CHEMICAL HERITAGE FOUNDATION

NANCY M. HOLLINGSWORTH

The Pew Scholars Program in the Biomedical Sciences

Transcript of an Interview
Conducted by

William Van Benschoten

at

SUNY Stony Brook
Stony Brook, New York

on

11, 12, and 13 November 2002

From the Original Collection of the University of California, Los Angeles

Nancy M. Hollingsworth

ACKNOWLEDGEMENT

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REFORMATTING:

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UNIVERSITY OF CALIFORNIA, LOS ANGELES

Oral History Interview Agreement No. R120902A

This Interview Agreement is made and entered into this 9 day of December, 2002 by and between THE REGENTS OF THE UNIVERSITY OF CALIFORNIA, a California corporation, on behalf of the Oral History Program at the UCLA campus, hereinafter called "University," and NANCY M. HOLLINGSWORTH, having an address at Department of Biochemistry and Cell Biology,, State University of New York at Stony Brook, 314 Life Sciences, Stony Brook, New York, 11794-5215, hereinafter called "Interviewee."

Interviewee agrees to participate in a series of University-conducted tape-recorded interviews, commencing on or about November 14, 2002, and tentatively entitled "Interview with Nancy M. Hollingsworth. This Agreement relates to any and all materials originating from the interviews, namely the tape recordings of the interviews and a written manuscript prepared from the tapes, hereinafter collectively called "the Work."

In consideration of the mutual covenants, conditions, and terms set forth below, the parties hereto hereby agree as follows:

1. Interviewee irrevocably assigns to University all her copyright, title and interest in and to the Work. This assignment applies to University, its successors, and assigns, for and during the existence of the copyright and all renewals and extensions thereof.

2. By virtue of this assignment, University will have the right to use the Work for any research, educational, or other purpose, including electronic reproduction, that University may deem appropriate.

3. Interviewee acknowledges that she will receive no remuneration or compensation for her participation in the interviews or for the rights assigned hereunder.

4. Interviewee will receive from University, free of charge, one bound copy of the typewritten manuscript of the interviews.

5. To insure against substantive error or misquotation, Interviewee will have the right to review the manuscript before it is put into final form. University therefore will send Interviewee a copy of the edited transcript for review and comment. Interviewee will return transcript and comments to University within 30 days of receipt of the transcript. In the event that Interviewee does not respond within 30 days, University will assume that Interviewee has given full approval of the transcript.

6. All notices and other official correspondence concerning this Agreement will be sent to the following:

If to University:

Oral History Program
University of California, Los Angeles
Box 951575
Los Angeles, California 90095-1575

Attention: Janice L. Reiff

If to Interviewee:

Nancy M. Hollingsworth
Department of Biochemistry
and Cell Biology
State University of New York
314 Life Sciences
Stony Brook, NY 11794-5215

University and Interviewee have executed this Agreement on the date first written above.

INTERVIEWEE

Nancy Hollingsworth
(Signature)

Nancy M. Hollingsworth
(Typed Name)

State University of New York
(Address)

314 Life Sciences

Stony Brook, NY 11794-5215

Date 11/11/02

THE REGENTS OF THE UNIVERSITY OF CALIFORNIA

Janice L. Reiff
(Signature)

Janice L. Reiff
(Typed Name)

Interim Director, Oral History Program
(Title)

Date 9 Dec 2002

Pew Scholars in the Biomedical Sciences

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I, Nancy M. Hollingsworth, Ph.D., hereby request that my wishes be followed as per the checked selection below with regards to posting portions of the digital copy of the audio-taped interview of me and the related written transcript on the internet for non-commercial, educational use only.

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This constitutes my entire and complete understanding.

Nancy Hollingsworth

Nancy M. Hollingsworth, Ph.D.

2/8/08

Date

Chemical Heritage Foundation
Oral History Program
315 Chestnut Street
Philadelphia, Pennsylvania 19106

NANCY M. HOLLINGSWORTH

1958 Born in San Francisco, California, on 2 July

Education

1980 B.S., Zoology, Oregon State University
1988 Ph.D., Genetics, University of Washington

Professional Experience

Fred Hutchinson Cancer Research Center, Seattle, Washington
1988-1989 Postdoctoral Fellow

University of California, San Francisco, California
1989-1994 Postdoctoral Fellow

State University of New York at Stony Brook, New York
1994-2000 Assistant Professor, Department of Biochemistry & Cell Biology
2000-present Associate Professor, Department of Biochemistry & Cell Biology

