Indiana University Department of Biology

2009 Sonneborn Lecture

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Terry L. Orr–Weaver

Massachusetts Institute of Technology

"Differential DNA Replication as a Developmental Strategy and Replication Model"

Thursday, October 29, 2009
4:00 p.m., Myers Hall 130

Terry L. Orr-Weaver is an American Cancer Society Research Professor in the Department of Biology at the Massachusetts Institute of Technology and a Member of the Whitehead Institute for Biomedical Research. She obtained her BA degree in Chemistry, summa cum laude, from the University of California, San Diego, in 1977 and her PhD in the laboratory of Dr. Jack Szostak in Biological Chemistry from Harvard University in 1984. Following postdoctoral training in developmental biology in Dr. Allan Spradling's laboratory at the Department of Embryology of the Carnegie Institution of Washington in Baltimore, MD, she joined MIT as an Assistant Professor of Biology and an Associate Member of the Whitehead Institute in 1987. From 2004-2006, Dr. Orr-Weaver was Vice-President, President, and Past-President of the Genetics Society of America. She was Vice-Chair and Chair of the Scientific Advisory Committee of the Damon Runyon Cancer Research Foundation from 2002-2006. She currently is President of the National Drosophila Board of Directors. Dr. Orr-Weaver serves on the scientific advisory boards of Children's Hospital in Boston and the Radcliffe Institute, as well as on grant review panels for the March of Dimes Foundation and the National Institutes of Health. In 2006, she was elected a fellow of the American Academy of Microbiology and a member of the National Academy of Sciences.

Dr. Orr-Weaver's research group investigates how the two fundamental steps in cell division, DNA replication and chromosome segregation, are regulated during the development of multicellular organisms. This coordination not only involves controlling the number of cell division cycles, but also the implementation of modified cell cycles for particular developmental strategies. Haploid gametes are produced by meiosis, and in oogenesis the meiotic cell cycle is linked to oocyte differentiation by developmentally triggered arrest and release points. Organisms that undergo rapid embryogenesis utilize an abbreviated cell cycle without growth phases. A third variant cell cycle, the endo cycle, is employed in specific tissues in most plants and animals. In the endo cycle DNA replication occurs but not mitosis, producing large polyploid or polytene cells with high metabolic activity. To investigate the interface between cell cycle and development they are using the fruit fly, *Drosophila melanogaster*, because variant cell cycles are employed throughout its development. Dr. Orr-Weaver's research has identified conserved proteins crucial for chromosome segregation and DNA replication. Her work defined a new role for two proteins implicated in the majority of human cancers by showing they interact directly with the DNA replication machinery. In addition, her research is defining mechanisms by which progression through meiosis is developmentally controlled in the oocyte, an essential aspect in the production of an egg that can yield a viable embryo.

Following the lecture, please join us for a reception in the lobby of Myers Hall 130.