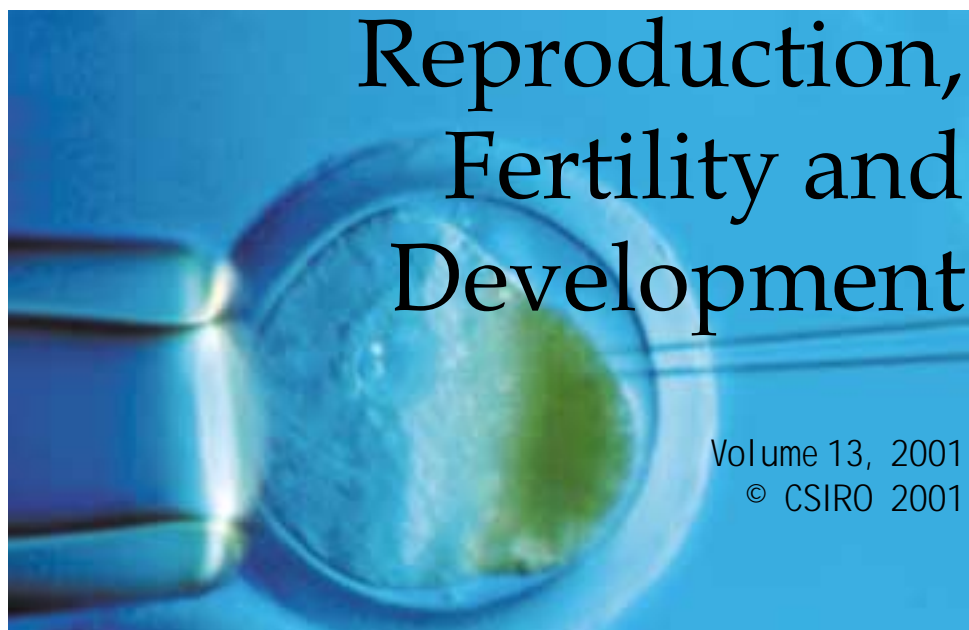


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Published by CSIRO Publishing
for CSIRO and the Australian Academy of Science

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Introduction

The Sero Symposium on Embryos, Embryonic Stem Cells and Transplantation was held in Canberra in April, 2000 joining the annual conferences of the Australian Society for Reproductive Biology and the Fertility Society of Australia. The symposium was composed of presentations on basic molecular and cell biology of animal and human embryology together with clinical subjects that are intrinsic to the applications of embryology in animal and reproductive medicine.

The recent developments in nuclear transfer have started to challenge established concepts in early development and these developments are due in part to the extraordinary technical advances in micromanipulation and interesting new hypotheses of creative scientists. This is best demonstrated in Yana's laboratory in Hawaii, where the barriers to mouse cloning have been substantially removed and many new experiments have been formulated using radically improved cloning techniques. The number of questions that can now be addressed is only limited by the creativity of those interested in development and transgenesis.

It is also apparent that embryonic stem (ES) cells offer an extraordinary new resource to study the very early events of lineage decisions involved in early embryonic development. Although the mouse remains the model par excellence, it is abundantly clear that human ES cells will be used widely to explore the developmental events that are usually hidden in the implanted embryo within the mother's uterus. The discoveries are illuminating from mouse to human and the model will provide leads that are used to identify tissue progenitors and pathways for directed differentiation into mature cell and tissue types. The potential for use of ES cells in human medicine for cell therapy is challenging and requires considerable research. This is a wonderful opportunity for young scientists.

Nuclear transfer has begun to be used in animal breeding and the issues for development are interesting. The applications are numerous but an understanding of epigenetics will be required to harness the opportunity. This creates further opportunities for molecular and genetic researchers.

Embryology remains the most fascinating of all biological fields with clocks 'tick-tocking' for regulation of development and cell cycles tuned for ordered gene expression. Methylation and demethylation patterns alter to regu-

late imprinted genes and the synchrony of gene expression and development must proceed without interference to be successful. Interventions such as nuclear transfer are generally unwelcome and at best tolerated only occasionally.

The clinical scene in reproductive medicine is founded on the quality of research in the basic sciences and is generally regarded to be sound with suitable in-built quality assurance. Some challenges remain, some as simple as embryo transfer, others complex in regard to twinning and surrogacy, but all deserving analysis and debate. It is important to recognize that the cost of caring for multiple births is as high, or higher, than the provision of IVF services. It is essential that progress towards single embryo transfers continues in order to minimize the cost consequences of multiple embryo transfer. Embryo quality and viability remain paramount in achieving this and Australia has unique basic and applied research strengths that can deliver this objective.

A well-credentialed group of international and national scientists, recognized for their innovation and experimental creativity, joined the Symposium and their contributions are presented as mini-reviews, original papers and viewpoint articles. Their contributions will be read with considerable interest by scientists who are joining the front line of research in embryology, development and applications in human and animal reproductive medicine and biology.

We thank Sero Symposia Australasia for their generous support of this important Symposium on Embryos, Embryonic Stem Cells and Transplantation. We also thank *Reproduction, Fertility and Development* for publishing the papers from the Symposium. Special thanks are due to our staff, Mrs Jill McFadyean and Mrs Christine Hi, for personal assistance given to everyone.

Alan Trounson and Martin Pera

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