



Journal of Andrology, Vol. 23, No. 5, September/October 2002
Copyright © [American Society of Andrology](#)

Development of an In Vivo Model to Study Testicular Morphogenesis

JANNETTE M. DUFOUR^{*}, RAY V. RAJOTTE^{*,†,‡} AND GREGORY S. KORBUTT^{*,†}

From the ^{} Surgical-Medical Research Institute and the Departments of [†] Surgery and [‡] Medicine, University of Alberta, Edmonton, Canada.*

Correspondence to: Dr Gregory S. Korbutt, Surgical-Medical Research Institute, 1074 Dentistry/Pharmacy Centre, University of Alberta, Edmonton, Alberta, Canada T6G 2N8 (e-mail: korbutt@ualberta.ca).

We have developed an in vivo model to examine testicular cord formation by isolated Sertoli and myoid cells when implanted under the kidney capsule of severe combined immunodeficient (SCID) mice. Neonatal porcine Sertoli (92.5% ± 3.5%) and myoid (2.2% ± 0.7%) cellular aggregates were transplanted underneath the kidney capsule of SCID mice. Grafts were removed between 0 and 60 days posttransplantation and examined histologically for the progressive development of structures resembling testicular cords. Aggregates began to reorganize by day 3, and cord structures were present at day 7 posttransplantation. These structures became larger and more defined as the time progressed after implantation. To localize Sertoli and peritubular myoid cells, grafts were immunostained for the Sertoli cell proteins, vimentin, DNA transcription factor GATA-4, and Müllerian inhibiting substance (MIS), as well as for a myoid cell protein, smooth muscle alpha-actin. In the "seminiferous" epithelial layer, the Sertoli cells were arranged with their nuclei along the basal edge adjacent to the peritubular myoid cells that were surrounding the tubules. Moreover, the expression of MIS mimicked that during porcine testicular development, suggesting the Sertoli cells were developing normally. In addition, proliferating cell nuclear antigen (PCNA) was detected in the Sertoli cells at all time points, indicating the proliferation of Sertoli cells in the grafts, which is consistent with Sertoli cell proliferation prior to puberty in the native porcine testis. These results suggest that the specific factors required for cord formation and prepubertal development are inherent in the transplanted cells. Moreover, we have developed a novel in vivo transplantation model to study seminiferous cord formation and prepubertal development.

Key words: Sertoli cell, peritubular myoid cell, cord formation, severe combined immunodeficient mice, testis development

This article has been cited by other articles:

This Article

- ▶ [Full Text](#)
- ▶ [Full Text \(PDF\)](#)
- ▶ [Alert me when this article is cited](#)
- ▶ [Alert me if a correction is posted](#)

Services

- ▶ [Similar articles in this journal](#)
- ▶ [Similar articles in PubMed](#)
- ▶ [Alert me to new issues of the journal](#)
- ▶ [Download to citation manager](#)

Citing Articles

- ▶ [Citing Articles via HighWire](#)
- ▶ [Citing Articles via Google Scholar](#)

Google Scholar

- ▶ [Articles by Dufour, J. M.](#)
- ▶ [Articles by Korbutt, G. S.](#)
- ▶ [Search for Related Content](#)

PubMed

- ▶ [PubMed Citation](#)
- ▶ [Articles by Dufour, J. M.](#)
- ▶ [Articles by Korbutt, G. S.](#)



Reproduction

▶ HOME

L. Arregui, R. Rathi, S. O Megee, A. Honaramooz, M. Gomendio, E. R S Roldan, and I. Dobrinski
Xenografting of sheep testis tissue and isolated cells as a model for preservation of genetic material from endangered ungulates
Reproduction, July 1, 2008; 136(1): 85 - 93.
[\[Abstract\]](#) [\[Full Text\]](#) [\[PDF\]](#)



Journal of ANDROLOGY

▶ HOME

Z. Zhang, J. Hill, M. Holland, Y. Kurihara, and K. L. Loveland
Bovine Sertoli Cells Colonize and Form Tubules in Murine Hosts Following Transplantation and Grafting Procedures
J Androl, July 1, 2008; 29(4): 418 - 430.
[\[Abstract\]](#) [\[Full Text\]](#) [\[PDF\]](#)



BIOLOGY of REPRODUCTION

▶ HOME

K. Kita, T. Watanabe, K. Ohsaka, H. Hayashi, Y. Kubota, Y. Nagashima, I. Aoki, H. Taniguchi, T. Noce, K. Inoue, *et al.*
Production of Functional Spermatids from Mouse Germline Stem Cells in Ectopically Reconstituted Seminiferous Tubules
Biol Reprod, February 1, 2007; 76(2): 211 - 217.
[\[Abstract\]](#) [\[Full Text\]](#) [\[PDF\]](#)



BIOLOGY of REPRODUCTION

▶ HOME

A. Honaramooz, S. O. Megee, R. Rathi, and I. Dobrinski
Building a Testis: Formation of Functional Testis Tissue after Transplantation of Isolated Porcine (*Sus scrofa*) Testis Cells
Biol Reprod, January 1, 2007; 76(1): 43 - 47.
[\[Abstract\]](#) [\[Full Text\]](#) [\[PDF\]](#)



BIOLOGY of REPRODUCTION

▶ HOME

J. M. Dufour, M. Hamilton, R. V. Rajotte, and G. S. Korbitt
Neonatal Porcine Sertoli Cells Inhibit Human Natural Antibody-Mediated Lysis
Biol Reprod, May 1, 2005; 72(5): 1224 - 1231.
[\[Abstract\]](#) [\[Full Text\]](#) [\[PDF\]](#)



Toxicologic Pathology

▶ HOME

K. Kai, N. Satoh, A. Watanabe, K. Shiraiwa, H. Sasano, and K. Furuhashi
Case Report of Rat True Hermaphroditism: Colocalization of Oocytes and Granulosa and Sertoli Cells in the Germinal Cord
Toxicol Pathol, April 1, 2003; 31(3): 290 - 294.
[\[Abstract\]](#) [\[PDF\]](#)