

# An MBoC Favorite: Mitochondrial transmission during mating in *Saccharomyces cerevisiae* is determined by mitochondrial fusion and fission and the intramitochondrial segregation of mitochondrial DNA

Thomas D. Fox

Department of Molecular Biology and Genetics, Cornell University, Ithaca, NY 14853-2703

*In celebration of MBoC's first 20 years, members of the Editorial Board, members of the ASCB Council, and others comment on their favorite MBoC papers from the past two decades.*

Because there is true equality of the sexes in *Saccharomyces cerevisiae*, the inheritance of its mtDNA after zygote formation is more complex than mtDNA inheritance in most larger eukaryotes. Early genetic studies showed that mitochondria fuse after mating, and their mtDNAs recombine. Nunnari *et al.* (1997) brought these phenomena, and more, into clear focus by studying labeled mitochondrial proteins and mtDNA microscopically in real time. The authors saw mitochondrial proteins mix rapidly after mating, while mtDNA movement was restricted, suggesting mtDNA is anchored to and guided by cellular components outside the organelles. They observed fission and fusion, and obtained stereo pictures of the dynamic tubular network that effectively constitutes a single mitochondrial compartment. In retrospect, the paper marks the transition between studies based primarily on the non-Mendelian genetics of mtDNA, and current studies integrating mitochondrial behavior into our overall views of dynamic cellular phenomena.

*A PDF file of the paper discussed above is attached to this article.*

## REFERENCE

Nunnari J, Marshall WF, Straight A, Murray A, Sedat JW, Walter P (1997). Mitochondrial transmission during mating in *Saccharomyces cerevisiae* is determined by mitochondrial fusion and fission and the intramitochondrial segregation of mitochondrial DNA. *Mol Biol Cell* 8, 1233–1242.

---

DOI: 10.1091/mbc.E12-03-0182

*Molecular Biology of the Cell* Volume 23 Page 4144.

Address correspondence to: Thomas D. Fox (tdf1@cornell.edu).

© 2012 Fox. This article is distributed by The American Society for Cell Biology under license from the author(s). Two months after publication it is available to the public under an Attribution–Noncommercial–Share Alike 3.0 Unported Creative Commons License (<http://creativecommons.org/licenses/by-nc-sa/3.0>).

“ASCB®,” “The American Society for Cell Biology®,” and “Molecular Biology of the Cell®” are registered trademarks of The American Society of Cell Biology.