Honors

1978-1980 Oregon State Scholarship-Leadership Honoree
1979 C. Robert Herrick Jr. Memorial Scholarship
1980 B. S. with highest honors
1981 Jim Mountain Memorial Scholarship
1988-1991 Damon Runyon-Walter Winchell Cancer Fund Postdoctoral Fellowship
1991-1993 American Cancer Society Senior Postdoctoral Fellowship
1995-1997 March of Dimes Basil O'Connor Starter Scholar Research Award
1995 Ad hoc member of the NSF Microbial Genetics Study Section
1996-2000 Pew Scholars Program in the Biomedical Sciences
2000-2004 Member of the NIH Microbial Genetics and Physiology II Study Section
2002-present Member of the Pew Charitable Trust Sponsored Science and Society Institute

Selected Publications

Hollingsworth, N. M. and S. J. Brill. (2004) The Mus81 solution to resolution: Generating

meiotic crossovers without Holliday junctions. Genes Dev. 18: 117-125.
Wan, L., T. de los Santos, C. Zhang, K. Shokat, N. M. Hollingsworth (2004) Mek1 kinase activity functions downstream of *RED1* in the regulation of meiotic DSB repair in budding yeast. Mol. Biol. Cell 15: 11-23.
Hollingsworth, N. M. (2004). Homologous Recombination in Meiosis. In "Encyclopedia of Biological Chemistry" (William J. Lennarz and M. Daniel Lane, eds.) Elsevier, San Diego (in press).
de los Santos, T., N. Hunter, C. Lee, B. Larkin, J. Loidl, and N. M. Hollingsworth (2003). The Mus81/Mms4 endonuclease acts independently of double Holliday junction resolution to promote a distinct subset of crossovers during meiosis in budding yeast. Genetics 164: 8 1-94.
de los Santos, T., J. Loidl and N. M. Hollingsworth (2001) *MMS4* is required for a late step of meiotic recombination in *Saccharomyces cerevisiae.* Genetics 159: 1511- 1525.
Woltering, D., B. Baumgartner, S. Bagchi, B. Larkin, J. Loidl, T. de los Santos and N. M. Hollingsworth (2000) Meiotic segregation, synapsis and recombination checkpoint functions require physical interaction between the chromosomal proteins Red1p and Hop1p. Mol. Cell. Biol. 20: 6646-6658.
Suzuki, T., H. Park, N. M. Hollingsworth, R. Sternglanz, and W. J. Lennarz (2000). *PNG1,* a yeast gene encoding a highly conserved peptide:N-glycanase. J. Cell Biol. 149: 1039-1051.
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Kironmai, K. Mary, K. Muniyappa, D. B. Friedman, N. M. Hollingsworth and B. Byers (1998) DNA-binding properties of Hop1 protein, a synaptonemal complex component from *Saccharomyces cerevisiae.* Mol. Cell. Biol. 18: 1424-143 5.
Pochart, P., D. Woltering and N. M. Hollingsworth (1997) Conserved properties between functionally distinct MutS homologs in yeast. J. Biol. Chem. 272: 30345- 30349.
Hollingsworth, N. M. and L. Ponte (1997) Genetic interactions between *HOP1, RED1* and *MEK1* suggest that *MEK1* regulates assembly of axial element components during meiosis in the yeast, *Saccharomyces cerevisiae.* Genetics 147: 33-42.
Hollingsworth, N. M., L. Ponte and C. Halsey (1995) *MSH5,* a novel MutS homolog, facilitates meiotic reciprocal recombination between homologs in *Saccharomyces cerevisiae,* but not mismatch repair. Genes Dev. 9: 1728-1739.
Byers, B. and N. M. Hollingsworth (1994) DNA branching during meiotic recombination. Current Biology 4: 448-451.
Friedman, D. B., N. M. Hollingsworth and B. Byers (1994) Insertional mutations in the yeast *HOP1* gene: Evidence for multimeric assembly in meiosis. Genetics 136: 449-464.
Hollingsworth, N. M. and A. D. Johnson (1993) A conditional allele of the yeast *HOP1* gene is suppressed by overexpression of two other meiosis-specific genes: *RED1* and *REC104.* Genetics 133: 785-797.
Vershon, A. K., N. M. Hollingsworth and A. D. Johnson (1992) Meiotic induction of the yeast *HOP1* gene is controlled by positive and negative regulatory elements. Mol. Cell. Biol. 12: 3706-3714.
Hollingsworth, N. M., and L. Goetsch and B. Byers (1990) The *HOP1* gene encodes a meiosis-

specific component of yeast chromosomes. Cell 61: 73-84.
Hollingsworth, N. M. and B. Byers (1989) *HOP1:* a yeast meiotic pairing gene. Genetics 121: 445-462.
Dawson, P. S. and N. M. Hollingsworth (1982) Sex linkage of the glucose-6- phosphate dehydrogenase locus in the flour beetle *Tribolium castaneum.* Can. J. Genet. Cytol. 24: 267-271.

