



Department of Biology

The College of Arts + Sciences | Indiana University Bloomington

Tracy M. Sonneborn Lecture

Thu., Feb. 22, 2018 • 4–5:00 p.m. • Myers Hall 130

Scott Hawley, Ph.D.

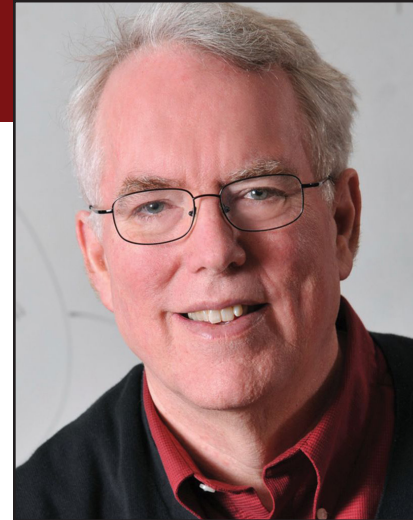
Investigator and American Cancer Society Research Professor
Dean, The Graduate School of the Stowers Institute for Medical Research
Professor of Molecular and Integrative Physiology, School of Medicine,
University of Kansas Medical Center

How a really really big structure facilitates meiosis

Although many of the core aspects of the meiotic process are highly conserved, many of the proteins and structures that mediate meiosis are rapidly evolving. Two examples of that diversity are the proteins that comprise the central region of the synaptonemal complex (SC) and the Mtrm protein (a regulator of Polo kinase). Our discussion of the SC will focus both on the role of the very rapidly evolving transverse filament proteins C(3)G and Corolla in mediating assembly and structure as well as on a recently diverged family of E3 ligase proteins (Vilya, Narya, and Nanya), which mediate crossover formation. The consideration of the Mtrm protein will focus on the opportunity that specific *mtrm* mutant genotypes appear to play in allowing the transmission of newly arisen B chromosomes and, thus, in accelerating genome evolution. If a central theme can be crafted from the interweaving of these stories, it will be that meiosis (and many of the proteins that execute it) is surprisingly tolerant of genetic change, allowing the creation of new structural forms (the SC), novel means of executing critical processes like recombination (Vilya et al.), and even facilitating genome evolution. If time allows, balancers will be discussed.

Hosted by Soni Lacefield, Associate Professor of Biology
Refreshments served prior to seminar

Support for this lecture has been provided by the Sonneborn Lecture Fund and the IU Department of Biology. Learn more at <https://biology.indiana.edu/news-events/named-lectures/sonneborn-lecture-series.html>.



There are three necessary functions of a scholar: to learn, to write, and to teach.
—Larry M. Sandler

At the top of Scott Hawley's CV is the above quote by Larry Sandler, Hawley's thesis advisor. Distinguished scholar Scott Hawley takes all three functions very seriously. He has made seminal contributions to the field of genetics and was inducted into the National Academy of Sciences in 2011 for groundbreaking research in meiosis. He has authored more than 150 research articles and has written 7 books. Hawley is particularly quick to point out the importance of his role as teacher (the third function), noting that engaging undergraduates has enhanced his career as a *Drosophila* geneticist.

Hawley's research strives to define how the two highly specialized cell divisions that halve chromosome number to form eggs are orchestrated molecularly. He has studied this tightly choreographed dance for more than 30 years, using the fruit fly *Drosophila melanogaster* as a model system.

Recently Hawley has focused on three questions relevant to how meiosis progresses: how chromosomes in *Drosophila* female cells pair up and swap sequences (recombine), how they separate into two daughter cells at the critical first meiotic division, and how that program including a second division is coordinated, producing eggs, or oocytes, with half the complement of the correct chromosomes.

Better genetic and biochemical tools as well as increasingly more sophisticated imaging techniques have allowed Hawley and his lab to investigate the intricacies of meiosis in greater detail than ever before. Discoveries at the level of molecular detail during meiosis hold promise for explaining major medical mysteries.

Hawley received his Ph.D. in genetics from University of Washington, Seattle, in 1979. He joined the Albert Einstein College of Medicine (Bronx, New York) faculty in 1982. He served as professor of genetics at University of California, Davis, from 1991 to 2001. He is now Investigator, Stowers Institute for Medical Research, and Dean, Graduate School of the Stowers Institute for Medical Research.

