

The Koala and its Retroviruses: Implications for Sustainability and Survival

edited by

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Preface

to Papers Presented at the Koala Retrovirus Workshop, San Diego Zoo, April 2013

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This volume presents peer-reviewed papers from the oral presentations and break-out group-sessions delivered at the *San Diego Zoo Global Koala Conservation Workshop: The Koala and its Retroviruses: Implications for Sustainability and Survival* meeting, held at San Diego Zoo, 17–18 April 2013. Over 70 participants from Australia, Europe, Japan, and North America attended, including experts in the fields of koala care, conservation, ecology, epidemiology, immunology, molecular biology, population management, retrovirology, veterinary medicine, and zoonoses.

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The recognition of lymphoid neoplasia in koalas (Backhouse & Billinger, 1960; Canfield *et al.*, 1987) and its likely association with a retrovirus (Canfield *et al.*, 1988; Worley *et al.*, 1993; Hanger *et al.*, 2000; Tarlinton *et al.*, 2005) stimulated research amongst virologists as they excitedly studied what they believed to be the first real-time endogenization of a retrovirus (Tarlinton *et al.*, 2006; Stoye, 2006; Oliveira *et al.*, 2007; Tarlinton *et al.*, 2008). More recent work has shown a suspected exogenous spread of KoRV in southern Australia (Simmons *et al.*, 2012) as well as an extension of the possible time line of the endogenization (Ávila-Arcos *et al.*, 2013).

In addition, research has demonstrated the possibility of trans-species transmission (Fiebig *et al.*, 2006), identification of the KoRV receptor as PiT1 (Oliveira *et al.*, 2006), identification of the virus in koalas in Japanese and German zoos (Fiebig *et al.*, 2006; Miyazawa *et al.*, 2011) and the ability to detect presence of the virus in fecal material (Miyazawa *et al.*, 2011).

The recent isolation of a variant from the originally sequenced koala retrovirus, isolated from koalas dying from lymphoid malignancies in a North American zoo (Xu *et al.*, 2011; Xu *et al.*, 2013), and the concern it generated about population management prompted San Diego Zoo Global

to identify the need for a workshop to initiate the expansion of KoRV knowledge from foundational research to applied research, in order to promote the sustainability and survival of the koala.

The first day of the workshop was based on the current state of foundational research of KoRV, the level of impact of KoRV on both captive and free-ranging koala populations, the different disease entities that may be related to KoRV infection, koala immunology, and what future research is needed to further our understanding of KoRV. The second day was based on the need for applied research, what we could extrapolate from other well-researched retrovirus models (e.g., HIV treatment, FeLV vaccination), the role of KoRV in Chlamydial infections in koalas, strategies to reduce the spread and disease expression of KoRV, and to determine the zoonotic risk of KoRV.

The research presented and discussed at the two-day workshop demonstrated that although much progress has been made in understanding KoRV and its influence on koala health, a great deal remains to be learned and further empirical scientific data gathered to improve our understanding of this retrovirus in koalas.

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