

## Nuclear gene sequences provide evidence for the monophyly of australidelphian marsupials

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## An Analysis of Marsupial Interordinal Relationships Based on 12S rRNA, tRNA Valine, 16S rRNA, and Cytochrome *b* Sequences

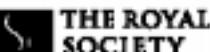
Angela Burk,<sup>1</sup> Michael Westerman,<sup>2</sup> Diana J. Kao,<sup>1</sup> John R. Kavanagh,<sup>1</sup> and Mark S. Springer<sup>1,3</sup>

### Abstract

Relationships among the seven ordinal clades of marsupials remain contentious. Previous analyses have reported inconclusive results. However, because the basal split between Ameridelphia and Australidelphian marsupials has important implications for understanding marsupial systematics, we sequenced the cytochrome *b* gene plus representatives of all orders of marsupials and used maximum parsimony, distance methods, and Bayesian analysis to examine a priori hypotheses. A strict consensus tree supported 99–100% posterior probability for all clades. Statistical tests within Diprotodontia had posterior probabilities of 1.00. © 2003 Elsevier Science (USA). All rights reserved.

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**KEY WORDS:** Marsupial; bandicoot; brushtail possum; mitochondrial genome; phylogeny; sequence analysis



[doi:10.1002/mpev.2001.1677](https://doi.org/10.1002/mpev.2001.1677)

## Mitochondrial genomes of a bandicoot and a brushtail possum confirm the monophyly of australidelphian marsupials

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Recent molecular analyses suggest that the position of bandicoots is the major difficulty in determining the root of the tree of extant marsupials. To resolve this, we analyse mitochondrial genome sequences of a bandicoot (*Issodone macroura*) and a brushtail possum (*Trichosurus vulpecula*) together with the previously available marsupial mitochondrial genomes, the Virginia opossum (*Didelphis virginiana*) and the wallaroo (*Macropus robustus*). Analyses of mitochondrial protein-coding and RNA genes strongly support the bandicoot as sister to the wallaroo and the brushtail possum. This result, combined with other recent molecular analyses, confirms the monophyly of Australidelphian (Australasian marsupials plus *Dromiciops* from South America). Further, RY-coding was found to nullify AGCT-coding nucleotide composition bias.

**Keywords:** Australidelphian; marsupial; bandicoot; *Issodone*; *Trichosurus*; nucleotide composition bias