

Guidelines needed for creating germ cells in vitro, scientists state

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Research aimed at developing germ cells—the progenitors of eggs and sperm—in vitro should be held to especially rigorous scientific standards, a distinguished team of reproductive biologists declares in the journal *Cell*.

In the article, authors John Schimenti, Ph.D., of Cornell University and his Jackson Laboratory colleagues, Mary Ann Handel, Ph.D., and John Eppig, Ph.D., note that because "germ cells are the ultimate stem cells," laboratories are racing to develop these cells in vitro for assisted reproduction.

Yet the researchers claim that no one has yet conclusively demonstrated that [meiosis](#), a critical step in the development of germ cells in mammals, can be replicated in vitro.

"Because the stakes are high when it comes to artificial reproductive technologies involving unprecedented germ cell manipulation, it is imperative that the scientific community applies the highest standards when conducting and evaluating research concerning in vitro gamete generation," they write.

The authors propose a list of benchmarks—which they dub "gold standards"—to substantiate successful in vitro development of germline cells in mouse models. Besides the key events that take place during spermatocyte and oocyte development, the ultimate test is whether a two-celled embryo created from [germ cells](#) developed in vitro will grow into

a viable offspring when implanted in a host female.

Schimenti is director of Cornell's Center for Vertebrate Genomics and a professor of genetics in the departments of biomedical sciences and molecular biology and genetics. "These guidelines emanate from our combined many years of basic studies on meiosis," he says, "and are a reminder to the 'translational' community of scientists of the hurdles to leap, as well as of the potential of the research for further understanding of meiosis."

With his JAX colleagues Handel and Eppig, Schimenti established a "Reprogenomics" program that has generated the world's most extensive collection of mouse models of infertility. He is a fellow of the American Association for the Advancement of Science.

Eppig, a fellow of the National Academy of Sciences and former president of the Society for the Study of Reproduction, achieved the first complete development of mammalian oocytes in vitro and, in 1996, the birth of the first mammal derived from an in vitro-developed oocyte, a mouse dubbed "Eggbert." Eppig is on the editorial board of the *Proceedings of the National Academy of Sciences*; he and JAX Senior Research Scientist Handel are former co-editors of the journal *Biology of Reproduction*.

Provided by Jackson Laboratory

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