Technical Reports of the Australian Museum, Online (2014) No. 24, pp. 15–17.
ISSN 1835-4211 (online)
http://dx.doi.org/10.3853/j.1835-4211.24.2014.1608

Koala Retrovirus in Free-Ranging Populations—Prevalence

Joanne Meers,*[1] Greg Simmons,[1] Kiersten Jones,[1,2]
Daniel T. W. Clarke,[2] and Paul R. Young[2]

[1] School of Veterinary Science,
The University of Queensland, Gatton Queensland 4343, Australia

[2] School of Chemistry & Molecular Bioscience,
The University of Queensland, St Lucia QLD 4072, Australia

j.meers@uq.edu.au

Abstract. The prevalence of koala retrovirus (KoRV) provirus (DNA) and the average number of proviral insertions per cell vary in different free-ranging koala *(Phascolarctos cinereus)* populations across Australia. Populations in the northern states of Queensland and New South Wales have 100% proviral prevalence and mean proviral copy number of 140–165 per cell. In contrast, the proviral prevalence in the southern states of Victoria and South Australia differs among populations, with a mean prevalence in these states' mainland populations of 73% and 38%, respectively and with the prevalence on southern island populations ranging from 0–50%. The proviral load in southern populations is comparatively low, with some populations having an average of less than 1 proviral copy per cell. The KoRV RNA load in plasma shows a similar discordance between northern and southern populations, with consistently high loads in northern koalas (103 to 1010 RNA copies per ml plasma), and loads ranging from 0 to 102 copies per ml in southern KoRV provirus-positive koalas. The variation in KoRV proviral prevalence and the disparity in proviral and viral loads between northern and southern koalas may reflect different types of infection in the two populations (endogenous versus exogenous). Alternatively, it is possible that KoRV has been present for a longer time period in northern populations resulting in differences in the host-virus relationship.

Meers, Joanne, Greg Simmons, Kiersten Jones, Daniel T. W. Clarke, and Paul R. Young. 2014. Koala retrovirus in free-ranging populations—prevalence. In *The Koala and its Retroviruses: Implications for Sustainability and Survival*, ed. Geoffrey W. Pye, Rebecca N. Johnson and Alex D. Greenwood. *Technical Reports of the Australian Museum, Online* 24: 15–17.

Koala retrovirus (KoRV) is a gammaretrovirus of koalas *(Phascolarctos cinereus)* that possesses features of both endogenous and exogenous viruses. In previous work, we demonstrated that KoRV is truly an endogenous virus in koalas in south-east Queensland, with proviral DNA present in every animal tested and also present in single sperm cells. We also showed evidence of specific proviral insertion inheritance in Queensland koalas (Tarlinton *et al.*, 2006). However, KoRV is clearly not endogenous in all koala populations in Australia because our early work demonstrated mixed KoRV presence in some southern populations (Tarlinton *et al.*, 2006). Despite its endogenous nature in Queensland koalas, KoRV also displays exogenous virus characteristics in these populations, with high levels of viral RNA present in the blood of every animal tested, indicating active transcription of the KoRV proviral elements (Tarlinton *et al.*, 2005). There is also considerable variation in the number and sites of KoRV proviral insertions in individual koalas, which again is not typical for an endogenous virus where the conservation of a proviral

* author for correspondence