ABSTRACT:
Aging and longevity are genetically regulated, programmed to respond to fluctuating environments and nutrient availability. The control of somatic aging is intimately connected with the ability to reproduce; that is, slowed germline proliferation in response to low nutrients extends lifespan to allow late mating and reproduction, ensuring optimal reproductive success. Yet a third component links reproduction and longevity: mating. Mating is an elaborately regulated process with critical individual and population consequences. We found that males hijack the well-studied “longevity pathways,” changing mothers’ gene expression and metabolism to age rapidly, likely to prevent other males from mating with that female. Behavior is also affected by mating, in both males and females. These changes in behavior may increase efficiency in mate selection (and avoidance, when necessary). We examine the roles of conserved longevity pathways in these behaviors, as well as conservation of the behaviors in other species, to understand how aging may be influenced by these factors in other organisms.

BIOGRAPHY:
Coleen T. Murphy is a Professor of Genomics and Molecular Biology at Princeton University. She graduated from the University of Houston with a B.S. in Biochemistry and Biophysics, then earned her doctorate in Biochemistry at Stanford University, studying the structure-function determinants of the motor protein myosin. Dr. Murphy became interested in applying new quantitative technologies to approach the question of aging during her postdoctoral work in Dr. Cynthia Kenyon’s lab (UCSF), developing microarray approaches to identify the set of genes downstream of the insulin signaling/FOXO longevity pathway, revealing a vast array of downstream cellular processes, including stress response, proteostasis, metabolism, immunity, autophagy, and intercellular signaling, to extend cellular and organismal maintenance with age. In her own lab, Dr. Murphy’s team has developed C. elegans models of human “quality of life” aging phenotypes, such as cognitive aging and reproductive aging; these processes are remarkably well-conserved at the molecular level, and her group has identified genetic pathways that can extend these processes with age through the development of quantitative assays and genomic approaches to study these aging phenomena. As a faculty member, Dr. Murphy has been named a Sloan Fellow, Pew Scholar, Ellison New Scholar, Basil O’Connor Scholar, McKnight Scholar, and Keck Scholar, and is the recipient of the NIH’s New Innovator and Pioneer...