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### Characterization and detection of tick-borne pathogens using platform technologies

**Statement of the Problem:** In Australia, a conclusive aetiology of Lyme disease-like illness in human patients remains elusive, despite growing numbers of people presenting with symptoms attributed to tick bites. This undetermined disease usually presents as acute flu-like symptoms including headache, fever, and fatigue that can persist for weeks to months, and may develop into a severe chronic illness that can include, but is not limited to, myalgia, arthralgia, chronic migraine, and a systemic inflammatory syndrome. Despite this, little has been documented about microorganisms harboured within Australian native ticks or their pathogenic potential.

**Methodology & Theoretical Orientation:** Universal PCR primers were used to amplify the V1-2 hyper-variable region of bacterial 16S rRNA genes in DNA samples from human-biting ticks and ticks from wildlife. The 16S amplicons were sequenced on the Illumina MiSeq platform and analysed in USEARCH, QIIME, and BLAST to assign genus and species-level taxonomies. Nested PCR and Sanger sequencing were used to confirm the NGS data and further analyse novel findings.

**Findings:** NGS of 16S rDNA amplicons has identified five novel bacterial species in ticks including an *Anaplasma* sp., an *Ehrlichia* sp., two Ca. Neoehrlichia species, and a novel Borrelia species, which is divergent from *B. burgdorferi* and relapsing fever (Fig. 1).

**Conclusion & Significance:** Determining whether these newly discovered organisms can cause disease in humans and animals, like closely related bacteria do abroad, are of public health importance and require further investigation.

#### **Biography**

Una Ryan is an expert in the molecular detection and characterization of bacterial and protozoan parasites and to date, she has described more than 17 new protozoan parasites and five new bacterial species. She has 249 publications, including one book, 16 book chapters, 208 research papers in international journals, and 24 invited reviews.

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