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By Chandra Shekhar

## THE LITERATURE

# Scientist to Watch

Coleen Murphy: Immersed in the Inevitable

September 2006

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It might seem baffling that someone as young as Coleen Murphy could be so preoccupied with aging. But, as the 37-year-old researcher explains, "Aging is a cool problem from the philosophical viewpoint all the way down to the scientific nitty-gritty." Her fascination centers on *Caenorhabditis elegans*, which may hold answers to the aging puzzle. "You can take a single gene and change it, and now it lives twice as long," she says. "I want to figure out how it can do that."

Cynthia Kenyon, whose pioneering genetics work implicated an insulin/IGF-1 signaling pathway in worm lifespan regulation, took Murphy on as a postdoc in 2000, and quickly put her flair for quantitative work to the test. "Coleen made a whole genome-wide microarray for 20,000 genes almost single handedly," Kenyon recalls. RNAi technology was also emerging at the time, and armed with these tools, Murphy not only found the genes involved in aging, but also tracked them along the nonlinear pathways through which they act. "I think the people at Cynthia's lab thought I was a little crazy," says Murphy. "They were doing very nice genetics, and here I was, doing 40,000 PCRs."

Murphy's labors paid off. Her microarray studies identified key differences in gene-expression patterns between normal and long-lived worms. They also demonstrated that worms and flies express a similar pattern of genes as they age. "She showed that we get increased lifespan by the additive effects of many genes doing different things," says Kenyon. "It was one of the most important studies that anyone has ever done in my lab." <sup>1</sup>

Murphy recalls her excitement on finding genes downstream of the DAF-16 transcription factor that slow the aging process. <sup>2</sup> Worms with the factor knocked out glowed green as their guts expressed a tagged insulin-like peptide known to promote aging. "They were so bright you could see them on the scope even without looking through the eyepiece," she says.

This past year, Murphy joined the Lewis-Sigler Institute for Integrative Genomics at Princeton University, attracted by its multidisciplinary faculty. "She brings a very strong combination of basic biological insight and a quantitative, postgenome-sequence approach," says institute director David Botstein.

As she continues to work with worms, Murphy's approach is growing more sophisticated. "We are trying to get away from

just studying death, because that's the end point," she says. "Instead we look at the processes that decline with age." As to her own progress along that inevitable road, she says, "You see yourself aging and think, 'That's not so great.'" But she's not looking for immortality. "That's not really what interests me about aging. It's just a very cool scientific question."

**Title:** Assistant Professor, Department of Molecular Biology and Lewis-Sigler Institute for Integrative Genomics, Princeton University  
**Age:** 37

**Representative Publications:**

1. S.A. McCarroll et al., "Comparing genomic expression patterns across species identifies shared transcriptional profile in aging," *Nat Gen*, 36:197-204, 2004. (Cited in 59 papers) | [[PubMed](#)]
2. C.T. Murphy, et al., "Genes that act downstream of DAF-16 to influence the lifespan of *C. elegans*," *Nature*, 424:277-83, 2003. (Cited in 209 papers) | [[PubMed](#)]

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