbes, including Q Fever (*Coxiella burnetii*). As the Approved Pathology Provider (APP) for the laboratory, and a Fellow of the Royal College of Pathologists of Australasia, his laboratory receives Medicare funding that is then applied to solving research questions. As one of the original Fellows of the Australian Society for Microbiology, he considers teaching and mentoring younger microbiologists to be his crucial role at this stage of his career.

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