ABSTRACT

Nancy M. Hollingsworth was born in San Francisco, California, but spent most of her youth moving around—to Oregon, Panama, New Mexico, California, and, finally, Arizona—with her parents and older brother. Her father was a psychiatrist (and the reason for the travel); her mother was a trained dietitian who chose not to work while her children were growing up. Hollingsworth enjoyed school from a young age, a precocious child who loved reading, schoolwork (she would also play "school" when at home), playing cards with her family, nature, and music. In high school she had a great interest in literature, mathematics, and history, though did think about pursuing zoology as a major in college.

Hollingsworth matriculated at Oregon State University and felt fortunate to have Peter Dawson as her advisor and mentor—Dawson was a population geneticist who worked on the flour beetle, *Tribolium castaneum* and *Tribolium confusum*, and who also taught the undergraduate genetics class. Though maintaining an interest in history and literature, Hollingsworth began working in Dawson's lab very early on in her undergraduate career, doing crosses and measuring map distances between some genes in *Tribolium*. She completed her degree in zoology, moving on to a master's degree at Oregon State. She participated in a summer course at the Marine Biological Laboratory in Woods Hole, Massachusetts, working under the tutelage of Lynna Hereford and Mary Anne Osley and solidifying her decision to attend the University of Washington for doctoral studies (instead of one of the three Ivy league schools that accepted her). At the University of Washington, Hollingsworth chose to work in the lab of Breck E. Byers, studying meiosis in yeast, ultimately developing a mutant screen for yeast recombination proteins and subsequently identifying the *HOP1* mutant; she also had the opportunity to meet Leland H. Hartwell, with whom she also worked. From there she moved on to postdoctoral research in Gerald R. Smith's laboratory at the Fred Hutchinson Cancer Research Center, studying *Schizosaccharomyces pombe* recombination, at which point she also met her future husband, Aaron Neiman. She transferred to the University of California, San Francisco to work with Alexander D. Johnson on *Hop1* biochemistry and *HOP1* alleles. She then accepted a position at the State University of New York, Stony Brook, and began her research on the recombinant promoter gene *MSH5* in yeast and on the roles of the *Mms4*/*Mus81*complex and of *Mek1* in recombination.

The remainder of the interview focuses on the topics of Hollingworth's lab, her mentoring style, and her thoughts on contemporary issues in science and its practice. She talks about the impact of the Pew Scholars Program in the Biomedical Sciences on her work; her teaching duties; how she chooses her research projects; and how she balances family (she has three children) and career. The interview ends with her thoughts on collaboration and competition in research; the national scientific agenda the role of scientists in informing the public and determining public policy; gender issues; and more on the influence of Lynna Hereford and Mary Ann Osley on her career.

UCLA INTERVIEW HISTORY

INTERVIEWER:

William Van Benschoten, Interviewer, UCLA Oral History Program. B.A., History, University of California, Riverside; M.A., History, University of California, Riverside; C. Phil., History, UCLA

TIME AND SETTING OF INTERVIEW:

Place: Hollingsworth's office, State University of New York at Stony Brook.

Dates, length of sessions: November 11, 2002; November 12, 2002; and November 13, 2002

Total number of recorded hours: 5.5

Persons present during interview: Hollingsworth and Van Benschoten.

CONDUCT OF INTERVIEW:

This interview is one in a series with Pew Scholars in the Biomedical Sciences conducted by the UCLA Oral History Program in conjunction with the Pew Charitable Trusts' Pew Scholars in the Biomedical Sciences Oral History and Archives Project. The project has been designed to document the backgrounds, education, and research of biomedical scientists awarded four-year Pew scholarships since 1988.

To provide an overall framework for project interviews, the director of the UCLA Oral History Program and three UCLA faculty project consultants developed a topic outline. In preparing for this interview, Van Benschoten held a telephone preinterview conversation with Nancy Hollingsworth to obtain written background information (curriculum vitae, copies of published articles, etc.) and agree on an interviewing schedule. He also reviewed prior Pew scholars interviews and the documentation in Hollingsworth's file at the Pew Scholars Program office in San Francisco, including the proposal application, letters of recommendation, and reviews by Pew Scholars Program national advisory committee members.

ORIGINAL EDITING:

Carol L. Squires edited the interview. She checked the verbatim transcript of the interview against the original tape recordings, edited the punctuation, paragraphing, and spelling, and verified proper names. Words and phrases inserted by the editor have been bracketed.

Nancy Hollingsworth reviewed the transcript. She verified proper names and made a number of corrections and additions.

Carol L. Squires prepared the table of contents. Victoria Simmons compiled the

interview history. TechniType Transcriptions compiled the index.

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