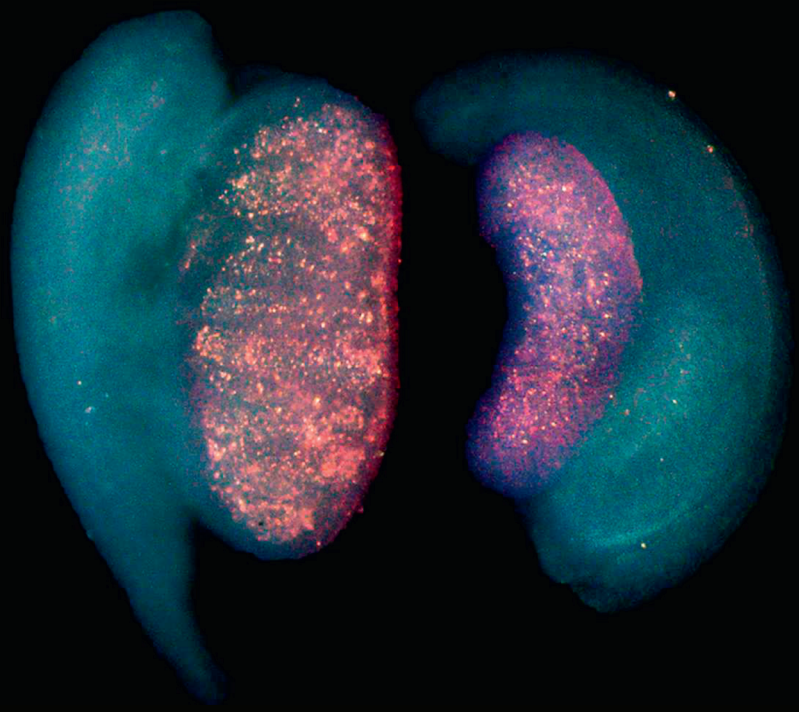

The Primordial Journey

Development and differentiation of primordial germ cells (PGCs) marks the origin of the gamete and is essential for sexual reproduction. During mouse embryogenesis, PGCs migrate from the base of the allantois through the embryonic hindgut to colonize the gonadal ridge and undergo mitotic proliferation. It is only upon reaching the embryonic gonad that PGCs go through sex-specific differentiation into precursors for either the female (oocyte) or male (sperm) gamete.

The peripheral cytoplasm of PGCs contains higher alkaline phosphatase (AP) activity than that of the surrounding somatic cells, making AP staining a useful tool to observe PGCs *in situ*. For this vision, whole precursor testis (left) and ovaries (right) from CD1 mice at embryonic day (E) 13.5 were stained for AP. The AP substrate used was alpha-naphthyl phosphate, that becomes yellow upon hydrolysis. Embryonic gonads were visualized by light microscopy with adjustments to the phase contrast to give the germ cells (GCs) a 'shiny' effect. The color balance was modified using the NIH imageJ software to enhance orange or pink tones in male or female GCs, respectively.

At E13.5, the gonads have been completely colonized, peaking at 25,000 GCs. It is at E13.5 that the first morphological sign of sex-specific GC differentiation can be visualized. Here, female PGCs cease proliferation and begin to asynchronously transition into meiosis (oogenesis). Female GCs then arrest at prophase I until just before ovulation. In contrast, male GCs, now enclosed in testis chords (seen as distinct lines), continue to proliferate until E14.5 before entering a period of quiescence. Male GCs will again resume proliferation (during the first wave of spermatogenesis) 1–2 days postpartum. (Figure 1)

BETTINA P. MIHALAS[1,2], BRENDAN J. HOUSTON[1,3], ELLA S. GREEN[1,4], ELIZABETH ANN L. ENNINGA[1,5], ERIC A. RHON-CALDERÓN[1,6]

[1]Frontiers in Reproduction Course, Marine Biological Laboratories, University of Chicago, Massachusetts, United States of America
[2]Priority Research Centre for Reproductive Science, School of Environmental and Life Sciences, University of Newcastle, Callaghan, New South Wales, Australia
[3]School of Biological Sciences, Monash University, Clayton, Victoria, Australia
[4]Robinson Research Institute, Adelaide Medical School, University of Adelaide, Adelaide, South Australia, Australia
[5]Department of Obstetrics and Gynecology, Mayo Clinic, Rochester, Minnesota, United States of America
[6]Universidad de Buenos Aires, Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), Centro de Estudios Farmacológicos y Botánicos (CEFYBO), Facultad de Medicina, Paraguay 2155, 16° P, (C1121ABG) Ciudad Autónoma de Buenos Aires, Buenos Aires, Argentina

Correspondence
Bettina P. Mihalas, Priority Research Centre for Reproductive Science, School of Environmental and Life Sciences, The University of Newcastle, University Drive, Callaghan, NSW, 2308, Australia. E-mail:Bettina.Mihalas@uon.edu

DOI: 10.1002/mrd.23048

ACKNOWLEDGMENT

Authors would like to acknowledge Associate Professor Joan Jorgensen for providing animals and for technical advice.

CONFLICT OF INTEREST STATEMENT

Authors have no conflicts of interest to declare

© 2018 Wiley Periodicals, Inc.