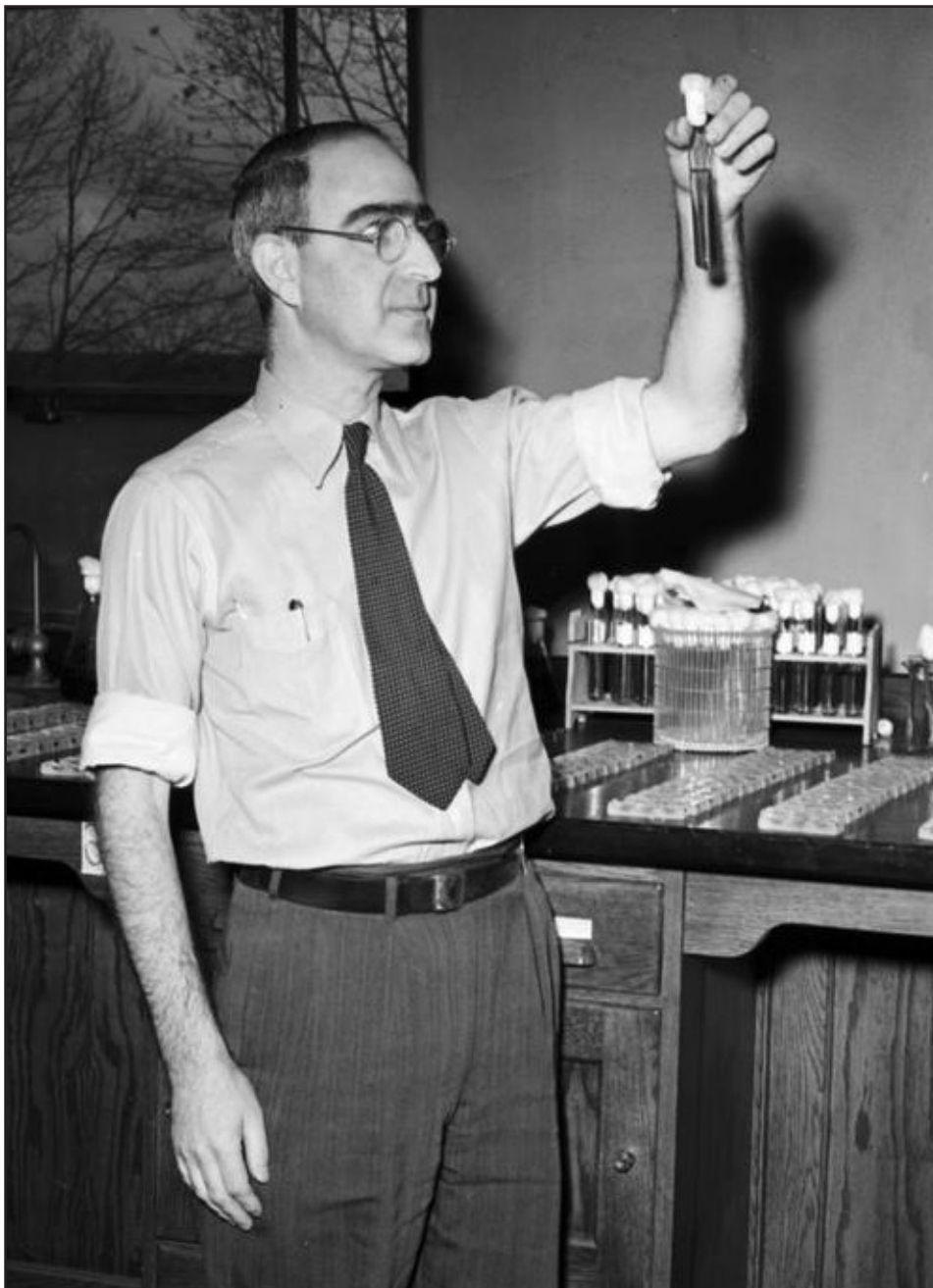
Hawley was appointed American Cancer Society Research Professor in 2005 and received the American Cancer Society Excellence in Research Award in 2015. He received the Genetics Society of America's Elizabeth W. Jones Award for Excellence in Education (2008) and George W. Beadle Award (2013).

He is a member of National Academy of Sciences, American Academy of Arts and Sciences, and the Genetics Society of America (for which he served as president in 2010). Hawley is a fellow of American Association for the Advancement of Science.

Learn more about Scott Hawley and his research

Hawley Lab: <https://www.stowers.org/faculty/hawley-lab>

"Profile of R. Scott Hawley" in PNAS: <http://www.pnas.org/content/109/35/13883>



Tracy M. Sonneborn (1905–1981)

Photo courtesy of IU Archives

To learn more about Dr. Sonneborn, read John Preer's essay and 2006 commentary in *Genetics* 172:1373–77.

About Tracy M. Sonneborn

Aside from a few years at Johns Hopkins University, where he received a Ph.D. degree, Tracy Sonneborn spent his entire career at IU. His devotion to the study of *Paramecium* established him as the world leader in biology and genetics of protozoa; indeed it is no exaggeration to say that he founded the modern era of study in these areas.

One of his major contributions was in demonstrating that preexisting structures in cells can repeatedly determine the patterns of new structures through many generations. Although recognized as an important exception to Mendelian inheritance and a critical element in prion diseases, the mechanism of structural inheritance in biology is not yet understood. "Whatever the final outcome of studies of these phenomena, he must take his place among the most brilliant and devoted experimentalists in the history of biology and a true giant, like no other, in the field of protozoan research," John Preer, Distinguished Professor of Biology.

With precision, thoroughness, and infectious enthusiasm—Tracy Sonneborn also contributed unstintingly to teaching at Indiana University. In spite of the many attempts to entice him away, he remained loyal to IU, finding here the environment he thought was best.

To honor his contributions to science and his outstanding career, Tracy Sonneborn's friends and colleagues initiated the Sonneborn Lectureship. This is the 33rd lecture in the series.

Past Lectures

2016	Jasper Rine	1997	Randy W. Schekman
2013	Eric F. Wieschaus	1996	Lucy Shapiro
2011	Joseph G. Gall	1995	Gerald M. Rubin
2011	C. David Allis	1994	Christine Guthrie
2010	Tian Xu	1993	Christiane Nüsslein-Volhard
2009	Terry L. Orr-Weaver	1992	Melvin I. Simon
2007	David Baulcombe	1991	Elizabeth H. Blackburn
2006	J. Richard McIntosh	1990	Thomas R. Cech
2005	Cynthia Kenyon	1989	Ira Herskowitz
2003	Sharon Long	1988	Franklin Stahl
2002	Philip Hanawalt	1987	David Botstein
2001	David Prescott	1986	Mark Ptashne
2000	Elliot Meyerowitz	1985	David S. Hogness
1999	John Kilmartin	1984	Gerald R. Fink
1998	James Forney, Eric Meyer, Meng-Chao Yao, John Preer	1983	Philip Leder
		1982	Donald D. Brown
		1981	Charles Yanofsky