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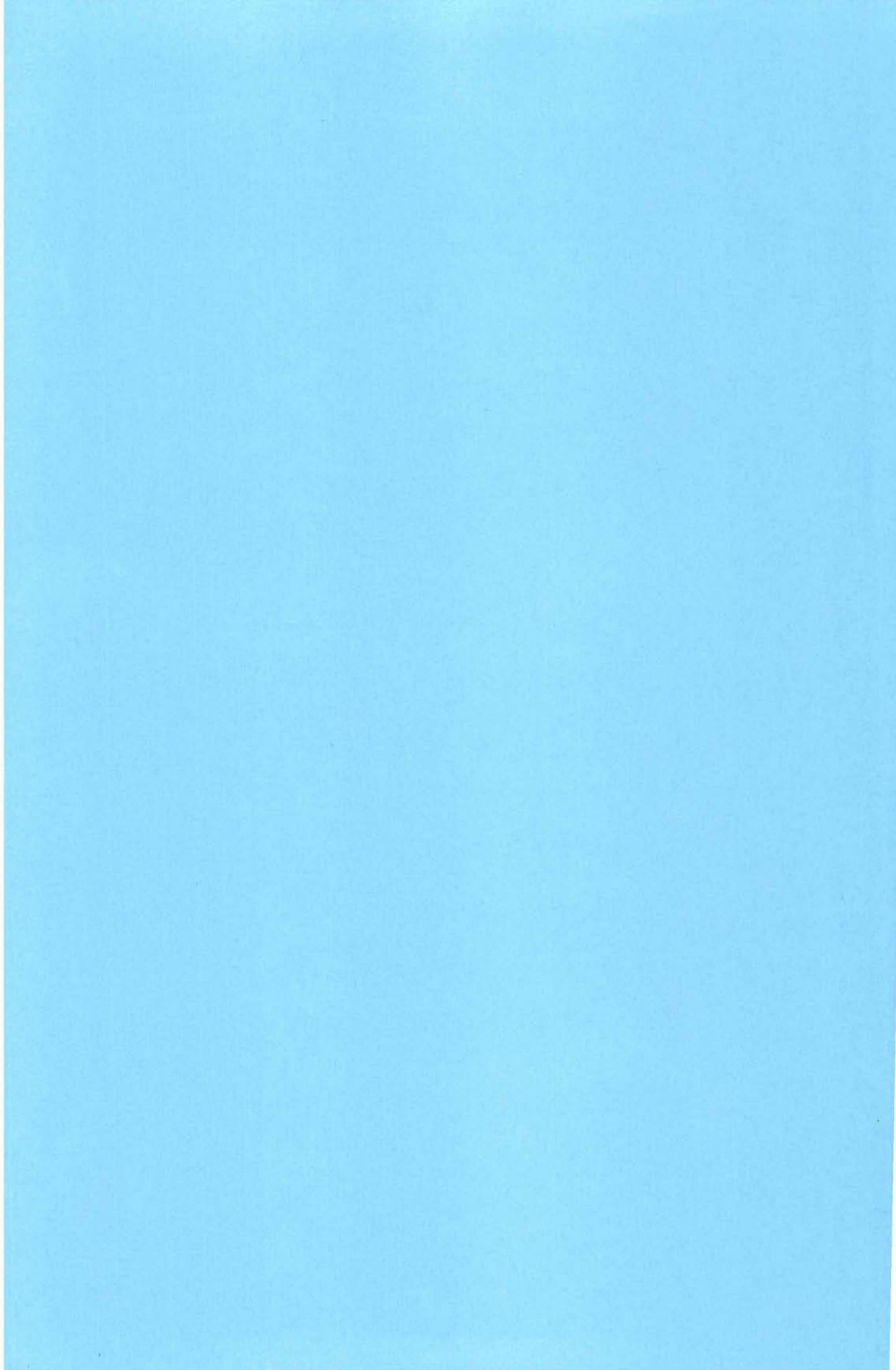
**The origins and evolution of prokaryotes  
and eukaryotes.**

**A thesis presented in partial fulfilment of the  
requirements for the degree of**

**Doctor of Philosophy  
in Molecular BioSciences**

**at Massey University**

**Anthony Masamu Poole  
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### **Papers and manuscripts included in this thesis:**

1. Jeffares DC, **Poole AM** & Penny D. Relics from the RNA world. *J Mol Evol* 46, 18-36 (1998). *Reprinted with permission from Springer-Verlag New York Inc.*
2. **Poole AM**, Jeffares DC & Penny D. The path from the RNA world. *J Mol Evol* 46, 1-17 (1998). *Reprinted with permission from Springer-Verlag New York Inc.*
3. RNA evolution: separating the new from the old. (manuscript).
4. **Poole A**, Jeffares D, Penny D. Early evolution: prokaryotes, the new kids on the block. *Bioessays* 21, 880-889 (1999). *Reprinted by permission of Wiley-Liss, Inc., a subsidiary of John Wiley & Sons, Inc.*
5. Penny D & **Poole A**. The nature of the Last Universal Common Ancestor. *Curr Opin Genet Dev* 9, 672-677 (1999). *Reprinted with permission from Elsevier Science.*
6. The origin of the nuclear envelope and the origin of the eukaryote cell. (manuscript).
7. **Poole AM**, Phillips MJ & Penny D. Prokaryote and eukaryote evolvability. *Biosystems* (submitted).
8. **Appendix: Poole A** & Penny D. Does endosymbiosis explain the origin of the nucleus? *Nature Cell Biol* 3, E173. [Letter]

### **Related papers not included in this thesis:**

- Jeffares DC, **Poole AM** & Penny D. Pre-rRNA processing and the path from the RNA world. *Trends Biochem Sci* 20, 298-299 (1995). [Letter]
- **Poole A**, Penny D & Sjöberg B-M. Methyl-RNA: an evolutionary bridge between RNA and DNA? *Chem Biol* 7, R207-R216 (2000).
- **Poole A**, Penny D & Sjöberg B-M. Confounded cytosine! Tinkering and the evolution of DNA. *Nature Reviews Mol Cell Biol* 2, 147-151 (2001).
- **Poole AM**, Logan DT & Sjöberg B-M. The evolution of the ribonucleotide reductases: much ado about oxygen. *J Mol Evol* (accepted).

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Ant.